KA HUA MAI TE MATE PUKUPUKU I TE INU WAIPIRO

ALCOHOL CAUSES CANCER

ROYAL SOCIETY TE APĀRANGI

Contents

Kōrero whakataki
Introduction

Most of us know that activities like smoking and sunbathing can lead to cancer. But what about drinking alcohol?

It is well established that ethanol, the active ingredient in all alcoholic beverages, causes cancer in humans (1–4). Most New Zealanders (more than four in five people) do not know this (5).

This factsheet provides evidence-based information about how alcohol causes cancer, with the aim of informing choices about drinking – for people and communities.

Ngā kōrero pono e rua
Two quick facts

- Ethanol, the active ingredient in alcoholic beverages, is a Group 1 carcinogen, as defined by the World Health Organization (6). This means that it conclusively causes cancer in humans (6).
- The more alcohol we drink, the greater our risk of cancer (7). There is no safe minimum (8) and the type of alcoholic drink (eg, wine, beer, cider, spirits) does not affect the risk (9).

Most New Zealanders (more than four in five people) do not know that drinking alcohol causes cancer.

Stock image: alcohol fermentation

Waipiro
Alcohol

He aha te waipiro?
What is alcohol?

Waipiro – 'Foul and stinking water.' (10)

Alcohol – the common name for the chemical ethanol – is the active ingredient in fermented drinks, such as wine, beer, cider, and spirits. Alcoholic drinks are important in many cultures and drinking is common, particularly in Western nations like Aotearoa New Zealand (11,12).

Māori did not produce or drink waipiro, alcohol, until the arrival of Europeans (10,13).

Despite being enjoyed in many social settings, alcohol is a psychoactive drug with addictive and toxic qualities (8,14). Drinking alcohol can cause many harms to health, whānau, and society besides cancer (8,11,12,14–19), but these are outside the scope of this publication.

He aha kei roto i te inu?
What's in the drink?

All alcoholic drinks contain ethanol. Different drinks have different amounts of ethanol. In Aotearoa New Zealand, a 'standard drink' is defined as one shot of a 40 percent spirit or a small glass of beer or wine, and contains 10 grams of pure alcohol (Figure 1). At the time of writing, Manatū Hauora Ministry of Health recommends a limit of two standard drinks per day for women and three for men (with a maximum of 10 and 15 per week, respectively) to reduce long-term health risks (20). These guidelines, however, are under review (20). International guidelines are much more conservative, recommending **below four standard drinks per week** to minimise health risks (21) (Figure 1).

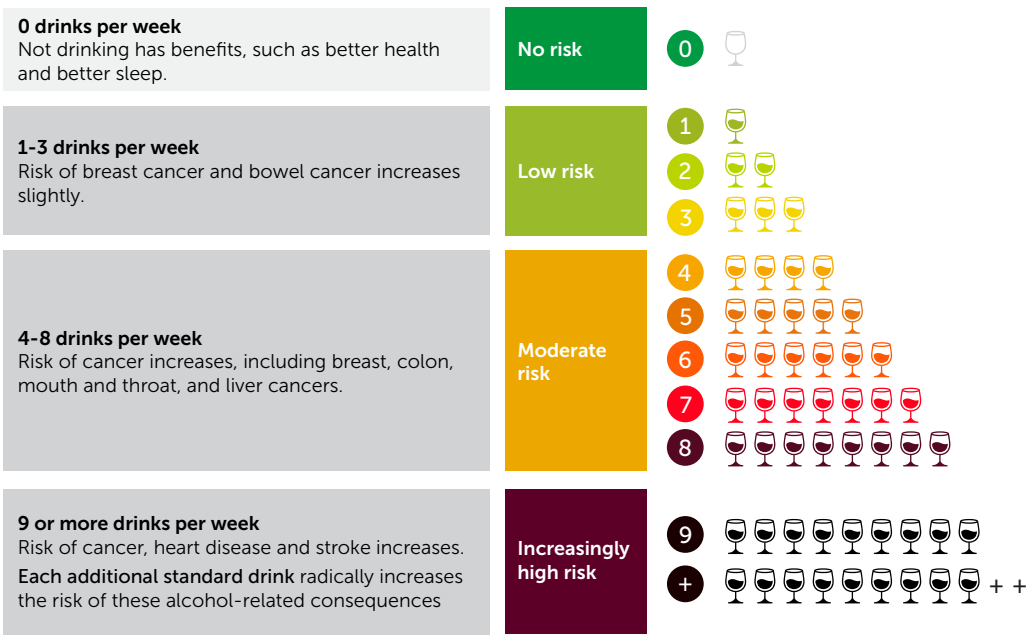


Figure 1: Zero weekly drinks is the only safe number for our health. But using these alcohol cancer "risk zones" (adapted from Canadian guidelines (21)) can help us make informed decisions about our drinking.


330 mL
bottle of beer (4% alcohol)
=
100 mL
glass of wine (12.5% alcohol)
=
30 mL
of straight spirits (42% alcohol)

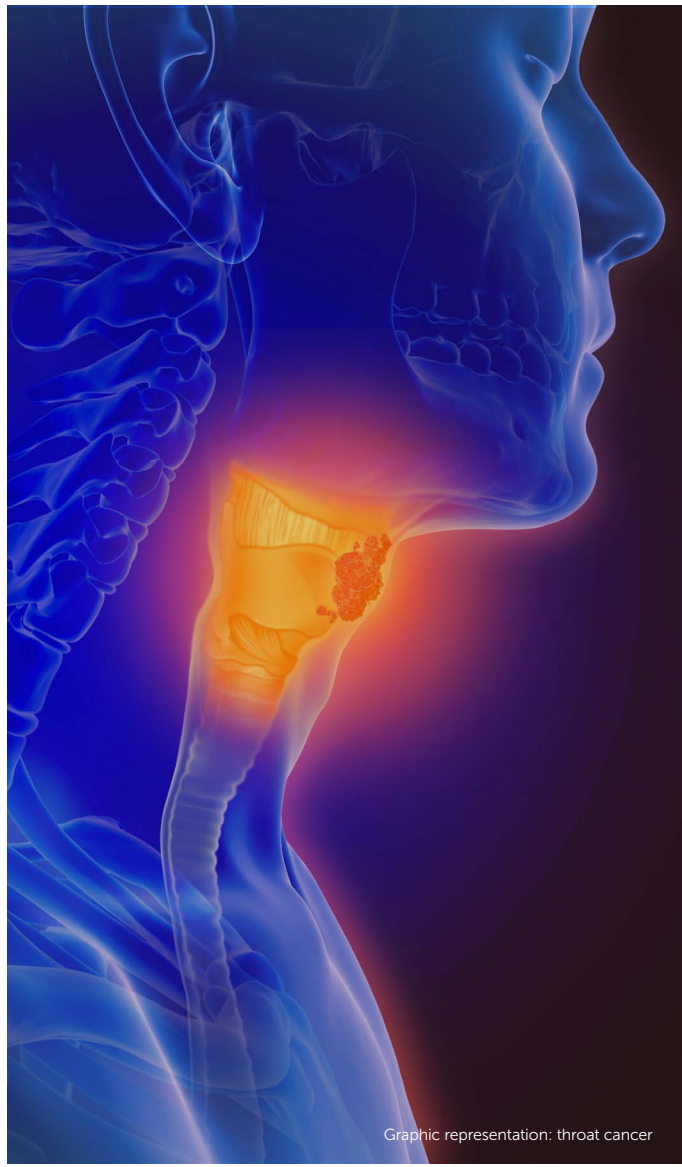
Te waipiro me te mate pukupuku
Alcohol and cancer

Cancer is a group of diseases caused by abnormal cells growing and spreading in an uncontrolled way. **Globally, one in every six deaths is caused by cancer (22,23).**

In Aotearoa New Zealand, it is the leading cause of death for those under age 70 (15,24). Of those cancer deaths, about 4 percent are caused by alcohol (3). In 2021, for example, 10,488 people died of cancer in Aotearoa New Zealand (25) and about 420 of these deaths were likely caused by alcohol (3).

