



State Variation in Medicaid Prescriptions for Opioid Use Disorder from 2011 to 2018

Lisa Clemans-Cope, Victoria Lynch, Emma Winiski, and Marni Epstein

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Expanding access to effective treatment for opioid use disorder (OUD) is essential to staunching the opioid epidemic. Access to these treatments is particularly important in Medicaid, which covers a disproportionately large share of people with OUD (MACPAC 2017). Despite strong evidence supporting the effectiveness of pharmacotherapy for OUD (sometimes called medication-assisted treatment), research indicates that most people with OUD do not receive treatment (Clemans-Cope, Lynch, et al. 2019; Saloner and Karthikeyan 2015). Three medications—buprenorphine, methadone, and naltrexone—are approved by the Food and Drug Administration (FDA) for OUD treatment and have well-documented benefits.¹ This brief uses Medicaid State Drug Utilization Data (SDUD) to assess buprenorphine maintenance treatment in Medicaid. We estimated trends from 2011 to 2018 and patterns across states and the District of Columbia, which we consider a state for this analysis.

We find the following:

- The number of Medicaid-covered prescriptions for buprenorphine maintenance treatment filled or dispensed in pharmacies and providers' offices in the United States increased almost fivefold between 2011 and 2018, from 1.3 million to 6.2 million. In 2018, 4.8 million, or 77.2 percent, of these prescriptions were in states that expanded Medicaid under the Affordable Care Act (ACA) by early 2014.

- The national estimate of Medicaid prescriptions for buprenorphine maintenance treatment per 1,000 enrollees ages 12 and older (the “prescribing rate”) increased from 36 in 2011 to 124 in 2018. On average, the buprenorphine prescribing rate was far lower in nonexpansion states than in other states. Between 2011 and 2018, Medicaid prescriptions for buprenorphine maintenance treatment per 1,000 enrollees increased from 40 to 138 among states that expanded Medicaid by early 2014 and from 16 to 41 in nonexpansion states.
- We found substantial variation in states’ prescribing rates in 2018, with the highest rate, 1,210 in Vermont, being 200 times greater than the lowest rate of 5 in Arkansas. We also compare deciles of states’ prescribing rates: Ohio, at the 90th percentile (with the fifth-highest rate), has a rate of 438, 31 times greater than the rate of 14 in Kansas, which is at the 10th percentile (with the fifth-lowest rate).
- The states with buprenorphine prescribing rates at or above the 90th percentile were Ohio (438), Montana (588), Kentucky (662), West Virginia (827), and Vermont (1,210); those with rates at or below the 10th percentile were Arkansas (5), Texas (8), South Dakota (11), Florida (12), and Kansas (14).
- At 1,210 prescriptions for buprenorphine maintenance treatment per 1,000 Medicaid enrollees in 2018, Vermont’s prescribing rate is 46 percent higher than the next highest rate. Though Vermont’s higher rate likely relates to greater treatment needs than those of the nation overall, they also likely reflect increased OUD treatment capacity and coverage under the Medicaid expansion. Reportedly, 73 percent of Vermonters with OUD were in treatment in 2014, and by 2017, Vermont eliminated treatment wait lists in every county. Vermont’s higher prescribing rate may also reflect higher dosing (e.g., 16 mg buprenorphine taken as two 8 mg tablets). Because growing evidence suggests higher doses of buprenorphine (e.g., 16–32 mg) are more efficacious than lower doses, Vermont’s higher prescribing rate could reflect clinically effective dosing.
- Though state-level differences in prescribing rates may partially reflect differences in underlying rates of OUD and prescription-writing practices, it is unlikely that such factors account for the 31-fold state variation in prescriptions per enrollee we find in 2018. The low buprenorphine prescribing rates in many Medicaid programs suggest states may need to take up policy solutions addressing barriers to treatment and retention, including expanding coverage under the ACA, increasing treatment capacity, and improving treatment effectiveness.

Introduction

As noted, expanding access to effective OUD treatment is essential to staunching the opioid epidemic, especially in Medicaid, which covers a disproportionately large share of people with OUD (MACPAC 2018). Despite the strong evidence supporting the effectiveness of pharmacotherapy for OUD (sometimes called medication-assisted treatment), only about one-fifth of people with OUD receive

treatment (Saloner and Karthikeyan 2015). Three medications used in OUD pharmacotherapy—buprenorphine, methadone, and naltrexone—are FDA approved for treating OUD and have well-documented benefits.² This brief focuses on buprenorphine maintenance treatment.

Before the ACA, many low-income adults lacked access to affordable health insurance that covered OUD treatment, and OUD treatment rates did not increase in the years before the ACA, even as OUD rates rose (Saloner and Karthikeyan 2015). With the ACA, low-income adults with OUD in states that expanded Medicaid gained coverage including at least one type of buprenorphine maintenance treatment (Grogan et al. 2016), and coverage of more types has been growing (Miller 2018; SAMHSA 2018). In contrast, low-income uninsured adults in states that have not expanded Medicaid under the ACA are less likely to have access to affordable OUD treatment. Research finds that Medicaid-covered OUD treatment increased more in 2014 in states that expanded Medicaid under the ACA (Wen et al. 2017). Subsequent research shows a larger increase in Medicaid-reimbursed prescriptions and Medicaid coverage for OUD treatment in expansion states than in other states from 2010 to 2015 (Maclean and Saloner 2017). In prior analysis of data from 2011 to 2016, we found buprenorphine receipt and spending increased under Medicaid after 2014, particularly in states that expanded Medicaid by early 2014 (Clemans-Cope, Lynch, et al. 2017), and these trends continued into 2017 (Clemans-Cope, Epstein, Lynch, et al. 2019).

This analysis focuses on Medicaid coverage of buprenorphine maintenance treatment, including the combination buprenorphine-naloxone medication, where naloxone is added to buprenorphine to deter misuse. As of October 2018, Medicaid programs covered buprenorphine for OUD in all states, and several states expanded access to buprenorphine through policies such as eliminating prior authorization requirements (Miller 2018). However, some state Medicaid programs have prior authorization requirements for buprenorphine treatment or require reauthorization or documentation of participation in counseling, and most apply dosage limits, such as a maximum daily dose of 16 or 32 mg.

