

# Medicaid Expansion and Prescription Trends

## *Opioids, Addiction Therapies, and Other Drugs*

Benjamin A.Y. Cher, MS,\*† Nancy E. Morden, MD, MPH,\* and Ellen Meara, PhD\*‡

**Background:** Opioid overdose deaths in the United States have climbed since 1999. In 2014, the Affordable Care Act prompted some states to expand Medicaid programs, providing low-cost prescription access to millions of Americans. Some have questioned whether Medicaid expansion might worsen the opioid crisis.

**Objective:** To test the association between the expansion of state Medicaid programs and Medicaid-paid prescriptions of opioid pain relievers and opioid addiction therapies.

**Research Design:** We analyzed the 2010–2016 Medicaid State Drug Utilization Data using a difference-in-differences regression approach, comparing prescriptions per enrollee between states that expanded Medicaid in 2014 and states that did not. We compared opioid pain relievers and opioid addiction therapies to 5 other commonly prescribed drug types important to the Medicaid expansion population (antidepressants, antihypertensives, diabetes medications, cholesterol treatments, and contraceptives) and to overall prescription volume. A secondary analysis compared opioid pain relievers and opioid addiction therapies, between states with high and low overdose death rates.

**Results:** We found overall prescription use per enrollee was higher after 2014. Relative growth in opioid pain reliever prescriptions was modest compared with growth in medications for depression, hypertension, diabetes, and high cholesterol. Growth in prescriptions used to treat opioid use disorder greatly outpaced other drugs, suggesting important gains in access to addiction treatments; growth was higher in states with higher pre-2014 overdose death rates.

**Conclusions:** Our results suggest Medicaid expansion benefited a population with unique needs, and that Medicaid expansion could be a valuable tool in addressing the opioid overdose epidemic.

**Key Words:** substance use disorder, drug utilization, health policy, Medicaid

(*Med Care* 2019;57: 208–212)

Opioid overdose deaths in the United States have climbed since 1999.<sup>1</sup> In 2014, the Affordable Care Act (ACA) prompted some states to expand Medicaid programs, providing low-cost prescription access to millions of Americans.<sup>2</sup> Some have questioned whether Medicaid expansion might worsen the opioid crisis.<sup>3</sup>

Research to date offers an early glimpse at how Medicaid-paid prescriptions changed with Medicaid expansion, but the relationship between expansion and prescription opioid pain relievers remains unclear. Studies have found expansion associated with increases in Medicaid-paid prescriptions of buprenorphine, a drug used to treat opioid use disorder,<sup>4–7</sup> medications used to treat mental health conditions<sup>8,9</sup> and other chronic conditions including diabetes and heart disease,<sup>9,10</sup> and prescriptions of all drugs.<sup>9,11</sup>

Since prescription pain relievers carry risk of misuse, addiction, and drug overdose, understanding if and how their use changed in association with Medicaid expansion is essential to a deeper appreciation of the impact of this policy.<sup>12</sup> A study of the 2008 Oregon Health Insurance Experiment found expansion was not associated with increased prescriptions of opioid pain relievers or addiction treatments, but the implementation of this expansion was substantially different from the 2014 ACA Medicaid expansions.<sup>9</sup> Two recent studies<sup>7,13</sup> examined opioid pain relievers in the context of the ACA, but they did not present information on other commonly prescribed drugs to allow comparisons to overall prescribing trends, or to other drugs likely to be important in the expansion population, such as drugs for conditions like diabetes and depression. In addition, studies to date have not clarified if the rise in buprenorphine prescriptions aligned with the state-level need for addiction treatment (rate of opioid overdose deaths)—a factor that could prove as strong or stronger than Medicaid expansion.

To enhance our understanding of changes in Medicaid-paid prescriptions after the Medicaid expansion, we used publicly available prescription fill data to compare trends between states that expanded Medicaid in 2014 and states that did not. Across these 2 groups of states, we compared changes in prescription trends of opioid pain relievers, opioid addiction therapies, and other drugs likely to be used by the expansion population of low income adults.

From the \*The Dartmouth Institute for Health Policy and Clinical Practice, Lebanon, NH; †University of Michigan Medical School, Ann Arbor, MI; and ‡National Bureau of Economic Research, Cambridge, MA.

Supported by NIH/NIA P01-AG019783.

The authors declare no conflict of interest.

Reprints: Benjamin A.Y. Cher, MS, 220 N. Ingalls Street, Ann Arbor, MI 48104. E-mail: bcher@med.umich.edu.

Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website, [www.lww-medicalcare.com](http://www.lww-medicalcare.com).

Copyright © 2019 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

ISSN: 0025-7079/19/5703-0208

## METHODS

### State Classification and Prescription Data Source

We used the Centers for Medicare and Medicaid Services (CMS) State Drug Utilization Data (SDUD) for the period 2010–2016. The SDUD provide quarterly counts of Medicaid-paid, outpatient drug prescriptions filled at retail and online pharmacies. We identified 2 groups of US states: those that expanded their Medicaid programs in 2014 and those that had not expanded their programs by the end of 2016 (Table 1, Supplemental Digital Content, <http://links.lww.com/MLR/B675>).<sup>14</sup> Five states that expanded Medicaid before 2014 and 5 that expanded in 2015 or 2016 were excluded to maintain equal time periods before and after expansion across the sample. A sensitivity analysis included states that expanded Medicaid programs before or after 2014.

### Outcome

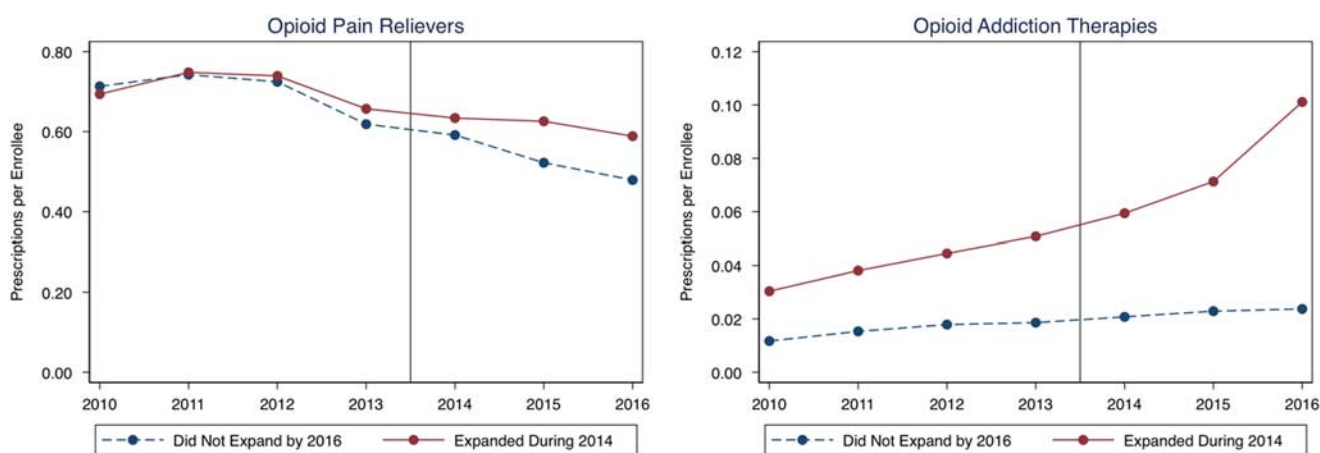
We calculated total prescriptions per Medicaid enrollee by state and drug type, for 7 mutually exclusive drug groups including our key drug groups of interest: opioid pain medications (eg, hydrocodone and oxycodone), opioid addiction therapies (buprenorphine and buprenorphine/naloxone), as well as antidepressants, antihypertensives, diabetes medications, high cholesterol treatments, and contraceptives. The latter drug groups served as a comparison against which to interpret changes in opioids and addiction therapies. We classified drug groups using the First Data Bank Enhanced Therapeutic Classification System (Table 2, Supplemental Digital Content, <http://links.lww.com/MLR/B675>). Collectively, these 7 drug groups accounted for 29% of all Medicaid-paid prescriptions during the study period. We grouped and measured all other prescription products as “other drugs.” We also measured total prescription volume.

