

What Alcohol Does to the Body

When someone has a drink, the alcohol follows the same path that food does as it travels through the digestive system. Once in the blood, alcohol affects every system in the body. Some of these effects are short-term. Others are not apparent for some time, perhaps even years. In either case, alcohol can do damage.

HEALTH TERMS

blood alcohol concentration

designated drivers

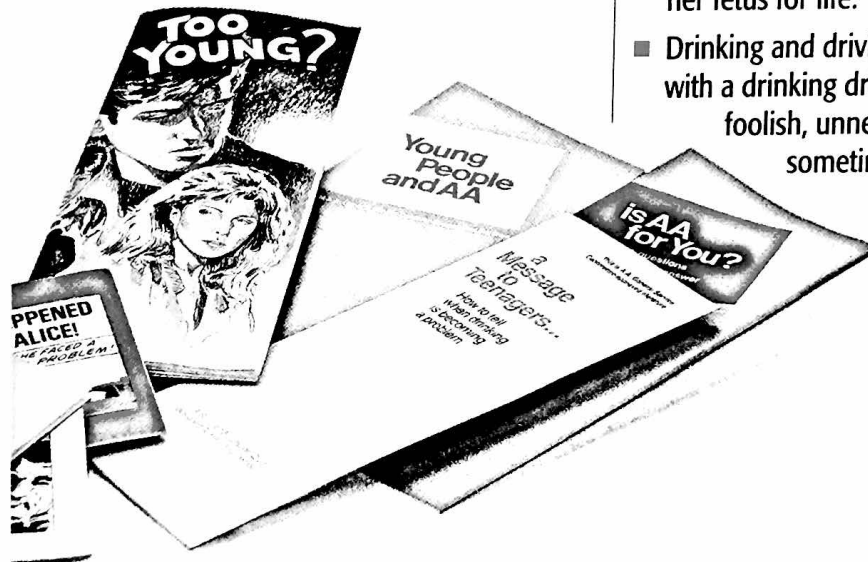
fatty liver

cirrhosis

fetal alcohol syndrome

HEALTH CONCEPTS

- Alcohol can quickly impair a person's judgment and, over time, cause permanent and serious health problems.
- Being in the presence of someone under the influence of alcohol can place a person's health and safety in jeopardy.
- Alcohol consumed by a pregnant female can damage the health of her fetus for life.
- Drinking and driving or riding with a drinking driver is taking a foolish, unnecessary, and sometimes deadly risk.



Short-Term Effects of Drinking

The short-term effects alcohol has on the body depend on several factors. These include the amount of alcohol consumed, the person's gender and size, and whether or not there is food in the person's stomach.

- **Brain.** Alcohol reaches the brain almost as soon as it is consumed. It depresses the activity of the brain, slowing the work of the **central nervous system**. Thought processes are disorganized, and memory and concentration are dulled. Decision making can be badly affected.
- **Liver.** The **liver**, in a process called *oxidation*, changes alcohol to water, carbon dioxide, and energy. The liver can oxidize only about one-third to one-half of an ounce (10 to 15 ml) of alcohol an hour. There is no way to speed up this process. Until the liver

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central nervous system For more information on the central nervous system and its functions, see Chapter 16, page 364.

liver For more information on the functions of the liver and ways of caring for this vital organ, see Chapter 18, page 416.

SHORT-TERM EFFECTS OF ALCOHOL

BRAIN

Alcohol reaches the brain within minutes, and the brain becomes less able to control the body. Movement, speech, and vision may be affected.

