Alcohol – the Body and Health Effects

A brief overview

Health New Zealand
Te Whatu Ora

The contents of this publication can also be found online at **resources.alcohol.org.nz**

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Introduction

This publication provides a brief overview of the health and body effects of alcohol. It is a series of short summaries based on available evidence rather than a comprehensive literature review. Areas covered include the effects of alcohol on body parts, the health effects of acute alcohol use, the health conditions related to chronic alcohol use and the effects of alcohol on other people and populations. Low-risk drinking advice is also outlined along with information about where to find support and further information.

What is alcohol?

Alcohol (ethanol or ethyl alcohol) is the ingredient found in beer, wine and spirits that causes drunkenness. Alcohol is formed when yeast ferments (breaks down without oxygen) the sugars in different foods. For example, wine is made from the sugar in grapes, beer from the sugar in malted barley (a type of grain), cider from the sugar in apples and vodka from the sugar in potatoes, beets or other plants.[1]

Body effects of alcohol

Alcohol is classed as a 'sedative hypnotic' drug[2], which means it acts to depress the central nervous system at high doses.

At lower doses, alcohol can act as a stimulant,[3] inducing feelings of euphoria and talkativeness, but drinking too much alcohol at one session can lead to drowsiness, respiratory depression (where breathing becomes slow, shallow or stops entirely), coma or even death.[4,5,6]

As well as its acute and potentially lethal sedative effect at high doses, alcohol has effects on every organ in the body and these effects depend on the blood alcohol concentration (BAC) over time.[7]

After a drink is swallowed, the alcohol is rapidly absorbed into the blood (20% through the stomach and 80% through the small intestine), with effects felt within 5 to 10 minutes after drinking.[6] It usually peaks in the blood after 30 to 90 minutes[6] and, thus, is carried through all the organs of the body.

Most (90%) of the metabolism, or breaking down, of alcohol from a toxic substance to water and carbon dioxide is performed by the liver,[6] with the rest excreted through the lungs (allowing alcohol breath tests), through the kidneys (into urine) and in sweat.[8]

The liver can break down only a certain amount of alcohol per hour, which for an average person is around one standard drink.[8]

The BAC rises and the feeling of drunkenness occurs, when alcohol is drunk faster than the liver can break it down. Table 1 shows the relationship between BAC and symptoms of drunkenness – the higher the BAC, the greater the effects on the body. However, BAC does not correlate exactly with symptoms of drunkenness and different people have different symptoms even after drinking the same amount of alcohol. The BAC level and every individual's reaction to alcohol, is influenced by:[1,2,7]

- the ability of the liver to metabolise alcohol (which varies due to genetic differences in the liver enzymes that break down alcohol)[7]
- the presence or absence of food in the stomach (food dilutes the alcohol and dramatically slows its absorption into the bloodstream by preventing it from passing quickly into the small intestine)
- the concentration of alcohol in the beverage (highly concentrated beverages such as spirits are more quickly absorbed)
- how quickly alcohol is consumed
- body type (heavier and more muscular people have more fat and muscle to absorb the alcohol)[2]
- age, sex, ethnicity (eg, women have a higher BAC after drinking the same amount of alcohol than men due to differences in metabolism and absorption – since men have, on average, more fluid in their body to distribute alcohol around than women do, some ethnic groups have different levels of a liver enzyme responsible for the breakdown of alcohol)
- how frequently a person drinks alcohol (someone who drinks often can tolerate the sedating effects of alcohol more than someone who does not regularly drink).[6]

Table 1: Symptoms of drunkenness at different levels of blood alcohol concentration (BAC)

BAC	Symptoms
<50 mg/dL	• Some impairment in motor coordination and thinking ability • Talkativeness • Relaxation
50-150 mg/dL	• Altered mood (increased wellbeing or unhappiness) • Friendliness, shyness or argumentativeness • Impaired concentration and judgement • Reduce sexual inhibition
150-250 mg/dL	• Slurred speech • Unsteady walking • Nausea • Double vision • Increased heart rate • Drowsiness • Mood, personality and behaviour changes that may be sudden, angry and antisocial
300 mg/dL	• Unresponsive/extremely drowsy • Speech incoherent/confused • Memory loss • Vomiting • Heavy breathing
>400 mg/dL	• Breathing slowed, shallow or stopped • Coma • Death

Adapted from: Table 163.1 in Brust, J. C. M. (2005). Alcoholism. In L. P. Rowland (Ed.), ***Merritt's neurology*** (11th ed.). Philadelphia: Lippincott Williams & Wilkins.[4] and Table 1 in Vonghia, L., Leggio, L., Ferrulli, A., Bertini, M., Gasbarrini, G., Addolorato, G., et al. (2008). Acute alcohol intoxication. ***European Journal of Internal Medicine,*** 19(8), 561–567.[5]

Body effects of alcohol

Summary of main effects

Alcohol affects all parts of the body including:

mental health
Alcohol can be used to relax but it is also addictive and can lead to dependency.

eyes
Being drunk can cause blurred vision.

skin
Alcohol use can have direct and indirect effects on the skin.

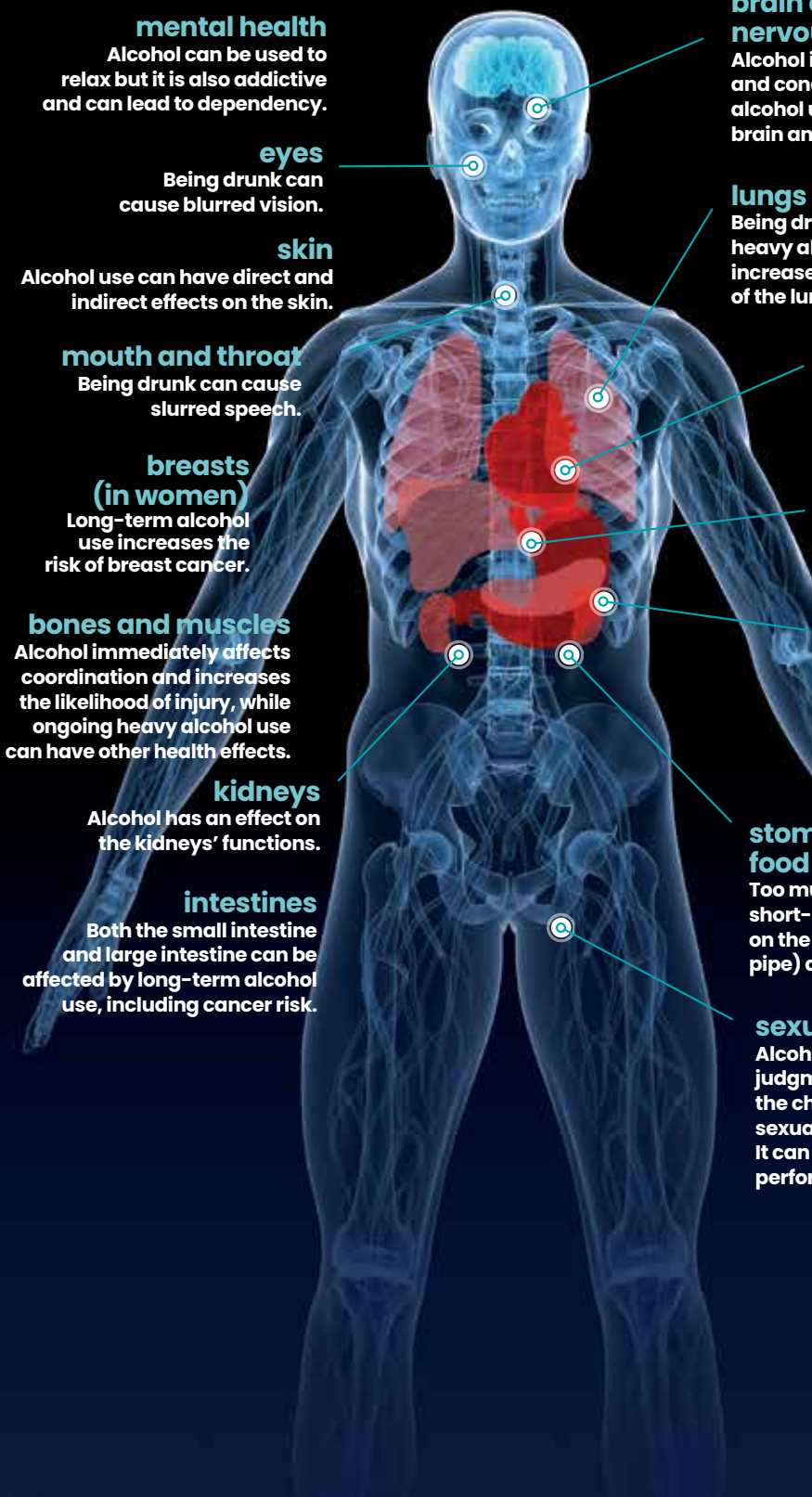
mouth and throat
Being drunk can cause slurred speech.

