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THREE ESSAYS ON IMPROVING ACCESS TO CARE FOR MEDICAID BENEFICIARIES WITH OPIOID USE DISORDERS

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This dissertation is dedicated to my mother, Sushmita Sinha; my grandmother, Kalpana Sinha; and my late grandfather, Nisakar Sinha.

Table of Contents

List of Figures v

List of Tables vi

List of Abbreviations viii

Acknowledgments ix

Abstract xi

Introduction 1

Chapter 1: To require or not to require Prior Authorization? 7

Chapter 2: Can Value-Based Payment Models improve access to evidence-informed High-Value Treatments? 38

Chapter 3: Improving Access to Medications for Opioid Use Disorders: Insights from a Qualitative Study 61

Conclusion 84

References 88

Appendix-A: Chapter 1 99

Appendix-B: Chapter 2 116

Appendix-C: Chapter 3 131

List of Figures

Figure 1.1: States Implementing Prior Authorization Repeal for Prescribing Buprenorphine..... 23

Figure 1.2: Event Study Plots from Differences-in-Differences Model using Callaway And Sant'Anna (2021)..... 29

Figure 2.1: Implementation of DSRIP in State Medicaid Programs 50

Figure 2.2: Event Study Plots for Likelihood of Receiving MOUD 55

Figure 3.1: States where Key Informants work or provide MOUD care..... 66

Appendix Figure A1: Robustness of Estimates excluding states with Data Quality Issues in TAF using Callaway and Sant'Anna (2021) Estimator..... 115

List of Tables

Table 1.1: Baseline Characteristics of Medicaid Beneficiaries with Opioid Use Disorders 24

Table 1.2: Estimates from Difference-in Differences Models..... 28

Table 1.3: Effects of Policy Change across Insurance Plan Types..... 30

Table 1.4: Effects of Policy Change across State-Specific Prior Authorization Repeal Policies for prescribing Buprenorphine 31

Table 2.1: Baseline Characteristics of Medicaid Beneficiaries with Opioid Use Disorders 51

Table 2.2: Effect of DSRIP on Likelihood of Receiving MOUD 54

Table 3.1: Characteristics of Key Informants..... 67

Table A1: Cohort Size 99

Table A2: State Inclusion based on Key Variables 100-102

Table A3: TAF Checklist..... 103-106

Table A4: Details of Prior Authorization Repeal Policies..... 107

Table A5: Diagnosis Codes used to identify enrollees with Opioid Use Disorders 108-109

Table A6: Codes used to identify Medications for Opioid Use Disorders (MOUD) 110

Table A7: Event Study Estimates using Chaisemartin and D'Haultfoeuille (2020) Estimator.. 111

Table A8: Event Study Estimates using Callaway and Sant'Anna (2021) Estimator 112

Table A9: Robustness Check excluding States that implemented other MOUD access Policies 113

Table A10: Robustness of excluding states with known Data Quality Issues in TAF 113

Table A11: Robustness Leaving One State Out 114

Table B1: Cohort Size..... 116

Table B2: State Inclusion based on Key Variables..... 117-119

Table B3: TAF Checklist 120-123

Table B4: Implementation of DSRIP in Select State Medicaid Programs 124

Table B5: Diagnosis Codes used to identify enrollees with Opioid Use Disorders 125-126

Table B7: Event Study Estimates using Callaway and Sant'Anna (2021) 128

Table B8: Robustness of Estimates using Alternate Difference in Differences Specification ... 128

Table B9: Robustness of main results excluding Treatment States that implemented other policies for enhancing MOUD access 129

Table B10: Robustness of Estimates excluding States with known Data Quality Issues 129

Table B11: Robustness of Estimates to Leaving One State Out using Callaway and Sant'Anna (2021) method 130

List of Abbreviations

DSRIP – Delivery System Reform Incentive Payment

FASC – Federally Assigned Service Category

FDA – Food and Drug Administration

MCO – Managed Care Organization

MOUD – Medications for Opioid Use Disorder

NDC – National Drug Classification

SUPPORT – Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities

T-MSIS – Transformed Medicaid Statistical Information System

TAF – Transformed Medicaid Statistical Information System Analytic Files

VBP – Value-Based Payment

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Abstract

The opioid epidemic remains a major public health challenge in the United States, with opiate overdose continuing to account for tens of thousands of deaths annually. Medications for Opioid Use Disorder (MOUD) — Buprenorphine, Methadone, and Naltrexone — are highly effective treatments that reduce overdose risk and support recovery. Despite strong clinical evidence supporting their effectiveness, access to MOUD remains limited. Medicaid plays a central role in addressing this gap, as it covers a substantial share of individuals with opioid use disorder and finances a large portion of treatment services for opioid use disorders. In response to the opioid epidemic, policymakers have introduced a range of reforms intended to improve access to MOUD, including changes to insurance benefit design and implementation of value-based payment models. However, the effectiveness of many of these policies remains unclear. Chapters 1 and 2 of this dissertation leverage Medicaid claims data from 2015 to 2019 and exploit variation in the timing of policy changes across states to explore how Medicaid policies influence access to MOUD. Further using key informant interviews I examine how policy reforms affect treatment delivery for persons with opioid use disorders. The results from the first two essays suggest that repealing administrative ordeals such as prior authorization and implementing value-based payment reforms can improve access to MOUD. Findings from the third essay highlight the continued influence of stigma, social determinants of health, and logistical challenges in delivering MOUD, may render prior authorization repeals and value-based payment models insufficient to optimally expand MOUD access. Taken together, the findings suggest that policy reforms can play an important role in improving access to MOUD. However, policy changes must be complemented by investments in behavioral health care and alternative treatment delivery models to address barriers to addiction-related care.

Introduction

Drug overdose deaths are one of the leading cause of deaths in the United States. Approximately 900,000 Americans have died as result of opioid overdoses since 1999. Despite recent declines in the absolute number of opioid overdose deaths, almost 45,000 Americans died from opioid overdose in a 12-month period ending in October 2025. The rising number of opioid-related overdose deaths emphasizes the urgency to link opioid-using patients to effective addiction treatments such as Medications for Opioid Use Disorders (MOUD). MOUD — Buprenorphine, Naltrexone and Methadone — are Food and Drug Administration (FDA) approved drugs used for treating individuals with opioid use disorders. MOUD are cost-effective and considered to be the first-line treatment in assisting the recovery of individuals suffering from opioid use disorders. Given their clinical- and cost-effectiveness, MOUD are considered to be high-value treatments in the domain of addiction-related care. However, MOUD care is underutilized and access to MOUD remains a challenge.

On the demand side, access to MOUD is deterred by patient-level barriers to care such as social stigma, social determinants of health such as criminal-legal involvement and access to transportation, negative attitudes toward agonist — Buprenorphine and Methadone — treatments. On the supply side, MOUD treatment is often characterized by factors like negative perceptions (regarding the 'illness ahead of the person'), compassion fatigue (chronic stress experienced by providers after repeated encounters with patient trauma and suffering), professional burnout (chronic stress caused by uncontrollable occupational stressors that lead to professional dissatisfaction, depersonalization and exhaustion), therapeutic pessimism and helplessness (negative outlook on the likely benefits of treatment) and inadequate training and skills. Such stigma has the potential to deter access to MOUD treatments when manifested

through administrative barriers such as requiring prior authorization for safe-to-use and affordable drugs like Buprenorphine, or distorted incentives in payment contracts that disincentivize providers from offering evidence-based, high-value care. Thus, for a variety of reasons, MOUD treatments continue to be underutilized, and access to MOUD remains a public health challenge.

