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## Content

- 2 Introduction
- 3 The Symptoms of a Hangover
- 4 The Causes of a Hangover
- 6 Risk Factors for a Hangover
- 7 Cautions
- 8 Conclusion

## Introduction

One of the most immediate and common unwanted consequences of drinking alcohol is the hangover, known to the medical world as “veisalgia.” These terms describe the group of unpleasant symptoms that may follow a night of drinking; chiefly, the headache, often accompanied by stomach discomfort, fuzzy tongue and fuzzy thinking, drowsiness and sweating.

In the Canadian Alcohol and Drug Use Monitoring Survey of 2012, 20.3% of Albertans (aged 15 and over) indicated that they binge drank once a month or more in the 12 months before the survey (where binge drinking is defined as four or more drinks for women and five or more drinks for men in a single sitting). We can assume that many of these Albertans suffered a hangover, since an estimated 75% of people who drink to excess experience a hangover.

This resource provides an overview of the symptoms, causes, and risk factors associated with a hangover, as well as offering a caution about exceeding Canada’s Low-Risk Alcohol Drinking Guidelines (LRDG) and advice about common remedies for a hangover.



*Consequences of hangover symptoms include feeling poorly and missing work.*

## The Symptoms of a Hangover

Hangover is generally described as a malaise that includes biological, physiological and affective symptoms that can be severe enough to impair function.

Hangover symptoms are related to blood alcohol concentration (BAC), which is the amount of alcohol present in a person's blood. While the amount of alcohol consumed is the most important influence on BAC, other factors such as a person's weight, rate of drinking and presence of food in the stomach are also factors. A hangover develops approximately six to eight hours after alcohol intake, when the BAC is starting to decrease. It reaches maximum intensity when BAC reaches 0 and tends to last for up to 24 hours after alcohol consumption.

There are a number of commonly reported hangover symptoms:

- fatigue, depression, distress and tremendous thirst
- muscle pains or cramps, and headaches
- gastrointestinal disturbances such as a loss of appetite, stomach ache, nausea, vomiting and diarrhea
- increased activity in the sympathetic nervous system, which can result in pressure on the arteries, rapid heart rate (tachycardia), palpitations, tremors and perspiration
- increased anxiety, in those prone to panic attacks
- sensory-perceptual symptoms, such as dizziness and a hyper-sensitivity to sound and light
- general reduction in the amount of sleep and quality of sleep
- cognitive and psychopathological symptoms, such as problems with attention, concentration and short-term memory, deficits in visual-spatial and psychomotor skills, and depression and irritability

*20% of Albertans indicate they binge drink.*



# The Causes of a Hangover

The causes of an alcohol hangover may be indirect or direct.

- Indirect causes are the dehydration, sleep disturbance and low blood sugar resulting from excessive drinking.
- The direct cause is the production of acetaldehyde, a substance that is toxic to the body.

## Indirect Causes: Dehydration, Sleep Disturbance and Low Blood Sugar

### Dehydration

Tremendous thirst associated with a hangover is the result of dehydration. So are aching muscles and headache. When the body is dehydrated, it will draw water from any available source, including the brain. When it does this, the brain atrophies somewhat and the meninges (the protective covering around the brain) shrinks. The shrinking is what causes headaches. Dehydration also means a significant loss of electrolytes, which can explain the cramps and muscle pains that generally accompany a hangover.



### Sleep disturbance

Studies have shown that one reason people feel so poorly the morning after excessive drinking is the sleep disturbance caused by the drinking. Alcohol makes one sleepy, but it also alters the sleep cycle. Specifically, it can cause insomnia, cause one to wake up repeatedly during the night and exacerbate sleep disturbances.

For more information on alcohol's effects on sleep, refer to the resource in this series titled *Alcohol and Sleep*.



