Opioid Use Disorder in the Nonmetro Regions: Some Basic Facts from the 2018 National Survey on Drug Use and Health (NSDUH)

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Abstract

This paper highlights opioid misuse behavior among rural or nonmetro residents using micro data from the recently released 2018 NSDUH. Compared to the urban population, rural residents are 87% more likely to be prescribed opioids, and the overdose death rate driven mostly by prescription opioids has been trending higher in nonmetro regions since 2004. To tackle the opioid epidemic, communities need an accurate assessment of what is happening on the ground, assessing what intervention is working, and what is not. This report describes the happenings on the ground. A multi-variable, contingency table analysis of individual responses to NSDUH reveals that the nonmetro region is home to 1.53 million of opioid misusers of which 52% are either unemployed, not in the labor force, or less than 18 years of age. A person's employment and health status are the context for the misuse. White-collar, salaried social group misuses opioids the most.

Keywords: Cross tabulation, Nonmetro, NSDUH, Opioid, Social Class

1.0. Introduction

This paper deals with misuse of prescription pain relievers that contain opioid, or the use of heroin, in nonmetro regions of the nation; prescription pain relievers include hydrocodone, oxycodone, and morphine[2]. In a recent review article on opioid epidemic, Singh et al (2019) claim that during 1999-2017 drug overdose mortality increased among all age and ethnic groups; the per-year increases in drug overdose mortality are: 7.6% among non-Hispanic whites, 3.6% for African Americans, and 3.3% for Hispanics. The mortality rate was higher for women. Geographically, both the metro and the nonmetro regions in New England registered the highest drug-overdose mortality rates.

The correlates of opioid related morbidity, and prevalence of prescription opioids, include structural factors such as lack of economic opportunities, and demographic factors such as gender and age (see for example, Dasgupta, Beletsky, and Ciccarone (2018); Keyes et al (2014)). In the following pages, we use the structure of a

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[2] See https://www.cdc.gov/drugoverdose/opioids/index.html for more information about prescription opioids.

'behavioral model of man' (Mowrer and Klien, 2000) to summarize the findings from the 2018 National Survey on Drug Use and Health[3].

2.0. **Conceptual Framework**

Behavior is learned, acquired through reinforcement, it means some activity could be rewarded, or punished. The propositions involved in the learning of behavior may be stated as follows:

> P_1: Behavior (R) is acquired, maintained, or weekend by contingent stimuli which follow it.

P_1 states that the presentation of reinforcing stimuli (S^+) or the removal of aversive stimuli (S^-) increases the probability that the action will be repeated. Similarly, punishment, which involves the presentation of aversive stimuli or removal of reinforcing stimuli, decreases the probability of action.

> P_2: The effectiveness of a contingent stimulus depends on a person's state variables (SV), the conditions of deprivation and satiation.

P_2 suggests that deprivation makes reinforcing stimuli effective by their capacity to reduce this state. In a multicultural society with many different subcultures and values, the population is expected to be subject to a variety of learned or secondary deprivations, for example, food preference.

> P_3: The elements of the context in whose presence an action was reinforced will become the occasions for response, labeled discriminative stimuli S^D.

The implication of P3 for the presence of aversive stimuli or removal of reinforcing stimuli can be stated thus: the probability of the action being repeated in that context declines.

