



University of Pennsylvania
ScholarlyCommons

Joseph Wharton Scholars

Wharton Undergraduate Research

5-2019

The Effect of the ACA Medicaid Expansion on Availability of Medication Assisted Treatment for Opioid Use Disorder

Hannah Gay
University of Pennsylvania

Follow this and additional works at: https://repository.upenn.edu/joseph_wharton_scholars

 Part of the [Business Commons](#)

Recommended Citation

Gay, H. (2019). "The Effect of the ACA Medicaid Expansion on Availability of Medication Assisted Treatment for Opioid Use Disorder," *Joseph Wharton Scholars*. Available at https://repository.upenn.edu/joseph_wharton_scholars/71

This paper is posted at ScholarlyCommons. https://repository.upenn.edu/joseph_wharton_scholars/71
For more information, please contact repository@pobox.upenn.edu.

The Effect of the ACA Medicaid Expansion on Availability of Medication Assisted Treatment for Opioid Use Disorder

Abstract

Importance: In 2017, 47,600 Americans died of an opioid overdose. Medication assisted treatment is effective at treating opioid use disorder, but it is not available at most substance abuse treatment centers. Expanding insurance coverage may motivate treatment centers to add the capacity to provide MAT.

Objective: To determine whether or not the ACA Medicaid expansion caused more treatment centers to add the ability to prescribe drugs for MAT.

Design and Data: This quasi-experimental study uses a difference-in-differences design exploiting the variation in the date states expanded their Medicaid programs. The data is provided by the 2011-2017 National Survey of Substance Abuse Treatment Services (N-SSATS), conducted annually by SAMHSA. This survey includes roughly 14,000 treatment centers every year. Data were aggregated to the expansion group-year level. A difference-in-differences regression model was estimated for changed in the percent of centers offering MAT in expansion states vs non-expansion states.

Outcome variable: Percent of centers offering MAT

Results: The difference-in-differences analysis estimates a very slight difference in the percent of centers offering MAT before and after the expansion of Medicaid in 2014 between expansion and non-expansion states, producing a confidence interval of (-4.11%, 4.87%) centered at a mean of 0.38%. This estimate is insignificant.

Conclusion and Implications: The Medicaid expansion had no significant effect on the percent of centers choosing to offer MAT. In order to increase access to MAT, policy makers will have to consider alternate incentives to motivate treatment centers to add capacity.

Keywords

Opioid use disorder, ACA medicaid expansion, medication

Disciplines

Business

THE EFFECT OF THE ACA MEDICAID EXPANSION ON AVAILABILITY OF
MEDICATION ASSISTED TREATMENT FOR OPIOID USE DISORDER

By

Hannah Gay

An Undergraduate Thesis submitted in partial fulfillment of the requirements for

JOSEPH WHARTON SCHOLARS

Faculty Advisor:

Dr. Abby Alpert

Assistant Professor, Dept. of Health Care Management

THE WHARTON SCHOOL, UNIVERSITY OF PENNSYLVANIA

MAY 6, 2019

Contents

Section	Pages
Abstract.....	3
Introduction.....	4-10
Literature Review.....	11-14
Methods.....	14-18
Results.....	20-22
Discussion.....	23-25
Conclusion.....	25

Abstract

Importance: In 2017, 47,600 Americans died of an opioid overdose. Medication assisted treatment is effective at treating opioid use disorder, but it is not available at most substance abuse treatment centers. Expanding insurance coverage may motivate treatment centers to add the capacity to provide MAT.

Objective: To determine whether or not the ACA Medicaid expansion caused more treatment centers to add the ability to prescribe drugs for MAT.

Design and Data: This quasi-experimental study uses a difference-in-differences design exploiting the variation in the date states expanded their Medicaid programs. The data is provided by the 2011-2017 National Survey of Substance Abuse Treatment Services (N-SSATS), conducted annually by SAMHSA. This survey includes roughly 14,000 treatment centers every year. Data were aggregated to the expansion group-year level. A difference-in-differences regression model was estimated for changes in the percent of centers offering MAT in expansion states vs non-expansion states.

Outcome variable: Percent of centers offering MAT

Results: The difference-in-differences analysis estimates a very slight difference in the percent of centers offering MAT before and after the expansion of Medicaid in 2014 between expansion and non-expansion states, producing a confidence interval of **(-4.11%, 4.87%)** centered at a mean of 0.38%. This estimate is insignificant.

Conclusion and Implications: The Medicaid expansion had no significant effect on the percent of centers choosing to offer MAT. In order to increase access to MAT, policy makers will have to consider alternate incentives to motivate treatment centers to add capacity.

Introduction

In 2017, 47,600 people in the United States died from an overdose of an opioid. Prescription opioids caused 40% of these deaths, while heroin, fentanyl, and other non-prescription opioids caused the other 60% of deaths. An estimated 11.4 million people misused prescription opioids in 2017, roughly 4% of the overall population. 2.1 million people had an opioid use disorder (OUD) in 2017, defined as a problematic pattern of opioid use leading to clinically significant impairment or distress by the CDC. OUD is commonly referred to as opioid addiction (U.S. Department of Health and Human Services, What is the U.S. Opioid Epidemic? 2019). The death rate due to opioid overdose has risen drastically in the last five years of data—from 7.4 deaths per 100,000 population in 2012 to 14.9 in 2017 (CDC, U.S. Opioid Prescribing Rate Maps 2018). The increasing trend shows no sign of relenting, prompting the public and lawmakers to ask how the country plunged into such a crisis.

Historically, the United States has been somewhat afraid of opiates and viewed pain as an inevitable symptom. In 1914, the government passed the Harrison Narcotic Control Act in response to the marketing of heroin and cocaine for common ailments. This act made it illegal to possess morphine and other narcotics without a prescription. Doctors hesitated to prescribe opioids throughout the mid-1900s under the belief that they were addictive (Jones et al. 2018). This began to change in the 1980s. In 1985, JP. Morgan published an article that stated that doctors undertreated severe pain because of an irrational fear that patients would become addicts—a concept he called “opiophobia” (Morgan 1985). A 1993 paper stated that opiophobia prohibited 50-80% of cancer patients in Europe from receiving adequate pain relief, a situation that it argued needed to be rectified immediately. The paper also reaffirmed that loosening prescribing laws for opioids would not lead to an increase in deaths, saying, “In France,

consumption of morphine for medical use increased by 650% during the years 1986 to 1990 but drug deaths rose by only 89%” as proof (Zenz and Willweber-Strumf 1993, 1076).