LIVER

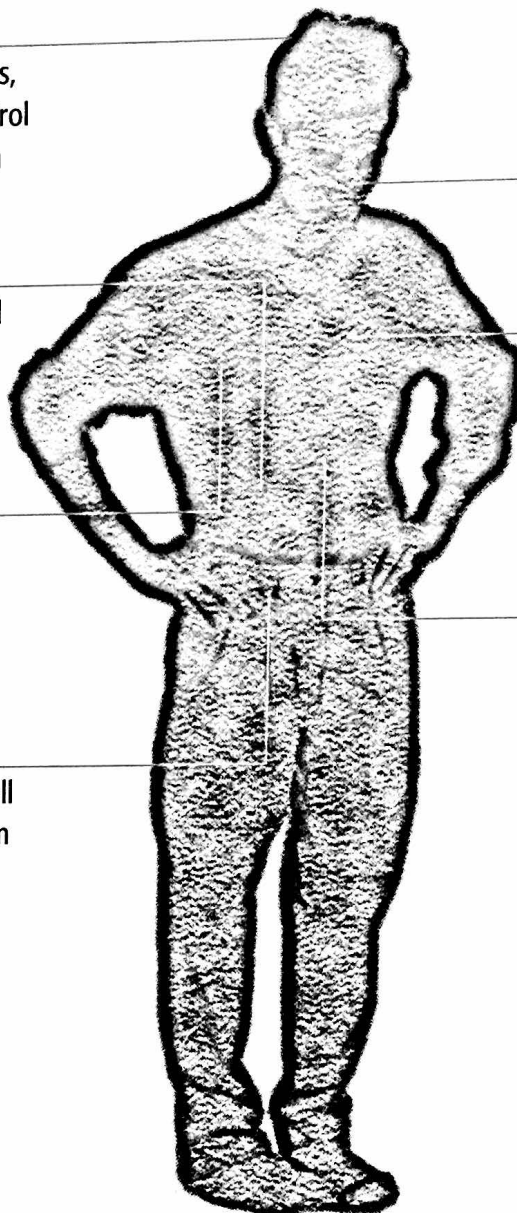
The liver changes alcohol into water and carbon dioxide. When a person drinks alcohol faster than the liver can break it down, the person becomes intoxicated.

LUNGS

The carbon dioxide is released from the body through the lungs. The water passes out of the body in the form of urine, perspiration, and breath vapor.

SMALL INTESTINE

The rest of the alcohol moves to the small intestine, where it enters the bloodstream more slowly.



MOUTH AND THROAT

Chemicals affect mucosal lining tongue, gums, and throat

HEART

Alcohol causes the heart to beat faster and the blood vessels to widen. The increased blood flow to the surface gradually allows body heat to escape and body temperature to drop.

STOMACH

About 20 percent of the alcohol consumed passes through the lining of the stomach and into the bloodstream. Too much alcohol in the stomach may cause vomiting.

Alcohol has many negative effects on the drinker's body and behavior. The short-term effects are those that occur within minutes of drinking an alcoholic beverage.

has time to oxidize all the alcohol, the alcohol keeps circulating through all body parts. Contrary to popular myth, neither a cold shower nor black coffee can counter these effects and sober up a person who has been drinking.

- **Blood Vessels.** The blood carries the alcohol to all parts of the body, including the heart, liver, and brain. When alcohol enters the blood, it causes the blood vessels to dilate, or widen. The result is an increased flow of blood, especially to the skin. This makes the skin feel flush and warm. However, it is an artificial warmth. The increase of blood flow near the surface of the skin causes the body to lose heat by radiation. Body temperature actually decreases. People who drink and then go out into cold weather are at increased risk for **hypothermia**.
- **Heart.** Alcohol causes an increase in heart rate and an increase in blood pressure. It can lead to arrhythmias, or abnormal heartbeats.

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hypothermia For more information on the condition known as hypothermia and ways of protecting yourself against it, see Chapter 4, page 87.

It can cause scar tissue to build up in the muscle fibers of the heart. The risk of heart attack and stroke also increases.

- **Kidneys.** Alcohol affects the pituitary gland, which, in turn, acts on the **kidneys**, causing them to produce more urine. It is for this reason that a person feels dehydrated the day after he or she has been drinking heavily.
- **Stomach.** Because the alcohol molecule is very small and water-soluble, it does not have to be digested. It can be immediately absorbed from the stomach into the blood. Having food in the stomach slows the absorption process. Even so, food will not keep a person from getting drunk if he or she drinks too much. Alcohol increases the flow of gastric juices from the stomach lining. Larger amounts of alcohol cause a larger flow of these high-acid juices, irritating the stomach lining. Repeated irritation can cause internal bleeding.

