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Urban–Rural Differences in Opioid Dispensing, U.S., 2019–2021

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INTRODUCTION

In 2021, over 80,000 people in the U.S. died of an overdose involving an opioid, nearly one fifth of which were prescribed.¹ Although opioid dispensing rates have declined since 2012, differences persist among states and counties.^{2,3} Urban–rural differences in opioid dispensing were assessed between 2019 and 2021.

METHODS

IQVIA Xponent data, representing 93% of U.S. retail prescriptions projected to national estimates, were used to calculate five annual opioid dispensing measures between 2019 and 2021 at the national and county levels: morphine milligram equivalents (MMEs) per person, average daily MME per prescription, overall opioid dispensing rate, dispensing rate of opioid prescriptions filled in high dosage (≥ 50 MME/day), and average days supply per prescription. To compute MME per person, total MME was divided by population estimates. Dispensing rates were calculated per 100 persons. Annual population estimates were obtained from the U.S. Census Bureau and included individuals of all ages.^{4,5} A positive or negative change of any metric by $\geq 10\%$ between 2019 and 2021 was considered an increase or decrease, respectively.

Metropolitan classification of counties in the U.S. was determined by population size using county location of the provider. Three levels examined were metropolitan ($\geq 50,000$ people), micropolitan (10,000–49,999 people), and noncore ($<10,000$ people).⁶ Differences in dispensing among metropolitan levels were computed using absolute difference between

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CREDIT AUTHOR STATEMENT

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SUPPLEMENTAL MATERIAL

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the 90th and 10th percentiles and their relative ratio.³ Because records contained no identifying information, this study was determined to be exempt from review by the Centers for Disease Control and Prevention IRB. Analyses were conducted using SAS, Version 9.4 (SAS Institute Inc.).

RESULTS

Nationally, all five measures of opioid dispensing decreased, with high-dosage opioid dispensing decreasing the most (−17.4%) and average days of supply decreasing the least (−0.7%). Changes varied substantially over time according to metropolitan level (Table 1 and Appendix Figure 1, available online). For example, the ratio of counties with decreased versus increased MME per person across this period was only 1.6 among noncore counties compared with 4.3 among metropolitan and 2.6 among micropolitan counties (Table 1). Noncore counties experienced the lowest MME per person and opioid dispensing rates. All 5 measures within each metropolitan level had large variability among counties. Of note, among noncore counties, a nearly 70-fold relative differences over time occurred between the county-based 90th and 10th percentiles of high-dosage dispensing rates (Table 1).

DISCUSSION

Nearly 14% (46 million) of U.S. residents live in rural/ metropolitan counties where they may face greater public health challenges than those living in denser population areas.⁷ Rural residents, particularly in noncore counties, typically have a higher prevalence of chronic pain, lower income, less access to health care, and higher uninsured rates, and interventions may not be practical without equitable outreach and engagement of a broader group of stakeholders.^{7,8} Each factor can influence the need for prescription pain medication and its ease of access. Within each metropolitan level, the wide variation in opioid prescription dispensing may be related to a shortage of providers, high patient load, and/or greater need for pain relief.^{7,8}

The continued overall downward national trend in opioid dispensing could be related to state legislation, pharmacy regulations, and prescription drug monitoring programs that track and improve prescribing practices.^{2,3} Even so, overdoses and deaths from illicitly manufactured fentanyl, methamphetamine, and cocaine increased during this period.¹ Multiple simultaneous approaches (e.g., primary prevention, harm reduction, evidence-based treatment, and recovery support) could help reduce the nation's overdose epidemic while improving care for patients with pain, mental health conditions, or substance use disorder.⁹

Limitations

These data concern trends in populations, not individuals, and do not directly point to specific solutions for patients. The reasons an opioid was prescribed and its appropriateness could not be determined. There is a lack of data on prescriptions dispensed outside of retail pharmacies (i.e., mail-order, prescriber-dispensed, and hospital- or clinic-based pharmacies).

