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Rural Opioid Abuse: Prevalence and User Characteristics

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INTRODUCTION

This study examined the prevalence of non-medical use of pain relievers and heroin in the past year in rural and urban areas and the socio-demographic and economic characteristics associated with their use. Additionally, we examined opioid use by age at first use as well as dependence and abuse; treatment history and perceived need for treatment; use of alcohol and other drugs; perceived risk of using drugs and availability of drugs; problems resulting from the use of drugs; driving under the influence; and illegal activities and arrest records. Consistent with current usage, the term "opioid" in this policy brief refers to all opioids and opiates and we jointly refer to non-medical use of pain relievers and heroin as opioid use.

BACKGROUND

Extent of the Problem. Opioid abuse is the fastest growing substance abuse problem in the nation[1] and the primary cause of unintentional drug overdose deaths.[2] Between 2005 and 2011, non-medical use of pain relievers among persons age 12 and over was higher in urban counties than rural[3] and this trend continued into 2011-12 among adults, even when holding demographic characteristics, perceived risk, and consequence variables constant.[4] However, multiple studies document a higher prevalence rate among specific vulnerable rural populations, particularly among youth,[5,6] women who are pregnant[7] or experiencing partner violence,[8] and persons with co-occurring disorders.[9] Likewise, heroin use has grown significantly in recent years, particularly among those reporting non-medical use of opioid pain relievers prior to initiating heroin.[10,11] Heroin initiation is 19 times higher among those who reported prior non-medical pain reliever use compared to those who have not.[12]

Consequences. Opioid use and abuse has serious consequences for individuals and communities. Non-medical pain reliever users are at high risk for overdose-related death, long-term health impacts, and illegal activities. Of the nearly 23,000 deaths related to pharmaceutical overdose in 2013, over 70% were related to opioid pain relievers.[2,13] Between 2000 and 2014, the U.S. experienced a 200% increase in the rate of overdose deaths attributable to non-

Key Findings

Although the prevalence of non-medical pain reliever and heroin use in the past year was slightly higher among urban persons than rural, the magnitude of the difference was small.

Rural opioid users were more likely to have socio-economic vulnerabilities that might put them at risk of adverse outcomes, including limited educational attainment, poor health status, being uninsured, and low-income.

Rural heroin users — especially men and those in poor health — were less likely than urban to say there was a great risk in trying heroin only once or twice.

Compared to urban, rural opioid users were more likely to have ever been arrested and booked for breaking the law and to have been on probation in the past year.

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medical pain relievers and heroin, with several predominantly rural states experiencing the highest rates (e.g., Kentucky. New Hampshire, New Mexico, and West Virginia,).[14,15] Prescription opioid overdoses explained half of the substantial increase in the death rate for non-Hispanic white women ages 15 to 54—a typically healthy cohort—between 1999 and 2011.[16] Emergency department visits doubled between 2004 and 2008 for opioid abuse, while substance abuse treatment program admissions grew 400% between 1998 and 2008, with pain relievers the second most commonly abused substance after marijuana.[17] Additionally, non-medical prescription drug use was associated with social and health consequences among rural adolescents such as dropping out of school, poor health status, and having a major depressive episode.[5]

Sources for Opioids. Though not specific to rural communities, diversion of prescriptions is the primary source of prescription drugs intended for misuse. Among those who misuse prescription pain relievers, 75% obtained the drugs from someone else who had a prescription.[18] In a national survey of opioid treatment program clients, diverted medications primarily came from drug dealers (48%), prescriptions from a physician (25%), sharing and trading (20%), and theft (less than 5%).[19] Illegitimate internet-based pharmacies are another source of opioids, which allow the purchase of opioid medications without a prescription, contact with a physician, or knowledge of a person's medical history. To date, it is unclear how widespread these pharmacies are.[20] For rural youth, school, unsupervised parties, and older relatives including parents were sources for alcohol and illegal substances, though not opioids specifically.[21]

