

ORIGINAL RESEARCH

Perceived ease of access to alcohol, tobacco and other substances in rural and urban US students

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ABSTRACT

Introduction: Ease of access to substances has been shown to have a direct and significant relationship with substance use for school-aged children. Previous research involving rural samples of middle and high school students reveals that perceived ease of access to substances is a significant predictor of recent use among rural adolescents; however, it is unclear if perceived access to substances varies between rural and urban areas. The purpose of the present study was to examine rural–urban differences in perceived ease of access to alcohol, smoking and chewing tobacco, marijuana, and seven other substances in the US state of Georgia in order to better inform and promote future substance use prevention and programming efforts in rural areas.

Methods: Data were analyzed from the 2013 Georgia Student Health Survey II, administered in all public and interested private/charter schools in the state of Georgia. A total of 513 909 students (18.2% rural) indicated their perceived ease of access to 11 substances on a four-point Likert-type scale. Rural–urban differences were investigated using χ^2 analysis.

Results: In general, it appeared the rural–urban differences fell along legal/illicit lines. For middle school students, a significant difference in perceived ease of access was found for each substance, with rural students reporting greater access to smoking tobacco, chewing tobacco, and steroids, and urban students reporting greater access to alcohol, marijuana, cocaine, inhalants, ecstasy, methamphetamine, hallucinogens, and prescription drugs. Rural high school students reported higher access to alcohol, smoking tobacco, chewing tobacco, and steroids, with urban students reporting higher access to marijuana, cocaine, inhalants, ecstasy, and hallucinogens. Perceptions of ease of access more than doubled for each substance in both geographies between middle and high school.

Conclusions: The present study found multiple and fairly consistent differences between rural and urban students' perceived ease of access to a variety of substances, with rural students reporting higher levels of access to legal substances and urban students reporting higher levels of access predominantly to illicit substances. Most troubling were the high levels of perceived access to



substances, particularly among high school students. Even within rural students who reported lower ease of access, more than half of students reported having at least somewhat easy access to marijuana. More than 60% of both rural and urban high school students reported easy access to alcohol. Future research should investigate ways to decrease the perceptions of access to substances in order to prevent use and abuse.

Key words: access, adolescents, alcohol, children, drugs, students, substance use, tobacco, USA.

Introduction

The National Center on Addiction and Substance Abuse¹ has identified adolescent substance use as one of the USA's top public health concerns, highlighting that, by the time they are in high school, three-quarters of students (approximately 10 million) have engaged in at least one form of substance use (smoked cigarettes, drank alcohol, and/or used illicit drugs), with almost half of students (6.1 million) being current users and one in eight (1.6 million) meeting diagnostic criteria for a substance use disorder. Given the high rates of substance use among youth, it appears that tobacco, alcohol, and other drugs may be readily available and easily accessible to many middle and high school students. In fact, the ease of access to tobacco, alcohol, and certain illicit drugs has been recognized as one of the main underlying causes of the current substance use epidemic among US youth¹⁻⁴, with adolescents' perceptions of the ease of access to alcohol, tobacco, and drugs being shown to significantly increase their risk for use^{1,5-14}.

To illustrate, data from the 2012 National Survey on Drug Use and Health⁴ reveals that, for adolescents aged 12–17 years, almost half (47.7%) indicate that marijuana is 'fairly or very easy to obtain', 25.5% indicated ease of access to cocaine, 15.8% to heroin, and 14.6% to lysergic acid diethylamide (LSD). Johnston and colleagues³ examined ease of access of substances by grades (8th, 10th, and 12th) using national data from the 2012 Monitoring the Future Survey and found that, by the 12th grade, 91% of students reported ease of access to alcohol, 81.6% to marijuana, and 29.8% to cocaine.

