Hospitals and substance use disorder services in the time of the opioid epidemic

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Objective: To test whether the opioid epidemic increased hospitals' offerings of substance use services.

Data Sources/Study Setting: This study employs data from the 2010 and 2015 American Hospital Association Annual Survey.

Study Design: A multilevel, cross-sectional design was utilized to examine associations between county-level overdose rates and hospital substance use services.

Data Collection/Extraction Methods: The analytic sample consisted of 3365 acute care hospitals that answered pertinent survey questions.

Principal Findings: In 2010, 334 hospitals offered inpatient opioid services and 588 hospitals offered outpatient services, compared to 327 and 577, respectively, in 2015, indicating that more hospitals dropped services than added them as overdose rates increased. Factors other than growing need weigh more heavily in hospitals' determination to offer substance use services, including resources, mission, and the presence of psychiatric facilities within their communities. Importantly, hospitals that employ medical home models had greater odds of offering outpatient substance abuse services in 2015 OR, 95 percent CI (1.54; 1.23-1.93; $P < 0.0001$).

Conclusions: Hospitals are either not willing or equipped to increase substance use services in response to growing need.

KEYWORDS

hospitals, inpatient care, outpatient care, substance use disorder

1 | INTRODUCTION

An epidemic of opioid misuse and corresponding overdose deaths has confronted the United States in the last decade. Although this impact has been national in scope, some regions and states have been particularly affected.¹ Since 1999, deaths due to opioid overdose have tripled and continue to rise.² Visits to emergency departments for opioid overdose doubled from 2004 to 2011.³ U.S. life expectancy decreased for the second consecutive year in 2016, which is largely attributed to drug overdoses.⁴ The recent surge in opioid misuse and overdose has emerged due to a confluence of factors including aggressive marketing and prescription of opioid

pain medications, falling heroin prices, and increasing availability of fentanyl.⁵

In response to this epidemic, a variety of interventions have emerged across the United States, including harm reduction initiatives such as increasing the availability of the opioid-reversal drug naloxone and syringe exchange programs.⁶ Health care institutions, such as hospitals and Federally Qualified Health Centers (FQHCs), play critical roles in responding to growing opioid misuse by offering evidence-based treatment such as medication-assisted treatment (MAT).⁷ Hospital emergency departments also play an important role in responding to overdose and screening for substance use disorders.⁸

Beyond emergency departments, hospitals could play a more enduring role in both opioid prevention and treatment. The vast majority of substance abuse treatment occurs in outpatient settings, with about one quarter in stand-alone residential facilities unaffiliated with health systems.⁹ Experts have called for the integration of substance abuse treatment into traditional medical care facilities to ensure that secondary health conditions are addressed and patients have access to relevant health care services.¹⁰ The 2010 Patient Protection and Affordable Care Act (ACA) provided support for the development of patient-centered medical homes (PCMHs), as well as health homes; evidence suggests this type of care coordination is associated with better outcomes in substance use disorder treatment.¹¹⁻¹³ Through the provision of both inpatient detoxification and outpatient services, hospitals and health care systems stand to play a critical role in substance abuse treatment.

Despite new support for strengthening ties between medical care and behavioral health in the ACA, we still do not know whether hospital service provision has changed in response to the growing opioid epidemic. New community benefit guidelines introduced as part of the ACA require hospitals to respond to pressing health needs in their communities through the implementation of new programming.¹⁴ However, preliminary evidence exists that hospitals in particularly vulnerable regions are not initiating new opioid services and prevention programs due to financial barriers and other concerns regarding capacity.¹⁵ This paper seeks to fill a gap in current knowledge by assessing hospitals' offerings of inpatient or outpatient substance use disorder services, whether they have changed in recent years, and what factors predict the presence of services within hospitals.

2 | DATA AND METHODS

2.1 | Data

This study uses data from the 2015 American Hospital Association Annual Survey, the most recent AHA data currently available. The survey was distributed to the U.S hospital population, consisting of 6251 hospitals across the fifty states and territories. The 2015 survey had 4751 respondents. This study focuses on general acute care hospitals (as opposed to specialty) from the fifty states and District of Columbia (excluding territories). The 2015 data were linked to data from the 2010 survey so that we could assess hospital changes over this time period. After excluding hospitals that did not respond to both surveys, our total analytic sample included 3365 hospitals.