In this brief, we use Medicaid SDUD to estimate trends and patterns across states in prescriptions for buprenorphine maintenance treatment per 1,000 Medicaid enrollees from 2011 to 2018. We examined trends overall, by state, and by states' Medicaid expansion status and timing. This analysis draws from methods used in a recent study of state-level variation in opioid prescribing in Medicaid programs (Schieber et al. 2019).

Methods

We used Medicaid SDUD files from 2011 to 2018 to assess prescriptions for buprenorphine medications FDA approved for OUD treatment. We identified OUD- and opioid overdose-related prescriptions by linking the National Drug Code numbers in Medicaid SDUD with drug information published by the FDA. Medicaid SDUD exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics (MACPAC 2018; Murrin 2016). In addition, methadone OUD treatment, dispensed only at opioid

treatment programs, is not included in Medicaid SDUD. Thus, the SDUD exclude all Medicaid reimbursements of OUD medication treatments. Because Medicaid SDUD suppress data for National Drug Code state quarters with fewer than 11 prescriptions, we imputed the missing prescription count data based on an analysis of one year (2014) of claims-level data from the Medicaid Statistical Information System (MSIS).

We computed estimated 2018 buprenorphine maintenance treatment prescription counts by aggregating data for the first three quarters of 2018 (for which revised data are available) plus an imputed count for the fourth quarter of 2018, estimated by multiplying the third quarter of 2018 prescription count by the average percentage change over the past four quarters. We computed trends spanning 2011 through estimated 2018 as the mean annual percentage change. We computed trends of shorter time segments as the annual percentage change.

Following research assessing variation in states' prescribing patterns (Schieber et al. 2019), we quantified state-level geographic differences in buprenorphine maintenance treatment prescriptions by comparing the lowest and highest rates estimated across states, as well as by comparing the rates for the states at the 10th and 90th percentiles. We used the ratio between the estimate for the state at the 90th percentile and the state at the 10th percentile to assess the relative difference between states.

To confirm our findings in the Medicaid SDUD, we checked them against the most recent quarter of MSIS enrollee-level prescription data covered by our current data usage agreement with the Centers for Medicare & Medicaid Services.³ We examined buprenorphine maintenance treatment prescription counts for enrollees with any buprenorphine prescription for OUD in the MSIS for six states, with a particular focus on Vermont, which stood out in the SDUD. To inform interpretation of the SDUD estimates, we also examined prescriptions per month using the MSIS.

Key Measures

Buprenorphine maintenance treatment prescription counts show the number of buprenorphine prescriptions FDA approved for OUD treatment filled and dispensed in outpatient settings, such as pharmacies, and processed as Medicaid outpatient drug claims.

The number of Medicaid enrollees ages 12 and older by state is the estimated annual Medicaid enrollment of full-benefit enrollees ages 12 and older from 2011 to 2018. We used multiple data sources, including person-level analytical data files of administrative records from the MSIS and the Medicaid Analytic eXtract, to directly derive enrollment counts, using data from those in the universe of interest.⁴ We adjusted counts based on relevant MSIS/Medicaid Analytic eXtract data and/or reports states submitted to the Centers for Medicare & Medicaid Services with broader Medicaid population counts.

Buprenorphine maintenance treatment prescriptions per 1,000 Medicaid enrollees ages 12 and older, or the prescribing rate, divide buprenorphine maintenance treatment prescriptions by the estimated number of Medicaid enrollees ages 12 and older (in thousands) in each state and year. We derive this

rate from three factors: prevalence of OUD, treatment and retention rates, and treatment dose. In this dataset, the share of Medicaid enrollees with OUD and the treatment rate are unknown. In addition, treatment dose may be reflected as higher prescribing rates in this data. For example, a typical dose of 16 mg buprenorphine is commonly taken as two 8 mg tablets and could appear in the dataset as two separate prescriptions (ASAM 2015).

The relative variation ratio measures relative state variation as the ratio of the 90th-percentile state to the 10th-percentile state. The 90th-percentile state has the fifth-highest prescribing rate and the 10th-percentile state has the fifth-lowest prescribing rate.

Medicaid Expansion Status and Timing

As shown in tables 1 and 2, we categorize states into four groups by the timing and status of their action on Medicaid expansion, either through the ACA or by waiver (Sommers et al. 2013):⁵

- “Early 2014 expansion states” are the 25 states and the District of Columbia that expanded Medicaid through the ACA or a waiver on or before April 2014; some states expanded Medicaid under the ACA in early 2014 or had expanded eligibility for adults before the ACA.
- “Later 2014–16 expansion states” are the six states that expanded Medicaid between April 2014 and August 2016.
- “2019 expansion states” are the two states that expanded Medicaid after December 2018.
- “Nonexpansion states” are the 17 states that had not implemented a Medicaid expansion by January 2019.

TABLE 1

States Classified by Medicaid Expansion Status

State	Expansion date	State	Expansion date
Early 2014 expansion states		Late 2014–16 expansion states	
Arizona ^a	1/1/2014	Alaska	9/1/2015
Arkansas ^a	1/1/2014	Indiana ^a	2/1/2015
California	7/1/2010	Louisiana	7/1/2016
Colorado	4/1/2012	Montana ^a	1/1/2016
Connecticut	4/1/2010	New Hampshire ^a	8/15/2014
Delaware	1/1/2014	Pennsylvania	1/1/2015
District of Columbia	7/1/2010	2019 expansion states	
Hawaii	1/1/2014	Maine	1/10/2019
Illinois	1/1/2014	Virginia	1/1/2019
Iowa ^a	1/1/2014	Nonexpansion states	
Kentucky ^a	1/1/2014	Alabama	
Maryland	1/1/2014	Florida	
Massachusetts	1/1/2014	Georgia	
Michigan ^a	4/1/2014	Idaho ^b	
Minnesota	3/1/2010	Kansas	
Nevada	1/1/2014	Mississippi	
New Jersey	4/14/2011	Missouri	
New Mexico	1/1/2014	Nebraska ^b	
New York	1/1/2014	North Carolina	
North Dakota	1/1/2014	Oklahoma	
Ohio	1/1/2014	South Carolina	
Oregon	1/1/2014	South Dakota	
Rhode Island	1/1/2014	Tennessee	
Vermont	1/1/2014	Texas	
Washington	1/3/2011	Utah ^b	
West Virginia	1/1/2014	Wisconsin ^c	
		Wyoming	

Notes: ^a These states used Section 1115 waivers for Medicaid expansion.