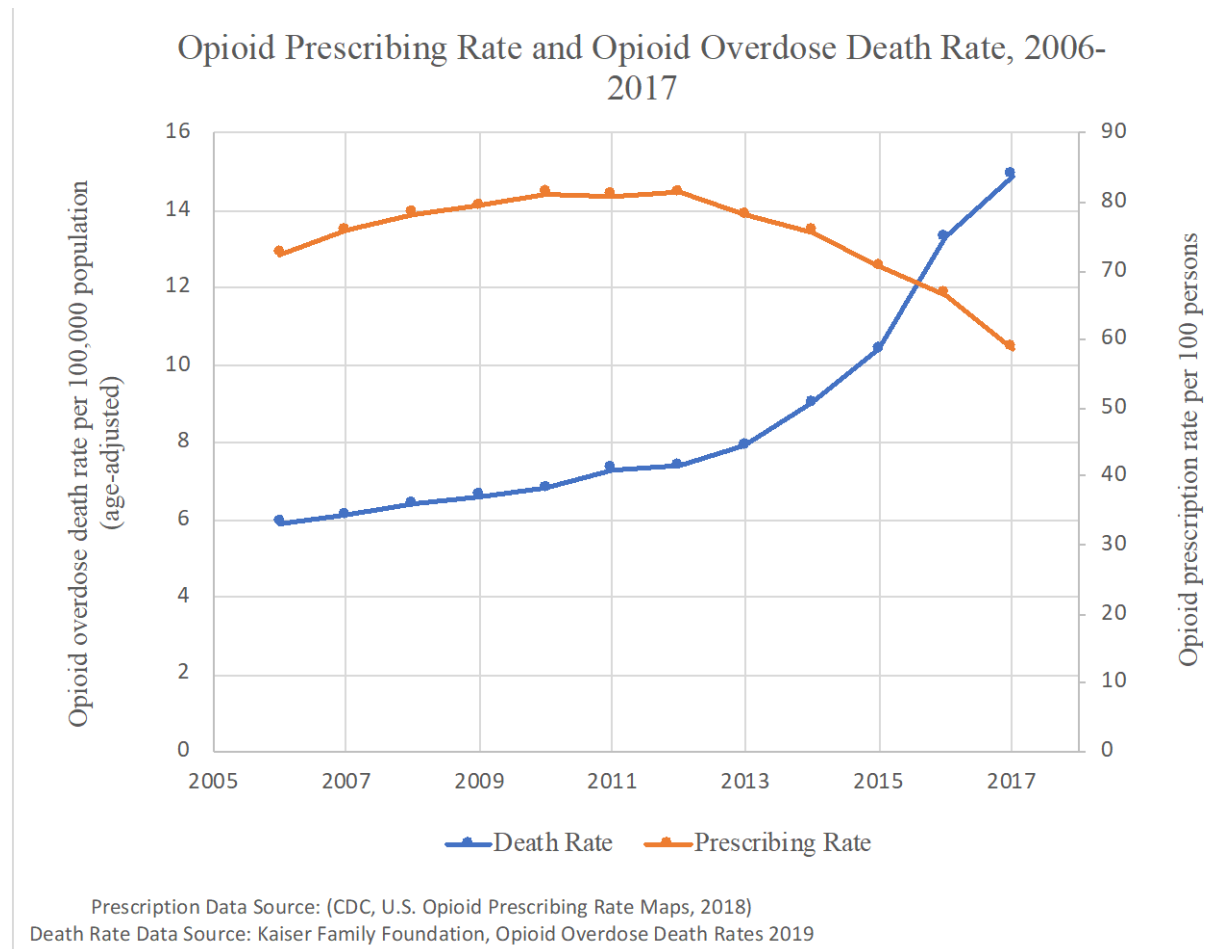
Medical governing bodies quickly began to change their views. In 1986, the World Health Organization published a brief blaming “fears concerning ‘addiction’ both in cancer patients and in the wider public if strong opioids are more readily available for medicinal purposes” as one of the four reasons for unsatisfactory pain treatment in cancer patients (Cancer Pain Relief 1986, 13). The American Pain Society launched a campaign naming pain as the fifth vital sign in 1995, which the Veteran’s Health Administration adopted in 1999. The DEA and Federation of State Medical Boards promised less regulation of opioids, and the Joint Commission added standards that required accredited doctors and organizations to make a quantitative assessment of patient pain in 2000 (Jones et al. 2018). A 2016 statement issued by the Joint Commission characterizes the literature prior to 2000 as a “national outcry about the widespread problem of undertreatment of pain” and asserts that the guidelines never advocated for pain as a fifth vital sign or for the use of opioids to treat pain (Baker 2016).

One of the main factors enabling the sudden acceptance of the use of opioids for acute and chronic pain was the newfound belief that opioids did not cause addiction, based on two main sources. The first, a single-paragraph letter to the editor published in the *New England Journal of Medicine* in 1980, stated that of 11,882 patients treated with narcotics in a hospital, only four (0.03%) showed signs of an addiction afterwards. With over 360 citations, this letter is considered so important to the now debunked belief that opioids are not addictive that the journal published an accompanying disclaimer “for reasons of public health” in 2017 (Porter and Jick 1980). The second source, published in 1986, showed that only 2 of 38 patients treated with various opioids in a hospital became dependent afterwards, both of whom had a history of drug

abuse. It concludes that opioid maintenance therapy can be safe and sustainable (Portenoy and Foley 1986).

The number of opioid prescriptions written annually increased from 76 million in 1991 to 255 million in 2012. The prescription rate per 100 people has been falling since that year, fueled by doctors' increased awareness of the dangers of opioids, but deaths due to overdoses of opioids continue to rise (see Figure 1). This continued increase may be attributable to the observed behavior of some people who lose access to prescription opioids and switch to more potent street drugs, like heroin or fentanyl (Alpert, Powell and Pacula 2018). Strategies to curb the crisis need to address treatment of OUD as much as they must address supply of opioids.

Figure 1:



