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How Does DATA-Waiver Provider Patient Capacity Relate to Opioid and Buprenorphine Prescribing?

HIGHLIGHTS

This paper examines how increases in patient capacity among buprenorphine waivered providers relates to prescribing of buprenorphine and opioids at the county-level. Key findings include:

- Increases in buprenorphine capacity of one patient per 100 residents predicts a 3.8% increase in buprenorphine prescribing.
- The same increase in buprenorphine capacity predicts a 2.3% decrease in other opioid prescribing.
- This relationship appears to be driven by metropolitan counties, as no statistically significant relationship between patient capacity and buprenorphine and other opioid prescribing was identified in non-metropolitan counties.

Introduction

Opioid misuse and use disorder continue to be a significant public health crisis in the United States. In response to the crisis, interventions are being implemented at the state and federal level to reduce opioid prescribing and to increase access to treatment among individuals with opioid use disorder (OUD) (HHS 2018). Expanded utilization of medication-assisted treatment (MAT) is an important component of this intervention, as MAT has been demonstrated to be cost effective and associated with reduced opioid misuse and opioid related mortality (Wen, Borders, & Cummings 2019). Despite current policy efforts, MAT remains significantly under-utilized, as some research has found that less than one-fifth of individuals with OUD received any addiction treatment (Saloner, Stoller, & Alexander 2018; Novak et al. 2019).

Office-based treatment with buprenorphine has the potential to significantly increase access to treatment for OUD (Saloner, Stoller, & Alexander 2018). The Drug Addiction Treatment Act (DATA) of 2000 created a program of waivers for qualified physicians to prescribe buprenorphine for OUD in the office-based setting, outside of federally-registered opioid treatment programs. Until 2016, DATA-waivered physicians could treat up to 30 patients at a time during the first year of the waiver and could increase the limit to 100 patients after one year. In 2016, a regulatory change expanded these limits by allowing physicians to increase their patient limit to 275 (after a year at the 100-patient

limit), and the Comprehensive Addiction and Recovery Act included a provision that permitted nurse practitioners and physician assistants to obtain a DATA-waiver after completing certain training requirements. The Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment Act of 2018 further expanded waiver access to other mid-level providers, such as certified midwives.

Despite these efforts, little is known about how changes in patient capacity among buprenorphine waivered providers relate to prescribing of buprenorphine and other opioids at the county-level. This is an important gap because although research has generally found a positive correlation between the number of providers with a waiver and the number of buprenorphine prescriptions (Dick et al. 2015), not all waivered providers prescribe to their maximum patient limit (Stein et al. 2016). Further motivation for this study lies in the evidence that the availability of waivered providers varies substantially across counties, especially in rural counties where many of them lack even one waivered provider (Ghertner 2019). Understanding how increases in county-level buprenorphine patient capacity correlates to changes in buprenorphine and opioid prescribing is important to understand the public health impacts of expanded access to buprenorphine waivered providers.

This study uses statistical methods to identify how changes in total buprenorphine treatment capacity predict changes in buprenorphine and non-buprenorphine opioid prescribing. The study focuses on nine states with complete data: California, Idaho, Kentucky, Louisiana, Ohio, Texas, Virginia, Washington, and West Virginia. Details on data sources and analytic methods can be found in the Appendix, along with detailed statistical output.

Increases in Buprenorphine Treatment Capacity Predict Increases in Buprenorphine Prescribing and Decreases in Other Opioid Prescribing

From 2016 to 2017, 48% of counties in our sample experienced an increase in buprenorphine patient capacity. The mean increase in capacity was 0.25 patients per 100 residents. At the same time, counties on average experienced a 8.0% decrease in non-buprenorphine opioid prescribing, and a 9.4% increase in buprenorphine prescribing.