The link between drinking alcohol and cancer has been known about for over a hundred years (26). Many studies, collectively involving millions of people, have shown that drinking causes cancer in several organs (3). The evidence is strongest for mouth, throat, female[1] breast, liver, and bowel cancers (see *Which cancers are linked to alcohol?* on pages 14-15). On average, countries with higher average consumption of alcohol have more cases of cancer caused by alcohol in their populations (3).

In 1988, alcohol was officially classified as a Group 1 carcinogen by the World Health Organization's International Agency for Research on Cancer (6), meaning that it conclusively causes cancer in humans. Group 1 carcinogens also include tobacco smoke, solar radiation, asbestos, and cured meats (27).



Graphic representation: throat cancer

[1] The language in this report is determined by the information sources cited, which report data for gender assigned at birth only.

Ehara ko te mea e inumia ana, engari ko te nui

It's not what we drink, but how much

Cancer risk is affected by the amount of alcohol we drink but not what we drink: many studies have shown that the type of alcoholic beverage does not matter (28,29). A standard drink of wine increases our risks as much as a standard shot of vodka or whisky – all contain the same amount of harmful ethanol (10 grams). We sometimes hear about possible heart benefits of small amounts of alcohol, but the evidence for this is not strong (28). The cancer risk associated with ethanol outweighs any possible health advantages from other chemicals such as antioxidants found in some red wines (30).

The more we drink, the greater our cancer risk (2,7). Heavy drinking[2] carries the greatest risk, but even moderate and light drinking (as little as one standard drink a day) can also cause cancer (32). An Aotearoa New Zealand study estimated that half the deaths from alcohol-caused cancer were of people who drank fewer than four standard drinks a day (33).

Reducing our drinking lowers our cancer risks (7,34,35).

[2] Heavy drinking is defined by Manatū Hauora Ministry of Health as more than 10 standard drinks per week for women and more than 15 for men (31). Manatū Hauora is the source of the alcohol consumption data for Aotearoa New Zealand in this publication.

He pēhea te pā mai o te mate pukupuku i te inu waipiro?

How does drinking cause cancer?

Alcohol can cause cancer via three main routes:

- **Making harmful products:** Ethanol from the drink is broken down in our bodies (mostly in the liver) into a chemical called acetaldehyde. Both acetaldehyde and ethanol can attack our DNA and cause mutations that lead to cancer[3] (36,37).
- **Carrying carcinogens:** Alcohol can act as a delivery vehicle for other carcinogens that may be dissolved in it, such as toxins from tobacco. Alcohol helps these toxins cross the cellular barriers in our mouths and throats (37–39).
- **Disrupting hormones:** Alcohol has been shown to interfere with oestrogen, which increases the risk for breast cancer in women (37,38).

Most research into alcohol and cancer uses population studies where participants report their own drinking habits over the length of the study. Researchers then analyse the participants' health to see whether 'drinkers' get cancer more frequently than 'never-drinkers'. They also analyse what *amount* of alcohol causes cancer. Population studies unequivocally show that alcohol causes cancer[4,5] (1,3,32). The cancer risks of smoking are determined by the same type of research (40).

[3] Acetaldehyde is eventually broken down into a non-toxic product in the body. Some people have genetics that lead to acetaldehyde buildup in the body and a greater risk of cancer (38).

[4] The cancer risk data reported in this factsheet are taken from meta-analyses (research that combines many independent studies). Meta-analyses assess a large number of research studies for quality and then use the best ones to draw the most accurate conclusions.

[5] Population studies do not give insight into how alcohol causes cancer inside our cells. Instead, researchers experiment on mice and with human cells in the lab to learn the details of how cancer develops (38).


Drinking increases the
cancer risk from smoking.

Ko ēhea ngā mate pukupuku e hono ana ki te waipiro?

Which cancers are linked to alcohol?

Drinking alcohol causes cancers of the:

- mouth and throat
- female breast
- liver
- bowel (3,4).

Bowel and breast cancer are among the top four most common cancers in Aotearoa New Zealand (25). This means that **alcohol is responsible for hundreds of cancer cases every year** (3).

Drinking probably also increases the risk for pancreatic and stomach cancers (1,39,40), and there is also some evidence that alcohol causes skin (melanoma) cancers (43).

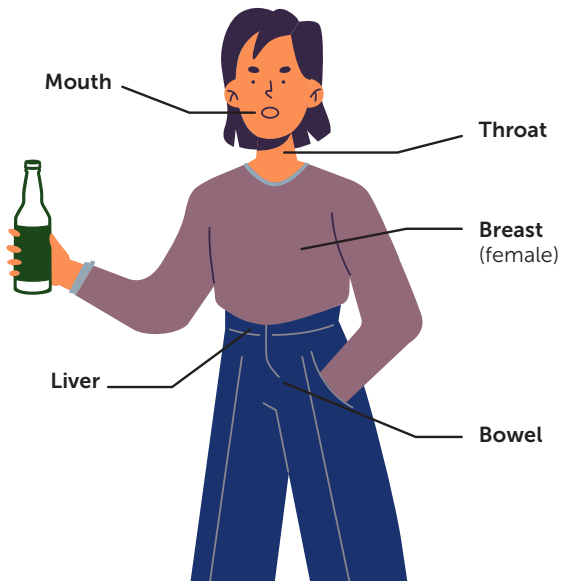


Figure 2: Cancers associated with drinking alcohol.

Alcohol has the strongest association with mouth and throat cancers

Heavy drinking is a powerful cause of cancers of the lip, oral cavity (mouth), pharyngeal (throat), laryngeal (voice box), and oesophageal (swallowing tube) (34,44–46) (Figures 2 and 3). Every daily drink increases the risk of cancer (47). Drinking five standard drinks a day increases the risk of mouth and throat cancers by three to five times (1,21). These cancers are aggressive and deadly: during 2017–21, there were 4,838 cases in Aotearoa New Zealand and 2,199 deaths (25). Rates of mouth and throat cancers have been increasing in the past decade (25).

Alcohol, and its toxic breakdown product acetaldehyde, are more likely to cause cancer in tissues they touch (48) – our mouths and throats are, of course, the first places alcohol goes when we drink. Some ethanol is converted to harmful acetaldehyde in our mouths while we are drinking. The alcohol also carries other dissolved carcinogens (from the drink and other sources) and amplifies their damage to tissue (39). International research has shown that **when we drink and smoke at the same time, the cancer risks from each don't just add together; they *multiply*** (49). Between them, drinking and smoking account for three in four of all mouth and throat cancers in industrialised countries (44).

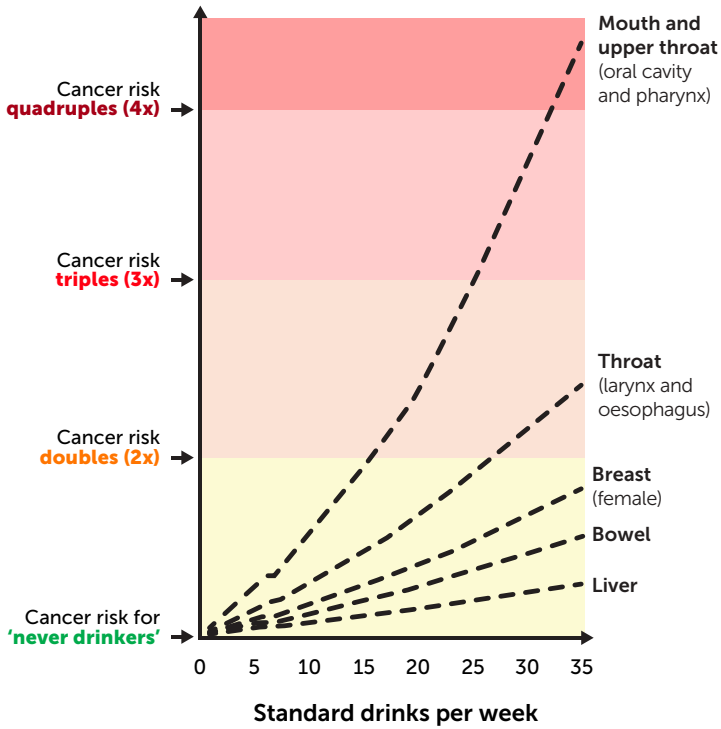


Figure 3: Cancer risk from alcohol increases with every weekly drink. Data from (21).