Risk Factors. Use of other illicit drugs or alcohol abuse is a risk factor for non-medical use of pain relievers among rural and other substance users.[8,22,23] Additionally, depression and intimate partner violence are also risk factors for non-medical use of opioids among rural persons.[8,9,22] Among rural adolescents, ever having used prescription drugs non-medically was associated with having one or more major depressive episode, living with a single parent, and use of other illicit drugs and alcohol[5] as well as peer use of prescription drugs.[24] Poverty, fewer local resources, higher disability rates, and co-morbidities may be related to greater consumption of long-acting opioids in distressed areas of Appalachian Kentucky that had higher rates of controlled–release oxycodone prescription claims compared to other regions of the state.[25] Treatment for pain and addiction was also associated with non-medical pain reliever use.[19,26,27]

APPROACH

Data Source. The National Survey of Drug Use and Health (NSDUH) is sponsored by the Substance Abuse and Mental Health Services Administration (SAMSHA) and provides annual measures of prevalence and correlates of drug use in the United States. We used the public-use file, which uses confidentiality procedures to reduce its sample size to approximately 56,000 respondents annually. To assure stable estimates for subpopulations, we linked six years of data: 2008-2013.

Variables. To evaluate the prevalence of opioid abuse and the characteristics of rural and urban persons who used opioids in the past year, our dependent variable was non-medical use of pain relievers or use of heroin in the past year, collectively referred to as opioids. The primary independent variable was rural or urban residence. As of 2008, the NSDUH includes the U.S. Office of Management and Budget (OMB)'s metropolitan and non-metropolitan designation. We used metropolitan to indicate an urban county and non-metropolitan to indicate a rural county. Demographic and economic information included age, sex, race and ethnicity, health status, educational attainment, marital status, military service, employment status, health insurance, and family income.

Analysis. At the bivariate level, we used chi-square tests to compare the rural-urban prevalence and characteristics of opioid users in the past year. We used multivariate logistic regression models to estimate: 1) the odds of opioid use in the past year among persons ages 12 and older; and 2) the odds of opioid use in the past year among rural persons ages 12 and older. Results are presented as odds ratios with 95 percent confidence intervals. All statistical tests were completed in SUDAAN version 11 to adjust for clustering and to yield valid standard errors for weighted data.

FINDINGS

Prevalence of opioid use. Between 2008-13, 4.7% of U.S. residents over the age of 12 had used opioids non-medically in the past year. Past year use of opioids was higher in urban counties than rural; however, the magnitude of the difference was small (4.8% in urban counties vs. 4.4% in rural counties). Less than 1% of our sample met the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria for non-medical pain reliever or heroin dependency or abuse and there was no difference in dependency prevalence between residents of rural and urban counties. Mean age at

first use—23 years—did not vary between rural and urban residents.

Rural residents with certain sociodemographic characteristics had higher prevalence of opioid use in the past year than the overall prevalence of 4.4%. Nearly 8% of rural youth ages 12-19 and 9.5% of rural young adults ages 20-29 had used opioids in the past year compared to nearly 5% of rural adults ages 30-49 and 1.5% of rural adults ages 50 and over. Other rural groups at risk of opioid use in the past year were males, those with less than a high school education, those who had never served in the military, the uninsured, and those with low-income.

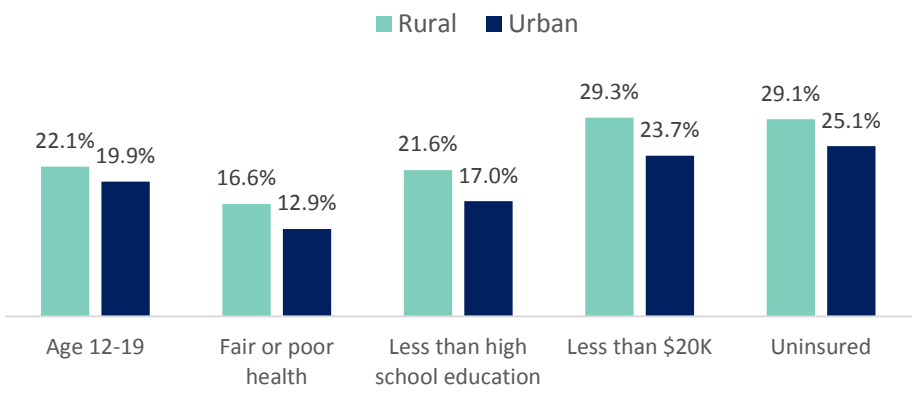
Sociodemographic variation among past year opioid users. Compared to urban persons, rural persons over age 12 who used opioids in the past year were more likely to be under age 20, in fair or poor health, to have low educational attainment, to have low-income, and to have public insurance or no insurance (Figure 1). Rural persons who used opioids in the past year were also more likely than urban to be white, unemployed, and to be married. These qualities reflect the general characteristics of rural residents who have been found in past research more likely than urban to have poorer health status, low-income, public insurance, or no health insurance[28] as well as lower educational attainment.[29]