CONCLUSIONS

This study supports that opioid prescribing practices may differ by community on the basis of metropolitan level. Evidence-based interventions suggested by clinical practice guidelines could modify this, even if they are unevenly effective across communities of different metropolitan levels.¹⁰ Suggested evidence-based interventions could include (1) more pain management education of local clinicians concerning the full range of pain treatments; (2) improvements in electronic health records, particularly by embedded clinical decision-making support; (3) enhanced shared decision making with patients where applicable; and (4) team-based care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1. Opioid Dispensing by U.S. County Metropolitan Classifications, between 2019 and 2021

Opioid dispensing measure ^d	Counties with changes, 2019 versus 2021, <i>n</i> (%) ^b					Variation by metropolitan status in 2021						
	2019, mean (SD)	2021, mean (SD)	Relative change, %	Decrease	Stable	Increase	Decrease/increase ratio	CV % ^c	10th	90th	Absolute	Relative
MME per person												
National/all counties	329.6 (288.6)	304.2 (272.8)	-7.7	1,166 (37.9)	1,420 (46.2)	490 (15.9)	2.4	89.7	34.8	560.0	525.2	16.1
Metropolitan	319.1 (304.0)	295.2 (291.6)	-7.5	474 (40.9)	575 (49.6)	110 (9.5)	4.3	98.8	55.6	592.5	536.9	10.7
Micro-metropolitan	321.4 (316.1)	305.0 (296.2)	-5.1	226 (35.9)	318 (50.4)	86 (13.7)	2.6	97.1	68.4	601.1	532.7	8.8
Noncore	236.2 (251.0)	222.7 (234.6)	-5.7	466 (36.2)	527 (41.0)	294 (22.8)	1.6	105.3	18.9	503.1	484.3	26.7
Overall dispensing rate per 100 persons ^e												
National/all counties	43.5 (30.8)	41.9 (29.8)	-3.7	765 (24.9)	1,853 (60.2)	458 (14.9)	1.7	71.1	8.2	70.8	62.6	8.6
Metropolitan	42.3 (31.8)	40.7 (30.9)	-3.7	238 (20.5)	827 (71.4)	94 (8.1)	2.5	75.9	11.2	77.6	66.3	6.9
Micro-metropolitan	44.9 (33.4)	43.8 (32.3)	-2.6	133 (21.1)	416 (66.0)	81 (12.9)	1.6	73.7	15.2	77.5	62.3	5.1
Noncore	32.4 (27.2)	31.4 (26.0)	-3.2	394 (30.6)	610 (47.4)	283 (22.0)	1.4	82.8	4.9	61.2	56.3	12.6
High-dose dispensing rate per 100 persons ^f												
National/all counties	9.4 (8.1)	7.8 (7.2)	-17.4	1969 (64.0)	575 (18.7)	532 (17.3)	3.7	92.3	0.4	13.6	13.1	30.2
Metropolitan	8.8 (9.0)	7.3 (8.0)	-17.2	806 (69.5)	227 (19.6)	126 (10.9)	6.4	109.6	0.8	15.2	14.4	19.4
Micro-metropolitan	8.3 (9.1)	7.0 (7.8)	-15.1	401 (63.7)	133 (21.1)	96 (15.2)	4.2	111.4	1.0	14.5	13.4	14.0
Noncore	5.4 (6.3)	4.7 (5.8)	-12.2	762 (59.2)	215 (16.7)	310 (24.1)	2.5	123.4	0.2	11.6	11.4	69.6
Average daily MME per prescription												
National/all counties	39.4 (9.1)	38.5 (8.9)	-2.2	291 (9.5)	2,600 (84.5)	185 (6.0)	1.6	23.1	26.3	45.1	18.8	1.7
Metropolitan	37.3 (7.9)	36.4 (7.6)	-2.5	74 (6.4)	1,046 (90.3)	39 (3.4)	1.9	20.9	27.2	45.6	18.4	1.7
Micro-metropolitan	35.6 (8.5)	34.9 (8.1)	-2.0	42 (6.7)	562 (89.2)	26 (4.1)	1.6	23.2	26.1	44.1	18.0	1.7
Noncore	34.1 (10.0)	33.4 (10.0)	-1.1	175 (13.6)	992 (77.1)	120 (9.3)	1.5	29.9	22.3	45.0	22.7	2.0
Average duration of prescriptions, d												
National/all counties	18 (3.9)	17.9 (4.1)	-0.7	324 (10.5)	2,413 (78.5)	339 (11.0)	1.0	22.9	13.6	23.4	9.7	1.7