Driving Under the Influence

Among the problems related to the short-term effects of drinking, one of the deadliest and most widespread is that of driving while intoxicated (DWI), also known as *driving under the influence* (DUI). A person is said to be driving while intoxicated when his or her blood alcohol concentration exceeds the limit allowed by law in that state. **Blood alcohol concentration**, or BAC, is *the amount of alcohol in a person's blood expressed as a percentage*. Signs of being intoxicated can begin to appear at blood alcohol concentrations as low as .02. Factors that affect the amount of alcohol in a person's blood include gender, weight, **metabolism**, the amount of alcohol (not the number of drinks) consumed, whether the person ate before or while drinking, and the time that elapsed between drinks or after drinking stopped.

What effect does alcohol have on an individual's ability to operate a car or other heavy machinery? Driving experts and medical researchers have found that drinking on any level

- reduces the ability to judge distances, speeds, and turns.
- reduces the ability to judge accurately one's own capabilities and limitations.
- increases the tendency to take risks.
- slows reflexes.
- adds to forgetfulness to take precautions such as using signals when turning.
- reduces the ability to concentrate.

CONSEQUENCES OF DWI

Driving while intoxicated is the leading cause of death among teenagers. Each day in the United States, 11 teenagers are killed and over 350 are injured in alcohol-related motor vehicle crashes.

Driving under the influence is a problem not only for the drinker but also for the nondrinker, who can easily become a victim in a crash caused by an alcohol-impaired driver. Almost 50 percent of the

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kidneys For more information on the functions and problems of the kidneys, see Chapter 18, page 425.

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metabolism For more information on metabolism and its role in fitness, see Chapter 3, page 54.

Did You Know?

- For years, police have asked drunk drivers to perform such tests as touch their nose with their fingers or walk a straight line, heel to toe. Now, a test called the Horizontal Gaze Nystagmus test is being used to see if further breath or blood testing is needed. This test is based on the theory that people high on alcohol or other drugs can't prevent the jerking motions of their eyes when they try to track, or follow, moving objects.

Did You Know?

- About 85 percent of all car crashes involving teens are linked to alcohol.
- In the past decade, a quarter of a million Americans have died in car crashes in this country due to the use of alcohol.
- Alcohol and marijuana in combination have greatly increased sedative effects. They impair manual dexterity, psychomotor skills, and the ability to process information, and they cause visual disturbances.

crashes in which the passenger dies occur because the drivers were legally drunk. After a decrease in the number of alcohol-related traffic deaths between 1986 and 1994, drunken driving deaths again increased in 1995.

OTHER COSTS OF DWI

Even when fatal traffic accidents are averted, numerous problems exist for the individual who is stopped for driving while intoxicated. Here are some:

- immediate confiscation of driver's license
- arrest, a trip to jail, court appearance, and fine
- possible suspension of driver's license
- possible mandatory jail sentence
- cost of bail to get out of jail
- higher insurance rates
- possible lawsuits

EFFORTS TO REDUCE DWIs

Each state has determined the legal acceptable limit of alcohol in the blood. In most states, driving while intoxicated is defined as having a 0.1 percent BAC, though other states have pushed and are pushing for lower concentrations such as 0.08. In all states, driving while intoxicated is against the law. There are also laws in some

Building Health Skills

Using Refusal Skills: Ways to Turn Down a Drink

EVEN WHEN THE PRESSURE to use alcohol is intense, saying no becomes much easier when you're prepared. Copy the following responses into your private Health Journal. Add any other responses that work as well or better for you, and practice them in front of a mirror. Make sure your body language backs up your words.

1. **Refuse politely but firmly.** No, thanks. I've already got a drink (such as bottled water, juice, etc.).
2. **Give a personal reason.** I'm watching my weight; I'm allergic to it; I hate the taste; It gives me a headache.
3. **Explain that you have more important goals.** I've got a game in the morning. It affects my schoolwork. I want to be in control of my life.
4. **State your values and responsibilities.** I wouldn't consider it. It's against the law for people my age.



states that make it illegal to have an open alcohol container inside the car. Mandatory chemical tests for blood, breath, or urine exist in some states. Refusal to submit to a test can mean automatic suspension of the person's driver's license. In some states, anyone caught driving while intoxicated may go to jail immediately.

