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Risky Substance Use Behaviors Among Adolescents Residing in Non-Metropolitan and Metropolitan Counties in the United States, 2017-2018

Tyrone Borders, PhD; Michael Singleton, PhD; Katie Youngen, MPH

Overview of Key Findings

- **Tobacco Use.** The prevalence of any past year tobacco use was significantly higher among non-metropolitan than metropolitan adolescents (13.9% vs. 8.3%). Daily cigarette use in the past 30 days was more than 3 times more prevalent among non-metropolitan than metropolitan adolescents (1.0% vs. 0.3%) and the difference was also statistically significant.
- **Alcohol Use.** Alcohol was the most commonly used substance among both non-metropolitan and metropolitan adolescents, although the differences in prevalence rates for past year and past 30-day alcohol use were not statistically significant. In the past year, 21.8% of non-metropolitan and 21.7% of metropolitan adolescents drank alcohol. In the past 30 days, 9.3% of non-metropolitan adolescents and 9.6% of metropolitan adolescents drank alcohol, and more than half of each group reported binge drinking.
- **Illicit Drug Use.** Prevalence rates for most illicit drugs were similar among non-metropolitan and metropolitan adolescents, with two exceptions. The prevalence of past year methamphetamine use was significantly higher among non-metropolitan than metropolitan adolescents (0.3% vs 0.2%), and the prevalence of past 30-day hallucinogen use was significantly lower among non-metropolitan than metropolitan adolescents (0.2% vs. 0.6%).

Introduction

A limited body of prior literature describes rates of risky substance use, including alcohol, tobacco, and illicit drugs (e.g., marijuana, cocaine, heroin, methamphetamine, and other illicit substances) among non-metropolitan and metropolitan adolescents nationally. Many published works that compare rates of alcohol, tobacco, and other illicit substance use between non-metropolitan and metropolitan adolescents are based on statewide surveys or cohort studies,¹⁻³ making it difficult to generalize their findings nationally.

The literature that does exist has yielded some consistent findings about risky substance use patterns among adolescents. First, non-metropolitan adolescents are more likely to report tobacco use (particularly chewing tobacco and cigarettes) than metropolitan adolescents, a finding supported by the 2016 Monitoring the Future survey.^{2,4-6} Ziller and colleagues found that between 2008-2010 and 2014-2016, cigarette smoking rates declined for both rural and urban youth, but rural declines lagged urban. When controlling for socioeconomic characteristics, rural youth had 50% higher odds of smoking than their urban peers during 2014-2016.⁷ Another finding is that adolescents in non-metropolitan areas report prescription opioid misuse more often than

adolescents in metropolitan areas, based on the 2008 and 2012 NSDUH surveys.^{8,9} One study using the 2012 NSDUH estimates that, controlling for various risk factors, “rural adolescents have 35% greater odds... of past-year prescription opioid misuse” compared to “large urban adolescents,” defined as those who live in a metropolitan area with one million or more residents.⁸ A 2012 study using multiple nationwide surveys estimated that “by 17 years of age, most adolescents (59% to 71%) had consumed alcohol, 31% to 44% had tried cannabis, and 4% to 6% had tried cocaine.”¹⁰ Nationally, rates of substance use among adolescents have been decreasing in recent years, a finding supported by analyses of the 2014 NSDUH¹⁰ and the 2016 MTF survey.¹² Lastly, a 2019 data brief by the Centers for Disease Control and Prevention found that adolescents and young adults ages 15-24 in non-metropolitan areas were significantly less likely than their metropolitan peers to die from drug overdoses attributable to natural or semisynthetic opioids, heroin, synthetic opioids (not including methadone), cocaine, and psychostimulants.¹³

Adolescent substance use is a risk factor for developing a substance use disorder as an adult,^{14,15} underlying the importance of measuring and understanding the prevalence of risky substance use among adolescents. Furthermore, adolescent substance use is associated with impaired or dangerous driving, sexually transmitted infections, and juvenile delinquency, leading to poor health outcomes, legal problems, and injury or death.¹⁶

Study Purpose

The purpose of this study was to compare the prevalence of key risky substance use behaviors (tobacco, alcohol, and illicit drug use) among adolescents, or individuals 12 to 17 years of age, residing in non-metropolitan (rural) and metropolitan (urban) counties nationally.

