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Effectiveness of health warning labels on alcoholic beverages



A systematic review with a narrative analysis for Austria

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List of abbreviations

ACPI..... Alcohol Control Policy Index
AOR..... Adjusted Odds Ratio
APC ..... Alcohol per-capita consumption
AUD ..... Alcohol Use Disorder
CAMELOT ..... Cochrane Qualitative Methodological Limitations Tool
EU ..... European Union
FF ..... Forschungsfrage
GRADE..... Grading of Recommendations Assessment, Development and Evaluation
GÖG ..... Gesundheit Österreich GmbH
HWL ..... Health Warning Label
ICD-11 ..... International Classification of Diseases, 11th Revision
INAHTA ..... International HTA Database
MeSH ..... Medical Subject Heading
OIS ..... Optimal Information Size
OR ..... Odds Ratio
PICOS ..... Population, Intervention, Control, Outcome, Study design
pp..... Percentage Points
RD ..... Risk Difference
ROBIS ..... Risk Of Bias In Systematic Reviews
RoB2..... Cochrane Risk of Bias Tool for Randomised Trials version 2
RR ..... Risk Ratio
RQ ..... Research question
SD..... Standard Deviation
SE ..... Standard Error
SR ..... Systematic Review
WHO ..... World Health Organization
WHO IRIS ..... World Health Organization Institutional Repository for Information Sharing

Executive Summary

Introduction

Alcohol is a toxic and psychoactive substance and a leading modifiable risk factor for numerous health consequences, including several cancers. Moreover, it causes a substantial societal and economic burden. Health warning labels (HWLs) on alcoholic beverages are discussed internationally as a low-threshold measure to inform consumers about alcohol-related health risks. Despite growing international recommendations, HWLs remain rare worldwide. In addition, evidence on their effectiveness, especially in the Austrian context, is limited.

Research aims

This report aimed (i) to identify the HWL designs described in the literature, (ii) to assess the effectiveness of HWL compared with no HWL and with one another regarding health-related and economic outcomes in the general population, and (iii) to derive an evidence-based contextualisation for Austria.

Methods

A systematic literature search for systematic reviews (SR) and primary studies was conducted in the following databases: the Cochrane Library, Embase, Medline (Ovid), HTA-INAHTA and PsycINFO (EBSCO) to address the report aims (i) and (ii). The SR included publications available from January 2016 to February 2026 in English and German. The outcomes of interest were health risk perception associated with alcohol consumption, shift in behaviour regarding alcohol consumption, intentions to change alcohol consumption, attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes. The methodology included independent literature selection, double-checked data extraction and qualitative assessment using RoB 2 (experimental studies) and CAMELOT (qualitative study) and the certainty of evidence was rated using the GRADE approach. The Austrian contextualisation was based on the WHO-INTEGRATE Evidence-to-Decision Framework, with findings from the conducted SR serving as the primary evidence base.

Results

Ten primary studies (nine randomised experimental studies and one qualitative study) were included. Four types of HWLs were identified: text-only, text-and-pictogram, text-and-image and image-only. HWLs communicating cancer risk were most consistently associated with higher health risk perception, a shift in alcohol consumption behaviour and intentions to change alcohol consumption. For risk perception and intentions to change, HWL types did not differ from each other regarding their effectiveness. Concerning the outcome shift in behaviour, an image-only HWL (large picture of a diseased bowel) was considered as the most effective HWL type, followed by a text-and-image (picture of a diseased bowel and written cancer warning) and a text-only (written cancer warning) HWL. The evidence therefore is based on one study. No eligible evidence was identified for the pre-defined outcomes incidence of alcohol-related diseases, attitudes and beliefs or for economic outcomes. Risk of bias was high across the outcomes health risk perception and intention to change, mainly due to self-reported and unblinded outcome measurement and low to moderate for the outcome shift in behaviour. The overall certainty of evidence was moderate for risk perception and for shift in behaviour regarding alcohol consumption. Contextualisation using the WHO-INTEGRATE framework suggests that HWLs may be a favourable, feasible, and low-intrusiveness intervention for Austria as part of a broader alcohol policy approach. These findings are mostly based on evidence from this systematic review and WHO reports, which is limited by the predominance of experimental studies with mostly single-exposure designs.

Conclusion

The available evidence indicates that HWLs, particularly addressing cancer risk, may strengthen consumers' health risk perception, may shift consumption behaviour and may increase intentions to change alcohol consumption. Robust real-world and long-term evidence is still lacking. For Austria, introducing HWLs as one component of a broader alcohol policy appears justifiable, but should be considered critically and not as a stand-alone intervention, given the limitations of the currently available evidence.

Zusammenfassung

Hintergrund und Ziele

Alkoholkonsum und alkoholassoziierte Gesundheitsfolgen

Alkohol ist eine toxische und psychoaktive Substanz. Die gesundheitlichen Risiken eines erhöhten Alkoholkonsums sind vielfältig und manifestieren sich zum Teil erst im Laufe des Lebens. Es besteht Evidenz für einen Zusammenhang zwischen Alkoholkonsum und einigen Erkrankungen, u. a. Krebserkrankungen (Einstufung als Gruppe-1-Karzinogen), Erkrankungen des Nerven-, Kreislauf- und Verdauungssystems, psychischen Störungen sowie Unfällen und Gewalt. Weltweit wurden 2019 rund 2,6 Millionen und in der WHO-Region Europa rund 800.000 Todesfälle mit Alkoholkonsum in Zusammenhang gebracht. Im Jahr 2023 waren in Österreich 681 von 89.760 Todesfällen alkoholassoziiert. 15 % der österreichischen Bevölkerung weisen laut der Repräsentativerhebung 2020 einen problematischen Alkoholkonsum auf (Männer 18 %, Frauen 11 %). Außerdem zählt Österreich mit einem jährlichen Pro-Kopf-Konsum von 11,6 Litern reinem Alkohol (2023, 15+ Jährige) zu den Ländern mit dem höchsten Alkoholkonsum in der WHO-Region Europa. Die österreichische Alkoholpolitik verfolgt im internationalen Vergleich einen eher problem- als bevölkerungsorientierten Ansatz.

Gesundheitsbezogene Warnhinweise

Das Ziel der WHO ist es, den schädlichen Alkoholkonsum weltweit bis 2030 um zehn Prozent zu reduzieren. Als eine von mehreren Maßnahmen dafür empfiehlt die WHO die Einführung von Warnhinweisen oder Kennzeichnungspflichten, einschließlich gesundheitsbezogener Warnhinweise (englisch: health warning labels, HWLs) auf alkoholischen Getränken. Ziel ist es, Konsument:innen dadurch verständliche Informationen über Alkoholgehalt, Inhaltsstoffe sowie Gesundheitsrisiken zugänglich zu machen. HWLs sind auf dem Produkt oder dessen Verpackung angebrachte Risikokommunikationsinstrumente, die über gesundheitliche und teilweise soziale Folgen des Alkoholkonsums informieren. HWLs können sowohl dem Verbraucher:innenschutz (Recht auf Information über Produktinhalt und Gesundheitsrisiken) als auch als Public-Health-Instrument zur Beeinflussung des Kaufverhaltens und zur Risikobewusstseinsbildung dienen. Da keine standardisierte internationale Regulierung besteht, unterscheiden sich HWLs erheblich in Inhalt (z. B. Warnungen vor Krebs, Lebererkrankungen, Herzerkrankungen, Risiken in der Schwangerschaft, Trunkenheit am Steuer, Jugendschutz) und Gestaltung (bild- oder textbasiert). In der WHO-Region Europa haben aktuell 15 Länder (davon vier EU-Mitgliedstaaten: Deutschland, Frankreich, Irland, Litauen) verpflichtende Warnhinweise auf alkoholischen Getränken eingeführt. Diese sind überwiegend in Textform vorgeschrieben. Irland führt als erstes EU-Land einen verpflichtenden Krebswarnhinweis ein, dessen Inkrafttreten jedoch nach Einflussnahme der Alkoholindustrie von 2026 auf 2028 verschoben wurde. In Österreich existieren bislang keine nationalen Verpflichtungen zu HWLs auf alkoholischen Getränken.

Ziel des Berichts

Das Ziel dieses Berichts ist es, (i) die in der Literatur beschriebenen Gestaltungsformen von HWLs auf alkoholischen Getränken zu identifizieren, (ii) die Wirksamkeit von HWLs im Vergleich zu keinem HWL und untereinander hinsichtlich gesundheitsrelevanter und ökonomischer Endpunkte in der Allgemeinbevölkerung zu bewerten und (iii) die Ergebnisse in den österreichischen Kontext zu übertragen.

Methoden

Der vorliegende Bericht umfasst eine systematische Übersichtsarbeit (Englisch: systematic review/SR) mit narrativer Synthese sowie eine anschließende Kontextualisierung der Ergebnisse für Österreich. Es wurde eine systematische Literatursuche in fünf Datenbanken (The Cochrane Library, Embase, Medline via Ovid, International HTA Database, PsycINFO via EBSCO) durchgeführt und auf den Zeitraum von Jänner 2016 bis Februar 2026 sowie auf englisch- und deutschsprachige Publikationen eingeschränkt. Insgesamt wurden 1.353 Referenzen von zwei unabhängigen Reviewerinnen in einem zweistufigen Verfahren gescreent.

Die Datenextraktion erfolgte durch eine Person mit Verifikation durch eine zweite Person. Die Bewertung der Vertrauenswürdigkeit der randomisierten Studien erfolgte mittels Cochrane Risk of Bias Tools Version 2, jene der qualitativen Studie mittels CAMELOT. Die Vertrauenswürdigkeit der Evidenz wurde für die kritischen Endpunkte nach dem GRADE-Schema bewertet. Zur Kontextualisierung für Österreich wurde das WHO-INTEGRATE Evidence-to-Decision Framework angewandt. Die Ergebnisse des durchgeführten SR dienten als Datengrundlage und wurden mittels Handsuche durch WHO-Berichte sowie österreichische Daten ergänzt.

Ergebnisse

Insgesamt wurden zehn Primärstudien in die Evidenzsynthese des SR eingeschlossen: neun randomisierte experimentelle Studien mit insgesamt 37.031 Teilnehmenden sowie eine qualitative Studie mit 50 Teilnehmer:innen. Sechs Studien wurden in Großbritannien und jeweils eine Studie in 14 europäischen Ländern (inklusive Österreich), sowie in der deutschsprachigen Schweiz, in Chile und in Australien durchgeführt. Die Teilnehmer:innen waren aktive Alkoholkonsument:innen im gesetzlichen Mindestalter. Vier Studien schlossen ausschließlich junge Erwachsene bzw. Studierende (18–35 Jahre) ein. Die Exposition gegenüber dem HWL erfolgte überwiegend einmalig und ausschließlich in einem experimentellen Setting, real oder online auf einem alkoholischen Getränk. Den Kontrollgruppen wurde ausschließlich das Originaletikett ohne HWL gezeigt.

Ergebnisse HWL-Gestaltung

In den zehn eingeschlossenen Studien wurden vier HWL-Typen identifiziert:

- rein textbasiert
- text- und piktogrammbasiert
- text- und bildbasiert
- rein bildbasiert

Die Gestaltung der HWL unterscheidet sich nicht nur im Typ, sondern auch im vermittelten Inhalt. Jede der zehn Studien beinhaltete zumindest einen Krebswarnhinweis; weitere Inhalte betrafen

- Leber- und Herzerkrankungen
- Hirnblutungen
- Gewichtszunahme
- Risiken in der Schwangerschaft und Stillzeit
- Trunkenheit am Steuer
- Jugendschutz
- verantwortungsvoller Alkoholkonsum

Die Schrift aller HWLs war schwarz und von einem schwarzen, gelb-orangen oder roten Rahmen umgeben. Bildbasierte HWLs zeigten Bilder erkrankter Organe oder Personen sowie Bilder eines Computertomografen. Piktogrammbasierte HWLs zeigten Warnsymbole oder verdeutlichten den Warnhinweis (z.B. Schwangerschaft oder Trunkenheit am Steuer) in Form eines Piktogramms.

Ergebnisse HWL-Wirksamkeit

Die Ergebnisse der Wirksamkeit von HWLs wurden nach den Vergleichsgruppen (HWL versus kein HWL und HWL versus HWL) analysiert. Die folgenden Endpunkte wurden hinsichtlich der Wirksamkeit von HWLs auf alkoholischen Getränken bewertet. Die Vertrauenswürdigkeit der Evidenz (Englisch: Certainty of Evidence, CoE) für die kritischen Endpunkte wurde als moderat eingestuft.

HWL versus kein HWL

- **Wahrnehmung von Gesundheitsrisiken aufgrund von Alkoholkonsum** (6 randomisierte experimentelle Studien, n=29.610, moderate CoE): Krebswarnungen waren der einzige Inhalt, der im Vergleich zu keinem HWL konsistent mit einem sehr großen Effekt auf die erhöhte Wahrnehmung der mit Alkoholkonsum verbundenen Gesundheitsrisiken assoziiert war.
- **Veränderung des Konsumverhaltens** (5 randomisierte experimentelle Studien, n=15.091, moderate CoE): Krebswarnungen waren der einzige Inhalt, der im Vergleich zu keinem HWL

konsistent mit einer Verhaltensänderung in Bezug auf den Alkoholkonsum verbunden war, wobei die Effekte von klein bis sehr groß reichten.

- **Veränderung der Konsumintention** (3 randomisierte experimentelle Studien, n=9.178, CoE nicht bewertet, da der Endpunkt als wichtig, aber nicht relevant eingestuft wurde): Mehrere HWL-Inhalte, darunter Warnungen von Krebs, Lebererkrankungen und allgemeinen Gesundheitsrisiken, waren im Vergleich zu keinem HWL konsistent mit einer statistisch signifikanten Intentionsänderung des Alkoholkonsums verbunden, welche bis zu sehr großen Effekten reichte.
- **Einstellungen und Glaubensansätze zum Alkoholkonsum, Inzidenz alkoholassoziierter Erkrankungen, ökonomische Endpunkte:** Für diese Endpunkte wurden in den eingeschlossenen Studien keine Ergebnisse gefunden.

HWL versus HWL:

Insgesamt haben sechs der inkludierten randomisierten experimentellen Studien zusätzlich Vergleiche zwischen den verschiedenen HWL-Typen durchgeführt. Mit moderater Vertrauenswürdigkeit zeigten rein bildbasierte HWLs den größten Effekt hinsichtlich Veränderung des Konsumverhaltens, gefolgt von text- und bildbasierten sowie rein textbasierten HWLs. Die Evidenz zum HWL-Vergleich dieses Endpunktes beruht jedoch auf einer Einzelstudie und ist lediglich ein Näherungsindikator für den tatsächlichen Alkoholkonsum. Daher wird keine anhaltende Veränderung des Alkoholkonsumverhaltens belegt. Für die Wahrnehmung von Gesundheitsrisiken und die Veränderung der Konsumintention zeigten sich hingegen keine statistisch signifikanten Unterschiede zwischen den HWL-Typen. Auch diese Ergebnisse beruhen überwiegend auf Einzelstudien, und der Endpunkt Wahrnehmung von Gesundheitsrisiken aufgrund von Alkoholkonsum wurde mit moderater Vertrauenswürdigkeit bewertet, da die inkludierten Studien ein hohes Verzerrungsrisiko aufweisen.

Ergänzend wurde eine qualitative Studie einbezogen, in welcher verschiedene text- und bildbasierte HWLs diskutiert wurden. Spezifische Warnhinweise, insbesondere zu Krebs und Lebererkrankungen, sowie eindeutig dargestellte Bilder alkoholbedingter Gesundheitsschäden wurden als informativer und wirkungsvoller wahrgenommen als allgemeine oder mehrdeutige Warnhinweise.

Kontextualisierung für Österreich

Die Bewertung anhand des WHO-INTEGRATE Evidence-to-Decision Frameworks zeigt, dass eine Umsetzung von HWLs in Österreich möglich ist. Hinsichtlich der **Gesundheitswirkungen** erhöhen sie wahrscheinlich die Wahrnehmung alkoholbedingter Gesundheitsrisiken sowie die Intention und das Verhalten, den Alkoholkonsum zu reduzieren. In Bezug auf **gesellschaftliche Auswirkungen** können HWLs die gesellschaftliche Akzeptanz des Alkoholkonsums abschwächen und langfristig zur Verringerung gesellschaftlicher und wirtschaftlicher Belastungen durch alkoholbedingte Folgeschäden beitragen. Aus **menschenrechtlicher Perspektive sowie hinsichtlich soziokultureller Akzeptanz** unterstützen HWLs das Recht auf Gesundheitsinformation und greifen nicht in die individuelle Autonomie der Menschen ein. Rund die Hälfte der österreichischen Bevölkerung (52%) schätzt sie außerdem als wirksame Maßnahme zur Reduktion alkoholbedingter gesundheitlicher Folgen ein. In der Alkoholindustrie stoßen sie hingegen auf geringe Akzeptanz. Hinsichtlich der **gesundheitlichen Chancengleichheit** sind HWLs voraussichtlich für alle Bevölkerungsgruppen zugänglich und dürften gesundheitliche Ungleichheiten nicht verstärken. Einschränkungen bezüglich der Anwendbarkeit bestehen jedoch in der Gastronomie, da dort alkoholische Getränke oftmals direkt im Glas und nicht in der Flasche serviert werden, sowie für Menschen mit geringen oder keinen Deutschkenntnissen, mit niedriger Gesundheitskompetenz oder mit Sehbeeinträchtigungen. Zu **Kosten-, Budget- und Umweltauswirkungen** liegt bislang keine ausreichende Evidenz vor. HWLs gelten jedoch als kostengünstige Ergänzung bestehender alkoholpolitischer Maßnahmen. Im Hinblick auf die **Machbarkeit und gesundheitssystembezogene Aspekte** sind HWLs rechtlich umsetzbar, mit dem österreichischen Gesundheitssystem vereinbar und erfordern nur geringe zusätzliche Ressourcen. Insgesamt sollten HWLs nicht als alleinstehende Maßnahme, sondern als kostengünstiger Bestandteil eines umfassenden, kombinierten alkoholpolitischen Maßnahmenpakets betrachtet werden.

Diskussion

Die verfügbare Evidenz deutet darauf hin, dass HWLs, insbesondere Warnhinweise zum Krebsrisiko, die Wahrnehmung von Gesundheitsrisiken aufgrund des Alkoholkonsums stärken, das Konsumverhalten verändern und die Intention, den Alkoholkonsum zu reduzieren, erhöhen können.

Die Ergebnisse dieses Berichts sind allerdings aufgrund mehrerer methodischer Einschränkungen mit Vorsicht zu interpretieren. Die interne Validität ist eingeschränkt, da eine Verblindung der Teilnehmenden gegenüber der HWL-Exposition strukturell nicht möglich war und die Endpunkte zur Wahrnehmung von Gesundheitsrisiken aufgrund von Alkoholkonsum sowie Veränderung der Konsumintention ausschließlich selbstberichtet und unmittelbar nach der Exposition erhoben wurden.

Die externe Validität ist limitiert, da keine der eingeschlossenen Studien ausschließlich in Österreich durchgeführt wurde; nur eine Studie schloss österreichische Teilnehmende im Rahmen einer größeren europäischen Stichprobe ein, wobei sich die untersuchten Länder in Trinkkultur, Konsumniveau und Alkoholpolitik von Österreich unterscheiden. Entscheidender als die Übertragbarkeit der in anderen Ländern beobachteten Effekte auf Österreich ist die Frage, ob überhaupt reale Effekte unter natürlichen Alltagsbedingungen auftreten und ob diese zu anhaltenden Verhaltensänderungen führen, da sämtliche Studien in experimentellen Settings (Einkaufslabor, Online-Shop, Online-Umfrage, Universitätsumgebung) durchgeführt wurden. Studien zu real implementierten Kennzeichnungsmaßnahmen wurden aufgrund der strikten Einschlusskriterien nicht inkludiert, und die Wirkung wurde nahezu ausschließlich unmittelbar nach einmaliger Etikettenexposition gemessen. Erkenntnisse zur Größe, Dauerhaftigkeit und praktischen Relevanz der beobachteten Effekte von HWLs sowie zu deren langfristiger Wirkung fehlen in diesem Zusammenhang vollständig. Die angenommene Wirksamkeit basiert daher vor allem auf Plausibilitätsüberlegungen.

Die Ergebnisse dieses Berichts stehen im Einklang mit drei vorangegangenen systematischen Übersichtsarbeiten, erweitern die bestehende Evidenz jedoch um einen systematischen Vergleich der HWL-Typen untereinander, eine getrennte Betrachtung von Intentions- und tatsächlicher Verhaltensänderung sowie erstmals um eine länderspezifische Kontextualisierung für Österreich.

Schlussfolgerung

Angesichts der permissiven Trinkkultur in Österreich, eines der höchsten Pro-Kopf-Konsumniveaus innerhalb der WHO-Region Europa, sowie der geringen Kenntnis des Zusammenhangs zwischen Alkohol und Krebs, könnten insbesondere krebsspezifische HWLs geeignet sein, um Wissen und Risikowahrnehmung in der Bevölkerung zu erhöhen. Grundsätzlich können HWLs dabei nicht als Einzelmaßnahme, sondern als unterstützendes und niederschwelliges Element innerhalb einer umfassenden Alkoholpolitik betrachtet werden.

Aufgrund der dargestellten Limitationen der verfügbaren Evidenz, insbesondere der ausschließlich experimentellen Evidenzbasis, der moderaten Vertrauenswürdigkeit hinsichtlich Gesundheitsrisikowahrnehmung und der Veränderung des Konsumverhaltens sowie der überwiegend auf Einzelstudien beruhenden Vergleiche zwischen HWL-Typen und des Fehlens österreichspezifischer, realer und Langzeitstudien, kann jedoch keine unmittelbare Umsetzungsempfehlung für Österreich abgeleitet werden.

1 Background

1.1 Alcohol consumption, alcohol-related health conditions, and countermeasures

Alkohol: toxische & psychoaktive Substanz; Abhängigkeitspotenzial

Alcohol (ethanol) is a toxic and psychoactive substance produced through the fermentation of sugars and is present in a wide range of beverages. Due to its small molecular size, ethanol is distributed throughout the body after ingestion and works as a central nervous system depressant. The effects of ethanol on the human body arise from its toxic impact on cells in multiple organs and tissues, intoxication resulting in impaired physical coordination, consciousness, cognition, perception, affect or behaviour and its potential to induce dependence [2, 3].

Alkohol: Gruppe-1-Karzinogen; assoziiert mit Organerkrankungen, Krebs, Unfällen & psychischen Störungen

Österreich: 15% der Bevölkerung mit problematischem Alkoholkonsum (2020)

Alcohol consumption is associated with various health consequences resulting in organ system diseases, cancer, accidents and violence due to intoxication, as well as mental and neurocognitive disorders [2]. The International Agency for Research on Cancer classified alcohol as a Group 1 carcinogen for humans [4]. In the 11th revision of the International Classification of Diseases (ICD-11), the World Health Organisation (WHO) lists alcohol-related health conditions within the category "Disorders due to Substance Use or Addictive Behaviours" [2]. The global prevalence of alcohol use disorder (AUD) was estimated at seven per cent among individuals aged 15 years and older in 2019. Across all WHO regions, the European Region had the highest prevalence of AUD, with 10.7% among individuals aged 15 years and older in 2019 [5]. In 2020, a nationwide representative survey on substance use conducted in Austria indicated that 15% of respondents engage in problematic alcohol consumption (>40g pure alcohol per day for women, >60g pure alcohol per day for men). The prevalence of this consumption pattern is higher among men (18%) than women (11%) [6].

Europa-Region: höchster Alkoholkonsum weltweit (9,1 Liter/Jahr, Ø 2020–2022)

Österreich: 11,6 L/Jahr (Männer 17,6 L, Frauen 6,9 L, 2023)

In 2022, the worldwide alcohol per capita consumption per year (APC) reached five litres of pure alcohol for the general population aged 15 years and older. Across the six WHO geographical regions, the European Region has the highest APC of 9.1 litres of pure alcohol per year, based on a three-year average from 2020-2022, followed by the Region of the Americas[1] (APC: eight litres of pure alcohol per year). The Eastern Mediterranean Region presented the lowest APC with 0.2 litres of pure alcohol per year [7, 8]. Austria is one of the countries with the highest APC across the European Region, reaching 11.6 litres of pure alcohol for the general population aged 15 years and older in 2023 [9]. Worldwide and across all WHO regions, the APC is significantly higher in men than in women. In 2019, males in the European Region had an APC of 14.9 litres of pure alcohol per year, compared with four litres for women [5]. The same pattern was observed in Austria (men: 17.6 litres of pure alcohol per year; women: 6.9 litres of pure alcohol per year) [9].

[1] North, Central, and South America, as well as the Caribbean

1.1.1 Alcohol as a risk factor for health

WHO: kein sicherer Alkoholkonsum

Rauschtrinken: schädlichstes Trinkmuster; Österreich 34,6% betroffen (2020)

The World Health Statistics Report 2025 describes alcohol as a behavioural risk factor for health, associated with more than 200 disease and injury conditions [7]. The WHO stated that there is no safe level of alcohol consumption, as one drink per day can measurably raise the risk of alcohol-related health consequences, especially for cancer [10]. The WHO defines heavy episodic ('binge') drinking as the consumption of ≥60 g of pure alcohol on a single occasion in the past 30 days. Binge-drinking is the most acutely harmful drinking pattern [5]. According to this definition, binge-drinking was most common in the WHO European and Americas regions, affecting 6.6% and 5.5% of the general population aged 15 years and older in 2019 [5]. In Austria, 34.6% of the general population aged 15 years and older engaged in binge-drinking in 2020, according to the WHO definition [8]. Although it needs to be addressed, that binge-drinking has no universally accepted definition and is used inconsistently in the literature and public discourse. Traditionally, the term referred to prolonged episodes of heavy drinking over several days that disrupt normal daily functioning but should not be equated with intentional extreme intoxication [11].

diverse alkoholassoziierte Gesundheitsfolgen

The health risks associated with alcohol consumption are diverse and, in some cases, may manifest only later in life. Health consequences causally related to alcohol consumption include [5]:

- communicable, maternal, perinatal and nutritional conditions (e.g. tuberculosis and sexually transmitted diseases)
- noncommunicable diseases (e.g. several types of cancers, cardiovascular disease and organ damage)
- unintentional injuries (e.g. road traffic accidents)
- intentional injuries (e.g. suicides)

ICD-11: Alkohol als primäre Ursache für Erkrankungen des Nerven-, Kreislauf- & Verdauungssystems, psychische Störungen & perinatale Schäden

These health consequences can be divided into those that are entirely attributable to alcohol consumption and those for which alcohol consumption acts as a contributing risk factor [5]. The ICD-11 lists health consequences for which alcohol is the primary cause and an essential precondition for their occurrence, as follows [2, 5]:

- diseases of the nervous, circulatory and digestive system
- mental, behavioural and neurodevelopmental disorders
- conditions originating in the perinatal period and developmental anomalies
- alcohol poisoning as an external cause of morbidity or mortality

Alkohol erhöht Krebsrisiko

Alcohol-associated cancers warrant particular attention. Especially in the Western World, alcohol consumption is associated with an increased risk of developing several types of cancer, including mouth and oropharynx, oesophagus, colon and rectal, liver, breast, cervix uteri, and larynx cancer [12, 13].

2,6 Mio. alkoholassoziierte Todesfälle weltweit (2019)

In 2019, an estimated 2.6 million deaths worldwide were attributable to alcohol consumption, relating to [5]:

- 284,000 deaths from communicable diseases (maternal, perinatal and nutritional conditions)
- 1.6 million deaths from noncommunicable diseases (including 401,000 cancer-related deaths)
- 724,000 deaths from injuries

~800.000 alkoholassoziierte Todesfälle/Jahr in Europa (2019)

For the WHO European Region, 42% of all homicides, 37% of suicides and 35% of road deaths were associated with alcohol consumption in 2019. In total, alcohol consumption causes an estimated 800,000 deaths yearly in Europe, based on data from 2019 [14].

681 alkohol-assoziierte Todesfälle/Jahr in Österreich (2023)

In 2023, out of 89,760 deaths in total, the following numbers of deaths were associated with alcohol consumption in Austria [9]:

- Alcohol psychosis: 97
- Alcohol dependence: 552
- Alcohol misuse: 1
- Alcohol intoxication: 31

Exact numbers for other alcohol-associated deaths, such as those from liver disease and cancer, remain unclear in Austria. This is partly because of the form of record in the Austrian mortality statistics. Only the underlying cause of death is recorded, while alcohol may contribute to the development of other diseases without being recorded as the underlying cause. Consequently, the contribution of alcohol to deaths from conditions such as liver disease and cancer may be underestimated [9].

1.1.2 Societal and economic consequences of alcohol consumption

Alkohol: individuelle & gesellschaftliche Folgen; nehmen mit Konsumniveau zu

Alcohol consumption leads to wide-ranging consequences on the personal and societal level. For individuals, especially problematic drinking patterns can destabilise relationships with family and friends, lead to job loss, contribute to criminal behaviour or result in homelessness or social isolation. These consequences affect not only the drinkers themselves but also their social environment, for example, family members experience reduced quality of life, and colleagues are burdened with covering for absent coworkers. Alcohol also plays an important role in violence and criminal behaviour, especially when it comes to domestic abuse and child maltreatment, with severity usually increasing with consumption level [3].