Medication Assisted Treatment

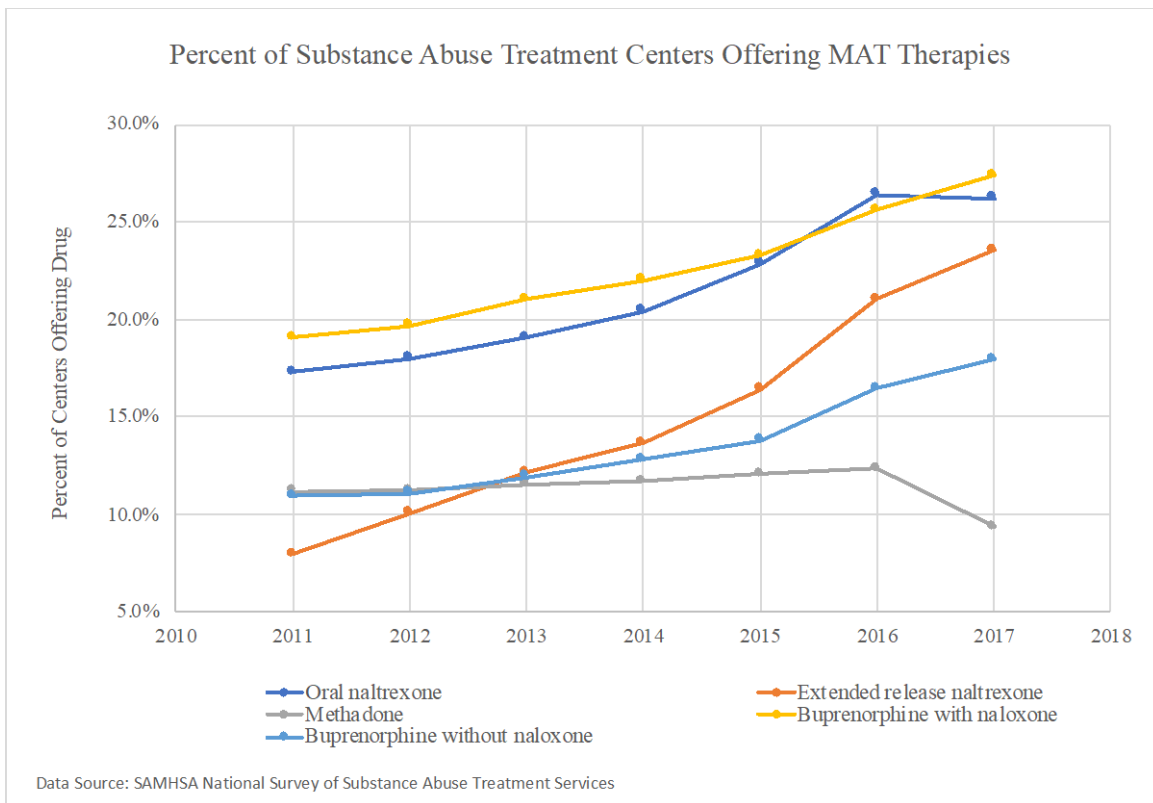
One way to treat OUD is through medication assisted treatment, or MAT. This form of treatment uses a set of pharmacotherapy drugs that limit a person's craving for opioids. There are three main drugs used for MAT. The first drug is methadone, an opioid that blocks receptors in the brain that might respond to other opioids. It does not produce a feeling of euphoria but does relieve pain associated with withdrawal. Patients undergoing methadone maintenance typically receive one dose per day, administered in an addiction treatment facility, for anywhere from six months to three years. Only certified Opioid Treatment Programs (OTPs) can dispense methadone. By law, OTPs must also provide counseling and other assessment services to patients receiving methadone maintenance. To become an OTP, a treatment center must seek certification from SAMHSA and accreditation from an independent, SAMHSA-approved accreditation body. The center must also be licensed by the state and renew its accreditation every year (SAMHSA, Certification of OTPs 2015).

The second main MAT drug is buprenorphine, approved in 2002 for clinical use. Buprenorphine is an opioid partial agonist, meaning that it produces similar but weaker effects than opioids like heroin. Unlike methadone, buprenorphine can be prescribed to a patient for use outside of the treatment facility. It is often paired with naloxone, an opioid antagonist, which blocks the effect of the buprenorphine if the pill is crushed and injected or otherwise misused. Buprenorphine can be prescribed by an OTP or by a doctor who has completed the eight-hour SAMHSA training (SAMHSA, Buprenorphine 2019). The final drug is naltrexone, an opioid antagonist. Unlike buprenorphine and methadone, which activate opioid receptors in the brain, naltrexone binds and blocks receptors. There is very little abuse potential with naltrexone. Any

doctor who is certified to prescribe medications can prescribe naltrexone (SAMHSA, Medication and Counseling Treatment 2019).

In 2017, 40% of substance abuse treatment centers in the nation offered at least one of these drugs used for MAT, up from 31.4% in 2011. The mix of MAT drug offerings has changed since 2011 as well. The percent of centers offering methadone hovered between 11 and 12% from 2011 to 2016 but dropped to 9.4% in 2017. Both oral and injectable (extended release) naltrexone, along with buprenorphine with and without naloxone, saw a sharp and steady rise in popularity during the period. Figure 2 shows these trends. This can partly be attributed to the difficulty of the OTP certification process compared to the certification process to prescribe buprenorphine or naltrexone. Patients also do not have to travel to the treatment center every day to receive naltrexone or buprenorphine, as they do with methadone.

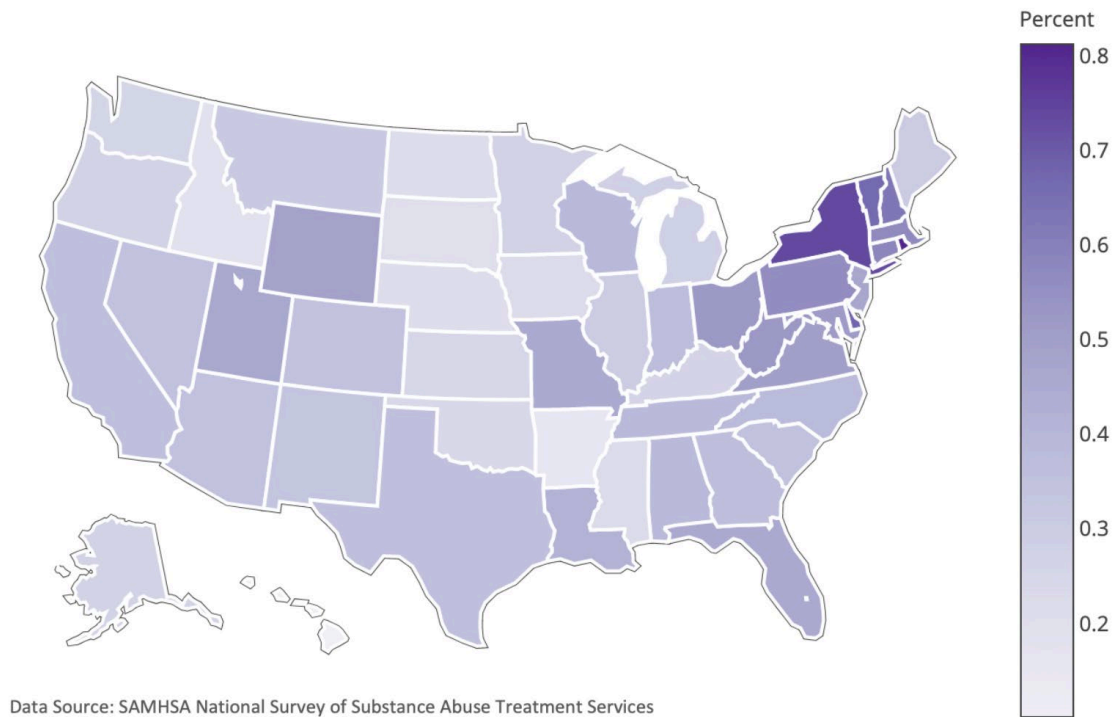
Figure 2:



The percent of centers that offer MAT is also not constant across states. In 2017, 15% of substance abuse treatment centers in Arkansas offered at least one type of MAT, while 74% of centers in New York did. Generally, states in the Northeast and upper Appalachian regions have a higher rate of MAT offered. Figure 3 shows this regional variation.

Figure 3:

Percent of Substance Abuse Treatment Centers Offering MAT



MAT has been shown to be more effective than other methods of substance abuse treatment. According to SAMHSA, MAT significantly reduces the need for inpatient detoxification services for those with OUD. It also increases patient survival and patient retention in treatment, decreases illicit opioid use and crime among those with MAT, increases

patient ability to work, and improves birth outcomes for women with OUD (SAMHSA, Medication and Counseling Treatment 2019). However, only 11-26% of patients with OUD receive treatment, and of those, only a third receive MAT (Knudsen, Abraham and Roman 2011).