Methods

Data. We combined public data files for 2017 and 2018 from the National Survey on Drug Use and Health (NSDUH), a series of nationally representative in-person surveys administered by the Substance Abuse and Mental Health Services Administration (SAMHSA). NSDUH is the primary source of information on substance use behaviors among the civilian, non-institutionalized population of the United States ages 12 years and older. The focus of this brief is risky substance use behaviors among adolescents, defined as persons 12 to 17 years of age. A [companion brief](#) examines risky substance use behaviors among adults ages 18 years and older. Metropolitan (N=1,871; weighted N=1,768,083) and non-metropolitan (N=811; weighted N=494,132) status was defined according to U.S. Office of Management and Budget definitions. NSDUH classifies county of residence as large metropolitan, small metropolitan, or non-metropolitan. For this brief, large and small metropolitan areas were combined to form a single category for residents of metropolitan counties.

Risky Substance Use Behaviors. We considered three categories of risky substance use behavior, including tobacco use, alcohol use, and illicit drug use. In the NSDUH, “any tobacco” includes cigarettes, cigars, pipes, and smokeless tobacco. Note that for 2017 and 2018 the NSDUH did not include questions differentiating e-cigarettes or nicotine vapes from other tobacco products. Types of illicit drugs include marijuana, cocaine, heroin, hallucinogens, inhalants, methamphetamine, pain medications, tranquilizers, stimulants, and sedatives. Specific examples and notes on the inclusion criteria for selected illicit drugs are shown in Table 1. We examined the presence of the following substance use behaviors during the past year: any tobacco use; any illicit drug use; heroin, cocaine, methamphetamine, marijuana, or inhalant use; and misuse of prescription pain relievers, sedatives, stimulants, tranquilizers, and hallucinogens. We examined the same substance use behaviors in the past 30 days in addition to the following variables that are available in NSDUH for the previous 30 days only: daily cigarette use; binge alcohol use (5 or more drinks on the same occasion for

males, or 4 or more for females, on at least 1 day in the past 30 days); and heavy alcohol use (5 or more drinks on the same occasion for males, or 4 or more for females, on each of 5 or more days in the past 30 days).

Table 1. Selected Illicit Drugs Included in Analysis and Examples/Notes

Illicit Drug Category	Examples/Notes
Methamphetamine	Differentiated from cocaine and prescription stimulants (see stimulants).
Cocaine	Includes powder and crack cocaine.
Hallucinogens	LSD, PCP, peyote, mescaline, psilocybin mushrooms, “Ecstasy” (MDMA or “Molly”), ketamine, DMT/AMT/“Foxy,” and Salvia divinorum
Inhalants	Nitrous oxide, amyl nitrite, cleaning fluids, gasoline, spray paint, computer keyboard cleaner, other aerosol sprays, felt-tip pens, and glue.
Stimulants	Amphetamine products, methylphenidate products, anorectic (weight-loss) stimulants, Provigil®, or any other prescription stimulant (including those prescribed for attention deficit disorder/attention deficit hyperactivity disorder). Not included when used as prescribed.
Pain medications	Hydrocodone, oxycodone, tramadol, codeine, morphine, prescription fentanyl, buprenorphine, oxymorphone, and hydromorphone, Demerol®, methadone, or any other prescription pain reliever. Not included when used as prescribed.
Sedatives	Zolpidem products, eszopiclone products, zaleplon products, benzodiazepine sedatives (e.g., as flurazepam and temazepam products or triazolam products), barbiturates, or other prescription sedative. Not included when used as prescribed.
Tranquilizers	Benzodiazepine tranquilizers (e.g., as alprazolam, lorazepam, clonazepam, or diazepam products), muscle relaxants, or other prescription tranquilizer. Not included when used as prescribed.