Medicaid is the largest source of federal support for opioid use disorder treatments, covering about 40 percent of Americans with opioid use disorders. This makes Medicaid a key policy lever to tackle the opioid crisis by linking beneficiaries to essential evidence-informed treatments. In the past decade, several policies intended to enhance MOUD accessibility have been implemented in response to the opioid crisis. These policies range from repealing prior authorization for prescribing some MOUD, instituting value-based payment models, enacting regulatory changes, and expanding coverage of telehealth services, among others. However, these policies have not been rigorously evaluated. As the opioid epidemic continues to result in opioid-related overdose deaths and injuries, it is important to provide rigorous evidence to inform Medicaid policy and ensure that individuals with opioid use disorders have adequate access to essential evidence-informed treatments such as MOUD.

This dissertation aims to evaluate and inform Medicaid policy on access to MOUD for Medicaid beneficiaries with opioid use disorders. In addition to evaluating MOUD access policies and directly adding to the literature on improving access to care for Medicaid beneficiaries with opioid use disorders, the essays in this dissertation broadly add to the literature on improving access to high-value care through existing policy mechanisms.

Access to care is a multidimensional concept that extends beyond the mere availability of services. In the domain of addiction treatment, access to MOUD encompasses the ability of

opioid using individuals to initiate, receive and continue evidence-based high-value treatment in a timely manner. In this dissertation, access to MOUD is defined as the realized use of a clinically appropriate treatment — MOUD — conditional on need, shaped by key features of the health care system. In this framework, access is shaped by administrative burdens that affect treatment initiation, provider incentives that influence the availability of care, and delivery constraints that determine how treatment is implemented in practice. This dissertation evaluates policy interventions targeting these factors by combining quasi-experimental analyses of reforms to administrative requirements and payment models with qualitative insights into care delivery constraints that affect the tactile realities of providing care.

In the first essay, I examine how access to MOUD changes when prior authorization restrictions are repealed. Prior authorization is a utilization management tool used to reduce wasteful utilization and contain health care costs. However, growing evidence suggests that such policies may inadvertently impede access to high-value treatments. Recognizing this, several state Medicaid programs have recently repealed prior authorization requirements for opioid use disorder treatment, yet these policies have not been rigorously evaluated. Theoretically, repealing prior authorization should reduce administrative burdens and improve access to care. However, given that prior authorization has long been the norm and given that high-value treatments continue to be underutilized, the impact of repealing prior authorization on access to essential and effective care remains uncertain and warrants further investigation. This study is among the first to examine the impact of repealing prior authorization on access to high-value treatments in the context of Buprenorphine – an effective medication for treating opioid use disorder. Using 2015-2019 data from the Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF), I exploit time variation in repeal of state Medicaid program prior

authorization policies to causally measure the impact of repealing prior authorization for prescribing Buprenorphine on access to Buprenorphine and on acute health care utilization among Medicaid beneficiaries with opioid use disorders. I find that repealing prior authorization increases Buprenorphine access and reduces opioid-use related hospitalizations. These effects are larger for beneficiaries in managed care plans and in states with less restrictive prior authorization repeals for Buprenorphine formulations. The findings imply that although prior authorization has been effective in curbing wasteful utilization and containing rising health care expenditures in appropriate contexts, its application to high-value treatments may generate barriers in access to care, especially for vulnerable populations.

In the second essay, I evaluate whether value-based payment models can be used to facilitate access to high-value care. Despite its many benefits, patients experience problems in accessing high-value services, and high-value care continues to be underutilized. Such patterns often arise due to misaligned incentives, whereby payment contracts reward volume of care rather than value of care. Value-based payment models are often used to facilitate access to evidence-informed high-value treatments that reduce wasteful utilization and unnecessary spending and maximize patient health. By linking reimbursement to quality metrics and patient outcomes, value-based payment models align provider incentives with patient outcomes, which in turn promotes the provision and utilization of evidence-informed high-value treatments. However, if value-based payment programs are poorly designed, it can distort incentives without any notable improvements in the quality of care. Further, it remains uncertain as to whether, how and what type of value-based payment models work in practice, which patient populations benefit and under what conditions these models are most effective. In this study, I seek to fill this gap by empirically examining whether the implementation of the Delivery System Reform

Incentive Payment (DSRIP) program in Medicaid, which, among other goals, improved access to effective yet underutilized MOUD. Exploiting geographical and temporal variation in the implementation of DSRIP programs and applying a staggered difference-in-differences framework, I estimate the plausibly causal effects of implementing DSRIP on access to MOUD for Medicaid beneficiaries with opioid use disorders. I find that DSRIP implementation was associated with higher MOUD access. The result was primarily driven by increase in access to Buprenorphine and to a small extent by increase in access to Naltrexone. The findings highlight that value-based payment models (like DSRIP) can be used to expand access to high-value treatments that can be prescribed in office-based settings.

Although quantitative evaluations have been essential in documenting the effects of recent policy reforms on MOUD access, these studies are not well suited to explain why expanded MOUD access has failed to materialize in practice despite a conducive policy environment. Analyses relying on administrative claims data have offered critical insight into changes in MOUD utilization and resulting implications on acute health care utilization, but they have not been able to explain how policies intended to improve MOUD access have shaped the tactile realities of providing care to individuals with opioid-use disorders. To address this gap, in the third essay of this dissertation I conducted semi-structured interviews with key informants in the addiction care domain to identify mechanisms through which policies aimed at improving MOUD access constrain or facilitate care delivery of MOUD to opioid-using individuals. I found that while easing regulations for prescribing MOUD are perceived positively by key informants, the policies do not adequately influence the tactile realities of providing MOUD care to opioid-using individuals, rendering access to MOUD a continued issue. We found that even though policies such as repealing prior authorization and eliminating X-waivers make it easier to

prescribe and access MOUD, pervasive stigma from providers and among patients along with social determinants of health and logistical challenges act as barriers to accessing MOUD care. Thus, to facilitate MOUD care, interview participants recommend (a) staffing behavioral health professionals in emergency rooms and linking patients to outpatient MOUD treatment after emergency room visits; (b) expanding mobile treatment services, especially in high opioid-use areas and (c) integrating persons with lived experiences in the addiction care continuum.

Taken together, findings from this dissertation suggest that repealing administrative barriers such as prior authorization for prescribing MOUD and implementing value-based payment models have improved access to MOUD treatments to some extent. However, partial policy interventions will likely result in only modest gains in MOUD access. Easing administrative burdens can lower the cost of initiating MOUD treatment but may be insufficient if provider incentives do not support treatment provision. Similarly, provider incentives may not translate into optimal MOUD provision if stigma, workforce limitations, or logistical barriers constrain treatment delivery and uptake at the point of care. Thus, expanding access to MOUD for Medicaid beneficiaries with opioid use disorders requires action across multiple dimensions of the health care system, rather than interventions focused on a single policy area in isolation.