Alkohol verursacht direkte & indirekte gesellschaftliche Kosten

tatsächliche Kosten vermutlich unterschätzt: nicht-monetäre Folgen schwer quantifizierbar

At the societal level, the costs caused by alcohol consumption are substantial and multifaceted [15]. A systematic review, primarily including high-income countries in Europe and North America, found that the mean societal costs of alcohol consumption amounted to approximately 818 international dollars[2] per adult, equivalent to 2.6% of gross domestic product. About 39% of total costs were attributable to direct costs, which reflect utilisation of resources (e.g., healthcare and criminal justice systems, traffic accidents), with healthcare accounting for almost half of these direct costs. Indirect costs accounted for 61% of total costs, reflecting productivity losses primarily due to workplace absence, impaired work performance, and premature mortality [17]. These calculations typically underestimate the true costs, as non-monetary costs, such as the consequences experienced by drinkers' families, remain difficult to quantify [12]. However, the interpretation of costs caused by substance abuse, particularly productivity losses due to premature mortality, remains methodologically debated. As these estimates are mostly based on hypothetical losses in economic productivity, they may overstate the societal

[2] An international dollar would buy in the cited country a comparable amount of goods and services a U.S. dollar would buy in the United States [16]

burden, as they generally do not account for offsetting effects, such as reduced lifetime consumption and healthcare expenditures following premature death [18].

1.1.3 Measures to reduce alcohol consumption

WHO-Globalplan 2022–2030: Maßnahmen zur Reduktion alkoholbedingter Schäden

The Global Action Plan 2022-2030, published by the WHO, sets a target of a 20% relative reduction in the harmful use of alcohol by 2030, relative to 2010 baseline data [15]. To achieve this goal, the following six key actions are recommended for WHO Member States, the WHO Secretariat, national and international partners and other relevant stakeholders [15]:

- implementation of high-impact strategies and interventions
- advocacy, awareness and commitment
- partnership, dialogue and coordination
- technical support and capacity-building
- knowledge production and information systems
- resource mobilisation

WHO evidenzbasierte Interventionen zur Pro-Kopf-Alkoholkonsumreduktion (APC)

Various strategies and approaches are available to reduce the APC. To summarise the available evidence, the WHO developed the Alcohol Policy Playbook [14], which outlines evidence-based information for interventions aiming to reduce alcohol consumption through:

- alcohol pricing and taxation policies
- alcohol availability policies
- alcohol marketing policies
- alcohol labelling policies
- drink-driving interventions
- no- and low-alcohol products

striktere Alkoholpolitik assoziiert mit niedrigerem APC

In general, stricter alcohol control policies were associated with a lower APC, based on findings from the Alcohol Control Policy Index (ACPI). This index was developed by Madureira-Lima and Galea (2018) [19] based on WHO data from 2012, to compare the strength of alcohol policies across 167 countries worldwide. Among developed countries, considerable variations in policy strength were observed. Austria was classified as having a relatively weak to moderate alcohol control policy, reaching a median ACPI score of 24.5. Sweden achieved the highest ACPI score among developed countries (median 88.8), followed by Norway (median 79.6). The lowest ACPI score was found in San Marino (median 13.0) [19].

Österreich: schwach bis moderater Alkoholkontrollindex

Österreich: problemorientierter Alkoholkontrollansatz

Austria follows a problem-focused rather than a population-focused approach to control alcohol consumption. Unlike countries that seek to reduce overall alcohol availability and consumption (e.g. Scandinavian countries), Austrian alcohol policy primarily targets specific areas where alcohol poses a significant risk, such as drink-driving, pregnancy, youth protection, and harmful alcohol use [20]. The WHO states that pricing, marketing, and availability policies are the ‘best buys’ to reduce alcohol consumption [21]. Currently, these regulatory measures are legislated for Austria as follows:

- **Alcohol taxation:** In Austria, some alcoholic beverages are subject to product-specific excise duties. All are subject to 20% Value Added Tax. Excise duties are based on the type of beverage rather than its value, with spirits taxed at €12 per litre of pure alcohol, beer at approximately €4 per litre of pure alcohol, while wine, fruit wine, sparkling wine, and semi-sparkling wine are exempt from excise duty [20].

Alkoholsteuer Österreich: produktspezifisch; Wein & Fruchtwein von Verbrauchssteuer befreit

- **Availability:** Alcohol is widely available. No prohibition, no sales monopoly, no alcohol-policy-based limits on outlet numbers or opening hours. Restrictions are limited to youth-protection age limits (beer and wine may be legally consumed from the age of 16, and spirits from the age of 18), bans on serving intoxicated persons, and alcohol bans in selected public places [20].

Alkohol in Österreich weitgehend uneingeschränkt verfügbar

- **Advertising:** Alcohol advertising is permitted within limits, spirits advertising is banned on radio/television, and all alcohol advertising is banned in schools. Sponsorship and product placement are allowed. Advertising largely relies on industry self-regulation rather than comprehensive statutory restrictions [20].

Alkoholwerbung in Österreich erlaubt; ausgenommen Spirituosenwerbung in Radio/TV

Over the past 50 years, alcohol consumption and alcohol-related problems have shown a declining trend, despite substantial reductions in alcohol prices relative to disposable income and extended retail and hospitality opening hours in Austria. This may indicate that positive changes in alcohol culture may not depend solely on price increases or restrictions on alcohol availability [22]. Therefore, to effectively reduce alcohol-related harm, policy decisions should be guided by independent, evidence-based public health research and interventions that prioritise population health outcomes [14].

Rückgang Alkoholkonsum in Österreich trotz gelockerter Maßnahmen

1.2 Labelling for alcoholic beverages

Based on the Global Action Plan 2022-2030, the WHO calls the Member States, the WHO Secretariat, national and international partners and other relevant stakeholders to achieve the goal of a 20% relative reduction in the harmful use of alcohol by 2030 by implementing several approaches. One approach recommended by the WHO to achieve this goal is implementing alcohol labelling requirements. Consumer protection should be supported through alcohol labelling that provides accessible, comprehensible information on alcohol content, relevant health ingredients, energy content and health warnings [15].

WHO: Alkohol-Kennzeichnung als empfohlene Maßnahme; inkl. Gesundheitswarnhinweise & Nährwertinformationen

The following paragraphs provide a definition and an overview of health warning labels (HWL) and their implementation worldwide, as well as current labelling practices in Austria.

1.2.1 Health warning label

A warning label is a risk communication tool attached to a product or its packaging, intended to convey potential harms that remain despite product design interventions [23]. The European Union (EU) defines ‘label’ as “any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to the packaging or container of food” [21], and ‘labelling’ as “any words, particulars, trademarks, brand name, pictorial matter or symbol relating to a food and placed on any

Warnhinweis auf Alkohol (HWL): informiert über gesundheitliche Risiken & soziale Folgen des Konsums

packaging, document, notice, label, ring or collar accompanying or referring to such food" [21].

Health warning labels are a form of product labelling that inform consumers of potential health risks associated with the product use. For alcohol products, these warnings may address not only health-related harms but also broader social consequences, including harm to others. The purpose of HWLs on alcoholic beverages can be seen from two perspectives [21]:

HWL: Verbraucher:innenschutz & Public-Health-Instrument

- **Consumer protection:** Individuals have a right to be informed about a product's content and potential health risks associated with its consumption. HWLs are intended to provide consumers with important safety information and support informed decision-making and risk avoidance [21].
- **Public health tool:** HWLs can also be used as an intervention to reduce harm by influencing purchasing behaviour and increasing awareness of potential risks. Additionally, HWLs may provide new information to individuals and remind them of known hazards at the time of decision-making [21].

HWL: keine standardisierte Regulierung, Unterschiede in Inhalt & Design (text- und bildbasiert)

As no standardised regulation of HWLs exists, there is a wide variety of HWLs, ranging from existing mandatory to voluntary HWLs and newly designed HWLs for research purposes. Apart from the addressed target group, HWLs can differ in two major aspects:

- **HWL content:** This includes the warning message content (e.g. warning of cancer or other health risks, social harm, harm for others, consumption recommendations) and wording of the addressed content (e.g. use of signal words, causal or narrative language) [21, 24, 25].
- **HWL design:** HWL can vary in size, colour, positioning (e.g. front or back of the container), and format (e.g. text-based or image-based) [21, 24, 25].

keine einheitliche Terminologie von HWL; Synonyme je nach Warninhalt oder Zielgruppe

Although HWL is the most common term used in this context, various expressions can be found in the literature, based on their content or design focus. The most common synonyms are:

- **Alcohol Warning Label:** Special term explicitly used on alcoholic beverages, indicating risks associated with alcohol consumption (e.g. used by Al-Hamdani et al. [26-28]).
- **Pregnancy Warning Label:** A warning label aimed at pregnant and breastfeeding women, advising against alcohol consumption due to the potential harm to the foetus or child (e.g. used by Lacoste-Badie et al. [29]).

1.2.2 International use of health warning labels

weltweit: 40% der 139 berichtenden Länder mind. 1 verpflichtendes HWL (2024)

According to the Global Status Report on Alcohol and Health and Treatment of Substance Use Disorders published in 2024 (using data from 2019), 40% of 139 reporting countries worldwide reported mandating at least one HWL on alcohol containers, as presented in Table 1-1 [5].

Table 1-1: International requirements for health warning labels of alcoholic beverages and population size, 2019 [5]

HWL type	Number (%) of reporting countries (n=139)	Cumulative population of reporting countries
Pregnancy warning labels	31 (22.3%)	1.4 billion
Drink-driving warning labels	42 (30.2%)	1.9 billion
Underage drinking warning labels	48 (34.5%)	2.2 billion
Cancer warning labels	12 (8.6%)	297 million
Any warning labels	55 (39.6%)	2.3 billion

Abbreviations: HWL… health warning label

WHO Europa-Region: 15 Länder mit HWL-Pflicht; davon 4 EU-Mitglieder (Deutschland, Frankreich, Irland & Litauen); überwiegend textbasiert

Within the WHO European Region, 15 countries (Armenia, Belarus, France, Germany, Ireland, Israel, Kazakhstan, Kyrgyzstan, Lithuania, Norway, Republic of Moldova, the Russian Federation, Turkey, Turkmenistan and Uzbekistan) have legislation on health information on alcoholic beverages, of which four countries are members of the European Union (Germany, France, Ireland and Lithuania) [30]. Message content on HWL in these countries includes:

- general health-harm warning
- pregnancy warning
- underage drinking warning
- others (e.g. recommendations to refrain from excessive consumption)

Legislation in most of these countries requires labels to be text-based (e.g. Ireland), while in some countries HWLs may also be displayed as pictograms (Turkey, Republic of Moldova, France). No country has legislated for the use of images or pictures on the HWLs [30].

Ireland

Irland: erstes EU-Land mit Krebs-HWL; Einführung auf 2028 verschoben (Einflussnahme Alkoholindustrie)

As the first country in the European Union, Ireland implements a legislated HWL on alcoholic beverages communicating the association between alcohol consumption and cancer [21]. The HWL is required to display written information on alcohol content and energy value and to communicate the increased risk of certain cancers and liver disease associated with alcohol use. A pregnancy warning graphic is presented as a pictogram and includes a link to the Health Service Executive Website [31, 32]. The HWL is displayed in Figure 1-1. Originally scheduled take effect in May 2026, the legislation was postponed to 2028 after interference from the alcohol industry [33].



Figure 1-1: Health warning label legislated in Ireland by 2028, source: Alcohol Action Ireland

1.2.3 Alcohol labelling in Austria

Österreich: alkohol. Getränke von Zutaten- & Nährwertdeklaration befreit (Ausnahme Wein)

In Austria, alcohol labelling is primarily governed by the Food Information to Consumers Regulation of the European Union (EU) [34], which requires beverages containing more than 1.2% alcohol by volume to display their alcohol content. Unlike most food products, alcoholic beverages are generally exempt from mandatory ingredient lists and nutrition declarations, although the EU has applied these requirements to wine and fruit wine since December 2023 [11]. Beyond those regulations, Austria requires disclosure of the full ingredients list for beer only but has not introduced any national requirements for health information.

Einführung nationaler Vorschriften zu Warnhinweisen bei EU-Verpflichtung geplant

In Austria, the introduction of mandatory HWLs has been delayed due to ongoing discussions at the EU level. Rather than pursuing national legislation, Austria has indicated that it will implement such labelling requirements only be if mandated through EU regulation [30].

Verfügbarer Platz auf Flaschen ist begrenzt

Any mandatory alcohol labelling scheme operates under a physical constraint, as the surface of a container is limited, and every element added to it competes with other elements. Under EU law this constraint is made explicit, since Regulation (EU) No 1169/2011 requires mandatory particulars to be printed with a minimum x-height of 1.2 mm (reduced to 0.9 mm only where the largest surface of the packaging is smaller than 80 cm^2) [34]. The same regulation has so far exempted beverages containing more than 1.2 % alcohol by volume from the obligation to declare ingredients and nutritional values [34].

Despite growing recommendations, especially by the WHO, to support HWLs, alcoholic beverages in Austria are not required to carry mandatory HWLs by law. Moreover, there is a lack of context-specific evidence regarding the effectiveness of HWLs in supporting consumers' health risk perception and behaviour regarding alcohol consumption. Addressing this gap is essential to inform Austria's position in EU-wide discussions on future alcohol policy.

2 Report aims and research questions

Berichtsziel: Evidenzbasis zur Wirksamkeit von HWLs mit Kontextualisierung für Österreich

As outlined above, the World Health Organisation (WHO) recommends implementing alcohol labelling requirements to support consumer protection through accessible information on alcohol content, health-relevant ingredients, energy content, and health warnings [15]. Given Austria's comparatively high alcohol consumption and its problem-, rather than population-focused approach to alcohol policy, the absence of health warning labels (HWLs) may constitute a gap in consumer protection in line with WHO recommendations. As HWLs vary considerably in content and design and are not subject to standardised regulation, the WHO recommendation alone does not specify which HWL design would be most suitable, nor whether existing international evidence on HWL effectiveness is applicable to the Austrian setting. Closing this gap requires an evidence base that maps existing HWL designs, synthesises their effectiveness on health-related and economic outcomes, and contextualising these findings for Austria's specific alcohol policy environment.

Zielpopulation: Allgemeinbevölkerung Österreich

In this report, the target population is defined as the general population. In the Austrian context, this includes all current and potential consumers of alcoholic beverages, regardless of gender, health or socioeconomic status. Although the legal minimum age for purchasing alcoholic beverages in Austria is 16 years for beer and wine and 18 years for spirits, the report considers the general population, regardless of age, as the target group for HWLs.

Research questions

Forschungsfragen (FF)

To achieve the aim of this report, the following research questions (RQ) are addressed:

RQ1: What designs for health warning labels on alcoholic beverages can be identified in the literature?

RQ2: How effective are health warning labels on alcoholic beverages in comparison with each other and in comparison, with no warning labels, regarding health-related and economic outcomes for the general population?

RQ3: What recommendations regarding health warning labels on alcoholic beverages can be made based on the available evidence for the Austrian context?

3 Methods

pre-registriertes Protokoll;

FF1 & 2: systematische Übersichtsarbeit; FF3: Kontextualisierung Österreich

In this report, a systematic review (SR) with a narrative analysis following the PRISMA guidelines [2] was conducted to answer research questions (RQ) 1 and RQ 2. Furthermore, the results were contextualised for Austria by using the WHO-INTEGRATE Evidence-to-Decision framework to answer RQ3 [1, 35]. A protocol, pre-registered on the Open Science Framework (https://osf.io/rnp5u) [3] before data extraction, was followed. The project protocol is also available online on the AIHTA website: (https://aihta.at/page/wirksamkeit-gesundheitsbezogener-warnhinweise-auf-alkoholischen-getraenken-ein-systematischer-review-mit-einer-narrativen-analyse-fuer-oesterreich/en) [4].

3.1 Systematic Review

This chapter presents the methods for the systematic review addressing RQ1 and RQ2, including the eligibility criteria, the systematic literature search and study selection process, data extraction, quality assessment of the included studies, and the synthesis of the results.

3.1.1 Eligibility criteria

Einschlusskriterien für relevante Studien

PIKOS-Kriterien nach Titel/Abstrakt-Screening präzisiert

Following title and abstract screening, the intervention and outcome criteria were refined to improve clarity in the delineation of eligible studies. The intervention criteria were more precisely defined to include only HWLs explicitly presented on an alcoholic beverage container (in real-world or online settings) as eligible for inclusion in this SR. The outcomes were divided into primary and secondary outcomes. Therefore, only studies reporting at least one of the primary outcomes, reflecting the most critical health outcomes, were included. For the outcome 'shift in behaviour regarding alcohol consumption' studies measuring an actual behaviour change within the study setting were included, regardless of the study duration. The full PICOS table is presented in Table 3-1.

Only studies conducted in countries assigned to the same Human Development Index as Austria [36] were included. Due to team members' language availability, only studies published in English or German were included.

Table 3-1: PICOS Framework for inclusion criteria

Population	General population
Intervention	Health warning labels (HWLs) displayed on an alcoholic beverage container as a stand-alone intervention, communicating risks or health consequences of alcohol consumption. Included formats: ■ Text-based HWLs (e.g., information on health consequences) ■ Image-based HWLs (including pictograms) ■ Combinations of image- and text-based HWLs
Control	■ No HWL ■ HWLs displayed on an alcoholic beverage container communicating risks or health consequences of alcohol consumption compared with one another (intervention vs. intervention)

Outcome	At least one of the following primary outcomes: ■ Perception of health risks associated with alcohol consumption (e.g., awareness or knowledge of association between alcohol consumption and health risk) ■ Shift in behaviour regarding alcohol consumption (measured or reported changes in actual alcohol consumption, selection or purchasing behaviour) Secondary outcomes: ■ Attitudes towards and beliefs about alcohol consumption ■ Intention to change alcohol consumption (e.g. self-reported plans, willingness, or readiness to change alcohol consumption without actual reported changes) ■ Incidence of alcohol-related diseases ■ Economic outcomes (e.g., effects on healthcare expenditures resulting from a potential reduction in alcohol-related indirect costs, as well as costs and benefits for the health and social care systems) **Rationale**: based on the existing literature
Study design	Meta-analyses, systematic reviews, and other types of reviews (e.g., Cochrane reviews, umbrella reviews, rapid reviews) (preferred) Primary studies, in particular randomised controlled trials (RCTs) (alternative) Inclusion period: 2016–2026 **Rationale**: A best-evidence approach will be applied for study selection, prioritizing recent and methodologically rigorous systematic reviews, while ensuring the transferability of findings. Although systematic reviews and RCTs represent the methodological gold standard, their explanatory value at population level may be limited due to the lack of a real-world setting. In addition, health warning labels are rarely implemented in isolation. Therefore, where necessary, these reviews are supplemented with primary studies.
Country	Countries assigned to category 'very high human development' according to the Human Development Index [36]
Language	German, English

Abbreviations: HWLs… health warning labels, RCTs… randomised controlled trials

The exclusion criteria are presented in Table 3-2 below. Ausschlusskriterien

Table 3-2: Exclusion criteria

Exclusion criteria	HWLs on non-alcoholic products, e.g.: ■ Tobacco ■ Food ■ Non-alcoholic beverages ■ Sugar ■ HWLs only, without being displayed on a container HWLs on alcoholic beverage containers not communicating risks or health consequences of alcohol consumption, e.g.: ■ Nutritional information (e.g., calories, ingredients lists) ■ Health or nutrition claims (e.g., low-carb, organic, gluten-free) ■ Branding, marketing, or promotional labels All other alcohol prevention measures alone or in combination with warning labels, e.g.: ■ General awareness campaigns on alcohol ■ Tax on alcoholic beverages ■ Adjustment of the minimum age for alcohol consumption ■ Accessibility and availability of alcoholic beverages ■ Advertising ■ Regulations prohibiting alcohol consumption ■ HWLs on alcoholic beverages in combination with other prevention measures

Abbreviations: HWLs… health warning labels

3.1.2 Systematic literature search

systematische Literatursuche in 5 Datenbanken

The systematic literature search was conducted from February 4th to 5th, 2026, by an information specialist in the following databases:

- The Cochrane Library
- Embase
- Medline via Ovid
- International HTA Database (INAHTA)
- PsycINFO via EBSCO

Sucheinschränkungen: 01/2016–02/2026; Englisch & Deutsch

The systematic search was limited to 01/2016 – 02/2026 and to studies published in English or German, due to the researcher's language proficiency. The search strategy was developed according to the pre-specified PICOS framework. Search strings and results for each database are provided in the Appendix (Literature search strategies).

3.1.3 Flow chart of study selection

insgesamt 2.479 Publikationen identifiziert

Overall, 2,479 hits were identified through database searches. After deduplication, 1,353 references were screened in a two-step approach by two independent researchers (MM and JP) using Rayyan (Rayyan Systems Inc., USA) [37]. Disagreements were resolved through discussion, and if necessary, a third researcher (AD) was involved. The selection process is displayed in detail in Figure 3-1.

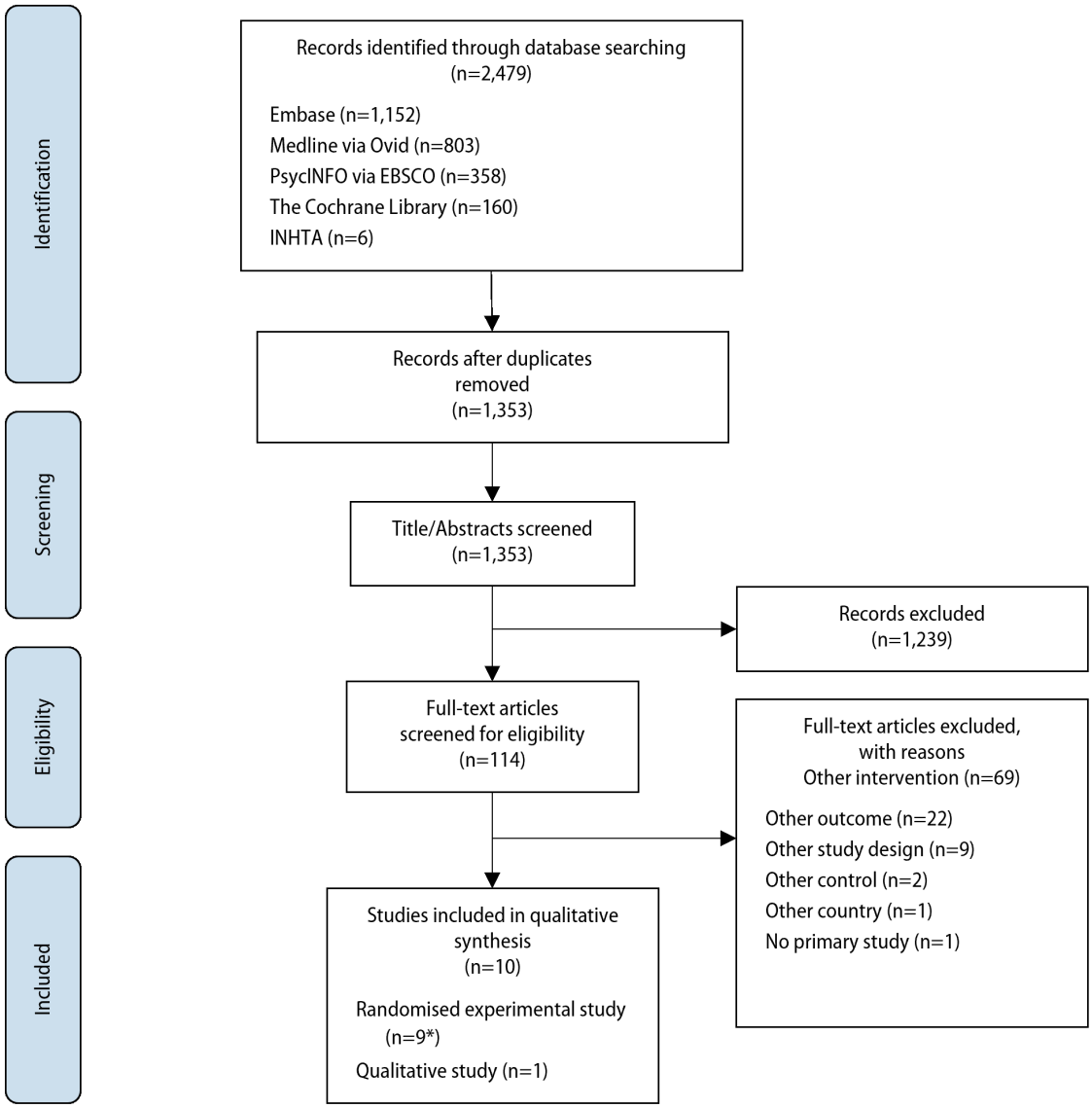


Figure 3-1: Flow chart of study selection (PRISMA Flow Diagram)

*Notes: * three of nine randomised experimental studies [38-40] were derived from a systematic review by Zuckermann et al. (2024) [41]*

systematische Übersichtsarbeit (Zuckermann et al. 2024) dient als Grundlage; 3 inkl. Primärstudien daraus entnommen

To avoid duplicating scientific effort, the screening process initially focused on identifying systematic reviews (SRs) matching the inclusion criteria. During the title and abstract screening, some potentially relevant SRs were identified. However, following full-text screening, it became apparent that the most recent systematic review (SR) relevant to the research question was Zuckermann et al. (2024) [41], hereafter referred to as SR. The quality of the SR [41] was assessed using the Risk Of Bias In Systematic reviews (ROBIS) tool [42] and showed a low overall risk of bias (details can be found in the Appendix Table 7-8). Therefore, the SR [41] served as a guide for this review. Three primary studies were derived from the SR and incorporated into the evidence synthesis. As the identified SR [41] did not cover all outcomes of

interest and its literature search was limited to March 2024, screening was subsequently extended to primary studies.

After screening the primary studies, ten studies in total were included in the evidence synthesis. Nine randomised experimental primary studies (three out of nine derived from the SR [41]) and one qualitative study.

insgesamt 10 Primärstudien eingeschlossen

3.1.4 Data extraction and quality assessment

Overall, we used single-data extraction (MM) with verification by a second reviewer (AD or JP).

Einzelextraktion mit Verifikation durch zweite Person

Data extraction RQ1

To identify HWL designs addressing RQ1, relevant data from all included studies were extracted into a pre-defined evidence table, categorised by HWL type (see Appendix Table 7-1). For the three studies identified through the SR [41], data were extracted from the SR, whereas data for the seven additional studies were extracted directly from the primary studies.

Datenextraktion FF1: Warnhinweis-Designs

Data extraction RQ2

Addressing RQ2, the effectiveness of HWLs on alcoholic beverages is presented according to the control conditions: *HWL versus no HWL* or *HWL versus HWL*.

Datenextraktion FF2: Warnhinweise (HWLs) versus keine HWLs

For the *HWL versus no HWL* comparison, relevant data from all included randomised experimental studies were extracted into the following two pre-defined extraction tables, focusing on study characteristics, HWL type and outcomes.

- Relevant data from the three studies derived from the SR [41] were extracted from the SR without modification (see Appendix Table 7-3).
- Relevant data from the remaining six randomised experimental studies were extracted directly from the original publications into a separate evidence table (see Appendix Table 7-2).

If not directly reported, the proportion of female participants was calculated from the numbers provided in the primary studies (%female = number female participants/number total participants).

Across the included studies, the effectiveness of the HWL intervention was reported by dichotomous variables (odds ratio or adjusted odds ratio) or continuous variables (mean score or risk difference). The SR's [41] methodology was followed to categorise the intervention effect (no effect, low effect, large effect, very large effect). Therefore, for studies reporting odds ratios (OR) or adjusted odds ratios (AOR), the risk ratios (RR) were calculated first as $RR \approx OR / [1 - p_0 + p_0 \star OR]$, where p_0 represents the no-label control group. RRs were then assigned to an intervention effect category as described above, according to the SR [41] definition. The intervention effect category then allows for comparing studies. Details are presented in the Appendix (Table 7-11).

Effektkategorisierung nach Methodik von Zuckermann et al. (2024)

For the *HWL versus HWL* comparison, relevant data from seven included studies were extracted into the following two pre-defined extraction tables, focusing on study characteristics, HWL type and outcomes.

Datenextraktion FF2: Vergleich von HWL versus HWL

- Data from all relevant randomised experimental studies were extracted from the primary studies, even if the studies were included in

the SR [41], because the HWL versus HWL comparison was not analysed by the SR (see Appendix Table 7-4).

- Relevant data from the qualitative study were extracted directly from the original publication into a separate evidence table, as results were presented in a different format compared to the randomised experimental studies (see Appendix Table 7-5).

