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Commentary

Addressing the Critical Health Problem of Adolescent Substance Use Through Health Care, Research, and Public Policy

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A B S T R A C T

The use of addictive substances—tobacco, alcohol, and other drugs—during adolescence interferes with brain development and increases the risk of serious health and mental health conditions, including addiction. Yet, adolescents live in a culture in which family, social, community, and media influences regularly bombard them with pro-substance use messages, creating an environment in which substance use is considered an expected behavior, rather than a considerable health risk. To prevent the significant harm that falls to teens and young adults because of substance use, The National Center on Addiction and Substance Abuse at Columbia University (CASA Columbia) undertook a study to explore how adolescent brain development relates to the risk of substance use and addiction; the cultural influences that create an environment in which substance use is considered normative behavior; individual factors that make some teens more disposed to substance use and addiction; and evidence-based prevention and treatment strategies for addressing this problem. The recently published report *Adolescent Substance Use: America's #1 Public Health Problem* concludes that risky substance use is a major public health problem that can be ameliorated through evidence-based public health measures, including education about the disease and its risk factors, screenings, and clinical interventions, and that addiction can be treated and managed effectively within routine health care practice and specialty care.

Despite the tremendous toll that addictive substances take on the health and well-being of adolescents, three of four high school students ages 18 years and younger (75.6%, 10.0 million, based on census population estimates) report having ever used an addictive substance (includes cigarettes, alcohol, marijuana, and/or cocaine) by grade 12, with 82.3% of students reporting having done so [1,2]. Alcohol is by far the most commonly used substance (72.5%), followed by cigarettes (46.3%) and marijuana (36.8%) [2]. Among adolescents who use addictive substances, two-thirds (65.1%) are polysubstance users (prevalence rates are measured as lifetime use) [3]. Among those who have ever used tobacco, alcohol, or other drugs, 19.4% meet the clinical diagnostic criteria for a substance use disorder (defined as meeting the Nicotine Dependence Syndrome Scale criteria for past-month nicotine dependence or the Diagnostic and Statistical Manual of Mental Disorders criteria for past-year alcohol/drug abuse or dependence), as do one-third (33.3%) of current users of these substances [3]. In total, one in eight high school students (11.9%, 1.6 million) suffers from an addictive disorder [3].

The treatment gap for adolescents is unacceptably high. In 2009, only 6.4% of high school students who met clinical criteria for an alcohol or other drug use disorder received formal treatment (including treatment for alcohol and other drug addiction at hospitals, rehabilitation facilities, or mental health centers), and those who do receive treatment often receive substandard care [3]. Fewer teens who needed treatment received it compared with any other age-group [3].

Although many effective and science-based prevention and treatment strategies are available, they rarely are implemented. The public is ill-informed about the dangers of teen substance

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use [4]. Physicians seldom screen for adolescent substance use or discuss it with their patients or their parents [5–7]. Even for teens who seek specialty care, there are few treatment programs that offer age-appropriate evidence-based services [8,9].

Adolescent Brain Development Is Strongly Linked to Substance Use Risk

The initiation of substance use during adolescence is driven, in part, by biological factors. Addiction is a progressive and complex brain disease [10] that disrupts the functioning and structure of the areas of the brain responsible for pleasure, decision making, self-control, and survival, including motivation, risk and reward assessment, pleasure seeking, impulse control/inhibition, emotion, learning, memory, and stress control [11,12]. Because the adolescent brain, particularly the prefrontal cortex and the reward pathways, is still developing [13], adolescents exhibit an increased proclivity toward taking risks, including the risk of smoking, drinking, or using other drugs [14,15]. Moreover, addictive substances have a greater negative impact on the adolescent brain than the adult brain [16–18], increasing the risk of further use, adversely influencing the development of the regions of the brain associated with judgment, attention, memory, and reward seeking, and increasing the risk of addiction [19,20].

The earlier an individual initiates substance use, the greater the likelihood of developing a substance use disorder [21–23]. Analysis of data from the National Survey on Drug Use and Health indicates that 9 of 10 people who meet the clinical criteria for substance use disorders involving nicotine, alcohol, or other drugs began smoking, drinking, or using other drugs before they turned 18 [3]. Individuals who begin using any addictive substance (including nicotine, alcohol, or other drugs) before age 15 are 6.5 times as likely to develop a substance use disorder as those who delay use until age 21 or older (28.1% vs. 4.3%) [3] (Fig. 1). These findings are particularly striking because the average age of initiation of substance use among high school students is between 13 and 14 years old [3].