2.1. Opioid Use Disorder

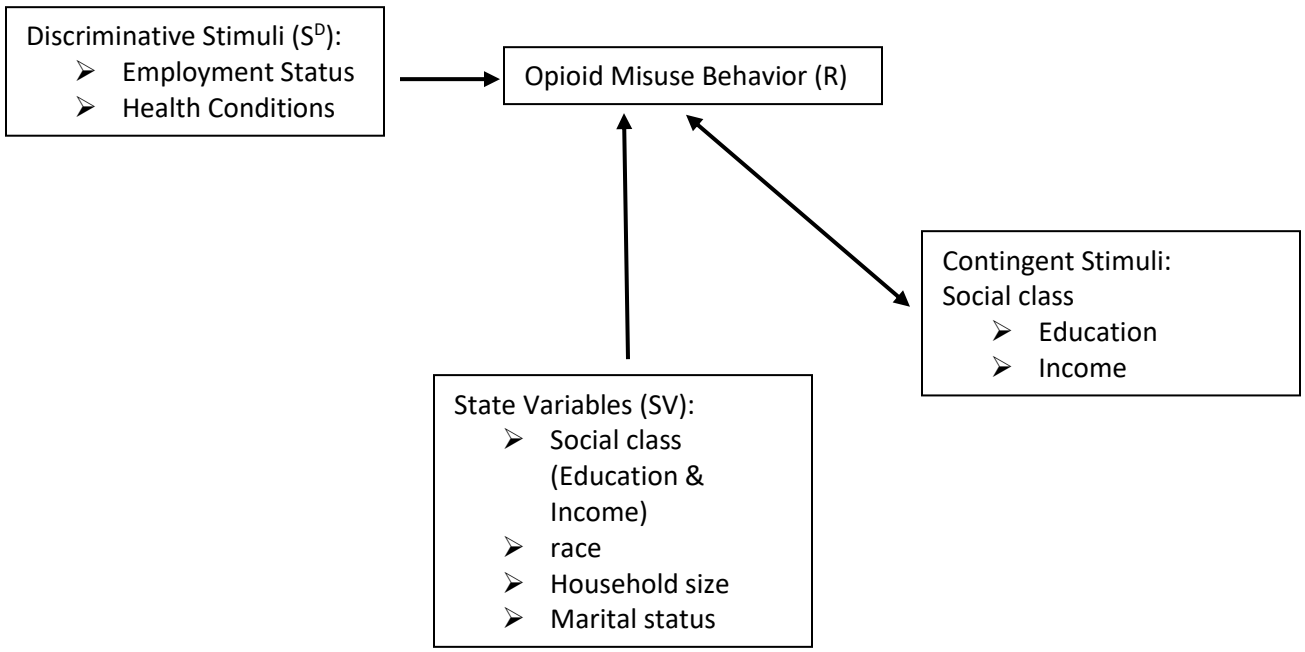
According to the behavioral framework, the contextual determinants of opioid use disorder would be the discriminative stimuli (S^D). For example, unemployment and the resulting boredom from doing nothing could make a person misuse licit and illicit drugs. Similarly, poor health conditions could be the context in which opioid use disorder could become reinforced.

Demographic factors could be both state variables (SV) and reinforcing, contingent stimuli (S^r). For example, social class, determined by the person's income and level of education, would be a state variable if the reference group's values and norms shape

[3] See http://www.samhsa.gov/data/release/2018-national-survey-drug-use-and-health-nsduh-releases for details about the survey.

the individual's deprivation or need for opioids; social class approval would be the S^r. Figure 1 is a schematic representation of constructs and their measures.

Figure 1: A Behavioral Model of Opioid Misuse



3.0. Key Findings

Statistically[4], opioid use disorder (OUD), including the use of heroin, does not differ between metro and nonmetro populations[5]. In spite of this, data are presented for both the metro and the nonmetro regions for non-statistical, or practical, comparison purposes.

3.1. Behavior, Cross-classified with Gender and Age[6]

Of the 273.75mil 12+ years old in the nation, 4% or approximately 10 million people, misuse opioids. In the nonmetro, 51% of those who misuse opioids are female; the opposite is true in the metros, most misusers are male (53%). Age wise, people aged 35-49 misuse the drug the most (Table 1).

[4] Chi-Square tests of independence relating opioid use disorder in the geographical regions and all the S^D and SV variables shown in Figure 1 confirmed the null associations.

[5] Metro and nonmetro classifications were based on the rural-urban continuum codes; see www.ers.usda.gov/data-products/rural-urban-continum-codes

[6] Gender and age are part of the misuse behavior, the variables do not generate particular outcomes, they are categorical qualities of those with opioid use disorder (see for example, Grills and Prus, 2008).