Compared with rural persons who did not use opioids, rural opioid users demonstrated multiple vulnerabilities (Figure 2). Rural opioid users were more likely to be under the age of 20, to have low educational attainment, to be unmarried, to have low family income, and to be uninsured. Also among rural residents, opioid users were less likely to have ever served in the U.S. armed forces compared to non-opioid users (6.8% vs. 12.8%). Rural opioid users were more likely to be male than rural non-users (54.9% vs. 48%).

Treatment. Among those who had used opioids in the past year, 19.5% had ever received treatment for drug or alcohol addiction and this did not vary by rural-urban residence. Likewise, there was no difference between rural and urban opioid users in receiving alcohol or drug treatment in the past year (8.5% vs. 8.7% respectively) or among persons who felt they needed drug treatment in the past year (3.2% vs. 2.7%). Among those opioid users who felt they needed treatment in the past year, the most common reason why treatment had not been obtained was that the person was not ready to stop using or felt they could handle the problem on their own (35.1%). Additionally, opioid users were likely to go without treatment as a result of cost (21.1%) and the negative impacts of treatment on their job and time (16.6%). None of these results varied by rural or urban residence.

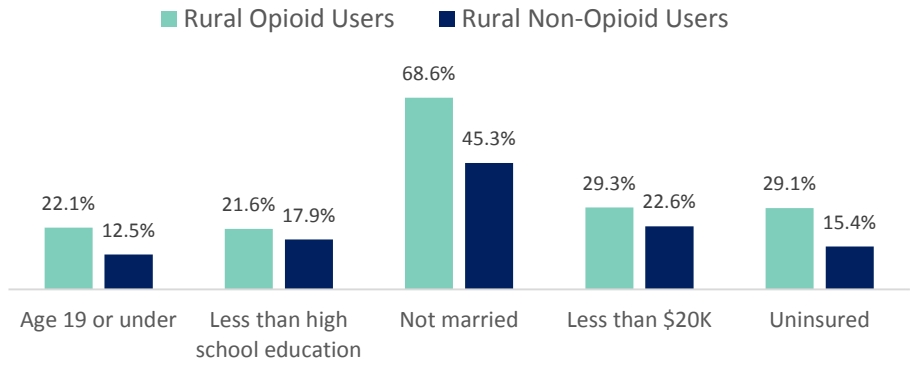
Among those who had used heroin in the past year, rural persons were less likely than urban to have received their last or most current opioid treatment

Figure 1. Rural Persons Who Used Opioids in the Past Year Are More Likely to Have Socio-Demographic Vulnerabilities Than Urban Persons



Data: National Survey of Drug Use and Health, 2008-13.
Residence differences significant at p<.001

Figure 2. Rural Past Year Opioid Users Are More Likely to Have Socio-Demographic Vulnerabilities Than Rural Persons Who Were Not Opioid Users



Data: National Survey of Drug Use and Health, 2008-13.
Differences between opioid users and non opioid users significant at p<.001

for heroin use (20.4% vs. 35.3%). There was no rural-urban difference in receipt of last or most current treatment for pain reliever use.