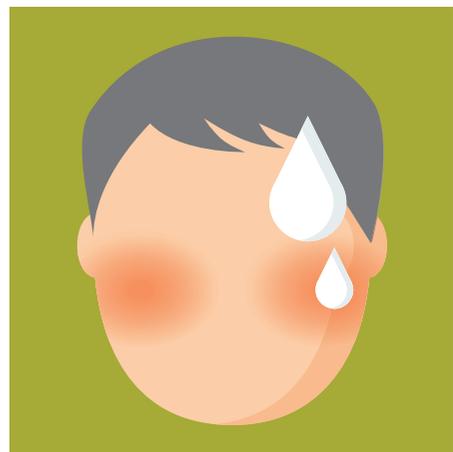
### Low blood sugar

A significant number of hangover symptoms are also those of hypoglycemia. Most of the alcohol a person drinks is processed by the liver, which produces glucose. But the liver cannot produce glucose while processing alcohol. Glucose is the primary source of energy for metabolism, and the substance most likely to affect the brain. A lack of glucose causes the brain to function abnormally, which is why, for several hours after drinking too much, a person may feel weak, tired, dizzy, anxious and depressed, and have difficulty concentrating and seeing clearly.

In theory, everyone who drinks to intoxication will suffer temporarily from hypoglycemia. Very young people who have little body fat or who have not eaten for more than 24 hours, and regular drinkers who eat little or nothing while they drink are particularly vulnerable because their liver glycogen stores would be very low.

### Direct Cause: Acetaldehyde Production

As mentioned above, most of the alcohol a person drinks is processed by the liver. The liver produces the enzyme alcohol dehydrogenase, which turns alcohol into acetaldehyde, a very toxic substance. A high concentration of acetaldehyde has a variety of effects on the body, including reddening of the face, sweating, nausea, vomiting and tachycardia (accelerated heart rate). Given the similarity between these symptoms and those of an alcohol hangover, some researchers hypothesize that the discomfort of a hangover is a direct result of the metabolism of alcohol by the liver. The production of acetaldehyde is one of the only factors that explains both the presence and severity of hangover symptoms.



## Risk Factors for a Hangover

Obviously, the primary risk factor associated with an alcohol hangover is excessive drinking. The incidence and severity of symptoms increases with the amount of alcohol consumed. However, the incidence and intensity of a hangover can vary from one person to the next, even if they drink exactly the same amount. Other risk factors are listed below.



### Congeners and Impurities

Separate episodes of excessive drinking can have different consequences, even if the amount of alcohol is identical. The general consensus among researchers is that congeners (i.e., chemical compounds found in alcoholic beverages, such as methanol, histamine or polyphenols) can affect the severity of a hangover. It is thought that methanol and its degradation products—formaldehyde and formic acid—may be the cause of the headaches, thirst, sweating and dizziness that drinkers may experience. It is believed that dark spirits, which contain more methanol than clear spirits, may produce stronger hangover symptoms.

Similarly, alcoholic drinks that contain high levels of impurities or preservatives may contribute to hangover symptoms even when only moderate amounts are consumed. For example, zinc and other metals are sometimes added to alcoholic beverages as artificial sweeteners or to enhance flavour. That is why artificially sweetened drinks

will produce stronger hangover symptoms than drinks sweetened with real fruit juice. It also explains why some people report feeling sicker the day after an evening of drinking sweet cocktails.

## Psychological Vulnerability

About 25% of drinkers do not display hangover symptoms after heavy drinking. Research on this subject is still limited, but one hypothesis is that the incidence and intensity of hangover symptoms are not due solely to objective causes; they might also be influenced by psychosocial factors. In one study of 1,104 drinkers who had reported being “tipsy, high or drunk,” a correlation was shown between feelings of guilt about drinking, neurosis, anger, depression, or negative life events and the severity of hangover symptoms.

In short, the incidence and intensity of hangover symptoms cannot be explained by objective causes alone; they are also influenced by subjective factors unique to the individual drinker at a particular moment. This may be another reason why researchers note such variations in hangover response from one drinker (and one drinking incident) to the next.

