

a series of fact sheets written  
by experts in the field of liver  
disease

# Alcohol and the Liver

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*One of the best strategies to keep the liver healthy for people living with hepatitis C is to stop drinking alcohol or to greatly reduce the amount of alcohol consumed. In addition to the harmful effects alcohol has on the liver, alcohol also poses other problems for people with hepatitis C. Consuming alcohol (especially in large quantities) can:*

- Lower the immune response in people with hepatitis C
- Help the hepatitis C virus replicate or make more copies of itself
- Lower HCV treatment response
- Add to the emergence of HCV quasi-species
- Increase the level of iron stored in the liver
- Increase fat accumulation in liver cells

When all of these factors are considered, it is no wonder that people are advised to abstain from alcohol. But how is alcohol actually metabolized by the body? This factsheet will focus on how alcohol is absorbed and metabolized throughout the body and also on some of the effects of prolonged alcohol use.

When alcohol is consumed it reaches the stomach then the small intestine where it passes into the blood stream. About 20% is absorbed through the lining of

the stomach and about 80% is absorbed through the small intestines. Once the alcohol enters the blood stream it is sent to and processed by the liver. After one drink of alcohol the concentration of alcohol in the blood peaks in about 30 to 45 minutes and drops back to normal in about an hour if no further alcohol is consumed.

The liver is responsible for converting the alcohol into a substance that is safe for the body. There may be a small quantity of alcohol that does not reach the liver – this is excreted in the urine and breath. That's why breath analyzers are able to measure the amount of alcohol someone has consumed.

## *Liver*

There are two liver enzymes that are responsible for converting alcohol into a safe substance: alcohol dehydrogenase (ADH) and cytochrome P45011E1 (CYP2E1). ADH is the main enzyme responsible for converting alcohol. In people who are chronic alcohol drinkers the liver will make more CYP2E1 in an effort to compensate for excess alcohol consumed. Unfortunately, the extra production of CYP2E1 does not stabilize the effects of long-term alcohol use or the damage that is caused to the liver.

In people without liver disease, chronic drinking will lead to the deposit of fat in the liver cells, leading to inflammation and cell death. After a time the cell death will cause light scarring of the liver and after years of chronic drinking the liver can develop cirrhosis. If you combine the effects of alcohol with another factor such as hepatitis C the time it takes to cause damage is much shorter.

There are differences in what causes intoxication in people. Some factors that influence the degree of absorption and, therefore, intoxication include:

- The amount of alcohol consumed – the liver can only metabolize a certain amount of alcohol per hour.
- The rate of metabolism differs depending on the amount of ADH enzyme in the liver and this differs by gender.
- Food can affect the amount of alcohol absorbed by the body. If there is food in the stomach it can slow down the absorption of alcohol. Foods high in carbohydrates

and fat help to slow down the process of the stomach pushing the food (and alcohol absorbed) into the small intestine. Mixing alcohol with beverages can also affect the absorption of alcohol – alcohol mixed with fruit juice or water is absorbed more slowly than alcohol mixed with carbonated beverages.

- Muscle tissue contains more water than fat tissue so the more muscle tissue a person has the more diluted the alcohol will be.

### Gender Differences

There are differences in the way that men and women metabolize alcohol. The amount of body water affects the rate at which alcohol is absorbed. The more body water a person has the less the amount of alcohol that is absorbed. In general, women have higher body fat composition (less body water); men have a higher body composition of muscle (more body water). For this reason women will achieve higher concentrations of alcohol in their bodies than men who consume equal amounts of alcohol. In addition to gender differences, total body water composition decreases as people age so a person over 60 years old has less total body water than someone under 40 years old.

Another reason why women metabolize alcohol differently is that they have less of a certain enzyme called ADH. This enzyme is responsible for converting alcohol into levels that the liver can handle or process safely. What this means is that women who drink the same amount of alcohol as men will achieve a higher concentration of alcohol in the blood.

Because of these gender differences the amount of alcohol for a healthy adult (without liver disease) differs for women and men – women should not drink more than 1 alcoholic

drink a day and men should not drink more than 2 alcoholic drinks per day.