Chapter 1: To require or not to require Prior Authorization?

Introduction

Prior authorization is a widely-used health plan cost-control process that requires health care providers to obtain advance approval from a health plan before a specific service or drug is delivered to the patient to qualify for payment coverage (American Medical Association 2022). When a service or drug is under prior authorization restriction, in order for the service or drug to be covered by insurance, the patient's provider must fill out some paperwork provided by the insurer. The paperwork will usually require the provider to answer some yes-or-no questions regarding why they are choosing to prescribe a restricted drug as well as other drugs used to treat the condition in question, accompanied by documentation to support claims made in the form. After the form is submitted, the provider and patient wait for approval from the insurer which can take between 1 and 5 business days. If authorized, the patient can access the restricted treatment with standard insurance coverage. If authorization is denied, the patient will either have to pay out-of-pocket to access treatment or not be able to access treatment unless their provider appeals the decision or submits a new request to the insurer.

Economic theory posits that utilization management tools such as prior authorization limit spending, ensure appropriate service use (Baicker and Robbins 2015) and control the illicit use of potentially dangerous substances (Academy of Managed Care Pharmacy Professional Practice Committee 2019). However, the prior authorization process is onerous and arduous, consuming significant time and resources for providers, which may lead to reduced care provision and access issues (Kyle and Song 2023). Thus, the impact of using prior authorization is a subject of ongoing debate. Evidence supports its role in limiting wasteful use and containing costs but challenges its role in impeding access to essential care. At its best, prior authorization

increases guideline-concordant care and reduces unnecessary spending (Anderson et al. 2022). However, at its worst, prior authorization induces administrative burdens for physicians which depresses supply of care to patients and as a consequence, adversely affects access to essential treatments and patient health (Woolhandler et al. 2003; Himmelstein et al. 2020; Dunn et al. 2024; Brot-Goldberg et al. 2023).

Recognizing this trade-off, policymakers have moved to streamlining or repealing prior authorization for select high-value treatments. These efforts have been perceived positively by physicians, patients, and advocacy groups. However, it remains unknown as to whether or not these policy changes have actually improved access to care. Theoretically, repealing prior authorization should reduce hassle costs and improve access to high-value care; however long-standing norms in clinical practice could limit its impact. If providers are accustomed to doing prior authorizations and prescribing alternative medications and therapies due to prior authorization barriers, simply streamlining or repealing prior authorization requirements may not be sufficient to influence prescribing behavior or ensure optimal utilization of high-value treatments. Thus, the broader implications of implementing or eliminating prior authorization remains unclear. In this study, I seek to fill this gap by empirically examining whether repealing prior authorization for high-value treatments improves access to care and leads to more efficient use of health care services. I answer this question by leveraging a (natural) policy experiment in Medicaid in which some states repealed prior authorization for prescribing Buprenorphine – a highly effective yet underutilized medication used to treat opioid use disorders (Chilcoat et al. 2019). Exploiting geographical and temporal variation in the implementation of prior authorization repeal policies for prescribing Buprenorphine and applying a staggered difference-in-differences framework, I aim to estimate the causal effects of repealing prior authorization for

prescribing Buprenorphine on Buprenorphine access and downstream opioid-use-related health care utilization. Using Buprenorphine as an example, this study more broadly aims to provide evidence on the implications of repealing prior authorization for high value services and inform policy on the types of treatments that should be targeted for utilization management.

Studies have shown that prior authorization has proven effective to limit the utilization of low-value health care services (Colla et al. 2017). Prior authorization has been successful in containing the prevalence of unnecessary medical testing (Sinclair et al. 2004), curtailing the use of outpatient antimicrobial therapy (Conant et al. 2014), and reducing millions of dollars in drug spending (Brot-Goldberg et al. 2023). Insurance companies and policymakers — citing studies that support prior authorization's role in curbing overuse — have largely upheld its use as a cost-control measure. However, physicians, patients and advocacy groups have increasingly lobbied against prior authorization, arguing that it induces administrative hassles and impedes care access (Kyle and Song 2023; Yang and Yang 2020). Studies have shown that prior authorization leads to substantial time- and resource-costs for physicians and results in delayed — and sometimes — denied access to timely and essential care for patients . Further, a burgeoning literature concerned with administrative burdens (Herd and Moynihan 2021) has documented that ordeals such as prior authorizations have caused unintended harms and blocked delivery of essential high-value services, interventions, and entitlements to vulnerable persons in the greatest need of those services (Lu et al. 2011; Goodman et al. 2016; Landis et al. 2022). Evidence suggests that when efficiently implemented — i.e., when the right types of treatments are targeted — prior authorization can generate cost savings that outweigh administrative burdens (Brot-Goldberg et al. 2023). However, when prior authorization is required for high-value, treatments, it raises concerns about barriers to accessing timely and essential care.

In addition to contributing to the broader economics literature on improving access to high-value care, I contribute to two strands of the literature. First, I contribute to the literature on the adverse consequences of administrative burdens in health care. Prior authorization — as conceptualized by Nichols and Zeckhauser (1982) — serves as an *ordeal* that aims to improve target efficiency by ensuring that interventions are prescribed only to those who stand to benefit the most (Nikpay 2022). Ordeals such as prior authorization require providers to signal the appropriateness of a treatment for a patient to payors and efficiently target high-benefit users of a health care service. In this study, using the example of Buprenorphine I demonstrate that requiring an ordeal in the form of prior authorization reduces welfare, as it prevents a number of opioid-using individuals from accessing Buprenorphine treatment potentially leading patients to opt for alternative ineffective treatments or forgoing treatment altogether, thus putting them at risk for overdose and other opioid-related harm. The findings from this study are in line with other research, which has found that ordeals impede access to essential services (Herd and Moynihan 2021).

Second, I contribute directly to the specific literature that explores the effects of repealing prior authorization for prescribing Buprenorphine and other high-value treatments. The literature on the effects of prior authorization on the utilization of medical services is vast but limited in the context of Buprenorphine access for Medicaid beneficiaries. Previous work on the topic has either been limited to Medicaid beneficiaries in fee-for-service plans, or the analysis has been limited to select state Medicaid programs. One study analyzing data from the State Drug Utilization Data found that repealing prior authorization requirements for Buprenorphine had no effect on the number of Buprenorphine prescriptions (Christine et al. 2023). This study did not account for the number of Medicaid enrollees with opioid use disorders and was not able to

distinguish whether a state's Buprenorphine prescriptions rate was a function of care availability or the proportion of the Medicaid population with opioid use disorder. The authors also did not account for differences in Buprenorphine prior authorization policies across states. Further, the dataset used by the authors did not have adequate data on managed care encounters, and their analyses was based on fee-for-service enrollees. A second study (Keshwani et al. 2022) using the same dataset focused on 2 states — California and Illinois — and found mixed evidence regarding the impact of prior authorization repeal on Buprenorphine access. Thus, it remains largely unknown as to how repealing prior authorization for Buprenorphine prescribing affects Buprenorphine access. This study using rich data and a more robust study design makes a case as to why repealing prior authorization for high-value services might be an appropriate policy lever to encourage uptake of high-value treatments.