breasts (in women)
Long-term alcohol use increases the risk of breast cancer.

bones and muscles
Alcohol immediately affects coordination and increases the likelihood of injury, while ongoing heavy alcohol use can have other health effects.

kidneys
Alcohol has an effect on the kidneys' functions.

intestines
Both the small intestine and large intestine can be affected by long-term alcohol use, including cancer risk.



blood
Alcohol is absorbed into the bloodstream and can have some long-term effects.

brain and nervous system
Alcohol impairs judgement and concentration. Long-term alcohol use can damage the brain and nerves.

lungs
Being drunk and chronic heavy alcohol use can increase the risk of infections of the lungs.

heart
Alcohol use at low levels may be beneficial for the heart in some people but is harmful for everyone at high levels.

liver
Long-term alcohol use can cause damage to the liver in a variety of ways.

pancreas
Alcohol use, particularly when heavy, can cause acute or chronic pancreatitis (inflammation and damage to the pancreas).

stomach and food pipe
Too much alcohol can have short- and long-term effects on the oesophagus (food pipe) and the stomach.

sexual health
Alcohol use can affect judgment and increases the chance of unwanted sexual experiences.
It can also affect sexual performance in men.

Overall body effects

Alcohol affects all parts of the body including:

- blood and immune system
- bones and muscles
- brain and nervous system
- breasts (in women)
- eyes
- heart and blood pressure
- intestines
- kidneys and fluid balance
- liver
- lungs
- mental health
- mouth and throat
- pancreas and digestion of sugar
- sexual and reproductive system – men and women
- skin and fat
- stomach and food pipe (oesophagus).

As well as potentially affecting the physical and mental health of individuals in many ways, chronic and heavy alcohol use can increase the risk of death[9] either directly, such as through acute alcohol poisoning or because alcohol causes a fatal disease such as cancer[10], or indirectly, such as alcohol being a factor in violent death or suicide. Alcohol contributes to a high burden of disease in society in terms of years that people spend with disability or in poor health because of alcohol-related illnesses or injuries.[11,12] Unintentional injuries from alcohol use often result from falls, burns, motor vehicle accidents, assaults and drowning.[9]

Blood and immune system

Long-term effects of alcohol use

Chronic heavy alcohol use can cause abnormalities in the blood, leading to anaemia (low haemoglobin, the component of blood that carries oxygen around the body) and low platelets (platelets help prevent bleeding).[13] Chronic heavy alcohol use also suppresses the immune system (such as affecting the white blood cells that fight infections), making it more difficult for the body to fight off both viral and bacterial infections. People who drink heavily over a long time are more likely to suffer from infections after surgery, burns, trauma, hepatitis C infection, HIV/AIDS, meningitis, tuberculosis and pneumonia (acute inflammation of the lung, usually due to infection).[4,14,15]

Bones and muscles

Immediate effects of alcohol use

Alcohol use causes many different types of injuries, including injuries from road traffic accidents, assaults and falls.[9] This is usually because high levels of blood alcohol impair the brain's thought processes and the coordination of muscles, causing clumsiness and difficulty walking.[16] Common injuries seen at the emergency department include cuts, bruises, sprains and broken bones.[17,18] The risk of injury in the six hours after drinking doubles with four standard drinks and increases rapidly the more alcohol is drunk on a single occasion.[19]

Long-term effects of alcohol use

Moderate alcohol use may protect against osteoporosis (thinning of the bones, which makes the bones more likely to break).[20] However, chronic heavy alcohol use interferes with the absorption of calcium and bone formation and can actually lead to osteoporosis.[20,21] Chronic heavy use is also associated with a painful condition where bone tissue dies (osteonecrosis)[22], gout (a type of arthritis or inflammation of the joints, often affecting the joint of the big toe)[13], and muscle wasting and weakness.[4,23]

Brain and nervous system

Immediate effects of alcohol use

Being drunk impairs judgment, inhibitions and concentration and in increasing amounts leads to drowsiness and coma.[4] The loss of memory for a period of drunkenness (alcoholic blackout) can occur in occasional as well as regular heavy drinkers and is due to alcohol interfering with the laying down of memories.[4,8]

Long-term effects of alcohol use

Chronic heavy alcohol use can damage the brain and nerves in a variety of ways. Some damage to the brain, from mild to severe, occurs in around half of chronic heavy alcohol drinkers.[24] This may be a result of thiamine (vitamin B1) deficiency (secondary to alcohol use, either because of poor diet or because alcohol reduces the absorption of thiamine from the gut and interferes with how thiamine is used in the body).[25]

Thiamine deficiency can cause an acute, severe, life-threatening disorder called Wernicke's encephalopathy, which usually presents with symptoms of abnormal or paralysed eye movements, difficulty walking and confusion. It also causes a chronic condition of memory loss (variously called Korsakoff's syndrome, psychosis or dementia), where loss of old memories occurs and difficulties in laying down new memories may be profound.[4,24,25] Both of these disorders are ultimately fatal without treatment with thiamine.[4]

Chronic heavy alcohol use can also damage the part of the brain responsible for balance and coordination (the cerebellum), leading to instability and problems with walking.[4,25] It can also damage peripheral nerves in the body, leading to pain, weakness, numbness and the inability to sense touch.[4,26] In rare cases it can damage specific centres in the brain, leading to loss of mental function, inability to walk and death[8] and can lead to the development of epilepsy (chronic fits)[9] and sleep disturbances. Although individuals suffering from insomnia sometimes use alcohol to treat the insomnia, tolerance to the sedating effect of alcohol is likely to occur, increasing the risk of excessive use.[3]

