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Alcohol Use Disorders in Adolescents

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Educational Gap

Alcohol is the drug of choice among youth, with 12% of 8th-graders, 22% of 10th-graders, and 29% of 12th-graders reporting heavy episodic drinking. Although prevalence rates are at historic lows, alcohol use continues to be widespread among adolescents, and pediatricians must screen for underage and family alcohol use in health assessment visits.

Objectives

After completing this article, readers should be able to:

1. Discuss the epidemiology of alcohol use in youth and identify problems associated with underage use.
2. Identify the biological and developmental impact of alcohol use in youth.
3. Discuss the health effects of alcohol use and describe the hallmarks of problem drinking.
4. Discuss approaches to screening and assessment for alcohol use disorders and alcohol-related problems.

Nature of the Problem/Epidemiology

National surveys make it clear that the use of alcohol among adolescents is both widespread and harmful. By the 12th grade, close to three-quarters of adolescents in high school report ever having an alcoholic drink, and more than one-quarter report having their first drink before age 13 years. Data from Monitoring the Future, an annual survey of youth in the United States, show that 71% of high school seniors reported some experience with alcohol in the past; 41% reported use in the last 30 days and, of great concern, 3% reported daily use. More than one-half (58%) of 10th-graders and more than one-third (36%) of 8th-graders report having consumed alcohol at some point in their lives, and more than one-third of 10th-graders (37%) and one of six 8th-graders (16%) report having been drunk in the past. (1) The good news is that the use of alcohol by teens, as well as the use of many of the illicit drugs, has declined over the past decade. The bad news is that, although these declines are encouraging, alcohol remains the drug of choice among youth.

The pattern of alcohol use that is exhibited by many adolescents is one of drinking too much and at too early an age, thereby creating problems for themselves, for people around them, and for society as a whole. Underage drinking is a leading public health problem in this country. Underage drinkers consume, on average, four to five drinks per occasion approximately six times per month. By comparison, older adult drinkers, ages 26 and older, consume, on average, two to three drinks per occasion approximately nine times per month. A particularly worrisome trend is the high prevalence of heavy episodic or binge drinking in adolescents, which is defined often as five or more drinks in a row in a single episode. Monitoring the Future data show that 12% of 8th-graders, 22% of 10th-graders, and 29% of 12th-graders report engaging in heavy episodic drinking.

Studies find that drinking alcohol often starts at very young ages. Moreover, studies indicate that the younger children and adolescents are when they begin to drink, the more likely they are to engage in behaviors that can harm themselves and others. Those who start to drink before age

Abbreviations:

AUDIT: Alcohol Use Disorders Identification Test
COAs: children of alcoholics

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13 years, for example, are nine times more likely to binge drink frequently as high school students than those who begin drinking later. Data from recent surveys show that approximately 10% of 9- to 10-year-olds have already started drinking; nearly one third of youth begin drinking before age 13, and more than one in four 14-year-olds report drinking within the past year. (2)(3)

A number of studies show that the early onset of alcohol use, as well as the escalation of drinking in adolescence, are risk factors for the development of alcohol-related problems in adulthood. Initiating alcohol use earlier in adolescence or in childhood is a marker for later problems, including heavier use of alcohol and other drugs. Individuals who report initiation of alcohol use before age 15 years were four times more likely to meet criteria for alcohol dependence and two times more likely to meet criteria for alcohol abuse as those individuals who began drinking after age 21 years. (4)

Alcohol-Related Consequences

The consequences of underage drinking include a range of physical, academic, and social problems. Perhaps most frightening is the fact that alcohol is the leading contributor to morbidity and mortality in youth. Alcohol use is the leading contributor to death due to injuries, the primary cause of death in individuals younger than 21 years of age. Annually, 5,000 youth die of alcohol-related injuries that involve underage drinking. This includes injuries sustained in motor vehicle crashes (~1,900), homicides (~1,600), and suicides (~300), as well as unintentional injuries not related to motor vehicle crashes. Among studies of adolescent trauma victims, alcohol is reported in 32% to 45% of hospital admissions. The association between alcohol use and violent behavior is well documented. Numerous studies of adolescents report that alcohol use is linked to both violent behavior and to violence-related injuries. (5)(6)

Other harmful behaviors and negative consequences frequently related to excessive drinking among adolescents are high-risk sexual behaviors (unplanned and unprotected intercourse); sexual misconduct, including rape; and assaults. Having multiple sexual partners, failing to use condoms, and performing other high-risk sexual behaviors have been associated with alcohol use in adolescents. Furthermore, alcohol use by the offender, victim, or both has been linked to sexual assault, including date rape.

Biological and Developmental Impact

As youth move from adolescence to young adulthood, they encounter dramatic physical, emotional, and lifestyle

changes. Developmental transitions, such as puberty and increasing independence, have been associated with alcohol use. Because drinking is so widespread among adolescents, simply being an adolescent may be a key risk factor for initiation of alcohol use, as well as for drinking dangerously.

