



“A Demographic and Regional Comparison of Opioid-Related Hospital Visits Within Communities in the United States”

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INTRODUCTION

The opioid epidemic is a complex national crisis demonstrating a greater than 400% increase in related deaths over the past two decades, through 2017.¹ Moreover, the current coronavirus pandemic, with its resultant economic and social isolation impacts, is likely compounding opioid usage.²

Several databases exist that provide an overview of opioid use in the U.S. One such database is maintained by the Agency for Healthcare Research and Quality and is the Healthcare Cost and Utilization Project (HCUP).³

Using HCUP, we analyzed this data to investigate both the number of opioid-related hospital inpatient stays and opioid related emergency department visits in 10 regions of the United States. We studied the incidence of these opioid associated visits, and demographics, in 3 different metro population sizes as well as rural areas in all regions.

Our hypothesis was ethnicity, unemployment and low socio-economic status in relation to opioid use would demonstrate a greater association in rural communities. We also anticipated inherent demographic factors such as age distribution, race, education and income would have a direct impact on inpatient hospital admissions and/or emergency department visits among the different population sizes.

METHODS

HCUP was utilized to retrospectively review longitudinal healthcare data including opioid-related inpatient and emergency department visits between the 10 regions as defined by the US Department of Health and Human Services from 2010-2018.

Demographics confounders were gathered from US Census data which included age, race, education, and income.

Data were analyzed through Generalized Linear Mixed Models where inpatient and ER visit incidence by community size type was estimated using HCUP and demographic data.

Community size types were modeled independently, and outcomes are presented per Department of Health and Human Services defined regions.

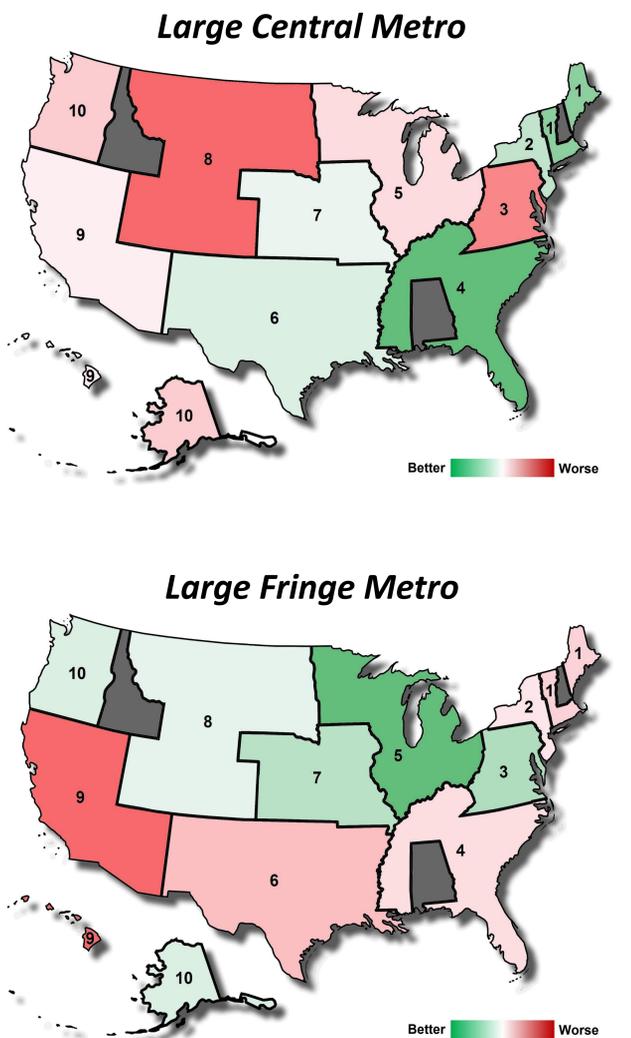
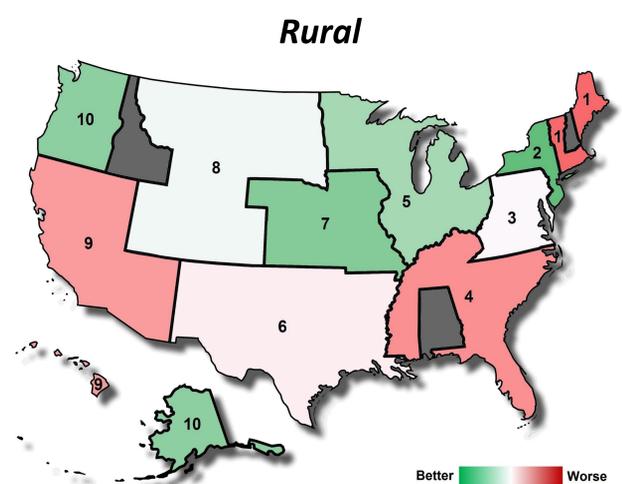
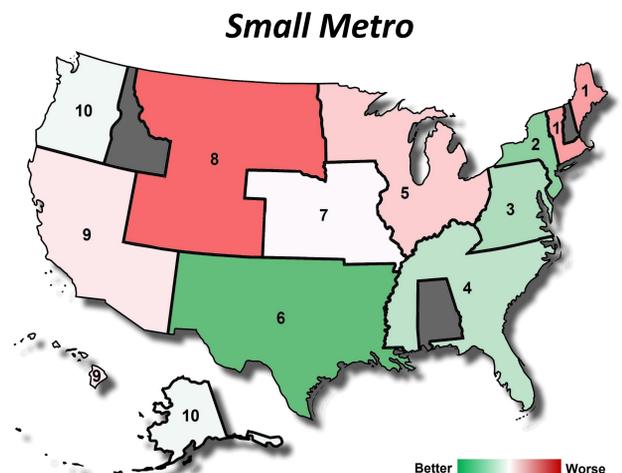
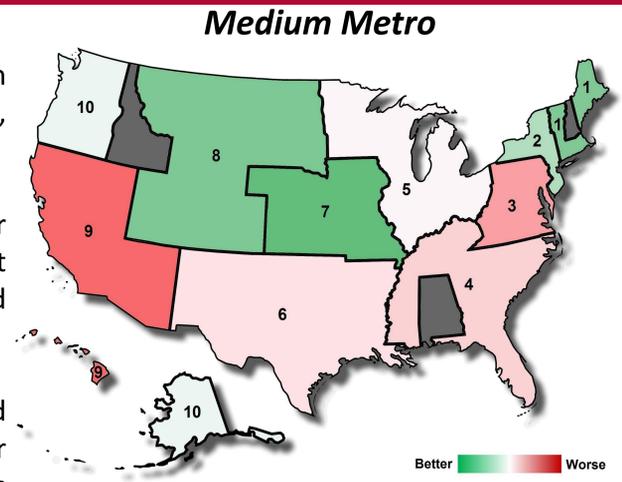


