



# Alcohol and Substance Abuse

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## ALCOHOL ABUSE

Alcohol abuse is a major public health problem. In 2010, an estimated 2,735,511 deaths worldwide were attributable to alcohol use. About 58.3 million people in the United States (nearly one quarter of persons aged 12 years or older) participate in binge drinking, and almost 16 million (6.2% of the population aged 12 or older) report heavy drinking, defined as binge drinking on at least 5 days in the past month. Alcohol use is the third leading preventable cause of death in the United States (exceeded only by cigarette smoking and obesity) and claims over 80,000 lives annually. In 2011, an estimated 11% of persons aged 12 years or older drove under the influence of alcohol at least once. Alcohol use contributes to roughly 31% of all fatalities caused by motor vehicle accidents, or approximately 10,000 vehicular deaths annually, and is a major contributor to risky sexual behavior, domestic violence, homicide, and suicide. For the year 2006, the estimated economic cost of excessive drinking in the United States was \$223.5 billion: 72% from lost productivity, 11% from healthcare costs, 9% from criminal justice costs, and 7.5% from other effects.

## DEFINITION AND EPIDEMIOLOGY

The American Psychiatric Association has specific criteria for the diagnosis of *alcohol use disorder*; these 11 criteria are described in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition, and are listed in [Table 126-1](#). Alcohol use disorder is further characterized as mild, moderate, or severe, based on the number of criteria the individual meets; 2 to 3 criteria indicate a mild disorder, 4 to 5 criteria a moderate disorder, and 6 or more a severe disorder. The so-called *binge drinker* is defined as one who typically consumes five or more drinks on a single occasion.

Among individuals aged 12 or older, whites are more likely to report current alcohol use than other racial groups ([Fig. 126-1](#)), and men are more likely than women to be drinkers (57% versus 47%, respectively). The average age at first alcohol use is 17 years; 65% of college students currently use alcohol ([Fig. 126-2](#)); and more than half of all college students admit to heavy episodic drinking. Although the prevalence of ethanol use is highest in individuals younger than 30 years of age, survey data suggest that about two thirds of persons over age 30 consume it.

## PHARMACOLOGIC AND METABOLIC FACTORS

After oral ingestion, alcohol is absorbed predominantly in the small intestine, and its rate of intestinal absorption is accelerated by the simultaneous ingestion of carbohydrates and carbonated

beverages. Prolonged retention of alcohol in the stomach, as occurs when food is consumed before drinking, delays alcohol absorption because absorption in the stomach is considerably slower than in the duodenum. Once in the blood, alcohol equilibrates rapidly across all membranes, including the blood-brain barrier, thereby accounting for the prompt onset of its euphoric effects. Maximal blood alcohol concentrations are reached 45 to 75 minutes after alcohol is ingested.

The liver metabolizes approximately 90% of ethanol to acetaldehyde via the alcohol dehydrogenase pathway; subsequently, acetaldehyde is converted by aldehyde dehydrogenase to acetate, which enters the Krebs cycle. At low or moderate serum concentrations of ethanol, the alcohol dehydrogenase pathway functions almost exclusively in metabolizing ethanol. At high concentrations, the microsomal ethanol oxidizing system (CYP2E1) contributes to metabolism. Less than 10% of ethanol is excreted unchanged through the skin, kidneys, and lungs. Elimination of alcohol from the body is affected by obesity, food intake, previous exposure to alcohol, and variability among individuals in the efficiency of the alcohol and aldehyde dehydrogenase systems.

**TABLE 126-1** CRITERIA FOR THE DIAGNOSIS OF ALCOHOL USE DISORDER

### TWO OR MORE OF THE FOLLOWING IN THE PREVIOUS 12 MONTHS

- Recurrent alcohol use resulting in a **failure to fulfill major** obligations at work, school, or home
- Recurrent alcohol use in situations in which it is physically **hazardous**
- Continued alcohol use despite having persistent or **recurrent social or interpersonal problems** caused or exacerbated by the effects of alcohol
- Tolerance**, as defined by:
  - need for markedly increased amounts of alcohol to achieve intoxication or desired effect; and/or
  - markedly diminished effect with continued use of the same amount of alcohol
- Withdrawal**, as manifested by:
  - characteristic alcohol withdrawal syndrome; and/or
  - alcohol is taken to relieve or avoid withdrawal symptoms
- Alcohol is often taken in **larger amounts** or over a longer period than was intended
- Persistent desire or **unsuccessful efforts to diminish** or to control alcohol use
- A great deal of **time** is spent in activities necessary to obtain, use, or recover from the effects of alcohol
- Important social, occupational, or recreational **activities are relinquished or reduced** because of alcohol use
- Alcohol use is **continued despite knowledge** of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol use
- Craving** or a strong desire or urge to use a specific type of alcohol

Modified from the American Psychiatric Association: *Diagnostic and statistical manual of mental disorders*, ed 5, Washington, D.C., 2013, American Psychiatric Press.