Given the magnitude of substance use behaviors and the perceived ease of access to alcohol, tobacco, and illicit drugs among middle and high school students, researchers have begun to explore sources of access and other factors that may impact ease of access to substances among students, in order to better inform prevention and intervention efforts. In terms of sources of access, research consistently demonstrates that the most reported source by which adolescents perceive that they could gain access to substances is through friends and/or social networks^{3,11,15-18}. Other factors that have been shown to increase adolescents' perceived ease of access include the adolescent's age (perceived ease of access increases with age³), the prevalence of the use (more widely used substances are perceived to be easier to access³), the physical availability of substances in one's community^{1,7,12,14,19,20} and the social availability of substances (perceptions of substance use norm, prevalence of use, and support for use amongst one's peers, parents, school, and community^{13,17,21}).

Given that geographic location (urban or rural) has been associated with distinct cultural factors that can have a significant impact on one's attitudes/beliefs, behavior, and experiences²²⁻²⁵, living in and attending school in an urban or rural area likely has a significant impact on adolescents' perceptions of the ease of access to alcohol, tobacco, and other drugs. Namely, in comparison to their rural counterparts, urban adolescents may perceive that illicit drugs are easier to access due to the higher prevalence of use and greater availability of these substances in large metropolitan areas (especially 'street drugs' such as marijuana, cocaine, ecstasy, and hallucinogens such as LSD²⁶⁻²⁸). In contrast, rural populations have been shown to have more relaxed attitudes and beliefs about adolescent alcohol



and tobacco use, especially when used at home and/or in social settings (they are more likely to supply adolescents with and/or not restrict access to alcohol and tobacco products²⁹⁻³²).

Due to the unique sociocultural aspects of rural living related to alcohol and tobacco use (eg higher adult prevalence, decreased access to care, isolation, loneliness, lack of recreation opportunities^{24,30}), it seems that rural youth likely experience greater risk for alcohol and tobacco use and may perceive alcohol and tobacco products as easier to access. In fact, research consistently demonstrates that, in comparison to urban youth, rural adolescents report higher levels of alcohol and tobacco use^{29,33-41}. Research involving rural samples of middle and high school students reveals that perceived ease of access to alcohol is a significant predictor of recent use among rural adolescents^{13,42,43}. Although this previous research provides useful information regarding the substance use behaviors and alcohol use risks that are associated with greater perceived ease of access among rural youth, further research that specifically explores rural–urban differences in adolescent substance use risk factors is essential for the promotion of much needed evidence-based education, prevention, and intervention efforts in rural areas.

More specifically, there is currently a dearth of quantitative research that specifically examines differences between rural and urban adolescents with regards to the perceived ease of access to alcohol, tobacco, and other substances, with only three known US-based studies available that examine rural–urban differences, all of which are limited in their applicability and/or generalizability to the current generation of rural youth. Edwards⁴⁴, using data that is now more than 20 years old (the 1993 and 1994 results of the American Drug and Alcohol Survey), found significant rural–urban differences in perceived ease of access for 9 out of 13 substances among 8th graders and 11 out of 13 among 12th graders. More specifically, no significant rural–urban differences in perceived ease of access to alcohol and cigarettes was found for both 8th and 12th grade samples (approximately 80% or higher of students across all samples indicated ease of access); however, for all of the significant

differences that emerged for both 8th and 12th grades, a greater percentage of urban students indicated ease of access in comparison to the rural students. To the best of the authors' knowledge, this is the only available study that examined rural–urban differences across alcohol, tobacco, and other drugs within the same study. More recently, Rothwell and Lamarque⁴⁵ conducted a series of focus groups with male adolescent tobacco users from rural and urban areas and, through qualitative analysis, found no differences with regards to adolescents' reports of ease of access to tobacco for both first time and regular use. Gibbons and colleagues⁴² explored rural–urban differences with regards to perceived ease of access to substances (three items assessing perceived ease of access to alcohol, tobacco, and drugs were combined into one index score) among a sample of African-American youth from rural and urban counties in Iowa and Georgia and found that the urban sample indicated greater perceived ease of access to substances in comparison to their rural counterparts.