Medicaid Expansion

On March 23rd, 2010, the Patient Protection and Affordable Care Act was signed into law by President Obama. Among other provisions to increase Americans' access to health insurance and care, the ACA expanded Medicaid to cover all individuals under 138% of the federal poverty line, to take effect January 1st, 2014. Prior to 2010, each individual state ran its own Medicaid program, deciding whom and what to cover. These programs were supported financially by the federal government but administered and organized by the state. To expand Medicaid coverage, the ACA stipulated that the states would lose federal financial backing for their existing Medicaid programs if they did implement an expanded Medicaid program, though the expansion would be paid for almost entirely by the federal government. The Supreme Court ruled on June 28, 2012 that this maneuver was unconstitutionally coercive in the case *Florida v. Dept. of Health and Human Services*, giving states a reasonable choice whether or not to expand their Medicaid program in 2014. Half of the states chose to do so in 2014. As of April 2019, 36 states and the District of Columbia have elected to expand their Medicaid programs (KFF, Status of State Medicaid Expansion Decisions 2019). By law, expanded Medicaid must cover prescription pain medication including opioids, as well as treatment for addiction including MAT.

Prior Literature

Insurance Coverage and Medicaid Expansions

Research has so far shown that the Medicaid expansion increased insurance coverage in expansion states, both among low-income individuals and the population as a whole. The first study to use nationally representative data found that the number of people covered by Medicaid in expansion states increased 10.5 percentage points compared to non-expansion states. The percentage of people reporting no insurance coverage dropped 7.4 percentage points. Visits to a general physician and days stayed in hospital increased significantly, along with a small handful of diagnostic frequencies (Wherry and Miller 2016). Prior work had shown that by the second quarter of 2014, the uninsured rate had dropped 6 percentage points for people with income below 138% of the poverty line in states that had expanded Medicaid, but only 3.1 percentage points in states that had not expanded Medicaid. Only the result for the expansion states was significant. The study used the Gallup-Healthways Well-Being Index, as federal data had not yet been released (Sommers et al. 2014). The Urban Institute also showed that the uninsured rate had dropped more in Medicaid expansion states than non-expansion states (52.5 percent drop versus 30.6 percent drop), but the lack of data from the federal government hindered this work too (Long et al. 2015). Another early study, using a differences-in-differences design with the Gallup-Healthways WBI again, showed that Medicaid expansion was associated with a 5.2 percentage point decrease in the uninsured rate among low-income adults (Sommers et al. 2015).

These results correspond to similar studies finding insurance gains following an expansion in Medicaid. Using the Medicaid expansions in Maine (expanded 2002), Arizona (expanded 2001), and New York (expanded 2001), Sommers, Baicker, and Epstein (2012) found that expansions of Medicaid precipitated a significant increase in Medicaid coverage by 2.2

percentage points, or a relative increase of 25 percent. The expansions also were associated with a 3.2 percentage point decrease in the uninsured rate in these states, also statistically significant (Sommers, Baicker and Epstein 2012).

Later studies on the ACA Medicaid expansion using federal data found similar effects to the earlier ones. Three years after the first ACA Medicaid expansions went into effect, Courtemanche et al. (2017b) found the expansion increased the insurance rate by 5.9 percentage points in expansion states. States that did not expand Medicaid saw only a 2.8 percentage point increase in the insurance rate. The study uses data from the Census Bureau American Community Survey for 2011 to 2014 and isolated the effect of the Medicaid expansion versus the ACA as a whole, finding that the Medicaid expansion in expansion states was responsible for 3.1 percentage points of the overall increase in insurance rate. Using the ACS and additional data from the Current Population Survey, Kaestner et al. (2017) found the Medicaid expansion to be associated with a 50 percent increase in insurance rates among childless adults. This study used data on the broader population rather than only low-income adults.

Some feared the Medicaid expansion, whether by increasing disposable income or providing easier access to addictive drugs, may increase risky health behaviors or use of opioids. Research has generally not found this to be the case. A recent study found no significant impacts of the Medicaid expansion on a variety of risky behaviors after two years. The study used smoking, drinking, and BMI as measures of risky behaviors (Courtemanche et al. 2017a). Simon, Soni and Cawley (2017) found that the Medicaid expansion significantly increased the use of some forms of preventative services but did not increase ex ante moral hazard. This study also used smoking, heavy drinking, lack of exercise and obesity as proxies for risky behavior. Little research has been conducted on the effect of the Medicaid expansion on total opioid use, though

a 2018 study found that the Medicaid expansion was not associated with an increase in prescription opioids used (Saloner et al. 2018).

Medicaid Expansion and MAT

While it probably did not increase the abuse of opioids, the Medicaid expansion increased insurance coverage among people receiving treatment for substance abuse. Maclean and Saloner (2019) found that expansion led to a 13-percentage point increase (almost double the prior rate) in Medicaid paying for service at treatment centers, while state and local governments paid for less. The study also found that the annual volume of prescriptions used to treat substance abuse that were paid for by Medicaid increased 31% following expansion.

This result was in contrast to the first study relating Medicaid expansion to substance abuse treatment, which found that use of substance abuse treatment did not change significantly as a result of the expansion. However, the use of overall mental health services did increase 2.1 percentage points. The uninsured rate also dropped 5.1 points among those with substance abuse disorders. Payment by Medicaid for substance abuse treatment increased 7.4 percentage points, compared to the 13-point increase found by Maclean and Saloner. The study used data from the National Survey on Drug Use and Health encompassing 2011 through 2014 but was only descriptive in nature (Saloner et al. 2017).

Research has also established a link between the Medicaid expansion and specific drugs used in MAT. State Medicaid expansions have been associated with a 70 percent increase in the number of buprenorphine prescriptions paid for by Medicaid in 2014, representing a 50 percent increase in buprenorphine spending. Increasing prescribing capacity of physicians was also associated with increased buprenorphine utilization, suggesting that decreasing patient costs or

increasing supply of MAT increases access to MAT (Wen et al. 2017). Clemans-Cope, Epstein and Kenney (2017) similarly found that spending on buprenorphine, naltrexone, and naloxone by Medicaid increased 136% from 2011 to 2016, though this study did not isolate the difference between expansion and non-expansion states.

A 2018 quasi-experimental study found that the Medicaid expansion significantly increased the number of prescriptions for buprenorphine with naloxone per 100,000 residents in expansion counties. The study used longitudinal, patient-level retail pharmacy data covering a sample of 11.9 million people who had filled at least two prescriptions for opioids over a five-year period. Only data from California, Maryland, and Washington (expansion states) and Florida and Georgia (not expansion) were used. Using a difference-in-difference regression model, the study found that the expansion increased the number of prescriptions for buprenorphine with naloxone per 100,000 residents as well as the proportion of the costs paid for by Medicaid. There was no effect of the expansion on the number of opioid pain reliever prescriptions filled, nor on the number of prescription days of buprenorphine filled (Saloner et al. 2018).