Use of alcohol and other drugs. Alcohol, marijuana, and other illicit drug use is common among all opioid users. About half of all opioid users have also used marijuana at least once in the past year, regardless of residence. Binge drinking and heavy drinking were more prevalent among opioid users in urban counties, though the magnitude of the difference was small. For example, 20% of rural opioid users reported heavy drinking compared to 22.6% of urban opioid users. Urban opioid users were more likely to report that they had used one or more of six illicit drugs (cocaine, crack, ecstasy, PCP, hallucinogens, or inhalants) in the past year compared to rural opioid users (28% vs. 23.4%).

Obtaining pain relievers. Among those who had used pain relievers non-medically in the past year, there was no significant difference between rural and urban persons in source for obtaining pain relievers for their last non-medical use. Regardless of residence, friends and relatives (69.6%) were the primary source of pain relievers for non-medical use, followed by one or more doctors (21%), drug dealers (4.3%), internet/other (4.3%), and fake prescription/theft from a provider (0.8%). Rural heroin users were more likely to indicate that it was difficult to obtain heroin compared to urban (27.8% vs. 18.3%). Rural heroin users were less likely than urban to say there was a great risk in trying heroin only once or twice (41% vs. 54.4%); in particular, those rural persons who were male or in fair or poor health were less likely to perceive a great risk.

Negative behaviors. Rural opioid users were more likely to have ever been arrested and booked for breaking the law than urban (42.5% vs. 36.1%) and rural opioid users were also more likely to have been on probation in the past year (10.6% vs. 8.2%) (Figure 3). Regardless of residence, a large proportion of persons who had used opioids in the past year had also driven under the influence of illicit drugs or alcohol (43.1%).

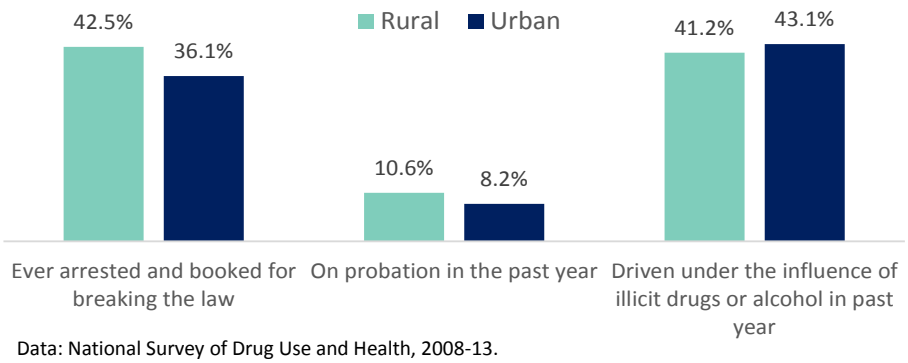
Factors associated with differences in prevalence of past year opioid use. Our multivariate models supported bivariate findings that rural persons were slightly less likely to have used opioids in the past year. As shown in Table 1, rural persons were about 20% less likely to have used opioids in the past year than urban, controlling for other socioeconomic factors (OR: 0.81; CI: 0.74, 0.88). Compared to adults ages 30-49, adolescents ages 12-19 and young adults between ages 20-29 were over 70% more likely to use opioids in the past year. Adults 50 and over had the lowest odds of using opioids in the past year. Males were 30% more likely than females to have used opioids in the past year. White, not Hispanic persons had 81% higher odds of using opioids in the past year compared to not white, not Hispanic persons and Hispanic persons. Persons with socioeconomic vulnerabilities—poor health status, low educational attainment, the uninsured, and those with very low income (under $20,000)—had higher odds of past year opioid use, compared to their less vulnerable counterparts. Being married was associated with lower odds of past-year opioid

use (OR: 0.59; CI: 0.53, 0.64). Interactions between rural-urban residence and age, insurance status, and employment showed no signficant differences.

Including only rural persons in a second model of past year opioid use, we again find that rural persons younger than 30 had higher odds of opioid use than rural persons age 30 and over (Table 2). Rural adolescents were nearly twice as likely as a rural adult ages 30-49 to have used opioids (OR: 1.95; CI: 1.56, 2.45), while rural young adults ages 20-29 had nearly 70% higher odds of past year opioid use (OR: 1.69; CI: 1.43, 2.00). Being married was protective against opioid use, with married rural persons having 39% reduced odds of past year use. The rural uninsured had 58% higher odds of having used opioids in the past year.