Given these current limitations within the literature, the purpose of the current study was to examine rural–urban differences, stratified by school level (middle and high school; ages 11–18 years), in perceived ease of access to 11 different substances (alcohol, smoking tobacco, chewing tobacco, marijuana, cocaine, inhalants, steroids, ecstasy, methamphetamine, hallucinogens, and prescription drugs) in order to better inform and promote future substance use prevention and programming efforts in rural areas.

Methods

Participants

The Georgia Student Health Survey (GSHS) II was administered to grades 6–12 students in every public school and in interested private and charter schools in the state of Georgia, USA⁴⁶. Data were received by the research team upon request to the state's Department of Education. A total of 513 909 student responses were included in the current sample, with responses from 252 403 middle school students and 261 506 high school students. When considering rurality, 18.2% ($N=93\,782$) of the total sample



attended school in a rural county and 80.2% ($N=412\ 317$) attended school in an urban county.

Procedure

All middle and high school students (grades 6–12) attending public school in every Georgia county, in addition to students from private and charter schools that expressed interest in participating, were invited to complete the survey⁴⁶. Parental consent for participation was provided for each student through a passive consent process. All students whose parents did not object to them participating in the GSHS II and who wished to participate completed the anonymous survey on a computer during school hours⁴⁷. A validity check question inquiring into the use of a fictitious drug eliminated students who provided erroneous responses.

In any analysis of rurality, the choice of definition is a critical one. Due to the nature of the data, county-level definitions were required. There are numerous ways in which the USA's counties have been defined in terms of rurality; for the present study, each county was coded as either rural or urban using the rurality designations of the Health Resources and Services Administration (HRSA)⁴⁸. The classification was developed by HRSA's Office of Rural Health Policy, the unit of the US government tasked with coordinating activities related to rural health care nationwide. The Office of Rural Health Policy's rurality designations utilize a combination of the federal Office of Management and Budget definition (focused on core areas with less than 50 000 population) and Rural–Urban Community Area (RUCA) codes, which focus on the degree of metropolitan influence on rural areas. Full documentation can be seen on the Office of Rural Health Policy's website⁴⁸. Given that county was not provided for students attending charter schools in Georgia (all charter schools were combined to form one 'county' category in the dataset), these students were excluded from analysis.

Measures

Perceived ease of access to substances was assessed using the sentence stem 'It is easy to get ...' regarding 11 different

substances: alcohol, smoking tobacco, chewing tobacco, marijuana, cocaine, inhalants, steroids, ecstasy, methamphetamine, hallucinogens, and prescription medications that were not prescribed to the student. The survey also included street names and/or examples for each substance type. Students were asked to rate ease of access using a four-point Likert-type scale (1='strongly agree', 2='somewhat agree', 3='somewhat disagree', 4='strongly disagree'). To facilitate interpretation, responses were collapsed into two categories, combining 'strongly agree' and 'somewhat agree' into an 'easy to get' category and 'somewhat disagree' and 'strongly disagree' into a 'hard to get' category.

Data analysis

Odds ratios were calculated to compare perceived ease of access to each substance between rural and urban students. Analyses stratified into middle school (grades 6–8) and high school (grades 9–12) were conducted to allow for separate examination of each school level. Stratified analyses were chosen due to the previously demonstrated relationship between age and perceived access to substances³; by separately examining middle and high school students, conclusions regarding differences across broad age groups are possible. In addition, substance use prevention programs and interventions are likely to be implemented at the school level, and understanding any potential differences by school level may be beneficial in intervention planning.

Ethics approval

All relevant ethical safeguards were followed in relation to participant protection, and the project was reviewed by the institutional review boards of Georgia Southern University (H15174) and Mercer University (H1411314). All student survey data is anonymous and self-reported. Student race and gender have been redacted to safeguard the confidentiality of student data as required by the Federal Family Educational Rights and Privacy Act (FERPA) and other applicable state and federal laws and regulations.