In general, increases in buprenorphine patient capacity predicted increases in buprenorphine prescribing. As seen in Table 1 reports, on average increases in buprenorphine capacity of 1 patient per 100 residents predicted a 3.9% increase in buprenorphine prescribing. The relationship appears to be driven by metropolitan counties, where a capacity increase of 1 patient per 100 residents predicted a 6.4% in buprenorphine prescribing. We found no statistically significant relationship between buprenorphine prescribing and patient capacity in non-metropolitan areas.

Increases in buprenorphine patient capacity predicted decreases in non-buprenorphine opioid prescribing. On average increases in buprenorphine capacity

of 1 patient per 100 residents predicted a 2.4% decrease in non-buprenorphine opioid prescribing. Again, the relationship was stronger in metropolitan counties. No significant relationship was found in non-metropolitan counties.

TABLE 1. Predicted Change in Prescription Rates following Increase in Buprenorphine Patient Capacity of 1 Patient per 100 Residents, 2016-2017		
	Buprenorphine Rx	**Non-Buprenorphine Opioids Rx**
All Counties	3.7%* (0.1%, 6.7%)	-2.3%*** (-3.5%, -1.1%)
Metropolitan Counties	6.1* (1.3%, 11.0%)	-3.7%*** (-5.8%, -1.6%)
Non-Metropolitan Counties	1.3% (-0.6%, 3.4%)	-0.1% (-0.1%, 0.1%)
NOTES: Estimates in each cell are from a separate statistical model. See Table A1 in the Appendix for detailed output. Robust 95% confidence intervals in parentheses. *** p<0.001, ** p<0.01, * p<0.05. N: All Counties=1,607; Metro=669, Non-Metro=938		

Discussion

The findings from the study show that an increase in patient capacity among buprenorphine waivered providers are associated with an increase in buprenorphine prescribing and a decrease in non-buprenorphine opioid prescriptions. This study did not identify if there is a differential effect of increasing the number of waivered providers vis-à-vis increasing individual provider capacity.

Our study revealed a significant difference in the relationship between patient capacity and opioid prescribing between metropolitan and non-metropolitan counties. While an increase in patient capacity among waivered providers was associated with buprenorphine and non-buprenorphine opioid prescribing in metropolitan counties, it had no statistically significant relationship with prescribing in non-metropolitan counties.

This implies that the marginal effect of buprenorphine waivered providers is much smaller in non-metropolitan counties where inadequate access to OUD treatment is a significant problem and thus small increases in patient capacity among waivered providers might not necessarily translate into expanded access to treatment. It may take more substantial efforts to increase provider availability and capacity in non-metropolitan counties to have the intended effect of increased treatment. Previous research has documented that a large percentage of waivered providers do not opt to be publicly listed (Ali et al. 2019) and the lack of a significant relationship in non-metropolitan counties might imply that such a relationship might be conditional on provider visibility. The role of waivered providers' public listing status on buprenorphine and non-opioid agonist therapy (non-OAT) opioid prescribing might be an important direction for future studies to consider.

The findings of our study should be viewed in the context of some limitations. First, the data and methods do not permit causal estimates, and results should not be interpreted to reflect causal findings. Second, the data were drawn from select U.S. states and thus our findings might not be nationally representative. However, given the wide variation in regions that the county information are drawn from, the findings of the study are still policy relevant. Third, our data did not allow us to identify individual provider prescribing

behavior, thus we are unable to identify provider-level characteristics that might be correlated with opioid and buprenorphine prescribing behavior. Finally, providers were not required to renew their DATA-waivers with Substance Abuse and Mental Health Services Administration (SAMHSA); however, they must renew their Drug Enforcement Administration (DEA) registrations in order to continue prescribing controlled substances at all. Consequently, SAMHSA's database likely over-counts practicing DATA-waivered providers by including some who have allowed their DEA registrations to lapse.

Availability of buprenorphine treatment is an essential component in ensuring access to treatment among individuals with OUD across the Unites States. Office-based opioid treatment has the capacity to reach individuals needing treatment, and provide additional settings and practitioners to prescribe buprenorphine. The findings from this study suggest that provider patient capacity is an important element in increasing buprenorphine utilization and reducing opioid prescribing.

