

Drinking and Liver Disease

The Issue in Brief

Research has shown a clear association between drinking and alcohol-related liver disease.

Alcohol-related damage to the liver is linked to the pattern of alcohol consumption.

- For example, heavy and sustained drinking is linked with progressive liver disease, including fatty liver disease and alcoholic cirrhosis.
- A link has also been postulated between heavier drinking levels and liver cancer.

A definitive threshold level of alcohol intake below which liver disease is unlikely to result has not been established.

Many cirrhosis patients have a history of harmful drinking or dependence.

Liver damage related to alcohol consumption may be reversible. In some cases, reducing or ceasing alcohol consumption can restore liver health and improve response to medical treatment.

The effects of alcohol consumption on liver health may be complicated by other factors, such as damage caused by pharmaceuticals, contaminants and toxins, damage to ductile tissue in the liver, and fatty tissue buildup.

The relationship between alcohol and liver disease may also be modified by various illnesses, infections, and other sources of injury.

ICAP's Health Briefings cover the effects of alcohol consumption on health. They offer an overview of the relationship between drinking patterns and health outcomes, compile the key literature, and provide the reader with an extensive bibliography that refers to original research on each topic. The Briefings attempt to present the balance of the available evidence. They have been peer reviewed by external experts and do not necessarily reflect the views of ICAP or its sponsoring companies.

Relevant ICAP Publications:

Ellison, R. C. (Ed.). (2007, May). Health risks and benefits of moderate alcohol consumption: Proceedings of an international symposium. *Annals of Epidemiology*, 17(Suppl.), S1–S116. Available: <http://www.annalsofepidemiology.org/issues>.

What Is the Evidence?

Scientific research has shown a clear association between drinking and alcohol-related liver disease.

“Alcohol-related liver disease” is an umbrella term used to identify three major forms of liver damage associated with drinking (1): fatty liver disease, alcoholic hepatitis, and alcoholic cirrhosis.

- Fatty liver disease is characterized by a buildup of fatty tissue in the liver, causing liver enlargement. Damage caused by fatty liver disease is generally reversible, especially if alcohol consumption is reduced or ceased.
- Alcoholic hepatitis is an inflammation of the liver, leading to such symptoms as nausea, vomiting, and abdominal pain. Acute hepatitis may occur suddenly, after episodes of heavy drinking. Damage caused by this form of hepatitis is also potentially reversible.
- Alcoholic cirrhosis is the most serious stage of alcohol-related liver disease, in which normal liver tissue is replaced by scar tissue. An estimated 10 to 20% of chronic heavy drinkers will eventually develop alcoholic cirrhosis.

Drinking patterns and risk

Alcohol-related damage to the liver is linked to the pattern of alcohol consumption (1, 2).

Heavy and sustained drinking is linked with progressive liver disease, including fatty liver disease and alcoholic cirrhosis.

- Whereas many heavy drinkers may have low-grade, asymptomatic liver inflammation (as in fatty liver disease), serious alcohol-related liver disease predominantly results from long-term, heavy drinking (3):
 - Between 90 and 100% of heavy drinkers develop fatty liver disease.
 - Between 10 and 35% of heavy drinkers develop alcoholic hepatitis.
 - Between 8 and 20% of chronic heavy drinkers develop alcoholic cirrhosis.

Liver disease is thought to be the result of at least a decade of sustained heavy drinking (2, 4).

Moderate drinking¹ is not associated with liver injury or disease in most individuals.

- According to the American Liver Foundation, “For most people, moderate drinking will not lead to alcohol-[related] liver disease” (1).
- However, some studies have indicated that even moderate drinking may affect the progression of cirrhosis in some individuals, especially those with underlying liver damage from hepatitis or other conditions (5-8).

A link has also been postulated between heavier drinking levels and liver cancer.

- Liver cancer accounts for about 12% of all cancers that have been linked to alcohol consumption (9).
- No association has been found between liver cancer and moderate drinking (10).
- Liver cirrhosis is strongly correlated with chronic heavy drinking and is a risk factor for liver cancer (11, 12).
- Alcohol and tobacco are independent risk factors for liver cancer (13).

A definitive threshold level of alcohol intake below which liver disease is unlikely to result has not been established (4).

Women are more susceptible to the effects of alcohol and may be at risk for liver disease at lower levels of alcohol consumption than men (14, 15).

- The U.S. National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) links cirrhosis to the consumption of as few as two to three drinks per day in women and three to four drinks per day in men, though both figures are for long-term sustained drinking (2).

Many cirrhosis patients have a history of harmful drinking or dependence.

In Western nations, approximately one-half of end-stage liver disease occurs in individuals with an alcohol use disorder or dependence (16).

Death rates from cirrhosis range widely:

- In the United States, the rate is about 9.3 per 100,000 population (17).
- Rates in Europe are similar (about 10 per 100,000 in continental Europe and 6.5 per 100,000 in the United Kingdom) (18).
- Where hepatitis infection is a major cause of cirrhosis and liver disease—for example, in parts of Asia and Africa—rates are considerably higher (19, 20).

It should be noted that not all cirrhosis deaths are related to alcohol but also have other causes.

1 The American Liver Foundation defines “moderate drinking” as one drink or less per day for women and two drinks or less per day for men. The Foundation’s website also provides a definition for a standard drink (see <http://www.liverfoundation.org/>).

Liver damage related to alcohol consumption may be reversible. In some cases, reducing or ceasing alcohol consumption can restore liver health and improve response to medical treatment (21).

Even in persons with advanced liver disease, abstaining from alcohol can improve the functioning of the liver and enhance life expectancy (22).

Reduced alcohol intake can also improve the health of patients suffering from liver disease unrelated to alcohol consumption (e.g., chronic hepatitis infection) (21, 23).

Confounding factors

The effects of alcohol consumption on liver health may be complicated by other factors, such as damage caused by pharmaceuticals, contaminants and toxins, damage to ductile tissue in the liver, and fatty tissue buildup (2).

As the liver plays a vital role in breaking down substances entering the body, certain pharmaceutical products and other complex chemical compounds may worsen the impact of heavy drinking on liver health.

- Medications such as some pain relievers (e.g., acetaminophen or paracetamol) can be damaging to the liver—especially in conjunction with alcohol consumption (21, 24)—leading to liver scarring.

Contaminants and toxins in some noncommercial alcohol² may increase the risk of liver damage.

- Research from some eastern European countries had shown that low-quality noncommercial beverages can increase risk of liver damage (25).

Diet and nutrition also play a major role in maintaining liver health.

- Poor diet, especially a high-fat diet, can lead to liver damage. This can occur independently of alcohol consumption (26, 27).
- Metabolic disorders such as diabetes may also predispose individuals to fatty liver disease (21). Improved diet and exercise can help alleviate resulting liver damage (28).

The relationship between alcohol and liver disease may also be modified by various illnesses, infections, and other sources of injury (2).

- For example, genetic liver disease affects the liver's ability to metabolize various nutrients and substances. Reduced metabolic capability can lead to liver damage.
- Autoimmune hepatitis, like other autoimmune diseases, leads to damage and inflammation of the liver.
- Chronic hepatitis B and C are responsible for a significant portion of liver cirrhosis, though their prevalence varies by geographic region.

The effects of these conditions and drinking may be synergistic (21). The presence of multiple risk factors may heighten the likelihood of progressive liver disease (23).

² "Noncommercial alcohol" is defined here as traditional drinks, produced for home consumption or limited local trade; counterfeit or unregistered products; and nonbeverage—or surrogate—alcohols, unintended for human consumption.

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