Also, if more than one or two drinks are taken in the evening, sleep can be disrupted, increasing the chances of a person waking in the night and finding it hard to fall back asleep.[8]

The relationship between alcohol use and stroke, where there is a sudden paralysis, loss of sensation or inability to talk because the blood supply to the brain is interrupted, is complex. Alcohol increases the risk of hemorrhagic stroke, where the stroke is caused by bleeding in the brain. However, low to moderate alcohol use (one to two drinks a day) reduces the risk of ischaemic stroke, which is caused by blockage of the blood vessels in the brain, but higher levels of alcohol use increase the risk of ischaemic stroke.[9]

Breasts – women

Long-term effects of alcohol use

Long-term alcohol use increases the risk of breast cancer, with higher use resulting in a higher risk of cancer.[9,27,28] A significantly elevated risk is seen from having even one or two drinks of alcohol a day.[10] The risk increases on average by about 10% for every one standard drink of alcohol per day.[29]

Eyes

Immediate effects of alcohol use

Being drunk can cause blurred or double vision.[4]

Long-term effects of alcohol use

Chronic heavy alcohol use, when coupled with a diet low in vitamin B1 and B12, may lead to decreased vision.[4,30]

Heart* and blood pressure

Long-term effects of alcohol use

The evidence for the affect of alcohol on the heart is mixed. There is an opinion that light to moderate alcohol use (up to one standard drink per day for women and up to two standard drinks per day for men) can, in older age groups, reduce the risk of developing and dying from coronary artery disease (narrowing and blockage of the arteries supplying blood to the heart resulting from the buildup of fatty deposits inside the walls of the arteries (atherosclerosis), which can cause angina and heart attacks). This appears to be because small quantities of alcohol alter the lipids and clotting factors in the blood to make them protective against heart disease.[9,31,32,33]

However, heavy drinking (both chronic and a pattern of heavy drinking sessions) increases the risk of coronary artery disease.[9,34] Heavy drinking (chronic and/or at a single session) is also associated with sudden death from heart failure, with irregular heartbeats and with chronic disease of the heart muscle (dilated cardiomyopathy). Dilated cardiomyopathy leads to heart failure, where the heart can no longer pump blood around the body effectively.[9,27,32,34]

Heavy chronic alcohol use is also linked to high blood pressure, particularly in men.[9,34,35] Blood pressure increases with drinking more than two or three drinks a day on average and restriction of alcohol lowers the blood pressure.[35]

Drinking alcohol in order to 'protect the heart' is not advisable, since alcohol is an addictive drug that causes cancer, increases the risk of injury and causes damage to the fetus in pregnant women. People can find it difficult to limit their drinking to one or two standard drinks a day and heavy drinking actually increases the risk of heart disease.[34] People who have risk factors for, or have, established heart disease should also focus on other factors such as cigarette smoking, high cholesterol, high blood pressure, diabetes, overweight and physical inactivity. Young and middle-aged adults, especially women, are more likely to experience harm than benefit from alcohol use due to risk from injury and, for women, increased risk from breast cancer.[36,37]

Intestines

Long-term effects of alcohol use

Long-term alcohol use can cause cancer of the large bowel/intestines and rectum.[9,38,39] Alcohol can lead to malnutrition and diseases due to low vitamin levels, as it blocks the absorption of many important vitamins and nutrients in the gut.[23]

Kidneys and fluid balance

Immediate effects of alcohol use

Alcohol is a diuretic, meaning that it causes water to be lost from the body through the kidneys (into urine), which can lead to dehydration.[35] Alcohol can also cause the loss of important minerals and salts from the body such as magnesium, calcium, phosphate, sodium and potassium[13], either directly or because alcohol induces vomiting. Low levels of these elements can cause many problems ranging from irregular heartbeats to seizures.[5]

*The evidence for the effects of alcohol on the heart is mixed and often controversial. This section is a brief summary of the evidence available at the time of publication.

Liver

Long-term effects of alcohol use

Chronic heavy alcohol use can damage the liver, causing alcoholic liver disease. This occurs across a spectrum from fatty liver, to acute alcoholic hepatitis, to cirrhosis.[1]

Fatty liver, where fat builds up in the liver cells, is very common in heavy drinkers and is reversible if drinking is reduced. However, a small percentage of people with fatty liver will develop alcoholic hepatitis, cirrhosis or liver cancer.

Alcoholic hepatitis develops in 10% to 35% of heavy drinkers and is an acute injury to the liver that can present with symptoms of feeling unwell, tiredness, jaundice (yellow skin and whites of eyes), swollen stomach and enlarged, tender liver. Death from liver failure can occur in severe cases.

Cirrhosis of the liver develops in 5% to 15% of heavy drinkers and is where the liver is permanently damaged and cells are replaced by scar tissue, so the liver can no longer function (to detoxify the body, make vital proteins, store vitamins and sugars and make chemicals necessary for digestion). Cirrhosis can also lead to death from liver failure.

Treatment for alcoholic liver disease must include stopping the drinking of alcohol. Alcohol also causes liver cancer and treatment options are often limited if alcoholic liver disease is present or the cancer has spread widely by the time of diagnosis. This means liver cancer is often quickly fatal.[9,40,41]

Lungs

Immediate effects of alcohol use

Being drunk[9], increases the risk of pneumonia (inflammation of the lungs, usually caused by infection from bacteria or viruses).[5] This is because, at high blood concentrations, alcohol is sedating and relaxes the mouth and throat, suppresses reflexes (like the gag and cough reflexes) and reduces the ability of the lungs to clear mucus and foreign matter, so that vomit, saliva or other substances may enter the lungs and cause inflammation and infection (bronchitis or pneumonia).

Long-term effects of alcohol use

Chronic heavy alcohol use is also associated with higher rates of pneumonia, tuberculosis (an infectious disease that primarily affects the lungs but also any other part of the body)[9], and acute respiratory distress syndrome (ARDS – a life-threatening condition in which the lungs fill with fluid, which occurs as a rare complication of pneumonia, trauma and severe infections).[42] In addition to the ways in which acute alcohol use can cause pneumonia, chronic heavy alcohol use also impairs the immune system and changes the bacteria present in the mouth to those more likely to cause infections, making people more vulnerable to pneumonia.[9]

Mental health

Immediate effects of alcohol use

Many people use low doses of alcohol for relaxation and to relieve tension, nervousness and stress.[2,8] However, in some people alcohol creates rather than reduces stress through stimulating stress hormones.[43] Alcohol affects mood in a variety of ways and can make people feel happy, sad or aggressive and can also cause mood swings.[4,8] However, there is a risk of becoming dependent on alcohol if it is used as a primary means to relieve stress and anxiety without addressing the underlying causes. Because it removes inhibitions and increases aggression and recklessness, alcohol is often found in the blood of people who self-harm, or attempt or complete suicide.[44]

Long-term effects of alcohol use

Alcohol is addictive and can lead to dependency. This is where the body requires more alcohol to achieve the desired effect (eg, altered mood), where use of alcohol interferes with a person's life (causing legal, work/study, relationship or social problems), where a person continues to use alcohol despite it causing physical or mental problems and where, if alcohol is not taken, withdrawal symptoms occur.