Opioid dispensing measure ^a	Counties with changes, 2019 versus 2021, n (%) ^b					Variation by metropolitan status in 2021						
	2019, mean (SD)	2021, mean (SD)	Relative change, %	Decrease	Stable	Increase	Decrease/increase ratio	CV % ^c	10th	90th	Absolute	Relative
Metropolitan	18.2 (3.5)	18.0 (3.6)	-0.9	85 (7.3)	1,001 (86.4)	73 (6.3)	1.2	20.0	13.9	22.2	8.3	1.6
Metropolitan	18.1 (3.7)	18.2 (3.7)	0.5	55 (8.7)	506 (80.3)	69 (11.0)	0.8	20.3	13.1	22.7	9.5	1.7
Noncore	18.9 (3.4)	18.9 (4.6)	0.0	184 (14.3)	906 (70.4)	197 (15.3)	0.9	24.3	13.3	24.3	11.1	1.8

Source: Our analysis of the IQVIA xPONENT database from 2019 through 2021, representing 93% of retail prescriptions projected in the U.S. (<https://www.iqvia.com/locations/united-states/library/fact-sheets/xponent>).

Note: U.S. county metropolitan classification was based on the 2013 NCHS Urban–Rural Classification Scheme for Counties. In this scheme, counties are classified into 6 urbanization levels primarily on the basis of metropolitan–nonmetropolitan status and population distribution. In this study, 3 levels examined were metropolitan (> 50,000 people), micropolitan (10,000–49,999 people), and noncore (<10,000 people). Nonmetropolitan/rural counties are not part of a metropolitan area and are subdivided into micropolitan counties and noncore counties. Noncore counties are the most rural.

^aOpioid products included in the analysis: codeine, fentanyl, hydrocodone, hydromorphone, methadone, morphine, oxycodone, propoxyphene, tapentadol, tramadol, and buprenorphine (only buprenorphine products indicated for pain). Cough and cold formulations containing opioids and buprenorphine products commonly used to treat opioid use disorder were excluded. Data on prescriptions obtained by mail order and those dispensed directly by clinicians were not available. These data are weighted/projected to account for missing prescriptions and to be representative at the national, state, and county levels.

^bAmong the 3,076 counties with available data in 2019 and 2021, rises of 10% in each variable for these 2 years were considered an increase, reductions of 10% were considered a decrease, and changes between -10% and +10% were considered stable. For each variable, a decrease/increase ratio was calculated indicating the number of counties with a decrease relative to those with an increase between 2019 and 2021. Only the prescriber practice county location is available in the data, so the prescriber’s state and county were used to obtain geographic location of prescriptions.

^cCV is defined as the ratio of the SD to the mean of each measure. It was calculated on the basis of the following formula: $CV = (SD/mean) \times 100$.

^dThe difference between these 2 percentiles was used to indicate the degree of absolute difference, representing the absolute magnitude of the gap between high- and low-dispensing counties for each variable. The ratio between the 90th and 10th percentiles was used to assess the relative degree of differences across counties for each variable. Use of the 90th percentile instead of the maximum value and the 10th percentile instead of the minimum value reduced the ability of outliers to skew results for each variable.

^eOverall dispensing rates were weighted to the estimates of population for national or counties from the U.S. Census (www.census.gov).

^fHigh-dosage dispensing rate included opioid prescriptions with daily dosage > 50 MME, weighted to the estimates of population for national or counties from the U.S. Census (www.census.gov).

CV, coefficient of variation; MME, morphine milligram equivalent; NCHS, National Center for Health Statistics.