Analysis. We conducted descriptive analyses to compare and contrast prevalence rates for risky substance use behaviors among adolescents in non-metropolitan and metropolitan counties. All analyses accounted for the NSDUH’s complex sampling scheme and weights.

Findings

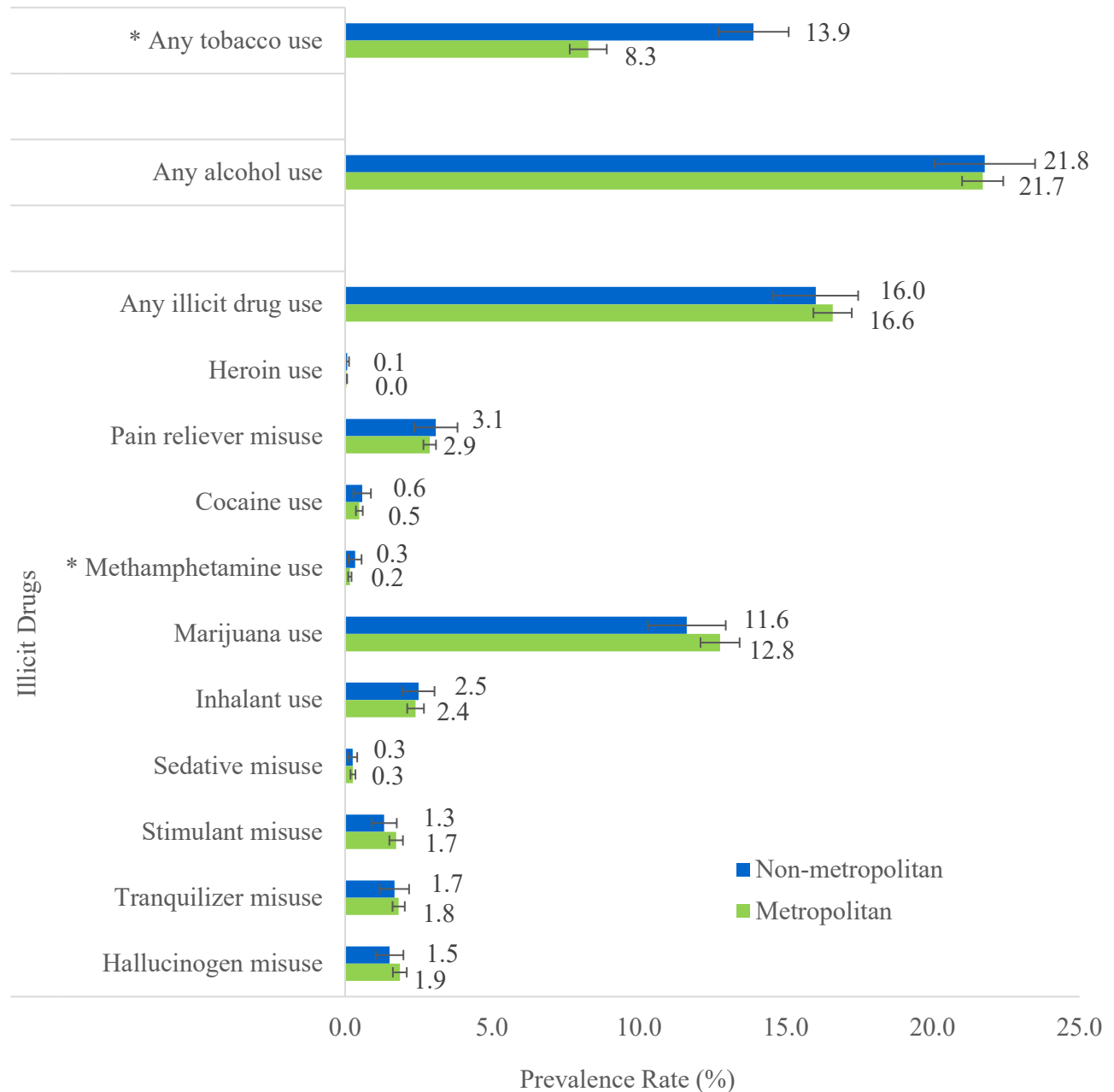
Tobacco Use. *The biggest disparities between non-metropolitan and metropolitan adolescents were for tobacco use.* The past year prevalence rate for any tobacco use was significantly higher among non-metropolitan than metropolitan adolescents (13.9% vs. 8.3%). Moreover, daily cigarette use in the past 30 days was more than 3 times more prevalent among non-metropolitan than metropolitan adolescents (1.0% vs. 0.3%), and the difference was also statistically significant.