Methods

Research Question

This study seeks to answer whether the increase in MAT prescriptions filled was due to existing centers treating more patients, or more centers gaining MAT capacity. On January 1, 2014, the expanded Medicaid program in 25 states plus DC went into effect. Millions of people in these states gained health insurance that they had not previously had. The percent of substance abuse treatment centers offering MAT in all states had been rising steadily from 2011 to 2014

and continued to do so until 2017. What is not known is whether the expansion of Medicaid induced a supply response in states that expanded the program compared to states that did not. Did the Medicaid expansion cause substance abuse treatment centers in expansion states to add the capacity to treat OUD with MAT?

Hypothesis

The percent of substance abuse treatment centers offering MAT increased more in expansion states than non-expansion states after the Medicaid expansion went into effect.

Data

The dataset used for this analysis is the National Survey of Substance Abuse Treatment Services (N-SSATS). The survey has been conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA) intermittently since the 1970s under different names but has been collected every year since 2002 as the N-SSATS. The survey is administered to all facilities in the nation that provide substance abuse treatment or detoxification. From 2011 to 2017, the years used in this study, an average of 92% of facilities responded to the survey with a low of 89% in 2017 and a high of 94%. An additional percent of centers is excluded each year if they are found to be ineligible after completing the survey, leaving an average of 14,027 centers included in the annual dataset (see Appendix A for more information).

While facilities are given a unique identifier in each year, this identifier changes from year to year, so it is impossible to track a specific treatment center across years. However, from 2011 to 2017 an average of 89% of facilities included in each annual dataset had also responded to the prior year's survey. Most centers that complete the survey do so every year. Of course,

notable shifts in treatment center characteristics do occur over time. In 2011, 57% of facilities were private and non-profit, while 31% were private for-profit. By 2017, only 53% of private facilities were non-profit and 36% were for-profit. A higher percent of for-profit facilities offer MAT than non-profits (in 2017, 44% vs. 36%, respectively). The client make-up also changed. In 2017, the largest group of patients were in treatment for drug abuse only (244 patients per 100,000 adults), while in 2011 the largest group of clients were being treated for both alcohol and drug abuse. Only 183 patients per 100,000 adults sought treatment for drug abuse alone in 2011, 25% fewer patients than in 2017. This can largely be attributed to the increased use of opioids during this time period.

The survey collects data about facility characteristics (ownership, size, organizational setting, licensure, fee structure, etc.), services offered (types of care, special client programs, conditions treated, etc.), and the number of clients in treatment on March 31st of that year. The data is reported at the individual facility level, though responses to many of the survey questions are excluded from the dataset each year. Data on the provision of five pharmacotherapies related to MAT has been collected and reported every year from 2011 to 2017: oral naltrexone, injectable naltrexone, methadone, buprenorphine with naloxone, and buprenorphine without naloxone. The 2017 survey also includes buprenorphine sub-dermal implant as an option. The survey in 2010 and earlier only included four pharmacotherapies used for MAT, which is why 2011 is used as the first year in this study.

Methodology

The design for this study is a quasi-experimental design using the differences in states' choices to expand Medicaid as a treatment. It uses the following difference-in-difference regression to determine whether the percent of centers offering MAT increased more in expansion states than in non-expansion states:

$$y = \beta_0 + \beta_1 Group + \beta_2 PrePost + \beta_3 Group * PrePost + \epsilon$$

where *Group* is a binary indicator for whether or not a treatment center was in an expansion state or not and *PrePost* is a binary indicator for whether the observation falls before or after the treatment (Medicaid expansion). The reference date of the annual survey is March 31 of that year, and data is collected between March and December of that year. Thus, the 2014 survey was collected after the expanded coverage went into effect on January 1st. The pre-event period includes data from the 2011 to 2013 surveys, while the post-event period covers 2014 to 2017 (the most recent data available).

In this difference-in-differences model, the percent of treatment centers offering MAT is the outcome variable of interest. These data have been grouped at the group-year level, then weighted by the quantity of centers in each observation.

In order to conduct difference-in-differences analysis, this study first seeks to determine the existence of parallel trends in the pre-event period. To do so, a standard regression model will be used with dummy variables for each year observed (exclusive of the treatment year):

$$\begin{aligned}
y = & \beta_0 + \beta_1 Group + \beta_2 PrePost + \beta_3 Group * year2011 + \beta_4 Group * year2012 \\
& + \beta_5 Group * year2014 + \beta_6 Group * year2015 + \beta_7 Group * year2016 \\
& + \beta_8 Group * year2017 + \epsilon
\end{aligned}$$

where if the effects of the 2011 and 2012 terms (prior to Medicaid) are insignificant, then the two groups followed parallel trends in the pre-event period.

Test Groups

Expansion states:

States that expanded Medicaid on January 1, 2014 form the test group of this study. This list includes DC plus the following 25 states: Arkansas, Arizona, California, Colorado, Connecticut, Delaware, Hawaii, Iowa, Illinois, Kentucky, Massachusetts, Maryland, Michigan, Minnesota, North Dakota, New Jersey, New Mexico, Nevada, New York, Ohio, Oregon, Rhode Island, Vermont, Washington, and West Virginia. Some of these states expanded Medicaid early under the ACA. Connecticut and DC expanded coverage in 2010, and California, Minnesota, New Jersey, and Washington expanded coverage in 2011. However, they all additionally increased coverage on the national expansion date of January 1, 2014. Data shows that in most early expansion states, the initial early coverage increase was limited compared to the increase on the national rollout date (Sommers, Kenney and Epstein 2014). For example, New Jersey enrolled four times as many new beneficiaries into Medicaid in 2014 as in 2011. California enrolled eight times as many, and Washington state 70 times as many. Minnesota and Connecticut were the only states whose early expansions enrolled more people than the 2014 expansion. However, both states still saw large enrollment gains in 2014.

Massachusetts, New York, Maine and Arizona also conducted significant expansions of Medicaid in the early 2000s, unrelated to the ACA, before expanding Medicaid again under the ACA. These states are nonetheless included for two main reasons. First, they also saw significant coverage gains in 2014. Second, and more importantly, the nature of state-run Medicaid programs prior to the ACA inherently means that every state included in analysis will reach 2014 with different levels of Medicaid coverage. Some states did not cover childless adults while others covered adults more generously than the ACA stipulations. The fact that the state made an additional expansion of Medicaid coverage is more important than the coverage level before expansion.

Non-expansion states:

States that did not expand Medicaid or decide to expand Medicaid under the ACA before Jan 1, 2018 form the control/comparison group for this study. Because the analysis only covers data through 2017, it is safe to include states that made the decision to expand in 2018 or later. This group includes the following 18 states: Alabama, Florida, Georgia, Idaho, Kansas, Missouri, Mississippi, North Carolina, Nebraska, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Wisconsin, and Wyoming.