Risk Taking

Data from imaging studies show that the brain continues developing well into the twenties, during which time it continues to establish important communication connections and further refines its function. Many believe that this lengthy developmental period may help to explain some of the behaviors characteristic of adolescence, such as the propensity to seek out new and potentially dangerous situations. For some adolescents, thrill-seeking includes experimenting with alcohol use. Developmental changes also may offer a possible physiologic explanation for why teens act so impulsively, often not recognizing that their actions—such as drinking—have consequences.

Expectations

How adolescents view alcohol and its effects also influences their drinking behavior, including whether they begin to drink and how much. An adolescent who expects drinking to be a pleasurable experience is more likely to drink than one who does not. Beliefs about alcohol are established very early in life, even before entering elementary school. Before age 9 years, children generally view alcohol negatively and see drinking as bad and associated with adverse effects. By approximately age 13 years, however, their expectancies shift, becoming more positive. Accordingly, adolescents who drink the most also place the greatest emphasis on the positive and arousing effects of alcohol.

Sensitivity and Tolerance

Differences between the adult brain and the brain of the maturing adolescent may explain why many young drinkers are able to consume much larger amounts of alcohol than adults before experiencing the negative consequences of drinking, such as drowsiness, lack of coordination, and withdrawal or hangover effects. This unusual tolerance may help to explain the high rates of binge drinking among many adolescents and young adults. At the same time, adolescents appear to be particularly sensitive to the positive effects of drinking, such as feeling more at ease in social situations, and young people may drink more than adults because of these positive social experiences.

Personality Traits, Psychiatric Comorbidity

Children who begin to drink at a very early age (before age 12 years) often share similar personality characteristics that may make them more likely to start drinking. Young people who are disruptive, hyperactive, and aggressive—often referred to as having conduct problems or being antisocial—as well as those who are depressed, withdrawn, or anxious, may be at greatest risk for alcohol problems. Other behavior problems associated with alcohol use include rebelliousness, difficulty avoiding harm or harmful situations, and a host of other traits seen in young people who act out without regard for rules or the feelings of others (ie, disinhibition).

Hereditary Factors

Some of the behavioral and physiologic factors that converge to increase or decrease a person's risk for alcohol problems, including tolerance to alcohol's effects, may be linked directly to genetic factors. For example, being a child of an alcoholic or having several alcoholic family members places a person at greater risk for alcohol problems. Children of alcoholics (COAs) are between 4 and 10 times more likely to become alcoholics themselves than are children who have no close relatives with alcoholism. (7) COAs also are more likely to begin drinking at a young age and to progress to drinking problems more quickly.

Research shows that COAs may have subtle brain differences that could be markers for developing later alcohol problems. For example, by the use of newer brain-imaging techniques, scientists have found that COAs have a distinctive feature in one brainwave pattern (called a P300 response) that could be a marker for later alcoholism risk. (8) Some studies suggest that these brain differences may be particularly evident in people who also have certain behavioral traits, such as signs of conduct disorder, antisocial personality disorder, sensation-seeking, or poor impulse control. (9)

Social and Environmental Context

Drinking and alcohol-related problem behavior reflect a complex interplay between inherited and social-environmental factors, the implications of which are only beginning to be explored in adolescents. And although even more is understood about the role and contribution of genetics, this knowledge still does not tell the entire story.

Social and environmental factors, such as the influence of parents and peers, also play a role in alcohol use. For example, parents who drink more and who view drinking favorably may have children who drink more. Other

influences, such as the impact of the media, have been examined and are felt to play an important role. Today, alcohol is widely available and aggressively promoted through television, radio, billboards, and the Internet.

Health Effects

Although the severe health problems associated with harmful alcohol use are not as common in adolescents as they are in adults, studies show that adolescents who drink heavily may put themselves at risk for a range of health problems.

Neurocognitive, Neurodevelopmental Effects

Chronic heavy drinking during adolescence and into young adulthood appears to be associated with detrimental effects on brain development, brain functioning, and neuropsychological performance. Recent evidence suggests that heavy drinking during adolescence is associated with poorer neurocognitive functioning during the young adult years and is associated particularly with impairment of attention and visuospatial skills. (10)

Brain imaging and studies of event-related potentials have demonstrated subtle but significant abnormalities in brain structure and function. In a recent study, researchers used magnetic resonance imaging to determine the effects of heavy drinking on the changing brain structure of teens and young adults with alcohol use disorders. Hippocampal volumes were smaller in youths with alcohol use disorders than in matched controls and correlated with the onset of alcohol use disorder and with the duration of alcohol use disorder. (11) The earlier an individual developed an alcohol use disorder and the longer the duration of the alcohol use disorder, the smaller was the volume of his or her hippocampus. (12) Other studies have looked at the effect of alcohol on the structure of white matter and have demonstrated that white matter integrity was reduced in the corpus callosum of youths with alcohol use disorders.