The severity of withdrawal symptoms depends on the quantity of alcohol consumed and the length of the drinking session. Symptoms include shaking of the hands, which commonly occurs the morning after the drinking session and may be relieved by more alcohol.

If alcohol is not taken, symptoms can progress to insomnia, increased heart rate, temperature and blood pressure, sweating, agitation, nausea, flushing of the face, nightmares, hallucinations (seeing, hearing or feeling things that are not present) and fits.[4,13,45,46] The most serious withdrawal syndrome is 'delirium tremens', which develops in about 5% of people with alcohol withdrawal (more if fits are not treated) and by definition includes the symptom of delirium (an altered and confused state of mind).[46] This syndrome has a death rate of around 5%.[46]

In people who drink heavily, alcohol commonly causes mood disorders, including depression, anxiety and psychosis (a mental illness defined by changes in personality, a distorted sense of reality and delusions).[8] If these disorders only occur during drinking sessions or withdrawal, they will usually resolve once drinking is stopped.[8] Alcohol abuse and dependency are also common in people with pre-existing mental health conditions.

Mouth and throat

Immediate effects of alcohol use

Being drunk can have various effects on speech, such as making people more friendly, talkative, unreserved, relaxed or argumentative. Increasing amounts of alcohol can cause aggressive, antisocial, angry, slurred and confused speech.[4,5]

Long-term effects of alcohol use

Alcohol is a carcinogen, meaning that it causes cancers in humans. Regular alcohol use increases the risk of cancers of the mouth, throat and voicebox.[9,29,47] Drinking around 50g of alcohol a day (five standard drinks) increases the risk of these cancers by two to three times compared with non-drinkers, but for people who smoke, this risk is increased much more.[10,47] Drinking more increases the risk of cancers and drinking less decreases the risk of cancers.

Pancreas and digestion of sugar

Immediate effects of alcohol use

Heavy alcohol use on a single occasion can lead to dangerously low blood sugar (hypoglycaemia), which can cause symptoms of shaking, sweating, dizziness, blurred vision and, if not treated, brain damage.[4,5]

Long-term effects of alcohol use

The pancreas is a gland that secretes digestive enzymes and releases insulin, which regulates sugar levels in the blood.[48]

Chronic heavy alcohol use can cause acute pancreatitis (sudden inflammation of and damage to the pancreas that resolves over several days)[9,48] and chronic pancreatitis (inflammation of the pancreas that does not heal and worsens over time).[48,49] Acute pancreatitis typically causes abdominal and back pain, nausea and fever[49] and may occur a few hours or up to two days after drinking alcohol.[48] In 20% to 30% of people, acute pancreatitis is a severe, life-threatening condition, which requires treatment in hospital.[50]

Chronic pancreatitis typically occurs in people aged 30 to 40 years and can cause abdominal pain, weight loss, diabetes, malnutrition and oily bowel motions (because the pancreas helps to digest fat and when the pancreas is damaged, fats are excreted out of the bowel instead of being absorbed into the body).[48] The risk of acute and chronic pancreatitis increases with higher alcohol use.[9]

Moderate alcohol use is associated with a reduced risk of developing type 2 diabetes, although the exact reason for this is not certain.[9]

Sexual health – men

Immediate effects of alcohol use

Being drunk increases the chances of having unsafe sex (without a condom), having sex that is later regretted or experiencing sexual assault[51,52] as alcohol impairs judgment and lowers inhibitions.[4] These factors are also likely to increase the risk of getting a sexually transmitted infection.[53]

Long-term effects of alcohol use

Chronic heavy alcohol use can lead to impotence, loss of sex drive, wasting of the testicles and reduced fertility.[35,54] This is primarily because alcohol affects testosterone levels.

Sexual health – women

Immediate effects of alcohol use

Being drunk increases the chances of having unsafe sex (without a condom), having sex that is later regretted or experiencing sexual assault[51,52] as alcohol impairs judgment and lowers inhibitions.[4] Such sexual experiences are also likely to increase the risk of getting a sexually transmitted infection[53] or having an unplanned pregnancy.

Long-term effects of alcohol use

Chronic heavy alcohol use can lead to reduced fertility and can make periods heavy or irregular or stop altogether.[19,35] Consuming alcohol while pregnant may increase the risk of miscarriage[55,56], low birth weight[13], stillbirth and premature birth.[9,57] It can also cause significant abnormalities in the unborn, developing baby (fetal alcohol spectrum disorder).[4,13,57,58]

Skin and fat+

Immediate effects of alcohol use

Acute alcohol use can lead to skin flushing and worsen the appearance of skin conditions such as rosacea (a chronic facial skin rash).[59]

Long-term effects of alcohol use

Chronic heavy alcohol use, when associated with serious liver disease and liver failure, can also cause yellowing of the skin, decreased body hair and spider veins.[40,60]

Alcohol is a high-calorie beverage. One standard drink (100ml of wine, 30ml of spirits or 280ml of standard beer) contains 290kJ, close to half the energy of a can of fizzy drink. Alcohol is also an appetite stimulant and people tend to eat more when consuming alcohol with their meals.[61] However, while theoretically the potential for alcohol to increase weight is clear and some studies find that alcohol use is associated with increased weight[62,63], others find the opposite result.[64,65]

Alcohol seems more likely to cause weight gain in those who drink intermittently (moderately to heavily), in those who are already overweight, in those eating a high-fat diet and in men.[63,66,67] For people concerned about their weight, nutritionists advise people to take into account how much energy alcohol is contributing to their diet.[68]

Chronic heavy drinkers are likely to be malnourished as alcohol has little nutritional value and replaces nutritious food in the diet.[23]

Stomach and food pipe (oesophagus)

Immediate effects of alcohol use

Being drunk can lead to nausea and vomiting, diarrhoea, heartburn (when acid from the stomach rises up into the food pipe, due to alcohol causing the muscle around the outlet of the stomach to relax) and acute gastritis (inflammation of the lining of the stomach, which causes stomach pain, nausea, loss of appetite and indigestion).[4,5,23,38] Vomiting and diarrhoea can result in dehydration, salt imbalances and the buildup of acids in the body, especially in combination with excessive alcohol intake.[5] Inhaling vomit can lead to bronchitis or pneumonia (infection of the lungs). Vomit can block the airway and windpipe when blood alcohol is very high and breathing and consciousness are impaired.[5]

Persistent vomiting and retching after heavy use on a single occasion can sometimes (but only rarely) rip the food pipe (a Mallory Weiss tear), which leads to vomiting of blood.

Long-term effects of alcohol use

Long-term alcohol use can cause cancer of the food pipe (oesophagus) and drinking 50g of alcohol a day (five standard drinks) doubles the risk compared with a non-drinker.[9,29,69] However, the risk is much greater in people who drink alcohol who are also deficient in a liver enzyme that metabolises alcohol (East Asian populations are commonly deficient in this enzyme).[7,29] The risk is also increased in smokers.[70] Chronic heavy alcohol use can also lead to chronic gastritis but alcohol may protect against infection from *Helicobacter pylori*, the bacteria that cause ulcers of the stomach.[16,38,71] In cases of advanced liver disease due to prolonged heavy alcohol use, the veins to the stomach and oesophagus can swell and may burst, causing life-threatening bleeding.