### Statistical Analysis

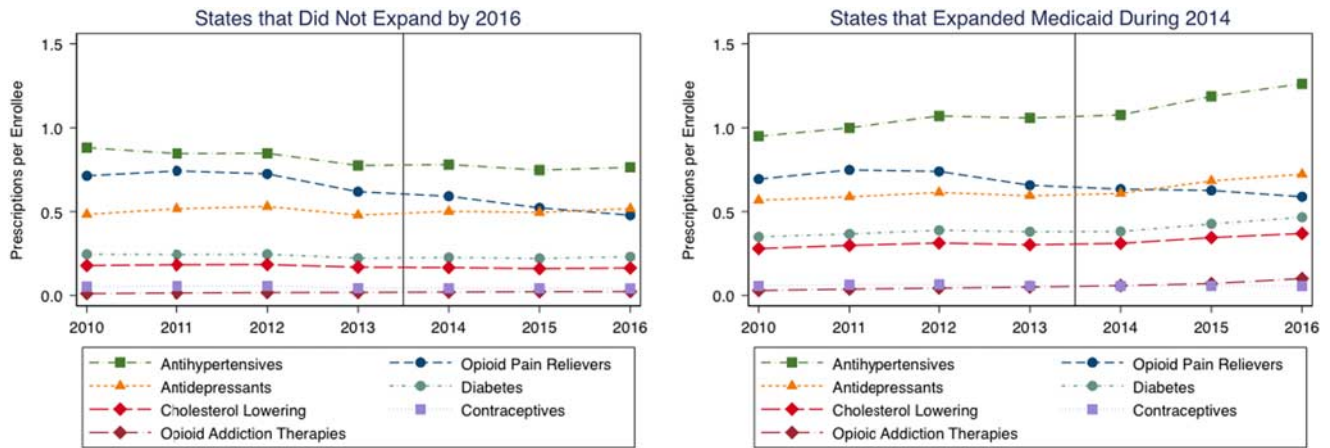
For each drug group, for each year, we compared the average Medicaid-paid prescriptions per enrollee between states that expanded Medicaid in 2014 and those that did not. Using a difference-in-differences regression approach, we modeled prescriptions per enrollee to calculate the difference between expansion and nonexpansion states in 2016 versus 2013. Independent variables included state fixed effects to control for time-invariant state characteristics; year indicators (2010 through 2016, omitting 2013, as the reference year); and year effects interacted with an expansion state indicator. Models also included annual unemployment rate in each state to control for economic determinants of prescription drug use.<sup>15</sup> Models were weighted by the average number of Medicaid enrollees in each state during the preexpansion period (2010–2013) to provide a national estimate of differential prescription drug use trends after Medicaid expansion. SEs were adjusted using Huber-White Sandwich estimators, clustering on state, to account for correlation of observations within states. See Supplemental Digital Content (<http://links.lww.com/MLR/B675>) for full model specification.

As our estimate of the association between Medicaid expansion and prescribing trends, we present the 2013–2016 growth in prescriptions per enrollee comparing expansion and nonexpansion states (ie, the coefficient on the indicator for observations in an expansion state in 2016). To facilitate comparisons across drug groups, we calculated the percent change in prescriptions per enrollee by dividing this coefficient by the 2013 prescriptions per enrollee in the expansion states, weighting by the average number of Medicaid enrollees in each state during the preperiod (2010–2013).

Our model allows for nonlinear trends in prescriptions per enrollee over time and thus is more flexible than that of studies assuming linear trends in prescriptions over time.



**FIGURE 1.** Opioid pain relievers and opioid addiction therapies, unadjusted prescriptions per Medicaid enrollee, by state Medicaid expansion status, 2010–2016. The 2014 vertical line indicates Medicaid expansion year. States expanding before or after 2014 were excluded from the analysis (before 2014: California, Connecticut, Minnesota, New Jersey, Washington; after 2014: Alaska, Indiana, Montana, Louisiana, Pennsylvania). Opioid pain relievers included all prescription opioids other than those classified as opioid addiction therapies. Opioid addiction therapies included buprenorphine and buprenorphine/naloxone. Methadone dispensed by addiction treatment centers does not appear in these data. *Source:* Medicaid State Drug Utilization Data, 2010–2016.



**FIGURE 2.** Prescriptions per Medicaid enrollee, 2010–2016, by drug group and state Medicaid expansion status. The 2014 vertical line indicates Medicaid expansion year. States expanding before or after 2014 were excluded from the analysis (before 2014: California, Connecticut, Minnesota, New Jersey, Washington; after 2014: Alaska, Indiana, Montana, Louisiana, Pennsylvania). Opioid pain relievers included all prescription opioids other than those classified as opioid addiction therapies. Opioid addiction therapies included buprenorphine and buprenorphine/naloxone. Methadone dispensed by addiction treatment centers does not appear in these data. *Source:* Medicaid State Drug Utilization Data, 2010–2016.

For some drug groups, including opioid pain relievers, the trends were nonlinear, with a rise followed by a fall during the preperiod. By comparing expansion and nonexpansion states in each individual year, one can assess whether the prescription trends, even nonlinear trends, were similar in expansion and nonexpansion states.