Research studies indicate that a number of factors seem to influence how and to what extent alcohol affects the brain, including:

- how much and how often a person drinks;
- the age at which a person first began drinking, and how long he or she been drinking;
- the person's age, level of education, gender, genetic background, and family history of alcoholism;
- whether the individual is at risk as a result of prenatal alcohol exposure;
- general health status.

Liver Effects

Elevated liver enzymes, indicating some degree of liver damage, have been found in some adolescents who drink alcohol. Young drinkers who are overweight or obese showed elevated liver enzymes, even with only moderate levels of drinking.

Growth and Endocrine Effects

In both boys and girls, puberty is a period associated with marked hormonal changes, including increases in the sex hormones estrogen and testosterone. These hormones, in turn, increase production of other hormones and growth factors, which are vital for normal organ development. Drinking alcohol during this period of rapid growth and development (ie, before or during puberty) may upset the critical hormonal balance necessary for normal development of organs, muscles, and bones.

Problem Drinking in Adolescents

Adolescents are the healthiest cohorts in the population in terms of organic disease. At the same time, they experience relatively high rates of mortality and morbidity because of their behavior, including the use of alcohol. Across many species, including humans, adolescence is a time of heightened risk taking, and for many young people in our society, some of that risk-taking involves alcohol use. In addition, adolescence is a period of increasing socialization, often involving alcohol. For some, the increased social demands of adolescence may be accompanied by increased anxiety, heightening the risk for alcohol use. In this way, alcohol use has become intertwined with the normal developmental processes of adolescence. The unhealthy or problem use of alcohol affects development and is affected as well by developmental processes.

The hallmarks of problem drinking are loss of control over drinking (ie, drinking more than planned or in inappropriate settings) and the occurrence of negative consequences from drinking (driving under the influence, high-risk sexual behaviors, fights, medical problems, etc) The development of addiction is associated with repeated heavy drinking over time, potentially as a continual attempt to recreate the pleasurable state associated with drinking and intoxication.

Repeated heavy drinking also can lead to the development of physiologic dependence, marked primarily by tolerance to alcohol and withdrawal symptoms between drinking periods. Tolerance is defined as the need to drink progressively greater amounts of alcohol to yield the same pleasurable effects that are experienced when

drinking alcohol. Although less frequently reported among adolescents than among adults, heavy drinking also can lead to alcohol withdrawal symptoms between drinking episodes (see Table 1).

Alcohol Use Disorders in Adolescents

The diagnostic criteria for alcohol abuse and dependence are detailed in the *Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association*. To meet the diagnosis of abuse, one of four abuse criteria must be met. To meet a diagnosis of dependence, three of seven dependence criteria must be met (see Table 2). In general, substance abuse is characterized by a maladaptive pattern of use indicated by continued use despite consequences or recurrent use where such use may be physically hazardous. Substance dependence is characterized as a chronic and progressive disorder characterized by loss of control over use, compulsion, and continued use despite consequences. (13)

Management of Acute Intoxication

Alcohol acts primarily as a central nervous system depressant. Alcohol produces euphoria, grogginess, talkativeness, and impaired short-term memory, and it increases

Table 1. Signs and Symptoms of Alcohol Intoxication and Withdrawal

Alcohol Intoxication	Alcohol Withdrawal
Signs	
Decreased heart rate	Increase heart rate
Lower blood pressure	Elevated blood pressure
Lower body temperature	Elevated body temperature
Sedation	Sweating
Decreased respiration	Tremors and muscle spasm
Loss of balance	Vomiting and diarrhea
Restlessness	Seizures
Slurred speech	Confusion
Agitation	Delirium
	Psychosis
Symptoms	
Relaxation	Craving
Sense of well-being	Anxiety
Euphoria	Irritability
Dizziness	Insomnia
Fatigue	Nausea
Nausea	Hallucinations
Blackouts	

Table 2. DSM-IV Criteria for Substance Abuse and Dependence

Criteria for Substance Abuse

- A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following occurring within a 12-month period:
1. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (eg, repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)
 2. Recurrent substance use in situations in which it is physically hazardous (eg, driving in an automobile or operating a machine when impaired by substance use)
 3. Recurrent substance-related legal problems (eg, arrests for substance-related disorderly conduct)
 4. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of substance (eg, arguments with spouse about consequences of intoxication, physical fights)

Criteria for Substance Dependence

- A. A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:
1. Tolerance, as defined by either of the following:
 - a. A need for markedly increased amounts of the substance to achieve intoxication or desired effect
 - b. Markedly diminished effect with continued use of the same amount of the substance
 2. Withdrawal, as manifested by either of the following:
 - a. Characteristic withdrawal syndrome
 - b. Substance use to relieve or avoid withdrawal symptoms
 3. Substance is taken in larger amounts or over a longer period than intended
 4. There is a persistent desire or unsuccessful effort to cut down or control use
 5. A great deal of time is spent in activities necessary to obtain the substance (eg, visiting multiple doctors or driving long distances)
 6. Important social, occupational, or recreational activities are given up or reduced because of substance use
 7. The substance 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 the substance

DSM-IV=Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.

the pain threshold. Alcohol's ability to produce vasodilation and hypothermia is centrally mediated also. At very high serum levels, respiratory depression occurs.