Organizations such as MADD, Mothers Against Drunk Driving, and SADD, Students Against Destructive Decisions, have been powerful forces in making the public and state legislators aware of the problem of drunk driving. Stricter enforcement of existing laws, tougher new laws, the banning of open containers in cars, and abolishment of drive-through liquor stores are a few of the contributions that these organizations have made in trying to reduce the problem of driving while intoxicated.

A response to the problem is also beginning to come from individual concerned citizens. Increasingly, the idea of identifying **designated drivers**—*people in social settings who choose not to drink so that they can safely drive themselves and others*—is becoming a popular trend in a drinking society. Such people recognize the importance of never riding with anyone who has had any alcohol to drink.



Long-Term Effects of Drinking

Long-term effects of alcohol on the body can include vitamin deficiencies, stomach and skin problems, and loss of appetite. Prolonged alcohol use can also do permanent damage to the liver and central nervous system.

Brain Damage

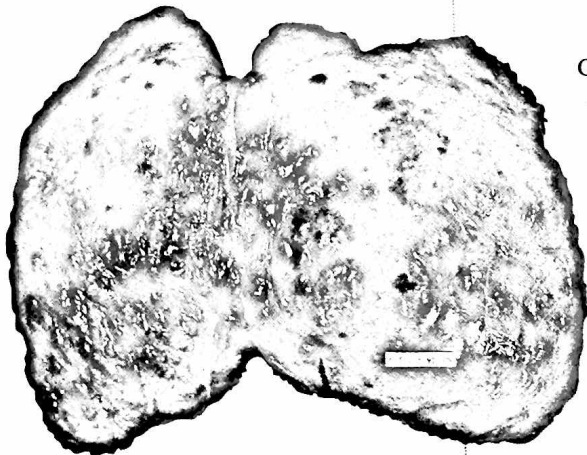
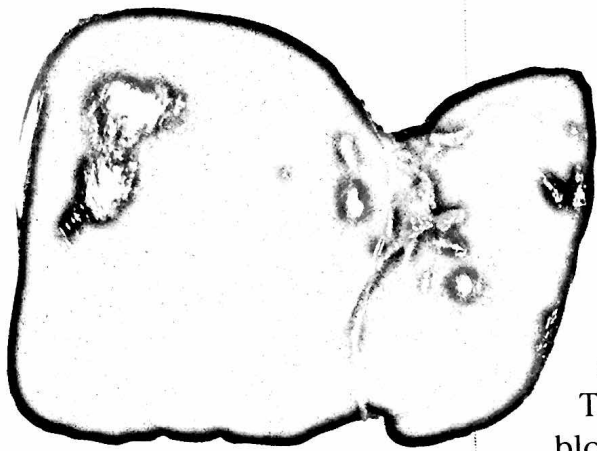
Long-term, excessive use of alcohol invariably leads to major brain damage. It may even lead to a decrease in brain size. People have been hospitalized in mental institutions for severe brain damage caused by excessive alcohol use. Even moderate drinking can destroy brain cells. There can be a loss of intellectual abilities, such as memory and problem solving. These losses can seriously interfere with everyday functions.

Chronic Liver Problems

Alcohol interferes with the liver's ability to break down fats. **Fatty liver**, a condition in which fats build up in the liver and cannot be broken down, develops. This increased amount of fat prevents the liver from functioning normally. It also interferes with the growth of new liver

▲ **In 1981, SADD began work to reduce alcohol-related traffic deaths. Their efforts were so successful they have since launched programs to address more issues affecting teens.**

ACTIVITY List issues that students in your school might work on to solve through programs like SADD.



▲ **Top: A healthy liver.**
Bottom: A liver damaged by alcohol use.

ACTIVITY Explain the function and importance of a healthy liver.