The study's dependent variables are based on 2015 Section C: Facilities and Services of the Annual Survey. This section is comprised of data reported by facilities regarding whether they offer each of a list of services. The services relevant to this study are "Alcohol/drug abuse or dependency inpatient care" and "Alcohol/drug abuse or dependency outpatient services" (questions C.13 and C.22, respectively). The survey defines outpatient services as "organized hospital services that provide medical care and/or rehabilitative treatment services to outpatients for whom the primary

diagnosis is alcoholism or other chemical dependency." These are distinct from services provided in emergency departments, which AHA data do not capture. Inpatient care is differentiated from outpatient as "inpatient/residential treatment for patients [with alcoholism or other drug dependencies] whose course of treatment involves more intensive care than provided in an outpatient setting or where patient requires supervised withdrawal." These items were considered in reference to each hospital's responses to the same questions in 2010.

The main independent variable in the study is the average of county overdose death rates from 2010 to 2015, sourced from the Centers for Disease Control. Additional independent variables include hospital characteristics (number of licensed beds, ownership type, religious affiliation, system member, critical access designation,^{16,*} academic medical center, Appalachian county) and payment structures used by the hospital (bundled payments or medical home model), all sourced from the AHA Annual Survey (see Table 1 for additional information). In an effort to consider community characteristics, the number of psychiatric facilities and the presence of a dependency facility within the county were sourced from the AHA Survey. Household income for the county was retrieved from the U.S. Census Bureau.

2.2 | Analytic strategy

Descriptive statistics were assessed to describe and summarize the data. Bivariate analysis was conducted to determine whether the inpatient and outpatient substance use disorder services offered by hospitals differed by the average of county overdose death rates.

Regression diagnostics were utilized to identify potential collinearity. Two-level multilevel logistic regression models were fitted to compute the fixed effect odds ratios (OR) and 95 percent confidence interval (CI). We constructed four nested models at level 1, level 2, level 3, and level 4. Model 1 constitutes an empty model without any covariate variables. This model was specified to decompose the variance in outcomes at the county levels. Model 2 was adjusted for hospital-level characteristics. Model 3 was adjusted for both hospital-level and payment characteristics. Model 4 additionally includes county-level characteristics. Intra-cluster correlation (ICC) was used to measure county-level random effects. The linear threshold model formula was used to compute the ICC.¹⁷ All analyses were conducted using SAS 9.4.¹⁸

3 | FINDINGS

Descriptive statistics show that, in spite of overdose deaths increasing between 2010 and 2015, the number of hospitals offering substance use disorder services decreased between 2010 and 2015 in both the inpatient and outpatient categories. Of the hospitals surveyed in 2015, 327 of them (9 percent of analytic sample) offered inpatient services in 2015, compared to 334 in 2010. While

86 hospitals added inpatient services over this time, 93 dropped them. Outpatient services, offered by 577 of 2015 survey respondents (15 percent of the analytic sample), were more common, but this was still lower than 2010 numbers, when 588 hospitals offered outpatient services. Over this period, 84 hospitals added outpatient services, but 95 dropped outpatient services (see Table 1).

For the inpatient dependent variable, Model 1 was an empty, baseline model. In Model 2, bed number had a significant and positive relationship with inpatient services, odds ratio (OR) (1.41). Critical access status (0.47) and for-profit ownership (0.65) had a significant and negative relationship with inpatient services. In Model 3, bed number (1.39), critical access status (0.54), and public

TABLE 1 Characteristics of the study sample by type of substance use disorder services offered. N = 3365^a