Alcohol's inhibitory effect on pituitary antidiuretic hormone release is responsible for its diuretic effect. The gastrointestinal complications of alcohol use can occur from a single large ingestion. The most common adverse effect is acute erosive gastritis, which is manifested by epigastric pain, anorexia, vomiting, and guaiac-positive stools. Less commonly, vomiting and midabdominal pain

may be caused by acute alcoholic pancreatitis; diagnosis is confirmed by the finding of elevated serum amylase and lipase activities.

Alcohol can produce detectable impairments in memory after only a few drinks and, as the amount of alcohol increases, so does the degree of impairment. Large quantities of alcohol, especially when consumed quickly and on an empty stomach, can produce a blackout, or an interval of time for which the intoxicated person cannot recall key details of events, or even entire events. (14) Ingested orally, alcohol is absorbed rapidly from the stomach, small intestine, and colon and distributed throughout all body fluid.

Approximately 95% of ingested alcohol is metabolized to carbon dioxide and water, and the remainder is excreted in the urine and expired air. In 1 hour, the body is able to metabolize about 30 mL (1 oz), or about one standard drink. Four ounces of liquor (86 proof) consumed on an empty stomach produce a plasma ethanol level of approximately 65 mg/dL in an adult male of average weight and 80 mg/dL in a postmenarchal female of average adult weight. The legal definition of intoxication in all states is a blood ethanol level of 80 mg/dL (or 0.08%).

The alcohol content of brewed beverages is measured in terms of the percentage of alcohol (weight to volume), whereas the content of distilled beverages is measured

in terms of proof units, which varies in different countries. In the United States, one proof equals 0.5% of alcohol. A conventional 12- to 14-oz bottle of beer, a 6-oz glass of unfortified wine, a 4-oz glass of sherry, and a single 1.5-oz shot of whiskey or distilled spirits will contain equivalent amounts of alcohol. Each of these beverages is considered a standard drink, which contains roughly 14 g of pure alcohol.

It is important to be aware of the alcohol contents of a standard drink and popularly consumed beverages; it is

equally important to be aware of the alcohol content of many over-the-counter medications and other preparations. Alcohol is often a major component of many cough and cold preparations (ie, one toothache remedy, 70%; a popular mouthwash, 26%; and a nighttime cold medication, 25%)

The primary management of alcohol intoxication and overdose is supportive care. The most important goal of management of intoxication is to prevent harm to the individual resulting from severe respiratory depression and to protect the airway from aspiration. Even with relatively high blood alcohol levels, survival is probable as long as the respiratory and cardiovascular systems are supported.

As with all patients who have impaired consciousness, intravenous glucose should be given if rapid testing of blood glucose is not immediately available. This consideration is particularly important because ethanol can impair gluconeogenesis, with an increased risk for hypoglycemia. The risk of hypoglycemia is more of a concern in younger children and particularly in those who are under- or malnourished. Interestingly, a number of studies examining this issue in otherwise healthy adolescents and adults have not found hypoglycemia to be more common in patients presenting with acute alcohol intoxication.

It is important, however, to assess whether the patient who presents with acute alcohol intoxication has ingested other drugs in addition to alcohol, because these agents may further suppress the central nervous system and alter the approach to treatment. The acutely intoxicated patient may exhibit some agitation as part of the presentation, but, again, management is primarily supportive and best managed nonpharmacologically. In the rare situation in which pharmacologic intervention is needed for management in a medical setting, most specialists would advise use of a rapid-onset and short-acting benzodiazepine.

The alcohol overdose syndrome should be suspected in any teenager who appears disoriented, lethargic, or comatose (Table 3). Although the distinctive aroma of alcohol may assist in diagnosis, confirmation by analysis of blood is recommended. There is a high correlation between results obtained by serum and breath analyses, so that the latter method may be used reliably. At levels greater than 200 mg/dL, the adolescent is at risk of death, and levels greater than 400 mg/dL usually are associated with significant respiratory depression. Levels at 600 mg/dL or greater usually are associated with a fatal outcome. When the level of depression appears excessive for the reported blood level, head trauma or ingestion of other drugs should be considered as possible confounding factors.