^b These states approved Medicaid expansion via ballot initiatives but have yet to implement it.

^c Wisconsin did not expand Medicaid under the Affordable Care Act but has Medicaid eligibility for adults with incomes up to the federal poverty level.

TABLE 2

Medicaid Enrollees Ages 12 and Older, 2011 to Projected 2018, by Medicaid Expansion Status

In millions

Year	Total	Early 2014 expansion	Late 2014–16 expansion	2019 expansion	Nonexpansion
2011	36.2	21.4	3.1	0.8	10.8
2012	37.8	22.5	3.2	0.8	11.2
2013	39.2	23.7	3.3	0.9	11.4
2014	48.4	32.8	3.2	0.7	11.7
2015	51.4	34.9	3.8	0.8	12.0
2016	52.2	35.2	4.1	0.8	12.1
2017	52.6	35.1	4.4	0.8	12.3
Projected 2018	52.8	34.7	4.6	0.8	12.6

Source: Estimates are based on analyses of several administrative datasets, including the Medicaid Statistical Information System and the Medicaid Analytic eXtract.

Note: See the Medicaid enrollment methodology appendix for more detail (Lynch, Winiski, and Clemans-Cope 2019).

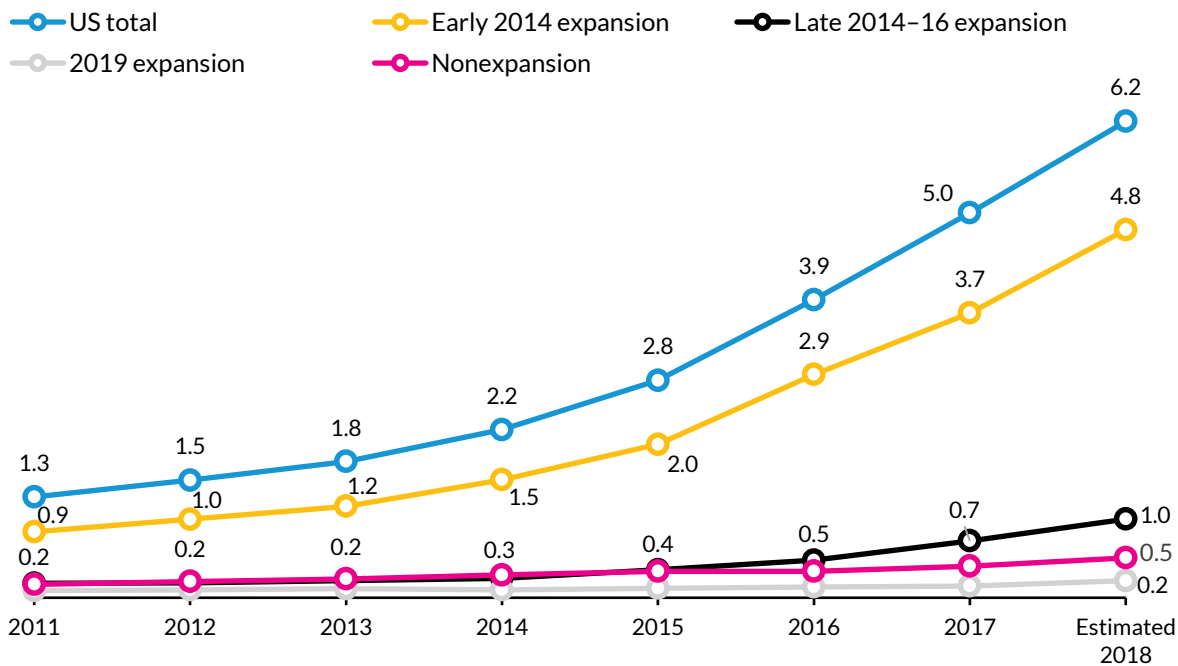
Findings

Trends in Medicaid-Funded Buprenorphine Maintenance Treatment Prescriptions, 2011 to 2018

In 2011, 1.3 million buprenorphine maintenance treatment prescriptions were filled or dispensed in pharmacies and providers' offices in the United States, and by 2018, this number rose to 6.2 million (figure 1). Most prescriptions were from states that expanded Medicaid by early 2014, accounting for 77.2 percent of the total, or an estimated 4.8 million prescriptions in 2018.

FIGURE 1
Annual Buprenorphine Maintenance Treatment Prescriptions, by State Medicaid Expansion Status, 2011 to 2018 (Estimated)

Millions



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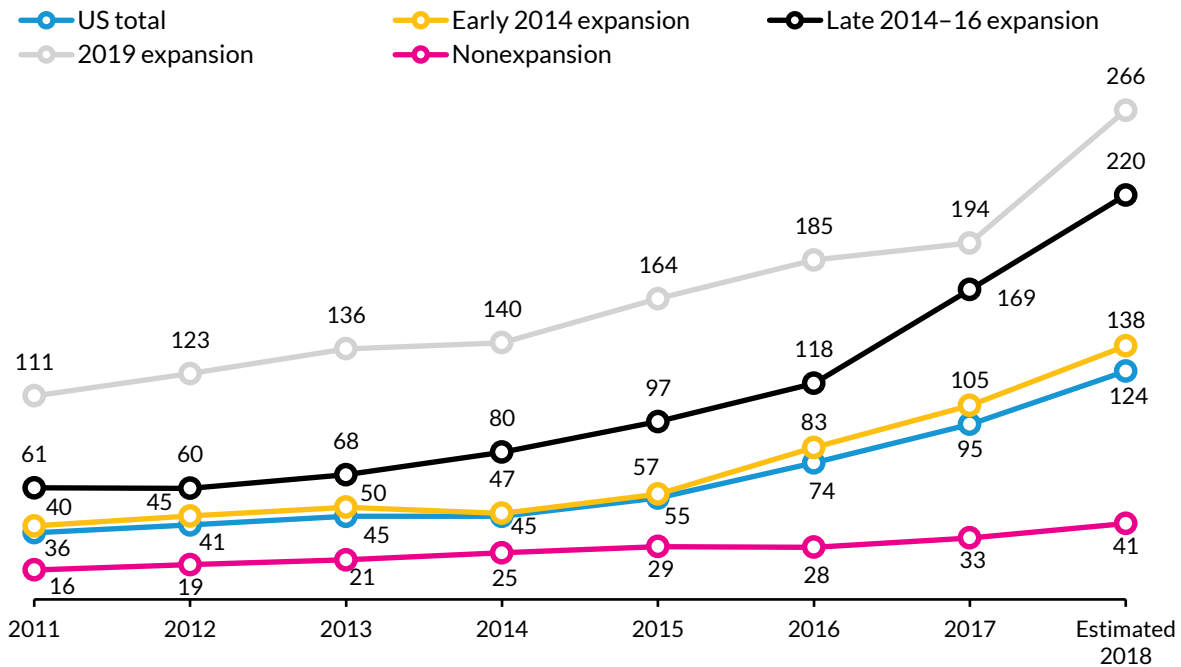
Source: Urban Institute analysis of Medicaid State Drug Utilization Data from the Centers for Medicare & Medicaid Services.

