

# Rural and Urban Differences in Primary Care Pain Treatment by Clinician Type

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## Key Findings

- Roughly 1 in 10 (9.8%) visits for opioid-naïve (i.e., no opioid prescriptions within 1 year) patients with a first-time complaint of pain received an initial opioid prescription in 2017.
- Comparing nurse practitioners (NPs) to physicians within primary care practices, NPs in rural areas were significantly less likely than physicians to prescribe an opioid for a first-time complaint of pain (11.9% vs. 13.4%).
- In urban primary care practices, NPs and physicians had similar opioid prescribing rates.
- In urban and rural primary care practices, NPs and physicians were similarly likely to refer patients to physical therapy.

## Purpose

The effects of the opioid epidemic are particularly pronounced in rural areas, where opioid prescribing and drug overdose deaths are more frequent than in urban areas. Little is known about the opioid prescribing patterns of nurse practitioners (NPs), compared to primary care physicians – and how prescribing patterns differ for rural vs urban practices. This policy brief presents findings from a comparison of opioid prescribing rates among physicians and NPs within primary care practices – using a novel database of all-payer health care claims and eprescribing data.

## Background

There is mounting recognition that increased opioid prescribing over the past three decades has been a major driver of the national crisis of opioid use disorder and overdose.<sup>1</sup> While no community in the U.S. has been untouched by the opioid epidemic,<sup>2,3</sup> rural areas have suffered especially devastating consequences.<sup>4</sup> Opioid prescribing rates – particularly among primary care clinicians – are 25-40% higher in rural areas, compared with urban areas.<sup>5</sup> As rural communities face growing primary care physician shortages and primary care practices increasingly rely on nurse practitioners,<sup>6</sup> it is important to understand how opioid prescribing patterns differ between physicians and nurse practitioners – and whether these differences are consistent across rural and urban settings.

We know of only one prior study that has examined differences in opioid prescribing by primary care clinician type – finding that NPs were less likely to prescribe opioids to Medicare patients than physicians.<sup>7</sup> Rural-urban differences were not assessed in this analysis. In this policy brief, we examine clinicians' pain treatment decisions – both opioid prescribing and referral to physical therapy – for opioid-naïve patients with a first complaint of pain. We focus on this patient population because consensus guidelines caution prescribers against using opioid painkillers as first-line therapy for patients suffering from pain.<sup>8</sup> This analysis looks separately at opioid prescribing by physicians and NPs, in both rural and urban communities.

## Approach

To assess the opioid prescribing patterns of physicians and NPs, we used a subset of 2017 de-identified claims and electronic health record (EHR) data from athenahealth, Inc, a cloud-based health care information technology company that provides physician practices with medical billing, practice management, and EHR services. This study included primary care appointments for adult (aged 25+) patients with a new painful condition (e.g. back pain, knee pain, neck pain) and no observable use of opioids within the past year, who received care from an NP or physician at an office-based primary care practice in a state where NPs can prescribe controlled substances. We classified practice sites as urban or rural, based on the county in which the group practice was located.

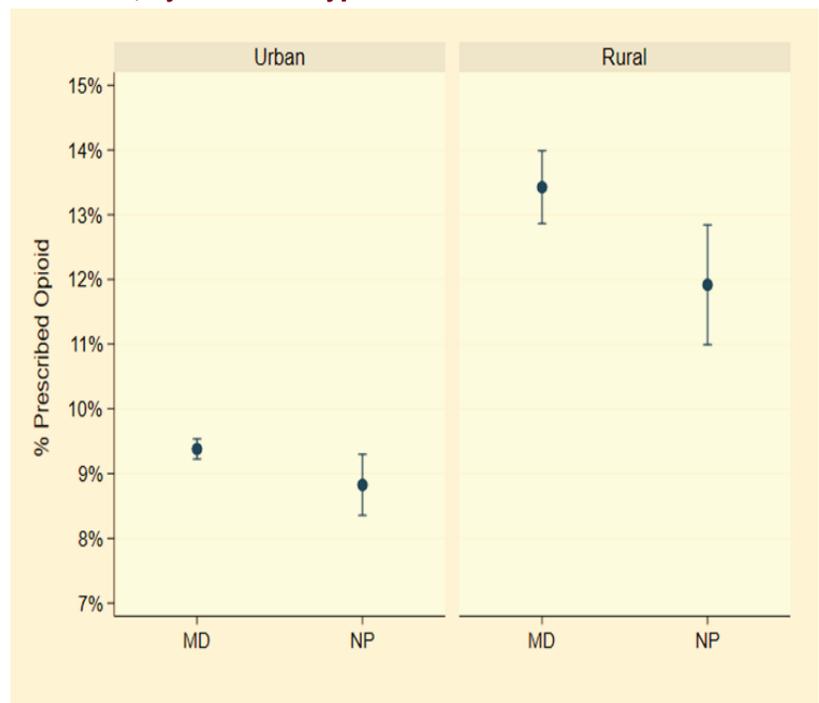
Our primary outcome of interest was opioid prescription, as ordered by the NP or physician. We also examined referrals to physical therapy, and we used multivariable linear probability models to assess the relationship between clinician type (NP versus physician) and prescribing for opioid-naïve patients with a painful condition. We controlled for patient characteristics (gender, age category, race, insurance status, chronic condition count, pain category), visit characteristics (scheduled appointment duration, same-day or pre-scheduled, after-hours scheduling [i.e., after 5pm or on a weekend]), and also included group practice fixed effects, to capture time-invariant observable and unobservable (e.g., practice style) differences across practices that may affect opioid prescribing. With practice fixed effects, our estimates represent average within-practice estimates of the association between prescribing and clinician type. We stratified our analyses by primary care practice geography, comparing pain treatment patterns by clinician type in rural and urban practice separately.