Genetic factors also contribute to the early initiation and persistence of substance use, and the progression from use to addiction [24–26].

Cultural Factors Drive Adolescent Substance Use

Although biology is a powerful influence, cultural and environmental factors play a critical role in setting the stage for adolescent substance use. Mixed messages generated by peers, family members, and communities regarding the acceptance of use; school environments and policies that contribute to student use; the widespread availability of tobacco, alcohol, marijuana, and controlled prescription drugs; pervasive advertising of addictive products; and media portrayals of substance use as glamorous, fun, or relaxing all contribute to the initiation and continued use of addictive substances among young people. These cultural influences, combined with the failure of the health care, education, social service, and justice systems to systematically identify risky use and intervene when it occurs, conspire to create a culture in which teen substance use is accepted as the norm.

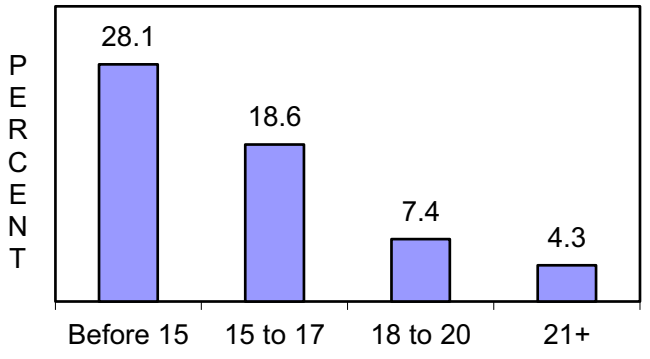

Figure 1. Substance use disorders among persons aged 12 years and older, by age of first use. Source: CASA Columbia analysis of The National Household Survey on Drug Use and Health (NSDUH), 2009.

Parental influences

Parents send mixed messages to their children, often unknowingly, through their tacit approval of teen substance use. Teens who believe their parents disapprove of their smoking, drinking, or using other drugs are less likely to do so, whereas those who believe their parents are tolerant of substance use are at higher risk of using [27,28]. Many parents fail to set clear expectations that their children will not engage in these behaviors. For example, recent national surveys conducted by The National Center on Addiction and Substance Abuse at Columbia University (CASA Columbia) found that 44% of parents think it is unrealistic to expect that their children will not try marijuana [29], and one in five parents (20.8%) believe that marijuana is a harmless drug [30]. In the absence of a clear and consistent "no use" message, adolescents may perceive such beliefs as tolerance.

Some parents believe that allowing their children to drink at home, or under adult supervision, will teach their children to drink more responsibly; however, providing alcohol to children increases the risk of adverse consequences, as noted previously, and research indicates that allowing teens to drink at home increases the likelihood that they will drink outside of the home as well [31,32].

Parents' own substance-related behaviors are another powerful influence on children's substance use expectations and behavior [33,34], and nearly half (45.4%, 33.9 million) of children aged <18 years live with a parent who engages in risky substance use (risky substance users include current smokers, underage drinkers, adult drinkers who exceed the U.S. Department of Agriculture guidelines of no more than one drink per day for women or two drinks per day for men, current users of any illicit drug, and/or current misusers of any controlled prescription drug). Living with a parent or other family member who is a risky substance user or who has a substance use disorder significantly increases the likelihood of adolescent substance use [35,36].

The media

One of the most persistent and pernicious sources of pro-substance use messages in adolescent culture is entertainment media. Adolescents spend more time in a typical day engaged in media use—television, Internet, radio, movies, magazines, and smartphones—than they spend with family, friends, or in school [37]. Most of these media are rife with messages that condone or promote substance use [4]. These pervasive pro-substance use messages can make substance use seem normal; exposure to pro-substance use media content is linked to initiation of adolescent smoking [38–40], drinking [41,42], and marijuana use [43]. Internet access and cell phones allow teens to discuss, read