Notes: The Medicaid State Drug Utilization Data exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics. See the methodological appendices for more details (Clemans-Cope, Epstein, Winiski, et al. 2019; Lynch, Winiski, and Clemans-Cope 2019).

Buprenorphine maintenance treatment prescriptions per 1,000 Medicaid enrollees ages 12 and older increased across all states, from 36 in 2011 to 124 in 2018, but per enrollee prescriptions were far lower for nonexpansion states than other groups (figure 2). In early 2014 Medicaid expansion states,

rates increased from 40 to 138 prescriptions per 1,000 Medicaid enrollees between 2011 and 2018 while this rate increased from 16 to 41 in nonexpansion states.

FIGURE 2
Annual Buprenorphine Maintenance Treatment Prescriptions per 1,000 Medicaid Enrollees Ages 12 and Older, by State Medicaid Expansion Status, 2011 to 2018 (Estimated)



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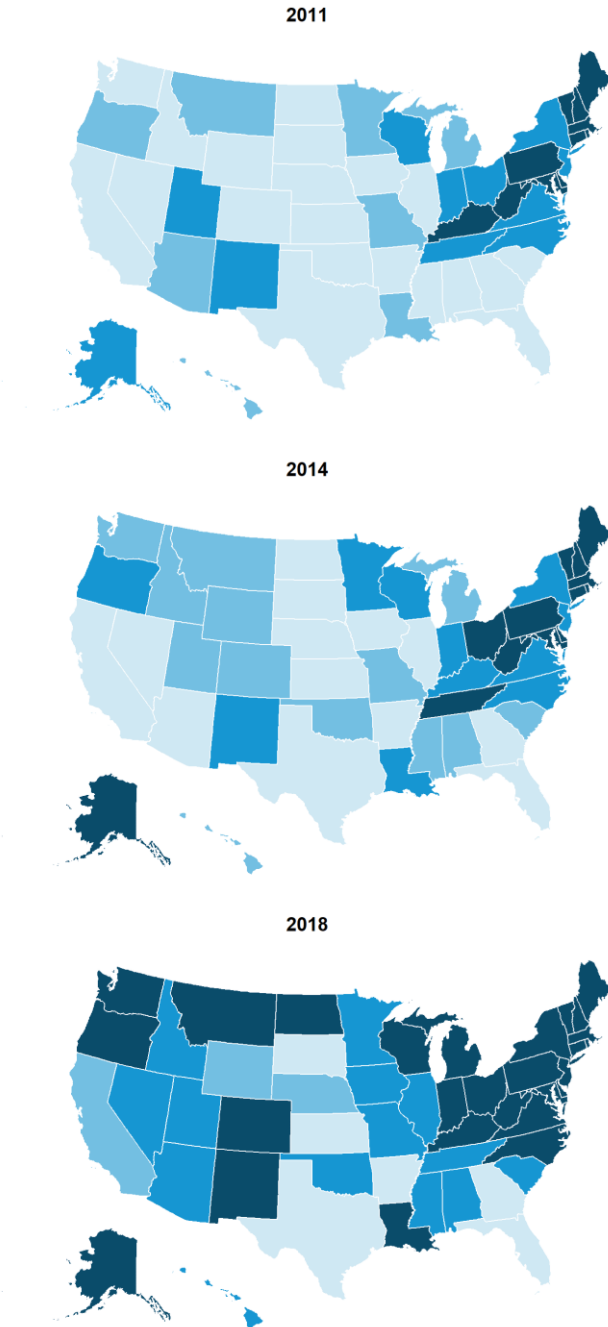
Source: Urban Institute analysis of Medicaid State Drug Utilization Data from the Centers for Medicare & Medicaid Services.
Notes: The Medicaid State Drug Utilization Data exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics. See the methodological appendices for more details (Clemans-Cope, Epstein, Winiski, et al. 2019; Lynch, Winiski, and Clemans-Cope 2019).

Buprenorphine maintenance treatment prescribing rates varied widely across states and geographic areas (figure 3). In 2011, buprenorphine maintenance treatment prescriptions per enrollee were highest in New England and parts of Appalachia, and by 2018, several additional regions across the United States had increased prescribing rates, including the Middle Atlantic, East North Central, and Northern Pacific states.

FIGURE 3

Number of Buprenorphine Maintenance Treatment Prescriptions per 1,000 Medicaid Enrollees, All States and the District of Columbia, 2011, 2014, and 2018

<14 14 to < 24 24 to < 80 >= 80



Notes: Prescriptions per 1,000 Medicaid enrollees ages 12 and older were derived from all buprenorphine maintenance treatment prescriptions in Medicaid State Drug Utilization Data for each state and the District of Columbia in that year. The 2014 quartiles were used as the break points for all three maps. The Medicaid State Drug Utilization Data exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics. See the methodological appendices for more details (Clemans-Cope, Epstein, Winiski, et al. 2019; Lynch, Winiski, and Clemans-Cope 2019).

Differences across States in Buprenorphine Maintenance Treatment Prescriptions per Enrollee, 2011–18

As shown in table 3, we found substantial variation across states' estimated number of prescriptions for buprenorphine maintenance treatment per 1,000 Medicaid enrollees, with the highest rate, 1,210 in Vermont, 200 times greater than the lowest rate of 5 in Arkansas.