Use of opioids and opioid addiction therapies may be influenced by state-level intensity of opioid overdose death,

independent of Medicaid expansion. We explored this by repeating our regression analysis of these 2 drug groups using models that estimate different effects of Medicaid expansion comparing high overdose states with low overdose states. These models included an interaction term between indicators of expansion status and a high state opioid overdose rate. On the basis of the distribution of the state level overdose rates, we defined high overdose states as states with > 8 age-adjusted opioid poisoning deaths per 100,000 during 2010–2013. This category included 20 states. Models were weighted and SEs were calculated as described above.

A potential limitation of our study is that we only observed prescriptions paid by Medicaid. We do not know whether Medicaid expansion resulted in an increase in drug use or if the policy simply resulted in Medicaid paying for prescriptions that other payers (private insurance or patients themselves) previously covered. To explore this, we repeated our analysis of opioid pain relievers using data from the Centers for Disease Control and Prevention that included 80% of all retail opioid sales.<sup>16</sup> This provided a measure of state-wide changes in opioid use, regardless of payer.

Analyses were conducted using Stata version 15.0 (College Station, TX). No human subjects review was required for analysis of these publicly available data.

**RESULTS**

Figure 1 contrasts the trend in prescriptions for opioid pain relievers with that for opioid addiction therapies; it reveals prescription opioid pain reliever use falling since 2012 in expansion and nonexpansion states. In contrast, opioid addiction therapies increased dramatically in expansion states after 2013 but grew slowly in nonexpansion states. The pattern for opioid pain relievers differed markedly from the rise in prescriptions per enrollee for opioid addiction therapies and for other drug groups (Fig. 2).

**TABLE 1.** Association Between Medicaid Expansion and Prescriptions Per Medicaid Enrollee

Drug Group	Difference-in-Differences Estimate of Changes in Prescriptions Per Enrollee Associated With Medicaid Expansion	
	Regression Coefficient* (95% CI)	Percent Change <sup>†</sup>
Opioid pain relievers	0.042 (−0.051, 0.135)	6.4
Opioid addiction therapies	0.042 (0.010, 0.074)	82.8
Antidepressants	0.071 (−0.016, 0.157)	11.9
Antihypertensives	0.202 (0.046, 0.357)	19.1
Diabetes therapies	0.080 (0.035, 0.125)	21.0
Cholesterol lowering	0.073 (0.033, 0.113)	24.1
Contraceptives	0.001 (−0.007, 0.010)	2.4
Other medications	0.225 (−0.564, 1.013)	3.0
All medications	0.736 (−0.387, 1.858)	6.9

Opioid pain relievers included all prescription opioids other than those classified as opioid addiction therapies. Opioid addiction therapies included buprenorphine and buprenorphine/naloxone. Methadone dispensed by addiction treatment centers does not appear in these data.

\*Regressions are adjusted for state and year fixed effects and state-level unemployment.

<sup>†</sup>Percent change is the regression coefficient divided by the 2013 average number of prescriptions per enrollee across states that expanded in 2014, weighted by the number of enrollees in each state.

CI indicates confidence interval.

*Source:* Medicaid State Drug Utilization Data, 2010–2016.

**TABLE 2.** Association Between Medicaid Expansion and Prescriptions Per Medicaid Enrollee, Comparing High and Low Opioid Overdose Death Rate States

Drug Group	Difference-in-Differences Estimate of Changes in Prescriptions Per Enrollee Associated With Medicaid Expansion			
	Low Overdose States (n = 20)		High Overdose States* (n = 20)	
	Regression Coefficient <sup>†</sup> (95% CI)	Percent Change <sup>‡</sup>	Regression Coefficient <sup>†</sup> (95% CI)	Percent Change <sup>‡</sup>
Opioid pain relievers	0.074 (−0.040, 0.188)	15.1	−0.035 (−0.166, 0.096)	−3.9
Opioid addiction therapies	0.006 (0.000, 0.012)	27.9	0.082 (0.037, 0.127)	88.2
All medications	0.712 (−0.799, 2.223)	7.4	0.222 (−1.735, 2.179)	1.9

Opioid pain relievers included all prescription opioids other than those classified as opioid addiction therapies. Opioid addiction therapies included buprenorphine and buprenorphine/naloxone. Methadone dispensed by addiction treatment centers does not appear in these data.

