

New Jersey
Alcohol/Drug Resource
Center & Clearinghouse

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Fact Sheet No. 15 (2)



12 OUNCES OF BEER



5 OUNCES OF WINE



1 1/2 OUNCES OF
DISTILLED SPIRITS

EACH OF THE DRINKS SHOWN
ABOVE CONTAINS ABOUT
1/2 OUNCE OF ALCOHOL

The New Jersey Alcohol/Drug Resource Center and Clearinghouse serves institutions of higher education, state agencies, communities, and school districts throughout the state of New Jersey by providing technical assistance, training, and resources in alcohol and other drug abuse education and prevention.

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THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

FACTS ON: The Effects of Alcohol

Gail Gleason Milgram, Ed.D.

Alcohol is a clear, thin, odorless liquid that boils at 173°F (78°C). It can burn and can also mix with water in any proportion. Most types of alcohol, such as amyl, butyl, isopropyl and methyl alcohols, ethylene glycol, and glycerol have many industrial and chemical uses. Ethyl alcohol (ethanol) is one of the few alcohols that is made for consumption; however, it never exists full-strength in any alcoholic beverage. Ethanol, or ethyl alcohol, is the subject of this fact sheet, and from now on it will be referred to simply as "alcohol."

Alcohol is produced during a natural process called *fermentation*, which occurs when yeast, a microscopic plant that floats freely in the air, reacts with the sugar in fruit or vegetable juice, creating alcohol and releasing carbon dioxide. The process stops naturally when about 11% to 14% of the juice is alcohol; the product of this fermentation is wine. A similar process is used to make beer.

Distillation is the process used to make beverages with a higher alcohol content. In this process the fermented liquid is heated until it vaporizes, and then the vapor is cooled until it condenses into a liquid again. Distilled alcoholic beverages (e.g., whiskey, gin, vodka, and rum) contain 40% to 50% alcohol. They are sometimes referred to as "spirits" or "hard liquor."

When someone drinks an alcoholic beverage it flows into the stomach. While it is in the stomach, the drinker does not feel the effects of the alcohol, but alcohol does not remain in the stomach very long. Some of it is absorbed through the stomach walls into the bloodstream, but most alcohol passes into the small intestine and then into the bloodstream, and this circulates throughout the body. Once alcohol is in the bloodstream it reaches the brain and the drinker begins to feel its effects. The reason that a large person does not feel the effects of a drink as quickly as a small person is because the large person has more blood and other body fluids and will not have as high a level of alcohol in the blood after drinking the same amount of alcohol.

The body disposes of alcohol in two ways: *elimination* and *oxidation*. Only about 10% of the alcohol in the body leaves by elimination

from the lungs and kidneys. About 90% of the alcohol leaves by oxidation. The liver plays a major role in the body's oxidation of alcohol. When alcohol enters the liver, some of it is changed to a chemical called *acetaldehyde*. When acetaldehyde is combined with oxygen, *acetic acid* is formed. When the acetic acid is further combined with oxygen, carbon dioxide and water are formed.

The oxidation of alcohol produces calories. One ounce of pure alcohol contains about 163 calories (or about 105 calories in a 1½ ounce glass of whiskey or gin), but it does not contain vitamins or other physically beneficial nutrients.

The liver can oxidize only a certain amount of alcohol each minute. The oxidation rate of alcohol in a person weighing 150 pounds is about 7 grams of alcohol per hour. This is equivalent to about ¾ of an ounce of distilled spirits, 2½ ounces of wine, or 7¾ to 8 ounces of beer per hour. If a person drank no more than ¾ of an ounce of whiskey or half a bottle of beer every hour, the alcohol would never accumulate in the body and he or she would feel little of the effects of the alcohol and would not become intoxicated.

Oxidation continues until all the alcohol has left the body. Since the body can remove only a small amount of alcohol at a time, those who choose to drink are advised to drink slowly.

The effects of alcohol on an individual depend on a variety of factors. These include:

•**How one feels before drinking:** If a person is upset and tense, very excited, sad, nervous, or even extremely happy, he or she may tend to gulp drinks and actually consume more alcohol than planned.