TABLE 3

Buprenorphine Maintenance Treatment Prescriptions per 1,000 Medicaid Enrollees Ages 12 and Older, All States and the District of Columbia, 2011, 2014, and 2018

By 2018 deciles of prescriptions

State	Total BMT Prescriptions per 1,000 Medicaid Enrollees			Rank
	2011	2014	2018	
VT	590.9	784.1	1,209.8	1
WV	143.9	210.1	826.6	2
KY	92.9	28.2	662.2	3
MT	19.8	21.5	587.5	4
OH	54.9	116.4	437.7	5
ME	206.8	281.0	403.5	6
MA	175.4	172.8	384.3	7
DE	93.4	127.8	291.2	8
MD	126.2	153.6	283.5	9
IN	31.8	53.5	256.2	10
NH	81.5	147.8	246.1	11
OR	15.8	58.2	236.1	12
PA	89.0	108.7	224.3	13
VA	60.8	79.9	217.5	14
RI	93.9	155.9	207.5	15
CT	104.7	131.2	186.9	16
AK	45.1	81.8	182.8	17
WA	11.4	18.6	145.5	18
NC	33.4	70.8	139.2	19
NM	28.5	78.0	139.2	20
WI	34.4	48.8	108.5	21
LA	21.8	29.1	99.3	22
CO	7.2	21.9	97.6	23
NJ	40.5	47.9	88.2	24
MI	19.0	17.3	84.9	25
NY	45.4	49.0	82.5	26
ND	13.8	12.2	81.6	27
AL	12.4	23.1	65.1	28
AZ	22.9	12.3	64.0	29
MO	16.3	20.3	63.0	30
UT	32.3	24.7	62.3	31

State	Total BMT Prescriptions per 1,000 Medicaid Enrollees			Rank
	2011	2014	2018	
DC	21.7	36.3	58.4	32
SC	14.5	19.9	51.9	33
ID	13.9	18.7	49.3	34
MN	16.5	26.3	48.8	35
IL	12.3	5.6	47.3	36
TN	61.8	89.4	35.1	37
OK	9.4	16.7	33.7	38
MS	10.4	16.5	33.5	39
IA	4.5	5.8	31.4	40
HI	15.1	23.0	31.4	41
NV	4.6	8.1	29.0	42
WY	14.4	15.6	24.4	43
CA	2.1	3.3	18.5	44
NE	0.5	1.4	15.2	45
GA	3.7	10.3	14.8	46
KS	2.6	13.0	14.1	47
FL	3.8	7.2	12.3	48
SD	2.9	4.7	10.8	49
TX	4.8	6.2	8.4	50
AR	2.1	2.6	5.4	51
US	36.2	45.2	121.8	

Source: Urban Institute analysis of Medicaid State Drug Utilization Data from the Centers for Medicare & Medicaid Services.

Notes: BMT = buprenorphine maintenance treatment. Horizontal lines delineate state decile groups. Buprenorphine maintenance treatment prescriptions per 1,000 Medicaid enrollees ages 12 and older were derived from all buprenorphine maintenance treatment prescriptions in Medicaid State Drug Utilization Data for each state and the District of Columbia in that year. The Medicaid State Drug Utilization Data exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics. See the methodological appendices for more details (Clemans-Cope, Epstein, Winiski, et al. 2019; Lynch, Winiski, and Clemans-Cope 2019).

In 2018, states in the highest decile of buprenorphine maintenance treatment prescriptions per Medicaid enrollee were Ohio (438), Montana (588), Kentucky (662), West Virginia (827), and Vermont (1,210); states in the lowest decile of buprenorphine maintenance treatment prescriptions per Medicaid enrollee were Arkansas (5), Texas (8), South Dakota (11), Florida (12), and Kansas (14).

At 1,210 in 2018, the Vermont per enrollee buprenorphine maintenance treatment prescribing rate is higher than that of all other states—and 46 percent higher than the next highest rate, in West Virginia.⁶ Vermont’s early 2014 Medicaid expansion and “hub-and-spoke” treatment system expanded treatment dramatically throughout the state (Brooklyn and Sigmon 2017). Though more research is needed to determine whether increased treatment decreased opioid-related deaths, Vermont had the lowest opioid-related death rate in 2017 across New England (box 1).⁷

We checked Vermont’s high prescribing rate in the Medicaid SDUD against enrollee-level prescription data in 2015 MSIS claims and found that it was 57 percent higher than that of West Virginia. The MSIS data confirmed that, on average, Vermont enrollees receiving buprenorphine treatment prescriptions received multiple prescriptions per month. Using the same MSIS data from

2015, we estimated the number of buprenorphine treatment prescriptions for enrollees with any such prescriptions was 50.2 per year for Vermont, compared with 31.8 in West Virginia.

BOX 1

Vermont's High Rate of Buprenorphine Maintenance Treatment Prescriptions per Medicaid Enrollee

Vermont's higher prescribing rate likely reflects several factors, the first of which is higher treatment rates. Vermont used its early 2014 Medicaid expansion to support a new hub-and-spoke treatment system that expanded treatment dramatically throughout the state by leveraging the expertise of methadone clinic staff (the hubs) to expand access to buprenorphine maintenance treatment integrated into the primary care health care system (spokes; Clemans-Cope, Wishner, et al. 2017).^a As more people sought treatment in Vermont, the state expanded treatment so that waiting periods for treatment did not increase, and consequently, Vermont now has the highest capacity for treating OUD in the United States (Brooklyn and Sigmon 2017). With a treatment rate of 73 percent in 2014, when a major treatment expansion began (Brooklyn and Sigmon 2017), current treatment rates could exceed 80 percent. In late 2017, Governor Scott announced that the state had eliminated OUD treatment waiting lists in all counties, making treatment available on demand,^b referring to the elimination of wait lists at hubs, but not necessarily at spokes.^c In addition, Vermont's higher prescribing rate may also reflect higher treatment dosages.^d As indicated in the American Society of Addiction Medicine's national guidelines, a typical dose of 16 mg of buprenorphine is commonly taken as two 8 mg tablets (ASAM 2015), thus higher prescribing rates could suggest higher dosing. Growing evidence suggests that higher doses of buprenorphine (e.g., 16–32 mg) are more efficacious than lower doses (Mattick et al. 2014; Thomas et al. 2014).

^a "Hub-and-Spoke," State of Vermont Blueprint for Health, accessed August 5, 2019,

<https://blueprintforhealth.vermont.gov/about-blueprint/hub-and-spoke>.