## Cautions

### Exceeding Drinking Guidelines

A hangover is an indication of an episode of excessive drinking. People who often drink excessively are at risk of developing alcohol dependence.

The LRDG state that to avoid intoxication and reduce the risk of short-term injury or acute illness, women should have no more than three drinks on a single occasion and men should have no more than four drinks on a single occasion.

For more information on the LRDG, please refer to the resource in this series titled *Low-Risk Drinking*. You can also visit [www.ccsa.ca](http://www.ccsa.ca).

### Remedies

Headaches are a symptom reported by almost 90% of people suffering from a hangover, but taking acetaminophen (Tylenol®) for the pain is not advisable for everyone. Acetaminophen is tolerated by occasional drinkers who may drink too much on a particular occasion, but it is strictly contraindicated for people with an alcohol dependency who have been diagnosed with liver problems. Clinical studies show that in such cases, the interaction between alcohol and acetaminophen significantly increases the risk of liver toxicity and may cause liver lesions, even when the medication is taken a day after drinking.

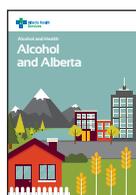
Depending on individual sensitivity, combining alcohol with acetylsalicylic acid (Aspirin®) or ibuprofen (Advil®, Motrin®) may also not be advised. Alcohol can cause irritation or even inflammation of the mucous lining of the stomach. In people who are prone to gastrointestinal problems, these medications can exacerbate the irritating effects of alcohol.

## Conclusion

Excessive drinking can lead to symptoms of a hangover. These symptoms are unpleasant at best and at worst can be very debilitating. When you have a headache, are sweating and trembling, and are suffering from vision and concentration problems, your personal abilities are compromised. Under these circumstances it is absolutely ill-advised and irresponsible to drive, operate machinery or tools, engage in dangerous physical activity, assume responsibility for the safety of others and/or make important decisions. Further, there can be several immediate consequences to hangover symptoms, including missing work or attending work when compromised, or missing family or other obligations. In addition, and importantly, those who have frequent hangovers may want to seek help, as excessive drinking can lead to alcohol problems, including dependency.

Alberta Health Services offers a wide range of services for individuals looking for help for someone they care about, or for themselves. For more information, and to find an addictions services office near you, call the Addiction Helpline at 1-866-332-2322. It's free, confidential and available 24 hours a day.

## Alberta Health Services' (AHS) Alcohol and Health series



Alcohol and Alberta



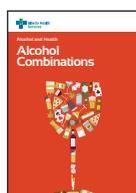
Alcohol and Sleep



Alcohol and Adolescents



Low-Risk Drinking



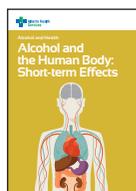
Alcohol Combinations



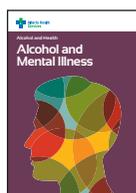
Talk to Your Children About Alcohol



Alcohol Hangover



Alcohol and the Human Body: Short-Term Effects



Alcohol and Mental Illness



Alcohol and Seniors

### More information means informed decisions

Well-informed people will be more conscious of the harmful effects of excessive drinking, and will be aware that if they choose to drink alcohol, drinking in moderation is a healthier choice.

#### For copies:

AHS staff and allied health professionals can download digital copies from under the "Resources" tab at: [www.albertahealthservices.ca/amhresources](http://www.albertahealthservices.ca/amhresources). Allied health professionals should contact their local Addiction and Mental Health office to access hard copies.

### Thank you

AHS would like to thank our allied health professionals at Éduc'alcool for their contribution to this series.

Alberta Health Services offers a wide range of  
addiction and mental health services.

For individuals looking for help for someone they care about,  
or for themselves the Addiction Helpline and the  
Mental Health Helpline are available.

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**1-866-332-2322**

**Mental Health Helpline**  
**1-877-303-2642**

Both helplines are free, confidential and  
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