Table 3. Alcohol Effects

Blood Alcohol Concentration, % Alcohol or Weight to Volume	Symptoms
0.05% or 50 mg/100 mL	Slowed reactions, altered cognition
0.08%–0.15% or 80–150 mg/100 mL	Intoxication, slurred speech, ataxia
0.20% or 200 mg/100 mL	Somnolence
0.30% or 300 mg/100 mL	Hypothermia, severe dysrhythmia
0.40% or 400 mg/100 mL	Respiratory depression, bradycardia
0.50% or 500 mg/100 mL	Coma
0.60% or 600 mg/100 mL	Lethal

The usual mechanism of death from the alcohol overdose syndrome is respiratory depression, and artificial ventilatory support must be provided until the liver can eliminate sufficient amounts of alcohol from the body. In a patient who is not an alcoholic, in general, it takes 20 hours to reduce the blood level of alcohol from 400 mg/dL to zero. Elimination thus occurs at a fixed rate, with the level falling approximately 20 mg/dL per hour. In extreme cases, dialysis may be considered when the blood level is higher than 400 mg/dL, but rarely is dialysis needed because supportive care usually is sufficient.

An Individual and Family Systems Approach to Screening

Alcohol and other drug use should be included as a primary consideration when evaluating behavioral, family, or psychosocial problems, as well as conditions that might be related to substance abuse. The identification and assessment of high-risk behaviors and predisposing risk factors are key aspects in the early recognition of alcohol-related problems. As a routine part of the adolescent visit, there should be an assessment of risk by reviewing risk factors and behaviors with youth and their parents.

Health risk appraisal and preventive counseling throughout preadolescence, adolescence, and young adulthood is a well-established principle. During regularly scheduled health maintenance visits, there are well-established tenets of health education, screening for health morbidities, and anticipatory guidance. These visits represent multiple opportunities for screening, early identification, and intervention for adolescents affected by alcohol-related problems, including adolescents affected by parental alcoholism.

Parents serve as important role models for their children. Attitudes and beliefs regarding alcohol, tobacco, and other drugs develop early in life. Parents need to be aware that their attitudes and beliefs can strongly influence and play a major role in shaping their children's behavior. Hence, it is important for the health-care professional to explore the attitude of the family toward alcohol use and to provide basic education, screening, and early intervention services that are appropriate to the age and development of the adolescent and the family situation.

If inquiries about parental alcohol and other drug use are incorporated into the family history portion of a clinical interview, such questions may seem less out of place to all involved. If one prefaces one's questions with phrases such as, "Now I'm going to ask you about diseases that can run in families or can have an effect on your adolescent's health," the line of questioning may seem more natural and less intrusive to families.

Families continue to exert significant influence on adolescents and on the behaviors in which teenagers choose to engage. Early identification of families with alcohol or other drug-related problems is critically important to the prevention of problem alcohol use among adolescents themselves. Family issues to address include parent-child interactions and maladaptive family problem solving, which often involve avoidance of issues and conflict. Families experiencing marital discord, financial strains, social isolation, and disrupted family rituals (such as meal times, holidays, and vacations) also increase an adolescent's risk of problem alcohol use. Adolescents are particularly at risk if parents are either excessively permissive or punitive, or if parents offer little praise or seem persistently neglectful of the adolescent.

Clear parent-defined conduct norms are an important protective factor. Adolescents least likely to use alcohol or other drugs are emotionally close to their parents, receive advice and guidance from their parents, have siblings who are intolerant of drug use, and are expected to comply with clear and reasonable conduct rules. The parents of nonusers typically provide praise and encouragement, engender feelings of trust, and are sensitive to their children's emotional needs.

Screening the Family

Screening for alcohol and other drug-use problems within families must begin with a careful and detailed psychosocial history. Information about the structure, function, and interpersonal problems of families, parents, children, and adolescents provides a necessary background from which the need for additional screening efforts can

be determined. Evidence of adolescent behavior problems, school failure, parenting difficulties, family conflict, or changes in the home environment commonly are present in families affected by alcohol and other drug-use disorders.

In many instances, family problems related to inappropriate alcohol use are subtle, and identifying them requires a deliberate and skilled screening effort. Based on the nature of a presenting health problem or as a result of problem areas in the psychosocial history, screening may involve asking the adolescent questions directly that are developmentally appropriate and addressing the youth's perceptions of problem alcohol use in the family. One can begin by asking a simple but important screening question, "Have you ever been concerned about someone in your family who is drinking alcohol or using other drugs?" This question sets the groundwork for possible later discussion. It also lets the adolescent and family know that you believe problem alcohol or other drug use is a health concern, and that you are willing and able to assist them. The following site provides an extended discussion of strategies, tools, resources, and tips on organizing the office visit: www.nacoa.org/healthpros.htm.