\*High overdose states are defined as states with > 8 opioid overdose deaths, age-adjusted, per 100,000 population, 2010–2013.

<sup>†</sup>Regressions are adjusted for state and year fixed effects and state-level unemployment.

<sup>‡</sup>Percent change is the regression coefficient divided by the 2013 average number of prescriptions per enrollee across states that expanded in 2014, weighted by the number of enrollees in each state.

CI indicates confidence interval.

Source: Medicaid State Drug Utilization Data, 2010–2016.

By 2016, of all drug groups in our study, opioid addiction therapies had the highest relative increase in prescriptions per enrollee associated with expansion (up 83% between 2013 and 2016, Table 1 and Supplemental Digital Content, Table 3, <http://links.lww.com/MLR/B675>). The next highest relative increases in prescription volume for Medicaid enrollees were among the groups of medications used to treat chronic conditions including: cholesterol-lowering medications (24%), diabetes medications (21%), antihypertensives (19%), and antidepressants (12%). The association between Medicaid expansion and opioid pain reliever prescriptions per enrollee was 6.4% and not statistically significant. The “other” category of medications and all medications rose by 3.0% and 6.9%, respectively. Our results were similar in sensitivity analyses including early-expanding and late-expanding states (Table 4, Supplemental Digital Content, <http://links.lww.com/MLR/B675>).

In our secondary analysis we allowed the effect of Medicaid expansion on opioid pain relievers and addiction therapies to differ by state-level patterns in opioid overdose death intensity. In these models we observed no significant associations between Medicaid expansion and opioid pain reliever prescriptions in either low overdose or high overdose states (Table 2). Expansion was associated with greater increases in per enrollee opioid addiction therapy prescriptions in high overdose states compared with low overdose states (88% vs. 28%).

In our examination of opioid pain reliever prescriptions, among the general population (regardless of payer), Medicaid expansion was associated with a nonsignificant 3.7% increase in per-capita opioid pain reliever prescriptions (Table 5, Supplemental Digital Content, <http://links.lww.com/MLR/B675>).

## DISCUSSION

In our study of the impact of Medicaid expansion on diverse prescription drug groups, we found extending coverage to low-income adults was not associated with a meaningful increase in opioid pain reliever use. Expansion was, however, associated with a substantial increase in opioid addiction therapies, especially in states with high opioid overdose rates. These findings suggest Medicaid expansion increased access to effective, evidence-based medications for opioid addiction and

counter the notion that Medicaid expansion contributed to the opioid use epidemic by fueling excess use of opioid pain relievers.

Our results suggest Medicaid expansions benefited a population with unique needs. Observed expansion-associated changes in prescriptions per enrollee (vs. total prescriptions) indicate that the population newly enrolling under the Medicaid expansions has different prescription drug needs than the traditional Medicaid population. Opioid use disorder appears more prevalent among new Medicaid enrollees than the pre-2014 Medicaid population, and, before 2014, drug overdose deaths were more common in states that chose to expand in 2014.<sup>17–19</sup> Our findings of substantial increases in per enrollee prescriptions used in the treatment of chronic conditions suggest that the expansion may have also addressed overall health needs.

Our study had limitations. Our data included state level prescription fill counts, a reasonable measure of drug use volume, but prescription fills can vary substantially in the amount of drug dispensed and dose, and fills do not reveal how many unique individuals received the prescriptions counted. SDUD data do not include methadone dispensed at addiction clinics. We did not have individual enrollee-level indicators for illness, age, race, and access to health care. We could not directly measure Medicaid enrollment prompted by the 2014 Medicaid expansions or prescriptions obtained specifically by new enrollees. We compared the postexpansion population (including both new and traditional enrollees) and the preexpansion population (including only traditional enrollees) to draw inferences about the newly-enrolled population.

Comparing Medicaid expansion and nonexpansion states, we found expansion associated with broad increases in the use of opioid addiction therapies, antihypertensives, diabetes therapies, and cholesterol-lowering medications. There was a small but statistically insignificant association between expansion and opioid pain reliever prescription trends. We found no evidence that Medicaid expansion accelerated the distribution of opioid analgesic medications; in contrast, dramatic rises in prescriptions for buprenorphine in expansion states suggest that Medicaid expansion could be a valuable tool in addressing the opioid overdose epidemic.