+ The evidence related to alcohol and fat is evolving. This section is a brief summary of the evidence available at the time of publication.

Health effects of acute alcohol use

The relationship between alcohol use and some health conditions is complex.

For example, drinking a small amount of alcohol may be beneficial in preventing heart disease in older adults, but drinking a lot of alcohol can also damage the heart. For other health conditions, alcohol is the single cause of the condition, such as alcoholic cirrhosis of the liver, fetal alcohol spectrum disorder and alcohol-induced pancreatitis. For many other health conditions, alcohol is one cause, among others, of the condition eg, cancers and pneumonia.[9] Overall, alcohol is a cause of more than 60 different health conditions and, for almost all conditions, heavier alcohol use means higher risk of disease or injury.[9,27]

Alcohol poisoning

Alcohol poisoning, known in emergency departments as acute intoxication, is when a large amount of alcohol is drunk, followed shortly afterwards by changes in mood or behaviour, impaired judgment or social functioning and one or more physical signs of drunkenness, such as slurred speech, unsteadiness, lack of coordination, impaired attention or loss of consciousness.[5]

The physical effects of alcohol poisoning are many, from nausea, vomiting and dehydration, which are familiar symptoms to those who may have drunk too much on one occasion, to the worst complication – death.

The term 'alcohol poisoning' is sometimes used to describe the most serious and life-threatening complications of alcohol overdose, such as slowed breathing and loss of consciousness.

The lethal dose of alcohol is 5 to 8g/kg (3g/kg for children)[6] – that is, for a 60kg person, 300g of alcohol can kill, which is equal to 30 standard drinks (about 1 litre of spirits or four bottles of wine).

Table 2 summarises, by body part affected, the various symptoms and complications that can occur from drinking too much alcohol on a single occasion. This includes symptoms caused directly by the excess alcohol, such as nausea, slurred speech and mood changes, but also health problems caused indirectly by alcohol, such as injuries and unsafe sex.

Hangover

A hangover can occur in anyone after a single episode of heavy alcohol use. Symptoms include headache, nausea, vomiting, sweating, fatigue, shakiness, sensitivity to light and irritability.[4] Typically, symptoms start a few hours after drinking stops, when blood alcohol is falling and peak at the time the blood alcohol concentration is zero, but may continue for 24 hours after this. Alcohol causes hangover symptoms through dehydration (which causes thirst, dizziness and weakness), irritation of the stomach and liver (which causes nausea, vomiting and stomach pain), low blood sugar (which causes fatigue and mood changes) and disturbance of sleep.[72]

The type of alcohol drunk may increase the chance of getting a hangover. Alcoholic drinks include compounds called congeners that add to the taste, smell or colour of the drink. Alcohol with fewer congeners, such as gin and vodka, may cause fewer hangover effects than alcohol with more congeners, such as brandy, whisky and red wine.[72]

The only cure for a hangover is time, although drinking water or fruit juice and eating bland food such as toast or crackers may help with dehydration and low blood sugar. Paracetamol should be avoided as this can be toxic to the liver during a hangover. Aspirin and anti-inflammatory medicines should also be avoided if nausea or stomach pain is present, as these can aggravate acute gastritis caused by alcohol, but antacids can be useful.[72]

Table 2: Potential symptoms and complications of acute intoxication or alcohol poisoning, by body part affected

Body part affected	Symptoms
Mouth	• Slurred/confused speech
Stomach and food pipe	• Nausea, vomiting • Heartburn • Gastritis
Intestines	• Diarrhoea
Pancreas and sugar digestion	• Pancreatitis • Hypoglycaemia
Kidneys and fluid balance	• Dehydration • Depleted salts and minerals
Heart and blood pressure	• Increased heart rate • Irregular heart rate
Lungs	• Slowed rate and depth of breathing (respiratory depression) • Pneumonia/bronchitis
Brain and nervous system	• Impaired concentration/attention • Blackouts/memory loss • Impaired consciousness/coma
Mental health	• Mood and personality changes • Aggression/antisocial behaviour • Suicide and self-harm
Sexual health	• Unsafe sex/STI/sexual assault • Unplanned pregnancy (females)
Bones and muscles	• Injuries
Eyes	• Blurred/double vision
Whole body	• Injuries • Death

Health conditions related to chronic alcohol use

Potential complications of chronic alcohol use

For some people, alcohol is a regular or occasional drink enjoyed at social occasions that causes no apparent harm. However, even moderate alcohol use carries some risks, as alcohol causes breast cancer even at low doses, can damage the developing fetus before a woman even knows she is pregnant and can lead to addiction and dependence in any individual.

When drunk regularly over time and/or drunk in a pattern of heavy single drinking sessions, alcohol can cause a variety of health conditions. These include cancers and other conditions such as alcoholic liver disease, which can range from reversible to permanent liver damage due to alcohol. The risks of alcohol-related cancers and other health conditions caused by alcohol are greatest in those who are dependent on alcohol or drink heavily and the risks increase with the average amount of alcohol drunk. Table 3 lists some of the conditions and complications of chronic and/or heavy episodic alcohol use.[9]

Cancers

Alcohol is now recognised as a carcinogen – it is known to increase the risk of several different types of cancer. This is based on assessments from the World Health Organization International Agency for Research on Cancer (IARC) Monograph Working Group, a group of expert scientists who review published studies and evaluate the evidence that alcohol increases the risk of cancer.[10,29,70]

Alcohol increases the risk of developing cancers of the:

- mouth, throat and voicebox
- oesophagus (food pipe)
- large bowel and rectum
- breast (in women)
- liver.

The risk of developing cancer increases with a higher use of alcohol.

In contrast, there is evidence that use of alcohol does not cause cancer of the kidney or non-Hodgkin lymphoma (a cancer of the lymph cells).

Cardiovascular disease#

The relationship between alcohol and cardiovascular disease (coronary artery disease and strokes) is complex. In summary, low to moderate alcohol use (one to two drinks per day) can reduce the risk of coronary artery disease (where the coronary arteries, which supply blood to the heart, become narrowed or blocked, which leads to angina and heart attacks) and the risk of ischaemic stroke (stroke caused by blocked arteries in the brain[31]).

However, higher alcohol use increases the risk of coronary artery disease and ischaemic stroke.[9] In addition, any alcohol use increases the risk of hemorrhagic stroke (stroke caused by bleeding arteries in the brain).[9] Both single episodes of heavy alcohol use and chronic heavy use can also increase the risk of hypertension, developing irregular heartbeats and suffering sudden death from a cardiac cause.[9,27,32,34]

The benefit of alcohol in reducing heart disease is primarily for those at risk of heart disease – particularly older people and those with a family history of heart disease.[36]

Note that the evidence of the relationship between alcohol and cardiovascular disease is mixed and often controversial. This section is a brief summary of the evidence available at the time of publication.