References

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Appendix: Data, Methodology and Detailed Statistical Results

Data Sources and Measures

Data on opioid prescriptions are drawn from the Prescription Behavioral Surveillance System housed at Brandeis University, which compiles data from state prescription drug monitoring programs (PDMPs). The non-OAT opioid prescription rate is measured as total opioid prescriptions in a county-year per 1,000 population, excluding all buprenorphine and methadone prescriptions. The buprenorphine prescription rate is the total buprenorphine prescriptions in a county-year per 1,000 population, and is not restricted to prescribing for MAT for OUD.

Data on buprenorphine patient capacity are drawn from administrative records from the SAMHSA Center for Substance Abuse Treatment. This includes all providers with a DATA-waiver to prescribe buprenorphine for OUD, including both those listed in SAMHSA's publicly-available Treatment Locator, as well as those not listed. Data were collected in July 2016 and June 2017. The number of waivered providers is fluid throughout the year, as they get initial waivers or change their patient limits. Patient capacity is measured as the sum of the patient limit for all waivered providers in a county, per 100 residents.

Counties are classified as metropolitan or non-metropolitan based on urban influence codes for 2013, created by the Economic Research Service at the U.S. Department of Agriculture. Control variables in the analysis include the following demographic and socioeconomic factors at the county-level: population race/ethnicity, age, poverty, median income, unemployment, and labor force participation. Health care access measures include primary care physicians per capita from the American Medical Association Physician Masterfile, and the number of prescribers reported in state PDMPs. In addition, the models include percent of the population receiving Supplemental Security Income, the percent enrolled in Medicare, and the illicit drug overdose rate per 100,000 residents.

Study Sample

The unit of analysis for this study is the United States county. Data were available for 2016 and 2017 in nine states from different geographic regions of the country: California, Idaho, Kentucky, Louisiana, Ohio, Texas, Virginia, Washington, and West Virginia. After accounting for missing data, the final sample includes 1,607 counties.

Statistical Methods

This study uses population-weighted linear regression models, with the outcome variables being opioid and buprenorphine prescribing rates in a county. Aside from the control variables listed above, models include county and year fixed effects. This accounts for county-specific factors that are not easily measured by control variables, and estimates how the average county's opioid prescribing changes with changes in buprenorphine capacity. Separate models were run for each opioid prescribing measure. Models were run for all counties, and then separate models were estimated

for metropolitan counties and non-metropolitan counties. All modeling incorporates robust standard errors.

TABLE A1. Model Summary Statistics		
	Mean	St. Dev.
Buprenorphine Rx	18.43	36.46
Non-Buprenorphine Opioid Rx	191.86	171.97
Buprenorphine Patient Capacity per 100	0.48	1.04
Population (1000s)	121.42	485.14
Black (percent)	8.95	12.14
White (percent)	73.06	22.19
Hispanic (percent)	15.62	20.39
Median Income (1000s)	34.57	9.38
Poverty Rate	16.87	6.41
Unemployment Rate	5.39	2.03
Labor Force Participation Rate	56.94	9.03
Pharmacies Reporting to PDMP	15.42	81.24
Primary Care Physician Rate (per 1000)	48.48	34.17
Medicare Enrollees (percent)	20.85	5.23
SSI Enrollees (percent)	0.03	0.02
Drug Overdose Death Rate	22.7	11.6