Table 1: Misuse of Prescription Opioids and the Use of Heroin by Age Group

	Geographical Region		
Age Category	**Metro - Large**	**Metro - Small**	**Nonmetro**
12 -17	6%	7%	8%
18 – 25	17%	19%	21%
26 – 34	23%	25%	21%
35 – 49	25%	25%	23%
50 – 64	22%	19%	18%
65+	6%	6%	9%
Total (Population)	100% (5.56mil)	100% (3.23mil)	100% (1.53mil)

3.2. Discriminative Stimulus

Of the 1.53mil misusers of opioids in the nonmetro region, 52% are either unemployed, not in the labor force, or 12-17 years of age (Table 2). Of these, 73% are of fair or poor health (Table 3). In contrast, the two metro areas average about 40% in the non-employed category, of which 60% are of fair or poor health.

Table 2: Employment Status

Work Status	**Metro – Large**	**Metro - Small**	**Nonmetro**
Employed – FT	46%	48%	39%
Employed – PT	14%	12%	9%
Unemployed	10%	7%	8%
Other (not in labor force)	24%	27%	36%
Age, 12 - 17 years	6%	7%	8%
Total (Population)	100% (5.56mil)	100% (3.23mil)	100% (1.53mil)

Table 3: Respondents' Health by Employment Status: Nonmetro Region

	Health Status			
Work Status	**Excellent**	**Very Good**	**Good**	**Fair/Poor**
Employed - FT	33%	53%	42%	19%
Employed - PT	14%	9%	9%	8%
Unemployed	5%	7%	12%	4%
Other (not in labor force)	35%	20%	30%	67%
Age, 12 -17 Years	13%	11%	8%	2%
Total (Population)	100% (0.138mil)	100% (0.498mil)	100% (0.518mil)	100% (0.38mil)

3.3. State Variables

One-in-four of the licit and illicit opioid misusers have never been married and live in households with another person, the numbers range from 25% to 27% for the metros and 24% for the nonmetro (Table 4). Eight percent of the 1.53 million misusers of opioids in the nonmetro region are less than 14 years of age, and slightly more than one-in-three of them live in households with six or more people.

Further analysis of the three-way crosstabs in Table 4 reveals that:

(i) widowers living in two-person households, although low in absolute numbers, are the largest category of misusers of the drug;
(ii) married people living in a two-person household also constitute a large proportion of opioid misusers, and
(iii) divorced or separated persons living in households with 5+ people register the lowest opioid use disorder.

Table 4: Impact of Respondents' Marital Status and Household Size on Opioid Use Disorder

(i) Nonmetro Region

Size of the Household	Married	Widowed	Divorced or Separated	Never been Married	Less than or Equal to 14 Years of Age
1 Person	1%	24%	45%	10%	0%
2 Persons	30%	61%	16%	24%	3%
3 Persons	26%	0%	22%	23%	15%
4 Persons	16%	0%	11%	22%	20%
5 Persons	18%	5%	4%	15%	27%
6+ Persons	9%	11%	3%	6%	34%
Total (Population)	100% (0.49mil)	100% (0.06mil)	100% (0.32mil)	100% (0.59mil)	100% (0.07mil)

(ii) Metro – Large

Size of the Household	Married	Widowed	Divorced or Separated	Never been Married	Less than or Equal to 14 Years of Age
1 Person	4%	18%	25%	8%	
2 Persons	34%	38%	28%	25%	3%
3 Persons	18%	44%	19%	25%	19%
4 Persons	22%	0%	15%	17%	35%
5 Persons	12%	0%	6%	13%	24%
6+ Persons	10%	0%	7%	12%	19%
Total (Population)	100% (1.76mil)	100% (0.22mil)	100% (0.81mil)	100% (2.69mil)	100% (0.08mil)

(iii) Metro – Small

Size of the Household	Married	Widowed	Divorced or Separated	Never been Married	Less than or Equal to 14 Years of Age
1 Person	2%	33%	13%	12%	0%
2 Persons	29%	49%	35%	27%	8%
3 Persons	20%	18%	16%	26%	15%
4 Persons	29%	0%	21%	18%	44%
5 Persons	11%	0%	7%	10%	6%
6+ Persons	9%	0%	8%	7%	27%
Total (Population)	100% (0.98mil)	100% (0.11mil)	100% (0.51mil)	100% (1.58mil)	100% (0.06mil)

In terms of marital status and race, most opioid use disorders are among the married, whites. Asians, specifically widowed persons, record little or no opioid use disorder. People of Hispanic origin, both married and unmarried, are the second largest group of opioid misusers (Table 5).