•**What the drinker expects alcohol to do:** Some people expect a drink to help them feel relaxed, happy, angry or sad. Quite naturally, these feelings can be produced by the drink; how you want to feel helps you feel that way.

•**How much one drinks:** A person who has one drink during dinner is not likely to feel the effects of alcohol. But having six drinks before and during dinner means the individual might not make it through dessert.

•**How long one takes to drink:** This is a critical factor: four drinks in one hour will have an obvious effect on the drinker, but the same four drinks over a four-hour period will probably have a very slight, if any, effect.

•**Type of alcoholic beverage:** Some beverages have more alcohol in them than others. Beer has about 4.5% alcohol, "table wines" average from 11% to 14%, "fortified" or "dessert wines" (such as sherry or port) have 16% to 20%, and distilled spirits range from 40% to 50%. However, in normal size, each drink (i.e., 12 ounces of beer, 5 ounces of wine, and 1½ ounces of distilled spirits) contains approximately the same amount of alcohol.

•**Size of the drinker:** Because of the way alcohol circulates in the body, the size of the drinker also relates to the effects of alcohol. A person weighing 220 pounds will not feel the effects of a drink as much as a person weighing 120 pounds.

•**Food in the stomach:** The alcohol consumed does not affect the drinker until it has been absorbed into the bloodstream. Food in the stomach slows the alcohol's absorption, so that a person who has a drink after eating a meal will feel less effect than a person who has a drink on an empty stomach.

•**Experience in using alcoholic beverages:** Someone drinking a glass of wine may experience light-headedness the first time, but will probably not experience that effect on subsequent occasions. However, most individuals who drink know what to expect from various amounts of alcohol because of their prior experience with drinking.

Alcohol acts directly on the brain, and affects its ability to work. The effects of alcohol on the brain are quite complex, but alcohol is usually classified as a depressant. Judgment is the first function of the brain to be affected; the ability to think and make decisions becomes impaired. As more alcohol is consumed, the motor functions of the body are affected.

The effects of alcohol are directly related to the concentration (percentage) of alcohol in the blood; however, the effects vary among individuals and even in the same individual at different times. In the following description,

the blood alcohol concentrations are those that would probably be found in a person weighing about 150 pounds:

•At a blood alcohol concentration of 0.03% (after about one cocktail, one glass of wine, or one bottle of beer), the drinker will feel relaxed and experience a slight feeling of exhilaration.

•At 0.06% (after two cocktails, two glasses of wine, or two bottles of beer), the drinker will experience a feeling of warmth and mental relaxation; there will be a decrease of fine motor skills and he or she will be less concerned with minor irritations.

•At 0.09% (after three cocktails, three glasses of wine, or three bottles of beer), reaction time will be slowed, muscle control will be poor, speech will be slurred and the legs will feel wobbly.

•At 0.12% (after four cocktails, four glasses of wine, or four bottles of beer), his or her judgment will be clouded, inhibitions and self-restraint lessened, and the ability to reason and make logical decisions will be impaired.

•At 0.15% (after five cocktails, five glasses of wine, or five bottles of beer), vision will be blurred, speech unclear, walking will be unsteady, and coordination impaired. At 0.18% (after six cocktails, six glasses of wine, or six bottles of beer), all of the drinker's behavior will be impaired, and he or she will find it difficult to stay awake.

•At a concentration of about 0.30% alcohol in the blood (after 10 to 12 drinks), the drinker will be in a semi-stupor or deep sleep. Most people are not able to stay awake and reach blood alcohol concentrations higher than 0.30%.

•If the blood alcohol reaches 0.50% the drinker is in a deep coma and in danger of death. As the alcohol level reaches 1% in the blood, the breathing center in the brain becomes paralyzed and death occurs.

In many states a blood alcohol concentration (BAC) of 0.10% is considered legal evidence that a driver is intoxicated. Some states use a BAC of 0.08%. In some European countries the legal blood alcohol limit for a driver is as low as 0.05%.

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Suggestions for Further Reading

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