	Overall for 2015	Inpatient services offered		P	Outpatient services offered		P
	Sample	Yes	No		Yes	No	
	n (%)	n (%)	n (%)		n (%)	n (%)	
Hospital-level characteristics							
Academic medical center status (member of the Council of Teaching Hospitals)							
Yes	1076 (32.0)	158 (14.7)	918 (85.3)	<0.001	343 (31.9)	733 (68.1)	<0.001
No	2289 (68.0)	132 (5.8)	2157 (94.2)		197 (8.6)	2092 (91.4)	
Critical access status (designated critical access hospital by CMS)							
Yes	941 (28.0)	24 (2.6)	917 (97.4)	<0.001	38 (4.0)	903 (96.0)	<0.001
No	2424 (72.0)	266 (11.0)	2158 (89.0)		502 (20.7)	1922 (79.3)	
System member (member of a multi-hospital system)							
Yes	2223 (66.1)	215 (9.7)	2008 (90.3)	0.002	399 (18.9)	1824 (82.1)	<0.001
No	1142 (33.9)	75 (6.6)	1067 (93.4)		141 (12.3)	1001 (87.7)	
Public ownership (local, state, or federal government controlled)							
Yes	753 (22.4)	62 (8.2)	691 (91.8)	0.670	113 (15.0)	640 (85.0)	0.377
No	2612 (77.6)	228 (8.7)	2384 (91.3)		427 (16.4)	2185 (83.6)	
Religious affiliation (controlled by religious organization, for example, Catholic Church)							
Yes	413 (12.3)	50 (12.1)	363 (87.9)	0.007	79 (19.1)	334 (80.9)	0.069
No	2952 (87.7)	240 (8.1)	2712 (91.9)		461 (15.6)	2491 (84.4)	
For-profit ownership (investor-owned)							
Yes	403 (12.0)	20 (5.0)	383 (95.0)	0.005	24 (6.0)	379 (94.0)	<0.001
No	2962 (88.0)	270 (9.1)	2692 (90.9)		516 (17.4)	2446 (82.6)	
Hospital bed category							
0 (<6 beds)	6 (0.2)	0	6 (100.0)	<0.001	0	6 (100.0)	<0.001
1 (6-24 beds)	347 (10.3)	8 (2.3)	339 (97.7)		14 (4.0)	333 (96.0)	
2 (25-49 beds)	727 (21.6)	17 (2.3)	710 (97.7)		31 (4.3)	696 (95.7)	
3 (50-99 beds)	522 (15.5)	22 (4.2)	500 (95.8)		46 (8.8)	476 (91.2)	
4 (100-199 beds)	695 (20.6)	64 (9.2)	631 (90.8)		91 (13.1)	604 (86.9)	
5 (200-299 beds)	393 (11.7)	45 (11.5)	348 (88.5)		90 (22.9)	303 (77.1)	
6 (300-399 beds)	264 (7.8)	40 (15.2)	224 (84.8)		76 (28.8)	188 (71.2)	
7 (400-499 beds)	149 (4.4)	33 (22.2)	116 (77.8)		60 (40.3)	89 (59.7)	
8 (>499 beds)	262 (7.8)	61 (23.3)	201 (76.7)		132 (50.4)	130 (49.6)	
Payment characteristics							
Bundled payment model							
Yes	525 (15.6)	86 (16.4)	439 (83.6)	<0.001	168 (32.0)	357 (68.0)	<0.001
No	2840 (84.4)	204 (7.2)	2636 (92.8)		372 (13.1)	2468 (86.9)	
Medical home model							
Yes	930 (27.6)	124 (13.3)	806 (86.7)	<0.001	275 (29.6)	655 (70.4)	<0.001
No	2435 (72.4)	166 (6.8)	2269 (93.2)		265 (10.9)	2170 (89.1)	

(Continues)

TABLE 1 (Continued)

	Overall for 2015 Sample	Inpatient services offered		P	Outpatient services offered		P
		Yes	No		Yes	No	
	n (%)	n (%)	n (%)		n (%)	n (%)	
County characteristics							
Hospital operates in Appalachian county							
Yes	324 (9.6)	28 (8.6)	296 (91.4)	0.987	53 (16.4)	271 (83.6)	0.873
No	3041 (90.4)	262 (8.6)	2779 (91.4)		487 (16.0)	2554 (84.0)	
Number of county psychiatric hospitals							
0	2232 (66.3)	160 (7.2)	2072 (92.8)	<0.001	287 (12.9)	1945 (87.1)	<0.001
1	544 (16.2)	63 (11.6)	481 (88.4)		124 (22.8)	420 (77.2)	
2	253 (7.5)	41 (16.2)	212 (83.8)		62 (24.5)	191 (75.5)	
3	100 (3.0)	15 (15.0)	85 (85.0)		27 (27.0)	73 (73.0)	
4	97 (2.9)	1 (1.0)	96 (99.0)		8 (8.3)	89 (91.7)	
6	59 (1.8)	5 (8.5)	54 (91.5)		22 (37.3)	37 (62.7)	
10	80 (2.4)	5 (6.3)	75 (93.7)		10 (12.5)	70 (87.5)	
County has dependency facility							
Yes	81 (2.4)	6 (7.4)	75 (92.6)	0.694	19 (23.5)	62 (76.5)	0.066
No	3284 (97.6)	284 (8.7)	3000 (91.3)		521 (15.9)	2763 (84.1)	
County characteristics	Mean (SE)	Mean (SE)	Mean (SE)		Mean (SE)	Mean (SE)	
Median household income	51 524.38 (13 449.61)	55 319.0 (14 856.5)	51 166.5 (13 256.0)	<0.001	56 403.3 (15 253.5)	50 591.8 (12 870.6)	<0.001
Average county overdose rate 2010-2015	13.63 (5.82)	13.30 (5.54)	13.66 (5.84)	0.317	13.87 (5.49)	13.58 (5.88)	0.295