Results

The results of the χ^2 analysis comparing rural and urban students' perceived ease of access to each substance are presented in Table 1. For middle school students, a significant difference in perceived ease of access was found for each substance, with rural students reporting greater access to predominantly 'legal' substances including smoking tobacco (odds ratio (OR)=1.12; $p<0.001$), chewing tobacco (OR=1.46; $p<0.001$), and steroids (OR=1.04; $p<0.05$), and urban students reporting greater access to alcohol (OR=0.94; $p<0.001$), marijuana (OR=0.87; $p<0.001$), cocaine (OR=0.95; $p<0.01$), inhalants (OR=0.89; $p<0.001$), ecstasy (OR=0.94; $p<0.001$), methamphetamine (OR=0.97; $p<0.05$), hallucinogens (OR=0.95; $p<0.01$), and prescription drugs (OR=0.93; $p<0.001$). The largest magnitudes of difference were found in access to chewing tobacco (with rural students 46% more likely to report ease of access) and for marijuana (with urban students 15% more likely than rural students to report ease of access).

These differences largely held the same for high school students, with the exception that significant differences were not found for methamphetamine or prescription drug access, and unlike middle school students, rural high school students reported a higher degree of access to alcohol. Overall, rural high school students reported higher access to 'legal' substances including alcohol (OR=1.04; $p<0.001$), smoking tobacco (OR=1.20; $p<0.001$), chewing tobacco (OR=1.51; $p<0.001$), and steroids (OR=1.08; $p<0.001$), with urban students reporting higher access to 'illegal' substances including marijuana (OR=0.75; $p<0.001$), cocaine (OR=0.97; $p<0.01$), inhalants (OR=0.97; $p<0.01$), ecstasy (OR=0.83; $p<0.001$), and hallucinogens (OR =0.86; $p<0.001$). As with middle school students, the largest magnitudes of difference were found for chewing tobacco (with rural students 51% more likely to report ease of access) and for marijuana (with urban students 33% more likely to report ease of access).

When comparing perceived ease of access between middle and high school students, stark differences emerged. For each substance investigated, and in both rural and urban areas, students reported twice the perceived ease of access in high school in comparison to middle school. For instance, while 26.5% of urban and 25.2% of rural middle school students indicated ease of access to alcohol, 60.4% of urban and 61.3% of rural high school students indicated ease of access. This pattern repeated for all 11 substances investigated.

Discussion

The present study's results suggest that differences in perceived ease of access to alcohol, tobacco, and other substances between rural and urban students may follow legal/illicit lines. For rural students, all instances of significantly higher reports of perceived access to substances were for 'legal' substances, namely alcohol (high school only), smoking tobacco, chewing tobacco, and steroids. For the most part, urban differences focused on illicit substances, including marijuana, cocaine, inhalants, ecstasy, methamphetamine (middle school only), and hallucinogens, although urban students also reported higher levels of perceived access to prescription drugs and alcohol (middle school only for both substances).

These patterns seem to mirror overall usage rates typically found between rural and urban areas, with children reporting higher access to tobacco in rural areas (known to have higher rates of tobacco use in adults⁴⁹). What is unclear, however, is what factors are driving the perceived ease of access. It could be that, particularly for the rural-focused alcohol and tobacco findings, students are more likely to see their parents or other family members engaging in use of those substances, thereby increasing perceived ease of access (if the substance is only as far away as the parent, it is likely thought to be easier to get). The authors have repeatedly heard rural community members discuss parents being too 'permissive' toward use, and been told of similar discussions by those working on rural substance abuse issues in other communities. This permissiveness could in turn increase rural youth's



perception of being able to easily access alcohol and/or tobacco use. Future research is needed to investigate the specific psychological, social, and cultural factors that lead a child to feel she or he has access to a substance; in particular, mixed-methods approaches that can better elicit the background behind the perception may be important in discovering the reasons behind the differences found (eg focus groups and one-on-one interviews that allow for a more in-depth examination of context and underlying factors). While decreasing actual ease of access is also important in combating youth substance use, the factors impacting actual access (eg poverty) may be much harder to modify. It could be that the factors increasing the perceptions of access may be more modifiable (eg visibility of substance use) and therefore present easier intervention targets. Previous studies of rural youth have shown a direct connection between perceptions of access and actual use of alcohol^{13,42,43}; therefore, it is likely that perceived access is a valuable potential intervention target. Regardless, future research should investigate innovative ways to assess both perceived and actual access, as well as the factors that influence both.