Figure 1. The number of opioid related inpatient stays and emergency department visits compared between 10 regions of the United States as defined the US Department of Health and Human Services.



Effect	RURAL	SMALL METRO	MEDIUM METRO	LARGE FRINGE METRO	LARGE CENTRAL METRO
Year	0.0173	0.6158	0.0978	0.0662	0.2024
Region	0.0068	0.0526	0.7631	0.0440	0.0220
Hospital Setting	5.6E-10	3.5E-18	0.0230	0.6325	0.2670
All Inpatient Stays	8.3E-63	1.1E-27	1.3E-83	1.1E-83	3.1E-84
Population					
Total population (LN)	0.9903	0.0742	0.3347	0.0087	0.5864
Population Density	0.3039	0.5301	0.1120	0.3751	0.2355
Sex Ratio	0.7881	0.6347	0.2171	0.6009	0.0072
Age					
% Under 25	0.3341	0.0391	0.3676	0.1979	0.5547
% 25 to 65	0.9127	0.3929	0.3521	0.0462	0.3990
% 65 and over	0.4891	0.1442	0.2020	1.0000	1.0000
Race					
% White Alone	0.7485	0.0239	0.0495	0.4587	0.0447
% African-American	0.9024	0.0681	0.0711	0.7270	0.0694
% Asian	0.3011	0.1842	0.0080	0.8004	0.0348
% Native American	0.8485	0.0038	0.0052	0.8062	0.0311
% Hispanic	0.9594	0.0603	0.0607	0.8827	0.0561
Education					
% No High School	0.8248	0.5890	0.2024	0.2893	0.7425
% High School	0.4069	0.7209	0.2026	0.5208	0.7715
% Some College	0.2828	0.6936	0.1957	0.2164	0.7529
% Bachelors or more	0.4021	0.9609	0.5795	0.7986	0.5975
Income					
Household Adjusted Income	0.9076	0.4611	0.0033	0.9670	0.9979
% Poverty Level	0.3760	0.1402	0.7839	0.6598	0.7576
% Unemployment	0.4837	0.0005	0.0120	0.3315	3.5E-05

Table 1. Demographic data compared across different population sizes for the entire United States. Highlighted values are statistically significant demographic measures within that population size.

Effect by population type	Estimate	Standard Error	Pr > t
Rural			
Hospital Setting ED vs ID	-0.72190	0.11410	5.6E-10
All Inpatient Stays	0.02133	0.00111	8.3E-63
Small Metro			
Hospital Setting ED vs ID	-1.43780	0.15920	3.5E-18
All Inpatient Stays	0.01807	0.00156	1.1E-27
% Under 25	-0.91290	0.44150	0.0391
% White Alone	-0.78760	0.34770	0.0239
% Native American	-1.28630	0.44290	0.0038
% Unemployment	-0.36910	0.10500	0.0005
Medium Metro			
Hospital Setting ED vs ID	-0.24930	0.10940	0.0230
All Inpatient Stays	0.02612	0.00110	1.3E-83
% White Alone	0.54770	0.27820	0.0495
% Asian	1.02130	0.38380	0.0080
% Native American	1.05430	0.37570	0.0052
Household Adjusted Income	-0.00012	0.00004	0.0033
% Unemployment	-0.18740	0.07437	0.0120
Large Fringe Metro			
All Inpatient Stays	0.02683	0.00109	1.1E-83
Total population (LN)	2.13120	0.80910	0.0087
% 25 to 65	0.54750	0.27380	0.0462
Large Central Metro			
All Inpatient Stays	0.03881	0.00154	3.1E-84
Sex Ratio	-82.79490	30.67000	0.0072
% White Alone	-0.95300	0.47310	0.0447
% Asian	-1.36880	0.64610	0.0348
% Native American	-1.60920	0.74360	0.0311
% Unemployment	0.48480	0.11570	0.0000

Table 2. A list of demographic variables within each population size for the entire United States that were found to be statistically significant.

RESULTS

Opioid use varies by population center size and region as outlined in Figure 1. In general, opioid visits in the southwest region were greatest across the majority of population center sizes. Rural usage was greatest in the northeast, southeast, and southwest.

As shown in Tables 1 and 2, the association with poverty, unemployment and ethnicity was greatest in Small, Medium and Large Metro areas and less in rural areas.

CONCLUSION

The data in our study indicate opioid use remains significant among diverse populations across the United States. There are specific regional differences with respect to the size of communities affected. Understanding unique dynamics associated with opioid usage in populations within the regions studied is important in guiding future interventions to fight this crisis.

Future studies should consider the impact of the COVID pandemic on opioid use and the related morbidity.

REFERENCES

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