^aThis table describes the 2015 data for hospitals that responded to the American Hospital Association Annual Survey in both 2010 and 2015 on the key variables. The total sample for the 2010 AHA Annual Survey consisted of 6334; the total sample for the 2015 AHA Annual Survey 6251.

ownership (1.44) had a significant relationship with inpatient services. Neither payment model was significant in this model. In Model 4, bed number (1.44), critical access status (0.52), public ownership (1.55), and religious affiliation (1.49) had a significant relationship with inpatient services. Additionally, this model showed the number of psychiatric facilities in the county (0.88) and average county overdose rate during 2010-2015 (0.97) to have a significant and negative relationship to inpatient services (see Table 2).

For the outpatient dependent variable, Model 1 was an empty, baseline model. In Model 2, academic medical center status (1.65), bed number (1.45), critical access status (0.51), and for-profit ownership (0.28) had a significant relationship with outpatient services. In Model 3, academic medical center status (1.50), bed number (1.39), critical access status (0.53), and public (1.35) and for-profit ownership (0.37) had a significant relationship with outpatient services. Medical home model (1.64) was significant and positive as well. In the final model, findings from Model 3 were consistent. The county variables of household income (1.00) and operating in an Appalachian county (1.51) were both significant and positive. The number of psychiatric facilities (0.91) was significant and negative (see Table 3).

Results of random-effect measures from multilevel analysis showed that there is significant variation in the likelihood of alcohol/drug abuse or dependency inpatient and outpatient care services across counties. An examination of the ICC revealed that about 15.5 percent and 22.5 percent of the total variation in the provision of alcohol/drug or dependency inpatient and outpatient care services are attributable to county-level differences, respectively. Model 2 took into account hospital-level characteristics, and in this model, 10.9 percent and 12.1 percent of the total unexplained variation in the odds of the provision of alcohol/drug abuse or dependency inpatient and outpatient care services are attributable to unobserved county-level factors, respectively. This proportion slightly reduced to 7.7 percent and 11.3 percent once additional hospital-level payment characteristics were adjusted in Model 3. The inclusion of county-level factors in Model 4 further reduced the total unexplained variation to 3.8 percent and 10.4 percent for the provision of alcohol/drug abuse or dependency inpatient and outpatient care services. This evidence suggests the use of multilevel modeling that accounts for county-level variations is appropriate.

A post hoc logistic regression analysis was completed to assess the characteristics of hospitals that dropped or added services over

TABLE 2 Association of hospital and county-level factors and provision of inpatient substance use disorder services

Variable	Model 1 ^a		Model 2 ^b		Model 3 ^c		Model 4 ^d	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
<i>Level 1: Hospital-level characteristics</i>								
Academic medical center status			0.94 (0.69, 1.27)	0.672	0.89 (0.64, 1.24)	0.491	0.95 (0.68, 1.32)	0.759
Critical access status			0.47 (0.30, 0.78)	0.003	0.54 (0.33, 0.88)	0.013	0.52 (0.32, 0.86)	0.011
System member			1.21 (0.90, 1.62)	0.203	1.14 (0.84, 1.55)	0.405	1.21 (0.89, 1.65)	0.232
Public ownership			1.30 (0.94, 1.79)	0.111	1.44 (1.03, 2.02)	0.034	1.55 (1.10, 2.19)	0.012
Religious affiliation			1.39 (0.99, 1.95)	0.054	1.42 (0.99, 2.02)	0.055	1.49 (1.04, 2.13)	0.031
For-profit ownership			0.65 (0.43, 0.99)	0.044	0.61 (0.37, 1.00)	0.051	0.69 (0.41, 1.14)	0.143
Hospital bed category			1.41 (1.30, 1.53)	<0.001	1.39 (1.28, 1.52)	<0.001	1.44 (1.32, 1.58)	<0.001
<i>Level 2: Payment characteristics</i>								
Bundled payment model					1.31 (0.96, 1.78)	0.084	1.34 (0.98, 1.83)	0.063
Medical home model					1.10 (0.83, 1.45)	0.519	1.03 (0.77, 1.37)	0.856
<i>Level 3: County-level characteristics</i>								
Hospital operates in Appalachian county							1.33 (0.85, 2.09)	0.213
Number of county psychiatric hospitals							0.88 (0.82, 0.96)	0.003
Median household income							1.00 (1.00, 1.02)	0.065
Average county overdose rate 2010-2015							0.97 (0.94, 0.99)	0.010
County has dependency facility							0.42 (0.18, 1.01)	0.053
<i>Random effects</i>								
<i>County level</i>								
Variance (SE)	0.60 (0.20)		0.40 (0.18)		0.27 (0.18)		0.13 (0.15)	
ICC	15.5		10.9		7.7		3.8	