Table 3: Potential conditions and complications of chronic and/or heavy episodic alcohol use, by body part affected

Body part affected	Symptoms
Mouth	• Cancer of mouth, voicebox and throat
Stomach and food pipe	• Cancer of food pipe (oesophagus) • Chronic gastritis
Intestines	• Cancer of bowel
Liver	• Cancer of liver • Alcoholic liver disease (fatty liver, hepatitis, cirrhosis)
Pancreas and sugar digestion	• Acute and chronic pancreatitis
Heart and blood pressure	• Coronary heart disease • Hypertension • Heart failure due to cardiomyopathy
Blood and immune system	• Anaemia • HIV/AIDS • Hepatitis C • Tuberculosis • Infections
Lungs	• Pneumonia
Brain and nervous system	• Brain damage (Wernicke's encephalopathy, Korsakoff's dementia, etc) • Nerve damage • Epilepsy • Sleep disturbances • Stroke
Mental health	• Addiction/dependence • Mood disorders • Withdrawal symptoms
Sexual health	• Impotence • Infertility • Fetal alcohol spectrum disorder (in children born to women who drink while pregnant) • Premature birth/low birth weight (in babies born to women who drink while pregnant)
Breasts (women)	• Cancer of breast
Bones and muscles	• Muscle weakness • Gout
Eyes	• Decreased vision
Skin and fat	• Malnutrition
Whole body	• Death

Existing health conditions
– impact of alcohol

The treatment of alcohol-related liver disease, alcohol-related pancreatitis, alcohol-related mood disorders, alcohol dependence, or brain damage due to alcohol involves stopping alcohol use.

Alcohol may also worsen other health conditions not related to alcohol and temporary reduction or stopping of alcohol use is recommended. These include any disease of the liver, which can be worsened by alcohol use, infections, as heavy alcohol use can impair the immune system and sleep disorders, as alcohol interferes with the sleep cycle.[19]

Diabetes mellitus

People with diabetes are advised to discuss alcohol use with their health professional.[19] Those with well-controlled diabetes can safely drink alcohol, although the risk of low blood sugar is increased if alcohol is drunk without food and insulin is used.[19,73] People with diabetes are advised to monitor blood sugars when drinking and to wear an alert bracelet or similar identification (alerting others of their diabetes in an emergency) because the symptoms of low blood sugar, which is life threatening but quickly treatable and drunkenness are very similar.[74]

Mental health conditions

The relationship between alcohol use and mental health conditions is somewhat complicated as heavy or problem drinking can cause some mental health conditions and, conversely, some mental health conditions may cause problematic drinking.[43]

People with mental health conditions are more likely to use alcohol than those without. Alcohol is strongly associated with social phobias and anxiety, as it can help people with anxiety to feel they function better in social situations, but this is also associated with a risk of alcohol dependence. Alcohol problems are more common in people who are depressed and heavy alcohol use in people with depression is associated with higher risk of suicide, self-harm and poor outcomes. Alcohol use worsens the severity of bipolar disorder. Heavy alcohol use is common among people with schizophrenia and may increase the severity of symptoms.

All people with a mental health condition are advised to discuss their alcohol use with their health professionals, as it may have a negative impact on their illness and/or interact with medication that is taken to treat their illness.[19]

Alcohol and drug interactions

Alcohol interacts with many drugs, including prescribed and over-the-counter medicines, herbal medicines and illegal drugs.

Alcohol can react with different medicines and drugs in different ways, such as increasing the sedating effect of sleeping tablets and opiate-based pain relief, increasing the potential for aspirin to irritate the stomach or increasing the potential of paracetamol to damage the liver. Also, chronic and/or heavy episodic drinking activates the liver enzymes that are involved in breaking down prescription medicines, which can lead to these medicines being metabolised faster than usual and being less effective.[7]

Prescription drugs that interact with alcohol include benzodiazepines, opiates, paracetamol, antidepressants, antibiotics, antihistamines, anti-inflammatory drugs, hypoglycaemic agents, warfarin, barbiturates and some heart medicines. Anyone starting or using one of these medicines should seek advice from their health professional about how alcohol may interact with the drug and whether reduction or temporary stopping of alcohol is necessary. People who are driving a motor vehicle or operating heavy machinery must take particular care when starting a new medicine that has a potential interaction with alcohol.[2,19]

When combined with illegal drugs, alcohol can have various effects depending on the type of illegal drug. It may increase the risk of sedation when mixed with other sedating drugs, or counteract the effect of stimulant drugs. When alcohol is taken with cannabis, driving ability is significantly impaired, even more than when alcohol is drunk alone.[75]

Effects of alcohol on other people

Drinking alcohol can affect other people, in particular unborn children and children and families.

Alcohol also impacts on other people through crime, assault and sexual assault.

Alcohol features in many statistics relating to crime, assault and sexual assault in New Zealand and overseas and alcohol has been shown to impair judgment and increase aggression in some people.[27]

The unborn child

Drinking alcohol at any stage during pregnancy can affect the development of the unborn baby (the fetus) as alcohol passes through the placenta from the blood of the mother to the fetus. The most extreme consequence of alcohol affecting the fetus is a miscarriage or stillbirth. In other cases, the baby can be born with significant permanent effects.[57] The range of effects on a child caused by alcohol is called fetal alcohol spectrum disorder (FASD). These effects include premature birth, restricted growth, birth defects, brain damage, developmental delay and social, emotional, behavioural and mental deficits.[35,57] In an older child, this can manifest as low IQ, poor social skills, inattention and problems with aggressive and impulsive behaviour.

As there is no known safe level for using alcohol during any stage of pregnancy, it is advised that any woman who is pregnant or wishing to get pregnant should not drink alcohol. Alcohol is also best avoided while breastfeeding, as alcohol can pass through the milk to the baby and affect development.[57]

Children and families

Children in families where an adult abuses alcohol or drinks heavily are known to be vulnerable to a variety of negative effects. As well as the risk of being affected by FASD, these children, compared with children in families without a parent or caregiver who drinks heavily, are at higher risk of injury, poisoning and hospitalisation, eating disorders (for females), depression and anxiety, conduct disorders, aggression, attention deficit/hyperactivity, lower educational achievement and heavy alcohol use in adolescence. Some of the reasons for these negative effects include higher rates of conflict between parents, greater absence of parents, violence against children, higher stress and economic deprivation and less parental supervision.[76]

Alcohol, especially when drunk in large amounts, can also contribute to domestic violence. It seems to do this by increasing aggressiveness, particularly in people already feeling hostile towards their partners, although whether alcohol leads to violence depends on personality, cultural and situational factors.[77,78] Alcohol abuse has featured in a significant number of homicides involving couples and children in New Zealand.[79]

Effects of alcohol on population groups

Women

Women have higher blood alcohol levels after drinking the same amount of alcohol as men, so can get drunk faster and can suffer the toxic and lethal effects of alcohol poisoning at a lower dose. This is because women on average:

- are smaller than men so have less fluid in their bodies to distribute alcohol around (having a higher fat to water ratio)
- probably have less of the enzyme needed to break down alcohol in the liver.[37]

Women who drink alcohol are at increased risk of developing breast cancer[9] and drinking while pregnant increases the risk of harm to the unborn baby.[35,57]

Men

Patterns of alcohol use differ between men and women in New Zealand, with men still being more likely to drink compared with women. Among drinkers, men are more likely to drink daily or several times a week, drink heavily on a single occasion and drink heavily more often.[80] Men are at higher risk of experiencing harm from their own drinking and physical assault related to alcohol[80,81] and experience more deaths from alcohol-related causes.[82]

Young people

Children and young adults are more vulnerable to negative impacts of alcohol on memory and learning, as the brain is still developing up until the 20s.[82]

Young people up to the age of 25 years are at a higher risk of harm from alcohol use than older adults. This is because young adults have the greatest risk of injury and accidents related to alcohol use, an increased risk of alcohol dependence and a lower tolerance to alcohol than older adults.[19] Other harms that affect young people more than adults include unprotected and unwanted sex, assault, arrests and harmful effects on social life, finances or work/study.[80,82]

Older people

Alcohol use often declines in older age but older people may be at risk of developing problem drinking – alcohol abuse or dependency – often triggered by significant life events such as loss of a loved one, loneliness, retirement, insomnia, illness or pain.