## REFERENCES

1. National Institute on Drug Abuse. Overdose death rates. 2018. Available at: [www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates](http://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates). Accessed September 25, 2018.
2. Antonisse L, Garfield R, Rudowitz R, et al. The effects of Medicaid expansion under the ACA: updated findings from a literature review. KFF. 2018. Available at: <https://www.kff.org/medicaid/issue-brief/the-effects-of-medicaid-expansion-under-the-aca-updated-findings-from-a-literature-review-march-2018/>.
3. Johnson R. Drugs for dollars: how Medicaid helps fuel the opioid epidemic. A Majority Staff Report of the Committee on Homeland Security and Governmental Affairs. 2018. Available at: [www.hsgac.senate.gov/imo/media/doc/2018-01-17%20Drugs%20for%20Dollars%20How%20Medicaid%20Helps%20Fuel%20the%20Opioid%20Epidemic.pdf](http://www.hsgac.senate.gov/imo/media/doc/2018-01-17%20Drugs%20for%20Dollars%20How%20Medicaid%20Helps%20Fuel%20the%20Opioid%20Epidemic.pdf). Accessed September 25, 2018.
4. Wen H, Hockenberry JM, Borders TF, et al. Impact of Medicaid expansion on Medicaid-covered utilization of buprenorphine for opioid use disorder treatment. *Med Care*. 2017;55:336–341.
5. Maclean JC, Saloner B. The effect of public insurance expansions on substance use disorder treatment: evidence from the Affordable Care Act. NBER Working Paper No. 23342, National Bureau of Economic Research, 2017.
6. Clemans-Cope L, Lynch V, Epstein M, et al. Medicaid coverage of effective treatment for opioid use disorder. Urban Institute. 2017. Available at: [https://www.urban.org/sites/default/files/publication/90461/2001287\\_medicaid\\_coverage\\_of\\_effective\\_treatment\\_for\\_opioid\\_use\\_disorder.pdf](https://www.urban.org/sites/default/files/publication/90461/2001287_medicaid_coverage_of_effective_treatment_for_opioid_use_disorder.pdf).
7. Saloner B, Levin J, Chang H, et al. Changes in buprenorphine-naloxone and opioid pain reliever prescriptions after the affordable care act medicaid expansion. *JAMA Network Open*. 2018;1:e181588.
8. Maclean JC, Cook BL, Carson N, et al. Public insurance and psychotropic prescription medications for mental illness. NBER Working Paper No. 23760. National Bureau of Economic Research. 2017.
9. Baicker K, Allen HL, Wright BJ, et al. The effect of Medicaid on medication use among poor adults: evidence from Oregon. *Health Aff (Millwood)*. 2017;36:2110–2114.
10. Ghosh A, Simon K, Sommers BD. The effect of state Medicaid expansions on prescription drug use: evidence from the Affordable Care Act. NBER Working Paper No. 23044. National Bureau of Economic Research. 2015.
11. Wen H, Borders TF, Druss BG. Number of Medicaid prescriptions grew, drug spending was steady in Medicaid expansion states. *Health Aff (Millwood)*. 2016;35:1604–1607.
12. Kolodny A, Courtwright DT, Hwang CS, et al. The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction. *Annu Rev Public Health*. 2015;36:559–574.
13. Sharp A, Jones A, Sherwood J, et al. Impact of Medicaid expansion on access to opioid analgesic medications and medication-assisted treatment. *Am J Public Health*. 2018;108:642–648.
14. Henry J Kaiser Family Foundation. Status of state action on the Medicaid expansion decision. 2018. Available at: [www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/](http://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/). Accessed April 13, 2018.
15. Hollingsworth A, Ruhm CJ, Simon K. Macroeconomic conditions and opioid abuse. NBER Working Paper No. 23192. National Bureau of Economic Research. 2017.
16. Center for Disease Control and Prevention. US Prescribing Rate Maps. 2017. Available at: [www.cdc.gov/drugoverdose/maps/rxrate-maps.html](http://www.cdc.gov/drugoverdose/maps/rxrate-maps.html). Accessed April 13, 2018.
17. Goodman-Bacon A, Sandoe E. Did Medicaid expansion cause the opioid epidemic? There's little evidence that it did. HA Blog. 2017.
18. Becker WC, Fiellin DA, Merrill JO, et al. Opioid use disorder in the United States: insurance status and treatment access. *Drug Alcohol Depend*. 2008;94:207–213.
19. Busch SH, Meara E, Huskamp HA, et al. Characteristics of adults with substance use disorders expected to be eligible for Medicaid under the ACA. *Psychiatr Serv*. 2013;64:520–526.