The fact that nearly every substance demonstrated a significant rural–urban difference in perceived access suggests that there potentially is an underlying difference in actual access to the investigated substances. This is supported by the fact that for smoking tobacco, chewing tobacco, marijuana, cocaine, inhalants, ecstasy, and hallucinogens, the significance and direction of access differences were consistent between middle and high school. Furthermore, only one substance (alcohol) had higher reported access in different groups across school levels. It is unclear why alcohol was the only substance where the difference switched directions between middle and high school – it could be that rural parents are more permissive toward alcohol use than urban parents, and these effects are felt more strongly in high school than middle school. It could also be that alcohol use prevention programs such as convenience store ID check monitoring are less prevalent in rural settings, which would be more likely to be experienced by high school students attempting to directly purchase alcohol. Both of these factors should be investigated

in future studies to see if such differences do exist, and may partially explain differences in perceived access.

The most alarming aspect of the study's findings is the significant jump in perceived ease of access found between middle and high school, both for rural and urban students. For each substance investigated, high school students were at least twice as likely to report having easy access, including more than half of students reporting easy access to alcohol, to smoking tobacco, and even to marijuana. Roughly 40% or more of high school students also reported it was easy to get chewing tobacco, inhalants, and prescription drugs. This strongly indicates that new models of substance use prevention should not only focus on modifying individual behaviors surrounding initiation and maintenance of use (eg avoiding situations of use, seeking out supportive friendships), but should also take into account systems-level factors that are increasing perceived access to substances (eg implementation and enforcement of laws and regulations, cultural norms). This is further supported by the rural–urban differences found, which inherently point to contextual factors directly influencing perceived access to substances.

The generalization of these findings is limited by the study's focus on a single state within the USA, and by the use of self-reported perceptions of ease of access. Comparable data are not available in other states, which precludes expansion of the study's included populations. While this does potentially limit generalizability, the comprehensive nature of the data (with more than 500 000 participants from all public schools in the state) strengthens the validity of the results for Georgia specifically and it is likely that the sociocultural processes impacting the differences demonstrated are similar at least for other states in the Deep South, if not beyond. Because of the nature of the question's wording, it is unknown if students had ever actually attempted to access the substances, which could also be informative for prevention efforts. Nevertheless, the study's focus on perceived ease of access has a high level of relevance, as people who feel a substance is less accessible are potentially less likely to seek it out for use in the first place (as supported by previous findings linking perceived access and actual use^{13,42,43}).



Table 1: Rural–urban differences in perceived ease of access to alcohol, tobacco, and other substances among middle and high school students in Georgia, USA

Substance	% of students who indicated 'somewhat agree' or 'strongly agree' that substance 'is easy to get' and OR values			
	Middle school		High school	
	Urban	Rural	Urban	Rural
Alcohol	26.5%	25.2%	60.4%	61.3%
	OR=0.94***		OR=1.04***	
Smoking tobacco	21.6%	23.6%	57.2%	61.4%
	OR=1.12***		OR=1.20***	
Chewing tobacco	16.5%	22.4%	49.5%	59.7%
	OR=1.46***		OR=1.51***	
Marijuana	17.6%	15.7%	58.7%	51.6%
	OR=0.87***		OR=0.75***	
Cocaine	10.0%	9.5%	24.0%	23.3%
	OR=0.95**		OR=0.97**	
Inhalants	17.8%	16.1%	40.5%	39.8%
	OR=0.89***		OR=0.97**	
Steroids	11.7%	12.0%	25.5%	26.9%
	OR=1.04*		OR=1.08***	
Ecstasy	8.9%	8.4%	27.0%	23.6%
	OR=0.94**		OR=0.83***	
Methamphetamine	9.5%	9.2%	21.1%	21.2%
	OR=0.97*		OR=1.00	
Hallucinogens	8.5%	8.1%	24.3%	21.6%
	OR=0.95**		OR=0.86***	
Prescription drugs	22.1%	21.0%	49.3%	49.0%
	OR=0.93***		OR=0.99	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
OR, odds ratio