I find that states that repealed prior authorization for prescribing Buprenorphine displayed higher Buprenorphine access and lower opioid-use related hospitalizations. I find that these results are heterogeneous across insurance plan types and state policies. This study provides evidence that coverage of high-value treatments without prior authorization can improve access to high-value care (like Buprenorphine) and reduce avoidable hospitalizations and in some instances emergency department visits.

The paper proceeds as follows. In section 2, I describe the background and setting. In section 3, I discuss the conceptual model and resulting theoretical predictions for subsequent empirical analysis. I describe the data in Section 4 and discuss empirical strategy in Section 5. I present the results in Section 6 and robustness checks in Section 7. In Section 8, I conclude.

2. Background and Setting

2.1 Opioid Epidemic in the United States

Drug overdose deaths are one of the leading cause of deaths in the United States. Approximately 900,000 Americans have died as result of opioid overdoses since 1999 (Abraham et al. 2022; Biondi et al. 2022). Despite recent declines in the absolute number of opioid overdose deaths, more than 45,000 Americans died from opioid overdose between September, 2025 and October 31, 2025 (*Provisional Drug Overdose Death Counts* 2026). Owning its origins to the increased prescriptions of OxyContin since the late 1990s, Medicaid beneficiaries have been disproportionately prescribed pain medications which have led to an increase in opioid addiction (Alpert et al. 2022). In order to regulate the OxyContin and pain-medication-induced opioid crisis, policymakers regulated the supply of prescription Oxycontin which led to opioid-using individuals to substitute OxyContin for more harmful illicit opioids such as heroin and synthetic opiates. As a result of the new regulations — prescription drug monitoring programs, Medicaid lock-in programs — use of OxyContin dropped, and use of heroin increased exponentially triggering an opioid epidemic in early 2010s. The crisis worsened as the supply of synthetic opiates — fentanyl and fentanyl-laced substances — circulated increasingly in the market, further triggering a rise in the number of overdose deaths (Alpert et al. 2018). The rising number of opioid-related overdose deaths increased the urgency to link opioid-using patients to effective addiction treatments such as Medications for Opioid Use Disorders (MOUD).

MOUD — Buprenorphine, Naltrexone and Methadone — are Food and Drug Administration (FDA) approved drugs used for treating individuals with opioid use disorders (Clark et al. 2015; Hser et al. 2016; Wakeman et al. 2020; Weiss et al. 2015). MOUD has been

shown to be cost-effective, and is considered to be the first-line treatment in assisting the recovery of individuals suffering from opioid use disorders (Madras et al. 2020; Committee on Medication-Assisted Treatment for Opioid Use Disorder; 2019; NIDA. Overview. National Institute on Drug Abuse website. 2021). Studies have shown that any of the three medications are effective in treating opioid use disorders. However, given the differing pharmacological profiles of the drugs, and the differing clinical realities of their administration, both patients and clinicians often show preferences for specific MOUD. Buprenorphine induces fewer side effects compared to Naltrexone (Gonzalez and Brogden 1988) and is subject to fewer regulatory requirements and patient constraints than methadone treatment (Deck and Carlson 2004; Yarborough et al. 2016). Owing to its higher patient acceptability, many clinicians prefer prescribing Buprenorphine over other MOUD modalities to opioid-using patients (Yarborough et al. 2016). As a result, numerous interventions intending to improve access to MOUD, try to link patients with outpatient Buprenorphine treatment (Gastala et al. 2024).

2.2 Prior Authorization for Buprenorphine

The low cost and high efficacy of Buprenorphine in aiding treatment and recovery among individuals with opioid use disorders makes Buprenorphine a high-value medication and an essential tool for the effective and evidence-based treatment of patients who experience opioid use disorders. However, due to its potential for diversion, trafficking, and misuse, Buprenorphine is classified as a Schedule III controlled substance under the Controlled Substances Act (Drug Enforcement Administration 2025). Despite Buprenorphine's relatively low risk profile and the low incidence of misuse and diversion reported by the Office of Inspector General (HHS, 2023), its prescribing has been subject to stringent regulation and oversight, including prior authorization requirements. While designed to ensure appropriate prescribing and prevent

MOUD diversion, this stringent regulatory measure has inadvertently exacerbated barriers to Buprenorphine treatment access (Landis, 2022). In addition, access to Buprenorphine has been impeded by several factors. First, there is considerable stigma amongst physicians and patients in willing to prescribe and use Buprenorphine to treat opioid addictions (Blendon and Benson 2018). Second, a number of physicians lack requisite training to adequately treat patients with opioid use disorders (Woo et al. 2017; Parish et al. 2025). Third, regulatory barriers like the requirement of X-waivers to prescribe Buprenorphine — a requirement under federal law that required providers to complete additional registration and training to prescribe Buprenorphine — and prior authorization requirements, hindered timely access (Bozinoff et al. 2024) to a high-value treatment for a patient population that already faces significant stigma and other barriers to care (Parish et al. 2025).

Between 2007 and 2013, prior authorization was required for prescribing Buprenorphine in 48 state Medicaid programs (Landis et al. 2022). Studies found that prior authorization requirements for Buprenorphine caused treatment delays (Andraka-Christou and Capone 2018; ASAM 2013) and was associated with lowered odds of Buprenorphine provision, putting patients with opioid use disorder at risk of adverse clinical outcomes and overdose deaths (Andrews et al. 2019). Thus, taking evidence into account that Buprenorphine is safe and effective a number of Medicaid programs started repealing the use of prior authorization for prescribing Buprenorphine in both the fee-for-service and managed care organization (MCO) plans (Christine et al. 2023; Andraka-Christou et al. 2023).

Illinois' Medicaid program was the first to repeal prior authorization for all FDA approved Buprenorphine-Naloxone products for both its fee-for-service and managed care beneficiaries in 2015. Rhode Island's Medicaid program followed suit and repealed prior

authorization for all Buprenorphine products in 2015. Similar policies repealing prior authorization for all Buprenorphine products were implemented in Maryland and Pennsylvania in 2017 and 2018 respectively. In Delaware and Nebraska, the Medicaid programs repealed prior authorization for Buprenorphine products that were on the states' preferred drug list. In Indiana, Arizona, Washington and Wisconsin prior authorization was repealed for prescribing Buprenorphine-Naloxone formulations between 2017 and 2018 but prior authorization was still required for prescribing long-acting formulations of Buprenorphine. In North Carolina, the Medicaid program repealed prior authorization for generic films of Buprenorphine that were on the states' preferred drug list, however prior authorization was still required for brand name formulations of Buprenorphine. Eventually, the passage of the Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities (SUPPORT) Act — a comprehensive, bipartisan legislation to address the opioid epidemic — required that state Medicaid programs cover at least one formulation of Buprenorphine without prior authorization in its Medicaid plans (H.R.6 Substance Use-Disorder Prevention That Promotes Opioid Recovery and Treatment for Patients and Communities Act or the SUPPORT for Patients and Communities Act 2018). Owing to the SUPPORT Act, since 2019, all states have covered at least one formulation of Buprenorphine without any prior authorization. However, this provision expired at the end 2025, and Medicaid programs in the future could opt to once again impose prior authorization restrictions for prescribing Buprenorphine. Thus, a rigorous and immediate evaluation of policies repealing prior authorization for prescribing Buprenorphine is warranted.