No amount of alcohol is safe for breast cancer

Dozens of studies across the world with millions of women have shown that drinking alcohol increases the risk of breast cancer.

Breast cancer is the most common cancer in women living in Aotearoa New Zealand (50). Every year, breast cancer is diagnosed in an average of 3,400 New Zealanders and takes the lives of more than 650 (25). Every additional standard drink consumed per day increases the risk of breast cancer by 10.5 percent for premenopausal and 11.1 percent for postmenopausal women (51). **Even low rates of drinking – equivalent to less than one standard drink per day – have been shown to increase breast cancer risk relative to no drinking** (52–55).

When a woman drinks, even moderately, the rise in her blood alcohol levels can increase the concentration of oestrogens (female sex hormones) circulating in her body. This, among other mechanisms[6], can upset hormone regulation in a way that encourages breast cancer tumours to grow (56). The combination of alcohol and hormone replacement therapy during menopause or post-menopause can markedly increase the risk of some types of breast cancer (57).

Women may drink less than men as a group (58), but the additional risk for alcohol-caused breast cancer means that the cancer risk per standard drink is greater for women (15,52).

Breast cancer is more common in Māori women than non-Māori women (25). It is the leading cause of alcohol-related death in both Māori and non-Māori women in Aotearoa New Zealand (15).

[6] In addition to the cancer-forming effects of alcohol and acetaldehyde in the breast (56).

Alcohol causes liver cancer – and makes it more deadly

Alcohol is one of the main risk factors for the most common liver cancer, hepatocellular carcinoma, and is linked to 30 percent of all cases worldwide (59). This means that of the 2,039 liver cancer cases reported in Aotearoa New Zealand in 2017–21 (25), around 600 were likely caused by drinking. Drinkers have lower liver cancer survival rates than non-drinkers (60), so may be over-represented in the 1,512 deaths reported (25) for the same period.

Heavy, sustained drinking can lead to changes in the liver that encourage cancer to form (59). Liver cirrhosis, a serious outcome of late-stage liver disease, causes cancer and also makes treatment difficult (61). **Liver cancer is twice as common in men than women** (25,62), probably because men drink more heavily than women, on average (58).

Māori develop liver cancer about three times more frequently than non-Māori (25,59,62). This is likely due to higher rates of heavy drinking (58) and the prevalence of Hepatitis B and C in Māori communities (59,62,63). Inequity in the healthcare system (10,33,59,64–69) and other lasting impacts of colonisation are also factors (10).

Pacific peoples also have higher rates of liver cancer and lower survival from liver cancer than non-Pacific peoples (70). Pacific peoples are less likely to drink than non-Pacific peoples (58). However, data show that, like Māori, Pacific peoples are more likely than non-Pacific people to drink heavily when they do drink (58). Pacific peoples suffer negative effects due to inequity in the healthcare system (69).

Alcohol causes bowel cancer

Alcohol is one of many risk factors for bowel cancer (also called colorectal cancer – it occurs in the colon and the rectum). Other risks include smoking, excess body weight, diabetes, low physical activity, diets rich in red and processed meats but low in fibre, and age (cancer is more common in people over 50) (71).

Alcohol causes bowel cancer through a complex series of interactions – between ethanol, acetaldehyde, and the cells in our gut – that lead to DNA mutations and tumours (72). Each additional standard drink of alcohol per day increases the risk of bowel cancer by 7 percent. For comparison, the increased risk from eating 100 grams of red meat per day is 12 percent (73).

Aotearoa New Zealand has one of the highest rates of bowel cancer in the world (74). Bowel cancer is the second most common cancer in men and third most common in women in Aotearoa New Zealand (25,50).

About 1,250 New Zealanders die from bowel cancer every year (75). Bowel cancer is more common in men than women, and in Pākehā, New Zealand Europeans, than other ethnicities (25).

Alcohol causes metastasis

Drinking alcohol has been shown to increase the risk of metastasis, a process where cancer cells move from the primary tumour site and cause cancer in other parts of the body. Alcohol has been linked to metastasis of bowel cancers into the lung (76), and of breast cancers into the bones (77). In the lab, ethanol directly causes metastasis of breast cancer cells (78).

Metastatic tumours are common in the late stages of many cancers and are associated with poor prognosis and death (79).


Alcohol causes bowel cancer, every drink per day increases your risk.

He kino ake mō ētahi atu
More deadly for some

For each of us, our cancer risk is affected by our **genetics** and the **environment** we live in[7]. Genetics account for about 10 percent of all cancers and the rest is environmental (which includes individual habits like drinking) (80).

Therefore, two people can have similar drinking habits, but their personal cancer risk will depend on their individual genetics combined with environmental factors other than drinking.

Genetics

There are two types of genes that can affect our risk of cancer from alcohol. The first type increases our individual cancer risk regardless of alcohol. People with these genes (an example of genes of this kind is 'faulty' copies of BRCA1 and BRCA2[8]) are likely to have a family history of cancer (80) and drinking alcohol can increase that already higher-than-usual risk.

The second type of gene increases cancer risk only when the person drinks alcohol. An example is the gene variant ALDH2*2. This mutant alcohol-processing gene causes **'alcohol flush'**[9] – pink blotches on face, neck, and chest, as well as other more severe reactions (81). People with ALDH2*2, which is common in East Asia (82,83), who drink are four to eight times more likely to develop oesophageal cancer than people with the regular gene (81,84,85). However, due to the unpleasant effects of drinking, people with ALDH2*2 are less likely to drink (86).

[7] In this context, environment refers to everything that is not genetic.
[8] People with these genes have an increased risk of developing breast, ovarian, pancreatic and prostate cancer (80).
[9] ALDH2*2 causes inefficient ethanol breakdown and a buildup of acetaldehyde, which causes the flush (81).

If you get ‘alcohol flush’ your risk of mouth and throat cancer from drinking goes up 4–8 times.

'Alcohol is harmful for all, but the burden is greater for Māori.'

Professor Sue Crengle, GP and
Māori health researcher

Environment

There are many factors in our daily lives that contribute to our personal cancer risk, including pollution, diet, exercise, and occupational hazards like exposure to radiation or toxic chemicals.

Tobacco smoke is a carcinogen itself and **smoking can aggravate the cancer risk from alcohol** (as described in *How does alcohol cause cancer?* (page 12) and *Alcohol has the strongest association with mouth and throat cancers* (page 15)).

Advertising and availability of alcohol are examples of environmental influences. Alcohol advertising is more prevalent in communities with high Māori and Pacific populations (87). Māori children are five times more likely than Pākehā to be exposed to alcohol marketing and Pacific children are three times more likely (87). Research also shows that there are more places to buy alcohol in communities with a high Māori population (88) and in communities with high levels of deprivation (88,89).

Not everyone is treated the same

Cancer is a more deadly disease for those in low socioeconomic groups (90–92). For instance, rich and poor get breast cancer at the same rate in Aotearoa New Zealand (25), but those in the most deprived groups are more likely to die from it (25,93) – likely due to inequity in healthcare (92,93).

Māori with alcohol-related cancers die an average of two years earlier than non-Māori, according to a 2017 study (33). This difference has, again, been linked to inequity in healthcare in Aotearoa New Zealand (10,33,66,67,69). A Treaty of Waitangi Claim (WAI 2624) has been lodged to hold the Crown responsible for protecting Māori communities against the harms of alcohol, including cancer (94).

He aha ngā mea ka taea e tātau
What we can do

Panonitia te ahurea inu waipiro mā te kaupapahere
Change drinking culture through policy

To reduce cancer caused by alcohol, all drinkers in the population need to consume less (32).

The World Health Organization recommends policies (95) that are proven to help reduce harm from alcohol (96–98).