Because of the high prevalence of unhealthy alcohol use, many experts recommend that all adults be screened with a validated survey instrument such as the CAGE questionnaire or the Alcohol Use Disorders Identification Test (AUDIT). The CAGE questionnaire is brief but was designed primarily to detect alcohol dependence. The AUDIT is longer but detects a spectrum of unhealthy drinking. (15)

The CAGE questionnaire is a four-item alcohol screening instrument with demonstrated relevance for primary care in clinical, educational, and research settings (Table 4). The CAGE asks whether the respondent has ever "needed to Cut down on your drinking; felt Annoyed by complaints about your drinking; felt Guilty about your drinking; or, had an Eye-opener or a drink in the morning."

One technique to maximize the usefulness of responses to these screening questions is to apply them

Table 4. CAGE Questionnaire

- Have you ever felt you should *Cut* down on your drinking?
- Have people *Annoyed* you by criticizing your drinking?
- Have you ever felt bad or *Guilty* about your drinking?
- Have you ever had an *Eye opener* or a drink in the morning to steady your nerves or to get rid of a hangover?

to all members of the household. The Family CAGE is a modified version of the commonly used CAGE questionnaire that simply broadens the standard CAGE items to include “anyone in your family” (Table 5). One can use the Family CAGE questions to provide a proxy report regarding another individual, such as a parent or an older sibling.

For example, if the patient is a 12-year-old who currently is not using alcohol or other drugs but is concerned about a parent’s use of alcohol, the health-care professional could screen for concerns about the parent’s alcohol use by asking the CAGE questions to the child in the following manner: “Do you think your mother needs to cut down on her alcohol use? Does your mother get annoyed at comments about her drinking? Does your mother ever act guilty about her drinking or something that happened while she was drinking? Does your mother ever have a drink early in the morning as an eye-opener?” One or more positive answers to the Family CAGE can be considered a positive screen, which indicates the need for additional assessment.

The Family CAGE is intended to screen for alcohol problems in families, not to diagnose family alcoholism. A positive finding on the Family CAGE implies a greater relative risk for alcoholism in the family and should be followed by a more thorough diagnostic assessment. In a recent study, one positive response on the Family CAGE was more sensitive than asking about perceived family alcohol problems. (16) The specificity of the Family CAGE for family alcohol problems was 96%, the positive predictive value 90%, the sensitivity 39%, and the negative predictive value 62%. The Family CAGE also correlates with family stress, family communication problems, marital dissatisfaction, and use of drugs other than alcohol.

The ability to use the Family CAGE in this manner offers the potential for greater flexibility for the adolescent encounter and allows for a comfortable way of collecting pertinent screening information about or from patients and parents. By substituting the words *drug use* for *drinking*,

the Family CAGE also can be used to screen for problematic use of drugs other than alcohol. (17)

Screening the Adolescent

The signs and symptoms of alcohol use disorders in adolescents often are subtle. More telling than physical signs may be the indication of dysfunctional behaviors. A sudden lapse in school attendance, falling grades, or deterioration in other life areas may become more apparent as alcohol or other drug use escalates. Problems with interpersonal relationships, family, school, or the law often become more evident as use increases. Depressive symptoms such as weight loss, change in sleep habits and energy level, depressed mood or mood swings, and suicidal thoughts or attempts may be presenting symptoms of problem alcohol use.

A general psychosocial assessment of an adolescent’s functioning is the most important component of a screening interview for alcohol misuse, abuse, or dependence. It may be helpful to begin with a discussion of general topical areas, including home and family relationships, school performance and attendance, peer relationships, recreational and leisure activities, vocational aspirations and employment, self-perception, and legal difficulties. The information gathered can lead to a determination of whether alcohol or other drug use is a cause of behavioral dysfunction and to assess the degree of impairment.

Although there is no single screen that has been recommended for screening adolescents, the CRAFFT questionnaire (Table 6), which has been validated in adolescents, is a brief screening tool that has been used by many and is easy to use. (18) Others find tools such as the AUDIT (Table 7) to be helpful because it incorporates questions about drinking quantity, frequency, and binge behavior, along with questions about the consequences of drinking. A recent guide developed by the National Institute on Alcohol Abuse and Alcoholism provides a more detailed discussion and suggests screening that uses a series of two questions, one about friend’s drinking and one about the patient’s personal drinking frequency (www.niaaa.nih.gov/YouthGuide). The guide goes on to provide tips on addressing positive and negative responses and strategies for brief intervention and referral.

Screening Versus Assessment

Screening questions help to identify those individuals most likely to have a problem related to alcohol or other drug use. Information gathered should help to decide whether there is a need for additional assessment by either the primary clinician or a consultant. It is helpful to keep in mind that screening is an important and time-efficient first step

Table 5. Family CAGE

Have you ever felt that anyone in your family should **Cut** down on their drinking?

Has anyone in your family ever felt **Annoyed** by complaints about their drinking?