The study is cross-sectional in nature, and the same findings may not be found at other points in time. Further, because of the very large sample size, there were some differences that, although statistically significant, may not have 'clinical' significance. However, there were still a number of differences that were substantial in nature (eg rural middle school students nearly half again as likely as their urban peers to perceive chewing tobacco as easy to access) and the authors believe still support the need to examine in particular which substances may need to be targeted for perceived ease of access interventions. Finally, information on gender and race/ethnicity were withheld in the dataset, which precluded analyses that incorporated these factors.

Conclusions

The present study found multiple and fairly consistent differences between rural and urban students' perceived ease

of access to a variety of substances, with rural students reporting higher levels of access to legal substances and urban students reporting higher levels of access predominantly to illicit substances. Most troubling were the high levels of perceived access to substances, particularly among high school students. Even within rural students who reported lower ease of access, more than half of students reported having at least somewhat easy access to marijuana. More than 60% of both rural and urban high school students reported easy access to alcohol. Future research should investigate ways to decrease both the perceptions of access, and actual access, to substances in order to prevent use and abuse.

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References

1. National Center on Addiction and Substance Abuse. *Adolescent substance use: America's #1 public health problem*. New York, NY: CASA, 2011.
2. Centers for Disease Control and Prevention. *Fact sheets – underage drinking*. (Online) 2014. Available: <http://www.cdc.gov/alcohol/fact-sheets/underage-drinking.htm> (Accessed 1 December 2014).
3. Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. *Monitoring the future: national results on adolescent drug use. Overview of key findings, 2009*. NIH publication no. 10-7583. Bethesda, MD: National Institutes of Health, 2010.
4. Substance Abuse and Mental Health Services Administration. *Results from the 2012 National Survey on Drug Use and Health: summary of national findings*, NSDUH Series H-46, HHS publication no. (SMA) 13-4795. Rockville, MD: SAMHSA, 2013.
5. Connell CM, Gilreath TD, Aclin WM, Brex RA. Social-ecological influences on patterns of substance use among non-metropolitan high school students. *American Journal of Community Psychology* 2010; **45(1-2)**: 36-48.
6. Doubeni CA, Li W, Fouayzi H, DiFranza JR. Perceived accessibility as a predictor of youth smoking. *Annals of Family Medicine* 2008; **6(4)**: 323-330.
7. Duncan DT, Palamar JJ, Williams JH. Perceived neighborhood illicit drug selling, peer illicit drug disapproval and illicit drug use among U.S. high school seniors. *Substance Abuse Treatment, Prevention, and Policy* 2014; **9(1)**: 35.
8. Johnston LD, O'Malley PM, Terry-McElrath YM. Methods, locations, and ease of cigarette access for American youth, 1997–2002. *American Journal of Preventive Medicine* 2004; **27(4)**: 267-276.
9. Komro KA, Maldonado-Molina MM, Tobler AL, Bonds JR, Muller KE. Effects of home access and availability of alcohol on young adolescents' alcohol use. *Addiction* 2007; **102(10)**: 1597-1608.
10. Resnick MD, Bearman PS, Blum RW, Bauman KE, Harris KM, Jones J, et al. Protecting adolescents from harm: findings from the National Longitudinal Study on Adolescent Health. *JAMA* 1997; **278(10)**: 823-832.
11. Steen JA. A multilevel study of the role of environment in adolescent substance use. *Journal of Child and Adolescent Substance Abuse* 2010; **19(5)**: 359-371.
12. Kuntsche E, Kuendig H, Gmel G. Alcohol outlet density, perceived availability and adolescent alcohol use: a multilevel structural equation model. *Journal of Epidemiology & Community Health* 2008; **62(9)**: 811-816.
13. Stanley LR, Henry KL, Swaim RC. Physical, social, and perceived availabilities of alcohol and last month alcohol use in rural and small urban communities. *Journal of Youth and Adolescence* 2010; **40(9)**: 1203-1214.
14. Treno AJ, Ponicki WR, Remer LG, Gruenewald PJ. Alcohol outlets, youth drinking, and self-reported ease of access to alcohol: a constraints and opportunities approach. *Alcoholism: Clinical & Experimental Research* 2008; **32(8)**: 1372-1379.
15. National Center on Addiction and Substance Abuse. *National survey of American attitudes on substance abuse XIV: teens and parents*. New York: CASA, 2009.
16. Forster J, Chen V, Blaine T, Perry C, Toomey T. Social exchange of cigarettes by youth. *Tobacco Control* 2003; **12(2)**: 148-154.