Limitations. Despite our use of six years of data, we did not have adequate sample size to examine rural-urban prevalence of non-medical use of pain relievers and heroin use separately. Additionally, using the public-use file with its reduced sample size may have impacted our findings given that opioid use is a low prevalence activity and it also precluded examination of more nuanced measures of rural or urban residency. The NSDUH relies on self-reported data, which is subject to gaps in respondent recall. The survey asked about non-medical use of pain relievers and heroin use, both illegal activities, which may have raised respondents' concerns for preserving their confidentiality. During sensitive segments of the interview, the survey uses headphones and pre-recorded questions that allowed respondents to directly key their answers into a computer without interviewers knowing how they were answering, a technique that may have helped to encourage accurate responses. The NSDUH excludes institutionalized persons (e.g., those in prison or hospitalized) from participation. This may affect prevalence estimates data if drug use estimates for the general population differ from those of the institutionalized population, which may be likely for rarely used drugs such as heroin.[18] The NSDUH does not include data on the respondent's region of residence and we know from previous research that prescription drugs are more likely to be misused in the West and South compared to the Midwest and Northeast.[30]

Figure 3. Rural Opioid Users More Likely to Be Involved with Law Enforcement



Data: National Survey of Drug Use and Health, 2008-13.
Ever arrested and on probation residence differences significant at $p \leq .01$.

DISCUSSION

Prevalence of past-year opioid use in rural counties remains somewhat lower than in urban counties. However, compared with urban opioid users, rural users demonstrate multiple socio-economic vulnerabilities that may negatively impact their ability to seek treatment and recover. We found higher past-year use rates among specific rural sub-populations, including those who were young, unmarried, with low educational attainment, no insurance coverage, and low-income, corroborating findings from other studies.[13] These characteristics could make it more difficult for a rural patient to seek and complete substance abuse treatment given the difficulties inherent in accessing specialized care from a remote location. Additionally, this epidemic targets young men with limited attachments to a spouse and employment – evidence that victims

of opioid use and abuse have limited attachment to the supports that might positively influence treatment outcomes.

Regardless of residence, diversion was the most common source of pain relievers for last non-medical use, a finding supported in the literature.[13,24] Rural opioid users more commonly identified involvement with law enforcement than did urban opioid users, though we do not know whether this relationship relates to their use of opioids. It may be that the socioeconomic characteristics more prevalent among rural opioid users also influence negative social behavior.

Importantly, rural heroin users were less likely to perceive a great risk in trying heroin compared to urban, a difference that could mean rural persons are more likely to try substance use. It will be important to target prevention to rural men and those in fair or poor health who were particularly likely to see heroin use as not a serious risk as well as rural youth and young adults who have high prevalence rates.

In a companion study in which we interviewed state substance abuse and law enforcement officials in four rural states, we found that the type of opioid use varies across communities. In some rural communities, problems are driven primarily by the misuse of prescription opioids while in others problems are driven by the growing heroin trade. This suggests the need for future research to track the different pathways of opioid use with data that distinguish between non-medical use of pain relievers and heroin.[31]

Although past-year rural opioid use is somewhat lower than in urban places, the impact on rural communities is substantial. Rural opioid users report greater interaction with the criminal justice system, both in terms of arrest and probation. While we find no significant differences in self-reported use of treatment, rural heroin users were less likely than urban to have received treatment for heroin use. This may reflect the limited availability of nearby treatment services and providers, continued recovery services, and prevention programs that are specific to opioid abuse. In 2011, nearly all opioid treatment programs (OTPs – programs that use methadone and other medications to treat heroin and other opiate addictions) were located in urban areas.[32] Patients who lived in low or moderately populated counties traveled longer distances to an OTP than patients in more densely populated counties,[33] which may deter rural patients from seeking or completing treatment since opioid treatments are typically dispensed on a daily basis.[34] Additionally, the vast majority (90.4%) of office-based physicians with a Drug Enforcement Administration waiver to prescribe buprenorphine-naloxone to treat opioid use disorder practice in urban counties, leaving most rural counties without a waivered physician.[35]