Table 5: Impact of Marital Status and Race on Misuse Behavior

(i) Nonmetro

Marital Status	White	Black	Asian	Hispanic
Married	34%	22%	0%	42%
Widowed	5%	2%	0%	2%
Divorced / Separated	25%	5%	97%	0%
Never Been Married	32%	65%	3%	49%
14 Years or Younger	4%	6%	0%	6%
Total (Population)	100% (1.20mil)	100% (0.11mil)	100% (0.008mil)	100% (0.12mil)

(ii) Metro – Large

Marital Status	White	Black	Asian	Hispanic
Married	33%	15%	41%	23%
Widowed	4%	7%	0%	0%
Divorced / Separated	17%	16%	0%	7%
Never Been Married	44%	62%	59%	66%
14 Years or Younger	1%	0%	0%	4%
Total (Population)	100% (2.41mil)	100% (0.24mil)	100% (0.04mil)	100% (0.42mil)

(iii) Metro – Small

Marital Status	White	Black	Asian	Hispanic
Married	38%	26%	26%	21%
Widowed	4%	7%	0%	2%
Divorced / Separated	15%	13%	13%	13%
Never Been Married	43%	52%	56%	62%
14 Years or Younger	1%	2%	5%	2%
Total (Population)	100% (3.18mil)	100% (0.88mil)	100% (0.18mil)	100% (1.11mil)

3.4. Contingent Variables

The reasoning that values which dictate judgment about actions will vary by class was tested by constructing an index of social class; the index was the sum of income and

education variables with numerical values in the range of 2 to 15[7]. The quartile scores of the index were computed and labeled as: Upper and Upper-Middle (the 4th quartile); Lower-Middle (3rd quartile); Upper-Lower (2nd quartile), and Lower-Lower, the 1st quartile; see the sidebar for definition of social class and research findings about the concept.

Table 6 shows the opioid misuses among each of the social classes, classified by race, in the nonmetro region. The relationship between misuse of opioids and social class is an "inverted U: ∩", the higher the social status, the less likely is the misuse; in the highest social class, Upper and Upper-Middle, the odds of misuse are 7 to 93 or 0.07 to 1.

Table 6: Opioid Use Disorders in Nonmetro: Impacts of Race and Social Class Memberships

	Race				
Social Class	Whites	Blacks	Asians	Hispanics	All Races
Lower-Lower	4%	6%	0%	21%	6%
Upper-Lower	28%	35%	97%	24%	29%
Lower-Middle	61%	59%	3%	47%	59%
Upper and Upper-Middle	8%	0%	0%	8%	7%
Total Population, in 000's	1197.21	110.02	8.06	124.53	1533.75

4.0. Discussion

This secondary analysis of NSDUH data shows that opioid misuse is widespread in the nation, with around 10 million people in the 12+ age group, both men and women, reporting misuse. The nonmetro region is home to 1.53 million of the misusers of which 52% are either unemployed, not in the labor force, or less than 18 years of age. The overdose death rate driven mostly by prescription opioids has been trending higher in nonmetro regions since 2004 (Mack, Jones, and Ballesteros, 2017). Rural communities are aware of this, polling of rural residents list opioid abuse as the most serious problem facing rural America (see for

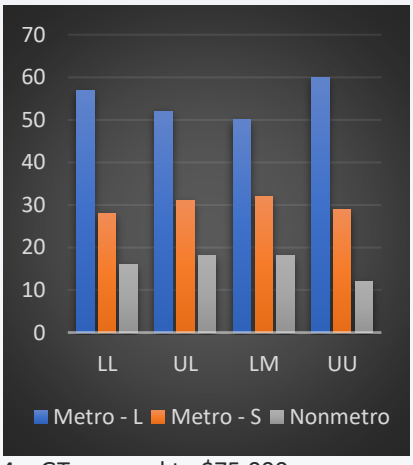
Social Class

Empirical research into the social class concept dates back to the 1940s and has produced the following generalizations: (i) social classes are groups of people who are more or less equal to one another in community status, and (ii) they share the same goals and ways of looking at life. A common classification of social class places a population into four groups:

1. Upper and Upper-Middle: mostly professionals and successful businessmen;
2. Lower-Middle: the white-collar salaried class;
3. Upper-Lower: skilled workers, and
4. Lower-Lower: the unskilled laborers.