Quality assessment

Qualitätsbewertung mit Verifikation durch 2. Person

Overall, one author (MM) assessed the quality, and a second author (JP) validated it for accuracy. Any disagreements regarding the risk of bias analyses were resolved by consensus. In case of disagreement, a third researcher (AD) was involved.

interne Validität randomisierte (rand.) experimentelle Studien: RoB v2

The internal validity of each primary study [43-48] not included in the SR [41] was assessed, where randomised experimental studies were evaluated using the Cochrane Risk of Bias Version 2 Tool (RoB 2) [49]. Each relevant outcome within each study was assessed separately. The three randomised experimental studies [38-40] included in the SR [41] were assessed using RoB2 by Zuckermann et al. (2024) [41], and results were extracted as reported in the SR.

interne Validität qualitative Studie: CAMELOT

For the qualitative study, the Cochrane Qualitative Methodological Limitations Tool (CAMELOT) [50] was used. As the official guidance for CAMELOT does not specify a method for determining the overall risk of bias, we applied an approach consistent with RoB 2. The lowest rating across the individual domains defined the overall risk of bias.

Vertrauenswürdigkeit in die Evidenz: GRADE Bewertung

To rate the certainty of evidence, the Grading of Recommendations Assessment, Development and Evaluation (GRADE) scheme was used [51]. Outcomes were classified into 'critical' or 'important but not critical' and confirmed by a subject matter expert. Only outcomes defined as critical were assessed by GRADE. Studies were evaluated based on their overall risk of bias for the assessed outcome. Each outcome was assessed by specific HWL type before being combined across all HWL types. Due to heterogeneity in the presentation of results across the studies, the optimal information size (OIS) was used to rate imprecision. Therefore, the rule of thumb was used according to the GRADE handbook [52]. For dichotomous variables, the OIS comprised at least 2,000 participants; for continuous variables, at least 400 participants. The impact was described narratively without adding a numerical range. If follow-up data were available in the primary study, the number of participants from the follow-up was used.

3.1.5 Synthesis

narrative Synthese

Findings from the systematic review were narratively synthesised, supported by GRADE evidence tables where available.

To address RQ 1 on existing HWL designs, the identified HWLs were categorised by label type (text-and-image, text-and-pictogram, text-only, image-only).

To report the effectiveness of HWL versus no HWL and HWL versus HWL for RQ 2, HWLs were evaluated according to their label type (text-only, text-and-pictogram, text-and-image, image-only) and content (e.g. cancer HWL, general health HWL, pregnancy HWL, etc.).

3.2 Contextualisation for Austria

FF3: Kontextualisierung für Österreich nach WHO-INTEGRATE-Framework

To contextualise the findings from this SR for Austria (RQ 3), the WHO-INTEGRATE Evidence-to-Decision Framework (guiding questions version 11 May 2026) presented in Figure 3-2 was applied [35]. This framework was chosen as it provides a comprehensive approach to evaluating complex public health interventions. The framework applies to population-level measures with system- and individual-level impacts, aligns with WHO principles and values, and supports evidence-informed decision-making across diverse policy contexts. Finally, the quality of the evidence across the included sources is assessed as part of the framework to ensure transparency regarding the evidence on which the final recommendation is based.

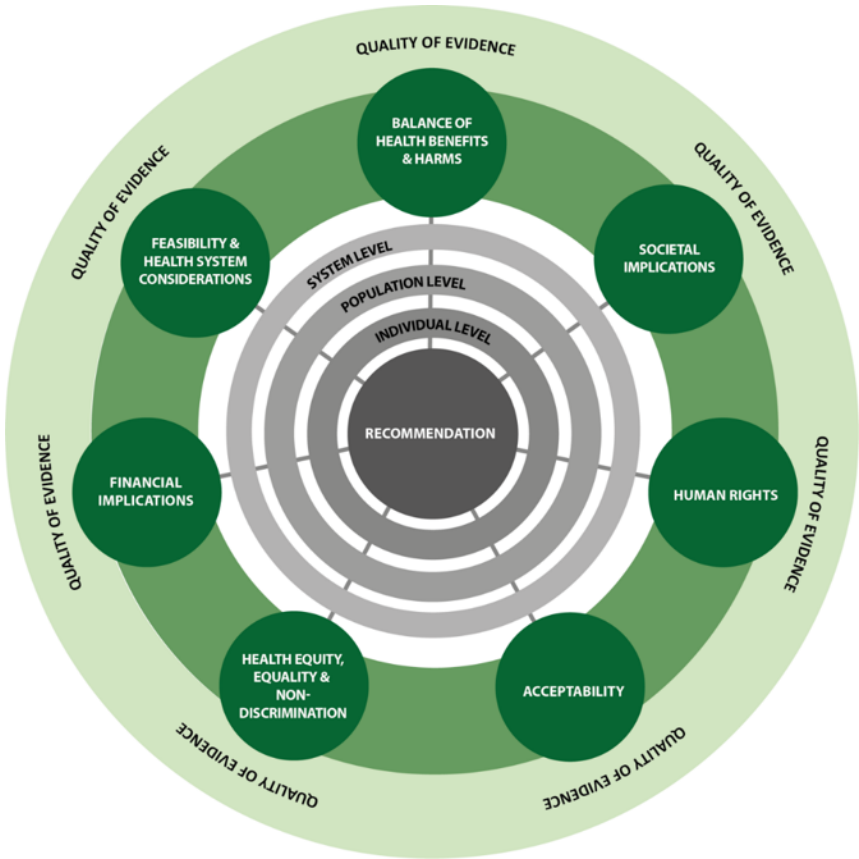


Figure 3-2: WHO-INTEGRATE Evidence-to-Decision Framework (version 11 May 2026) [1]

The WHO-INTEGRATE Evidence-to-Decision Framework defines seven criteria [1]:

WHO-INTEGRATE Kriterien

- Balance of health benefits and harms
- Societal implications
- Human rights
- Acceptability
- Health equity, equality and non-discrimination

- Financial implications and feasibility
- Health system considerations

Following the WHO-INTEGRATE guidance, all seven substantive criteria of the framework were considered, as well as the WHO-INTEGRATE meta-criterion on quality of evidence, assessing the strength and quality of the evidence supporting each of the seven substantive criteria. Sub-criteria were selected independently by two researchers (MM and AD), and consensus was reached through discussion.

Kontextualisierung basierend auf Ergebnissen der erstellten systematischen Übersichtsarbeit, erweitert mit WHO-Berichten und österr. Daten

To derive a contextualisation across the framework criteria, the findings of the preceding SR served as the primary evidence base and were mapped to the relevant sub-criteria. Additionally, WHO reports and relevant evidence from the Austrian context were drawn upon to support the recommendations. Where Austrian evidence was unavailable or insufficient, evidence from the broader European context was considered. The additional evidence was identified through a targeted manual search conducted in June 2026 of the following sources:

- WHO Institutional Repository for Information Sharing (WHO IRIS)
- Gesundheit Österreich GmbH (GÖG)
- Statistik Austria
- Institute for Advanced Studies (IHS), Vienna
- PubMed

For the contextualisation synthesis, the quality of evidence meta-criterion was informed by the GRADE assessments of the preceding SR, and the WHO-INTEGRATE sub-criteria were synthesised narratively.

4 Results

In total, ten studies met the inclusion criteria for this report: nine randomised controlled experimental studies [38-40, 43-48] and one qualitative study [53]. Tables of included studies are available in the Appendix (Table 7-2, Table 7-3, Table 7-5)

10 Primärstudien eingeschlossen: 9 randomisierte (rand.) Studien, 1 qualitative Studie

All studies aimed to examine at least one of the primary outcomes (perception of health risks associated with alcohol consumption, shift in behaviour regarding alcohol consumption). Three studies [45, 46, 48] additionally assessed the secondary outcome, intention to change alcohol consumption. No study met the inclusion criteria for measuring the remaining secondary outcomes (attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases, economic outcomes).

Study characteristics

Two studies were conducted outside of Europe (Chile [46], Australia [38]), five in the United Kingdom [39, 40, 43, 45, 48], one in the German-speaking part of Switzerland [47] and one was conducted in 14 European countries (Austria, Belgium, Estonia, France, Germany, Ireland, Latvia, Lithuania, the Netherlands, Norway, Portugal, Slovenia, Spain, and Sweden) [44]. Six studies were conducted between February 2020 and May 2023 [38, 43-47], while three studies did not report the study period [39, 40, 48].

Studien aus Großbritannien, 14 europäischen Ländern (inkl. Österreich), Schweiz, Chile & Australien

Overall, the studies included 37,031, with numbers ranging from 45 [40] to 19,110 [44]. After dropouts, 36,616 participants were included in the analysis across the included studies (6,884 in no-label control groups and 29,732 in intervention groups). The intervention groups included 12,476 text-only, 10,006 text-and-pictogram, 5,718 text-and-image, and 1,502 image-only participants (one study [40] did not report the number of participants allocated to the text-only and image-only intervention groups).

37.031 rand. Teilnehmer:innen

Participant characteristics

Across all studies, participants were at or above the legal drinking age of the country where the study was conducted and actively consumed alcohol. Six studies included adults aged 18 years and older [38, 39, 43, 44, 46, 47], except for participants in Lithuania, where the study set the minimum age at 20 years [44]. In one study, participants were young adults aged 18 to 35 [45], and two studies explicitly included university students (aged 18-35 years [48], aged 18-25 years [40]).

Mindestalter: 7 Studien 18+ Jahre, 3 Studien 18–35 Jahre

Six studies specifically defined a timed minimum consumption level of alcohol for participants to be eligible for the study (≥one alcoholic drink per week [38-40, 43] and ≥one alcoholic drink in the past year [44, 46]). In comparison, three studies did not quantify a minimum amount of alcohol consumption [45, 47, 48]. The consumption of a specific alcoholic drink was required in four studies (wine or beer [39, 43], wine [47], vodka [40]). In the study assessing the proportions of alcoholic drinks in a naturalistic shopping laboratory, participants were only included if they purchased supermarket products at least once a month in a physical store [43]. While female proportions range from 50% to 59.6% across seven studies [38, 39, 43-47], a considerably higher proportion of females was included in two studies: 72% [48], 100% [40].

aktive Alkoholkonsument:innen

2 Studien mit überproportionalem Frauenanteil

Intervention and Comparator

All studies used different HWLs as their intervention, varying in the label design. The exposure to the label was either online on a virtual alcohol container [38, 39, 44-47] or on a real alcohol container [40, 43, 48]. The HWL was exposed once across all studies except for two, where exposure was repeated on the same day [39] or for eight consecutive days [38]. For studies measuring shifts in behaviour, the setting was either a naturalistic shopping laboratory [43], an online shop [46], an online survey platform [38, 39] or a university-based setting where participants watched a movie while drinking alcoholic beverages [40].

Intervention: HWL, überwiegend einmalige Exposition

Kontrolle: Etikett ohne HWL

Across all studies included in the HWL versus no HWL comparison, the control groups were exposed to alcoholic beverage containers displaying only the original, currently used label. No additional HWL was attached to containers in the control groups.

Primary endpoints

Several primary endpoints relevant to this report were assessed by self-reported questionnaires. These include knowledge or perception of alcohol associated risks [38, 44, 46-48], cognitive and behavioural impact [45], alcohol consumption [38] and intentions to change alcohol consumption or alcohol-related behaviour [46, 48]. Alcohol drink selection or purchase [39, 43, 46] and alcohol consumption rate [40] are primary outcomes, which were assessed by measuring actual behaviours in experimental or online settings. Primary outcomes that were not relevant to this report included effectiveness on existing labels [45], support and need for HWLs [45, 47], acceptance of HWLs [47], health benefits and cultural worldviews of alcohol consumption [47] and fear arousal [48].

Endpunkte per Fragebogen oder Verhaltensbeobachtung erfasst

Blinding

Participants were not blinded in any study, as the label was always directly exposed to the participants and clearly visible. One study [48] used a cover story to conceal the true aims of the research from participants. In studies examining perceptions of health risks associated with alcohol consumption [38, 44-48] and intentions to change alcohol consumption [45, 48], the outcome assessor were the participants themselves, who answered self-reported questionnaires. Therefore, blinding the assessor was not possible in these studies. Studies used a Likert scale [38, 45, 46, 48], a slider without an indication [47] or provided predefined answer options to choose from [44] to measure their outcomes. For the outcome shift in behaviour regarding alcohol consumption, the assessor was either the participant themselves [38], an online computer program [39, 46] or a non-blinded researcher [40, 43].

keine Verblindung in allen Studien

Funding

While two studies [47, 48] did not report information about funding, two were sponsored by an university (University of Portsmouth [40], University of Stirling [45]), two by national public sector agencies (Ministry of Economy, Development and Tourism of Chile National Office of Productivity and Entrepreneurship [46], Australian National Health and Medical Research Council [38]), one by the European Union public funding program EU4Health [44], and two by the global charitable foundation The Wellcome Trust [39, 43].

Finanzierung: überwiegend öffentlich, keine Industriefinanzierung

Qualitative study

1 qualitative Studie für Vergleich HWL zu HWL

Charakteristika der qualitativen Studie

For the HWL versus HWL comparison, one qualitative study [53] conducted in September 2019 was included. In this study, eight focus group discussions with 50 past-month drinkers, aged 18 to 35 years, were conducted in Glasgow, United Kingdom. 50% of participants were female. Small and large text-only and text-and-image HWLs were displayed on vodka, gin and wine bottles in the second part of the focus group discussion. Participants compared the HWLs against existing health information and messages on alcohol packages as well as against each other. Relevant primary endpoints for this report are the perceived effectiveness of warning designs. Further endpoints are knowledge of alcohol harms, recall, awareness perceptions, and use of health information and messaging on packaging, perceptions of alcohol companies' approach to health messaging on packaging, and perceptions of novel warnings and their impact on appeal. The public health charity and non-profit organisation Alcohol Focus Scotland funded the study. Details can be found in the Appendix (Table 7-5).

4.1 RQ 1: Designs of health warning labels

HWL von 10 Primärstudien analysiert

Across all ten included studies [38-40, 43-48, 53], different designs of HWLs were found, varying in HWL type and HWL content.

Four types of HWLs were found and classified into the following categories:

4 HWL-Typen identifiziert

- text-only HWL
- text-and-pictogram HWL
- text-and-image HWL, and
- image-only HWL

unterschiedlichen HWL-Inhalt identifiziert

The following HWL contents were found, addressing several alcohol-related health and safety risks:

- various cancer types [38-40, 43-48, 53]
- liver cirrhosis and liver disease [38, 43, 45, 53]
- heart disease and heart failure [38, 43]
- bleeding in the brain [38]
- weight gain and obesity [38]
- general health harm [44, 45, 53]
- risks during pregnancy and lactation [46]
- drink-driving [46]
- underage alcohol consumption [46]
- responsible alcohol use

jede inkludierte Studie beinhaltet ein HWL zu Krebs

Each study evaluated at least two different label types as its intervention. While three studies [40, 47, 48] used the same cancer warning across all their label types, the remaining studies included warnings addressing different cancer types [39] or multiple alcohol-related health risks [38, 43-46, 53]. Either a specific or general cancer warning was included in each of the ten studies [38-40, 43-48, 53]. Table 4-1 provides an overview of the findings.

Table 4-1:- Summary of findings for health warning label designs

Reference	HWL type	HWL content

Brennan et al., 2022* [38]	Text-only HWL Text-and-pictogram HWL Text-and-image HWL	Cancer (liver, bowel, throat, at least 7 types), weight gain, heart failure, bleeding in the brain, liver cirrhosis and liver disease, bleeding in the brain
Clarke et al., 2021 [43]	Text-only HWL Text-and-image HWL	Cancer (bowel, breast, liver), liver cirrhosis and liver disease, heart disease
Clarke et al., 2021* [39]	Text-only HWL Text-and-image HWL Image-only HWL	Cancer (bowel, breast, liver)
Correia et al., 2024 [44]	Text-only HWL Text-and-pictogram HWL Text-and-image HWL	Cancer (breast and colon), general health harm, responsible alcohol use
Jones et al., 2021 [53]	Text-only HWL Text-and-image HWL	Cancer (no specification), general health harm, liver disease
Jones et al., 2022 [45]	Text-only HWL Text-and-image HWL	Cancer (mouth), general health harm, liver disease
Schwartz et al., 2024 [46]	Text-and-pictogram HWL	Cancer (no specification), risks during pregnancy and lactation, drink-driving, underage alcohol consumption
Stafford & Salmon, 2017* [40]	Text-only HWL Image-only HWL	Cancer (liver)
Staub et al., 2022 [47]	Text-only HWL Text-and-image HWL	Cancer (liver)
Wigg & Stafford, 2016 [48]	Text-only HWL Text-and-image HWL	Cancer (liver)

*Abbreviations: HWL… health warning label, *… study included in Zuckermann et al. (2024) [41]*

4.1.1 Text-only HWL

Nine out of ten studies [38-40, 43-45, 47, 48, 53] included a text-only HWL in their intervention condition. An example is presented in Figure 4-1 below, all identified text-only HWLs can be found in the Appendix (Table 7-1).

9 Studien mit textbasiertem HWL



Figure 4-1: Example of text-only HWL, source: Wigg & Stafford, 2016 [48]

HWL content

In each of the nine studies [38-40, 43-45, 47, 48, 53], a cancer warning was included. Four studies used a cancer warning only, addressing the risk for one (liver) [40, 47, 48] or multiple (bowel, breast, liver) [39] alcohol-related cancer types. The remaining studies displayed at least two of several alcohol-related health risks, including various cancer types, liver cirrhosis and liver disease, heart disease and heart failure, bleeding in the brain, weight gain, general health harm, as well as a responsible drinking message [38, 43-45, 53].

Krebs, Leberzirrhose, Herzerkrankungen, Hirnblutung, Gewichtszunahme, allgemeine Gesundheitsschäden & verantwortungsvoller Konsum

Visual components

In each of the nine studies, the text was printed in black and framed by either a black border [39, 40, 43, 45, 47, 48, 53], a yellow and orange border [38], or a black or red border [44]. Two studies [45, 53] explicitly used a small and a large text-only HWL.

schwarzer Text mit Rahmen

4.1.2 Text-and-pictogram HWL

Three out of ten studies [38, 44, 46] included a text-and-pictogram HWL in their intervention condition. An example is presented in Figure 4-2 below, all identified text-and-pictogram HWLs can be found in the Appendix (Table 7-1).

3 Studien mit text- und piktogrammbasiertem HWL



Figure 4-2: Example of text-and-pictogram HWL, source: Correia et al., 2024 [44]

HWL content

In each of the three studies [38, 44, 46], a cancer warning was included. One study [44] used a cancer warning only, while the remaining two studies [38, 46] displayed several alcohol-related health risks, including several cancer types and a general cancer warning, heart failure, bleeding in the brain, liver cirrhosis and liver damage, weight gain and obesity, risks to the foetus during pregnancy, drink-driving and underage alcohol consumption. Each warning message was displayed on a separate label, except one study [46] that also assessed a combination of several warnings.

Krebs, Herzversagen, Hirnblutung, Leberzirrhose, Gewichtszunahme, Schwangerschaft, Fahren unter Alkohol & Jugendschutz

Visual components

A red [44, 46] or yellow and orange [44] border framed both the text and the pictogram on the label. Across all three studies [38, 44, 46], the text was printed in black colour. The text was accompanied by a red hazard symbol with a red exclamation mark [44], a black-white-and-red pictogram [38] or a red octagon with a white pictogram representing the warning in the text [46].

schwarzer Text und Piktogramme mit Rahmen

4.1.3 Text-and-image HWL

Eight out of ten studies [38, 39, 43-45, 47, 48, 53] included a text-and-image HWL in their intervention condition. An example is presented in Figure 4-3 below, all identified text-and-image HWLs can be found in the Appendix (Table 7-1).

8 Studien mit text- und bildbasierten HWL



Figure 4-3: Example of text-and-image HWL, source: Clarke et al., 2021 [39]

HWL content

In each of the eight studies [38, 39, 43-45, 47, 48, 53], a cancer warning was illustrated. Four studies used a cancer warning only, addressing the risk for one (liver) [47, 48] or multiple (bowel, breast, liver, colon) [39, 44] alcohol-related cancer types. The remaining studies presented at least two of several alcohol-related health risks, including various cancer types, liver cirrhosis and liver disease, heart disease and heart failure, bleeding in the brain, weight gain, general health harm and responsible drinking [38, 43-45, 53]. Each warning message was displayed on a separate label.

Krebs, Leberzirrhose, Herzerkrankungen, Hirnblutung, Gewichtszunahme, allgemeine Gesundheitsschäden & verantwortungsvoller Konsum

Visual components

In each of these eight studies, the text and the image were framed by either a black [39, 43, 45, 47, 48, 53] or a yellow-and-orange [38] or a red border [44]. The text was printed in black colour across all labels. All images added to the text were printed in colour and displayed a photograph of a diseased organ (bowel, breast, heart, or liver) [38, 39, 43, 47, 48], a patient with cancer or general health issues [44, 45, 53] or a magnetic resonance imaging scanner [45, 53]. In most studies [39, 43-45, 47, 48, 53], each label displayed a single image, except in one study [38], where two images were positioned in one label.

schwarzer Text und farbliche Bilder mit Rahmen

4.1.4 Image-only HWL

Two out of ten studies [39, 40] included an image-only HWL in their intervention condition. An example is presented in Figure 4-4 below, all identified image-only HWLs can be found in the Appendix (Table 7-1).

2 Studien mit bildbasierten HWL



Figure 4-4: Example of image-only HWL, source: Clarke et al., 2021 [39]

Visual components

farbliche Bilder

Both studies [39, 40] displayed a cancer-related image. One study [39] used a coloured picture of bowel cancer framed by a black border. The other study [40] did not specify which image was used.

4.2 RQ2: Effectiveness of health warning labels

This chapter presents results for RQ2. First, the assessed outcomes are described, followed by the findings on the effectiveness of HWLs. This description will be divided by the control, which was either *HWL* vs *no HWL* or *HWL* vs *HWL*.

4.2.1 Outcome measurements

Unterscheidung zwischen kritischen und wichtigen Endpunkten

For the comparisons *HWL vs no HWL* and *HWL vs HWL*, the outcomes were divided into *critical* and *important outcomes* to derive a recommendation and are described in more detail below.

Critical outcomes

kritische Endpunkte:

The following outcomes were defined as critical to derive a recommendation:

- **Perception of health risks associated with alcohol consumption [38, 44-48]:** This outcome was measured in six included studies and defined in different ways, such as assessing knowledge, cognitive and behavioural impacts or risk perceptions regarding the association between alcohol consumption and health risks. Each study applied self-reported questionnaires developed or adapted by the study authors, often based on items used in previous research in this field. The following section outlines the specific measures used by each study to assess this outcome.

  Wahrnehmung von Gesundheitsrisiken aufgrund von Alkoholkonsum (Gesundheitsrisikowahrnehmung)

  - **Knowledge of alcohol-related health risks:** One study measured changes in participants' knowledge of the association between alcohol consumption and an increased risk for cancer [44]. Another

study assessed whether participants agreed on the association between alcohol consumption and health risks [38].

- **Knowledge of risks associated with alcohol consumption among different population groups:** The outcome assessed participants' knowledge of the risks associated with alcohol consumption for the following population groups and situations: pregnant woman, breastfeeding woman, drinking alcohol before driving a vehicle, person under 18 years old, anyone [46].
- **Cognitive and behavioural impact:** This measure contains both cognitive (awareness of health risks of drinking alcohol) and behavioural (intention to buy or drink less alcohol) aspects [45]. As these two topics were reported as a single outcome in the study, it was included in two of our outcome categories (health risk perception and intentions to change alcohol consumption).
- **Perceived risk of consuming alcohol:** This outcome measured perception of health risks associated with alcohol consumption [47, 48].

- **Shift in behaviour regarding alcohol consumption [38-40, 43, 46]:** Five included studies measured self-reported changes in alcohol consumption, consumption time, selection or purchasing behaviour. Each of the five studies used a different, non-standardised measurement method, as described below. Measurements for this outcome are only proxies for actual alcohol consumption and do not directly demonstrate a sustained change in alcohol consumption behaviour.

  Veränderung des Verhaltens hinsichtlich Alkoholkonsum (Verhaltensänderung)

  - **Proportions of alcoholic drinks selected:** After completion of a shopping task, the proportions of alcoholic drinks selected by each participant were measured [43].
  - **Proportion of participants selecting at least one alcoholic beverage:** Three studies measured the proportion of participants who selected at least one alcoholic beverage within a shopping task [39, 43, 46].
  - **Total spend (£) on alcoholic drinks:** Participants' total expenditure on alcoholic drinks was calculated within a shopping task [43].
  - **Spend (£) on alcoholic drinks as a proportion of total spend:** Within a shopping task, the proportion of money spent on alcoholic beverages was calculated [43].
  - **Alcohol consumption in preceding week:** After exposure to a HWL once daily for one week, alcohol consumption during the preceding week was assessed using a standardised questionnaire (the seven-day follow-back measure [10]) [38].
  - **Consumption speed:** This outcome was assessed by measuring the time required to finish a full alcoholic beverage while participants watched a nature documentary [40].

Important outcomes

The following outcomes were defined as important, but not critical for decision making:

Wichtige Endpunkte

- **Intention to change alcohol consumption [45, 46, 48]:** This outcome was assessed in three included studies, measuring plans, willingness, or readiness to change alcohol consumption. Each study used questionnaires developed or adapted by the study authors, based on items from previous research in this field. The following section outlines the specific measures used by each study to assess this outcome.

  Intention den Alkoholkonsum zu verändern (Intentionsveränderung)

- Cognitive and behavioural impact [45]: Please see *critical outcomes* above
- **Intentions to reduce and quit alcohol consumption** [48]: For this measure, statements regarding the intentions to reduce (e.g. 'The health warning on the alcohol beverage makes me more likely to reduce my daily alcohol consumption') and quit (e.g. 'The health warning on the alcohol beverage makes me more likely to quit consuming alcohol') alcohol consumption were rated by the participants.
- **Intention to consume alcohol at a binge level [46]:** Participants were asked about the likelihood to drink more than four glasses (women)/five glasses (men) of an alcoholic drink (beer, wine, pisco [3] with soda or sparkling wine) on one occasion.
- **Intention to drive after consuming alcohol [46]:** Participants were asked about the likelihood of driving a car home, which is 15 minutes away, after having drunk two glasses of an alcoholic beverage (beer, wine, pisco with soda or sparkling wine).

- **Attitudes towards and beliefs about alcohol consumption:** No studies reporting this outcome were eligible for inclusion according to the predefined PICOS criteria.
- **Incidence of alcohol-related diseases:** No studies reporting this outcome were eligible for inclusion according to the predefined PICOS criteria.
- **Economic outcomes:** This outcome was intended to assess the impact on healthcare expenditures arising from potential reductions in alcohol consumption-related indirect costs, as well as the costs and benefits for health and social care systems. No studies reporting this outcome were eligible for inclusion according to the predefined PICOS criteria.

Einstellung und Glaubensansätze zum Alkoholkonsum; Inzidenz alkoholassoziierter Erkrankungen; wirtschaftliche Auswirkungen

4.2.2 Effectiveness: HWL versus no HWL

Nine randomised experimental studies [38-40, 43-48] assessed the effectiveness of HWLs on alcoholic beverages compared to no HWL.

Insgesamt 9 rand. Studien: Vergleich HWL zu kein HWL

The results for critical (perception of health risks associated with alcohol consumption, shift in behaviour regarding alcohol consumption) and important (intention to change alcohol consumption, attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases, economic outcomes) outcomes are reported below, categorised by HWL type (text-only HWL, text-and-pictogram HWL, text-and-image HWL). Details can be found in the Appendix (Table 7-2, Table 7-3).

Perception of health risks associated with alcohol consumption

Six randomised experimental studies (n=29,610) reported on the outcome perception of health risks associated with alcohol consumption, by measuring knowledge of alcohol-related health risks [38, 44], knowledge of risks associated with alcohol consumption among different population groups [46], cognitive and behavioural impact [45] and perceived risk of consuming alcohol [47, 48].

insgesamt 6 rand. Studien (n=29.610): Gesundheitsrisikowahrnehmung HWL zu kein HWL

[3] Pisco is a grape brandy and is the national alcoholic beverage of Peru and Chile

Text-only HWL versus no HWL:

5 rand. Studien zu textbasierten HWL zu kein HWL, überwiegend signifikante Zunahme der Gesundheitsrisikowahrnehmung

Five out of six studies (n=14,495) assessed health risk perception following exposure to text-only HWLs compared to no HWL [38, 44, 45, 47, 48]. The knowledge of alcohol as a risk factor for cancer significantly increased in one study [44] using text-only responsible drinking, general health harm and cancer HWLs, while another study [38] examining a mix of four labels showed no significant effect. Adjusted odds ratios (AOR) ranged from 1.27 to 20.20, with 95% confidence intervals (CI) of 1.08 to 26.12 (95% CI not reported for the study [38] extracted from the SR [41]).

Perceived health risks for cancer and the health impact of consuming alcohol significantly increased in two studies using text-only cancer HWLs compared to no HWL [47, 48]. No significant effect was measured for perceived risks of consuming two glasses or half a bottle of wine and health risk for an unborn child if the mother regularly drinks wine on text-only HWL versus no HWL [47].

A significantly positive cognitive and behavioural impact was measured by one study [45] testing multiple small and large text-only HWLs (cancer, liver disease and general health warning) with an AOR of 8.87 and 95% CI of 6.00–13.10 for the small HWL and an AOR of 11.88 and 95% CI of 8.09–17.46 for the large HWL in comparison to no HWL.