^b "Governor Phil Scott, State and Local Officials Announce Vermont Can Provide Opiate Addiction Treatment and Cure upon Request," State of Vermont Office of Governor Phil Scott, September 14, 2017, <https://governor.vermont.gov/press-release/governor-phil-scott-state-and-local-officials-announce-vermont-can-provide-opiate>.

^c Lola Duffort, "Vermont's Governor Inflated His Record on Reducing Opioid Treatment Waiting Lists," *Politifact*, November 8, 2018, <https://www.politifact.com/vermont/statements/2018/nov/08/phil-scott/vermonts-governor-inflating-his-record-when-it-com/>; "Opioid Use Disorder Treatment Census and Wait List," Vermont Department of Health, accessed August 5, 2019, https://www.healthvermont.gov/sites/default/files/documents/pdf/ADAP_OpioidUseDisorderTreatmentCensusandWaitList.pdf

^d When we assessed monthly prescription patterns, we found that most people receiving buprenorphine prescriptions in Vermont received multiple prescriptions per month, and a higher proportion in Vermont received multiple prescriptions per month than in the other four states we assessed, which is consistent with Vermont's dispensing higher treatment dosages.

Large differences in states' prescribing rates are evident when examining these rates by decile. To quantify these differences, we examined the ratio of the 90th- to 10th-percentile states. The 90th-percentile state has the fifth-highest rate of buprenorphine maintenance treatment prescriptions per enrollee, and the 10th-percentile state has the fifth-lowest prescribing rate. Using this metric, we found that the highest buprenorphine maintenance treatment prescribing rate is 31 times greater than the lowest prescribing rate in 2018 (table 4). This statistic is based on the ratio of two states' prescribing rates: Ohio, the 90th-percentile state with the fifth-highest prescribing rate (438) and Kansas, the 10th-percentile state with the fifth-lowest prescribing rate of 14 (table 5). We also find that relative

differences in buprenorphine maintenance treatment prescriptions per enrollee decreased between 2011 and 2018.

TABLE 4

Variation in Buprenorphine Maintenance Treatment Prescriptions per 1,000 Medicaid Enrollees Ages 12 and Older, All States and the District of Columbia, 2011 and 2018

Buprenorphine maintenance treatment prescriptions per 1,000 Medicaid enrollees	Median state	10th-percentile state	90th-percentile state	Relative variation ratio ^a
2011	20	3	126	43
2018	82	14	438	31
Overall change, 2011–18 ^b	317%	381%	247%	

Source: Urban Institute analysis of Medicaid State Drug Utilization Data from the Centers for Medicare & Medicaid Services.

Notes: The 10th-percentile state has the fifth-lowest prescribing rate, and the 90th-percentile state has the fifth-highest prescribing rate. The Medicaid State Drug Utilization Data exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics. See the methodological appendices for more details (Clemans-Cope, Epstein, Winiski, et al. 2019; Lynch, Winiski, and Clemans-Cope 2019).

^a Relative state variation was calculated as the ratio of the 90th-percentile state to the 10th-percentile state.

^b Change is calculated as the percentage change from 2011 to the 2018 value.

Discussion

This brief presents new Medicaid prescription data to give policymakers and the public insight on how states are leveraging Medicaid to address the opioid crisis. Our analysis of increases in buprenorphine maintenance treatment prescriptions for OUD suggests a large-scale increase in access to treatment, especially in expansion states, and particularly in a few states such as Vermont and West Virginia.

We found enormous differences across states in the number of buprenorphine maintenance treatment prescriptions per Medicaid enrollee ages 12 and older. Relative differences in states' prescribing rates may reflect differences in underlying rates of OUD, dosing, and prescribing patterns, but it is unlikely that such factors account for the 31-fold state variation in prescriptions per enrollee we find in 2018. That variation is far larger than the two- to threefold relative state differences in opioid prescribing per capita (Schieber et al. 2019). Those differences in opioid prescribing rates attracted a great deal of policy and public attention, but differences in buprenorphine maintenance treatment prescribing across states have not yet been recognized.

Vermont's rate of 1,210 buprenorphine maintenance treatment prescriptions per 1,000 Medicaid enrollees suggests higher treatment rates than in other states. With an estimated treatment rate of 73 percent in 2014, before much of Vermont's hub-and-spoke treatment system expansion (Brooklyn and Sigmon 2017), current treatment rates could exceed 80 percent. In late 2017, the governor of Vermont announced that treatment was available on demand after the elimination of OUD treatment waiting lists in all counties,⁸ referring to the elimination of hub wait lists, and health department data show no wait lists at hubs by 2018 and into 2019.⁹

Despite Vermont's high prescribing rate, Vermont officials do not report negative consequences related to "diversion" of buprenorphine to people without a prescription. Buprenorphine is said to be "diverted" from a person with a prescription to someone without a buprenorphine prescription, often because that person had trouble accessing treatment. In March 2019, Vermont's commissioner of the Department of Public Safety said, "The idea that you have diverted buprenorphine as a self-treatment option because of barriers to treatment, I just don't think that holds water any longer in Vermont, because we've done such a good job of making this kind of treatment available virtually on demand."¹⁰ To the extent that diversion occurs, most buprenorphine use without a prescription is used for "controlling withdrawal and cravings for other opioids and not to get high."¹¹ Burlington, Vermont, Police Chief Brandon Del Pozo observed that "taking nonprescribed buprenorphine predicts an increased eventual desire to enter into formal treatment."¹² Thus, in 2019, Vermont considered legislation to decriminalize possession of buprenorphine without a prescription.¹³

Vermont's high prescribing rate also suggests patients may be given a higher dose (e.g., 16 mg buprenorphine taken as two 8 mg tablets). Growing evidence suggests higher doses of buprenorphine (e.g., 16–32 mg) are more efficacious than lower doses (Mattick et al. 2014; Thomas et al. 2014), so Vermont's higher prescribing rates could reflect clinically effective dosing.

Though more research is needed to determine whether treatment decreased opioid-related deaths, Vermont had the lowest opioid-related death rate in 2017 across New England states. In contrast, rates of opioid-related overdose deaths remain high in some Medicaid expansion states, such as West Virginia. Our estimates show West Virginia's prescribing rate, the second highest in the nation, is far below Vermont's, suggesting current treatment levels in West Virginia may not meet underlying need.