3. Conceptual Framework

I conceptualize prior authorization for prescribing Buprenorphine to Medicaid beneficiaries with opioid use disorder as a form of ordeal — a non-monetary barrier — that is intended to filter out low-benefit users of Buprenorphine and prevent Buprenorphine misuse. I use the framework of ordeals (Nichols and Zeckhauser 1982; Finkelstein and Notowidigdo 2019; Brot-Goldberg et al. 2023) to provide insight into how prior authorization for Buprenorphine acts as a barrier to access.

The ordeals mechanism posits that when prior authorization is required for a treatment, physicians who wish to prescribe a treatment must be willing to overcome administrative and other logistical barriers imposed by the prior authorization process. This creates a treatment access hurdle as the prior authorization process disincentivizes providers from recommending the treatment. Prior authorization imposes a hassle cost but offers Medicaid an opportunity to save some money and reduce diversion of Buprenorphine. However, the benefit of this hassle cost depends on the value of the treatment in question. If the treatment in question is low-value or if the medication poses high risk of diversion, inducing ordeals through administrative burdens can be an effective way to curb wasteful utilization, control health care spending and prevent diversion. However, in the case of high-value treatments, it can prevent patients from obtaining essential care in a timely manner which can potentially generate downstream health care costs in the form of preventable hospitalizations and emergency department visits due to delayed or forgone care. This is particularly concerning given that many patients are reluctant to seek medical care and already encounter numerous barriers to accessing necessary care.

In the context of prescribing Buprenorphine, the prior authorization process imposes a cost C_P on providers for prescribing Buprenorphine. This would include time, paperwork,

administrative effort and other logistics that providers must overcome to ensure that opioid-using individuals Medicaid beneficiaries have access to Buprenorphine treatment. Under prior authorization, if a provider chooses to prescribe Buprenorphine to an opioid-using patient and they have to engage in the prior authorization process and incur the ordeal cost. I consider a principal-agent model in which the agent — the provider — decides whether or not to prescribe Buprenorphine based on both a patient's needs (the principal) and the administrative costs associated with prior authorization. The prescribing rule for patient i can be expressed as:

$$PB_i = B_i - C_P$$

where B_i is the provider-perceived private benefit that patient i derives from access to Buprenorphine and C_P represents the cost of the ordeal imposed by prior authorization. Thus, only individuals for whom $B_i > C_P$ will have access to treatment, while others may either forgo treatment, opt for alternative treatments or access Buprenorphine in the underground market. This creates a provider-selection process, whereby only a fraction of Medicaid beneficiaries with opioid use disorders have access to Buprenorphine treatment.

Let $i \in [0,1]$ represent a population of opioid-using Medicaid beneficiaries, each with a private provider-perceived B_i, drawn from a continuous distribution $F(B)$ over $[0, \bar{B}]$. In this model, I assume that providers perceive Buprenorphine to confer a strictly positive benefit to all opioid-using patients, such that $B_i > 0 \; \forall \; i,$ but that the Medicaid system does not provide automatic coverage. Instead, prior authorization imposes a hurdle, and demand for Buprenorphine is given by:

$$D(C_P) = \{i : B_i \geq C_P\}$$

The total demand for Buprenorphine treatment is therefore given by:

$$Q(C_P) = 1 - F(C_P)$$

When prior authorization is repealed ($C_P = 0$), all individuals with $B_i > 0$ receive treatment. Individuals who previously could not access Buprenorphine due to the prior authorization process are now able to do so, increasing treatment access.

In conventional ordeal models, such ordeals can improve efficiency by screening out wasteful care and mitigating moral hazard. However, Buprenorphine has high incremental value for opioid-using individuals and access to Buprenorphine treatment generates substantial social benefits beyond the individual patient. These external benefits include but are not limited to reductions in mortality from overdoses, decreased crime rates associated with opioid addiction, and reduced transmission of infectious diseases like HIV and hepatitis-C.

Let E_i represent the external benefits associated with treating patient i with Buprenorphine. The total social benefit of treating individual i is:

$$SB_i = B_i + E_i$$

where E_i is a positive externality and E_i for prescribing Buprenorphine to opioid-using patients is always positive. In this framework, the socially optimal rule for prescribing Buprenorphine should consider both provider-perceived private benefits and the social benefit, and should be based on the criterion:

$$SB_i = (B_i + E_i) - C_P$$

The prescribing rule under prior authorization fails to account for these externalities. Thus, requiring prior authorization for prescribing Buprenorphine creates a misalignment between private prescribing decisions and social welfare. Thus, repealing prior authorization for prescribing Buprenorphine increases prescribing and brings the private prescribing decision

closer to the social optimum. In the case of Buprenorphine, where external benefits include reductions in overdose mortality, crime, and transmission of infectious diseases such as HIV and hepatitis C, this improved alignment is likely to generate substantial welfare gains. Expanded access to Buprenorphine for opioid using patients may further reduce cost-ineffective downstream healthcare utilization by decreasing opioid-related hospitalizations and emergency department visits.

The conceptual framework motivates the empirical analysis. I aim to quantify the effects of repealing prior authorization for prescribing Buprenorphine on patient access to Buprenorphine and examine the effects of the policy change on opioid use related health care utilization among Medicaid beneficiaries with opioid use disorders. I hypothesize that the likelihood of being prescribed Buprenorphine will increase as the ordeal of prior authorization for prescribing Buprenorphine is repealed. However, I expect the policy change to have only a modest effect on Buprenorphine access for two reasons. First, prior authorization for Buprenorphine has been the norm since 2007, therefore, providers may have adapted to alternate therapies or medications to treat opioid use. Second, as noted in section 2, Buprenorphine treatment is highly stigmatized amongst both patients and providers. Therefore, repealing prior authorization may not be sufficient on its own to substantially improve access to Buprenorphine treatment. Nevertheless, even modest increases in Buprenorphine access may lead to meaningful improvements in health outcomes and reduce potentially preventable acute health care utilization. If access to Buprenorphine improves as a result of repealing prior authorization, then opioid-using individuals are less likely to access addiction care through hospitalizations and emergency department visits. Therefore, I predict that repealing prior authorization for

prescribing Buprenorphine will reduce the number of preventable opioid-use related hospitalizations and opioid-use related emergency department visits will decrease.

I anticipate heterogeneity in the policy's impact based on individual-level characteristics and state-specific policy contexts. First, the removal of prior authorization requirements for Buprenorphine prescribing is likely to have a more pronounced effect among Medicaid beneficiaries enrolled in managed care plans. MCOs employ utilization management strategies, including prior authorization, more extensively than fee-for-service Medicaid programs (Baicker and Robbins 2015). This places greater administrative burdens on providers, who must comply with varying prior authorization protocols across multiple MCOs. Eliminating prior authorization requirements, therefore, may reduce provider burden, lower the incidence of denied Buprenorphine claims, and mitigate barriers to initiating or continuing Buprenorphine treatment. As a result, the policy change may facilitate greater provider participation and better improve Buprenorphine access for individuals with opioid use disorder enrolled in managed care plans.