Text-and-pictogram HWL versus no HWL:

3 rand. Studien zu text- und piktogrammbasierten HWL zu kein HWL, teilweise Zunahme der Gesundheitsrisikowahrnehmung, abhängig vom HWL-Inhalt

Three out of six studies (n=14,394) assessed health risk perception following exposure to text-and-pictogram HWLs compared to no HWL [38, 44, 46]. Two studies examined knowledge of alcohol as a risk factor for cancer [38, 44], liver damage, heart disease and pregnancy complications [38] using a text-and-pictogram HWL. While the study using a mix of four HWLs [38] reported no significant change, another study [44] testing a cancer HWL reported a very large effect on increased knowledge, with an AOR of 21.16 and a 95% CI ranging from 16.62 to 27.38.

One study [46] found significant differences between the intervention group and the no HWL control group in knowledge of health risks addressing pregnant and lactating women, if the text-and-pictogram HWL was a pregnancy and lactation HWL. The same study found significant differences favouring the intervention group regarding knowledge of health risks addressing the general population if the HWL displayed a cancer warning. No significant effects were found for risk for pregnant and lactating women, underage and general population, and risk of driving after drinking if the HWL was a drinking-driving warning, combination or assortation of warnings (pregnancy/lactation + driving/drinking + under 18 + risk of cancer, obesity and cirrhosis). The pregnancy and lactating HWL showed no significant effect for perceived risk of driving after drinking and the risk for underage and the general population. The cancer HWL showed no effect for risk perception for pregnant and lactating women, underage drinking, and risk of driving after drinking.

Text-and-image HWL versus no HWL:

5 rand. Studien zu text- und bildbasierten HWL zu kein HWL, teilweise Zunahme der Gesundheitsrisikowahrnehmung, abhängig vom HWL-Inhalt

Five out of six studies (n=7,734) assessed health risk perception following exposure to text-and-pictogram HWLs compared to no HWL [38, 44, 45, 47, 48]. A significant increase in knowledge of cancer risk from before to after HWL exposure compared to no HWL was reported in one study displaying a text-and-image cancer HWL (AOR 20.61, 95% CI 16.19–26.6) [44]. In contrast, no significant changes regarding the risk of cancer, liver damage, heart disease and pregnancy complications were found in another study using a mix of four text-and-image labels for the intervention group [38].

Perceived health risks for cancer and the health impact of consuming alcohol significantly increased in two studies using cancer HWLs [47, 48]. No significant effect for text-and-image HWL versus no HWL was measured within one of these studies [47] for perceived risks of consuming two glasses or half a bottle of wine and health risk for an unborn child if the mother regularly drinks wine.

A significant positive cognitive and behavioural impact was measured in one study [45] testing multiple text-and-image HWLs (including cancer, liver disease, general health) compared to no HWL, with an AOR of 10.01 and a 95% CI of 6.78 to 14.77.

Shift in behaviour regarding alcohol consumption

insgesamt 5 rand. Studien (n=15.091): Verhaltensänderung HWL zu kein HWL

Five randomised controlled experimental studies (n=15,091) [38-40, 43, 46] reported on the outcome shift in behaviour regarding alcohol consumption by measuring the proportion of alcoholic drinks selected [43], proportion of participants selecting at least one alcoholic beverage [39, 43, 46], total spending on alcoholic drinks [43], spending on alcoholic drinks as a proportion of total spending [43], alcohol consumption in preceding week [38] and consumption speed [40]. These measurements are only proxies for actual alcohol consumption and do not directly demonstrate a sustained change in alcohol consumption behaviour.

Text-only HWL versus no HWL:

4 rand. Studien zu textbasierten HWL zu kein HWL, teilweise signifikante Verhaltensänderung

Four out of five studies (n=3,733, n for this intervention group not reported by one study [40]) [38-40, 43] assessed a shift in behaviour regarding alcohol consumption following exposure to text-only HWLs compared to no HWL.

The exposure to a text-only cancer HWL resulted in a decreased selection of an alcoholic drink (AOR 0.48, 95% CI 0.41–0.57) [39], as well as a 2.14 relative increase in consumption time of a ready-to-drink alcoholic beverage [40].

Compared to no HWL, no significant change was found in the proportion of alcoholic drinks selected, proportion of participants selecting at least one alcoholic beverage, total spend on alcoholic drinks, spend on alcoholic drinks as a proportion of total spend [43] and alcohol consumption in the preceding week [38] when being exposed to multiple text-only HWLs (including cancer, liver or heart disease).

Text-and-pictogram HWL versus no HWL:

2 rand. Studien zu text- und piktogrammbasierten HWL zu kein HWL, teilweise signifikante Verhaltensänderung

Two out of five studies (n=8,178) [38, 46] assessed a shift in behaviour regarding alcohol consumption following exposure to text-and-pictogram HWLs compared to no HWL.

A small effect for a decrease in purchases of alcoholic drinks was found if the text-and-pictogram HWL displayed a cancer, pregnancy or lactating warning or a combination or assortation of warnings (pregnancy/lactation +

driving/drinking + under 18 + risk of cancer, obesity and cirrhosis), with odds ratios (OR) ranging from 0.561 to 0.806, with 95% CI lower and upper limits of -0.139 to -0.005 [46]. Within the same study [46], no significant change in alcohol purchasing behaviour was found when displaying a drinking and driving text-and-pictogram HWL compared to no HWL. The exposure to a mix of text-and-pictogram HWLs once daily for a week did not have an effect on alcohol consumption compared to no HWL during the preceding week [38].

Text-and-image HWL versus no HWL:

3 rand. Studien zu text- und bildbasierten HWL zu kein HWL, teilweise signifikante Verhaltensänderung

Three out of five studies (n=3,711) [38, 39, 43] assessed a shift in behaviour regarding alcohol consumption following exposure to text-and-image HWLs compared to no HWL.

The exposure to a text-and-image cancer HWL decreased the selection of an alcoholic drink, compared to no HWL, with an AOR of 0.39 and 95% CI from 0.33 to 0.45 [39].

Two studies [38, 43] examined the effect of multiple text-and-image HWLs (including cancer, liver or heart disease). No significant change was found in the proportion of alcoholic drinks selected, proportion of participants selecting at least one alcoholic beverage, total spend on alcoholic drinks, spend on alcoholic drinks as a proportion of total spend [43], and alcohol consumption in the preceding week [38].

Image-only HWL versus no HWL:

2 rand. Studien zu bildbasierten HWL zu kein HWL, signifikante Verhaltensänderung

Two out of five studies (n=3027; n for this intervention group not reported by one study [40]) [39, 40] assessed a shift in behaviour regarding alcohol consumption following exposure to an image-only HWL compared to no HWL.

Both studies used an image-only cancer HWL; one [39] reported lower odds of selecting an alcoholic drink (AOR 0.29, 95% CI 0.25–0.34), and the other [40] reported a 2.42 relative increase in consumption time of a ready-to-drink alcoholic beverage.

Intention to change alcohol consumption

insgesamt 3 rand. Studien (n=9.178): Intentionsveränderung HWL zu kein HWL

Three randomised experimental studies (n=9,178) [45, 46, 48] reported on the secondary outcome intention to change alcohol consumption, by measuring cognitive and behavioural impact [45], intentions to reduce and quit alcohol consumption [48], intention to consume alcohol at a binge level [46] and intention to drive after consuming alcohol [46].

Text-only HWL versus no HWL:

2 rand. Studien zu textbasierten HWL zu kein HWL, teilweise signifikante Intentionsänderung

Two out of three studies (n=1,420) [45, 48] assessed the intention to change alcohol consumption following exposure to a text-only HWL compared to no HWL.

A statistically significant and very large effect on a positive cognitive and behavioural impact was measured by one study [45] testing multiple small and large text-only HWLs (cancer, liver disease and general health warning) with AORs ranging from 8.87 to 11.88 and 95% CI lower to upper limits from 6.00 to 17.46. The study using a cancer text-only HWL [48] found no significant change in intentions to reduce and quit alcohol consumption compared to the no HWL control group after the first label exposure. However, it did measure significantly higher intentions to reduce and quit alcohol consumption after the second exposure to the same text-only cancer HWL.

Text-and-pictogram versus no HWL:

1 rand. Studie zu text- und piktogrammbasierten HWL zu kein HWL, teilweise signifikante Intentionsänderung, abhängig vom HWL-Inhalt

One out of three studies (n=7,758) [46] assessed the intention to change alcohol consumption following exposure to a text-and-pictogram HWL compared to no HWL.

The intention to consume alcohol at a binge level decreased significantly in the general population if the text-and-pictogram HWL displayed a pregnancy and lactation, drinking and driving or cancer warning, or a combination or assortation of warnings (pregnancy/lactation + driving/drinking + under 18 + Risk of cancer, obesity and cirrhosis), with risk differences (RD) ranging from -0.177 to -0.103 and robust standard errors (SE) between 0.045 and 0.047. For pregnant and lactating women, only the exposure to a pregnancy and lactating HWL significantly decreased the intention to consume alcohol at a binge level (RD -0.285, SE 0.113).

No significant differences in the intention to drive after consuming two glasses of alcohol were observed between the text-and-pictogram HWLs and the no HWL condition among drivers and participants who had driven after drinking in the past 12 months.

Text-and-image versus no HWL:

2 rand. Studien zu text- und bildbasierten HWL zu kein HWL, signifikante Intentionsänderung

Two out of three studies (n=1,420) [45, 48] assessed the intention to change alcohol consumption following exposure to a text-and-image HWL compared to no HWL.

A statistically significant and very large effect on a positive cognitive and behavioural impact was observed in one study testing multiple text-and-image HWLs (cancer, liver disease and general health warning) (AOR 10.10, 95% CI 6.78–14.77) [45]. The study using a cancer text-and-image HWL also found a significant increase in intentions to reduce and quit alcohol consumption compared to the no HWL control group after the first and second label exposures, with mean scores on a 7-point Likert scale ranging from 2.06 to 3.30 and SEs ranging from 0.25 to 0.40 [48].

Attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes

keine Studien zu weiteren wichtigen Endpunkten

No results were found for attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes across eligible studies for this report.

4.2.3 Effectiveness: HWL versus HWL

insgesamt 6 rand. Studien und 1 qualitative Studie: Vergleich verschiedener HWL Typen

Six randomised controlled experimental studies [38, 39, 45-48] and one qualitative study [53] assessed the effectiveness of HWLs on alcoholic beverages compared against each other.

First, the results from the randomised experimental studies are reported below, categorised by the reference HWL types (text-only HWL, text-and-pictogram HWL, image-only HWL). Details can be found in the Appendix (Table 7-4).

Second, the results of the qualitative study are presented by HWL type and by comparison of HWL content and image. Details can be found in the Appendix (Table 7-5).

Perception of health risks associated with alcohol consumption

Five randomised experimental studies (n=9,051) reported on perceptions of health risks associated with alcohol consumption, by measuring cognitive and behavioural impacts [45], knowledge of alcohol-related health risks [38] and perceived risk of consuming alcohol [39, 47, 48].

5 rand. Studien (n=9,051): kein sig. Unterschied zwischen verschiedenen HWL-Typen für Gesundheitsrisikowahrnehmung

Text-only HWL versus other HWL:

Five studies (n=9,051) [38, 39, 45, 47, 48] compared a text-only HWL versus another HWL for perception of health risks associated with alcohol consumption. Across all studies, no significant difference was measured between a text-only HWL and either a differently sized text-only HWL [45], a text-and-image HWL [38, 39, 45, 47, 48] or a text-and-pictogram HWL [38].

Text-and-pictogram HWL versus other HWL:

One study (n=1,087) [38] compared a text-and-pictogram HWL with a text-and-image HWL for perception of health risks associated with alcohol consumption. No significant difference was measured between the two HWL types.

Image-only versus other HWL:

One study (n=6,087) [39] compared an image-only HWL with a text-and-image HWL for perception of health risks associated with alcohol consumption. No significant difference was measured between the two HWL types.

Shift in behaviour regarding alcohol consumption

Two randomised controlled experimental studies (n=13,845) [39, 46] reported on the outcome shift in behaviour regarding alcohol consumption by measuring the proportion of participants selecting at least one alcoholic beverage. These are only proxies for actual alcohol consumption and do not directly demonstrate a sustained change in alcohol consumption behaviour.

insgesamt 2 rand. Studien (n=13,845): Verhaltensänderung HWL zu HWL

Text-only HWL versus other HWL:

One study (n=6,087) [39] compared a text-only HWL versus a text-and-image HWL and found a significantly lower proportion of participants selecting an alcoholic drink in the text-and-image HWL group (56%) compared to the text-only group (61%), with an OR of 0.80 and a 95% CI from 0.69 to 0.92.

1 rand Studie: text- und bildbasiertes HWL größere Gesundheitsrisikowahrnehmung als textbasiert

Text-and-pictogram versus other HWL:

One study (n=7,758) [46] compared text-and-pictogram HWLs with different content regarding the likelihood of purchasing any alcoholic beverage. A significant difference was found between the pregnancy and lactation HWL and the cancer HWL, the drinking-driving HWL and the cancer HWL, the drinking-driving HWL and a combination of HWL (pregnancy/lactation + driving/drinking + under 18 + risk of cancer, obesity and cirrhosis), the cancer HWL and a combination of HWL, the cancer HWL and assorted HWL (one of pregnancy/lactation + driving/drinking + under 18 + risk of cancer, obesity or cirrhosis). No effect sizes were given for this study.

1 rand. Studie: Unterschiede zwischen HWL-Inhalten von text- und piktogrammbasierten HWL für Gesundheitsrisikowahrnehmung

No significant difference was found between the pregnancy and lactation HWL and the drinking-driving HWL, the pregnancy and lactation HWL and a combination of HWL, the pregnancy and lactation HWL and assorted HWL, the drinking-driving HWL and assorted HWL, a combination of HWL and assorted HWL.

Image-only HWL versus other HWL:

One study (n=6,087) [39] compared an image-only HWL versus a text-and-image HWL and found a significantly lower proportion of participants selecting an alcoholic drink in the image-only HWL group (49%) compared to the text-and-image group (56%), with an OR of 1.34 and a 95% CI from 1.16 to 1.55.

1 rand Studie: bildbasiertes HWL größere Gesundheitsrisikowahrnehmung als text- und bildbasiert

Intention to change alcohol consumption

Three randomised experimental studies (n=3,175) [38, 45, 48] reported on the secondary outcome intention to change alcohol consumption, by measuring cognitive and behavioural impact [45], intentions to reduce and quit alcohol consumption [48], intention to avoid drinking alcohol completely in the next month [38] and intention to drink less in the next week [38].

insgesamt 3 rand. Studien (n=3,175): kein sig. Unterschied zwischen verschiedenen HWL-Typen für Intentionsveränderung

Text-only versus other HWL:

Three studies (n=1,420) [38, 45, 48] compared a text-only HWL versus another HWL for intention to change alcohol consumption. Across all studies, no significant difference was measured between a text-only HWL and either a differently sized text-only HWL [45], a text-and-pictogram HWL [38] or a text-and-image HWL [38, 45, 48].

Text-and-pictogram versus other HWL:

One study (n=1,087) [38] compared a text-and-pictogram HWL versus a text-and-image HWL for intention to change alcohol consumption. No significant difference was measured between the two HWL types.

Attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes

No results were found for attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes across eligible studies for this report.

keine Studien zu weiteren wichtigen Endpunkten

Results from the qualitative study

One qualitative study (n=50) [53] discussing small and large text-only and text-and-image HWLs in focus groups was included in this review. Relevant for this report were results on HWL content and HWL image comparisons.

1 qualitative Studie HWL zu HWL

HWL content comparison:

The study compared the HWL content and found clear differences in perceived impact. The general warning 'Alcohol damages your health' drew mixed reactions. Some participants (particularly younger women) viewed it as too basic and already widely known, while others felt its severity level was appropriate.

HWL-Inhalt Vergleich:

Specific HWLs addressing liver disease and cancer attracted considerably more attention and were rated as most impactful, with some participants surprised to see such warnings on alcohol products. When comparing the two specific warnings, some participants preferred the liver disease message over the cancer message because it felt more nuanced and left room for individual variation in drinking behaviour and overall health. The cancer warning attracted scepticism, because without supporting statistics or threshold ('cut-off') information, some doubted that alcohol causes cancer at moderate consumption levels. Many groups concluded the cancer warning would be improved by specifying the type of cancer and the likelihood of developing it relative to consumption.

Krebswarnhinweis am wirkungsvollsten; gewünschte Ergänzungen: Kurzzeiteffekte, Abhängigkeitspotenzial & Hilfsangebote

Overall, participants valued realistic, relatable information, and the cancer warning in particular resonated with them. They suggested additional content to boost impact by displaying short-term effects (impairments, nausea, hangovers), noting alcohol's addictive potential, and including signposting to support, such as a helpline.

HWL image comparison:

HWL Bildvergleiche:

Participants compared the displayed images and rated them by clarity and impact. The image of the hospitalised patient divided opinions. Several participants found it ambiguous, questioning what had happened to the patient, while others felt it reinforced the textual message. The image of a person clutching their liver was generally regarded as more informative than the image of a hospitalised patient, as it was seen to convey the potential physical damage of alcohol consumption. The computed tomography scanner image was perceived as the most attention-grabbing and thought-provoking, as it was interpreted as illustrating the potential future consequences of alcohol consumption.

Patient:innenbild: geteilte Meinungen (ambivalent); Leberbild: informativ; CT-Scanner: größte Aufmerksamkeitswirkung

4.2.4 Certainty of evidence

Risk of Bias

Verzerrungsrisiko für rand. Studien mit Cochrane RoB v2 bewertet

The Risk of Bias (RoB) of the included randomised controlled experimental studies was assessed using the Cochrane RoB tool v2 (RoB2) [49]. Results for the three studies [38-40] included in the systematic review by Zuckermann et al. (2024) [41] were extracted as reported in the review. For these studies, no results were available for each assessment domain, and no justification for the overall risk of bias was provided.

hohes Verzerrungsrisiko in allen Studien für Gesundheitsrisikowahrnehmung und Intentionsänderung (keine Verblindung, Selbstauskunft)

Within the randomised controlled experimental studies [43-48] [41], there were some concerns regarding the randomisation process (missing baseline characteristics) in three studies [45, 46, 48], deviations from intended interventions (high number of excluded participants from analysis without sensitivity analysis) in one study [44] and the selection of the reported results (missing study protocol) within three studies [45, 47, 48]. Specifically for the outcome perception of health risks associated with alcohol consumption, there was a high risk within the outcome measurement across all studies. The nature of the intervention prohibited the blinding of the participants, as they were directly exposed to either an intervention health warning label (HWL) or no HWL in the control group. It was a self-reported outcome immediately after label exposure; the participants were therefore the outcome assessors themselves. Detailed results of the critical appraisal are presented in the Appendix (Table 7-6).

hohes Verzerrungsrisiko für qualitative Studie

The qualitative study [53] was assessed with the Cochrane Qualitative Methodological Limitations Tool [50]. The absence of researcher reflexivity and background, no explicit theoretical framework or protocol, limited ethnical and diversity considerations, and limited discussion of saturation or disconfirming cases collectively lead to serious undiscussed methodological limitations and an overall assessment of serious concerns. Detailed results of the critical appraisal are presented in the Appendix (Table 7-7).

Strength of evidence

Vertrauenswürdigkeit der Evidenz für kritische Endpunkte nach GRADE

The strength of evidence was rated for the critical outcomes *(perception of health risks associated with alcohol consumption, shift in behaviour regarding alcohol consumption)* according to the GRADE (Grading of Recommendations Assessment, Development and Evaluation) scheme [51]. Each outcome

was rated separately for each HWL comparison (e.g. text-only HWL versus no HWL, text-only HWL versus other HWL, etc.). A more detailed list of criteria applied can be found in the recommendations of the GRADE Working Group [51].

GRADE Working Group grades of evidence [51]:

- **High certainty:** We are very confident that the true effect lies close to that of the estimate of the effect;
- **Moderate certainty:** We are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different;
- **Low certainty:** Our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect;
- **Very low certainty:** We have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect;

The GRADE ranking for the research question is provided in the summary of findings tables below (Table 4-2, Table 4-3) and in the evidence profile in the Appendix (Table 7-9, Table 7-10).

Vertrauenswürdigkeit: moderat (Gesundheitsrisikowahrnehmung & Verhaltensänderung)

Overall, the certainty of evidence of the effectiveness of HWL compared to no HWL or another HWL was rated as moderate for the outcome perception of health risks associated with alcohol consumption due to high risk of bias (HWL versus no HWL and HWL versus HWL). For the outcome shift in behaviour regarding alcohol consumption, the certainty of evidence was also rated as moderate across all comparison groups due to indirectness. The assessed outcomes across these studies are only proxies for actual alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour. The risk of bias was rated as low and moderate across included studies for this outcome. For studies derived from the systematic review by Zuckermann et al. (2024) [41], no justification for the overall risk of bias was provided. Imprecision was not rated down for both outcomes, as the optimal information size (OIS) was higher than the rule-of-thumb across all HWL comparisons >2000 participants for dichotomous variables, >400 participants for continuous variables).

Inkonsistenz für HWL zu HWL-Vergleichen nicht beurteilbar: überwiegend Einzelstudien

Due to single-arm studies, the criterion inconsistency was not applicable to all HWL versus HWL comparisons, except for the comparison of text-only versus other HWL within the outcome perception of health risks associated with alcohol consumption.

Table 4-2: Summary of findings HWL versus no HWL comparison, critical outcomes

Outcome comparison	Impact	№ of participants (studies)	Certainty of the evidence
Perception of health risks associated with alcohol consumption			
All HWL vs no HWL	**The effectiveness of HWLs result in a range from no difference to a very large effect on the perception of health risks associated with alcohol consumption, compared to no HWL.**	29,610 (6 RCTs)	⊕⊕⊕◯ Moderate a b c
Text-only HWL vs no HWL	**Compared to no HWL, text-only HWLs varying in content may yield results ranging from no statistically significant difference to very large effects on perception of health risks associated with alcohol consumption.** ■ No statistically significant difference [38, 48]: cancer warning, mix of four warnings ■ Statistically significant difference (no effect size given) [47]: cancer warning ■ Large effect (AOR 1.46) [44]: responsible drinking warning ■ Very large effect (AOR 2.42 – 20.20) [44, 45]: general health harm warning, cancer warning, mix of multiple warnings (including cancer, liver disease and general health).	14,495 (5 RCTs)	⊕⊕⊕◯ Moderate a b c
Text-and-pictogram HWL vs no HWL	**Compared to no HWL, text-and-pictogram HWLs varying in content may yield results ranging from no statistically significant difference to very large effects on perception of health risks associated with alcohol consumption.** ■ No statistically significant difference [38, 46]: mix of four warnings, drinking-driving warning, assorted warnings ■ Statistically significant difference (no effect size given, RD range 0.074–0.085) [46]: pregnancy and lactation warning, cancer warning, combined warnings (pregnancy/lactation + driving/drinking + under-18 + risk of cancer, obesity, and cirrhosis) ■ Very large effect (AOR 21.16) [44]: cancer warning	14,394 (3 RCTs)	⊕⊕⊕◯ Moderate a b c
Text-and-image HWL vs no HWL	**Compared to no HWL, text-and-image HWLs varying in content may yield results ranging from no statistically significant difference to very large effects on perception of health risks associated with alcohol consumption.** ■ No statistically significant difference [38, 48]: mix of four warnings, cancer warning ■ Statistically significant difference (no effect size given) [47]: cancer warning ■ Very large effect (AOR range 10.01–20.61) [44, 45]: cancer warning, multiple warnings (including cancer, liver disease and general health).	7,734 (5 RCTs)	⊕⊕⊕◯ Moderate a b c
Shift in behaviour regarding alcohol consumption			
All HWL vs no HWL	**The effectiveness of HWLs result in a range from no difference to a very large shift in behaviour regarding alcohol consumption compared with no HWL.**	15,091 (5 RCTs)	⊕⊕⊕◯ Moderate c d e
Text-only HWL vs no HWL	**Compared to no HWL, text-only HWLs varying in content may yield results ranging from no statistically significant difference to very large effects on shift in behaviour regarding alcohol consumption.**	3,733 (4 RCTs)	⊕⊕⊕◯ Moderate c d e

Outcome comparison	Impact	№ of participants (studies)	Certainty of the evidence
	No statistically significant difference [38, 43]: multiple warnings (including cancer, liver disease and general health), mix of four warnings **Moderate effect (AOR 0.48) [39]: cancer warning** **Very large effect (2.14 relative increase) [40]: cancer warning**		
ext-and-pictogram HWL vs no HWL	**Compared to no HWL, text-and-pictogram HWLs varying in content may yield results ranging from no statistically significant difference to small effects on shift in behaviour regarding alcohol consumption.** ■ No statistically significant difference [38, 46]: drinking-driving warning, mix of four warnings ■ Small effect (OR range 0.561–0.806) [46]: cancer warning, pregnancy and lactation warning, combined warnings (pregnancy/lactation + driving/drinking + under-18 + risk of cancer, obesity, and cirrhosis), assorted warnings	8,178 (2 RCTs)	⊕⊕⊕◯ Moderate c e f
Text-and-image HWL vs no HWL	**Compared to no HWL, text-and-image HWLs varying in content may yield results ranging from no statistically significant difference to moderate effects on shift in behaviour regarding alcohol consumption.** ■ No statistically significant difference [38, 43]: multiple warnings (including cancer, liver disease and general health), mix of four warnings ■ Moderate effect (AOR 0.39) [39]: cancer warning	3,711 (3 RCTs)	⊕⊕⊕◯ Moderate c d e
Image-only HWL vs no HWL	**Compared to no HWL, image-only HWLs varying in content may yield results ranging from large to very large effects on shift in behaviour regarding alcohol consumption.** ■ Large effect (AOR 0.29) [39]: cancer warning ■ Very large effect (2.42 relative increase) [40]: cancer warning	3,027 (2 RCTs)	⊕⊕⊕◯ Moderate e f

Abbreviations: AOR … adjusted odds ratio, HWL … health warning label, RCT … randomised controlled trial, RD … risk difference, RoB2 … Risk of Bias 2 Tool, vs … versus
Explanations
a High risk of bias in one domain of outcome measurement in all studies (self-reported outcome after label exposure, no blinding), some concerns in multiple domains (mainly due to no sensitivity analysis, missing protocol, missing baseline data, high number participants excluded from analysis due to missing data)
b Risk of bias for one study was extracted from Zuckermann et al. (2024), no justification for overall high risk of bias was given
c Inconsistency not rated down because even though some results show no significant effect, all results point in the same direction
d Two studies with overall moderate risk of bias, results were extracted from Zuckermann et al. (2024), no justification was given
e Indirectness due to studies assessed hypothetical purchasing decisions, retrospective self-reported consumption, and drinking speed, which are only proxies for actual alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour
f One study with overall moderate risk of bias, results were extracted from Zuckermann et al. (2024), no justification was given

Table 4-3: Summary of findings HWL versus HWL comparison, critical outcomes

Outcome comparison	Impact	№ of participants (studies)	Certainty of the evidence
Perception of health risks associated with alcohol consumption			
Text-only HWL vs other HWL	Text-only health warning labels (cancer, liver disease, general health) likely do not differ from differently sized text-only, text-and-image, and text-and-pictogram health warning labels with the same content in their effects on the perception of health risks associated with alcohol consumption.	4,986 (5 RCTs)	⊕⊕⊕◯ Moderate [a]
Text-and-pictogram HWL vs other HWL	Text-and-pictogram health warning labels (eight different health risks) likely do not differ from text-and-image health warning labels with the same content in their effects on the perception of health risks associated with alcohol consumption.	432 (1 RCT)	⊕⊕⊕◯ Moderate [b c]
Image-only HWL vs other HWL	Image-only cancer health warning labels likely do not differ from text-and-pictogram cancer health warning labels in their effects on the perception of health risks associated with alcohol consumption.	3,003 (1 RCT)	⊕⊕⊕◯ Moderate [c d]
Shift in behaviour regarding alcohol consumption			
Text-only HWL vs other HWL	Text-only cancer health warning labels likely lead to a slightly statistically significant smaller shift in behaviour regarding alcohol consumption compared to cancer text-and-image health warning labels (OR 0.80, 95% CI 0.69 – 0.92).	3,012 (1 RCT)	⊕⊕⊕◯ Moderate [c e]
Text-and-pictogram vs other HWL	Text-and-pictogram health warning labels likely show statistically significant different or no shifts in behaviour regarding alcohol consumption depending on the warning content. No statistically significant difference: ■ Pregnancy and lactation HWL (-3.8 pp) vs Drinking-driving HWL (pp NR) ■ Pregnancy and lactation HWL (-3.8 pp) vs Combined HWLs (-6.1 pp) ■ Pregnancy and lactation HWL (-3.8 pp) vs Assorted HWL (-4.3 pp) ■ Drinking-driving HWL (pp NR) vs Assorted HWL ■ Combined HWL (-6.1 pp) vs Assorted HWL (-4.3 pp) Statistically significant difference: ■ Cancer HWL (-10.4 pp) vs Pregnancy and lactation HWL (-3.8 pp) ■ Cancer HWL (-10.4 pp) vs Drinking-driving HWL (pp NR) ■ Drinking-driving HWL (pp NR) vs Combined HWL (-6.1 pp) ■ Cancer HWL (-10.4 pp) vs Combined HWL (-6.1 pp) ■ Cancer HWL (-10.4 pp) vs Assorted HWL (-4.3 pp)	6,461 (1 RCT)	⊕⊕⊕◯ Moderate [c e]
Image-only HWL vs other HWL	Image-only cancer health warning labels likely result in a slightly greater shift in behaviour regarding alcohol consumption compared with a cancer text-and-image health warning label (OR 1.34, 95% CI 1.16 – 1.55).	3,003 (1 RCT)	⊕⊕⊕◯ Moderate [c e]

Abbreviations: CI … confidence interval, HWL … health warning label, NR … not reported, OR … odds ratio, pp … percentage points RCT … randomised controlled trial, RoB2 … Risk of Bias 2 Tool, vs … versus

Explanations
a High risk of bias in outcome measurement in all studies (self-reported outcome after label exposure, no blinding), some concerns in multiple domains (due to missing protocol and missing baseline characteristics).
b Risk of bias for one study was extracted from Zuckermann et al. (2024), no justification for overall high risk of bias was given
c Inconsistency not applicable due to single study design
d High risk of bias in outcome measurement (self-reported outcome after label exposure, no blinding)
e Indirectness due to studies assessed hypothetical purchasing decisions, retrospective self-reported consumption, and drinking speed, which are only proxies for actual alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour

4.3 RQ3: Contextualisation for Austria

Kontextualisierung für Österreich: WHO-INTEGRATE-Framework

This chapter presents a contextualization for the use of HWLs on alcoholic beverages in Austria, informed by the seven criteria of the WHO-INTEGRATE Evidence-to-Decision Framework (version 11 May 2026) [1, 35] developed by the World Health Organisation (WHO). Additionally, to the findings from the systematic review (SR) conducted to address RQ1 and RQ2 in this report, 21 sources identified through the targeted manual search contributed to the contextualisation for Austria.