Florida, with an opioid-related overdose death rate above the national average, has the fourth-lowest per enrollee buprenorphine maintenance treatment prescribing rate in 2018. Several states, including Florida, have not expanded Medicaid and have opioid-related death rates higher than the national average in 2018 (Missouri, North Carolina, South Carolina, Tennessee, Utah, and Wisconsin).¹⁴ Of these, Missouri, South Carolina, Tennessee, Utah, and Wisconsin were in the lower half of rates of buprenorphine maintenance treatment prescriptions per Medicaid enrollee in 2018. Medicaid expansion in these states would likely increase the share of people with access to both overdose reversal and treatment drugs, potentially increasing provider capacity and access to treatment and providers.

Yet, even many states that expanded Medicaid and have relatively high buprenorphine maintenance treatment prescribing rates could gain from understanding the factors underlying the differences between their rate and Vermont's, the highest rate of Medicaid-covered buprenorphine maintenance treatment prescriptions in the United States.

This analysis is only a first step and raises important questions. States will want to assess the effectiveness of treatments offered by providers in their state, including whether higher buprenorphine dosing and on-demand treatment upon demand increase retention and recovery. Further research could use claims data to assess characteristics of pharmacotherapy for OUD, including prescription

dosage, duration, and formulation. For example, to what extent do state Medicaid programs differ in the dosage, duration, and formulation of buprenorphine treatment prescriptions for those in treatment? Do differences reflect patient characteristics, including the patient's phase of treatment, or something else? To what extent do observed treatment patterns reflect clinical guidelines? It will also be critical to examine the extent to which differences in pharmacotherapy across and within states are associated with differences in mortality and claims-based outcomes, such as medication continuation, emergency department visits, or hospitalizations related to drug use. It is important that claims analyses be supplemented by discussions with buprenorphine treatment prescribers to understand what shapes their treatment decisions and, particularly, what roles dosage limits, utilization review, and payment and billing practices play, and how those roles vary across states and payers.

Finally, in many places, receipt of evidence-based treatment and recovery services for OUD, such as buprenorphine maintenance treatment, may be hampered by factors such as stigma, low rates of screening and referral, lack of provider capacity, and prescribing restrictions. However, several state models for expanding access to OUD treatment in Medicaid are being pursued.¹⁵ Closing coverage gaps in states that have not expanded Medicaid and addressing demand and supply factors will likely be needed to reduce harm caused by untreated OUD.

Limitations

Our study has several limitations. First, our analysis excludes other types of OUD pharmacotherapy: methadone and naltrexone. Second, the Medicaid SDUD exclude claims representing drugs purchased under the 340B Drug Pricing Program by certain safety net providers, including federally funded clinics, and thus undercount Medicaid-covered prescriptions overall. To the extent states differ in their shares of buprenorphine treatment prescriptions provided through entities participating in the 340B medication rebate program, state rankings may differ from the patterns shown here. Third, we cannot distinguish prescriptions written for Medicaid enrollees newly gaining coverage under the expansion from those written for existing enrollees. Fourth, the per enrollee estimates might not reflect treatment relative to need, because need for OUD treatment varies across states, as does access to methadone for OUD, which can substitute for buprenorphine OUD treatment. In addition, per enrollee estimates are derived from aggregate data, not individual-level data, and thus are a rough measure of prescriptions per person. Fifth, this analysis considers medication treatments only, though many people with OUD need more intensive treatment and services and recovery support, as well as treatment for comorbidities common among people with OUD, such as mental health problems, hepatitis C, and HIV/AIDS. See the study methodology appendix for a more detailed description of the limitations (Clemans-Cope, Epstein, Winiski, et al. 2019).

TABLE 5

Buprenorphine Maintenance Treatment, Overall and per 1,000 Medicaid Enrollees Ages 12 and Older, by State, 2011, 2014, and 2018

Ordered by largest to smallest 2018 per enrollee estimates

State	Total BMT Prescriptions			BMT Prescriptions per 1,000 Medicaid Enrollees Ages 12 and Older		
	2011	2014	2018	2011	2014	2018
VT	66,661	106,636	157,872	590.9	784.1	1,209.8
WV	36,799	92,851	328,543	143.9	210.1	826.6
KY	48,867	24,789	659,629	92.9	28.2	662.2
MT	1,236	1,565	95,598	19.8	21.5	587.5
OH	82,412	249,797	943,897	54.9	116.4	437.7
ME	59,278	60,966	88,205	206.8	281.0	403.5
MA	150,483	259,136	457,909	175.4	172.8	384.3
DE	13,899	19,240	58,869	93.4	127.8	291.2
MD	76,525	118,693	261,702	126.2	153.6	283.5
IN	20,730	32,384	229,527	31.8	53.5	256.2
NH	7,906	15,302	32,008	81.5	147.8	246.1
OR	5,395	54,891	183,096	15.8	58.2	236.1
PA	141,148	177,991	557,288	89.0	108.7	224.3
VA	33,528	40,977	134,333	60.8	79.9	217.5
RI	12,101	27,876	45,934	93.9	155.9	207.5
CT	55,525	80,269	150,207	104.7	131.2	186.9
AK	3,740	6,265	25,199	45.1	81.8	182.8
WA	8,494	26,844	224,991	11.4	18.6	145.5
NC	33,787	74,873	172,372	33.4	70.8	139.2
NM	8,195	32,274	72,765	28.5	78.0	139.2
WI	28,101	42,536	85,927	34.4	48.8	108.5
LA	13,528	19,293	83,207	21.8	29.1	99.3
CO	3,003	13,636	84,638	7.2	21.9	97.6
NJ	24,812	57,016	116,755	40.5	47.9	88.2
MI	22,227	32,489	145,096	19.0	17.3	84.9
NY	169,077	243,213	448,596	45.4	49.0	82.5
ND	699	732	5,884	13.8	12.2	81.6
AL	5,720	12,011	31,301	12.4	23.1	65.1
AZ	18,902	15,289	78,361	22.9	12.3	64.0
MO	9,902	13,034	40,468	16.3	20.3	63.0
UT	5,595	5,062	10,979	32.3	24.7	62.3
DC	3,680	7,079	12,312	21.7	36.3	58.4
SC	7,542	12,578	32,233	14.5	19.9	51.9
ID	1,838	3,017	8,289	13.9	18.7	49.3
MN	11,349	21,468	42,954	16.5	26.3	48.8
IL	22,251	11,368	97,733	12.3	5.6	47.3
TN	50,272	75,366	32,337	61.8	89.4	35.1
OK	4,615	7,481	15,101	9.4	16.7	33.7
MS	3,831	6,635	12,061	10.4	16.5	33.5
IA	1,569	2,598	16,398	4.5	5.8	31.4
HI	2,976	5,219	8,229	15.1	23.0	31.4
NV	840	2,825	13,550	4.6	8.1	29.0
WY	591	677	936	14.4	15.6	24.4