These include:

- regulating the price of alcohol to make it **less affordable**
- putting suitable **restrictions on availability**, and
- **limiting alcohol marketing** (95).

These actions have been shown to reduce a wide range of other harms from alcohol as well as cancer (98).

There is public support for similar policies in Aotearoa New Zealand, but they have not yet been implemented[10] (99). There is a call for future alcohol policy work in Aotearoa New Zealand to be conducted in partnership with Māori, centring te Tiriti o Waitangi, to address alcohol harms in communities and health inequities (10,102).

[10] A complete review of alcohol legislation by the Law Commission, published in 2010 (12), drew the same broad conclusions about evidence-based effective policies that would lower consumption and harm. These recommendations have been echoed in subsequent enquiries and reviews (19,100–103, 127).

The World Health Organization recommends using policy change to reduce alcohol-caused cancer.

Te whakatipu i te mōhio ki Aotearoa
Improve awareness in Aotearoa New Zealand

New Zealanders are big drinkers – four out of five adults in this country drink alcohol (58). However, awareness around alcohol and cancer is poor.

Only one in five New Zealanders surveyed in 2023 were aware that alcohol causes cancer (5). An earlier study (2014–15) found that most people knew that smoking and 'too much time in the sun' could cause cancer (98 and 88 percent, respectively) but only 7 percent knew that alcohol could cause cancer (104). This shows that, although there has been some improvement in the past decade, public knowledge about alcohol and cancer has a long way to go before it matches other well-known causes.

Greater awareness in the community is important because people have a right to know that alcohol has harmful properties. Studies have shown that, overall, if people are aware that alcohol contributes to cancer risk, they are more likely to support effective population-level policies on alcohol (5,105). The World Health Organization recommends health warnings on alcohol containers, like the ones we have on cigarette boxes (14,106). A study in Canada found that health labels about cancer risk at liquor stores led to a short-term decrease in sales (107) and an increased interest in alcohol regulation (108).

At the time of writing, Aotearoa New Zealand does not have any large-scale public awareness campaigns addressing alcohol as a cause of cancer[11]. The only mandatory health warnings for alcohol in Aotearoa New Zealand warn against drinking during pregnancy and were not required until 2023 (110). As of 2024, South Korea and Ireland[12] were the only countries requiring cancer warning labels on alcohol (111,112), but similar laws are under consideration elsewhere (113).

[11] The New Zealand Cancer Society had a small social media campaign about alcohol and cancer in 2022 (109).
[12] Irish regulations will go into effect in 2026 (111).

Four out of five adults in Aotearoa New Zealand drink alcohol. However, awareness around alcohol and cancer is poor.

'When it comes to alcohol consumption, there is no safe amount that does not affect health.'

World Health Organization (114)

Mēnā kāore koe e inu waipiro, kaua e tīmata
If you don't drink, don't start

When it comes to cancer, the safest amount of alcohol to drink is none (8,21,114) (Figure 1). Risk for alcohol-caused cancers goes up with every drink consumed and the impacts build over a lifetime (7).

Beginning to drink alcohol as a young person not only forms habits that continue into adulthood (115,116), but can also lead to physical changes in our organs (eg, breast tissue (117)) that make cancer more likely as we age. **Heavy drinking in adolescence is associated with increased risk of heavy drinking in later life**, leading to poorer health (118).

Alcohol consumption among young people has declined significantly over the past 20 years in many high-income countries. Young people are drinking less – and less often, and more are abstaining from drinking (119). In line with this trend, fewer New Zealand teens seem to be forming harmful drinking habits. Although about half of 15 to 17 year olds reported drinking in the past year, heavy drinking was lowest of all groups younger than 75 (58). Social pressure to drink was lower for Wellington high-school students interviewed in 2022 compared to students interviewed 20 years earlier (120). As New Zealanders appear to keep their drinking habits fairly stable over their lifetimes (121), this is good news for our younger generations.

Mēnā he inu waipiro koe, kia iti noa te inu
If you do drink, reduce how much

A lot of research looks at the effect of total abstinence from alcohol – but stopping drinking altogether is not a realistic goal for most people. However, studies show that reducing how much we drink lowers the risk for all cancers attributed to alcohol (7). US states with restrictive alcohol regulations have fewer cancer deaths related to drinking than states with fewer restrictions (122). Similarly, a study of 17 countries (which included Aotearoa New Zealand) found that **cancer deaths dropped when alcohol sales went down** (123).

There are a few studies showing that the risk of cancers that are very strongly associated with alcohol (head, neck, throat, and liver) can fall after quitting drinking, even to the level of a 'never drinker' (34,35). *But* it takes time. These studies show that it can take about 20 years after quitting for cancer risk to drop to the level of never drinkers (34,35). However, the longer you abstain, the more the risks go down. For example, studies suggest that your risk of alcohol-caused liver cancer drops by about 7 percent per year after quitting drinking (35).

Surveys show that about a third of New Zealanders feel regret when they drink (125) and want to reduce how much they consume (126). Statistics from the New Zealand Health Survey show drinking rates appear to be reducing (58). These changes are seen in all demographic groups but are biggest in men and Māori (58).

"Every additional drink per day increases your risk of breast cancer by 10 percent. Reducing your drinking substantially lowers your risk."

Emeritus Professor Jennie Connor (124)

Kōrero whakakapi
Conclusions

Drinking alcohol is an important cause of cancer in Aotearoa New Zealand but public awareness is low.

Drinkers have a right to know this information, which should give each individual an opportunity to lower their own risk of cancer through reducing their drinking.

While drinking is a personal choice, that choice is highly influenced by the environment we live in. The nature and level of drinking in Aotearoa New Zealand is determined by a range of influences that include our history and the choice of public policies that regulate sale and supply of alcohol.