## Results

Our sample consisted of 374,357 visits for opioid-naïve patients with a first-time pain complaint (Table 1, see p. 4). Of these, 51,818 (13.8%) occurred in rural primary care practices and 99,395 (26.6%) occurred with nurse practitioners. Compared to patients treated by physicians, patients of nurse practitioners were more likely to be insured by Medicaid, commercial insurance, or uninsured. Patients of NPs were also younger, more likely to be female, and more likely to be non-white. A lower average chronic condition count suggests that NPs treated healthier patients than physicians. Scheduling characteristics also differed by provider type, with NPs providing longer visits that were more likely to be scheduled on a same-day basis and provided after-hours than physician visits.

Overall, opioids were prescribed in 9.8% of the appointments in our sample, while patients received a referral to physical therapy in 12.3% of appointments. Figure 1 displays the share of appointments (and the 95% confidence interval around these estimates) resulting in an opioid prescription, by clinician type, adjusted for patient and appointment characteristics and group practice fixed effects.

**Figure 1: Opioid Prescribing in Urban and Rural Primary Care Practices, by Clinician Type**

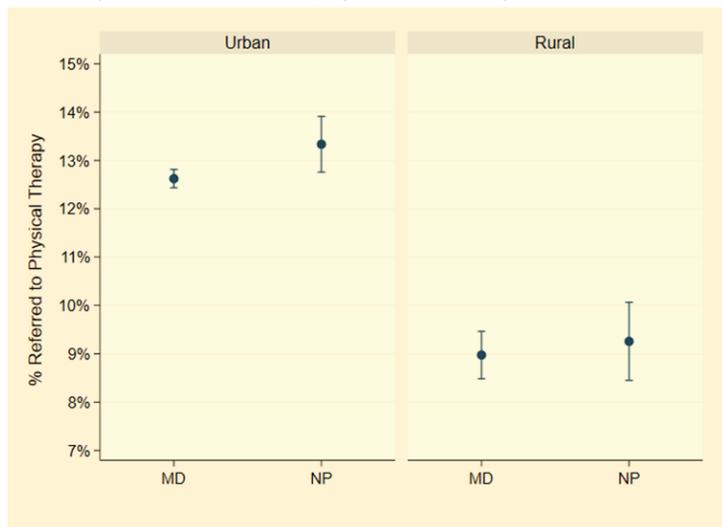


Source: Authors' analysis of athenahealth data

Appointments with NPs in urban practices were 0.6 percentage points less likely than physician appointments to result in an opioid prescription, but this difference was not statistically significantly different from zero at  $p < 0.05$ . In rural primary care practices, appointments with NPs were 1.5 percentage points less likely than physician appointments to result in an opioid prescription (11.9% included an opioid prescription [95% CI 11.0%-12.8%] vs. 13.4% [95% CI 12.9%-14.0%],  $P = 0.05$ ).

Figure 2 displays the share of appointments (and the 95% confidence interval around these estimates) yielding a physical therapy referral, by clinician type, adjusted for patient and appointment characteristics and group practice fixed effects. Appointments with NPs in urban practices were 0.7 percentage points more likely than physician appointments to result in a physical therapy referral, but this difference was not statistically significantly different from zero at  $p < 0.05$ . Appointments with NPs in rural practices were 0.3 percentage points more likely than physician appointments to result in a physical therapy referral, but this difference was also not statistically significantly different from zero at  $p < 0.05$ .

**Figure 2: Physical Therapy Referrals in Urban and Rural Primary Care Practices, by Clinician Type**



Source: Authors' analysis of athenahealth data

## Discussion and Implications

Past research shows that opioid prescribing rates are higher in rural areas, compared to urban areas.<sup>5</sup> This pattern is concerning, given evidence linking initial prescriptions to subsequent chronic use and opioid use disorder,<sup>9</sup>

and raises the question of whether an increased reliance on NPs for primary care provision contributes to higher opioid prescribing in rural areas.