Second, as stated in Section 2.2, when prior authorization was repealed across states, different states pursued different policies. In some states, the repeal applied to any and all products containing Buprenorphine, whereas in other states, the repeal only applied to specific formulations of Buprenorphine like Buprenorphine-Naloxone. I hypothesize that states with a more generous (less restrictive) repeal of prior authorization requirements for prescribing Buprenorphine will impose a lesser burden on physicians compared to states with more rigid prior authorization policies. Specifically, I predict that states where prior authorization is limited to a restricted list of Buprenorphine formulations will see a lower likelihood of opioid-using Medicaid beneficiaries receiving Buprenorphine compared to states where the repeal of prior authorization for Buprenorphine applies to a broader range of Buprenorphine products.

4. Methods

4.1 Data Sources

The data for this study come from the Transformed Medicaid Statistical Information System Analytic Files (TAF) data from 21 U.S. Medicaid programs from 2015-2019, through an agreement with the Centers for Medicare and Medicaid Services. Demographic and enrollment information for beneficiaries come from the demographic and eligibility files. Beneficiaries with opioid use disorders are identified using International Classification of Disease Codes (ICD)-9 and ICD-10 diagnoses codes (See Appendix A, Table A5) from the inpatient and other services claims files. Data on Buprenorphine use come from the pharmaceutical and other services claims files. Data on hospitalizations and emergency department visits come from the inpatient and other services claims files, respectively.

4.2 Study Sample

The study sample includes a repeated cross-section of non-elderly — aged 18 to 64 years — Medicaid beneficiaries who have a claims-based diagnostic record of opioid use disorder. In 2015 for all 21 states and for Maryland between 2015 and 2017, we used ICD-9 codes to identify beneficiaries with opioid use disorders; for other states after 2016, we use ICD-10 codes to identify beneficiaries with opioid use disorders.

Drug prescription coverage for dual eligible beneficiaries is largely covered by Medicare, and Medicaid only provides partial coverage for Buprenorphine. I therefore exclude beneficiaries who are dual eligible. In one state (Alabama) I cannot exclude duals due to data quality issues. I exclude Alabama from the main sample in a sensitivity analysis to ensure robustness of findings to the potential inclusion of duals in the analysis. I build on the minimal data quality checks from DQ Atlas for the years 2015-2019 and further exclude states from the analysis in which I cannot

reliably ascertain encounters for Buprenorphine prescriptions, inpatient hospitalizations or emergency department visits (Centers for Medicare & Medicaid Services 2025). A detailed description of the inclusion criteria for states is noted in Appendix A, Tables A1 and A2. I followed reporting guidelines for using TAF data developed by the Medicaid Data Learning Network (Schpero et al. 2025). Details are noted in Appendix A, Table A3.

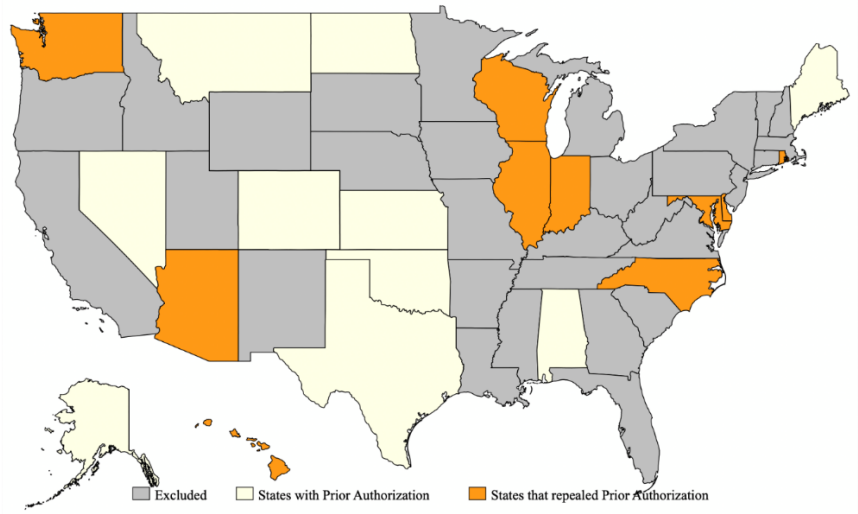
The final study sample includes data from 21 states for 737,379 unique Medicaid enrollees with a diagnostic record of opioid use disorder.

4.3 Study Variables

4.3.1 Treatment Variable: Indicator for Repeal of Prior Authorization for prescribing Buprenorphine

The main explanatory variable of interest is whether an individual with opioid use disorder was in a state Medicaid program in a given time period (quarter) repealed prior authorization for prescribing Buprenorphine. I use a dichotomous indicator that equals 1 if an individual is in a state that repealed the use of prior authorization for prescribing Buprenorphine during the study period (treatment group) and 0 if an individual is in a state that did not repeal the use of prior authorization for prescribing Buprenorphine during the study period (control group). This results in 11 states — Arizona, Delaware, Hawaii, Indiana, Illinois, Maryland, Nebraska, North Carolina, Rhode Island, Washington, Wisconsin — in the treatment group and 10 states in the control group. See Figure 1.1.

Figure 1.1: States Implementing Prior Authorization Repeal for Prescribing Buprenorphine



Implementing the inclusion restrictions, the final study sample consists of 295,521 unique opioid-using Medicaid beneficiaries in states where prior authorization was repealed for prescribing Buprenorphine and 441,858 unique opioid-using Medicaid beneficiaries in states that where prior authorization was required for prescribing Buprenorphine.

4.3.2 Dependent Variables

The study examines the impact of repealing prior authorization for prescribing Buprenorphine on four outcomes: (1) likelihood of receiving Buprenorphine, (2) number of Buprenorphine claims, (3) number of inpatient hospitalizations and (4) number of emergency department visits among Medicaid beneficiaries with opioid use disorders. Buprenorphine claims in the claims data are identified through National Drug Classification (NDC) codes and are dichotomized accordingly to explore the effects of the policy change on the likelihood of receiving Buprenorphine. Number of hospitalizations are identified through an algorithm of federally assigned service category (FASC) noted by TAF (Hula et al. 2021). Emergency

department visits are identified through procedure codes and revenue center codes (NCQA HEDIS 2022). The NDC codes and procedure codes used to identify opioid-using individuals, Buprenorphine prescriptions and health care utilization are detailed in Appendix A, Table A6.

4.3.3 Other Variables

I estimate all models controlling for a beneficiary's age, sex and whether or not they were enrolled in a managed care plan. In addition, I include state fixed effects and time (measured as quarters) fixed effects in all estimations to account for unobserved heterogeneity across states and over time periods. The covariates are summarized in Table 1.1.