Alcohol Use. *Alcohol was the most commonly used substance among both non-metropolitan and metropolitan adolescents, although the differences in past year and past 30-day alcohol use were not statistically significant.* In the past year, 21.8% of non-metropolitan and 21.7% of metropolitan adolescents drank alcohol. In the past 30 days, 9.3% of non-metropolitan adolescents drank alcohol and more than half of those reported binge drinking.

Illicit Drug Use. *The prevalence of past year methamphetamine use was significantly higher among non-metropolitan than metropolitan adolescents (0.3% vs 0.2%).* The only other statistically significant difference for use of a specific category of illicit drug was for past 30-day hallucinogen use, which was less prevalent among non-metropolitan than metropolitan adolescents (0.2% vs. 0.6%). Regardless of non-metropolitan or metropolitan residence, the most common type of illicit drug used was marijuana, followed by pain relievers and inhalants.

Figure 1 displays prevalence rates with 95% confidence limits for risky substance use behaviors in the past year among non-metropolitan and metropolitan adolescents.

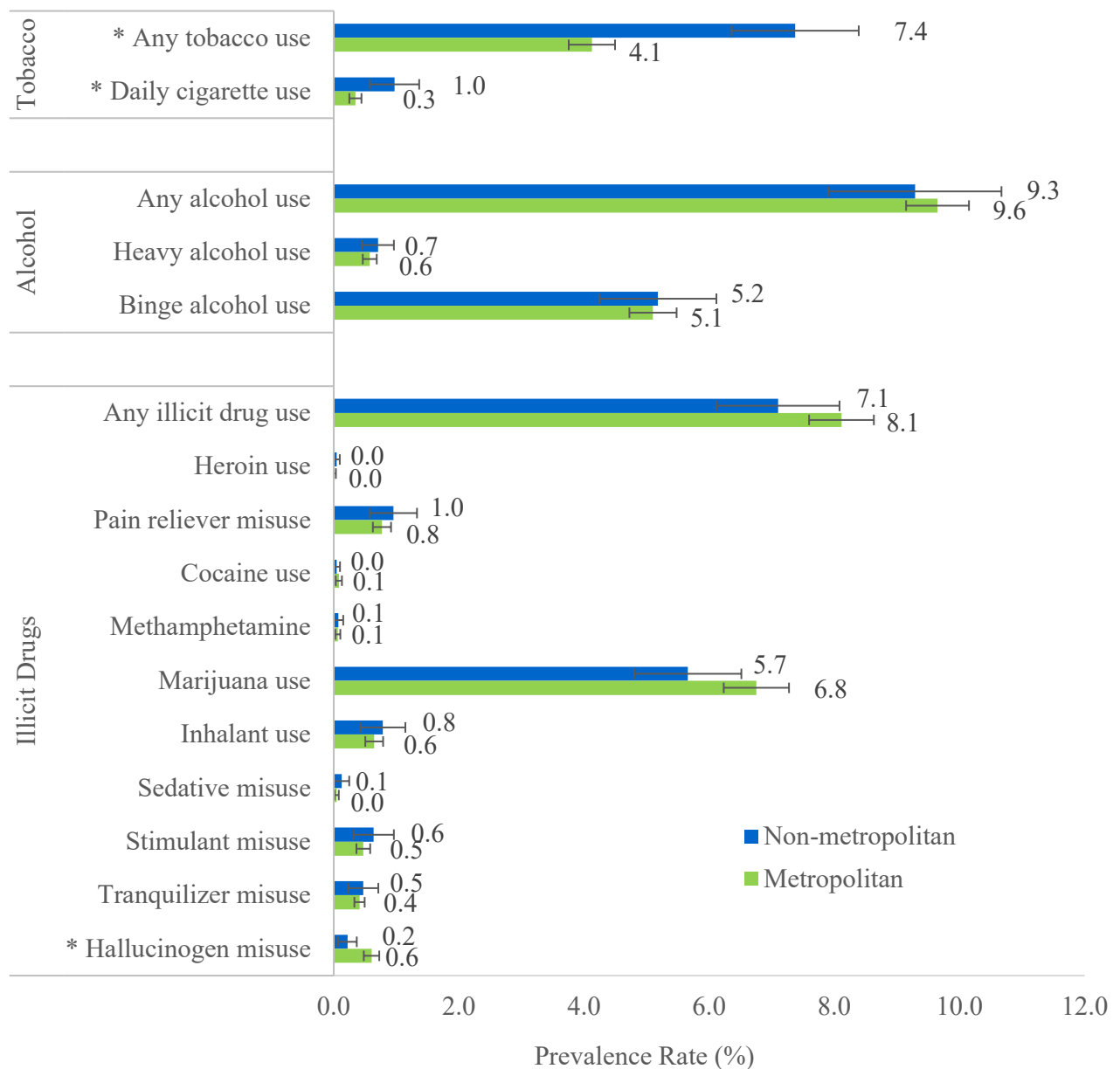
Figure 1. Prevalence Rates with 95% Confidence Limits for Risky Substance Use in the Past Year among Adolescents, by County Type