An overall judgement across all criteria of the WHO-INTEGRATE Evidence-to-Decision Framework is presented in Table 4-4 below. A detailed rating for each sub-criteria can be found in the Appendix (chapter 7.4).

Balance of health benefits and harms

This criterion evaluates whether the expected health benefits of an intervention outweigh any potential adverse effects or unintended harms, considering impacts at both the individual and population levels, as well as broader public health effects [1].

WHO: kein sicherer Alkoholkonsum; Krebswarnhinweise potenziell wirksam für Verhaltensänderung von Einzelpersonen

Effectiveness on individuals: The World Health Organization (WHO) stated that there is no safe level of alcohol consumption, as even one alcoholic drink per day can measurably increase the risk of alcohol-related health consequences, particularly cancer [10]. Austria presents one of the highest alcohol per capita consumption within the WHO European Region by 11.8 litres of pure alcohol per person per year for the general population aged 15+ years in the three-year average 2019-2022 [8]. In 2023, 3,397 deaths in Austria were associated with alcohol consumption [9]. Findings from the SR conducted within this report indicate that HWLs on alcoholic beverages may influence alcohol-related behaviour and intentions to change, as well as increase perception of potential health risks, especially when they communicate cancer-related health risks. These findings support the implementation of HWLs that communicate the association between alcohol consumption and relevant health consequences as a health benefit for individuals. No evidence was found indicating that HWLs cause net harm to individuals' health.

Alkohol schädigt nicht nur Konsument:innen; Auswirkungen auch auf Gesundheit der Allgemeinbevölkerung

Effectiveness on population and broader health-related impacts: Alcohol consumption, particularly at higher levels, not only increases health risks for individuals but also poses several risks to others, especially through unintentional injuries, traffic accidents, and alcohol-related violence, as well as a reduced quality of life for the social environment of drinkers [3, 5]. The effectiveness of HWLs in reducing the selection and purchase of alcoholic beverages for individuals, as well as slowing consumption rates, might contribute to decreasing alcohol-related harmful effects at the population level.

Value of different health outcomes: This sub-criterion aimed to assess how the target population values different health outcomes of HWLs. As there is no evidence addressing this topic, this sub-criterion cannot be assessed.

Overall, HWLs (particularly those communicating cancer-related risks) are likely to influence alcohol-related behaviour and might contribute to reducing both individual and population-level alcohol-related harms.

Societal implications

This criterion evaluates the wider societal implications of an intervention by considering its potential social, economic, and environmental effects beyond health outcomes, including impacts on communities and the broader society [1].

Social consequences: Austria is characterised by a permissive alcohol culture, in which moderate alcohol consumption is widely accepted, and excessive drinking is often tolerated in specific social and cultural settings, such as festivals and celebrations [11]. In this context, increasing public knowledge and perception of alcohol-related consequences may be particularly impactful. Findings from the SR conducted above indicate that HWLs on alcoholic beverages likely improve knowledge and risk perception regarding alcohol-related health risks as well as increase intentions to reduce or quit alcohol consumption. These effects were consistently observed when HWLs included a cancer warning. Given the widespread acceptance of alcohol consumption in Austria, cancer-specific HWLs may contribute to changing public perceptions of alcohol consumption by increasing awareness of its health risks.

Österreich: permissive Alkoholkultur; Krebswarnhinweise können zur Entstigmatisierung beitragen & Risikowahrnehmung verbessern

Environmental impact: This sub-criterion cannot be assessed, as no evidence on environmental impact and ecological sustainability of HWLs on alcoholic beverages was identified.

keine Evidenz zu Umweltauswirkungen von Warnhinweisen (HWLs)

Economic impact: An Austrian economic analysis from 2013 [54] estimated the annual net societal cost of alcohol-related disease at €738 million. It found €374 million in direct medical costs and €38 million in indirect non-medical costs (such as sick leave, long-term care, and disability pensions), plus additional indirect costs from lost productivity due to illness and premature death. After accounting for benefits such as alcohol tax revenues and reduced pension payments, alcohol-related disease resulted in a substantial net economic burden [54]. A 2021 SR, primarily including high-income countries in Europe and North America, found that societal costs associated with alcohol consumption are equivalent to 2.6% of gross domestic product [17]. Actual costs are likely even higher because many non-monetary impacts on families and communities are difficult to measure [12]. As the SR conducted within this report found that especially cancer HWLs likely result in a behaviour change in alcohol consumption, intentions to reduce or quit alcohol consumption, and increased knowledge of alcohol-related health risks, cancer HWLs might contribute to a reduction of the economic burden caused by alcohol consumption. Although reduced alcohol consumption may contribute to lowering the substantial societal costs attributable to alcohol-related harm, it may also have economic implications for the alcohol industry, which represents an important economic sector in Austria [11]. These competing economic interests should be considered when weighing the overall societal impact of implementing HWLs (also see sub-criterion Acceptability among implementors below).

Österreich: HWLs können Alkoholkonsum-Verhalten beeinflussen und zur Reduktion gesellschaftlicher Kosten beitragen, mögliche wirtschaftliche Auswirkungen auf Alkoholindustrie

Overall, HWLs (particularly those communicating cancer-related risks) might contribute to reducing the substantial societal and economic burden associated with alcohol consumption by increasing awareness of alcohol-related health consequences and encouraging healthier drinking behaviours. At the same time, reduced alcohol consumption may have negative economic implications for the alcohol industry, which is an important economic sector in Austria.

Human rights

This criterion examines whether an intervention is consistent with internationally recognised human rights principles [1].

HWL stärken Recht auf Gesundheitsinformation & informierte Kaufentscheidungen

HWLs on alcoholic beverages do not violate the Universal Declaration of Human Rights adopted by the United Nations in 1948. The introduction of HWLs on alcoholic beverages in Austria could further strengthen consumers' right to health information by ensuring access to clear and accessible information on the health risks associated with alcohol consumption. In line with WHO recommendations, HWLs have the potential to support informed decision-making, promote healthier choices, and enhance consumer protection [15, 55].

Acceptability

This criterion assesses the extent to which an intervention is acceptable to those affected by or involved in its implementation. It considers acceptability among recipients, implementers, and relevant stakeholder groups, as well as the interventions' intrusiveness and their potential impact on individual autonomy [1].

Österreich: 52% befürworten HWL als wirksame Maßnahme (2020)

Acceptability among recipients: According to the Austrian Representative Survey of Consumption and Potentially Addictive Behaviours 2020, 52% of respondents agreed that HWLs on alcoholic beverages are an effective measure to reduce alcohol-related health consequences, while 27% disagreed and 22% neither agreed nor disagreed [9].

Alkoholindustrie: gegen HWL-Pflicht (fehlende Wirksamkeit, Handelsbarrieren & wirtschaftliche Folgen); favorisiert Selbstregulierung

Acceptability among implementors: The alcohol industry generally shows low acceptability of mandatory HWLs on alcoholic beverages and consistently favours voluntary, self-regulatory approaches over government regulation [14]. Industry organisations argue that consumers are already aware of alcohol-related risks and that mandatory HWLs are unnecessary. They frequently question the effectiveness of HWLs in changing behaviour and have raised concerns about potential unintended consequences like trade barriers and negative economic impacts. The industry has often opposed legislative proposals for mandatory HWLs on alcoholic beverages [14]. The same arguments were used in Ireland against the mandatory implementation of HWLs [56]. Originally scheduled to come into effect in May 2026, the Irish legislation was postponed until 2028, following interference from the alcohol industry [33].

Stakeholder: keine klare Evidenz; EU: keine Einigung trotz wiederholter Diskussionen im Europaparlament

Acceptability among relevant stakeholders: There is no clear evidence on the acceptability of HWLs on alcoholic beverages among national and international relevant stakeholders, but the European Parliament has repeatedly discussed the mandatory implementation of HWLs on alcoholic beverages within the European Beating Cancer Plan. However, no EU-wide legislation has yet been adopted, with Ireland being the first EU Member State to mandate cancer HWLs on alcoholic beverages [57]. According to available evidence, Austria's current position indicates that mandatory HWLs on alcoholic beverages will be implemented only if required under EU legislation [30].

niederschwellige Intervention; HWL schränken Alkoholzugang nicht ein

Intrusiveness on individual liberties: Mandatory HWLs on alcoholic beverages are considered a low-intrusiveness intervention. They do not restrict consumers' access to alcohol, limit purchasing opportunities, increase legal barriers, or prohibit consumption. Instead, they provide information about the health risks associated with alcohol consumption at the point of purchase and consumption, thereby supporting informed decision-making [55].

Autonomy impact: HWLs have a low impact on individuals' autonomy. Findings from the SR conducted within this report support the implementation of HWLs on alcoholic beverages, as they are likely to increase knowledge and perception of the risks associated with alcohol consumption, enabling individuals to make more informed choices. The greatest effect was found across HWLs addressing the risks of cancer, regardless of their label design. A study conducted across 14 European countries found that only 55% of participants in Austria were aware of the association between alcohol consumption and cancer. Knowledge of specific alcohol-related cancers was even lower: 51% for liver cancer, 44% for colon cancer, 28% for oral cancer, 15% for female breast cancer and 6% for skin cancer [58].

Österreich: 55% kennen Alkohol-Krebs-Zusammenhang; Krebswarnhinweise zur Wissenssteigerung geeignet

Overall, HWLs on alcoholic beverages appear to be acceptable by the public, while acceptability among the alcohol industry is low due to opposition to mandatory regulation. As a low-intrusiveness intervention, HWLs might support informed decision-making by increasing awareness of alcohol-related health risks without restricting individual autonomy or access to alcohol.

Health equity, equality, and non-discrimination

This criterion evaluates whether an intervention promotes health equity and equality, avoids discrimination, and is affordable, accessible, and relevant to the severity or rarity of the health condition addressed [1].

Decrease of existing inequalities/inequities: No empirical evidence was identified that explicitly evaluated the impact of HWLs on health inequalities. The following assessment is therefore based on the characteristics of the intervention. HWLs are unlikely to increase and may help to reduce health inequalities because they provide standardised health information directly to all consumers at the point of purchase or consumption, including population groups with limited access to other health information sources.

keine verfügbare Evidenz zu Gesundheitsungleichheiten durch HWL

Affordability for the population: No empirical evidence on the affordability of HWLs on alcoholic beverages for the population was identified, and the assessment for this sub-criterion is based on the characteristics of HWLs as a regulatory labelling intervention rather than on empirical evidence. HWLs on alcoholic beverages are unlikely to create financial barriers for the target population. As a regulatory labelling intervention, HWLs are integrated into existing product packaging and provide health information at the point of purchase or consumption. Therefore, the intervention is not expected to generate direct out-of-pocket costs for consumers.

HWL: keine finanziellen Barrieren für Konsument:innen

Accessibility: From a physical perspective, HWLs on alcoholic beverages are highly accessible because they are directly attached to the alcohol container and therefore available to everyone at the point of purchase (and potentially consumption) across retail settings, including supermarkets and convenience stores [21]. Exposure might be lower in on-trade contexts (e.g. bars and restaurants), where consumers often do not directly see packaging. This might reduce reach in certain consumption settings. From the informational perspective, accessibility of HWLs on alcoholic beverages is uneven, creating potential barriers for non-German speakers, people with low health literacy or visual impairments. As the SR conducted in this report identified several HWL types and designs that showed beneficial effects compared with no HWL, the usage of text-and-image-based HWLs may improve the accessibility and comprehension of health warnings among the general population.

hohe physische Zugänglichkeit am Kaufort; eingeschränkt in Gastronomie,

eingeschränkte Verständlichkeit für vulnerable Gruppen

Addressing a severe or rare condition: HWLs address a severe and widespread public health condition in Austria, where 681 deaths were associated with alcohol consumption in 2023 [9]. The nationwide representative survey on substance use conducted in Austria in 2020 indicated that 15% of respondents engage in health-risk alcohol consumption. The prevalence of this consumption pattern is higher among men (18%) than among women (11%), indicating pronounced gender differences. Individuals in all age groups are affected by health-risk alcohol consumption, with the prevalence increasing with age [9]. HWLs displaying alcohol-related health risks directly address the health consequences of alcohol consumption, regardless of gender or age.

Österreich: 15% mit gesundheitsriskantem Alkoholkonsum, 681 alkoholassoziierte Todesfälle (2023)

Overall, HWLs are unlikely to increase health inequalities and might improve equity by providing standardised health information to all consumers without creating financial barriers. Although accessibility may be limited for some population groups and consumption settings, HWLs can reach a broad population and address the substantial burden of alcohol-related harm across all age groups and both sexes in Austria.

Financial implications

This criterion assesses the financial implications of an intervention by considering its costs, budgetary impact, and whether the expected benefits are proportionate to the resources required for its implementation [1].

Cost and budget impacts: Currently, there is no evidence or real-world data on the short- or long-term cost and budgetary impacts of HWLs on alcoholic beverages. It therefore remains unclear whether these impacts would be sustainable for those financing or implementing the intervention.

keine Kosten- & Budgetdaten zu HWL; finanzielle Nachhaltigkeit unklar

Cost to benefit ratio: As our report found, HWLs likely contribute to a change in intention and behaviour regarding alcohol consumption as well as increase knowledge of alcohol-related health consequences. According to the WHO, the most cost-effective measures for reducing alcohol-related consequences are pricing, marketing and availability policies. Even though HWLs are not among these 'best buys', evidence indicates that they increase support for other alcohol policies. Therefore, they should not be seen as a standalone intervention, but as a low-cost component of a broader and combined alcohol policy approach to reduce alcohol-related harms [21].

HWL: niedrigschwellige Ergänzung zu Preis-, Marketing- & Verfügbarkeitspolitik; nicht als Einzelintervention geeignet

Overall, HWLs are likely to be a low-cost intervention that complements broader alcohol control policies by promoting healthier alcohol consumption behaviours and increasing support for other alcohol policies.

Feasibility and health system considerations

This criterion evaluates the feasibility of implementing an intervention within the existing health system. It considers legal and regulatory requirements, governance and leadership, compatibility with current health system structures, workforce capacity and other human resources, as well as the availability of the necessary health system and broader infrastructure [1].

Legal and regulatory aspects: According to EU legislation, alcoholic drinks with an alcohol by volume above 1.2% (except wine) are exempt from mandatory ingredient and nutrition labelling. EU Member States do have the right to implement additional labels if they are in accordance with EU standards: accurate, easy to see and understand, not misleading, and indelible [59]. E.g. cancer HWLs would meet these criteria if designed according to EU standards, as alcohol is classified as a Group 1 carcinogen for humans by the International Agency for Research on Cancer [4].

Österreich: nationale Einführung von HWL laut EU-Recht möglich

Governance and leadership: The WHO requires HWLs on alcoholic beverages in its Global Alcohol Action Plan 2022-2030; therefore, a worldwide formal institution is leading this recommendation [15]. There are several non-governmental and public health organisations aiming for evidence-based alcohol policymaking, where Eurocare is one of them, in collaboration with the WHO Regional Office for Europe. Eurocare compiles and shares key policy documents and resources that support its advocacy efforts and those of partner organisations in Brussels. These materials also serve as valuable tools for national advocates and other stakeholders working on alcohol-related policy issues [60].

WHO fordert HWL; weitere Unterstützung durch NGOs auf EU- & nationaler Ebene

Compatibility with existing health system: HWLs on alcoholic beverages are compatible with Austria's existing health system, as implementation would primarily require regulatory amendments and enforcement through existing food-labelling and consumer protection mechanisms, with only minor coordination needed between health, regulatory, and industry stakeholders [55].

kompatibel mit österreichischem Gesundheitssystem

Health workforce and human resources: The WHO describes alcohol labelling and warning requirements as regulatory measures implemented through legislation and product regulation rather than through healthcare service delivery. This intervention does not depend on healthcare professionals to be delivered to individuals. Once legislation is adopted, producers are responsible for redesigning labels and ensuring compliance [15].

regulatorische Maßnahme; Umsetzung durch Produzent:innen

Health system and broader infrastructure: HWLs on alcoholic beverages are a relatively simple population-level intervention that can be implemented through existing product labelling and packaging systems. Unlike many public health interventions, HWLs do not require additional healthcare infrastructure or major information technology systems. Implementation is expected to require mainly regulatory changes and modifications to product labels by manufacturers rather than substantial investments in new infrastructure [55].

kein zusätzlicher Infrastrukturbedarf

Overall, HWLs on alcoholic beverages are legally feasible under EU legislation and are supported by WHO recommendations. Their implementation is compatible with Austria's existing regulatory and health system infrastructure and requires limited additional resources beyond regulatory amendments and product label changes.

Certainty of evidence

Overall, the certainty of the evidence was rated as moderate for perceptions of alcohol-related health risks and behavioural changes. However, confidence in the findings is limited because most evidence is derived from experimental studies without long-term follow-up, and several outcomes were assessed as having a high risk of bias due to self-reported, unblinded outcome measurements conducted immediately after exposure to the labels, and measurements for behaviour change are only proxies for actual alcohol consumption and do not directly demonstrate a sustained change in alcohol consumption behaviour. Details of the certainty of evidence from findings of this SR are presented in chapter 4.2.4 and in the Appendix (Table 7-9, Table 7-10).

Evidenz aus experimentellen Studien ohne Langzeitbeobachtungen

As the contextualisation was further supported by reports published by the WHO and by relevant data from the most recent Austrian nationwide representative survey commissioned by the Austrian Federal Ministry of Labour, Social Affairs, Health, Care and Consumer Protection, a best-practice approach was applied to incorporate the most relevant evidence available in this context.

Kontextualisierung gestützt durch WHO-Berichte & österreichische Daten

Table 4-4: Overall WHO-INTEGRATE judgement for health warning labels in Austria [1]

Criteria	Favours intervention	Probably favours intervention	Favours neither intervention nor comparator	Probably favours comparator	Favours comparator	Varies	Cannot assess
Balance of health benefits and harms		x					
Societal implications		x					
	Yes	Probably yes	Unclear	Probably no	No	Varies	Cannot assess
Human rights	x						
Acceptability			x				
Health equity, equality and non-discrimination		x					
Financial implications			x				
Feasibility and health system considerations		x					

5 Discussion

This report identified different types of health warning labels (HWLs) on alcoholic beverages, assessed their effectiveness on general population health, and provided a contextualisation for Austria.

Berichtsziel: Wirksamkeit von Warnhinweisen auf alkoholischen Getränken (HWL) & Kontextualisierung für Österreich

To answer the first research question (RQ), this report sought to identify HWL types described in the literature, which were then categorised as text-only, text-and-pictogram, text-and-image or image-only. Text-only HWLs displayed a warning message only, while for text-and-pictogram HWLs the warning message was accompanied by a pictogram and for text-and-image HWLs the warning message was reinforced by a coloured image representing the textual warning. The image-only HWL displayed no written warning and displayed a coloured image only. Additionally, HWLs also varied in label content, addressing several alcohol-related health and safety risks (e.g. cancer, heart and liver disease, pregnancy risk and drink-driving).

FF1: vier HWL-Typen identifiziert

Regarding the second RQ, HWLs were compared with the original, currently used label without an HWL, and with different HWL types (text-only, text-and-pictogram, text-and-image, image-only) against one another. Effectiveness was assessed regarding the perception of health risks associated with alcohol consumption, shift in behaviour regarding alcohol consumption, intentions to change alcohol consumption, attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes. The main results can be summarised as follows:

FF2: Vergleich HWL zu kein HWL und HWL-Typen untereinander

Perception of health risks associated with alcohol consumption

Six randomised controlled experimental studies (n=29,610) [38, 44-48] reported on the outcome perception of health risks associated with alcohol consumption. Across all studies, outcomes were reported immediately after participants' exposure to either an HWL or a no-HWL control condition. Therefore, a high risk of bias arises across these studies due to a lack of blinding and self-reported outcomes, leading to moderate certainty of evidence for this outcome.

6 rand. Studien, Krebswarnhinweise konsistent sehr großer Effekt auf Gesundheitsrisikowahrnehmung; kein signifikanter Unterschied zwischen HWL-Typen (moderate Evidenz)

Overall, cancer warnings were the only HWL content consistently associated with a very large effect on increased perception of health risks associated with alcohol consumption across all HWL types. There is moderate certainty of evidence indicating no significant differences between HWL types in their effects on the perception of health risks associated with alcohol consumption.

Shift in behaviour regarding alcohol consumption

Five randomised controlled experimental studies (n=15,091) [38-40, 43, 46] reported on proxies for the outcome shift in behaviour regarding alcohol consumption. The setting across these studies was either a naturalistic shopping laboratory, an online shop, an online survey platform, or a university-based setting in which participants watched a movie while drinking alcoholic beverages. In these settings, the outcome assessor was either an online computer program or a non-blinded researcher. The overall certainty of evidence for this outcome was assessed as moderate, as included studies assessed only proxies for actual alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour.

5 rand. Studien, Krebswarnhinweise konsistent kleine bis sehr große Effekte auf Verhaltensänderung; bildbasiertes HWL größter Effekt (Ergebnis aus Einzelstudie)

Overall, cancer warnings were the only HWL content consistently associated with effects on a shift in behaviour regarding alcohol consumption, ranging

from small to very large. There is moderate certainty of evidence for one study that an image-only HWL produced the largest effect regarding a shift in behaviour, followed by a text-and-image HWL and the text-only HWL.

Intentions to change alcohol consumption

Three randomised controlled experimental studies (n=9,178) [45, 46, 48] reported on the outcome intentions to change alcohol consumption. Across all studies, outcomes were reported immediately after participants' exposure to either an HWL or a no-HWL control condition. Therefore, a high risk of bias arises across these studies due to a lack of blinding and self-reported outcomes.

3 rand. Studien, multiple HWL (Krebs, Lebererkrankung, allg. Gesundheit) konsistent signifikante Erhöhung der Intentionsänderung; kein signifikanter Unterschied zwischen HWL-Typen

Overall, multiple HWLs (including cancer, liver disease, and general health) were consistently associated with a statistically significant difference ranging to very large effects across all HWL types when it comes to the intention to change alcohol consumption. No statistically significant differences between HWL types in their effects on intentions to change alcohol consumption were found.

Findings from the qualitative study

One qualitative study (n=50) [53] discussing small and large text-only and text-and-image HWLs in focus groups was included in this review. Relevant for this report were results on HWL content and HWL images comparison.

1 qualitative Studie: spezifische HWL (Krebs, Lebererkrankung) wirkungsvoller als allgemeine HWL; CT-Scanner-Bild am aufmerksamkeitsstärksten

For the *HWL content comparisons*, specific warnings on liver disease and cancer were perceived as more impactful than a general health warning. Participants favoured realistic and relatable information and suggested providing additional details on cancer risk, short-term health consequences, alcohol dependence, and sources of support such as helplines.

For the *HWL image comparisons*, participants perceived images that clearly showed alcohol-related health consequences as more informative and impactful than ambiguous images. The Computed Tomography Scanner image was rated as the most attention-grabbing and thought-provoking, as it clearly conveyed the potential long-term consequences of alcohol consumption.

Attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes

No results were found for attitudes towards and beliefs about alcohol consumption, incidence of alcohol-related diseases and economic outcomes across eligible studies for this report.

Summary of findings contextualisation for Austria

RQ3 assessed HWLs on alcoholic beverages across the seven criteria of the WHO-INTEGRATE Evidence-to-Decision framework [35] for the Austrian context. Overall, cancer-specific HWLs emerge as a favourable, low-intrusiveness intervention for the Austrian context. They likely result in increasing perception of alcohol-related health risks and shifting drinking behaviour and intentions, with potential population-level gains through reduced alcohol selection and slower consumption time. HWLs might contribute to reducing Austria's substantial disease burden from alcohol-related disease. They align with human rights by supporting consumers' right to information, show moderate public acceptability (52% of Austrians regard them as effective[4]) despite consistent opposition from the alcohol industry, and have a low impact on individual autonomy while addressing low awareness of the alcohol-cancer link among individuals in Austria. HWLs are considered likely to reduce or at least not worsen health inequalities, are affordable and easily accessible for everyone at the point of purchase. Though reach is lower in on-trade settings and among non-German speakers, those with low health literacy, or those with visual impairment. HWLs address a condition associated with 681 alcohol related deaths in Austria in 2023. They are legally feasible under EU labelling rules, are required globally by the WHO Global Alcohol Action Plan 2022-2030, and are compatible with Austria's existing health system, requiring minimal additional infrastructure or workforce. Several sub-criteria (value of different health outcomes, environmental impact, and cost and budget impacts) could not be assessed due to insufficient evidence. Overall, HWLs might be best positioned not as a standalone intervention but as a low-cost component of a broader, combined alcohol policy approach.

Krebswarnhinweise: niedrigschwellige Intervention für Österreich

potenziell wirksam für Gesundheitsrisikowahrnehmung, Verhaltens- und Intentionsänderung

EU-rechtlich umsetzbar

Menschenrechtskonform

Kompatibel mit österr. Gesundheitssystem

Ergänzungsmaßnahme einer kombinierten Alkoholpolitik

5.1 Interpretation

Internal validity, external validity and evidence gaps

Results of this systematic review should be interpreted cautiously due to concerns regarding the internal validity of the included studies. Six randomised controlled experimental studies [38, 44-48] reporting on perception of health risks associated with alcohol consumption and three of them additionally on intentions to change alcohol consumption were assessed as having a high risk of bias in the measurement of these outcomes (Cochrane Risk of Bias tool version 2), as outcomes were self-reported after label exposure and blinding was not possible. Additional limitations included missing study protocols, incomplete baseline data, substantial missing data, and the absence of sensitivity analyses in some studies. The overall high risk of bias led to moderate certainty of evidence in the GRADE assessment for the outcome of perception of health risks associated with alcohol consumption. Results from studies included for the outcome shift in behaviour also need to be interpreted with caution, as these studies measured only proxies for an actual change in alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour.

Interne Validität:

Verblindung strukturell nicht möglich; Selbstauskunft, daher moderate GRADE-Evidenz für Gesundheitsrisikowahrnehmung

Ergebnisse für Verhaltensänderung nur Annäherungen, keine langfristige Verhaltensänderung gemessen

[4] The specific type of warning labels referred to was not specified.

hohes Verzerrungsrisiko in qualitativer Studie

For the qualitative study [53], the absence of researcher reflexivity and background, a missing explicit theoretical framework or protocol, limited ethnical and diversity considerations, and limited discussion of saturation or disconfirming cases collectively lead to serious undiscussed methodological limitations and an overall assessment of serious concerns.

heterogene Messmethoden & Settings für alle Endpunkte

The internal validity of our findings is further limited by the fact that all outcomes combined several different measures. This might explain the wide range of effects from no difference to very large effect sizes within one outcome category and label type. Therefore, the results should be interpreted with caution. For perception of health risks and intentions to change alcohol consumption, studies [38, 44-48] used various questionnaires developed or adapted by the authors, often based on items from previous research, capturing cognitive and behavioural impact as well as knowledge or risk perception of the alcohol-health link and different items to assess intentions to change (e.g. quit or reduce alcohol consumption, intentions to drive after drinking alcohol). For shift in behaviour, studies [38-40, 43, 46] measured either self-reported changes in alcohol consumption over the previous week, consumption time, or selection and purchasing behaviour, and were conducted in diverse settings, including a naturalistic shopping laboratory, an online shop, an online survey platform, and a university-based setting where participants watched a movie while drinking.