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Ngā tohutoro
References

1. Bagnardi V, Rota M, Botteri E, Tramacere I, Islami F, Fedirko V, et al. Alcohol consumption and site-specific cancer risk: A comprehensive dose–response meta-analysis. *British Journal of Cancer.* 2015;112(3): 580–593. https://doi.org/10.1038/bjc.2014.579.
2. Connor J. Alcohol consumption as a cause of cancer. *Addiction.* 2017;112(2): 222–228. https://doi.org/10.1111/add.13477.
3. Rumgay H, Shield K, Charvat H, Ferrari P, Sornpaisarn B, Obot I, et al. Global burden of cancer in 2020 attributable to alcohol consumption: A population-based study. *Lancet Oncology*. 2021;22(8): 1071–1080. https://doi.org/10.1016/S1470-2045(21)00279-5.
4. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. *Alcohol consumption and ethyl carbamate in IARC Monographs on the Evaluation of Carcinogenic Risks to Humans.* International Agency for Research on Cancer. Report number: 96, 2010. https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Alcohol-Consumption-And-Ethyl-Carbamate-2010.
5. Peniamina R, McNoe B, Signal L. *Public awareness of cancer risk factors & support for prevention policies in Aotearoa New Zealand: A focus on alcohol and diet.* Te Rōpū Rangahau ō Te Kāhui Matepukupuku (Cancer Society Research Collaboration), University of Otago. 2023. https://www.otago.ac.nz/__data/assets/pdf_file/0017/510425/Awareness-fullreport-Oct2023.pdf.
6. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. *Alcohol drinking in IARC Monographs on the Evaluation of Carcinogenic Risks to Humans.* International Agency for Research on Cancer. Report number: 44, 1988. https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Alcohol-Drinking-1988.
7. Yoo JE, Han K, Shin DW, Kim D, Kim BS, Chun S, et al. Association between changes in alcohol consumption and cancer risk. *JAMA Network Open.* 2022;5(8): e2228544. https://doi.org/10.1001/jamanetworkopen.2022.28544.
8. Griswold MG, Fullman N, Hawley C, Arian N, Zimsen SRM, Tymeson HD, et al. Alcohol use and burden for 195 countries and territories, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet.* 2018;392(10152): 1015–1035. https://doi.org/10.1016/S0140-6736(18)31310-2.
9. Babor TF, Casswell S, Graham K, Huckle T, Livingston M, Österberg E, et al. *Alcohol: No Ordinary Commodity: Research and public policy*. 3rd ed. Oxford: Oxford University Press; 2023. https://doi.org/10.1093/oso/9780192844484.001.0001. [Accessed 12th June 2024].
10. Muriwai E, Huckle T, Romeo JS. *Māori attitudes and behaviours towards alcohol.* Te Hiringa Hauora Health Promotion Agency. 2018. https://www.hpa.org.nz/sites/default/files/Maori_attitudes_and_behaviours_towards_alcohol_September_2018.pdf.
11. World Health Organization. *Global status report on alcohol and health 2018.* World Health Organization. 2018. https://iris.who.int/bitstream/handle/10665/274603/9789241565639-eng.pdf?sequence=1.
12. New Zealand Law Commission te Aka Matua o e Ture. *Alcohol in our lives: Curbing the harm.* Law Commission. Report number: 114, 2010. https://www.lawcom.govt.nz/assets/Publications/Reports/NZLC-R114.pdf.
13. Saggers S, Gray D. *Dealing with Alcohol: Indigenous Usage in Australia, New Zealand and Canada*. Cambridge: Cambridge University Press; 1998.
14. World Health Organization. *Global strategy to reduce the harmful use of alcohol.* https://iris.who.int/handle/10665/44395 [Accessed 4th December 2023].
15. Connor J, Kydd R, Shield K, Rehm J. The burden of disease and injury attributable to alcohol in New Zealanders under 80 years of age: Marked disparities by ethnicity and sex. *New Zealand Medical Journal.* 2015;128(1409): 15–28.
16. Room R, Babor T, Rehm J. Alcohol and public health. *The Lancet.* 2005;365(9458): 519–530. https://doi.org/10.1016/S0140-6736(05)17870-2.
17. Rehm J, Gmel Sr GE, Gmel G, Hasan OSM, Imtiaz S, Popova S, et al. The relationship between different dimensions of alcohol use and the burden of disease—an update. *Addiction*. 2017;112(6): 968–1001. https://doi.org/10.1111/add.13757.
18. Connor J, Casswell S. Alcohol-related harm to others in New Zealand: Evidence of the burden and gaps in knowledge. *New Zealand Medical Journal.* 2012;125(1360): 11–27.
19. NZ Institute of Economic Research. *Costs of alcohol harms in New Zealand: Updating the evidence with recent research.* https://www.health.govt.nz/publications/costs-of-alcohol-harms-in-new-zealand-updating-the-evidence-with-recent-research.
20. Te Whatu Ora – Health New Zealand. *Standard drinks and legal limits.* https://www.alcohol.org.nz/help-and-support/advice/standard-drinks-and-legal-limits [Accessed 16th April 2024].
21. Paradis C, Butt P, Shield K, Poole N, Wells S, Naimi T, et al. *Canada's guidance on alcohol and health: Final report*. Canadian Centre on Substance Use and Addiction. 2023. https://www.ccsa.ca/sites/default/files/2023-01/CCSA_Canadas_Guidance_on_Alcohol_and_Health_Final_Report_en.pdf.
22. GBD 2016 Causes of Death Collaborators. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980-2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet.* 2017;390(10100): 1151–1210. https://doi.org/10.1016/S0140-6736(17)32152-9.
23. Roser M, Ritchie H. *Cancer.* Our World in Data. https://ourworldindata.org/cancer [Accessed 17th January 2024].

24. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians.* 2021;71(3): 209–249. https://doi.org/10.3322/caac.21660.

25. Te Whatu Ora – Health New Zealand. *Cancer web tool.* https://tewhatuora.shinyapps.io/cancer-web-tool/ [Accessed 7th December 2023].

26. Lamy L. Étude clinique et statistique de 134 cas de cancer de l'oesophage et du cardia. *Archives des maladies de L'Appareil Digestif.* 1910;4: 451–475.

27. World Health Organization. *List of classifications – IARC monographs on the identification of carcinogenic hazards to humans.* https://monographs.iarc.who.int/list-of-classifications [Accessed 6th December 2023].

28. Bongaerts BWC, van den Brandt PA, Goldbohm RA, de Goeij AFPM, Weijenberg MP. Alcohol consumption, type of alcoholic beverage and risk of colorectal cancer at specific subsites. *International Journal of Cancer.* 2008;123(10): 2411–2417. https://doi.org/10.1002/ijc.23774.

29. Purdue MP, Hashibe M, Berthiller J, La Vecchia C, Maso LD, Herrero R, et al. Type of alcoholic beverage and risk of head and neck cancer—a pooled analysis within the INHANCE consortium. *American Journal of Epidemiology.* 2009;169(2): 132–142. https://doi.org/10.1093/aje/kwn306.

30. Lachenmeier DW, Godelmann R, Witt B, Riedel K, Rehm J. Can resveratrol in wine protect against the carcinogenicity of ethanol? A probabilistic dose-response assessment. *International Journal of Cancer.* 2014;134(1): 144–153. https://doi.org/10.1002/ijc.28336.

31. Manatū Hauora Ministry of Health. *Alcohol.* https://www.health.govt.nz/your-health/healthy-living/addictions/alcohol-and-drug-abuse/alcohol [Accessed 21st November 2023; site inactive 15th October 2024] .

32. Choi YJ, Myung SK, Lee JH. Light alcohol drinking and risk of cancer: A meta-analysis of cohort studies. *Cancer Research and Treatment.* 2017;50(2): 474–487. https://doi.org/10.4143/crt.2017.094.

33. Connor J, Kydd R, Maclennan B, Shield K, Rehm J. Alcohol-attributable cancer deaths under 80 years of age in New Zealand. *Drug and Alcohol Review.* 2017;36(3): 415–423. https://doi.org/10.1111/dar.12443.

34. Rehm J, Patra J, Popova S. Alcohol drinking cessation and its effect on esophageal and head and neck cancers: A pooled analysis. *International Journal of Cancer.* 2007;121(5): 1132–1137. https://doi.org/10.1002/ijc.22798.

35. Heckley GA, Jarl J, Asamoah BO, G-Gerdtham U. How the risk of liver cancer changes after alcohol cessation: A review and meta-analysis of the current literature. *BMC Cancer.* 2011;11(1): 446. https://doi.org/10.1186/1471-2407-11-446.

36. Peana AT, Sánchez-Catalán MJ, Hipólito L, Rosas M, Porru S, Bennardini F, et al. Mystic acetaldehyde: The never-ending story on alcoholism. *Frontiers in Behavioral Neuroscience.* 2017;11. https://doi.org/10.3389/fnbeh.2017.00081.

37. Boffetta P, Hashibe M. Alcohol and cancer. *Lancet Oncology.* 2006;7: 149–156. https://doi.org/10.1016/S1470-2045(06)70577-0.

38. Rumgay H, Murphy N, Ferrari P, Soerjomataram I. Alcohol and cancer: Epidemiology and biological mechanisms. *Nutrients.* 2021;13(9): 3173. https://doi.org/10.3390/nu13093173.

39. Ogden GR. Alcohol and oral cancer. *Alcohol.* 2005;35(3): 169–173. https://doi.org/10.1016/j.alcohol.2005.04.002.

40. Gandini S, Botteri E, Iodice S, Boniol M, Lowenfels AB, Maisonneuve P, et al. Tobacco smoking and cancer: A meta-analysis. *International Journal of Cancer*. 2008;122(1): 155–164. https://doi.org/10.1002/ijc.23033.

41. Wang YT, Gou YW, Jin WW, Xiao M, Fang HY. Association between alcohol intake and the risk of pancreatic cancer: A dose–response meta-analysis of cohort studies. *BMC Cancer.* 2016;16(1): 212. https://doi.org/10.1186/s12885-016-2241-1.

42. Ma K, Baloch Z, He TT, Xia X. Alcohol consumption and gastric cancer risk: A meta-analysis. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research.* 2017;23: 238–246. https://doi.org/10.12659/MSM.899423.

