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# Special Issue Introduction: Youth at Risk

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Despite decreasing prevalence of many types of illicit drugs[a] since 2011, substance use among adolescents in the U.S. remains unacceptably high. In 2017, the annual nationally representative Monitoring the Future survey,[b] found that the percentage of youth having "ever tried" (aka lifetime prevalence) any kind of illicit drug[a] was 18.2% for 8th graders, 34.3% for 10th graders, and 48.9% for 12th graders.[1]   The percentage of youth having used an illicit drug in the "past month" (aka current prevalence) was 7.0% for 8th graders, 17.2% for 10th graders, and 24.9% for 12th graders.  Although these prevalence rates fluctuate annually, in the past year, from 2016 to 2017, many drug use indicators increased from .1 to 2.7%.[1] The Monitoring the Future results underscore the importance of continuing drug treatment and prevention efforts, and the need for annual assessment.

Currently, marijuana is the most commonly used drug among students; 37.1% of 12th grade students reported using in the past year, and past-month marijuana use remains steady.[1] Additionally and of concern, beginning in 2014 the prevalence of past-month e-cigarette use surpassed that for past-month cigarette use.[1,2] This trend is concerning because in 2016, the US Surgeon General declared that preventing nicotine exposure and addiction in youth with e-cigarette products is critical for reducing life-time risk of combustible smoking, and use of other drugs.[3]  As of 2014, in Texas, 14.0% and 23.6% of middle school and high school students reported past-month and lifetime e-cigarette use, respectively.[4] More than 75% of students reporting past-month e-cigarette use reported use of another tobacco product in the past-month.[4] There is a need to continue to study these substances in the growing landscape of new products that provide alternative delivery systems for both nicotine and marijuana, including evaluating the effects of these products on psychosocial and mental health outcomes in adolescents.

Substance use in adolescence is associated with negative consequences as these youth enter young adulthood and adulthood. For example, studies consistently have found that increased substance use in high school is associated with increased dropout rates,[5] as well as decreased academic achievement.[6] Epidemiological evidence suggests that marijuana use is associated with adverse academic outcomes in high school, and poor mental health and psychosocial health outcomes into

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a. For 12th graders only: Use of any illicit drug includes any use of marijuana, LSD, other hallucinogens, crack, cocaine other than crack, or heroin; or any use of narcotics other than heroin, amphetamines, sedatives (barbiturates), or tranquilizers not under a doctor's orders. For 8th and 10th graders only: The use of narcotics other than heroin and sedatives (barbiturates) has been excluded because these younger respondents appear to over-report use.

adulthood.[7] Further, there is little known about newer substances (e.g., e-cigarettes) and subsequent effects on health and health behaviors as adolescents age into adulthood.[3] Recent studies continue to assess the effects of substances separately, yet data show that use of conventional cigarettes, alcohol, and marijuana co-vary.[7]

Research has demonstrated that behaviors rarely occur in isolation of each other, and this clustering of behaviors is especially prevalent in adolescent and young adult populations. Multiple theoretical frameworks attempt to explain the grouping of risky behaviors. Problem Behavior Theory posits that risky behaviors cluster together.[8,9] For example, Creamer et al. concluded that cigarette use is associated with other alcohol and drug use in a sample of U.S. high school students.[10] Gateway Theory suggests that use of one substance, such as cigarettes, leads to use of other addictive and harmful substances such as marijuana and alcohol.[11,12] Lastly, in an extension of Problem Behavior Theory and Gateway Theory, there is evidence of Common Liability. Common Liability theorizes that there is an underlying cause, such as genetic factors, which cause risky behaviors to cluster together.[13]

Articles in this special issue highlight factors associated with risky behaviors, correlations among risky behaviors, and perspectives on how policies could influence behaviors. These studies utilize national and regional data to answer these important questions. Nicksic et al. examined the Population Assessment of Tobacco and Health (PATH) youth data (12-17 years old) to determine the relationship between marketing of tobacco products and susceptibility and use behaviors of cigarettes and e-cigarettes. The authors concluded that exposure to advertisements was associated with the susceptibility to, and use of, both cigarettes and e-cigarettes.

Regarding the clustering of behaviors, articles in this special issue examine the relations between marijuana and tobacco, as well as the relations between energy drink consumption, alcohol, and cigarettes. Authors Owotomo and Maslowsky as well as Trapl and Gonzalez examined how use of tobacco and marijuana co-varies. MS Owotomo and Maslowsky used Monitoring the Future data, and concluded that among 8th and 10th grade never smokers, marijuana and e-cigarette use were associated with one another; 25% of past-month marijuana users also reported past-month e-cigarette use. Trapl and Gonzalez examined Cleveland Youth Risk Behavior Survey, and found that approximately 80%

of 9th through 12th grade marijuana users also used a tobacco product, and that smoking marijuana in a blunt was the most common mode of marijuana use. Cha et al. analyzed Monitoring the Future data for grades 10 and 12, and determined that 53% of past month cigarette users and 39% of past month alcohol users reported energy drink consumption.

Lastly, Quinlan et al. analyzed data from the Youth Appalachian Tobacco Survey to assess how tobacco behaviors would change among adolescents ages 11 to 18 years if the legal age to purchase tobacco was 21. Most respondents believed the same number of adolescents would continue to use tobacco, with more tobacco users believing the policy would not change behavior compared to views of non-tobacco users. All of these articles add to the growing body of literature that indicates that risky behaviors rarely occur in isolation.

The papers in this special issue indicate a need to develop and implement prevention programs targeting multiple behaviors, to enact policies at the local and state level to prevent youth access to addictive substances and marketing of these substances, and to communicate to practitioners the risks of substance use in adolescence. In addition, these programs should target the use of other related substances that are not necessarily deemed illegal for adolescents, such as energy drinks, but that can also have negative health consequences.  The use of multiple substances creates unique measurement challenges, particularly surrounding addiction. For example, the lack of standard measures to evaluate e-cigarette use inhibits a meaningful understanding of broader questions around tobacco use behaviors, such as the relations between e-cigarette use and initiation of other tobacco products.

The increase in poly-substance use requires a reevaluation of how we measure and understand addiction, as it is not clear that current methods (e.g., binary response options or focus on an individual substance) provide valid and reliable measures of youth behaviors that permit an accurate understanding of patterns of use. Future research should continue to study the etiology of these substance use behaviors, using longitudinal methods and standard measures across key child and adolescent developmental periods. Such research will help to identify targets for intervention, and strategies to implement effective policies and programs at the local, state, and federal level.

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