TABLE A2. Regression Results for Buprenorphine Prescribing			
	All Counties	Metropolitan Counties	Non-Metropolitan Counties
Buprenorphine Patient Capacity per 100	0.037* (0.015)	0.061* (0.025)	0.014 (0.010)
Population (log)	1.414 (0.789)	1.591 (0.961)	1.539 (0.997)
Black (percent)	0.057 (0.062)	-0.009 (0.069)	0.119 (0.182)
White (percent)	0.122*** (0.035)	0.096** (0.037)	-0.016 (0.179)
Hispanic (percent)	0.042 (0.041)	0.038 (0.043)	-0.140 (0.189)
Percentage of population age 0-17	0.086* (0.040)	0.109* (0.055)	-0.004 (0.033)
Percentage of population age 65 and over	0.149* (0.059)	0.101 (0.109)	0.160*** (0.045)
Median Income (log)	0.006 (0.006)	0.007 (0.006)	0.056 (0.149)
Poverty Rate	-0.001 (0.004)	-0.006 (0.006)	0.006 (0.004)
Unemployment Rate	-0.009 (0.012)	-0.010 (0.018)	0.005 (0.011)
Labor Force Participation Rate	0.014* (0.007)	0.013 (0.010)	0.014* (0.007)
Pharmacies Reporting to PDMP (log)	0.004 (0.043)	-0.096 (0.104)	0.057 (0.031)
Primary Care Physicians (log)	0.005 (0.004)	-0.032 (0.129)	0.003 (0.004)
Medicare Enrollees (percent)	0.003 (0.038)	0.046 (0.095)	0.015 (0.019)
SSI Enrollees (percent)	-2.332 (8.550)	-3.567 (16.524)	-1.137 (5.856)
Drug Overdose Death Rate	0.059 (0.046)	0.051 (0.047)	0.056 (0.062)
Year=2017	0.036 (0.026)	0.021 (0.042)	0.058** (0.022)
Constant	-31.507** (11.559)	-32.027* (14.479)	-16.693 (24.535)
N	1,607	669	938
F (degrees of freedom)	12.996 (16, 832)***	7.622 (16, 347)***	15.608 (16, 484)***
Adj. R^2	0.367	0.367	0.428
NOTES: Cluster-robust standard errors in parenthesis. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.			

TABLE A3. Regression Results for Non-Buprenorphine Opioid Prescribing			
	All Counties	Metropolitan Counties	Non-Metropolitan Counties
Buprenorphine Patient Capacity per 100	-0.023*** (0.006)	-0.037*** (0.011)	-0.004 (0.003)
Population (log)	0.853* (0.381)	0.809 (0.462)	0.531 (0.326)
Black (percent)	0.017 (0.026)	0.035 (0.030)	0.049 (0.050)
White (percent)	0.010 (0.015)	0.015 (0.018)	0.068 (0.044)
Hispanic (percent)	0.051* (0.020)	0.049* (0.023)	0.140** (0.044)
Percentage of population age 0-17	-0.035 (0.018)	-0.041 (0.028)	-0.005 (0.015)
Percentage of population age 65 and over	-0.102*** (0.024)	-0.120* (0.049)	-0.075*** (0.017)
Median Income (log)	0.017*** (0.003)	0.016*** (0.003)	-0.153** (0.052)
Poverty Rate	-0.002 (0.002)	-0.002 (0.003)	-0.003* (0.001)
Unemployment Rate	-0.005 (0.007)	0.005 (0.010)	-0.012** (0.004)
Labor Force Participation Rate	-0.002 (0.003)	-0.001 (0.005)	-0.010*** (0.003)
Pharmacies Reporting to PDMP (log)	-0.013 (0.015)	-0.049 (0.046)	-0.001 (0.012)
Primary Care Physicians (log)	-0.003 (0.002)	0.098 (0.054)	-0.002 (0.001)
Medicare Enrollees (percent)	0.015 (0.018)	0.022 (0.048)	0.006 (0.009)
SSI Enrollees (percent)	-5.632 (4.917)	-10.288 (9.284)	2.047 (2.067)
Drug Overdose Death Rate	0.000 (0.022)	0.003 (0.024)	0.019 (0.020)
Year=2017	-0.059*** (0.013)	-0.050** (0.019)	-0.071*** (0.008)
Constant	-7.261 (5.236)	-7.707 (6.627)	-4.637 (5.771)
N	1,607	669	938
F (degrees of freedom)	57.404 (16, 832)***	43.080 (5, 347)***	68.691 (16, 484)***
Adj. R^2	0.742	0.762	0.731
NOTES: Cluster-robust standard errors in parenthesis. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.			

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