Definition of MAT

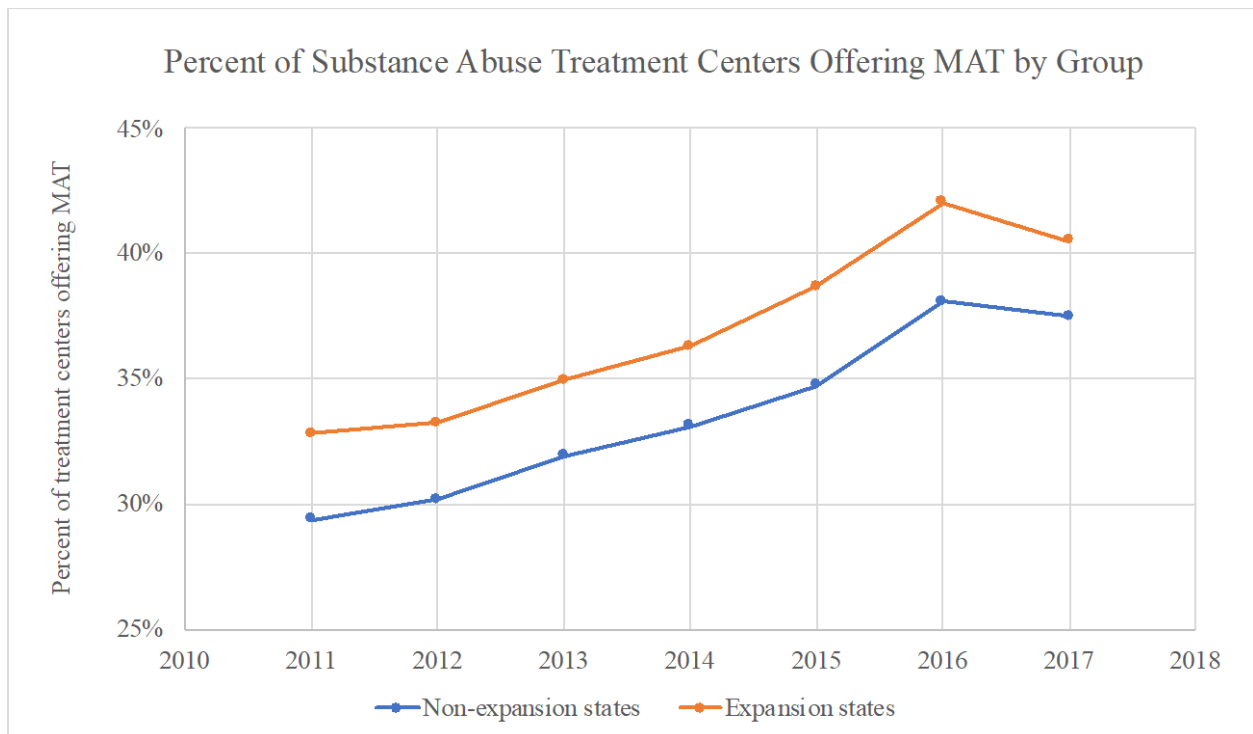
For the purposes of this study, a treatment center is defined as providing MAT if it offers any of the six pharmacotherapies used in MAT and covered in the 2011-2017 N-SSATS survey. This includes: oral naltrexone, injectable naltrexone, methadone, buprenorphine with naloxone, buprenorphine without naloxone, and the buprenorphine sub-dermal implant.

Results

For centers offering at last one form of MAT

Figure 4 presents a visual representation of the percent of treatment centers offering MAT in each group and year.

Figure 4:



Execution of the model for determining parallel trends confirms that the expansion group and non-expansion group experienced parallel trends before the event date in 2014, validating the use of a difference-in-difference test to determine the effect of the Medicaid expansion. Figure 5 shows the estimates for the effects of the pre-event fixed effect year terms to be insignificant.

Figure 5:

Coefficients:					
	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	0.305347	0.011421	26.736	1.37e-06	***
Group	0.044173	0.022842	1.934	0.1109	
PrePost	0.053329	0.015109	3.530	0.0167	*
group2011	-0.021010	0.027976	-0.751	0.4865	
group2012	-0.017136	0.027976	-0.613	0.5670	
group2014	-0.039573	0.031795	-1.245	0.2684	
group2015	-0.016010	0.031795	-0.504	0.6360	
group2016	0.017355	0.031795	0.546	0.6086	
group2017	0.002384	0.031795	0.075	0.9431	

Results of the subsequent difference-in-differences analysis estimate a very slight difference in the percent of centers offering MAT before and after the expansion of Medicaid in 2014, producing a confidence interval of **(-4.11%, 4.87%)** centered at a mean of 0.38%. Given its sizeable standard error, this estimate is insignificant. Therefore, this analysis concludes that the Medicaid expansion had no significant effect on the percent of centers choosing to offer MAT.

Figure 6:

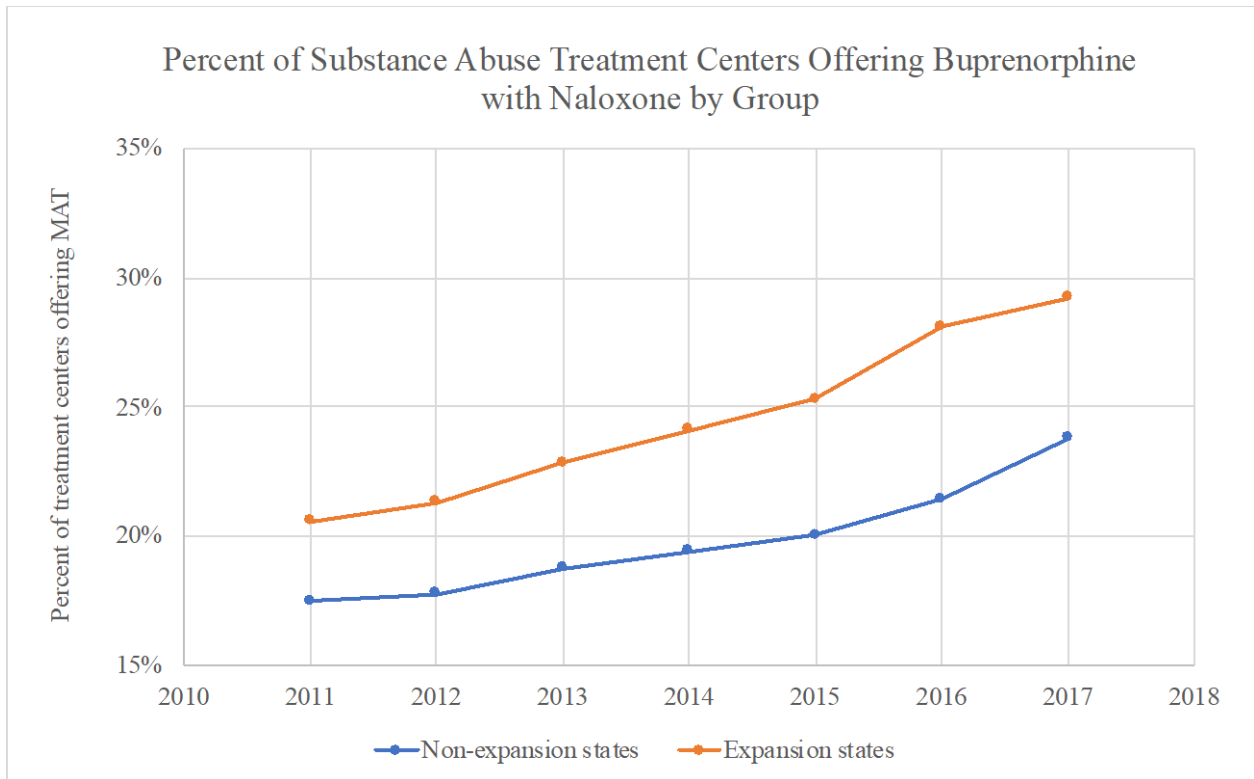
Coefficients:					
	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	0.305513	0.014028	21.778	9.32e-10	***
Group	0.031338	0.017343	1.807	0.1009	
PrePost	0.053260	0.018488	2.881	0.0164	*
Group:PrePost	0.003778	0.022903	0.165	0.8723	