Externe Validität:

nur 1 Studie mit österreichischen Teilnehmer:innen

The external validity of these findings is limited, as none of the included studies was conducted exclusively in Austria. Only one study [44] included Austrian participants. Although the remaining studies were carried out in countries classified as having the same Human Development Index as Austria, they were located in settings (the United Kingdom, Switzerland, Australia and Chile) which might not be fully comparable with Austria in drinking culture, baseline consumption levels, and existing alcohol-control policies. Austria's comparatively permissive drinking culture and high per-capita alcohol consumption may influence the effectiveness of HWLs, limiting the generalizability of these findings to the Austrian context. Despite these concerns, the key consideration is not whether effects observed in other countries would be replicated in Austria, but whether the intervention produces measurable effects under real-world conditions. Evidence from experimental settings may have limited applicability to real-world alcohol consumption behaviour, particularly regarding whether observed effects translate into sustained behavioural change. As only studies conducted in controlled environments were identified, the findings primarily reflect efficacy rather than real-world effectiveness and may therefore not fully capture the impact of HWLs under real-world conditions.

fragliche Übertragbarkeit der Ergebnisse auf reale Bedingungen

unterschiedliche Altersgruppen in analysierten Studien

A further concern is the sample composition: four studies [40, 45, 48, 53] were restricted to young adults or university students (aged 18–35 years), and all participants were active alcohol consumers. Because the prevalence of health-risk drinking in Austria increases with age, these younger and self-selected drinker samples may not represent the full target population. At the same time, established consumption patterns in older generations are only modifiable to a limited extent, so the most relevant effects of HWLs may in fact concern younger and future generations, for whom the predominance of younger samples could be less of a limitation than it first appears.

All included studies examined HWLs applied directly to the alcohol container and assessed their effects predominantly in retail-like contexts (e.g. a naturalistic shopping laboratory, an online shop, or containers presented on a screen), reflecting the point of purchase where consumers handle the labelled container. They do not capture consumption in bars, restaurants, and at events, where beverages are often served in glassware, and the labelled container is not visible to the consumer, substantially reducing the reach of container-based HWLs. This review did not include evidence on how warnings would need to be extended to other touchpoints, such as menus, draught dispensers or advertisements, to reach consumers where the container is not visible. Effectiveness estimates derived from container-based labelling may therefore not transfer directly to all real-world consumption settings in Austria.

HWL nur auf Flaschen; eingeschränkte Übertragbarkeit auf alle Konsumkontexte

All included studies were conducted in experimental settings, including shopping laboratories, online shops, online survey panels, or university rooms, rather than under real-world conditions. None of the included studies evaluated an actually implemented labelling policy using real-world sales, consumption or population-level data. Studies from a large real-world setting experiment conducted in Yukon, Canada, were not eligible for this review because the examined HWLs did not meet the restricted inclusion criteria. It therefore remains unclear whether the effects observed in experimental settings would translate into real-world changes in alcohol consumption across the population.

nur experimentelle Studien

Almost all studies exposed participants to the label only once and measured outcomes immediately afterwards. No evidence was available on the durability or long-term effects of HWLs on alcohol consumption. This is a substantial gap, as the central public-health question is whether HWLs can sustainably reduce consumption at the societal level over time, not whether they shift perception or intention at first exposure. Particularly critical is the implicit assumption that effects are measurable in the short term. Changes in attitudes, social norms, and drinking cultures are typically long-term processes, and short-term evaluations may therefore be misleading. Interventions can also initially provoke resistance, reactance, or even counterproductive effects but become effective over time, or vice versa.

Messung direkt nach Etikettexposition, keine Langzeiteffekte gemessen

Embedding findings into existing knowledge

There is one SR from 2021 [24] and two SRs from 2024 [25, 41] examining the effectiveness of HWLs on alcoholic beverages. Clarke et al. 2021 [24] primarily focused on alcoholic drink selection and consumption outcomes and secondly on intention or motivation to change alcohol consumption. Zuckermann et al. (2024) [41] reported on alcohol consumption behaviour, knowledge and understanding of the HWL message, as well as support for HWLs. Joyce et al. (2024) [25] organised findings on HWLs into six categories, including knowledge and awareness, perception, attention, recall and cognition, attitudes and beliefs, and intentions and behaviour. Even though outcomes were similar across these reviews, there are differences in study scope and methodology.

Beitrag zu bestehendem Wissen:

3 systematische Übersichtsarbeiten zu HWL auf Alkoholverpackungen (2021–2024);

Findings from the SR conducted in this report are consistent with the previous research, indicating that HWLs on alcoholic beverages likely result in increased perception of alcohol-related health risks, behaviour shift regarding alcohol consumption and increased intentions to change alcohol consumption. Another shared finding is that effects are moderated by label content and design.

Ergebnisse dieser Arbeit konsistent mit bisheriger Forschung

This SR extends findings from prior SRs not only by comparing HWLs against a no-HWL control, but also by systematically comparing the identified HWL types (text-only, text-and-pictogram, text-and-image, and image-only) directly against one another, allowing conclusions about the relative effectiveness of label types. In contrast to the broader scope of previous reviews, the SR conducted in this report restricted the analysis to HWLs presented on the alcohol container, isolating the effect of the labelled product itself. Clarke et al. [24] confined to controlled experimental settings and also covered food HWLs. Zuckermann et al. (2024) [41] evaluated HWLs alongside low-risk drinking and standard-drink labels, whereas Joyce et al. [25] span both experimental and real-world evidence at the cost of less restrictive methodological standards. The SR conducted in this report also examined intention to change alcohol consumption separately from actual reported behaviour change, which permits a clearer distinction between what consumers say they will do and what they actually are doing.

Erweiterung bisheriger Evidenz: systematischer Vergleich HWL-Typen; Trennung von Intentionsänderung & tatsächlicher Verhaltensänderung

erstmalige länderspezifische Kontextualisierung für Österreich

Within the three existing SRs mentioned above [24, 25, 41], experimental rather than real-world settings dominate the evidence base, and the certainty for most outcomes was moderate to low.

Finally, by appraising the evidence using the WHO-INTEGRATE Evidence-to-Decision Framework [48], the present report translates the findings from its SR into a concrete contextualisation for Austria, addressing the gap left by prior reviews, which do not provide country-specific contextualisation.

According to the WHO, the most cost-effective measures for reducing alcohol-related consequences are pricing, marketing and availability policies [21]. Even though HWLs are not among these 'best buys', findings from the SR in this report indicate that HWLs on alcoholic beverages might result in increased perception of alcohol-related health risks, behaviour shift and intentions to change alcohol consumption. Therefore, they should not be seen as a standalone intervention, but as a low-cost component of a broader and combined alcohol policy approach to reduce alcohol-related harms.

laut WHO: HWL keine Einzelmaßnahme; niedrigschwellige Ergänzung einer kombinierten Alkoholpolitik

5.2 Limitations

Several limitations regarding the interpretation of this report's findings should be noted. No real-world studies met the inclusion criteria, and the findings are based on experimental settings. None of the included studies was conducted exclusively in Austria, and only one study [44] included Austrian participants within a larger European sample, limiting the generalisability of our findings to the Austrian context.

Limitationen:

nur experimentelle Studien eingeschlossen; keine österr. Studien

Results for the outcome 'perception of health risks associated with alcohol consumption' should be interpreted with caution, as assessments conducted immediately after label exposure may primarily reflect short-term recall of the provided information rather than a long-lasting change in knowledge or risk perception. None of the included studies used long-term follow-ups, meaning that the persistence of any observed changes in risk perceptions over time remains unclear.

Endpunkt "Gesundheitsrisikowahrnehmung": keine Evidenz für langfristige Veränderung

A further limitation concerns our definition of the outcome 'shift in behaviour regarding alcohol consumption' itself, which was defined as a critical outcome but is not directly supported by the measures used across the included studies [38-40, 43, 46]. Only two measures approximated actual alcohol consumption (self-reported alcohol intake over the previous week following repeated label exposure [38] and the time taken to finish an alcoholic beverage [40]). The remaining outcomes assessed beverage selection or (simulated) purchasing decisions rather than consumption itself and should therefore be interpreted as proxies of alcohol consumption behaviour. The two consumption-related measures were assessed only once shortly after label exposure, providing no evidence of sustained changes in drinking behaviour. Therefore, the findings should not be interpreted as demonstrating lasting changes in actual alcohol consumption.

Endpunkt „Verhaltensänderung": inkludierte Studien erfassen keine tatsächliche Verhaltensänderung, überwiegend Annäherungen statt tatsächlicher Konsummessung

No studies could be included for the outcomes 'incidence of alcohol-related diseases' and 'economic outcomes'. Both outcomes were considered inappropriate indicators for evaluating the effectiveness of HWLs, as they do not represent direct or immediate consequences of HWL exposure. Potential effects on population health or economic outcomes would be expected to occur only in the long term and would be influenced by numerous additional factors beyond HWL. Therefore, they are not suitable proxy measures for assessing the immediate impact of HWL.

Inzidenz alkoholassoziierter Erkrankungen und ökonomische Endpunkte: ungeeignete Endpunkte

Another limitation concerns the broad population definition. By defining the target population as the general population, studies covering different age groups and varying gender proportions were included. As results were not reported stratified by age or gender, age- and gender-specific effect estimates could not be derived, limiting conclusions about which population groups HWLs are most effective for.

breite Populationsdefinition

Only studies published in English or German were eligible for inclusion, owing to the language capacities of the project team. This restriction may have introduced language bias and could have led to the exclusion of relevant studies published in other languages.

nur englisch- und deutschsprachige Studien

Risk of bias was assessed using the Cochrane Risk of Bias 2 tool (RoB2) [49], which is only suitable for randomised survey-based experiments to a limited extent. Domain 2 (awareness of the intervention) should be interpreted with caution because of direct exposure to the intervention (HWL) or the control (no HWL) condition across all studies. For the three studies [38-40] extracted from the systematic review by Zuckermann et al. (2024) [41], domain-specific RoB2 judgements and justifications were unavailable as they were not reported in the review. Reaching out to the authors was not successful.

RoB2 nur eingeschränkt für experimentelle Studien geeignet

Given the heterogeneity of the results, no meta-analysis was conducted; therefore, the GRADE assessment was rated narratively. The certainty of evidence was assessed only for critical outcomes. For all comparisons between different HWL types except one (text-only HWL versus other HWL), the certainty of evidence was based on a single study, resulting in a small evidence base per comparison and limiting the robustness of these findings, as consistency across studies could not be assessed.

Heterogenität der Effektmaße; GRADE narrativ; überwiegend Einzelstudien für Vergleiche von HWL-Typen

5.3 Conclusion

10 Studien eingeschlossen

HWL: potenzielle Wirksamkeit für Gesundheitsrisikowahrnehmung, Verhaltensänderung und Intentionsänderung; (v.a. Krebswarnhinweise)

bildbasierte HWL größten Effekt hinsichtlich Verhaltensänderung (1 Studie), kein Unterschied von HWL-Typen für andere Endpunkte

keine klare Empfehlung für Österreich möglich, HWL als Ergänzung kombinierter Alkoholpolitik

This report identified existing HWL types for alcoholic beverages, evaluated their effectiveness on the general population health and derived a contextualisation for Austria. Based on ten primary studies (nine randomised experimental studies and one qualitative study), the findings indicate that HWLs on alcoholic beverages may increase the perception of alcohol-related health risks and potentially change behaviour and intentions regarding alcohol consumption, depending on the HWL design. Cancer warnings were the only HWL content consistently associated with a potentially large effect across all identified HWL types (text-only, text-and-pictogram, text-and-image, image-only). The HWL type appears to matter only for behaviour change, where image-only HWLs likely produce the greatest effect, followed by text-and-image and text-only HWLs (based on findings from one study). In contrast, no statistically significant differences between HWL types were found for the perception of health risks associated with alcohol consumption or intentions to change alcohol consumption. These findings should be interpreted considering the report's limitations, in particular the exclusively experimental evidence base, the moderate certainty for the perception of health risk and behaviour change outcome, and the certainty mostly based on a single study for HWL type comparisons, as well as the absence of Austria-specific, real-world, and long-term studies.

Due to these limitations concerning the quality of available evidence, a direct recommendation for the Austrian setting regarding the implementation of HWLs cannot be derived. Despite limitations, HWLs for alcoholic beverages in Austria might be considered as a low-cost component of a broader alcohol policy approach to reduce alcohol-related harms. Given Austria's comparatively permissive drinking culture and one of the highest per-capita consumption levels in the WHO European Region, as well as a lack of knowledge regarding the alcohol-cancer link, cancer-specific HWLs may be particularly relevant for increasing knowledge and risk perception. HWLs should not be regarded as a standalone measure, but as one supportive element within a comprehensive alcohol policy.

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7 Appendix

7.1 Label characteristics of included studies

Table 7-1: Label characteristics of included studies

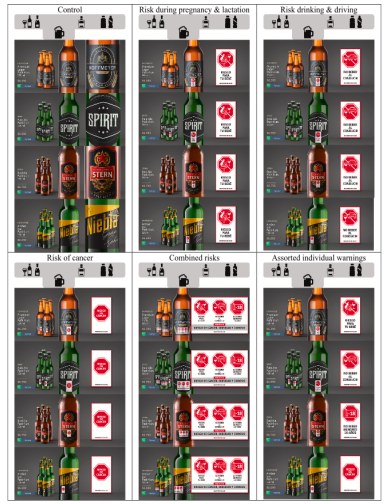
Country of study	HWL content	Visual components	Label message	Image (example)	Outcomes measured	Reference
Text-only HWL						
Australia	Cancer (liver, bowel, throat, at least 7 types), weight gain, heart failure, bleeding in the brain, liver cirrhosis and liver disease, bleeding in the brain	Yellow and orange border	One of the below: 1. Alcohol is high in kilo- joules and so causes weight gain 2. Drinking alcohol can increase your risk of heart failure 3. Drinking alcohol increases the risk of bleeding in the brain 4. Alcohol can increase your risk of cirrhosis and liver damage 5. Alcohol can increase your risk of liver cancer 6. Drink- ing alcohol increases the risk of bowel cancer 7. Alcohol increases the risk of throat cancer		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption Intention to change alcohol consumption	Brennan et al., 2022* [38]

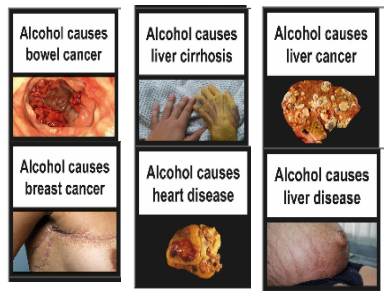
United Kingdom	Cancer (bowel, breast, liver), liver cirrhosis and liver disease, heart disease	black border	One of the below: 1. Alcohol causes bowel cancer 2. Alcohol causes breast cancer 3. Alcohol causes liver cirrhosis 4. Alcohol causes heart disease 5. Alcohol causes liver cancer 6. Alcohol causes liver disease		Shift in behaviour regarding alcohol consumption	Clarke et al., 2021 [43]
United Kingdom	Cancer (bowel, breast, liver)	black border	One of the below: 1. Alcohol causes bowel cancer 2. Alcohol causes breast cancer 3. Alcohol causes liver cancer		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption	Clarke et al., 2021* [39]

14 European countries (Austria, Belgium, Estonia, France, Germany, Ireland, Latvia, Lithuania, the Netherlands, Norway, Portugal, Slovenia, Spain, and Sweden)	Cancer (breast and colon), general health harm, responsible alcohol use	red or black border	One of the below: 1. Please drink responsibly 2. Alcohol harms your health 3. Alcohol causes cancer including breast and colon cancer		Perception of health risks associated with alcohol consumption	Correia et al., 2024 [44]
Scotland	Cancer (no specification), general health harm, liver disease	Black border, small and large label	One of the below: 1. Alcohol causes cancer (wine) 2. Alcohol damages your health (vodka) 3. Alcohol increases risk of liver disease (gin)		Knowledge of alcohol harms, and recall of health information and messaging on packaging	Jones et al., 2021 [53]

United Kingdom	Cancer (mouth), general health harm, liver disease	black border, small or large label	One of the below: 1. Alcohol damages your health 2. Alcohol causes liver disease 3. Alcohol causes mouth cancer		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption	Jones et al., 2022 [45]
Switzerland (German-speaking part)	Cancer (liver)	black border	Alcohol causes deadly liver cancer (translated from German)		Perception of health risks associated with alcohol consumption	Staub et al., 2022 [47]

United Kingdom	Cancer (liver)	black border	Alcohol causes fatal liver cancer		Perception of health risks associated with alcohol consumption (Wigg & Stafford) Shift in behaviour regarding alcohol consumption (Stafford & Salmon) Intention to change alcohol consumption (Wigg & Stafford)	Wigg & Stafford, 2016 [48] Stafford & Salmon, 2017* [40]
Text-and-pictogram HWL						
Australia	Cancer (liver, bowel, throat, at least 7 types), weight gain, heart failure, bleeding in the brain, liver cirrhosis and liver disease, bleeding in the brain	Yellow and orange border, black-white-and-red pictogram	One of the below: 1. Alcohol is high in kilo- joules and so causes weight gain 2. Drinking alcohol can increase your risk of heart failure 3. Drinking alcohol increases the risk of bleeding in the brain 4. Alcohol can increase your risk of cirrhosis and liver damage 5. Alcohol can increase your risk of liver cancer 6. Drinking alcohol increases the risk of bowel cancer 7. Alcohol increases the risk of throat cancer		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption Intention to change alcohol consumption	Brennan et al., 2022* [38]

14 European countries (Austria, Belgium, Estonia, France, Germany, Ireland, Latvia, Lithuania, the Netherlands, Norway, Portugal, Slovenia, Spain, and Sweden)	Cancer (breast and colon)	red border, red pictogramm (red hazard symbol and red exclamation mark)	Alcohol causes cancer, including breast and colon cancer		Perception of health risks associated with alcohol consumption	Correia et al., 2024 [44]
Chile	Cancer (no specification), risks during pregnancy and lactation, drink-driving, underage alcohol consumption	red border, red octagon with pictogram or text inside	One of the below: 1. Risk for your baby 2. no drinking for the driver 3. cancer risk 4. risk of cancer, obesity and cirrhosis 5. No alcohol for those under 18 (translated from Spanish by DeepL)		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption	Schwartz et al., 2024 [46]

Text-and-image HWL						
Australia	Cancer (liver, bowel, throat, at least 7 types), weight gain, heart failure, bleeding in the brain, liver cirrhosis and liver disease, bleeding in the brain	Yellow and orange border, coloured photograph	One of the below: 1. Alcohol is high in kilo- joules and so causes weight gain 2. Drinking alcohol can increase your risk of heart failure 3. Drinking alcohol increases the risk of bleeding in the brain 4. Alcohol can increase your risk of cirrhosis and liver damage 5. Alcohol can increase your risk of liver cancer 6. Drinking alcohol increases the risk of bowel cancer 7. Alcohol increases the risk of throat cancer 8. Alcohol increases the risk of at least 7 types of cancer		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption Intention to change alcohol consumption	Brennan et al., 2022* [38]
United Kingdom	Cancer (bowel, breast, liver), liver cirrhosis and liver disease, heart disease	Black border, coloured image (bowel cancer, breast cancer, hand with liver cirrhosis, heart disease, liver cancer or liver disease)	One of the below: 1. Alcohol causes bowel cancer 2. Alcohol causes breast cancer 3. Alcohol causes liver cirrhosis 4. Alcohol causes heart disease 5. Alcohol causes liver cancer 6. Alcohol causes liver disease		Shift in behaviour regarding alcohol consumption	Clarke et al., 2021 [43]

United Kingdom	Cancer (bowel, breast, liver)	Black border, coloured image (bowel cancer)	One of the below: 1. Alcohol causes bowel cancer 2. Alcohol causes breast cancer 3. Alcohol causes liver cancer		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption	Clarke et al., 2021* [39]
14 European countries (Austria, Belgium, Estonia, France, Germany, Ireland, Latvia, Lithuania, the Netherlands, Norway, Portugal, Slovenia, Spain, and Sweden)	Cancer (breast and colon)	red border, colored image (patient with cancer)	Alcohol causes cancer, including breast and colon cancer		Perception of health risks associated with alcohol consumption	Correia et al., 2024 [44]

Scotland	Cancer (no specification), general health harm, liver disease	black border, coloured image (MRI, patient in hospital bed or patient with liver disease)	One of the below: 1. Alcohol causes cancer (wine) 2. Alcohol damages your health (vodka) 3. Alcohol increases risk of liver disease (gin)		Knowledge of alcohol harms, and recall of health information and messaging on packaging	Jones et al., 2021 [53]
United Kingdom	Cancer (mouth), general health harm, liver disease	black border, coloured image (patient with health issues or MRI)	One of the below: 1. Alcohol damages your health 2. Alcohol causes liver disease 3. Alcohol causes mouth cancer		Perception of health risks associated with alcohol consumption Intention to change alcohol consumption (reported as one outcome)	Jones et al., 2022 [45]

Switzerland (German-speaking part)	Cancer (liver)	black border, coloured image (diseased liver)	Alcohol causes deadly liver cancer (translated from German)		Perception of health risks associated with alcohol consumption	Staub et al., 2022 [47]
United Kingdom	Cancer (liver)	black border, coloured image (diseased liver)	Alcohol causes fatal liver cancer	 	Perception of health risks associated with alcohol consumption (Wigg & Stafford) Shift in behaviour regarding alcohol consumption (Stafford & Salmon) Intention to change alcohol consumption (Wigg & Stafford)	Wigg & Stafford, 2016 [48]

Image-only HWL						
United Kingdom	NA	Black border, image of bowel cancer	NA		Perception of health risks associated with alcohol consumption Shift in behaviour regarding alcohol consumption	Clarke et al., 2021* [39]
United Kingdom	NA	Cancer	NA	NR	Shift in behaviour regarding alcohol consumption	Stafford & Salmon, 2017* [40]

Abbreviations: HWL… Health warning label, NA… not applicable, NR… not reported

*Notes: *… included in Zuckermann et al. (2024) [41]*

7.2 Evidence tables of included studies

Table 7-2: Evidence table HWL versus no HWL comparison, randomised experimental studies not included in Zuckermann et al. (2024) [41]

Author, year	Clarke et al., 2021 [43]	Correia et al., 2024 [44]	Jones et al., 2022 [45]	Schwartz et al., 2024 [46]	Staub et al., 2022 [47]	Wigg & Stafford, 2016 [48]
Country	United Kingdom	14 European countries (Austria, Belgium, Estonia, France, Germany, Ireland, Latvia, Lithuania, the Netherlands, Norway, Portugal, Slovenia, Spain, and Sweden)	United Kingdom	Chile	Switzerland (German-speaking part)	United Kingdom
Study design	Experimental study: randomised controlled shopping laboratory experiment	Experimental study: randomised controlled online survey	Experimental study: randomised controlled online survey	Experimental study: randomised controlled online experiment	Experimental study: randomised controlled online survey	Experimental study: randomised controlled laboratory experiment
Study duration	February 2020	October 24th 2022 - May 24th 2023	September - October 2020	February - March 2022	October 2020	NR
Study population	Adults †, regularly beer/wine consumption (i.e. ≥1 drink per week, supermarket product purchase + shopping in physical stores ≥ 1 per month	Adults † (20 years in Lithuania), ≥ 1 drink in past year	Young adults ††, alcohol cosumers (minimum drinking status NR)	Adults †, ≥ 1 drink in past year, plus pregnant or lactating women	Adults †, wine consumers (minimum drinking status NR)	University students ††, alcohol consumers (minimum drinking status NR)
Number of participants (% female)	n=399 (55%)	n=19,110 (51%)*	n=1,360 (59.6%)	n=7,758 (54%)	n=457 (51%)*	n=60 (72%)*
Intervention, HWL type	Text-only and text-and-image HWL	Text-only (responsible drinking, general health harm, cancer), text-and-pictogram (cancer) and text-and-image (cancer) HWL	Text-only (small), text-only (large), and text-and-image HWL	Text-and-pictogram HWL	Text-only and text-and-image HWL	Text-only and text-and-image HWL

Author, year	Clarke et al., 2021 [43]	Correia et al., 2024 [44]	Jones et al., 2022 [45]	Schwartz et al., 2024 [46]	Staub et al., 2022 [47]	Wigg & Stafford, 2016 [48]
Exposure to label	Once on a real container in a naturalistic shopping laboratory	Once on a virtual beer can, wine or vodka bottle	Once on a virtual Smirnoff vodka bottle	Once on a virtual container in a simulated online supermarket (Consumers could explore each aisle as long as they wanted before selecting which beverage to buy for their consumption, as they would before a gathering with friends.)	Once on a virtual wine bottle	Once on a real beer and wine bottle
Comparator	no HWL	no HWL HWL vs HWL (for non-included outcome in this report)	no HWL HWL vs HWL	no HWL HWL vs HWL (for alcohol bevererage purchase)	no HWL (and additionally between HWLs)	no HWL (and additionally between HWLs)
Primary endpoint(s)	Proportion of total alcoholic drinks selected	Increased knowledge of alcohol as a risk factor for cancer	Exposure to and engagement with current messaging on packs Support for displaying product and health-related information Impact on product appeal and social acceptability Cognitive and behavioural impact	Likelihood of purchasing any alcoholic beverage Intention to consume alcohol at a binge level intention to drive after consuming alcohol Knowledge of alcohol associated risks	Perceived health risks of wine consumption Acceptance and convincingness of HWLs Perceived need for HWLs Perceived health benefits of wine Cultural worldviews	Fear arousal Perception of health risks of consuming alcohol Intentions to reduce alcohol consumption Intentions to quit alcohol consumption
Funding	The Wellcome Trust ref: 206853/Z/17/Z)	EU4Health	University of Stirling	Ministry of Economy, Development and Tourism of Chile (National Office of Productivity and Entrepreneurship)	NR	NR

Outcomes by HWL vs no HWL comparisons (text-only, text-and-pictogram, text-and image)						
Text-only HWL vs no HWL						
Perception of health risks associated with alcohol consumption						
Responsible drinking HWL		Knowledge of alcohol as a risk factor for cancer from before to after exposure (knowledge increase weighted percentage 3.4% (95% CI 0-6.8) vs 2.4% (95% CI -1.2-6.0), AOR (95% CI) 1.46 (1.08–1.99) » RR 1.44**; large effect***).				
General health harm HWL		Knowledge of alcohol as a risk factor for cancer from before to after exposure (knowledge increase weighted percentage 5.5% (95% CI 2.1-8.9) vs 2.4% (95% CI -1.2-6.0), AOR (95% CI) 2.42 (1.83–3.24) » RR 2.34**; very large effect***).				

Cancer HWL		Knowledge of alcohol as a risk factor for cancer before to after label exposure (knowledge increase weighted percentage 32.5% (95% CI 29.8-35.2) vs 2.4% (95% CI−1.2-6.0), AOR (95% CI) 20.20 (15.88–26.12) » RR 13.83**; very large effect***).			Perceived risk on a 0 to 100 rating scale falling ill with cancer from regularly consuming wine M (SD) = 49 (27) vs 36 (26),sig. difference p<0.001 impact on health from regularly consuming wine M (SD) 53 (27) vs 45 (27), sig. difference p=0.029 consuming two glasses of wine per day M (SD) = 52 (30) vs 48 (29), no sig difference p=NR consuming half a bottle of wine M (SD) = 47 (32) vs 46 (31), no sig difference p=NR health risk for an unborn child if the mother regularly drinks wine M (SD) = 85 (19) vs 87 (16), no sig difference p=NR	Perception of the health risks of consuming alcohol on a 7-point Likert scale First label exposure: M (SE) 4.40 (0.43) vs 2.65 (0.40), no sig. difference p=0.07 Second label exposure: M (SE) 3.85 (0.45) vs 2.85 (0.33), p=NR
Multiple HWL (including cancer, liver disease, general health)			Cognitive and behavioural impact Small label: positive impact 27% vs 8%, (AOR (95% CI) 8.87 (6.00–13.10), sig difference p< 0.001, » RR 5.44**; very large effect***). Large label: positive impact 35.3% vs 8%, (AOR (95% CI) 11.88 (8.09–17.46), sig difference p< 0.001 » RR 6.35**; very large effect***).			