Has anyone in your family ever felt bad or **Guilty** about their drinking or something that has happened while drinking?

Eye opener: has anyone in your family ever had a drink first thing in the morning to steady their nerves or get rid of a hangover?

Table 6. CRAFFT: A New Brief Screen for Adolescent Substance Abuse

1. Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using AOD?
2. Do you ever use AOD to **RELAX**, feel better about yourself, or fit in?
3. Do you ever use AOD while you are by yourself, **ALONE**?
4. Do you ever **FORGET** things you did while using AOD?
5. Do your family or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?
6. Have you ever gotten into **TROUBLE** while you were using AOD?

A CRAFFT score ≥ 2 had a sensitivity of 92.3% and specificity of 82.1% for AOD treatment need. The positive predictive value was 66.7% and the negative predictive value was 96.5%. AOD=alcohol and other drugs.

to identifying the probable existence of a problem, but that screening differs from assessment and establishing a final diagnosis. Assessment is a more structured and lengthy process designed to determine the extent of the problem, explore comorbidities, and assist in treatment planning. Although the ability to do an in-depth assessment and make an actual diagnosis may be beyond the time limitations and skills of many practitioners, all primary health-care providers are responsible for screening and initial management or referral. Moreover, adolescent and other primary health professionals can play an important role in motivating adolescents for behavior change in an effort to avoid the potential adverse health outcomes associated with adolescent alcohol use.

Motivational Enhancement and Brief Interventions

The understanding of how problem alcohol use relates to developmental transitions, including how individual characteristics and contextual features serve to moderate these relationships, offers an important foundation for effecting meaningful and lasting change in adolescents. Over the past decade, research in this area related to adolescents points out that the many transitions that occur during adolescence represent windows of opportunity for intervention to change the many courses of behavior of adolescents that are already changing. The research suggests that by redirecting potentially risky trajectories, successful developmental interventions can not only assist in resolution of immediate difficulties, but also can set the

stage for continued enhanced health and well-being throughout adolescence and young adulthood.

Miller and Rollnick have described five basic motivational principles that can be used to lead patients and involved family members in initiating and complying with efforts to change behavior. (19) The basic principles and rationale for motivational enhancement begin with the assumption that the responsibility and capability for change lie within the patient or involved family member. Hence, the clinician's task is to create a set of conditions that will enhance the patient or the involved family member's own motivation for and commitment to change. The health provider's job is to mobilize the inner resources of those individuals as well as those positive elements inherent in their natural helping relationships. The components underlying this approach include:

Express Empathy

The clinician's role is to communicate great respect for the adolescent and family. He or she should be a blend of support person and knowledgeable consultant for the benefit of the patient. The adolescent's and family member's freedom of choice, direction and responsibility for change are respected. It is important to communicate to the adolescent that another person's drinking or drug use is not their fault and that they cannot be responsible for changing them. However, they are responsible for and can change their own drinking behavior.

Supportive persuasion is gentle, subtle, and always based on the assumption that change is up to the adolescent or family member. The major role of the clinician is listening rather than telling. The power of such gentle, nonaggressive persuasion is widely recognized in clinical writings. Reflective listening is a key to motivational interviewing. It communicates an acceptance of where patients are, while also supporting them in the process of change.

Develop Discrepancy

Motivation for change occurs when people perceive a discrepancy between where they are and where they want to be. The motivational enhancement approach seeks to enhance and focus attention on such discrepancies with regard to the drinking behavior. In certain cases, it may be necessary first to develop the concept of the discrepancy by raising the adolescent's awareness of the personal consequences related to alcohol use.

Avoid Argumentation

The motivational enhancement style explicitly avoids direct argumentation, which tends to evoke resistance. No attempt should be made to have the patient admit or

Table 7. Alcohol Use Disorders Identification Test (AUDIT)

Questions	0	1	2	3	4
1. How often do you have a drink containing alcohol?	Never	Monthly or less	2–4 times month	2–3 times a week	4 or more times a week
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7–9	10 or more
3. How often do you have five or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
4. How often during the last year have you found that you were not able to stop drinking once you started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
5. How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
9. Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year
10. Has a relative, friend, doctor, or other health-care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year
					Total

Note: This questionnaire is reprinted with permission from the World Health Organization. To reflect standard drink sizes in the United States, the number of drinks in question 3 was changed from 6 to 5. A free AUDIT manual with guidelines for use in primary care is available online at www.who.org. Positive = 8 or more for Adult Male or 4 or more for Adult Female or Adolescent or Adult Male over age 60.

accept a diagnostic label. The health-care provider does not seek to prove or convince by force or argument. Instead, the clinician assists the adolescent and family in seeing the consequence of the drinking accurately. When used properly, the adolescent or family and not the clinician voices the argument for change.