ICC, intra-cluster correlation coefficient.

^aModel 1 is an empty, baseline model without any exposure variable (N = 3765).

^bModel 2 is adjusted for hospital-level characteristics (N = 3765).

^cModel 3 is adjusted for hospital-level and payment characteristics (N = 3368).

^dModel 4 is adjusted for hospital-level, payment, and county-level characteristics (N = 3365).

time. One significantly associated characteristic was bed number, with larger hospitals being more likely to make either type of change. The regression also showed that public hospitals were more likely to add outpatient services than private.

4 | DISCUSSION

This analysis shows that as the urgency of the opioid crisis has heightened, the hospital population overall has not added substance use disorder services to their facilities. Although some hospitals have added these services to their facilities, even more discontinued them between 2010 and 2015. Our findings provide insight into why.

First, we see a pattern in the role of resources. As evinced by the significance of bed number (for inpatient and outpatient services) and whether a hospital is an academic medical center (for outpatient services), we see that hospital size and resources may play a role in whether a hospital feels they can offer substance use disorder services. The significance of household income (for outpatient services) may also indicate that hospitals are more likely to offer these services if they are more confident in their patients' ability to pay.

The significance of religious affiliation and public ownership of a hospital indicates that a hospital's mission or identity may also be relevant. These types of facilities are more likely to consider themselves safety net providers and therefore may be more willing to fulfill this need. Importantly, hospitals that

TABLE 3 Association of hospital and county-level factors and provision of outpatient substance use disorder services

Variable	Model 1 ^a	Model 2 ^b		Model 3 ^c		Model 4 ^d	
		OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
<i>Level 1: Hospital-level characteristics</i>							
Academic medical center status		1.65 (1.29, 2.09)	<0.001	1.50 (1.16, 1.94)	0.002	1.55 (1.19, 2.00)	0.007
Critical access status		0.51 (0.34, 0.74)	0.001	0.53 (0.36, 0.79)	0.002	0.57 (0.38, 0.86)	0.007
System member		1.20 (0.95, 1.52)	0.127	1.11 (0.87, 1.42)	0.407	1.15 (0.89, 1.47)	0.280
Public ownership		1.23 (0.94, 1.60)	0.125	1.35 (1.02, 1.78)	0.033	1.50 (1.13, 1.99)	0.005
Religious affiliation		1.09 (0.82, 1.45)	0.559	1.07 (0.79, 1.44)	0.666	1.14 (0.84, 1.54)	0.406
For-profit ownership		0.28 (0.18, 0.43)	<0.001	0.37 (0.23, 0.58)	<0.001	0.41 (0.26, 0.65)	<0.001
Hospital bed category		1.45 (1.36, 1.54)	<0.001	1.39 (1.30, 1.49)	<0.001	1.44 (1.34, 1.54)	<0.001
<i>Level 2: Payment characteristics</i>							
Bundled payment model				1.24 (0.96, 1.59)	0.094	1.23 (0.96, 1.59)	0.102
Medical home model				1.64 (1.32, 2.05)	<0.001	1.54 (1.23, 1.93)	<0.001
<i>Level 3: County-level characteristics</i>							
Hospital operates in Appalachian county						1.51 (1.05, 2.17)	0.027
Number of county psychiatric hospitals						0.91 (0.86, 0.96)	0.002
Median household income						1.00 (1.00, 1.02)	<0.001
Average county overdose rate 2010-2015						0.99 (0.97, 1.01)	0.382
County has dependency facility						0.65 (0.36, 1.16)	0.148
Random effects							
<i>County level</i>							
Variance (SE)	0.96 (0.20)	0.45 (0.16)		0.42 (0.17)		0.38 (0.15)	
ICC	22.5	12.1		11.3		10.4	

ICC, intra-cluster correlation coefficient.