Shift in behaviour regarding alcohol consumption						
Multiple HWL (including cancer, liver or heart disease)	Proportion of alcoholic drinks selected adjusted mean 41% vs 44%, OR (95% CI) 0.87 (0.67-1.14) » RR 0.92**, no effect***, no sig difference p=0.31, H0 = [Bayes factor (BF) < 0.01]). At least one alcoholic drink selected 91% vs 84%, OR (95% CI) 0.63 (0.28-1.42) »RR 0.91**; no to small effect***, no sig difference p=0.27 Total spend on alcoholic drinks, in £ unadjusted mean (SE) 10.52 (11.68) vs 9.56 (9.87), estimated MD (95% CI) 1.15 (-1.43-3.72), no sig difference p=0.38, Cohen's d=0.11 Total spend on alcoholic drinks as a proportion of total spend unadjusted mean (SE) 0.68 (0.28) vs 0.66 (0.32), estimated MD (95% CI) 0.01 (-0.06-0.09), no sig difference p=0.73, Cohen's d=0.03					

Intention to change alcohol consumption						
Cancer HWL						Intentions to reduce alcohol consumption First label exposure: M (SE) 3.21 (0.39) vs 1.80 (0.25), no sig. difference p>0.10 Second label exposure: M (SE) 2.68 (0.28) vs 2.10 (0.31), p=NR Intentions to quit alcohol consumption First label exposure: M (SE) 2.12 (0.21) vs 1.35 (0.11), no sig. difference p>0.10 Second label exposure: M (SE) 2.17 (0.23) vs 1.90 (0.24), p=NR
Multiple HWL (including cancer, liver disease, general health)			Positive cognitive and behavioural impact § Small label: positive impact 27% vs 8%, (AOR (95% CI) 8.87 (6.00–13.10), sig difference p< 0.001, » RR 5.44**; very large effect***). Large label: positive impact 35.5% vs 8%, (AOR (95% CI) 11.88 (8.09–17.46), sig difference p< 0.001 » RR 6.35**; very large effect***).			
Attitudes towards and beliefs about alcohol consumption						
NR						
Incidence of alcohol-related diseases						
NR						
Economic outcomes						

NR						
Text-and-pictogram HWL vs no HWL						
Perception of health risks associated with alcohol consumption						
Pregnancy and lactation HWL				Knowledge of health risks associated with alcohol consumption: Risk for pregnant control mean 4.508, (adjusted RD (robust SE) 0.085 (0.028), sig difference p=0.003) Risk in lactation control mean 4.325, (adjusted RD (robust SE) 0.079 (0.031), sig difference p=0.012) Risk drive after drinking control mean 4.713, (adjusted RD (robust SE) -0.003 (0.023), no sig difference p=0.903) Risk for underage control mean 3.938, (adjusted RD (robust SE) 0.027 (0.035), no sig difference p=0.443) Risk for anyone control mean 3.282, (adjusted RD (robust SE) -0.018 (0.034), no sig difference p=0.591)		

Drinking-driving HWLs				Knowledge of health risks associated with alcohol consumption: Risk for pregnant control mean 4.508, (adjusted RD (robust SE) 0.058 (0.030), no sig difference p=0.051) Risk in lactation control mean 4.325, (adjusted RD (robust SE) 0.047 (0.032), no sig difference p=0.140) Risk drive after drinking control mean 4.713, (adjusted RD (robust SE) -0.015 (0.023), no sig difference p=0.529) Risk for underage control mean 3.938, (adjusted RD (robust SE) 0.038 (0.035), no sig difference p=0.286) Risk for anyone control mean 3.282, (adjusted RD (robust SE) 0.014 (0.035), no sig difference p=0.687)		

Cancer HWL		Knowledge of cancer risk before to after label exposure (knowledge increase weighted percentage 33.3% (95% CI 30.4-36.2) vs. 2.4% (95% CI−1.2-6.0), AOR (95% CI) 21.16 (16.62–27.38) » RR 14.26**; very large effect***).		Knowledge of health risks associated with alcohol consumption: Risk for pregnant control mean 4.508, (adjusted RD (robust SE) 0.033 (0.029), no sig difference p=0.259) Risk in lactation control mean 4.325, (adjusted RD (robust SE) 0.052 (0.032), no sig difference p=0.107) Risk drive after drinking control mean 4.713, (adjusted RD (robust SE) 0.014 (0.023), no sig difference p=0.546) Risk for underage control mean 3.938, (adjusted RD (robust SE) 0.024 (0.035), no sig difference p=0.496) Risk for anyone control mean 3.282, (adjusted RD (robust SE) 0.074 (0.035), sig difference p=0.033)		

Combined HWLs (pregnancy/lactation + driving/drinking + under-18 + Risk of cancer, obesity, and cirrhosis)				Knowledge of health risks associated with alcohol consumption: Risk for pregnant control mean 4.508, (adjusted RD (robust SE) 0.097 (0.028), sig difference p=0.001) Risk in lactation control mean 4.325, (adjusted RD (robust SE) 0.062 (0.031), no sig difference p=0.047) Risk drive after drinking control mean 4.713, (adjusted RD (robust SE) -0.001 (0.023), no sig difference p=0.980) Risk for underage control mean 3.938, (adjusted RD (robust SE) 0.052 (0.035), no sig difference p=0.137) Risk for anyone control mean 3.282, (adjusted RD (robust SE) 0.041 (0.035), no sig difference p=0.234)		

Assorted warnings (rotating labels)				Knowledge of health risks associated with alcohol consumption: Risk for pregnant control mean 4.508, (adjusted RD (robust SE) 0.023 (0.030), no sig difference p=0.444) Risk in lactation control mean 4.325, (adjusted RD (robust SE) 0.024 (0.032), no sig difference p=0.461) Risk drive after drinking control mean 4.713, (adjusted RD (robust SE) -0.009 (0.023), no sig difference p=0.686) Risk for underage control mean 3.938, (adjusted RD (robust SE) -0.029 (0.035), no sig difference p=0.410) Risk for anyone control mean 3.282, (adjusted RD (robust SE) 0.014 (0.034), no sig difference p=0.694)		
Shift in behaviour regarding alcohol consumption						
Cancer HWL				Purchases of alcoholic beverages control 77.3% vs -10.4 pp, (adjusted RD (robust SE) -0.104 (0.018), sig difference p<0.001, OR (95% CI) 0.561 (-0.139,-0.069) » RR 0.85**; small effect***, sig difference p<0.001		

Pregnancy/lactation HWL				Purchases of alcoholic beverages control 77.3% vs -3.8 pp, (adjusted RD (robust SE) -0.038 (0.017), sig difference p=0.025, OR (95% CI) 0.806 (-0.071,-0.005) » RR 0.95**; no effect***, sig difference p=0.025		
Drinking-driving HWL				Purchases of alcoholic beverages control 77.3% vs pp NR, (adjusted RD (robust SE) -0.021 (0.017), no sig difference p=0.205, OR (95% CI) 0.884 (-0.054, 0.012) » RR 0.97**; no effect***, no sig difference p=0.19).		
Combined HWLs (pregnancy/lactation + driving + under-18 + cancer, obesity, and cirrhosis)				Purchases of alcoholic beverages control 77.3% vs -6.1 pp, (adjusted RD (robust SE) -0.061 (0.017), sig difference p<0.001, OR (95% CI) 0.708 (-0.095,0.028) » RR 0.91**; small effect***, sig difference p<0.001).		
Assorted warnings (rotating labels)				Purchases of alcoholic beverages control 77.3% vs -4.3 pp, (adjusted RD (robust SE) -0.043 (0.017), sig difference p=0.011, OR (95% CI) 0.782 (-0.076, -0.010) » RR 0.94**; no effect***, sig difference p=0.011).		

Intention to change alcohol consumption						
Pregnancy and lactation HWL				Intention to consume alcohol at a binge level: General population control mean 2.667, adjusted RD (robust SE) -0.166 (0.045), sig difference p<0.001 Pregnant or lactating women control mean 1.820, adjusted RD (robust SE) -0.285 (0.113), sig difference p=0.012 Intention to drive after drinking 2 glasses: Drivers only control mean 2.076, adjusted RD (robust SE) 0.059 (0.061), no sig difference p=0.329 Drank and drove last 12 months control mean 2.912, adjusted RD (robust SE) 0.070 (0.103), no sig difference p=0.495		

Drinking-driving HWLs				Intention to consume alcohol at a binge level: General population control mean 2.667, adjusted RD (robust SE) -0.103 (0.046), sig difference p=0.024 Pregnant or lactating women control mean 1.820, adjusted RD (robust SE) 0.081 (0.126), no sig difference p=0.519 Intention to drive after drinking 2 glasses: Drivers only control mean 2.076, adjusted RD (robust SE) 0.076 (0.061), no sig difference p=0.214 Drank and drove last 12 months control mean 2.912, adjusted RD (robust SE) 0.183 (0.103), no sig difference p=0.075		

Cancer HWL				Intention to consume alcohol at a binge level: General population control mean 2.667, adjusted RD (robust SE) -0.177 (0.046), sig difference p<0.001 Pregnant or lactating women control mean 1.820, adjusted RD (robust SE) -0.082 (0.123), no sig difference p=0.503 Intention to drive after drinking 2 glasses: Drivers only control mean 2.076, adjusted RD (robust SE) 0.061 (0.062), no sig difference p=0.319 Drank and drove last 12 months control mean 2.912, adjusted RD (robust SE) 0.031 (0.105), no sig difference p=0.771		

Combined HWLs (pregnancy/lactation + driving/drinking + under-18 + Risk of cancer, obesity, and cirrhosis)				Intention to consume alcohol at a binge level: General population control mean 2.667, adjusted RD (robust SE) -0.130 (0.046), sig difference p=0.005 Pregnant or lactating women control mean 1.820, adjusted RD (robust SE) -0.199 (0.110), no sig difference p=0.072 Intention to drive after drinking 2 glasses: Drivers only control mean 2.076, adjusted RD (robust SE) 0.106 (0.062), no sig difference p=0.089 Drank and drove last 12 months control mean 2.912, adjusted RD (robust SE) 0.182 (0.103), no sig difference p=0.078		

Assorted warnings (rotating labels)				Intention to consume alcohol at a binge level: General population control mean 2.667, adjusted RD (robust SE) -0.151 (0.047), sig difference p=0.001 Pregnant or lactating women control mean 1.820, adjusted RD (robust SE) -0.116 (0.129), no sig difference p=0.370 Intention to drive after drinking 2 glasses: Drivers only control mean 2.076, adjusted RD (robust SE) 0.057 (0.061), no sig difference p=0.348 Drank and drove last 12 months control mean 2.912, adjusted RD (robust SE) 0.109 (0.103), no sig difference p=0.291		
Attitudes towards and beliefs about alcohol consumption						
NR						
Incidence of alcohol-related diseases						
NR						
Economic outcomes						
NR						
Text-and-image HWL vs no HWL						
Perception of health risks associated with alcohol consumption						

Cancer HWL		Knowledge of cancer risk before to after label exposure knowledge increase weighted percentage 32.5% (95% CI 29.6-35.4) vs 2.4% (95% CI–1.2-6.0), AOR (95% CI) 20.61 (16.19–26.68) » RR 14.01**; very large effect***).			Perceived risk on a 0 to 100 rating scale falling ill with cancer from regularly consuming wine M (SD) = 47 (27) vs 36 (26), sig. difference p=0.001 impact on health from regularly consuming wine M (SD) 51 (27) vs 45 (27), no sig. difference p=0.145 consuming two glasses of wine per day M (SD) = 49 (28) vs 48 (29), no sig difference p=NR consuming half a bottle of wine M (SD) = 45 (33) vs 46 (31), no sig difference p=NR health risk for an unborn child if the mother regularly drinks wine M (SD) = 88 (16) vs 87 (16), no sig difference p=NR	Perception of the health risks of consuming alcohol on a 7-point Likert scale First label exposure: M (SE) 4.55 (0.37) vs 2.65 (0.40) sig difference p=0.003 Second label exposure: M (SE) 4.55 (0.34) vs 2.85 (0.33), p=NR
Multiple HWL (including cancer, liver disease, general health)			Cognitive and behavioural impact positive impact 29.7% vs 8%, (AOR (95% CI) 10.01 (6.78–14.77), sig difference p< 0.001, » RR 5.82**; very large effect***).			

Shift in behaviour regarding alcohol consumption						
Multiple HWL (including cancer, liver or heart disease)	Proportion of alcoholic drinks selected adjusted means 46% vs 44%, OR (95% CI) 1.08, (0.82–1.42) » RR 1.04**, no effect***, no sig. difference p=0.55; H0 = [Bayes factor (BF) < 0.01]. At least one alcoholic drink selected unadjusted mean 87% vs 84%, OR (95% CI) 0.85 (0.42-1.70) » RR 0.973**; no effect***, no sig difference p=0.64 Total spend on alcoholic drinks, in £ unadjusted mean (SE) 9.09 (7.03) vs 9.56 (9.87), estimated MD (95% CI) -0.43 (-2.41-1.56), no sig difference p=0.0.67, Cohen's d= -0.05 Total spend on alcoholic drinks as a proportion of total spend unadjusted mean (SE) 0.68 (0.30) vs 0.66 (0.32), estimated MD (95% CI) 0.03 (-0.04-0.11), no sig difference p=0.36, Cohen's d=0.09					

Intention to change alcohol consumption						
Cancer warning						Intentions to reduce alcohol consumption First label exposure: M (SE) 3.30 (0.40) vs 1.80 (0.25), sig difference p=0.04 Second label exposure: M (SE) 2.83 (0.34) vs 2.10 (0.31), p=NR Intentions to quit alcohol consumption First label exposure: M (SE) 2.06 (0.25) vs 1.35 (0.11), sig difference p=0.03 Second label exposure: M (SE) 2.58 (0.32) vs 1.90 (0.24), p=NR
Multiple HWL (including cancer, liver or heart disease)			Cognitive and behavioural impact § positive impact 29.7% vs 8%, (AOR (95% CI) 10.01 (6.78–14.77), sig difference p< 0.001, » RR 5.82**; very large effect***).			
Attitudes towards and beliefs about alcohol consumption						
NR						
Incidence of alcohol-related diseases						
NR						
Economic outcomes						
NR						

Abbreviations: AOR… adjusted odds ratio, CI… confidence interval, HWL... health warning label, M… mean score, NR… not reported, OR… odds ratio, pp... percentage points, RD… risk difference, RR… relative risk, SD… standard deviation, SE… standard error, ⋆… values calculated by the authors, †…aged 18 years and older, ††… aged 18–35 years, §... same outcome used for two outcome categories

Table 7-3: Evidence table HWL versus no HWL comparison, randomised experimental studies included in Zuckermann et al. (2024) [41]

Author, year	Brennan et al., 2022 [8]	Clarke, Pechey, et al., 2021 [9]	Stafford & Salmon, 2017 [11]
Country	Australia	United Kingdom	United Kingdom
Study design	RCT	RCT	RCT
Study duration	12 March 2020 – 8 April 2020	NR	NR
Study population	Adults (aged 18-69 years),≥1 drink per week in past year	Adults (aged 18 years and older), ≥1 drink per week (wine or beer)	University Students (aged 18-25 years), ≥1 drink per week (vodka)
Number of participants (% female)	Initial exposure: n=1,755 (52%) repeat exposure: n=1559 (%NR) Follow-up: n=1,087 (%NR)	n=6,087 (50%)	n=45 (100%)
Intervention, HWL type	Health warning label	Health warning label	Health warning label
Exposure to label	Repeat (multiple days) on virtual container	Repeat (same day) on virtual container	Once on real container
Comparator	no label	no label	no label
Outcomes	Alcohol consumption knowledge of alcohol health risks	Alcohol drink selection	Alcohol consumption rate
Funding	Australian National Health and Medical Research Council	The Wellcome Trust	University of Portsmouth
Outcomes by HWLs vs no HWL comparisons (text-only, text-and-pictogram, text-and image, image-only)			
Text-only HWL vs no HWL			
Perception of health risks associated with alcohol consumption			
Mix of four labels	Compared to no label control, participants demonstrated a similar level of knowledge regarding the risk of cancer (AOR 1.27 ≈ RR 1.09; no effect), liver damage (RR 0.98; no effect), heart disease (RR 0.98; no effect), and pregnancy complications (RR 0.99; no effect).	NR	NR
Shift in behaviour regarding alcohol consumption			
Mix of four labels	Compared to no label control, participants consumed a similar amount of alcohol in the preceding week (0.04% increase; no effect).	NR	NR
Cancer HWL	NR	Compared to no label, participants in the intervention group had lower odds of choosing a beverage with this health warning label (AOR 0.48; 95% CI	Compared to no label, participants in the intervention group were slower to consume a ready-to-drink mixed beverage (2.14 relative increase in consumption time; very large effect).

		0.41, 0.57 ≈ RR 0.80; 95% CI 0.75, 0.85; moderate effect, 95% CI moderate to small)	
Intention to change alcohol consumption			
NR			
Attitudes towards and beliefs about alcohol consumption			
NR			
Incidence of alcohol-related diseases			
NR			
Economic outcomes			
NR			
Text-and-pictogram HWL vs no HWL			
Perception of health risks associated with alcohol consumption			
Mix of four labels	Compared to no label control, participants demonstrated a similar level of knowledge regarding the risk of cancer (AOR 1.33 ≈ RR 1.10; no effect), liver damage (RR 1.02; no effect), heart disease (RR 1.02; no effect), and pregnancy complications (RR 0.98; no effect).	NR	NR
Shift in behaviour regarding alcohol consumption			
Mix of four labels	Compared to no label control, participants consumed a similar amount of alcohol in the preceding week (0.02% increase; no effect).	NR	NR
Intention to change alcohol consumption			
NR			
Attitudes towards and beliefs about alcohol consumption			
NR			
Incidence of alcohol-related diseases			
NR			
Economic outcomes			
NR			

Text-and-image HWL vs no HWL			
Perception of health risks associated with alcohol consumption			
Mix of four labels	Compared to no label control, participants demonstrated a similar level of knowledge regarding the risk of cancer (AOR 1.37 ≈ RR 1.11; no effect), liver damage (RR 1.03; no effect), heart disease (RR 0.99; no effect), and pregnancy complications (RR 0.92; no effect).	NR	NR
Shift in behaviour regarding alcohol consumption			
Mix of four labels	Compared to no label control, participants consumed a similar amount of alcohol in the preceding week (0.08% increase; no effect).	NR	NR
Cancer HWL	NR	Compared to no label, participants in the intervention group had lower odds of choosing a beverage with this health warning label (AOR 0.39; 95% CI 0.33, 0.45 ≈ RR 0.74; 95% CI 0.68, 0.78; moderate effect, 95% CI large to moderate).	NR
Intention to change alcohol consumption			
NR			
Attitudes towards and beliefs about alcohol consumption			
NR			
Incidence of alcohol-related diseases			
NR			
Economic outcomes			
NR			
Image-only HWL vs no HWL			
Perception of health risks associated with alcohol consumption			
NR			
Shift in behaviour regarding alcohol consumption			

Cancer HWL	NR	Compared to no label, participants in the intervention group had lower odds of choosing a beverage with this health warning label (AOR 0.29; 95% CI 0.25, 0.34 ≈ RR 0.64; 95% CI 0.59, 0.69; large effect, 95% CI large to large)	Compared to no label, participants in the intervention group were slower to consume a ready-to-drink mixed beverage (2.42 relative increase in consumption time; very large effect)
Intention to change alcohol consumption			
NR			
Attitudes towards and beliefs about alcohol consumption			
NR			
Incidence of alcohol-related diseases			
NR			
Economic outcomes			
NR			

Abbreviations: AOR… adjusted odds ratio, CI… confidence interval, HWL... health warning label, NR… not reported, RCT… randomised controlled trial, RR… relative risk

Table 7-4: Evidence table HWL versus HWL comparison, randomised experimental studies

Author, year	Jones et al., 2022 [4]	Schwartz et al., 2024 [5]	Brennan et al., 2022 [8]	Clarke, Pechey, et al., 2021 [9]	Wigg & Stafford, 2016 [7]	Staub et al., 2022 [6]
Country	United Kingdom	Chile	Australia	United Kingdom	United Kingdom	Switzerland (German-speaking part)
Study design	Experimental study: randomised controlled online survey	Experimental study: randomised controlled online experiment	Randomised controlled experimental study	Randomised controlled experimental study	Experimental study: randomised controlled laboratory experiment	Experimental study: randomised controlled online survey
Study duration	September - October 2020	February - March 2022	March-April 2020	NR	NR	October 2020
Study population	Young adults ††, alcohol cosumers (any drinking status)	Adults †, ≥ 1 drink in past year, plus pregnant or lactating women	Adults †,≥1 drink per week in past year	Adults †, ≥1 drink per week (wine or beer)	University students ††, alcohol consumers (any drinking status)	Adults †, wine consumers
Number of participants (% female)	n=1,360 (59.6%)	n=7,758 (54%)	Initial exposure: n=1,755 (52%) repeat exposure: n=1559 (%NR) Follow-up: n=1,087 (%NR)	n=6,087 (50%)	n=60 (72%)*	n=457 (51%)*
Intervention, HWL type	Text-only (small), text-only (large), and text-and-image HWL	Text-and-pictogram HWL	Text-only, text-and-pictogram and text-and-image HWL	Text-only, text-and-image and image-only HWL	Text-only and text-and-image HWL	Text-only and text-and-image HWL
Exposure to label	Once on a virtual Smirnoff vodka bottle	Once on a virtual container in a simulated online supermarket (Consumers could explore each aisle as long as they wanted before selecting which beverage to buy for their consumption, as they would before a gathering with friends.)	Repeat (eight following days) on virtual container	Repeat (same day) on virtual container	Once on a real beer and wine bottle	Once on a virtual wine bottle
Comparator	no HWL HWL vs HWL	no HWL HWL vs HWL (for alcohol bevererage purchase)	no HWL, DrinkWise label, (and additionally between HWLs)	no HWL, HWL vs HWL	no HWL (and additionally between HWLs)	no HWL (and additionally between HWLs)

Primary endpoint(s)	impact on product appeal and social acceptability impact on cognitive and behavioural	Likelihood of purchasing any alcoholic beverage Intention to consume alcohol at a binge level intention to drive after consuming alcohol knowledge of alcohol associated risks	Intention to avoid/reduce drinking Readiness to change Awareness of alcohol-related harms Emotional arousal Show/talk about images with other	Primary: impact on alcohol selection Secondary: impact on emotional and cognitive responses number of alcoholic drinks selected with cognitive resource manipulation	Fear arousal Perception of health risks of consuming alcohol Intentions to reduce alcohol consumption Intentions to quit alcohol consumption	Perceived risk regarding wine consumption Acceptance and convincingness of HWLs Perceived need for HWLs Perceived health benefits of wine Cultural worldviews
Funding	University of Stirling	Ministry of Economy, Development and Tourism of Chile (National Office of Productivity and Entrepreneurship)	Australian National Health and Medical Research Council	The Wellcome Trust (Collaborative Award in Science)	NR	NR
Outcomes by HWL vs HWL comparisons (text-only, text-ad-pictogram, text-and-image, image-only)						
Text-only HWL vs other HWL						
Perception of health risks associated with alcohol consumption						
Text-only HWL	Small vs large multiple HWL (including cancer, liver disease, general health) Positive cognitive and behavioural impact: positive impact 27.0% vs 35.3% (AOR (95% CI) 0.75 (0.54, 1.03), no sig difference p=0.075)					
Text-and-image HWL	Multiple HWL (including cancer, liver disease, general health) Positive cognitive and behavioural impact: positive impact 29.7% vs 35.3% (AOR (95% CI) 0.84 (0.61, 1.16), no sig difference p=0.296)		Multiple HWL (eight different health risks) Level of knowledge regarding the risk of cancer (Follow-up) adjusted proportions 68.2% vs 69.9%, (OR (95% CI) 1.08 (0.72, 1.63), no sig difference p=1.000)	Cancer HWL Perceived disease risk mean score 14.76 vs 14.99, mean difference (95% CI) 0.23 (-0.01, 0.74), no sig difference p=0.056	Cancer HWL Perception of the health risks of consuming alcohol (after first label exposure) no significant difference (p=0.75)	Cancer HWL Perceived risk of falling ill with cancer no significant difference (p=0.811) Perceived risk on health impact from regularly consuming wine no significant difference (p=0.801)

Text-and-pictogram HWL			Multiple HWL (eight different health risks) Level of knowledge regarding the risk of cancer (Follow-up) adjusted proportions 68.2% vs 69.1% (OR (95% CI) 1.05 (0.69, 1.60), no sig difference p=1.000)			
Shift in behaviour regarding alcohol consumption						
Text-and-image HWL				Cancer HWL Proportion selecting an alcoholic drink 61% vs 56%, (OR (95% CI), 0.80 (0.69, 0.92), sig difference p=0.002 ≈ RR 0.9**; small effect		
Intention to change alcohol consumption						
Text-only HWL	Small vs large multiple HWL (including cancer, liver disease, general health) Positive cognitive and behavioural impact: positive impact 27.0% vs 35.3% (AOR (95% CI) 0.75 (0.54, 1.03), no sig difference p=0.075)					

Text-and-pictogram HWL			Multiple HWL (eight different health risks) Intention to avoid drinking alcohol completely in the next month (immediately post-exposure) adjusted proportions 16% vs 22.1%, (OR (95% CI) 1.48 (1.02, 2.15), no sig difference p=0.222) Intention to drink less in the next week (Follow-up) adjusted proportions 48.8% vs 57.5%, (OR (95% CI) 1.44 (0.98, 2.11), no sig difference p=0.366) Intention to avoid drinking alcohol completely in the next month (Follow-up) adjusted proportions 15.9% vs 19.6%, (OR (95% CI) 1.29 (0.79, 2.09), no sig difference p=1.000)			

Text-and-image HWL	Multiple HWL (including cancer, liver disease, general health) Positive cognitive and behavioural impact: positive impact 29.7% vs 35.3% (AOR (95% CI) 0.84 (0.61, 1.16), no sig difference p=0.296)		Multiple HWL (eight different health risks) Intention to avoid drinking alcohol completely in the next month (immediately post-exposure) adjusted proportion 16% vs 20.1% (OR (95% CI) 1.32 (0.90, 1.92), no sig difference p=0.604) Intention to drink less in the next week (Follow-up) adjusted proportions 48.4% vs 48.1%, (OR (95% CI) 0.99 (0.67, 1.44), no sig difference p=0.945) Intention to avoid drinking alcohol completely in the next month (Follow-up) adjusted proportions 15.9% vs 17.2%, (OR (95% CI) 1.10 (0.67, 1.79), no sig difference p=0.716)		Cancer HWL (after first label exposure) Intention to reduce alcohol consumption no significant difference (p>0.10) Intention to quit alcohol consumption no significant difference (p>0.10)	
Attitudes towards and beliefs about alcohol consumption						
NR						
Incidence of alcohol-related diseases						
NR						
Economic outcomes						
NR						
Text-and-pictogram HWL vs other HWL						
Perception of health risks associated with alcohol consumption						

Text-and-image HWL			Multiple HWL (eight different health risks) Level of knowledge regarding the risk of cancer (Follow-up) adjusted proportions 69.1% vs 69.9%, (OR (95% CI) 1.04 (0.68, 1.57), no sig difference p=0.871)			
Shift in behaviour regarding alcohol consumption						
Text-and-pictogram HWL		Likelihood of purchasing any alcoholic beverage Pregnancy and lactation HWL (-3.8 pp) vs Drinking-driving HWL (pp NR), no sig difference p=0.348 Pregnancy and lactation HWL (-3.8 pp) vs Cancer HWL (-10.4 pp) sig difference p<0.001 Pregnancy and lactation HWL (-3.8 pp) vs Combined HWLs (-6.1 pp), no sig difference p=0.239 Pregnancy and lactation HWL (-3.8 pp) vs assorted HWL (-4.3 pp), no sig difference p=0.743 Drinking-driving HWL (pp NR) vs cancer HWL (-10.4 pp), sig difference p<0.001 Drinking-driving HWL (pp NR) vs Combined HWL (-6.1 pp), sig difference p=0.032 Drinking-driving HWL (pp NR) vs Assorted HWL, no				

		sig difference p=0.260 Cancer HWL (-10.4 pp) vs Combined HWL (-6.1 pp), sig difference p=0.026 Cancer HWL (-10.4 pp) vs Assorted HWL (-4.3 pp), sig difference p=0.001 Combined HWL (-6.1 pp) vs Assorted HWL (-4.3 pp), no sig difference p=0.327				
Intention to change alcohol consumption						
Text-and-image HWL			Multiple HWL (eight different health risks) Intention to avoid drinking alcohol completely in the next month (immediately post-exposure) adjusted proportions 20.1% vs 22.1%, (OR (95% CI) 0.89 (0.62, 1.28), no sig difference p=1.000) Intention to drink less in the next week (Follow-up) adjusted proportions 57.5% vs 48.1%, (OR (95% CI) 0.68 (0.46, 1.01), no sig difference p=0.385) Intention to avoid drinking alcohol completely in the next month (Follow-up) adjusted proportions 19.6% vs 17.2%, (OR (95% CI) 0.85 (0.52, 1.39), no sig difference p=1.000)			
Attitudes towards and beliefs about alcohol consumption						
NR						

Incidence of alcohol-related diseases						
NR						
Economic outcomes						
NR						
Image-only HWL vs other HWL						
Perception of health risks associated with alcohol consumption						
Text-and-image HWL				Cancer HWL Perceived disease risk mean score 15.05 vs 14.99, (mean difference (95% CI) -0.06 (-0.30, 0.18), no sig difference p=0.636)		
Shift in behaviour regarding alcohol consumption						
Text-and-image HWL				Cancer HWL Proportion selecting an alcoholic drink 49% vs 56% (OR (95% CI), 1.34 (1.16, 1.55), sig difference p<0.001 ≈ RR 1.13**; small effect		
Intention to change alcohol consumption						
NR						
Attitudes towards and beliefs about alcohol consumption						
NR						
Incidence of alcohol-related diseases						
NR						
Economic outcomes						
NR						

Abbreviations: AOR… adjusted odds ratio, CI… confidence interval, HWL... health warning label, M… mean score, NR… not reported, OR… odds ratio, pp... percentage points, RD… risk difference, RR… relative risk, SD… standard deviation, SE… standard error, ⋆… values calculated by the authors, †…aged 18 years and older, ††… aged 18–35 years, §... same outcome used for two outcome categories

Table 7-5: Evidence table HWL versus HWL comparison, qualitative study

Author, year	Jones et al., 2021 [53]
Country	United Kindgom
Study design	Focus group
Study duration	September 2019
Study population	Adults 18-35 years, past-month drinkers
Number of participants (% female)	n=50 (50%)
Intervention, type of label (label number*)	Small and large text-only, text-and-image health warning label
Exposure to label	In second part of focus group discussion on vodka, gin and wine bottles
Comparator	Existing health information and messaging on alcohol packaging, Intervention labels against each other
Primary endpoint(s)	Knowledge of alcohol harms, and recall of health information and messaging on packaging Awareness, perceptions and use of health information and messaging on packaging Perceptions of alcohol companies' approach to health messaging on packaging Perceptions of novel warnings and impact on appeal Effectiveness of warning design
Funding	Alcohol Focus Scotland
Outcomes intervention HWLs	
HWL content and image comparison	In addition to warning size, positioning and type, content was considered important with regards to potential effectiveness. While some considered 'Alcohol damages your health' too 'basic' (18–24F, C2DE) and widely known to be effective, others felt it was the appropriate level of severity. Although several participants found the image of the hospitalized patient ambiguous, questioning 'what's actually happened' (18–24F, ABC1) to the patient, others thought it consolidated the message. The more specific health warnings (liver, cancer) received a lot of attention and were considered most impactful, with some taken aback by seeing them on alcohol products. The image of the person clutching their liver was generally viewed as more informative than the hospitalized patient because it 'shows, to an extent, the damage it can do to you' (18–24M, ABC1). The CT scanner was perceived as the most attention-grabbing and thought-provoking image as it depicts what could be 'waiting for you' (18–24M, ABC1). Most participants felt that warnings should incorporate 'realistic information' (18–24F, C2DE), and noted the relatability of these warnings, particularly the cancer warning. Some participants preferred the liver message ('Alcohol increases risk of liver disease') as it felt more nuanced than the cancer message ('Alcohol causes cancer'), allowing for individual differences such as drinking behaviour and general health. Without statistics and 'cut-off' points, some questioned the likelihood of alcohol causing cancer, especially when consumed at moderate levels. Most groups suggested that it would be more useful if the type of cancer was specified, as well as the likelihood of developing cancer based on alcohol consumption. Participants recommended other possible changes to the content of warnings that may help enhance stand out and impact, suggesting that they also display various short-term effects of alcohol consumption (e.g. impairments, nausea, hangovers) or highlight that alcohol is potentially addictive, and include information on available support (e.g. a help- line). Rotation was also viewed as necessary to reach a greater number of consumers and prolong impact.
Conclusio	
Participants in our study attended to the warnings and generally found them more engaging than the information currently provided on alcohol packaging, with some suggesting they may help to reduce consumption, in line with previous research (Hobin, Schoueri-Mychasiw, et al. 2020). They viewed large warnings, displaying images and text, and placed on the front of packaging as most likely to increase perceptions of the associated health risks and intentions to reduce selection and consumption or quit.	