### Excess Alcohol

The liver can only absorb and metabolize so much alcohol. The excess is distributed to other areas of the body. If the alcohol can not be processed by the liver it can greatly affect other organs in the body and a person’s psychological well being. Excess alcohol use can cause a variety of problems including:

- Hypertension (high blood pressure)
- Irritation of the gastrointestinal system causing ulcers, gastritis, and inadequate absorption of nutrients
- Central nervous system disorders, including brain disorders, vitamin B deficiency, and peripheral neuropathy
- Male and female impotence
- Depression and anxiety as well as many social problems

Standard drink equivalents		
	<b>Beer or cooler</b> 12 oz., ~5% alcohol	12 oz. = 1 16 oz. = 1.3 22 oz. = 2 40 oz. = 3.3
	<b>Malt liquor</b> 8-9 oz., ~7% alcohol	12 oz. = 1.5 16 oz. = 2 22 oz. = 2.5 40 oz. = 4.5
	<b>Table wine</b> 5 oz., ~12% alcohol	a 750 mL (25 oz.) bottle = 5
	<b>80-proof spirits</b> (hard liquor), 1.5 oz., ~40% alcohol	a mixed drink = 1 or more* a pint (16 oz.) = 11 a fifth (25 oz.) = 17 1.75 L (59 oz.) = 39

\* Depending on factors such as the type of spirits and the recipe, one mixed drink can contain from one to three or more standard drinks.  
Source: NIAAA

If you are a person living with hepatitis C, the message is clear: mixing alcohol and hepatitis C will decrease the way your body is able to control hepatitis C and lead to faster liver disease progression. If you can not

stop drinking consider seeking help from family, friends and medical providers. Alcoholism is an insidious disease that affects millions of Americans and destroys many lives. Resources listed below can offer help and guidance to stop drinking.

### Alcohol Facts from Drug Rehabs.org

- Each year, a typical young person in the United States is inundated with more than 1,000 commercials for beer and wine coolers and several thousand fictional drinking incidents on television.
- Alcohol is involved in 50% of all driving fatalities.

- In the United States, every 30 minutes someone is killed in an alcohol related traffic accident.
- Over 15 million Americans are dependent on alcohol. 500,000 are between the age of 9 and 12.
- Each year the liquor industry spends almost \$2 billion dollars on advertising and encouraging the consumption of alcoholic beverages.
- Americans spend over \$90 billion dollars total on alcohol each year.
- An average American may consume over 25 gallons of beer, 2 gallons of wine, and 1.5 gallons of distilled spirits each year.
- Pregnant women who drink are feeding alcohol to their babies. Unfortunately the underdeveloped liver of the baby can only burn alcohol at half the rate of its mother, so the alcohol stays in the baby's system twice as long.
- Each year students spend \$5.5 billion on alcohol, more than they spend on soft drinks, tea, milk, juice, coffee, or books combined.
- 56% of students in grade 5 to 12 say that alcohol advertising encourages them to drink.
- 6.6% of employees in full time jobs report heavy drinking, defined as drinking five or more drinks per occasion on five or more days in the past 30 days.
- The highest percentage of heavy drinkers (12.2%) is found among unemployed adults between the age of 26 to 34.
- Up to 40% of all industrial fatalities and 47% of industrial injuries can be linked to alcohol consumption and alcoholism.
- In 2000, almost 7 million persons age 12 to 20 was a binge drinker; that is about one in five persons under the legal drinking age was a binge drinker.
- The 2001 survey shows 25 million (one in ten) Americans surveyed reported driving under the influence of alcohol. This report is nearly three million more than the previous year. Among young adults age 18 to 25 years, almost 23% drove under the influence of alcohol.
- Drunk driving is proving to be even deadlier than what we previously know. The latest death statistics released by the National Highway Traffic Safety Administration

(NHTSA), using a new method of calculation show that 17,488 people were killed in alcohol related traffic accidents last year. This report represents nearly 800 more people were killed than the previous year.

- Alcohol is the number 1 drug problem in America.
- Nearly one out of 4 Americans admitted to general hospitals have alcohol problems or are undiagnosed alcoholics being diagnosed for alcohol related consequences.
- Four in ten criminal offenders report alcohol as a factor in violence.
- Among spouse violence victims, three out of four incidents were reported to have involved alcohol use by the offender. In 1996, local law enforcement agencies made an estimated 1,467,300 arrests nationwide for driving under the influence of alcohol.


## Resources

- HCSP Factsheet: *Alcohol and HCV*
- HCSP Factsheet: *Tips for Staying Alcohol-Free at Social Events*
- [www.alcoholics-anonymous.org](http://www.alcoholics-anonymous.org)
- [www.hcvanonymous.com](http://www.hcvanonymous.com)

**For more information about hepatitis C, hepatitis B and HCV coinfections, please visit [www.hcvadvocate.org](http://www.hcvadvocate.org).**

• *hcspFACTsheet* •  
 A publication of the Hepatitis C Support Project

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