Table 1.1: Baseline Characteristics of Medicaid Beneficiaries with Opioid Use Disorders

	Full Sample	**States without Prior Authorization for Buprenorphine**	**States with Prior Authorization for Buprenorphine**
	N=737,379	**N=295,521**	**N=441,858**
Age, Mean (SD), Years	38.36 (12.07)	38.01 (12.01)	38.61 (12.09)
Sex, (%)			
Male	52.43	50.92	53.94
Female	47.57	49.08	46.06
Insurance Status, (%)			
Managed Care	58.89	72.06	50.09
Fee-for-Service	41.11	27.94	49.91

Medicaid beneficiaries with opioid use disorders across both states with (control group) and without prior authorization (treatment group) for prescribing Buprenorphine were on average 38 years old. In both the treatment and control groups Medicaid beneficiaries with opioid use disorders were more likely to be male with a higher proportion of men in the treatment group,

64% vs. 52%. Beneficiaries in the treatment group were more likely — 72% versus 50% — to be enrolled in Medicaid managed care plans compared to fee-for-service Medicaid.

5. Empirical Strategy

I use a difference-in-differences regression framework with staggered timing to examine the impact of repealing prior authorization for prescribing Buprenorphine on Buprenorphine access and health care utilization among Medicaid beneficiaries employing multiple estimators for transparency and comparison. The main source of identifying variation is whether a state Medicaid program repealed prior authorization for prescribing Buprenorphine. The identifying assumption in this research design is the parallel-trends assumption. In the context of this study, the assumption warrants that, trends in outcomes across states that repealed the use of prior authorization for prescribing Buprenorphine and states that allowed the use of prior authorization for prescribing Buprenorphine should be similar in absence of the policy change. While inherently untestable after the policy change, a standard way to assess the credibility of this assumption is to examine whether trends are parallel prior to implementation. I additionally test the parallel-trends assumption by plotting the pre-trends in covariates-adjusted outcomes in the preferred event study design using the Callaway and Sant'Anna (2021) estimator described later. The difference-in-differences research design also requires that the stable unit treatment value assumption (SUTVA) and the assumption of common shocks is satisfied (Cliff 2022). To satisfy SUTVA — which requires no interference between treatment and control units — I exclude beneficiaries who move across states from the analysis. To ensure that the common shocks assumption is satisfied I conduct robustness checks in Section 7 by excluding states — Washington and Arizona — that in addition to repealing prior authorization for prescribing

Buprenorphine implemented other Medicaid policies that aimed to expand Buprenorphine access during the study period.

To analyze the impact of repealing prior authorization for prescribing Buprenorphine, I start by estimating the following model:

$$\boldsymbol{Y_{ist} = \alpha + \beta_1 \, (PA\ Repeal)_{st} + X'_{ist}\gamma + \theta_s + \delta_t + u_{ist}}$$

where i indexes the individual, s indexes the states and t indexes the time period.

In the above equation $\boldsymbol{Y_{ist}}$ are patient-level outcomes of interest, $\boldsymbol{X'_{ist}}$ is a vector of time varying controls,$\boldsymbol{PA\ Repeal_{st}}$ equals 1 if individual i is in state s with prohibition on prior authorization for prescribing Buprenorphine in time period t. $\boldsymbol{\theta_s}$ and $\boldsymbol{\delta_t}$ are state fixed effects and quarter fixed effects, respectively. $\boldsymbol{u_{ist}}$ is a mean zero error term clustered at the state level. The coefficient of interest is $\boldsymbol{\beta_1}$, which provides the estimate of how change in outcomes differ across states that did and did not repeal prior authorization for prescribing Buprenorphine. The equation is estimated separately for each outcome.

Recent advances in econometric theory suggest that standard two-way fixed effects models can provide biased estimates when there is variation in treatment timing, as the estimate may capture heterogeneity and variation in the effect rather than the average treatment effect on the treated. More specifically, the use of earlier-treated units as controls for later-treated units — often referred to as a forbidden comparison — will bias the treatment effect if the impact of earlier implementation grows or wanes over time (De Chaisemartin and D'Haultfœuille 2020; Sun and Abraham 2021; Callaway and Sant'Anna 2021; Roth et al. 2023). Since, prior authorization for Buprenorphine prescribing was implemented across different states in different quarters, using a two-way fixed effects model without accounting for variation in treatment timing might violate the parallel trends assumption and provide incorrect estimates (Goodman-

Bacon 2021). In order to account for any bias arising from variation in treatment timing across the study period, the models are estimated using methods described in Chaisemartin and D'Haultfœuille (2020) and Callaway and Sant 'Anna (2021). The staggered difference-in-differences models specified using Chaisemartin and D'Haultfœuille (2020) and Callaway and Sant'Anna (2021) ensure that the parallel trends assumption holds when there is variation in treatment timing across units. To formally test the parallel-trends assumption, a dynamic event study of the form is estimated for of all periods using the above-mentioned estimators for each outcome.

We consider the Callaway and Sant'Anna (2021) estimator as the preferred model, since it more effectively avoids problematic 2 × 2 difference-in-differences comparisons that violate the parallel-trends assumption and derives estimates under more general conditions. In doing so, the estimator avoids the forbidden comparison between early and later-treated unit and yields an interpretable average treatment effect on the treated estimate under generalizations of the parallel trends assumption (Roth et al. 2023; Wang et al. 2024). However, given the lack of consensus on which estimator is most appropriate in which cases, results from two estimators —Callaway and Sant'Anna (2021) and Chaisemartin and D'Haultfœuille (2020) — are presented.

6. Results

6.1 Main Results

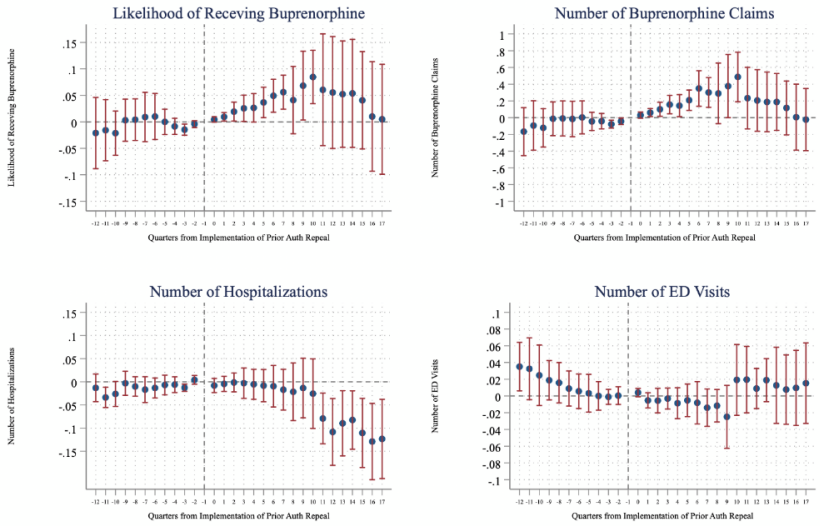
Estimated effects of repealing prior authorization for prescribing Buprenorphine on the likelihood of receiving Buprenorphine, number of Buprenorphine claims, opioid-use related hospitalizations and opioid-use related emergency department visits are presented in Table 1.2.