* Indicates a statistically significant difference in prevalence rate for metro vs. nonmetro residents

Figure 2 displays prevalence rates with 95% confidence limits for risky substance use behaviors in the past 30 days among non-metropolitan and metropolitan adolescents.

Figure 2. Prevalence Rates with 95% Confidence Limits for Risky Substance Use in the Past 30 Days among Adolescents, by County Type



* Indicates a statistically significant difference in prevalence rate for non-metropolitan and metropolitan residents.

Conclusion/Discussion

Our analysis of the 2017-2018 NSDUH data supports some of the existing literature on adolescent tobacco use. The difference between non-metropolitan and metropolitan adolescents in past year tobacco use was statistically significant, as was the difference in daily cigarette use among adolescents who reported any tobacco use in the past 30 days. Adolescents in non-metropolitan areas reported higher rates of tobacco use compared to their metropolitan counterparts, suggesting the need for smoking cessation and prevention programs and policies tailored to young people in non-metropolitan areas.

While the difference in past year alcohol use was not statistically significant between non-metropolitan and metropolitan adolescents, rates are high among both populations. More than 1 in 5 adolescents reported past year alcohol use and nearly 1 in 10 adolescents reported alcohol use in the past 30 days. In assessing alcohol use behaviors, non-metropolitan adolescents reported binge and heavy alcohol use slightly more often than their metropolitan peers. Our [companion brief](#) found more statistically significant differences in alcohol use behaviors among non-metropolitan and metropolitan adults, notably in past 30-day binge drinking, with metropolitan adults much more likely to report this drinking behavior. While the differences among adolescents are not statistically significant, they warrant monitoring through further research, especially in light of other research that suggests overall rates of adolescent substance use (including alcohol) are declining.^{10,11} Further research could differentiate the change in alcohol use over time in non-metropolitan and metropolitan adolescents and identify any groups where alcohol use is not decreasing like the national average. These groups would then warrant specific, tailored intervention.

The only other statistically significant findings were in the illicit drugs category. Past year methamphetamine use was low for both metropolitan and non-metropolitan adolescents (0.2% and 0.3%, respectively), but the difference between the two groups is statistically significant. This finding mirrors the finding in our companion brief on adult risky substance use, which also found that non-metropolitan adults were statistically more likely to report past year methamphetamine use than their metropolitan peers. The existing literature specifically on methamphetamine use among adolescents is limited, suggesting the need for further research on the prevalence of adolescent methamphetamine use and how and when adolescents initiate methamphetamine use.

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