Enhanced Federal support for training to health care professionals on proper opioid prescribing, combined with better supported medication-assisted treatment for opioid use in the primary care setting could be especially helpful in rural areas. Other suggested directions to combat persistent treatment shortages specifically targeting rural places include sustained-release formulations for opioid treatment medications and the delivery of psychosocial support, education, and adherence monitoring through mobile health platforms.[36]

Endnotes

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Table 1. Estimated Odds Ratios from a Logistic Regression of Past Year Opioid Use by Residence, 2008-13

Characteristic (Referent)	Opioid Use in the Past Year	
	Odds Ratios	Confidence Interval
Residence (Urban)		
Rural	0.81 [c]	0.74, 0.88
Age (30-49)		
12-19	1.75 [c]	1.62, 1.90
20-29	1.72 [c]	1.61, 1.84
50+	0.31 [c]	0.28, 0.36
Sex (Female)		
Male	1.30 [c]	1.21, 1.39
Race/Ethnicity (Hispanic)		
White, Not Hispanic	1.81 [c]	1.62, 2.02
Not White, Not Hispanic	0.95	0.83, 1.10
Health status (Excellent/VG/Good)		
Fair/Poor	1.48 [c]	1.32, 1.67
Educational attainment (College graduate)		
Less than high school	1.44 [c]	1.30, 1.60
High school, some college	1.32 [c]	1.21, 1.43
Marital status (Not married)		
Married	0.59 [c]	0.53, 0.64
Employment status (Employed)		
Unemployed	1.02	0.94, 1.11
Health insurance (Private Coverage)		
Public Coverage	0.93	0.83, 1.03
Uninsured	1.35 [c]	1.25, 1.44
Family income ($75K or more)		
Less than $20K	1.14 [b]	1.04, 1.25
$20K - $49K	1.06	0.97, 1.16
$50K - $74,900	1.00	0.91, 1.10

Data: National Survey of Drug Use and Health, 2008-13. Residence differences significant at [a] $p \leq .05$; [b] $p \leq .01$; [c] $p \leq .001$. Statistics are weighted to population level using weights provided with the NSDUH. Sample size is unweighted. Odds ratios significant at [a] $p \leq .05$; [b] $p \leq .01$; [c] $p \leq .001$.

Table 2. Estimated Odds Ratios from a Logistic Regression of Past Year Opioid Use for Rural Opioid Users Only, 2008-13

Characteristic (Referent)	Rural Opioid Use in the Past Year	
	Odds Ratios	Confidence Interval
Age (30-49)		
12-19	1.95 [c]	1.56, 2.45
20-29	1.69 [c]	1.43, 2.00
50+	0.26 [c]	0.19, 0.36
Sex (Female)		
Male	1.34 [c]	1.13, 1.60
Race/Ethnicity (Hispanic)		
White, Not Hispanic	1.17	0.79, 1.73
Not White, Not Hispanic	0.82	0.55, 1.21
Health status (Excellent/VG/Good)		
Fair/Poor	1.50 [c]	1.25, 1.80
Educational attainment (College graduate)		
Less than high school	0.99	0.72, 1.37
High school, some college	0.97	0.74, 1.27
Marital status (Not married)		
Married	0.60 [c]	0.51, 0.70
Employment status (Employed)		
Unemployed	1.13	0.97, 1.32
Health insurance (Private Coverage)		
Public Coverage	1.15	0.94, 1.41
Uninsured	1.58 [c]	1.26, 1.98
Family income ($75K or more)		
Less than $20K	1.07	0.84, 1.37
$20K - $49K	1.11	0.88, 1.39
$50K - $74,900	1.07	0.81, 1.40

Data: National Survey of Drug Use and Health, 2008-13. Residence differences significant at [a] $p \leq .05$; [b] $p \leq .01$; [c] $p \leq .001$. Statistics are weighted to population level using weights provided with the NSDUH. Sample size is unweighted. Odds ratios significant at [a] $p \leq .05$; [b] $p \leq .01$; [c] $p \leq .001$.

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