Older people are less tolerant to the effects of alcohol. As a result of aging, alcohol is not broken down by the body as efficiently. The ratio of body water to fat tends to fall and alcohol has a faster effect on the brain, meaning it takes less alcohol to become drunk and this increases the risk of falls and injury.

Older people who drink alcohol and drive are at much higher risk of traffic accidents than those who do not drink. Alcohol interacts with many common prescription medicines and this may be a reason for many older people to avoid or restrict their alcohol use.[83]

Low-risk alcohol drinking advice

Heath Promotion Agency's alcohol drinking advice is designed to help people make an informed choice and help keep their risk of alcohol-related accidents, injuries, diseases and death low.

Low risk is not, however, no risk. Even when drinking within the low-risk limits, a range of factors can affect your level of risk, including rate of drinking, your body type or genetic makeup, your gender, existing health problems and your age.

Advice for adults

Reduce your long-term health risks by drinking no more than:

- two standard drinks *a day for women* and no more than *10* standard drinks *a week*
- three standard drinks *a day for men* and no more than *15* standard drinks *a week.*

AND at least *two alcohol-free days* every week.

Reduce your risk of injury on a single occasion of drinking by drinking no more than:

- four standard drinks *for women* on any *single occasion*
- five standard drinks *for men* on any *single occasion.*

Stop drinking alcohol if you could be pregnant, are pregnant or trying to get pregnant.

There is no known safe level of alcohol use at any stage of pregnancy.

When not to drink

It's advisable not to drink if you:

- are **pregnant** or planning to get pregnant
- are on **medication** that interacts with alcohol
- have a **condition** that could be **made worse by drinking alcohol**
- feel unwell, **depressed,** tired or cold, as alcohol could make things worse
- are about to **operate machinery or a vehicle** or do anything that is risky or **requires skill.**

If you are not sure or are concerned, check with your doctor.

Advice for parents of children and young people under 18 years

For children and young people under 18 years, not drinking alcohol is the safest option.

- Those **under 15 years of age** are at the **greatest risk of harm from drinking alcohol** and **not drinking** in this age group is especially important.
- For young people aged **15 to 17 years,** the safest **option is to delay drinking for as long as possible.**

If 15 to 17 year olds do drink alcohol, they should be supervised, drink infrequently and drink at levels usually below and never exceeding the adult daily limits.

The following graphic visually explains low-risk drinking advice for adults

What is a standard drink?

A standard drink contains 10 grams of pure alcohol.

It is important to note that drink serving sizes are often more than one standard drink. The label on an alcoholic drink container provides the number of standard drinks in the container.

To work out the number of standard drinks in what you are drinking use this formula:

Amount of drink in litres (Vol) x% by volume of alcohol (%) x Density of ethanol at room temperature (0.789)

For example: 500ml of beer which is 5% alcohol by volume: 0.5 x 5 x 0.789 = 1.97 (approx two standard drinks)

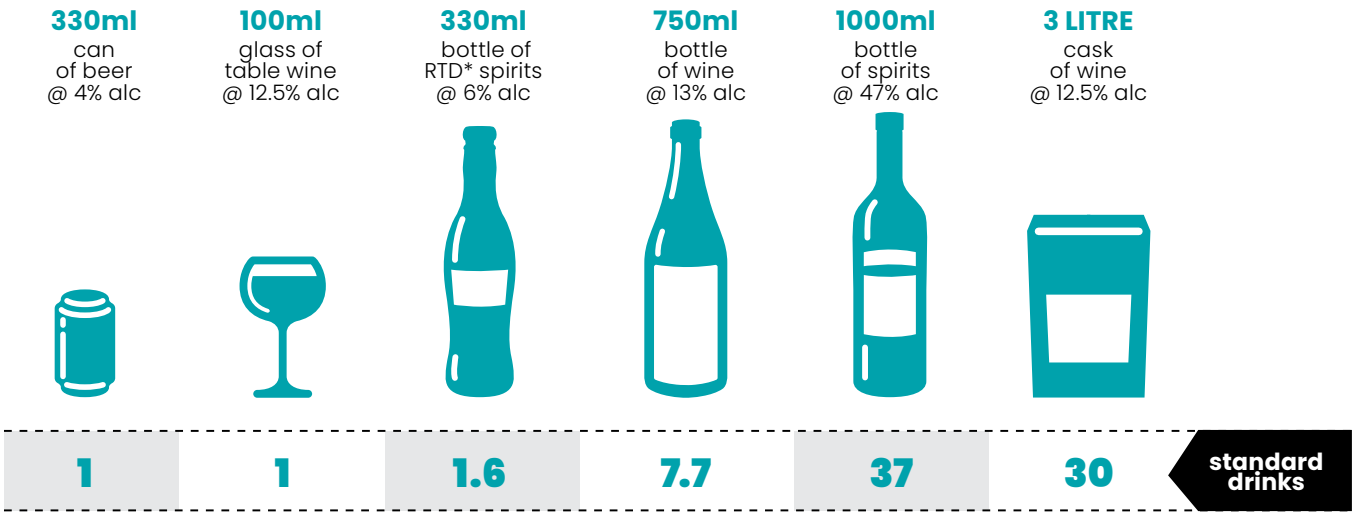
Tips for low-risk drinking

It is possible to drink at a level that is less risky, while still having fun. There are a number of things you can do to make sure you stay within low-risk levels and don't get to a stage where you are no longer capable of controlling your drinking.

These include:

- know what a standard drink is
- keep track of how much you drink – daily and weekly
- set limits for yourself and stick to them
- start with non-alcoholic drinks and alternate with alcoholic drinks
- drink slowly
- try drinks with a lower alcohol content
- eat before or while you are drinking
- never drink and drive
- be a responsible host
- talk to your kids about alcohol.

A guide to standard drinks



*** RTD (READY TO DRINK)**

Background to drinking advice

The Health Promotion's alcohol drinking advice was last revised in 2011 by the Alcohol Advisory Council of New Zealand (ALAC). In 2012, ALAC was disestablished and its functions were merged into the newly formed HPA. Like ALAC, HPA has statutory functions that include providing advice and research on alcohol-related issues.