Abbreviations: HWL… health warning label

7.3 Risk of bias tables and GRADE evidence profile

Internal validity of the included studies was judged by two independent researchers. In case of disagreement a third researcher was involved to solve the differences.

Table 7-6: Risk of bias by RoB2 Tool (randomised experimental studies)

Author, year	Outcome	Adequate generation of randomisation sequence	Deviations from intended interventions	Missing outcome data	Outcome measurement	Selective outcome reporting unlikely	Risk of bias – outcome level
Clarke et al., 2021 [43]	Shift in behaviour	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Correia et al., 2024 [44]	Health risk perception	Low risk	Some concerns	Low risk	High risk	Low risk	High risk
Jones et al., 2022 [45]	Health risk perception/ Shift in behaviour	Some concerns	Low risk	Low risk	High risk	Some concerns	High risk
Staub et al., 2022 [47]	Health risk perception	Low risk	Low risk	Low risk	High risk	Some concerns	High risk
Schwartz et al., 2024 [46]	Shift in behaviour	Some concerns	Low risk	Low risk	Low risk	Low risk	Low risk
	Health risk perception	Some concerns	Low risk	Low risk	High risk	Low risk	High risk
Wigg & Stafford, 2016 [48]	Health risk perception	Low risk	Low risk	Low risk	High risk	Some concerns	High risk
	Intentions to change alcohol consumption	Some concerns	Low risk	Low risk	High risk	Some concerns	High risk

Table 7-7: Risk of Bias by CAMELOT (qualitative study)

Jones et al., 2021 [53]	Fit between Research design domains and Research aim & question	Fit between Research design domains and Stakeholders	Fit between Research design domains and Researchers	Fit between Research design domains and Context	Fit between Research conduct domains and Research aim & question(s)	Fit between Research conduct domains and Stakeholders	Fit between Research conduct domains and Researchers	Fit between Research conduct domains and Context	Fit between Research design domains and Research conduct domains
	The researchers aimed to explore, in depth, young adult drinkers' awareness of the health information and messaging but failed to include people which are not able to understand the messages/information. No framework/checklist for equity assessment was used. The researchers used focus groups to collect data to address a sensitive topic. **Fair**	Alcohol Funding Scotland is the national alcohol charity working to reduce harm caused by alcohol. They do this by promoting evidence-based, cost-effective policy measures. **Excellent**	Researchers background was not described for the Researcher/Moderator of the focus group discussion. The experience of this researcher could influence the results. No discussion of researchers' relationship to participants, context or research question. **Unclear**	National and local context described, limited details on specific Glasgow-area setting. No consideration of ethical background, status of asylum seekers, language barriers. Especially, including people which are not able to understand the messages could influence the results. No framework/checklist for equity assessment was used. **Poor**	Recruitment, data collection, and analysis are well-aligned with the stated aims. Research questions not mentioned. No protocol available. Development of discussion guide was not described. No pre-testing. All other information is provided. **Fair**	Alcohol Funding Scotland is the national alcohol charity working to reduce harm caused by alcohol. AFS was not involved in the study conduction. **Excellent**	Single moderator of all focus groups. Good approach for consistency but not discussed how this may have influenced conversations and outcome data in group discussions. Not explained why mixed gender groups were not investigated and possible implications were not discussed. Researchers background was not described for the Researcher/Moderator of the focus group discussion. The experience of this researcher could influence the results. **Fair**	Context well described, urban-only recruitment might limit overall representation. **Good**	The design of the study fits the research aim and was conducted in a structured way. However, the conceptual misalignments are not isolated gaps at one stage of the research proces, they are structural absences that run through the entire study, especially since a protocol or theoretical framework is missing. The Discussion section lists several

									limitations, but the absence of theoretical grounding is not mentioned.
Indicate degree of fit	Moderate concerns	No or minimal concerns	Unclear	Serious concerns	Moderate concerns	No or minimal concerns	Moderate concerns	No or minimal concerns	Serious concerns
OVERALL ASSESSMENT OF LIMITATIONS	Serious concern								
Explanation for overall assessment	The study is well-conducted and transparently reported in most respects. But the absence of researcher reflexivity and background, no explicit theoretical framework or protocol, limited ethnical and diversity considerations, and limited discussion of saturation or disconfirming cases collectively leads to serious undiscussed methodological limitations.								

Table 7-8: Risk of bias of the systematic review from Zuckermann et al. (2024) [41] (ROBIS)

Domain	Concern	Rationale for concern
Concerns regarding specification of study eligibility criteria	Low	All signalling questions were answered as 'Yes' or 'Probably Yes',so no potential concerns about the specification of eligibility criteria were identified. Considerable effort was made to clearly specify the review questions and objectives, and to pre-specify detailed and appropriate eligibility criteria.
Concerns regarding methods used to identify and/or select studies	Low	Four out of five signalling questions were answered as 'Yes' or 'Probably Yes'. The answer 'no' refers to the language restrictions, which was appropriate given that English was included, as most studies are published in English.
Concerns regarding methods used to collect data and appraise studies	Low	All signalling questions were rated as 'Yes' and so no potential areas of bias were identified. The review processes of data collection and study appraisal are therefore unlikely to have introduced bias into this review
Concerns regarding the synthesis and findings	Low	Authors addressed heterogeneity in their analysis and explored using subgroup analyses. Risk of bias of the individual studies was addressed and authors stated it was included as a subgroup analysis.
Overall risk in the review	Low	The phase 2 assessment identified no concerns with the review process. The potential limitations of the studies included in the review in terms of risk of bias were discussed in detail in the discussion. The review conclusions appropriately reflect the results of the review

Table 7-9: Certainty of evidence (GRADE), HWL versus no HWL comparison for critical outcomes

Certainty assessment							Summary of findings
Participants (studies)	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Impact statement
Perception of health risks associated with alcohol consumption (assessed with: RoB2)							
All HWL vs no HWL							
29,610 (6 RCTs)	serious[a,b]	not serious[c]	not serious	not serious	none	⊕⊕⊕◯ Moderate[a,b,c]	Health warning labels likely result in no difference to a very large effect on the perception of health risks associated with alcohol consumption, compared to no health warning label.
Text-only HWL vs no HWL							
14,495 (5 RCTs)	serious[a,b]	not serious[c]	not serious	not serious	none	⊕⊕⊕◯ Moderate[a,b,c]	Text-only health warning labels likely result in no difference to a very large effect on the perception of health risks associated with alcohol consumption compared with no health warning label
Text-and-pictogram HWL vs no HWL							
14,394 (3 RCTs)	serious[a,b]	not serious[c]	not serious	not serious	none	⊕⊕⊕◯ Moderate[a,b,c]	Text-and-pictogram health warning labels likely result in no difference to a very large effect on the perception of health risks associated with alcohol consumption compared with no health warning label.
Text-and-image HWL vs no HWL							
7,734 (5 RCTs)	serious[a,b]	not serious[c]	not serious	not serious	none	⊕⊕⊕◯ Moderate[a,b,c]	Text-and-image health warning labels likely result in no difference to a very large effect on the perception of health risks associated with alcohol consumption compared with no health warning label.

Shift in behaviour regarding alcohol consumption (assessed with: RoB2)							
All HWL vs no HWL							
15,091 (5 RCTs)	not serious[d]	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,d,e]	Health warning labels likely result in no difference to a very large shift in behaviour regarding alcohol consumption compared with no health warning label.
Text-only HWL vs no HWL							
3,733 (4 RCTs)	not serious[d]	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,d,e]	Text-only health warning labels likely result in no difference to a very large shift in behaviour regarding alcohol consumption compared with no health warning label.
Text-and-pictogram HWL vs no HWL							
8,178 (2 RCTs)	not serious[f]	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,e,f]	Text-and-pictogram health warning labels likely result in no difference to a small shift in behaviour regarding alcohol consumption compared with no health warning label.
Text-and-image HWL vs no HWL							
3,711 (3 RCTs)	not serious[d]	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,d,e]	Text-and-image health warning labels likely result in no difference to a moderate to large shift in behaviour regarding alcohol consumption compared with no health warning label.
Image-only HWL vs no HWL							
3,027 (2 RCTs)	not serious[f]	not serious	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[e,f]	Image-only health warning labels likely result in a large to very large shift in behaviour regarding alcohol consumption compared with no health warning label.

Abbreviations: HWL… health warning label, RCT… randomised controlled trial, RoB2… Cochrane Risk of Bias version 2 tool

Explanations:

a. High risk of bias in one domain of outcome measurement in all studies (self-reported outcome after label exposure, no blinding), some concerns in multiple domains (mainly due to no sensitivity analysis, missing protocol, missing baseline data, high number participants excluded from analysis due to missing data)

b. Risk of bias for one study was extracted from Zuckermann et al. (2024), no justification for overall high risk of bias was given

c. even though some results show no significant effect, all results point in the same direction

d. Overall moderate risk of bias for two studies was extracted from Zuckermann et al. (2024), no justification was given

e. Indirectness because the studies assessed hypothetical purchasing decisions, retrospective self-reported consumption, and drinking speed, which are only proxies for actual alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour

f. One study with overall low risk, one study with overall moderate risk (RoB result extracted from Zuckermann et al. (2024), no justification was available)

Table 7-10: Certainty of evidence (GRADE), HWL versus HWL comparison for critical outcomes

Certainty assessment							Summary of findings
Participants (studies)	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Overall certainty of evidence	Impact statement
Perception of health risks associated with alcohol consumption (assessed with: RoB2)							
Text-only HWL vs other HWL							
4986 (5 RCTs)	serious[a]	not serious	not serious	not serious	none	⊕⊕⊕◯ Moderate[a]	Text-only health warning labels likely do not differ from differently sized text-only, text-and-image, and text-and-pictogram health warning labels in their effects on the perception of health risks associated with alcohol consumption.
Text-and-pictogram HWL vs other HWL							
432 (1 RCT)	serious[b]	not serious[c]	not serious	not serious	none	⊕⊕⊕◯ Moderate[b,c]	Text-and-pictogram health warning labels likely do not differ from text-and-image health warning labels in their effects on the perception of health risks associated with alcohol consumption.
Image-only HWL vs other HWL							
3003 (1 RCT)	serious[d]	not serious[c]	not serious	not serious	none	⊕⊕⊕◯ Moderate[c,d]	Image-only health warning labels likely do not differ from text-and-pictogram health warning labels in their effects on the perception of health risks associated with alcohol consumption.
Shift in behaviour regarding alcohol consumption (assessed with: RoB2)							
Text-only HWL vs other HWL							
3012 (1 RCT)	not serious	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,e]	Text-only health warning labels likely lead to a slightly greater shift in behaviour regarding alcohol consumption compared with text-and-image health warning labels
Text-and-pictogram HWL vs other HWL							
6461 (1 RCT)	not serious	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,e]	Text-and-pictogram health warning labels likely show different or no shift in behaviour regarding alcohol consumption depending on the warning content.

Certainty assessment							Summary of findings
Image-only HWL vs other HWL							
3003 (1 RCT)	not serious	not serious[c]	serious[e]	not serious	none	⊕⊕⊕◯ Moderate[c,e]	Image-only health warning labels likely result in a smaller shift in behaviour regarding alcohol consumption compared with text-and-image health warning labels.

Abbreviations: HWL… health warning label, RCT… randomised controlled trial, RoB2… Cochrane Risk of Bias version 2 tool

a. High risk of bias in one domain of outcome measurement in all studies (self-reported outcome after label exposure, no blinding), some concerns in multiple domains (due to missing protocol and missing baseline characteristics).

b. Risk of bias for one study was extracted from Zuckermann et al. (2024), no justification for overall high risk of bias was given

c. Inconsistency not applicable due to single study

d. High risk of bias in one domain of outcome measurement (self-reported outcome after label exposure, no blinding)

e. Indirectness due to studies assessed hypothetical purchasing decisions, retrospective self-reported consumption, and drinking speed, which are only proxies for actual alcohol consumption and do not directly demonstrate a sustained shift in alcohol consumption behaviour

7.4 WHO-INTEGRATE Evidence-to-Decision Framework

BALANCE OF HEALTH BENEFITS AND HARMS

Does the **efficacy or effectiveness** of the intervention **regarding the health of individuals** favour the intervention or the comparison?

Efficacy refers to the effect under controlled, often ideal circumstances; effectiveness refers to the effect in a real-world-setting. Consider both short-term and long-term effects.

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	Favours comparator	varies	cannot assess
	x					

Does the **effectiveness or impact** of the intervention **regarding the health of the population** favour the intervention or the comparator?

Consider whether population-level outcomes represent aggregated individual-level outcomes or emerge through system dynamics (e.g., herd immunity). Consider both short-term and long-term effects.

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	Favours comparator	varies	Cannot assess
	X					

Do the broader positive or negative health-related impacts favour the intervention or the comparator?

Broader health-related impacts may be e.g. health consequences due to reduced/increased stigma, positive/negative impact on other diseases or spillover effects beyond patients/beneficiaries.

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	Favours comparator	varies	cannot assess
	X					

Is there important **variability** in how patients or beneficiaries **value different health outcomes** of the intervention?

Consider whether the importance assigned to different health outcomes differs across individuals, population groups and contexts.

yes	probably yes	unclear	probably no	no	varies	Cannot assess
					Not applicable	not applicable

OVERALL JUDGEMENT | BALANCE OF HEALTH BENEFITS AND HARMS

Does the balance between desirable and undesirable health effects favour the intervention or the comparator?

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	Favours comparator	varies	cannot assess
	x					

SOCIETAL IMPLICATIONS

Do the **social consequences** of the intervention favour the intervention or the comparator?

This may refer to social consequences due to reduced/increased stigma, increases/decreases in educational outcomes, changes to social cohesion or changes in social norms.

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	favours comparator	varies	cannot assess
x						

Do the environmental impact and the implications for ecological sustainability favour the intervention or the comparator?

This may refer to protection/endangerment of natural resources and mitigation or adaption to climate change.

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	favours comparator	varies	cannot assess
						X

Does the **economic impact** favour the intervention or the comparator?

Consider how the different types of economic impact are distributed across different sectors or organizational levels, whether the intervention contributes to or limits the achievement of broader economic goals (e.g. development, poverty reduction).

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	favours comparator	varies	cannot assess
						x

OVERALL JUDGEMENT | SOCIETAL IMPLICATIONS

Does the balance between desirable and undesirable societal implications favour the intervention or the comparator?

favours intervention	probably favours intervention	favours neither intervention nor comparator	probably favours comparator	favours comparator	varies	cannot assess
	x					

HUMAN RIGHTS

OVERALL JUDGEMENT | HUMAN RIGHTS

Is the intervention in accordance with universal human rights standards and principles?

yes	probably yes	unclear	probably no	no	varies	cannot assess
x						

ACCEPTABILITY

Is the intervention acceptable among recipients?

yes	probably yes	unclear	probably no	no	varies	cannot assess
	x					

Is the intervention acceptable among implementors?

yes	probably yes	unclear	probably no	no	varies	cannot assess
				x		

Is the intervention acceptable among the public and other relevant stakeholder groups?

Consider relevant stakeholder groups across e.g. public sector, private sector and civil society and at all relevant levels

(e.g. international, national, regional, local).

yes	probably yes	unclear	probably no	no	varies	cannot assess
		x				

Does the intervention substantially **intrude on individual liberties**?

Intrusiveness refers to the extent to which an intervention imposes on an individual's privacy or personal space beyond what is considered acceptable. This ranges from low, e.g. enabling choice like offering more healthy food options, to high, e.g. restricting choice like banning cigarettes.

yes	probably yes	unclear	probably no	no	varies	cannot assess
				x		

Does the intervention substantially impact the **autonomy** of individuals, population groups and/or organizations?

Autonomy refers to the ability to make a competent, informed, and voluntary decision.

yes	probably yes	unclear	probably no	no	varies	cannot assess
				x		

OVERALL JUDGEMENT | ACCEPTABILITY

Is the intervention acceptable to key stakeholders?

yes	probably yes	unclear	probably no	no	varies	cannot assess
		x				

HEALTH EQUITY, EQUALITY AND NON-DISCRIMINATION

Is the intervention likely to **decrease existing inequalities and/or inequities** in the health condition or its determinants?

This implies that all interventions should aim to mitigate health inequalities, or at least should not worsen existing health inequalities. Selecting 'probably no' or 'no' refers to the intervention either having no effect or increasing existing health inequalities; where applicable, consider how the intervention might increase existing health inequalities. Consider both short-term and long-term effects.

yes	probably yes	unclear	probably no	no	varies	cannot assess
	x					

Is the intervention **affordable** across relevant population groups?

This refers to financial accessibility and considers household expenditures, including the risk of catastrophic health expenditures and health-related financial risks.

yes	probably yes	unclear	probably no	no	varies	cannot assess
	x					

Is the intervention **accessible** across relevant population groups? This refers to physical as well as informational accessibility.

yes	probably yes	unclear	probably no	no	varies	cannot assess
	x					

Does the intervention address a particularly severe or rare condition? Severe conditions may be life-threatening or affect individuals with a low pre-existing health status.

Yes	probably yes	unclear	probably no	no	varies	cannot assess
x						

OVERALL JUDGEMENT | HEALTH EQUITY, EQUALITY AND NON-DISCRIMINATION

Does the intervention positively impact health equity, equality and non-discrimination?

yes	probably yes	unclear	probably no	no	varies	cannot assess
	x					

FINANCIAL IMPLICATIONS

Does implementing and maintaining the intervention have **reasonable cost and budget impacts**?

Consider both short-term and long-term cost and budget impacts, and whether these are sustainable from the perspective of those financing and/or implementing the intervention.

yes	probably yes	unclear	probably no	no	varies	cannot assess
						x

Does the intervention show a favourable **ratio of costs to benefits**?

This ratio may be based on e.g. estimates of cost-effectiveness, cost-benefit or cost-utility with the perspective (e.g. health system, society) specified.

yes	probably yes	unclear	probably no	no	varies	cannot assess
		x				

OVERALL JUDGEMENT | FINANCIAL IMPLICATIONS

Are the financial implications of the intervention reasonable?

yes	probably yes	unclear	probably no	no	varies	cannot assess
		x				

FEASIBILITY AND HEALTH SYSTEM CONSIDERATIONS

Are there **legal and regulatory aspects** which may limit implementation of the intervention?

yes	probably yes	unclear	probably no	no	varies	cannot assess
			x			

Are there **governance and leadership aspects** which may limit implementation of the intervention?

Consider the presence or absence of formal or informal institutions, which may provide effective leadership, oversight and accountability in implementing the intervention.

yes	probably yes	unclear	probably no	no	varies	cannot assess
				x		

Is the implementation of the intervention **compatible with the existing health system** without major changes?

Where relevant, consider interactions with other systems involved in the implementation, such as education or social services.

yes	probably yes	unclear	probably no	no	varies	cannot assess
x						

Does the implementation of the intervention require an extensive health workforce and/or other human resources?

Consider the need for, usage of, and impact on the health workforce and other human resources, as well as their distribution. Where relevant, also consider these in other systems involved in the implementation, such as education or social services.

yes	probably yes	unclear	probably no	no	varies	cannot assess
				x		

Does the implementation of the intervention require **extensive health system and broader infrastructure**?

Consider the need for, usage of, and impact on non-human resources and infrastructure in the health system. Where relevant, also consider these in other systems involved in the implementation, such as transportation, energy or IT.

yes	probably yes	unclear	probably no	no	varies	cannot assess
				x		

OVERALL JUDGEMENT | FEASIBILITY AND HEALTH SYSTEM CONSIDERATIONS

Is the intervention feasible to implement?

yes	probably yes	unclear	probably no	no	varies	cannot assess
	x					

Table 7-11: Effect size categories for impact statement generation

Small effect	Moderate effect	Large effect	Very large effect
RR 1.10 to 1.20 or RR 0.91 to 0.83	RR 1.21 to 1.41 or RR 0.82 to 0.71	RR 1.41 to 1.80 or RR 0.70 to 0.56	RR 1.81 or greater or RR 0.55 or lower

Abbreviations: RR… risk ratio
Notes: Effect size categories were extracted from Zuckermann et al. (2024) [41]

7.5 Literature search strategies

Search strategy for Cochrane

Search Name: Alcohol Warning Labels	
Search date: 05.02.2026	
ID	Search
#1	MeSH descriptor: [Alcoholic Beverages] explode all trees
#2	MeSH descriptor: [Drinking] explode all trees
#3	((alcohol*) OR (drink*) OR (beer*) OR (wine*) OR (spirits)):ti,ab,kw (Word variations have been searched)
#4	#1 OR #2 OR #3
#5	((text NEXT warning*) OR (textual NEXT warning*) OR (graphic NEXT warning*) OR (graphical NEXT warning*) OR (health NEXT warning*) OR (health NEXT message*) OR (health NEXT communication*) OR (warning NEXT message*) OR (warning NEXT label*) OR (risk NEXT label*) OR (label NEXT messag*) OR (label NEXT text*)):ti,ab,kw
#6	#4 AND #5
#7	((alcohol* OR drink* OR beer* OR wine* OR spirits) NEAR (label?ing* OR warning*)):ti,ab,kw
#8	#6 OR #7
#9	#6 OR #7 with Publication Year from 2016 to 2026, in Trials
#10	#6 OR #7 with Cochrane Library publication date Between Jan 2016 and Feb 2026
#11	#9 OR #10
#12	(conference proceeding):pt
#13	(abstract):so
#14	(clinicaltrials OR trialsearch OR ANZCTR OR ensaiosclinicos OR Actrn OR chictr OR cris OR ctri OR registroclinico OR clinicaltrialsregister OR DRKS OR IRCT OR Isrctn OR rctportal OR JapicCTI OR JMACCT OR jRCT OR JPRN OR Nct OR UMIN OR trialregister OR PACTR OR R.B.R.OR REPEC OR SLCTR OR Tcr):so
#15	#12 OR #13 OR #14
#16	#11 NOT #15
Total hits: 160	

Search strategy for Embase

Search Name: Alcohol Warning Labels		
Search date: 04.02.2026		
No.	Query Results	Results
#1.	'alcoholic beverage'/exp	41,315
#2.	alcohol* OR drink* OR beer* OR wine* OR spirits	1,300,703
#3	#1 OR #2	1,301,754
#4	'warning label'/exp	11
#5	'text warning*' OR 'textual warning*' OR 'graphic warning*' OR 'graphical warning*' OR 'health warning*' OR 'health message*' OR 'health communication*' OR 'warning message*' OR 'warning label*' OR 'risk label*' OR 'label messag*' OR 'label text*'	24,929
#6	#4 OR #5	24,929
#7	#3 AND #6	1,782
#8	(alcohol* OR drink* OR beer* OR wine* OR spirits) NEAR/4 (label$ing* OR warning*)	725
#9	#7 OR #8	2,208

#10	#9 AND [2016-2026]/py	1,359
#11	#10 AND ([english]/lim OR [german]/lim)	1,348
#12	#11 AND 'Conference Abstract'/it	133
#13	'clinical trial':dtype	552,803
#14	#12 OR #13	552,936
#15	#11 NOT #14	1,152
Total hits: 1152		

Search strategy for Medline via Ovid

Search Name: Alcohol Warning Labels	
Search date: 03.02.2026	
ID	Search
1	exp Alcoholic Beverages/ (25373)
2	(alcohol* or drink* or beer* or wine* or spirits).mp. (720561)
3	1 or 2 (720595)
4	(text warning* or textual warning* or graphic warning* or graphical warning* or health warning* or health message* or health communication* or warning message* or warning label* or risk label* or label messag* or label text*).mp. (16140)
5	3 and 4 (933)
6	((alcohol* or drink* or beer* or wine* or spirits) adj5 (label?ing* or warning*)).mp. (708)
7	5 or 6 (1369)
8	limit 7 to yr="2016 - 2026" (813)
9	limit 8 to (english or german) (806)
10	remove duplicates from 9 (803)
Total hits: 803	

Search strategy for HTA-INAHTA

Search Name: Alcohol Warning Labels	
Search date: 05.02.2026	
Search step #	Search query,"Hits","Searched At"
1	"Alcoholic Beverages"[mhe],"1","2026-02-05T15:59:09.000000Z"
2	alcohol* OR drink* OR beer* OR wine* OR spirits,"234","2026-02-05T15:59:52.000000Z"
3	(alcohol* OR drink* OR beer* OR wine* OR spirits) OR ("Alcoholic Beverages"[mhe]),"235","2026-02-05T16:00:02.000000Z"
4	label*,"245","2026-02-05T16:00:26.000000Z"
5	warning*,"57","2026-02-05T16:01:07.000000Z"
6	message*,"65","2026-02-05T16:04:16.000000Z"
7	(message*) OR (warning*) OR (label*),"359","2026-02-05T16:09:01.000000Z"
8	((message*) OR (warning*) OR (label*)) AND ((alcohol* OR drink* OR beer* OR wine* OR spirits) OR ("Alcoholic Beverages"[mhe])),"8","2026-02-05T16:09:26.000000Z"
9	((message*) OR (warning*) OR (label*)) AND ((alcohol* OR drink* OR beer* OR wine* OR spirits) OR ("Alcoholic Beverages"[mhe])),"8","2026-02-05T16:09:32.000000Z"
10	(((message*) OR (warning*) OR (label*)) AND ((alcohol* OR drink* OR beer* OR wine* OR spirits) OR ("Alcoholic Beverages"[mhe]))) FROM 2016 TO 2026,"6","2026-02-05T16:09:45.000000Z"
Total hits: 6	

Search strategy for PsychINFO via EBSCO

Search Name: Alcohol Warning Labels	
Search date: 05.02.2026	
ID	Search
1	(alcohol use or alcohol consumption or drinking) AND (“text warning*” or “textual warning*” or “graphic warning*” or “graphical warning*” or “health warning*” or “health message*” or “health communication*” or “warning message*” or “warning label*” or “risk label*” or “label messag*” or “label text*”)
Total hits: 358	



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