43. World Cancer Research Fund/American Institute for Cancer Research. *Diet, nutrition, physical activity and skin cancer in Continuous Update Project Expert Report 2018.* World Cancer Research Fund. 2018. https://www.wcrf.org/wp-content/uploads/2021/02/skin-cancer.pdf.

44. Hashibe M, Brennan P, Benhamou S, Castellsague X, Chen C, Curado MP, et al. Alcohol drinking in never users of tobacco, cigarette smoking in never drinkers, and the risk of head and neck cancer: Pooled analysis in the International Head and Neck Cancer Epidemiology Consortium. *Journal of the National Cancer Institute.* 2007;99(10): 777–789. https://doi.org/10.1093/jnci/djk179.

45. Di Credico G, Polesel J, Dal Maso L, Pauli F, Torelli N, Luce D, et al. Alcohol drinking and head and neck cancer risk: The joint effect of intensity and duration. *British Journal of Cancer.* 2020;123(9): 1456–1463. https://doi.org/10.1038/s41416-020-01031-z.

46. Hashim D, Genden E, Posner M, Hashibe M, Boffetta P. Head and neck cancer prevention: from primary prevention to impact of clinicians on reducing burden. *Annals of Oncology.* 2019;30(5): 744–756. https://doi.org/10.1093/annonc/mdz084.

47. Shield KD, Parry C, Rehm J. Chronic diseases and conditions related to alcohol use. *Alcohol Research: Current Reviews.* 2014;35(2): 155–171.

48. Stornetta A, Guidolin V, Balbo S. Alcohol-derived acetaldehyde exposure in the oral cavity. *Cancers.* 2018;10(1): 20. https://doi.org/10.3390/cancers10010020.

49. Hashibe M, Brennan P, Chuang S-C, Boccia S, Castellsague X, Chen C, et al. Interaction between tobacco and alcohol use and the risk of head and neck cancer: Pooled analysis in the International Head and Neck Cancer Epidemiology Consortium. *Cancer Epidemiology, Biomarkers & Prevention.* 2009;18(2): 541–550. https://doi.org/10.1158/1055-9965.EPI-08-0347.

50. Te Aho o Te Kahu - Cancer Control Agency. *What are our most common cancers?* https://teaho.govt.nz/cancer-numbers/common-cancers [Accessed 19th December 2023].

51. Sun Q, Xie W, Wang Y, Chong F, Song M, Li T, et al. Alcohol consumption by beverage type and risk of breast cancer: A dose-response meta-analysis of prospective cohort studies. *Alcohol and Alcoholism.* 2020;55(3): 246–253. https://doi.org/10.1093/alcalc/agaa012.

52. Chen WY, Rosner B, Hankinson SE, Colditz GA, Willett WC. Moderate alcohol consumption during adult life, drinking patterns, and breast cancer risk. *JAMA.* 2011;306(17): 1884–1890. https://doi.org/10.1001/jama.2011.1590.

53. Floud S, Hermon C, Simpson RF, Reeves GK. Alcohol consumption and cancer incidence in women: Interaction with smoking, body mass index and menopausal hormone therapy. *BMC Cancer.* 2023;23(1): 758. https://doi.org/10.1186/s12885-023-11184-8.

54. Afshar M, Otroshi O, Elahian E, Papi S, Aalipour R, Pourebrahimi M, et al. Alcohol consumption and types of cancer: A review. *Journal of Contemporary Medical Sciences.* 2019;5(5): 234–241. https://doi.org/10.22317/jcms.v5i5.591.

55. Allen NE, Beral V, Casabonne D, Kan SW, Reeves GK, Brown A, et al. Moderate alcohol intake and cancer incidence in women. *Journal of the National Cancer Institute.* 2009;101(5): 296–305. https://doi.org/10.1093/jnci/djn514.

56. Shield KD, Soerjomataram I, Rehm J. Alcohol use and breast cancer: A critical review. *Alcoholism: Clinical and Experimental Research.* 2016;40(6): 1166–1181. https://doi.org/10.1111/acer.13071.

57. Hvidtfeldt UA, Tjønneland A, Keiding N, Lange T, Andersen I, Sørensen TIA, et al. Risk of breast cancer in relation to combined effects of hormone therapy, body mass index, and alcohol use, by hormone-receptor status. *Epidemiology.* 2015;26(3): 353–361. https://doi.org/10.1097/EDE.0000000000000261.

58. Manatū Hauora Ministry of Health. *Annual data explorer 2022/23: New Zealand Health Survey.* https://minhealthnz.shinyapps.io/nz-health-survey-2022-23-annual-data-explorer/ [Accessed 19th December 2023].

59. Clough S, Cleverley T, Kerrison C, Harwood M, Koea J, Gurney JK. The past, present and future of liver cancer control for Māori. *New Zealand Medical Journal.* 2022;135(1567): 91–104. https://doi.org/10.26635/6965.5852

60. Shih WL, Chang HC, Liaw YF, Lin SM, Lee SD, Chen PJ, et al. Influences of tobacco and alcohol use on hepatocellular carcinoma survival. *International Journal of Cancer.* 2012;131(11): 2612–2621. https://doi.org/10.1002/ijc.27508.

61. Pinter M, Trauner M, Peck-Radosavljevic M, Sieghart W. Cancer and liver cirrhosis: Implications on prognosis and management. *ESMO Open.* 2016;1(2): e000042. https://doi.org/10.1136/esmoopen-2016-000042.

62. Chamberlain J, Sarfati D, Cunningham R, Koea J, Gurney J, Blakely T. Incidence and management of hepatocellular carcinoma among Māori and non-Māori New Zealanders. *Australian and New Zealand Journal of Public Health.* 2013;37(6): 520–526. https://doi.org/10.1111/1753-6405.12108.

63. Blakely TA, Bates MN, Baker MG, Tobias M. Hepatitis B carriage explains the excess rate of hepatocellular carcinoma for Maori, Pacific Island and Asian people compared to Europeans in New Zealand. *International Journal of Epidemiology.* 1999;28(2): 204–210. https://doi.org/10.1093/ije/28.2.204.

64. Te Aho o Te Kahu. *He pūrongo mate pukupuku o Aotearoa 2020 - The state of cancer in New Zealand 2020.* Te Aho o Te Kahu, Cancer Control Agency. 2021. https://teaho.govt.nz/static/reports/state-of-cancer-in-new-zealand-2020%20(revised%20March%202021).pdf.

65. Signal LN, Edwards R, Gage R, Jackson N, McKerchar C, Sarfati D. The state of cancer prevention in Aotearoa New Zealand: Slow progress requires political leadership and investment for health and equity. *Journal of Cancer Policy*. 2020;23. https://doi.org/10.1016/j.jcpo.2019.100212.

66. Gurney J, Stanley J, McLeod M, Koea J, Jackson C, Sarfati D. Disparities in cancer-specific survival between Māori and non-Māori New Zealanders, 2007-2016. *JCO Global Oncology.* 2020;(6): 766–774. https://doi.org/10.1200/GO.20.00028.

67. Te Aho o Te Kahu, Cancer Control Agency. *Hei Āhuru Mōwai: Maori Cancer Leadership Aotearoa.* https://www.heiahurumowai.org.nz [Accessed 8th January 2024].

68. Morris T. The Side Eye's two New Zealands: The 2,700 day gap. *The Spinoff.* May 19 2021. https://thespinoff.co.nz/the-best-of/19-05-2021/the-side-eyes-two-new-zealands-the-2700-day-gap [Accessed 8th January 2024].

69. Talamaivao N, Harris R, Cormack D, Paine SJ, King P. Racism and health in Aotearoa New Zealand: A systematic review of quantitative studies. *New Zealand Medical Journal.* 2020;133(1521).