Applying this classification to the NSDUH data for the metro and the nonmetro populations, results in Figure 1A.

Figure 1A: Social Class Structure



[7] The variable "total family income" had four categories: 1 = LT $20,000, ..., and 4 = GT or equal to $75,000. "Education" had 11 categories: 1 = 5th grade, …, 11 = College graduate or higher.

example, Findling et al 2020). However, only 1 in 10 with OUD is receiving the needed treatment (Haffajee et al (2019)). In addition, the opioid epidemic is causing an increase in bacterial and fungal infections as well as new HIV and hepatitis C virus outbreaks across many parts of the country (Zibbell et al 2018).

According to a recent CDC report[8], opioid prescribing has declined substantially in the metro regions, but not so much in the rural or nonmetro areas; rural residents were 87% more likely to be prescribed opioids. Higher prescribing in nonmetro regions may be linked to a higher prevalence of poor health among the rural population; see Section 3.2 and Table 3 for evidence in this direction. It could also be that healthcare providers in rural areas have established personal relationships with their patients, and this may influence clinician's opioid prescribing behavior; further research is needed to understand the healthcare practices of rural communities and to tailor solutions for the OUD issues.

Addiction is a chronic illness, and effective treatment is often required for many years. Many factors influence the decision to enter treatment, for example, family pressure, and financial ability. On the latter, despite a strong national economy, rural residents continue to rate their local economy as fair or poor.[9] Inability to pay medical bills remains a significant burden (Somers et al, 2017). Our analysis shows that OUD patients in the nonmetro region not only suffer from poor health, and low income, but also lack private health insurance (Table 7).

Table 7: Age, Fair or Poor Health, Family Income Less than $20,000 per Year, and Health Insurance Status of OUD Sufferers in Nonmetro

Age Category	% of Population in the Income Category	% with Private Health Insurance	(Population in 000's)
12 to 17	20%	0%	1.838
18 to 25	55%	52%	25.332
26 to 34	26%	7%	18.387
35 to 49	56%	10%	68.725
50 to 64	84%	19%	72.751
65+	88%	0%	NA

The opioid manufacturers that fueled this ongoing epidemic, including OxyContin maker Purdue Pharma, are expected to pay billions of dollars in compensation to states, cities, and counties.[10] It is critical to direct these funds to communities affected by opioids, the OUD families need healthcare support for years to overcome their addiction.

[8] https://www.cdc.gov/mmwr/volumes/68/wr/mm6802a1.htm?s_cid=mm6802a1_w

[9] See USDA's *Rural America at a Glance*: https://www.ers.usda.gov/webdocs/publications/85740/eib-182.pdf?v=0

[10] See https://www.nbcnews.com/news/us-news/purdue-pharma-offers-10-12-billion-settle-opioid-claims-n1046526

Policymakers need to be vigilant that opioid settlements are not mismanaged; it has been reported that only 30% of the $126 billion settlement from tobacco companies have been spent on health initiatives, most states spent the money on other activities including deficit reduction.

5.0. Conclusions

This report summarizes data from the recently released NSDUH, 2018, using a behavioral framework; the focus is on the nonmetro regions. Four percent of the nation's population, in the 12+ age category, misuse opioids. A person's employment and health status are the context for the misuse; 52% do not work, of these 73% are of fair or poor health. Being a widowed person living alone or in a two-person household increases the odds of misuse by 6 to 1; we infer this combination of marital and household status to be a driver of drug abuse. Furthermore, the data reveal that the white-collar salaried persons misuse opioids the most; further primary or empirical research among the members of this social grouping is needed to validate this finding.

Science is concerned with truth, that is, not letting go of a problem until it is solved. Opioid misuse has to be addressed; communities need to do this by evaluating what is happening on the ground, assessing what intervention is working, and what is not. This report is a step in that direction.

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