State	Total BMT Prescriptions			BMT Prescriptions per 1,000 Medicaid Enrollees Ages 12 and Older		
	2011	2014	2018	2011	2014	2018
CA	10,025	27,395	169,794	2.1	3.3	18.5
NE	75	217	2,209	0.5	1.4	15.2
GA	3,330	10,522	15,405	3.7	10.3	14.8
KS	555	2,966	3,157	2.6	13.0	14.1
FL	7,473	16,646	36,132	3.8	7.2	12.3
SD	196	329	725	2.9	4.7	10.8
TX	10,155	13,143	18,996	4.8	6.2	8.4
AR	654	2,039	3,385	2.1	2.6	5.4
US	1,312,051	2,187,434	6,428,482	36.2	45.2	121.8

Sources: Urban Institute analysis of Medicaid State Drug Utilization Data from the Centers for Medicare & Medicaid Services and Multiple Cause of Death, 1999–2017, data from the Centers for Disease Control and Prevention WONDER online database, released December 2018 and available at <https://wonder.cdc.gov/mcd-icd10.html>. Data from the Multiple Cause of Death, 1999–2017, files were compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program.

Notes: BMT = buprenorphine maintenance treatment. All buprenorphine maintenance treatment prescriptions and those per 1,000 Medicaid enrollees ages 12 and older were derived from all buprenorphine maintenance treatment prescriptions in Medicaid State Drug Utilization Data for each state and the District of Columbia in that year. The Medicaid State Drug Utilization Data exclude prescriptions written by prescribers at some safety net providers participating in the 340B medication rebate program, such as federally funded clinics. See the methodological appendices for more details (Clemans-Cope, Epstein, Winiski, et al. 2019; Lynch, Winiski, and Clemans-Cope 2019).

Notes

¹ Outcomes of buprenorphine treatment for OUD include decreased mortality (Degenhardt et al. 2009; Schwartz et al. 2013; Sordo et al. 2017); reduced morbidity (Romelsjö et al. 2010), including reduced HIV and hepatitis C infection (Lawrinson et al. 2008; Tsui et al. 2014); increased retention in OUD treatment (Mattick et al. 2014); decreased relapse events, including hospitalizations and emergency department visits related to overdose (Clark et al. 2011); and reduced involvement with the justice system (Dunlop et al. 2017). Methadone treatment for OUD is also highly effective, as is naltrexone, particularly with highly motivated patients (Schuckit 2016). Naloxone has been shown to be highly effective at and safe for reducing opioid overdose mortality (Wermeling 2015).

² See note 1.

³ For most states we examined, the most recent quarter of MSIS data was the fourth quarter of 2015.

⁴ “Medicaid Statistical Information Statistics (MSIS),” Centers for Medicare & Medicaid Services, updated April 3, 2017, <https://www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/MSIS/>; “Medicaid Analytic eXtract (MAX) General Information,” Centers for Medicare & Medicaid Services, updated March 14, 2019, <https://www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/MedicaidDataSourcesGenInfo/MAXGeneralInformation.html>.

⁵ See also “Status of State Action on the Medicaid Expansion Decision,” Henry J. Kaiser Family Foundation, updated August 1, 2019, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/>; Lynn A. Blewett, “Medicaid ‘Early Opt-In’ States,” State Health Access Data Assistance Center, October 9, 2015, <https://www.shadac.org/news/medicaid-%E2%80%99Cearly-opt-in%E2%80%9D-states>.

⁶ When we assessed monthly prescription patterns, we found most people receiving buprenorphine prescriptions in Vermont received multiple prescriptions per month, and a higher proportion in Vermont received multiple

prescriptions per month than in the other four states we assessed, which, as indicated in box 1, is consistent with Vermont's dispensing higher treatment dosages.

- ⁷ Authors' calculations based on Multiple Cause of Death, 1999–2017, data from the Centers for Disease Control and Prevention WONDER online database, released December 2018 and available at <https://wonder.cdc.gov/mcd-icd10.html>. Data from the Multiple Cause of Death, 1999–2017, files were compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program.
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- ¹³ H.162, 2019 Gen. Assemb., Reg. Sess. (Vt. 2019).
- ¹⁴ See note 7.
- ¹⁵ Tyler Sadwith, John O'Brien, Vikki Wachino, and Sarah Twardock, "Leveraging Medicaid to Combat the Opioid Epidemic: How Leader States and Health Plans Deliver Evidence-Based Treatment," *Health Affairs Blog*, June 24, 2019, <https://www.healthaffairs.org/doi/10.1377/hblog20190619.49397/full/>.

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About the Authors

Lisa Clemans-Cope is a principal research associate and health economist in the Health Policy Center at the Urban Institute. Her areas of expertise include substance use disorder treatment, health spending, access to and use of health care, private insurance, Medicaid and CHIP programs, dual eligibles, health reform legislation and regulation, and health-related survey and administrative data. She has led qualitative and quantitative research projects examining the impacts of policies aimed at improving diagnosis and treatment of people with substance use disorders. Clemans-Cope holds a BA in economics from Princeton University and a doctorate in health economics from the Johns Hopkins Bloomberg School of Public Health.

Victoria Lynch is a senior research associate in the Health Policy Center. She is a survey methodologist with in-depth understanding of public policy on Medicaid, the Children's Health Insurance Program, and other health insurance, as well as extensive experience with Medicaid administrative claims data. She received her MS in survey methodology from the Joint Program in Survey Methodology, run by the University of Maryland, University of Michigan, and Westat.

Emma Winiski is a research assistant in the Health Policy Center. Her current works focuses on treatment of substance use disorder under Medicaid and analysis of survey data. She received a BS from Furman University.

Marni Epstein is a research assistant in the Health Policy Center. Her current works focuses on treatment of substance use disorder under Medicaid and quantitative analysis of Medicaid administrative claims data. She received a BA from Johns Hopkins University.

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500 L'Enfant Plaza SW
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