70. Cleverley T, Meredith I, Sika-Paotonu D, Gurney J. Cancer incidence, mortality and survival for Pacific Peoples in Aotearoa New Zealand. *The New Zealand Medical Journal.* 2023;136(1586): 12–31. https://doi.org/10.26635/6965.6299

71. Manatū Hauora Ministry of Health. *Bowel cancer. https://info.health.nz/keeping-healthy/cancer-screening/bowel-screening/bowel-cancer [Accessed 30th September 2024].*

72. Johnson CH, Golla JP, Dioletis E, Singh S, Ishii M, Charkoftaki G, et al. Molecular mechanisms of alcohol-induced colorectal carcinogenesis. *Cancers.* 2021;13(17): 4404. https://doi.org/10.3390/cancers13174404.

73. Vieira AR, Abar L, Chan DSM, Vingeliene S, Polemiti E, Stevens C, et al. Foods and beverages and colorectal cancer risk: A systematic review and meta-analysis of cohort studies, an update of the evidence of the WCRF-AICR Continuous Update Project. *Annals of Oncology.* 2017;28(8): 1788–1802. https://doi.org/10.1093/annonc/mdx171.

74. Morgan E, Arnold M, Gini A, Lorenzoni V, Cabasag CJ, Laversanne M, et al. Global burden of colorectal cancer in 2020 and 2040: Incidence and mortality estimates from GLOBOCAN. *Gut.* 2023;72(2): 338–344. https://doi.org/10.1136/gutjnl-2022-327736.

75. Te Aho o Te Kahu - Cancer Control Agency. *What are our most common causes of cancer death?* https://teaho.govt.nz/cancer-numbers/cancer-deaths [Accessed 19th December 2023].

76. Sapkota R, Zakaria J, Glenn E, Richard H, Rimawi A, Tobi M, et al. Alcohol use and the risk of colorectal liver metastasis: A systematic mapping review. *Biology.* 2023;12(2): 257. https://doi.org/10.3390/biology12020257.

77. Tahara RK, Brewer TM, Theriault RL, Ueno NT. Bone metastasis of breast cancer. In: Ahmad A (ed.) *Breast Cancer Metastasis and Drug Resistance: Challenges and Progress.* Cham: Springer International Publishing; 2019. p. 105–129. https://doi.org/10.1007/978-3-030-20301-6_7.

78. Meng Q, Gao B, Goldberg ID, Rosen EM, Fan S. Stimulation of cell invasion and migration by alcohol in breast cancer cells. *Biochemical and Biophysical Research Communications.* 2000;273(2): 448–453. https://doi.org/10.1006/bbrc.2000.2942.

79. National Cancer Institute. *Metastatic cancer: When cancer spreads.* https://www.cancer.gov/types/metastatic-cancer [Accessed 14th December 2023].

80. Cancer Research UK. *Inherited genes and cancer types.* https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/inherited-cancer-genes-and-increased-cancer-risk/inherited-genes-and-cancer-types [Accessed 5th June 2024].

81. Brooks PJ, Enoch MA, Goldman D, Li TK, Yokoyama A. The alcohol flushing response: An unrecognized risk factor for esophageal cancer from alcohol consumption. *PLOS Medicine.* 2009;6(3): e1000050. https://doi.org/10.1371/journal.pmed.1000050.

82. Ensembl. rs671 (SNP) - *Population genetics - Homo_sapiens - Ensembl genome browser 110.* http://asia.ensembl.org/Homo_sapiens/Variation/Population?r=12:111803462-111804462;v=rs671;vdb=variation;vf=728758843 [Accessed 6th December 2023].

83. Kim, M. 'Asian glow' from alcohol isn't just a discomfort. It's a severe warning. *Washington Post.* August 15 2023. https://www.washingtonpost.com/wellness/2023/08/15/asian-glow-alcohol-gene-mutation-cancer-risk/ [Accessed 25th June 2024].

84. Lee CH, Lee JM, Wu DC, Goan YG, Chou SH, Wu IC, et al. Carcinogenetic impact of ADH1B and ALDH2 genes on squamous cell carcinoma risk of the esophagus with regard to the consumption of alcohol, tobacco and betel quid. *International Journal of Cancer.* 2008;122(6): 1347–1356. https://doi.org/10.1002/ijc.23264.

85. Im PK, Millwood IY, Kartsonaki C, Chen Y, Guo Y, Du H, et al. Alcohol drinking and risks of total and site-specific cancers in China: A 10-year prospective study of 0.5 million adults. *International Journal of Cancer.* 2021;149(3): 522–534. https://doi.org/10.1002/ijc.33538.

86. Wall TL, Ehlers CL. Genetic influences affecting alcohol use among Asians. *Alcohol Health and Research World.* 1995;19(3): 184–189.

87. Chambers T, Stanley J, Signal L, Pearson AL, Smith M, Barr M, et al. Quantifying the nature and extent of children's real-time exposure to alcohol marketing in their everyday lives using wearable cameras: Children's exposure via a range of media in a range of key places. *Alcohol and Alcoholism.* 2018;53(5): 626–633. https://doi.org/10.1093/alcalc/agy053.

88. Chambers T, Mizdrak A, Herbert S, Davies A, Jones A. The estimated health impact of alcohol interventions in New Zealand: A modelling study. *Addiction.* 2024;119(1): 125–136. https://doi.org/10.1111/add.16331.

89. Connor JL, Kypri K, Bell ML, Cousins K. Alcohol outlet density, levels of drinking and alcohol-related harm in New Zealand: a national study. *Journal of Epidemiology and Community Health.* 2011;65(10): 841. https://doi.org/10.1136/jech.2009.104935.

90. National Cancer Institute. *Persistent poverty's impact on cancer death.* https://www.cancer.gov/news-events/cancer-currents-blog/2020/persistent-poverty-increased-cancer-death-risk [Accessed 17th January 2024].

91. Phillips J. Having cancer is bad. Having cancer when you're poor is worse. *Scientific American.* 2019;320(5): 12.

92. Haynes R, Pearce J, Barnett R. Cancer survival in New Zealand: Ethnic, social and geographical inequalities. *Social Science & Medicine.* 2008;67(6): 928–937. https://doi.org/10.1016/j.socscimed.2008.05.005.

93. Teng AM, Atkinson J, Disney G, Wilson N, Blakely T. Changing socioeconomic inequalities in cancer incidence and mortality: Cohort study with 54 million person-years follow-up 1981-2011: Changing socioeconomic inequalities in cancer incidence and mortality. *International Journal of Cancer.* 2017;140(6): 1306–1316. https://doi.org/10.1002/ijc.30555.

94. Wai 2624 - Amended statement of claim. https://static1.squarespace.com/static/6182360ae5fdbc615020237d/t/620c478a6dd9633b84432e80/1644971916993/Wai+2624+%231.1.1%28c%29+ASoC.pdf [Accessed 2nd August 2024].

95. World Health Organization. *The SAFER technical package: Five areas of intervention at national and subnational levels.* World Health Organization. 2019. https://iris.who.int/bitstream/handle/10665/330053/9789241516419-eng.pdf [Accessed 5th June 2024].

96. Chisholm D, Moro D, Bertram M, Pretorius C, Gmel G, Shield K, et al. Are the "Best Buys" for alcohol control still valid? An update on the comparative cost-effectiveness of alcohol control strategies at the global level. *Journal of Studies on Alcohol and Drugs.* 2018;79(4): 514–522. https://doi.org/10.15288/jsad.2018.79.514.

97. Babor TF, Caetano R, Casswell S, Edwards G, Giesbrecht N, Graham K, et al. *Alcohol: No Ordinary Commodity: Research and Public Policy.* Oxford: Oxford University Press; 2010. https://doi.org/10.1093/acprof:oso/9780199551149.001.0001.

98. Anderson P, Chisholm D, Fuhr DC. Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. *The Lancet.* 2009;373(9682): 2234–2246. https://doi.org/10.1016/S0140-6736(09)60744-3.

99. Ministerial Forum on Alcohol Advertising and Sponsorship. *Ministerial forum on alcohol advertising and sponsorship: Recommendations on alcohol advertising and sponsorship.* Manatū Hauora Ministry of Health. 2014. https://www.health.govt.nz/publications/ministerial-forum-on-alcohol-advertising-and-sponsorship-recommendations-on-alcohol-advertising-and [Accessed 5th June 2024].