The low risk alcohol drinking advice is based on the most current and best available scientific research and evidence using the primary resource material, including:

- *Australian Guidelines to Reduce Health Risks from Drinking Alcohol* (published in February 2009) *(http://www.nhmrc.gov.au/your-health/alcohol-guidelines)*.[19]
- Alcohol and Health in Canada: A Summary of Evidence and Guidelines for Low-risk Drinking (completed in November 2010 and published in November 2011) *(http://www.ccsa.ca/2011%20CCSA%20Documents/2011-Summary-of-Evidence-and-Guidelines-for-Low-Risk%20Drinking-en.pdf)*.[84]

Both these guidelines were developed by a committee of experts, informed by research literature reviews and studies conducted by Dr Jurgen Rehm and colleagues[9,12,16], peer reviewed by international experts and informed by consultation.

The 2009 Australian guidelines have the same limits for both men and women.[19] Health Promotion's drinking advice, like the Canadian guidelines[84], has different limits for men and women. These gender differences reflect the impact of alcohol on women, due to factors such as body size and composition, ability to metabolise alcohol and the higher risk of developing a range of health conditions.

The drinking advice about children and young people under 18 years also draws on the UK Department of Health's guidance document: *Guidance on the Consumption of Alcohol by Children and Young People* (published in December 2009).[85]

ALAC's previous 'upper limits for responsible drinking' were developed in 1994 by a group consisting of alcohol producers, health promoters and problem intervention and treatment workers that sought a consensus approach. The upper limits, which are frequently referred to as 'ALAC's guidelines', were reviewed and replaced by revised drinking advice because:

- considerably more evidence has emerged since 1994, particularly on the effect of alcohol on the developing brain of adolescents
- previously ALAC and now HPA has a legislated responsibility to provide up-to-date scientific evidence on the risks of drinking alcohol
- a corresponding change to guidelines has been made in comparable jurisdictions such as Australia and Canada.

Where to find support and further information

For support and treatment to reduce alcohol intake, talk to your doctor or call the

Alcohol Drug Helpline: 0800 787 797

The Alcohol Drug Helpline provides free and confidential information and self-help material, advice and referrals to local drug and alcohol services.

For further information and resources about alcohol, including an online version of this resource, visit **resources.alcohol.org.nz**

Glossary

Alcohol dependency	A physical or psychological dependence on alcohol, where the body requires more alcohol to achieve the desired effect (eg, of altered mood). Use of alcohol interferes with a person's life (causing legal, work/study, relationship or social problems). A person continues to use alcohol despite alcohol causing physical or mental problems and, if alcohol is not taken, withdrawal symptoms occur.
Alcohol poisoning	When a lot of alcohol has been drunk in a short time, blood levels of alcohol are high and symptoms of extreme drunkenness are present, such that breathing has slowed, the individual is only partially conscious or is unconscious, or some other complication is present that presents a serious danger to health. Also known as 'acute intoxication'.
Alcoholic hepatitis	An acute injury to the liver from chronic heavy drinking that can present with symptoms of feeling unwell, tiredness, jaundiced (yellow skin and whites of eyes), swollen stomach and enlarged, tender liver.
Anaemia	Low haemoglobin, the component of blood that carries oxygen around the body, which causes symptoms of tiredness and weakness.
Acute respiratory distress syndrome (ARDS)	A life-threatening condition in which the lungs fill with fluid, which occurs as a rare complication of pneumonia, trauma and severe infections.
Blood alcohol concentration (BAC)	Concentration of alcohol in the blood, used to determine level of drunkenness for legal or medical purposes. The current limit for driving in New Zealand is 80 mg/dL.
Burden of disease	The impact of diseases, health problems, injuries, etc measured by economic cost, mortality, morbidity, years of life lost to disability or ill health or other indicators.
Carcinogen	A substance that has been shown to cause cancer.
Cirrhosis	Disease of the liver where cells are permanently damaged and replaced by scar tissue, so the liver can no longer function (to detoxify the body, make vital proteins, store vitamins and sugars and make chemicals necessary for digestion).
Congeners	Compounds added to alcohol that adds to the taste, smell or colour of the drink.
Coronary artery disease	A condition where the coronary arteries, which supply blood to the heart, become narrowed or blocked because of the build-up of fatty deposits inside the walls of the arteries (atherosclerosis). This leads to angina and heart attacks.
Delirium tremens	The most severe alcohol withdrawal syndrome, which by definition includes the symptom of delirium (altered and confused state of mind) and usually also sweating, tremors, anxiety and sometimes fits.
Dilated cardiomyopathy	Chronic disease of the heart muscle that leads to heart failure, where the heart can no longer pump blood around the body effectively.
Diuretic	An agent that causes fluid to be lost from the body through the kidneys.
Fatty liver	Disorder of the liver where fat builds up in the liver cells, which is reversible and usually causes no symptoms but may progress to other forms of alcoholic liver disease.

Fetal alcohol spectrum disorder (FASD)	Disorder caused by alcohol passing from a pregnant woman to her unborn child and resulting in a range of possible effects on the child including premature birth, restricted growth, birth defects, brain damage, developmental delay and social, emotional, behavioural and mental deficits.
Gastritis	Inflammation (irritation and swelling) of the lining of the stomach, leading to symptoms of stomach pain, nausea, loss of appetite and indigestion.
Heartburn	Burning pain in the chest caused by acid from the stomach entering the food pipe. Also known as reflux (gastro-oesophageal reflux).
Hypoglycaemia	Low blood sugar.
Korsakoff's syndrome, psychosis or dementia	A chronic condition of memory loss where loss of old memories occurs and difficulties in laying down new memories may be profound.
Mallory Weiss tear	A tear in the join between the stomach and the food pipe due to prolonged or violent retching or vomiting.
Oesophagus	Food pipe, which takes food and fluid from the back of the mouth to the stomach.
Osteoporosis	Thinning of the bones that makes them more likely to break.
Pancreatitis	Inflammation of the pancreas, an organ that helps in digestion, which can be an acute, sudden or chronic, longstanding condition.
Pneumonia	Inflammation of the lungs usually caused by infection with bacteria or a virus, which causes shortness of breath, cough and fever.
Psychosis	A mental illness defined by changes in personality, a distorted sense of reality and delusions.
Respiratory depression	Slowing of the rate and/or depth of breathing to a point where breathing is insufficient to supply oxygen around the body.
Sedative	A type of drug that calms and reduces excitability and anxiety.
Standard drink	Different types of alcoholic drinks contain different concentrations of alcohol. The standard drink measures the amount of pure alcohol in a drink so the amount of alcohol across different volumes and concentrations of alcoholic drink can be compared. One standard drink equals 10 grams (g) of pure alcohol. For example, a 330ml can of 4% alcohol beer, 30ml of straight spirits and 100ml glass of table wine are all approximately 10g of alcohol and one standard drink.
Stroke	Sudden damage to brain cells due to the interruption of the blood supply to the brain, causing loss of function, such as paralysis or loss of speech. Also known as cerebrovascular accident (CVA).
Teratogen	A substance that can damage the fetus while it is developing inside a pregnant woman. Alcohol is a teratogen or is teratogenic.
Wernicke's encephalopathy	An acute, severe, life-threatening disorder that usually presents with symptoms of abnormal or paralysed eye movements, difficulty walking and confusion caused by thiamine deficiency (secondary to chronic heavy alcohol use).

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