17. Harrison PA, Fulkerson JA, Park E. The relative importance of social versus commercial sources in youth access to tobacco, alcohol, and other drugs. *Preventive Medicine* 2000; **31(1)**: 39-48.
18. Miller-Day MA, Alberts J, Hecht ML, Trost MR, Krizek RL. *Adolescent relationships and drug use*. New York, NY: Psychology Press, 2014.
19. Mann RE. Availability as a law of addiction. *Addiction* 2005; **100**: 924-925.
20. Truong KD, Sturm R. Alcohol environments and disparities in exposure associated with adolescent drinking in California. *American Journal of Public Health* 2009; **99**: 264-270.
21. Lipperman-Kreda S, Grube JW, Paschall MJ. Community norms, enforcement of minimum legal drinking age laws, personal beliefs and underage drinking: an explanatory model. *Journal of Community Health* 2010; **35**: 249-257.
22. Hart LG, Larson EH, Lishner DM. Rural definitions for health policy and research. *American Journal of Public Health* 2005; **95**: 1149-1155.
23. Hartley D. Rural health disparities, population health, and rural culture. *American Journal of Public Health* 2004; **94(10)**: 1675.
24. Smalley KB, Warren JC. Rurality as a diversity issue. In: KB Smalley, JC Warren, JP Rainer, Eds. *Rural mental health: issues, policies, and best practices*. New York, NY: Springer, 2012; 37-48.
25. Turley AC. *Urban culture: exploring cities and cultures*. Upper Saddle River, NJ: Prentice Hall, 2005.
26. Freisthler B, Gruenewald PJ, Johnson FW, Treno AJ, Lascola EA. An exploratory study examining the spatial dynamics of illicit drug availability and rates of drug use. *Journal of Drug Education* 2005; **35(1)**: 15-27.
27. National Drug Intelligence Center. *National drug threat assessment*. (Online) 2011. Available: <http://www.justice.gov/archive/ndic/pubs44/44849/44849p.pdf> (Accessed 1 December 2014).
28. US Department of Health and Human Services. *2001 National household survey on drug abuse*. (Online) 2002. Available: <http://www.oas.samhsa.gov/nhsda/2k1nhsda/vol1/toc.htm> (Accessed 1 December 2014).
29. Gale JA, Lenardson JD, Lambert D, Hartley D. *Adolescent alcohol use: do risk and protective factors explain rural-urban differences?* Portland, ME: Maine Rural Health Research Center (Working Paper #48), 2012.
30. Lenardson JD, Hartley D, Gale JA, Pearson KB. Substance use and abuse in rural America. In: JC Warren, KB Smalley, Eds. *Rural public health*. New York: Springer Publishing Company, 2014; 95-114.
31. Meyer MG, Toborg MA, Denham SA, Mande MJ. Cultural perspectives concerning adolescent use of tobacco and alcohol in the Appalachian Mountain region. *Journal of Rural Health* 2008; **24(1)**: 67-74.
32. Pettigrew J, Miller-Day M, Krieger J, Hecht ML. The rural context of illicit substance offers: a study of Appalachian rural adolescents. *Journal of Adolescent Research* 2012; **27(4)**: 523-550.
33. Atav S, Spencer GA. Health risk behaviors among adolescents attending rural, suburban, and urban schools: a comparative study. *Family & Community Health* 2002; **25(2)**: 53-64.
34. Botvin GJ, Malgady RG, Griffin KW, Scheier LM, Epstein JA. Alcohol and marijuana use among rural youth: interaction of social and intrapersonal influences. *Addictive Behaviors* 1998; **23(3)**: 379-387.
35. Coomber K, Toumbourou JW, Miller P, Staiger PK, Hemphill SA, Catalano RF. Rural adolescent alcohol, tobacco, and illicit drug use: a comparison of students in Victoria, Australia, and Washington State, United States. *Journal of Rural Health* 2011; **27(4)**: 409-415.
36. Gfroerer JC, Larson SL, Colliver JD. Drug use patterns and trends in rural communities. *Journal of Rural Health* 2007; **23(s1)**: 10-15.