Compared to physicians, NPs in rural primary care practice settings were significantly less likely to prescribe an opioid to opioid-naïve patients with a first complaint of pain. This is consistent with existing research focusing on opioid prescribing patterns by clinician type within the Medicare patient population,<sup>7</sup> and suggests that increasing involvement of NPs in primary care is unlikely to be driving opioid prescribing patterns in rural areas. Interestingly, this pattern is not observed in referrals to physical therapy, which NPs and physicians do with similar frequency, regardless of geography. Differences in opioid prescribing may reflect differences in other practice patterns by clinician type, including longer average visit length for nurse practitioners than physicians, comfort level in prescribing opioids and other practice patterns.<sup>10,11</sup> Given the growing role of nurse practitioners in primary care – particularly rural primary care – understanding clinician differences in pain treatment is crucial to addressing the opioid epidemic.

Our study has several limitations. First, we cannot rule out differences in patient severity as the reason why opioid prescribing patterns differ by clinician type. However, our analyses control for many patient characteristics and includes practice fixed effects, which should eliminate a considerable amount of patient severity differences driven by geographic variation in illness. Secondly, we cannot deem opioid prescriptions appropriate or inappropriate, using the data we have. Third, we merely observe orders for opioid painkillers, and are unable to observe whether patients fill these prescriptions as recommended. Fourth, we do not include physician assistants – who may be prescribing opioids in some states, as we cannot reliably observe their prescriptions in the dataset. Fifth, we could not discern the potential of misuse since we did not quantify the dose of the opioids prescribed, overlapping prescriptions with other opioids or benzodiazepines. Finally, our results may not generalize beyond the population of primary care practice on the athenahealth network. However, existing research finds broad similarities between athenahealth clients

**Table 1: Sample Characteristics by Rurality**

Patient Characteristics	Urban Visits		Rural Visits	
	Physician	NP	Physician	NP
<i>Payer, %</i>				
Medicare	33.0	21.8***	38.2	24.5***
Medicaid	9.0	15.0***	12.2	19.1***
Medicare + Medicaid	3.9	4.0	8.0	7.4***
Commercial	50.3	51.4***	36.8	41.9***
No Insurance	1.9	4.1***	2.8	4.2***
Other/Unknown	1.9	3.7***	1.9	2.9***
<i>Age Category, %</i>				
25-44	22.2	32.8***	19.5	31.3***
45-64	42.4	44.2***	40.8	43.8***
65+	35.4	23.0***	39.7	24.9***
<i>Sex, %</i>				
Female	57.9	64.4***	56.6	63.7***
Male	42.1	35.6***	43.4	36.3***
<i>Race/Ethnicity, %</i>				
White, non-Hispanic	70.5	67.7***	80.7	81.6***
Black, non-Hispanic	9.1	10.2***	8.9	7.7***
Hispanic	5.2	6.4***	3.6	4.6***
Other/Unknown	15.2	15.7***	6.8	6.1***
<i>Chronic Conditions, #</i>				
0	28.6	36.6***	27.6	37.4***
1	22.0	23.3*	21.1	21.6
2+	49.4	41.1***	51.3	41.0***
<i>Pain Category</i>				
Back	67.0	69.3***	69.2	72.8***
Knee	10.2	7.3***	9.7	6.1***
Neck	26.7	26.6	25.0	24.2*
<b>Visit Characteristics</b>				
<i>New Patient Visit, %</i>	13.4	13.5	14.7	13.7***
<i>Scheduled Duration, %</i>				
≤ 10 Minutes	8.8	7.5***	14.2	10.0***
15 Minutes	64.0	57.9***	53.7	61.2***
20 Minutes	12.9	16.1***	13.1	11.2***
≥ 30 Minutes	14.2	18.3***	18.3	17.6*
<i>Same-Day, %</i>	19.7	33.4***	21.8	35.9***
<i>After-Hours, %</i>	3.3	4.5***	2.3	3.8***
Sample Size	242,702	79,837	32,260	19,558

*Table 1 Note:* Each row presents predictive margins from regressing the characteristic of interest (i.e., an indicator for insurance coverage through Medicare) on clinician type (physician or NP) and group practice fixed effects, analyzing urban primary care practices (columns 2 and 3) and rural primary care practices (columns 4 and 5) separately. Urban and rural location is determined by the county of each primary care practice. Pain categories may sum to greater than 100% because patients frequently have more than one type of painful diagnosis recorded.  
\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Source: Authors' analysis of athenahealth data

and primary care clinicians nationwide.<sup>12</sup>

While the opioid epidemic has affected the whole country, rural areas have been devastated by it. Rural clinicians are struggling to meet the needs of patients generally, and the opioid epidemic has further strained a workforce and care capacity that was already limited. Opioid prescribing rates remain elevated in rural areas, compared to urban areas, but the practice patterns of NPs in rural primary care practices provide evidence that reducing opioid prescribing may be feasible. Attention to the support needed for rural communities to comply with CDC opioid prescribing guidelines may help both NPs and primary care physicians better support patient needs.

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## Rural Health Research & Policy Centers

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