100. Government Inquiry in Mental Health and Addiction. *He ara oranga: Report of the Government Inquiry in Mental Health and Addiction.* Te Hiringa Mahara Mental Health and Wellbeing Commission; 2018. https://www.mentalhealth.inquiry.govt.nz/assets/Summary-reports/He-Ara-Oranga.pdf.

101. Chambers T, Mizdrak A, Herbert S, Davies A, Jones A. Interventions to reduce alcohol's harms to health: A modelling study. *Addiction.* 2024;119(1): 125–136. https://doi.org/10.1111/add.16331.

102. Allen + Clarke. *Independent review of the alcohol levy: Stage two. A report for the Ministry of Health.* Allen + Clarke. 2024. https://www.health.govt.nz/publications/independent-review-of-the-alcohol-levy-stage-2 [Accessed 2nd August 2024].

103. Aron A, Allen K. *Public attitudes on policy interventions to reduce alcohol harm: Results from the 2019/20 Alcohol Use in New Zealand Survey (AUiNZ).* Te Hiringa Hauora Health Promotion Agency. 2021. https://www.hpa.org.nz/sites/default/files/Alcohol%20Use%20in%20NZ%20Survey%20%28AUiNZ%29%20Support%20for%20policy%20interventions.pdf

104. Richards R, McNoe B, Iosua E, Reeder A, Egan R, Marsh L, et al. Knowledge of evidence-based cancer risk factors remains low among New Zealand adults: Findings from two cross-sectional studies, 2001 and 2015. *Asian Pacific Journal of Cancer Prevention.* 2017;18: 2931–2936. https://doi.org/10.22034/APJCP.2017.18.11.2931.

105. Buykx P, Gilligan C, Ward B, Kippen R, Chapman K. Public support for alcohol policies associated with knowledge of cancer risk. *International Journal of Drug Policy.* 2015;26(4): 371–379. https://doi.org/10.1016/j.drugpo.2014.08.006.

106. World Health Organization. *Alcohol labelling: A discussion document on policy options.* World Health Organization. 2017. https://iris.who.int/bitstream/handle/10665/350744/WHO-EURO-2017-4124-43883-61793-eng.pdf?sequence=1 [Accessed 2nd August 2024].

107. Zhao J, Stockwell T, Vallance K, Hobin E. The effects of alcohol warning labels on population alcohol consumption: An interrupted time series analysis of alcohol sales in Yukon, Canada. *Journal of Studies on Alcohol and Drugs.* 2020;81(2): 225–237. https://doi.org/10.15288/jsad.2020.81.225.

108. Weerasinghe A, Schoueri-Mychasiw N, Vallance K, Stockwell T, Hammond D, McGavock J, et al. Improving knowledge that alcohol can cause cancer is associated with consumer support for alcohol policies: Findings from a real-world alcohol labelling study. *International Journal of Environmental Research and Public Health.* 2020;17(2): 398. https://doi.org/10.3390/ijerph17020398.

109. Cancer Society NZ. *Alcohol and Cancer Awareness.* https://www.cancer.org.nz/about-us/our-advocacy-work/our-advocacy-campaigns/waipiro-and-cancer/ [Accessed 28th March 2024].

110. Australia New Zealand Food Standards. *Labelling of alcoholic beverages and food containing alcohol.* Australian Government Federal Register of Legislation; 2023. https://www.legislation.gov.au/F2015L00469/latest/text [Accessed 7th August 2024]

111. The Lancet Gastroenterology & Hepatology. Distilling the message: Irish plans for alcohol warning labels. *The Lancet Gastroenterology & Hepatology.* 2023;8(3): 199. https://doi.org/10.1016/S2468-1253(23)00014-6.

112. Stockwell T, Solomon R, O'Brien P, Vallance K, Hobin E. Cancer warning labels on alcohol containers: A consumer's right to know, a government's responsibility to inform, and an industry's power to thwart. *Journal of Studies on Alcohol and Drugs.* 2020;81(2): 284–292. https://doi.org/10.15288/jsad.2020.81.284.

113. Alcorn T. Should alcoholic beverages have cancer warning labels? *The New York Times.* April 9 2024. https://www.nytimes.com/2024/04/09/health/alcohol-cancer-warning.html [Accessed 11th April 2024].

114. World Health Organization. *No level of alcohol consumption is safe for our health.* https://www.who.int/europe/news/item/04-01-2023-no-level-of-alcohol-consumption-is-safe-for-our-health [Accessed 22nd November 2023].

115. McCambridge J, McAlaney J, Rowe R. Adult consequences of late adolescent alcohol consumption: A systematic review of cohort studies. *PLOS Medicine.* 2011;8(2): e1000413. https://doi.org/10.1371/journal.pmed.1000413.

116. Odgers CL, Caspi A, Nagin DS, Piquero AR, Slutske WS, Milne BJ, et al. Is it important to prevent early exposure to drugs and alcohol among adolescents? *Psychological Science.* 2008;19(10): 1037–1044. https://doi.org/10.1111/j.1467-9280.2008.02196.x.

117. Ratna A, Mandrekar P. Alcohol and cancer: Mechanisms and therapies. *Biomolecules.* 2017;7(3): 61. https://doi.org/10.3390/biom7030061.

118. Viner RM, Taylor B. Adult outcomes of binge drinking in adolescence: Findings from a UK national birth cohort. *Journal of Epidemiology and Community Health.* 2007;61(10): 902–907. https://doi.org/10.1136/jech.2005.038117.

119. Pennay A, Caluzzi G, Livingston M, MacLean S. Risk and restraint—The key to understanding the decreasing use of alcohol for young people in high income countries? *Drug and Alcohol Review.* 2024;43(3): 654–663. https://doi.org/10.1111/dar.13709.

120. Ball J, Pettie MA, Poasa L, Abel G. Understanding youth drinking decline: Similarity and change in the function and social meaning of alcohol use (and non-use) in adolescent cohorts 20 years apart. *Drug and Alcohol Review.* 2024;43(3): 664–674. https://doi.org/10.1111/dar.13685.

121. Towers A, Sheridan J, Newcombe D, Szabó Á. *New Zealanders' alcohol consumption patterns across the lifespan.* Te Hiringa Hauora Health Promotion Agency. 2018. https://www.hpa.org.nz/sites/default/files/New%20Zealanders%20alcohol%20consumption%20across%20the%20lifespan%20September%202018.pdf.

122. Alattas M, Ross CS, Henehan ER, Naimi TS. Alcohol policies and alcohol-attributable cancer mortality in U.S. states. *Chemico-Biological Interactions.* 2020;315: 108885. https://doi.org/10.1016/j.cbi.2019.108885.

123. Schwartz N, Nishri D, Cheong S, Giesbrecht N, Klein-Geltink J. Is there an association between trends in alcohol consumption and cancer mortality? Findings from a multicountry analysis. *European Journal of Cancer Prevention.* 2017;28: 1. https://doi.org/10.1097/CEJ.0000000000000403.

124. Elder V. Alcohol a major cause of cancer. *Otago Daily Times Online News.* July 13 2013. https://www.odt.co.nz/news/dunedin/alcohol-major-cause-cancer [accessed 17th January 2024]

125. Winstock AR, Maier LJ, Zhuparris A, Davies E, Puljevic C, Kuypers KPC, et al. *Global Drug Survey (GDS) 2021 key findings report.* Global Drug Survey. 2021. https://www.drugsandalcohol.ie/35257/1/Global_drug_survey_report_2021.pdf.

126. Davies EL, Maier LJ, Winstock AR, Ferris JA. Intention to reduce drinking alcohol and preferred sources of support: An international cross-sectional study. *Journal of Substance Abuse Treatment.* 2019;99: 80–87. https://doi.org/10.1016/j.jsat.2019.01.011.

127. Te Aho o Te Kahu. ***Pūrongo ārai mate pukupuku, cancer prevention report***. 2022. Wellington: Te Aho o Te Kahu, Cancer Control Agency. https://hcmsitesstorage.blob.core.windows.net/cca/assets/Cancer_Prevention_V12_7_April22_05c46c078b.pdf

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