37. Hanson CL, Novilla MLL, Barnes MD, Eggett D, McKell C, Reichman P, Havens M. Using the rural–urban continuum to explore adolescent alcohol, tobacco, and other drug use in Montana. *Journal of Child & Adolescent Substance Abuse* 2008; **18(1)**: 93-105.
38. Hartley D. *Substance abuse among rural youth: a little meth and a lot of booze*. Research & Policy Brief No. 35A. Portland, ME: University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center, 2007.
39. Lambert D, Gale JA, Hartley D. Substance abuse by youth and young adults in rural America. *Journal of Rural Health* 2008; **24(3)**: 221-228.
40. Maxwell JC, Tackett-Gibson M, Dyer J. Substance use in urban and rural Texas school districts. *Drugs: Education, Prevention, and Policy* 2006; **13(4)**: 327-339.
41. Mink M, Wang JY, Bennett KJ, Moore CG, Powell MP, Probst JC. Early alcohol use, rural residence, and adult employment. *Journal of Studies on Alcohol and Drugs* 2008; **69(2)**: 266.
42. Gibbons FX, Reimer RA, Gerrard M, Yeh HC, Houlihan AE, Cutrona C, et al. Rural–urban differences in substance use among African-American adolescents. *Journal of Rural Health* 2007; **23(s1)**: 22-28.
43. Vicary JR, Snyder AR, Henry KL. The effects of family variables and personal competencies on the initiation of alcohol use by rural seventh grade students. *Adolescent & Family Health* 2000; **1(1)**: 21-28.
44. Edwards RW. Drug and alcohol use among youth in rural communities. *NIDA Research Monograph* 1997; **168**: 53-78.
45. Rothwell E, Lamarque J. The use of focus groups to compare tobacco attitudes and behaviors between youth in urban and rural settings. *Health Promotion Practice* 2011; **12(4)**: 551-560.
46. Georgia Department of Education. *Georgia Student Health Survey II*. (Online) 2014. Available: <http://www.gadoe.org/curriculum-instruction-and-assessment/curriculum-and-instruction/gshs-ii/Pages/Georgia-Student-Health-Survey-II.aspx> (Accessed 1 December 2014).
47. Goldammer L, Swahn MH, Strasser SM, Ashby JS, Meyers J. An examination of bullying in Georgia schools: demographic and school climate factors associated with willingness to intervene in bullying situations. *Western Journal of Emergency Medicine* 2013; **14(4)**: 324-328.
48. Health Resources and Services Administration Office of Rural Health Policy. *List of rural counties and designated eligible census tracts in metropolitan counties*. (Online) 2013. Available: <ftp://ftp.hrsa.gov/ruralhealth/Eligibility2005.pdf> (Accessed 1 December 2014).
49. American Lung Association. *Cutting tobacco's rural roots: tobacco use in rural communities*. (Online) 2012 Available: <http://www.lung.org/associations/states/california/advocacy/fight-/cutting-tobaccos-rural-roots.html> (Accessed 1 December 2014).