For centers offering buprenorphine with naloxone

Previous studies estimating the impact of the Medicaid on the availability of MAT have focused mainly on buprenorphine with naloxone rather than any MAT drugs. It is therefore useful to check the robustness of the previous results using the outcome variable of percent of centers offering buprenorphine with naloxone rather than percent of centers offering MAT. The

state treatment and control groups remain the same. Figure 7 presents a visualization of the percent of substance abuse treatment centers offering buprenorphine with naloxone in each group and year.

Figure 7:



Again, the two groups demonstrate parallel trends before 2014. Figure 8 shows the estimates for the effects of the pre-event fixed effect year terms to be insignificant.

Figure 8:

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.184386	0.009051	130.853	4.94e-10	***
Group	0.048347	0.014535	3.326	0.0209	*
PrePost	0.027957	0.011928	2.344	0.0661	.
group2011	-0.026725	0.016175	-1.652	0.1594	
group2012	-0.015456	0.016043	-0.963	0.3796	
group2014	-0.019386	0.020026	-0.968	0.3775	
group2015	-0.007554	0.020108	-0.376	0.7226	
group2016	0.020789	0.019989	1.040	0.3460	
group2017	0.031498	0.020167	1.562	0.1791	

Execution of the difference-in-differences analysis again shows a slight difference in the percent of centers offering MAT before and after the expansion of Medicaid in 2014, with a confidence interval of **(-2.14%, 6.18%)** centered at a mean of 2.02%. This estimate is also insignificant; the Medicaid expansion had no significant effect on the percent of centers choosing to offer buprenorphine with naloxone.

Figure 9:

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.18439	0.01300	91.073	6.23e-16	***
Group	0.03438	0.01608	2.138	0.0582	.
PrePost	0.02796	0.01714	1.631	0.1339	
Group:PrePost	0.02017	0.02123	0.950	0.3645	

Discussion

These results reject the hypothesis that substance abuse treatment centers in expansion states added MAT capacity more than in non-expansion states. The Medicaid expansion does not appear to have induced a supply response among treatment centers, even though millions of people gained the ability to pay for addiction treatment services should they need them. This result makes sense in light of the high barriers to gain certification to provide MAT drugs. The

OTP certification process, through which a center can prescribe methadone, can take years. It can also take time to find a doctor who is licensed to prescribe buprenorphine or to train existing doctors. Many substance abuse treatment centers do not have doctors affiliated with them, which is required to prescribe buprenorphine or naltrexone. Centers additionally have to be operating at or near capacity for it to make financial sense to increase capacity.

This study has a number of limitations, the most important of which involves the data itself. Because the unique identifier for a treatment center is not preserved from year to year in the data, it is impossible to track the responses of individual centers across the study period. The best that can be done is to use aggregate outcome variables, like percent of centers in a group of states offering MAT. The reasonably high annual response rate of 92% (see Appendix A) ensures that most eligible centers are included in every year. However, centers do close, open, stop offering addiction treatment or begin offering addiction treatment. There are therefore more ways than just not responding to the survey that a treatment center can appear or disappear from a year's data. There are also other care settings that can dispense MAT drugs in addition to substance abuse treatment centers. Doctors with a license can prescribe buprenorphine and naltrexone, whether or not they are associated with a treatment center. However, substance abuse treatment centers provide the majority of addiction treatment services in the country. They form an integral part of the network of resources for those seeking help with OUD or other addiction.

This research has important policy implications. MAT has been shown to be more effective than other methods of treatment for OUD. Not only does it save lives, but also helps those with OUD gain employment, stay in the workforce, and lead normal lives. In 2017, 2.1 million people suffered from OUD; with extraordinarily low unemployment, the nation benefits from helping these people live normal lives. This research shows that if lawmakers want to

expand access to MAT, it is not enough to increase the population of people who can pay for the therapy. Additional incentives need to be offered to motivate treatment centers to add capacity to treat MAT. Another strategy may require lowering the barriers to enter the MAT provision market. Lawmakers and medical governing bodies could lower the requirements one needs to meet to offer MAT. However, with the high potential for diversion of methadone and buprenorphine, this strategy may not make political sense.

Conclusion

Though the ACA Medicaid expansion led to an increase in buprenorphine prescriptions, buprenorphine paid for by Medicaid, and number of adults in substance abuse treatment covered by Medicaid, it did not cause substance abuse treatment centers to add the ability to provide MAT in addition to existing plans. It is heartening that the rate of centers offering MAT continues to rise in both expansion and non-expansion states, but policy-makers will have to turn to other methods to induce treatment centers to add MAT capacity. While insurance and ability to pay are critical factors deciding whether or not an individual seeks treatment, researchers must still consider access to treatment. In many states, still fewer than 20% of substance abuse treatment centers offer MAT. This means that people suffering from OUD lack access to the most effective method of treatment, which prohibits them from reaching their full capacity in life and personal relationships. More still needs to be done to ensure that people can take advantage of life-changing treatments.

Appendix A:

Year	Universe	Eligible universe	Response rate	Number responded	Number included	% Included in prior year	Client census	Clients per 100k adult population
2011	17,376	15,222	94%	14,302	13,720	87%	1,224,127	473
2012	19,316	16,114	93%	14,995	14,311	85%	1,248,905	479
2013	18,048	15,496	94%	14,630	14,148	90%	1,249,629	481
2014	17,224	15,351	94%	14,382	14,152	89%	-	-
2015	17,669	15,537	92%	14,234	13,873	91%	1,305,647	477
2016	18,087	16,007	91%	14,632	14,399	87%	1,150,423	425
2017	17,029	15,528	89%	13,857	13,585	91%	1,356,015	507
Average	17,821	15,608	92%	14,433	14,027	89%	1,255,791	474
Range	2,287	892	5%	1,138	814	6%	205,592	82

- *Year* is the year in which the survey took place
- *Universe* includes all substance abuse treatment centers known to SAMHSA
- *Eligible universe* includes all centers that are still open and still provide substance abuse treatment
- *Response rate* denotes the percent of centers in the eligible universe that responded to the survey
- *Number responded* is the number of centers that responded to the survey in that year
- *Number included* is the number of centers that were included in the final dataset
- *% Included in prior year* is the number of centers in that year's dataset that were also included in the prior year
- *Client census* is the number of clients in treatment on March 31st of that year in all treatment centers
- *Clients per 100k adult population* is the number of clients in treatment on March 31st, divided by the adult population of the country