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hepatitis For more information on hepatitis and modes of treatment, see Chapter 28, page 630.

tolerance For more information on tolerance to substances, see Chapter 23, page 517.

withdrawal For more information on withdrawal from substances, see Chapter 23, page 517.

synergistic effect For more information on the synergistic effect that occurs when two or more medicines are combined, see Chapter 23, page 516.

cells. As a result, old liver cells are not replaced as quickly as they normally would be. The excess fat in the liver blocks the flow of blood in the liver cells, resulting in reduced oxygen and eventually cell death. This condition has been found in both moderate and heavy drinkers. It can be reversed when drinking stops.

Prolonged heavy alcohol use can cause **cirrhosis** (sir-ROH-sis) of the liver, *a condition in which liver tissue is destroyed and then replaced with useless scar tissue.* Cirrhosis means "scarring." There is no blood flow in the scarred area because there are no blood vessels, so the work of the liver is greatly reduced.

Alcohol abuse can also lead to **hepatitis**, an inflammation or infection of the liver that can cause weakness, jaundice, fever, and sometimes death. Also referred to as *alcoholic hepatitis*, it is caused by the toxic effects of the drug. Recovery can be slow, and liver failure sometimes results.

Tolerance and Dependence

Because alcohol is a drug, people who use it regularly may develop a **tolerance**, making it necessary to drink more and more in order to produce the same effects. As tolerance develops, a person may drink an increasing amount without appearing to be intoxicated. The person may continue to function reasonably well until some severe physical damage results or until he or she is hospitalized for some other reason. Then the individual will experience symptoms of **withdrawal** that range from jumpiness, sleeplessness, sweating, and poor appetite to severe tremors, convulsions, and hallucinations.

Some people become physiologically dependent on alcohol. The body develops a chemical need for alcohol. Physiological dependence is marked by tolerance and withdrawal. The symptoms of withdrawal are so unpleasant, a person tends to drink more alcohol in order to avoid the symptoms. As a result, the level of tolerance increases.

The Multiplier Effect

Similar to the **synergistic effect** that occurs when two or more medicines are taken simultaneously, alcohol combined with other drugs or medicines produces an interaction known as the *multiplier effect*. When alcohol is mixed with another depressant such as a tranquilizer, the effects can be particularly devastating. Impairment of both mental and physical abilities results. Many accidental deaths result from combining alcohol with other drugs or medicines. What is especially dangerous is that these effects are often not predictable.

Both over-the-counter medicines, such as aspirin and prescription medicines, can alter the way alcohol affects the body. Medicines that might cause reactions with alcohol have labels that warn against drinking any alcoholic beverages while using the medicine.

Alcohol and Pregnancy

In recent years, scientists have found that heavy drinking by pregnant females carries a risk not only to themselves but to their unborn child. **Fetal alcohol syndrome (FAS)** is *a condition in which a fetus has been adversely affected mentally and physically by its mother's heavy alcohol use during pregnancy*. FAS babies may exhibit some or all of the following problems: low birth weight, impaired speech, cleft palate, general weakness, slow body growth, facial abnormalities, poor coordination, and heart defects. Mental retardation, poor attention span, nervousness, and hyperactivity are also common in children born with FAS. FAS is, in fact, the leading cause of mental retardation in the United States.

The alcohol the pregnant female drinks moves into her blood, then across the placenta and through the umbilical cord into the blood of the unborn child. Any effects felt by the pregnant female as a result of drinking are also experienced by the unborn child. The alcohol remains in the baby's body much longer. If the pregnant female drinks three or four times a week, chances are the fetus *never* rids itself of alcohol.

The most sobering fact about FAS is that it is 100 percent preventable. It does not occur in babies of nondrinking pregnant females. Yet each year, some 5,000 FAS babies are born in this country. Many more cases go undiagnosed. The public is becoming increasingly aware of the dangers of FAS, but now every woman who is pregnant must make the choice not to drink any alcohol at all.

In 1988, the U.S. Senate passed a bill that, in part, approved a label that warned of the dangers of drinking during pregnancy. The warning reads:

"ACCORDING TO THE SURGEON GENERAL, WOMEN SHOULD NOT DRINK ALCOHOLIC BEVERAGES DURING PREGNANCY BECAUSE OF THE RISK OF BIRTH DEFECTS."