^aModel 1 is an empty, baseline model without any exposure variable (N = 3765).

^bModel 2 is adjusted for hospital-level characteristics (N = 3765).

^cModel 3 is adjusted for hospital-level and payment characteristics (N = 3368).

^dModel 4 is adjusted for hospital-level, payment, and county-level characteristics (N = 3365).

employ a medical home model were more likely to offer substance use disorder services, which could be either a philosophical or financial decision. These hospitals may see substance use disorder treatment as an element of whole-person care and may have established connections with treatment providers. It is also likely that they are simply better situated to carry out the kind of collaborative, team-based work that this treatment requires. As incentives shift toward maintaining population health, hospitals may show greater interest in offering or adding these services, potentially accompanied by a decision to establish a PCMH. Additionally, hospitals that have taken on financial risk of certain populations could see substance use disorder services as an opportunity to avoid incurring future costs, such as repeat emergency visits.¹⁹

Perhaps most tellingly, hospitals in counties with psychiatric facilities were less likely to offer substance use disorder services. This

indicates that if other local entities exist, hospitals may not see offering substance use disorder services as their responsibility beyond stabilizing acutely ill patients in the emergency room. Instead, hospitals may view long-term treatment as the responsibility of facilities with specialized expertise in psychiatric and dependency treatment. This finding may also explain why outpatient services are more common in Appalachian counties, which are traditionally underserved and where hospitals may offer a broader range of services to address gaps.

4.1 | Policy implications

It may seem counterintuitive that the number of hospitals offering substance use disorder services is decreasing as need rises and as support grows for integrated care models. While other types of facilities, such as FQHCs (not considered in this study), are working

to combat the ongoing opioid crisis, there may be value in hospitals playing a greater role, particularly in areas that have few other facilities and limited social services due to geographic isolation. Based on these findings, it would be worthwhile for researchers to explore in greater detail how delivery models and payment incentives might further encourage hospitals to respond to these growing needs.

Several policy levers could help persuade or even force hospitals to invest in substance use disorder services. For example, federal tax law mandates that nonprofit hospitals carry out Community Health Needs Assessments and develop programming to address identified needs, but these regulations are underspecified and often lack oversight. Hospitals are required to solicit community feedback in identifying pressing issues but are not required to reflect that feedback in their programming. Future reforms could provide more guidance and fund oversight and enforcement.

It is likely, especially considering the high-profile nature of the opioid epidemic, that many hospitals would like to increase their work in this area but face substantial barriers or lack experience with care integration. Our findings suggest a need for coordination between government, hospital administrators, and communities. Considering the national attention that opioid misuse has gained in recent years, it is important to know whether programming is increasing. Given our finding regarding medical home participation, future research should consider whether policy developments such as the ACA and emerging models such as PCMH have encouraged additional substance use disorder services as the opioid epidemic has intensified and data have started to become available from demonstration projects.²⁰

4.2 | Limitations

The nature of the data used in this analysis lends itself to a number of limitations. Because the survey does not collect information on the presence of freestanding outpatient clinics, AHA data did not allow for consideration of their role or impact. Since AHA data do not offer a detailed understanding of emergency department admissions, our study did not enable us to consider the role of emergency departments, many of which likely serve on the front lines of the crisis. Research into the numbers of overdoses treated by emergency departments and their referral processes for ongoing treatment could provide greater insight. Additionally, the data did not provide information on community-based programs. It is possible that hospitals are partnering with other agencies, conducting educational programming or other outreach to address opioid needs, without implementing inpatient or outpatient services.

Finally, using overdose deaths as an outcome may not capture the severity of the opioid crisis in some areas. Counties that have strong emergency response efforts, such as first responder teams carrying naloxone, may have as many overdoses as other counties, but fewer deaths. Therefore, the need for treatment may be just as high, even if death rates are lower.

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ENDNOTE

* Critical access hospitals are rural hospitals with fewer than 25 beds, continuously operating emergency departments, and average stays of less than 96 hours. Designated by the Center for Medicare and Medicaid Services, these hospitals receive additional funding to improve health care access with few health care facilities.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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