References

- Alpert, Abby, David Powell, and Rosalie Liccardo Pacula. 2018. Supply-side drug policy in the presence of substitutes: Evidence from the introduction of abuse-deterrent opioids. *American Economic Journal: Economic Policy* 10 (4): 1-35.
- Baker, David W. "Joint Commission Statement on Pain Management." News release. April 18, 2016. https://www.jointcommission.org/joint_commission_statement_on_pain_management/.
- Cancer Pain Relief. Geneva: WHO, 1986.
- Centers for Disease Control and Prevention. "U.S. Opioid Prescribing Rate Maps." CDC. Last modified October 3, 2018. <https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html>.
- Clemans-Cope, Lisa, Marni Epstein, and Genevieve M. Kenney. "Rapid Growth in Medicaid Spending on Medications to Treat Opioid Use Disorder and Overdose." Urban Institute. Last modified June 29, 2017. <https://www.urban.org/research/publication/rapid-growth-medicare-spending-medications-treat-opioid-use-disorder-and-overdose>.
- Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2017a). Early effects of the Affordable Care Act on healthcare access, risky health behaviors, and self-assessed health (No. 23269). Cambridge, MA: National Bureau of Economic Research.
- Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2017b). Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. *Journal of Policy Analysis and Management*, 36, 178–210.
- Jones, Mark R., Omar Viswanath, Jacquelin Peck, Alan D. Kaye, Jatinder S. Gill, and Thomas T. Simopoulos. 2018. A brief history of the opioid epidemic and strategies for pain medicine. *Pain and Therapy* 7 (1): 13-21.
- Kaestner, Robert, Bowen Garrett, Jiajia Chen, Anuj Gangopadhyaya, and Caitlyn Fleming. 2017. Effects of ACA medicaid expansions on health insurance coverage and labor supply. *Journal of Policy Analysis and Management* 36 (3): 608-42.
- Kaiser Family Foundation. "Opioid Overdose Death Rates and All Drug Overdose Death Rates per 100,000 Population (Age-Adjusted)." KFF. Last modified 2019. <https://www.kff.org/other/state-indicator/opioid-overdose-death-rates/?currentTimeframe=11&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.
- Kaiser Family Foundation. "Status of State Medicaid Expansion Decisions: Interactive Map." KFF. Last modified April 26, 2019. <https://www.kff.org/medicaid/issue-brief/status-of-state-medicare-expansion-decisions-interactive-map/>.

- Knudsen, Hannah K., Amanda J. Abraham, and Paul M. Roman. 2011. Adoption and implementation of medications in addiction treatment programs. *Journal of Addiction Medicine* 5 (1): 21-7.
- Long, Sharon K., Michael Karpman, Genevieve M. Kenney, Stephen Zuckerman, Douglas Wissoker, Adele Shartzter, Nathaniel Anderson, and Katherine Hempstead. "Taking Stock: Gains in Health Insurance Coverage under the ACA as of March 2015." Urban Institute. Last modified April 16, 2015. <http://hrms.urban.org/briefs/Gains-in-Health-Insurance-Coverage-under-the-ACA-as-of-March-2015.html>.
- Maclean, Johanna Catherine, and Brendan Saloner. 2019. The effect of public insurance expansions on substance use disorder treatment: Evidence from the affordable care act. *Journal of Policy Analysis and Management* 38 (2): 366-93.
- Morgan, J. P. 1985. American opiophobia: Customary underutilization of opioid analgesics. *Advances in Alcohol & Substance Abuse* 5 (1-2): 163.
- Portenoy, Russell K., and Kathleen M. Foley. 1986. Chronic use of opioid analgesics in non-malignant pain: Report of 38 cases. *Pain* 25 (2): 171-86.
- Porter, Jane, and Hershel Jick. 1980. Addiction rare in patients treated with narcotics. *The New England Journal of Medicine* 302 (2): 123-.
- Saloner, Brendan, Jonathan Levin, Hsien-Yen Chang, Christopher Jones, and G. Caleb Alexander. 2018. Changes in buprenorphine-naloxone and opioid pain reliever prescriptions after the affordable care act medicaid expansion. *JAMA Network Open* 1 (4): e181588.
- Saloner, Brendan, Sachini Bandara, Marcus Bachhuber, and Colleen L. Barry. 2017. Insurance coverage and treatment use under the affordable care act among adults with mental and substance use disorders. *Psychiatric Services* 68 (6): 542-8.
- Simon, Kosali, Aparna Soni, and John Cawley. 2017. The impact of health insurance on preventive care and health behaviors: Evidence from the first two years of the ACA medicaid expansions. *Journal of Policy Analysis and Management* 36 (2): 390-417.
- Sommers, Benjamin D., Katherine Baicker, and Arnold M. Epstein. 2012. Mortality and access to care among adults after state medicaid expansions. *The New England Journal of Medicine* 367 (11): 1025-34.
- Sommers, Benjamin D., Genevieve M. Kenney, and Arnold M. Epstein. 2014. New evidence on the affordable care act: Coverage impacts of early medicaid expansions. *Health Affairs (Project Hope)* 33 (1): 78-87.

- Sommers, Benjamin D., Thomas Musco, Kenneth Finegold, Munira Z. Gunja, Amy Burke, and Audrey M. McDowell. 2014. Health reform and changes in health insurance coverage in 2014. *The New England Journal of Medicine* 371 (9): 867-74.
- Sommers, Benjamin D., Munira Z. Gunja, Kenneth Finegold, and Thomas Musco. 2015. Changes in self-reported insurance coverage, access to care, and health under the affordable care act. *Jama* 314 (4): 366-74.
- Substance Abuse and Mental Health Services Administration. "Buprenorphine." SAMHSA. Last modified May 1, 2019. <https://www.samhsa.gov/medication-assisted-treatment/treatment/buprenorphine>.
- Substance Abuse and Mental Health Services Administration. "Certification of Opioid Treatment Programs (OTPs)." SAMHSA. Last modified September 28, 2015. <https://www.samhsa.gov/medication-assisted-treatment/opioid-treatment-programs>.
- Substance Abuse and Mental Health Services Administration. "Medication and Counseling Treatment." SAMHSA. Last modified May 3, 2019. <https://www.samhsa.gov/medication-assisted-treatment/treatment#otps>.
- U.S. Department of Health and Human Services. "What is the U.S. Opioid Epidemic?" HHS.gov. Last modified January 22, 2019. <https://www.hhs.gov/opioids/about-the-epidemic/index.html>.
- Wen, Hefei, Jason M. Hockenberry, Tyrone F. Borders, and Benjamin G. Druss. 2017. Impact of medicaid expansion on medicaid-covered utilization of buprenorphine for opioid use disorder treatment. *Medical Care* 55 (4): 336.
- Wherry, Laura R., and Sarah Miller. 2016. Early coverage, access, utilization, and health effects associated with the affordable care act medicaid expansions: A quasi-experimental study. *Annals of Internal Medicine* 164 (12): 795.
- Zenz, M., and A. Willweber-Strumf. 1993. Opiophobia and cancer pain in europe. *The Lancet* 341 (8852): 1075-6.