Roll With Resistance

Motivational enhancement strategies do not meet resistance head on, but rather “roll with” the momentum, with a goal of shifting adolescent and family perceptions in the process. Ambivalence is viewed as normal, not pathologic, and is explored openly. Solutions usually are evoked from the adolescent or family rather than provided by the health-care provider.

Support Self-Efficacy

Individuals who are persuaded that they have a serious problem still will not move toward change unless there is hope for

change. Self-efficacy is a critical determinant of behavior change. Self-efficacy is, in essence, the belief that one can perform a particular behavior or accomplish a particular task (ie, going to a self-help group). In everyday language, this state of mind might be called hope or optimism. The clinician can be a cheerleader and play an important role by providing the patient and family with hope and optimism. The reader is directed to the following article about motivational interviewing in general: Barnes J, Gold M. Motivational interviewing. *Pediatrics in Review*. 2012;33(9):e57–e68.

Although a detailed discussion of motivational interviewing and brief interventions is beyond the scope of this article, it is helpful to keep in mind these principles when having a discussion with or giving feedback to adolescents and family members. This approach often involves providing adolescents and family members with *feedback* (feedback on personal information regarding health status and associated risks); emphasizing the adolescent or family member’s personal responsibility for change and

the potential impact of failing to take action; providing clear recommendations or advice regarding the need for change, conveyed in a supportive and concerned manner, rather than authoritatively; providing a menu of options for change, if possible; using empathy as a style for helping to guide the patient (based on reflective listening, warmth, genuineness, and respect); and reinforcing self-efficacy and expectations that the adolescent or family member can change.

An important part of attempting to motivate behavior changes in adolescents and making use of the principles of brief interventions is to recognize the importance of the entire health-care team in delivering clear and consistent messages, and to enlist the use of consultants and referral sources when needed. Last, do not underestimate the powerful influence of committed and caring family members and the role that they play in the lives of teens.

Summary

- Despite the fact that there has been a long-term decline in the use of alcohol by teens and the current rates of use are at historic lows, underage drinking remains a leading public health problem in this country. (1) Alcohol remains the illicit drug of choice for youth.
- Studies indicate that the younger children and adolescents are when they begin to drink, the more likely they are to engage in behaviors that can be harmful to themselves and to others. (3)
- Being the child of an alcoholic places a person at greater risk for alcohol problems. Children of alcoholics are between 4 and 10 times more likely to become alcoholics themselves than are children who do not have the same genetic predisposition. (7)(9) In addition, family alcohol problems can affect the development of youth adversely, and family dysfunction can increase an adolescent's risk of problem alcohol use.
- The hallmarks of problem drinking are loss of control over drinking and the presence of negative consequences from drinking. (3) Adverse effects of underage drinking, including biological and developmental impact, are well documented.
- Alcohol acts primarily as a nervous system depressant and at high serum levels leads to respiratory depression.
- Families continue to exert significant influence on adolescents and on the behaviors in which teenagers choose to engage. Early identification of children, adolescents, and families with alcohol-related problems is critically important to the prevention of problem alcohol use among adolescents. Addressing alcohol use is an important part of the health-care visit for all children and youth.

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PIR Quiz

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1. The mother of a 14-year-old new patient looked over the questions on the health screening form for young adolescents that the assistant gave her son to complete. She expresses surprise that the questionnaire asks about alcohol use. You tell her that the percentage of 14-year-olds who report drinking within the past year is greater than
 - A. 5%
 - B. 10%
 - C. 15%
 - D. 20%
 - E. 25%
2. You go on to tell her that the problem is not restricted to just experimentation with one or two drinks. In fact, the percentage of 8th-graders who participate in binge drinking, which you define as five or more drinks in a row in a single episode, is more than
 - A. 1%
 - B. 2%
 - C. 5%
 - D. 8%
 - E. 10%
3. The mother reports that she also has a 10-year-old child who will be coming to your office next week for a first visit. She asks if she should be concerned about alcohol use in that child as well. You tell her that alcohol use among 9- to 10-year-olds is approximately
 - A. 1%
 - B. 5%
 - C. 10%
 - D. 15%
 - E. 20%
4. A 2½-year-old girl whom the mother thought was napping is found with an empty bottle of mouthwash. The family reports that it was opened a day ago and only 1 to 2 teaspoons were used. On arrival in the Emergency Department, she is bradycardic and has respiratory depression. You are sure to include which of the following in her intravenous solutions?
 - A. Bicarbonate
 - B. Calcium
 - C. Glucose
 - D. Normal saline
 - E. Potassium
5. A high school student is brought in by his friends because he had been playing a drinking game and had been staggering and exhibiting slurred speech. Now he is deeply asleep, indicating that his blood alcohol level is at least:
 - A. 0.1%
 - B. 0.2%
 - C. 0.3%
 - D. 0.4%
 - E. 0.5%

Alcohol Use Disorders in Adolescents

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