Table 1.2: Estimates from Difference-in Differences Models

	Baseline	Chaisemartin and D'Haultfoeuille (2024)	Callaway and Sant'Anna (2021)
Likelihood of Receiving Buprenorphine	**0.05**	**0.029*** **	**0.031*** **
Number of Buprenorphine Claims	**0.21**	**0.153** **	**0.189*** **
Number of OUD-related Hospitalizations	**0.124**	**-0.025*** **	**-0.022*** **
Number of OUD-related ED Visits	**0.19**	-0.003	-0.008
Fixed Effects			
States	-	Yes	Yes
Time (Quarter)	-	Yes	Yes
Observations	-	5,974,562	6,146,150

Table 1.2, Column 2 shows estimated coefficients from the Callaway and Sant'Anna (2021) estimator. Within this specification, repealing prior authorization for prescribing Buprenorphine is associated with an estimated 3 percentage point increase in the likelihood of receiving Buprenorphine. The policy change is also associated with an increase of 0.19 Buprenorphine prescriptions, a decrease of 0.03 opioid-use related hospitalizations, and a (statistically insignificant) decrease of 0.008 opioid-use related emergency department visits per quarter. Figure 1.2 graphically presents the dynamic event study effects of repealing prior authorization. Estimated effects in most of the pre-treatment periods are not significantly different from zero for all four outcomes, suggesting no obvious violation of the parallel-trends assumption. We find similar results implementing the regression model using the Chaisemartin and D'Haultfœuille (2020) method.

Figure 1.2: Event Study Plots from Differences-in-Differences Model using Callaway and Sant'Anna (2021)



In the post-treatment periods, I see that repealing prior authorization for prescribing Buprenorphine slightly increases the likelihood of receiving Buprenorphine, and the same is observed for the number of Buprenorphine claims suggesting that repealing prior authorization for prescribing Buprenorphine has a modest increase on the likelihood of receiving Buprenorphine and the number of Buprenorphine prescriptions over time. The results also suggest that the number of opioid-use related hospitalizations decreases over time in the post-treatment period, especially in the latter half of the post-treatment period. However, opioid related emergency department visits remain largely constant, and the effects found in the post-treatment period are statistically insignificant. I report estimated event study effects of the policy change in all pre- and post-treatment periods in Appendix A, Tables A7 and A8.

6.1 Heterogeneity

To test for heterogeneous effects of repealing prior authorization for prescribing Buprenorphine, I stratify the main regression equation by several variables using the Callaway

and Sant'Anna (2021) estimator. First, I stratify by whether or not an individual was enrolled in a managed care plan. Stratifying the results by managed-care enrollment status underscores strong contrasts in the results. For enrollees in a managed care plan, repealing prior authorization for prescribing Buprenorphine significantly increases the likelihood of receiving Buprenorphine, significantly increases the number of Buprenorphine claims, and significantly decreases the number of opioid-use related hospitalizations. In contrast, I do not find statistically significant effects on these outcomes for enrollees in fee-for-service plans. For both categories of enrollees, I do not find statistically significant effects of the policy change on opioid-use related emergency department visits. I present these estimates in Table 1.3.

Table 1.3: Effects of Policy Change across Insurance Plan Types

	Managed Care		**Fee-for-Service**	
	Baseline	**Effect**	**Baseline**	**Effect**
Likelihood of Receiving Buprenorphine	**0.07**	**0.05*** **	**0.04**	-0.02
Number of Buprenorphine Claims	**0.26**	**0.28*** **	**0.12**	-0.09
Number of OUD-related Hospitalizations	**0.12**	**-0.02*** **	**0.11**	-0.02
Number of OUD-related ED Visits	**0.21**	-0.004	**0.18**	-0.004
Fixed Effects				
States	-	Yes	-	Yes
Time (Quarter)	-	Yes	-	Yes
Observations	-	3,904,200	-	2,241,950

Second, I stratify by restrictiveness of the prior authorization repeal for prescribing Buprenorphine. States that repealed prior authorization for all Buprenorphine products — Maryland, Delaware, Nebraska, Hawaii, Rhode Island —were categorized as non-restrictive and states that repealed prior authorization for only Buprenorphine-Naloxone formulations —

Arizona, Illinois, North Carolina, Washington, Indiana, Wisconsin—were categorized as states with restrictive prior authorization repeals. I define states with restrictive and non-restrictive prior authorization repeals as separate treatment groups in this analysis.

Table 1.4: Effects of Policy Change across State-Specific Prior Authorization Repeal Policies for prescribing Buprenorphine

	States repeal Prior Authorization without restrictions DE, HI, MD, RI, NE		**States repeal Prior Authorization with Restrictions AZ, IL, IN, WA, WI, NC**	
	Baseline	**Effect**	**Baseline**	**Effect**
Likelihood of Receiving Buprenorphine	**0.08**	**0.06*** **	**0.05**	**0.02*** **
Number of Buprenorphine Claims	**0.29**	**0.32*** **	**0.19**	**0.11*** **
Number of OUD-related Hospitalizations	**0.06**	**-0.02** **	**0.14**	**-0.04** **
Number of OUD-related ED Visits	**0.24**	**-0.03** **	0.19	0.005
Fixed Effects				
States	-	Yes	-	Yes
Time (Quarter)	-	Yes	-	Yes
Observations	-	2,720,626	-	3,425,524

I find that states that repealed prior authorization without restrictions saw a significant 6 percent increase in the likelihood of receiving Buprenorphine. These states also saw a significant increase in the number of Buprenorphine claims, and a significant decrease in both opioid-use related hospitalizations and emergency department visits. For states that repealed prior authorization with restrictions, I found that the policy change was significantly increased the likelihood of receiving Buprenorphine. However, the effect size was smaller compared to states that repealed prior authorization without restrictions. I also found that for these states, the

number of Buprenorphine claims increased, the number of hospitalizations decreased and the effect on the number of emergency department visits was statistically insignificant. Estimates are presented in Table 1.4.

7. Robustness Checks

I conducted several robustness checks. First, a common issue with analyses of state policies is unobserved confounding, in particular if implementation of prior authorization repeal policies occurred at the same time as other policies that could affect Buprenorphine access and health care utilization. The results would be biased if there are unobserved state policies that are associated with trends in Buprenorphine access and with health care utilization. To mitigate this concern, I collect information on other Medicaid policies potentially related to Buprenorphine access. One such policy is Delivery System Reform Incentive Program (DSRIP) — a value-based payment model aimed at improving medication assisted treatment coverage for Medicaid beneficiaries — which was implemented during the study period in Arizona and Washington (Hinton et al. 2022). I individually and collectively exclude Arizona and Washington from the main analyses to test the robustness of the results to the inclusion of these states in our data. The results are presented in Appendix A, Table A9. I find that results are robust to the exclusion of Arizona and Washington from the main sample frame which suggests that results are not biased by the implementation of the DSRIP in Arizona and Washington during the same time period.

Second given that I am not able to exclude duals due to poor data quality of the dual eligibility status variable for Alabama, I conducted a sensitivity analysis by excluding Alabama from the main sample. The results are presented in Column 1 of Appendix A, Table A10. I find that the results are robust to the exclusion of Alabama from the main sample, which suggests

either that there are very few opioid-using dual eligible beneficiaries in the state of Alabama or that the potential inclusion of duals in a single state does not significantly influence the study outcomes. In addition, three other states in the dataset — North Carolina, Maine and Rhode Island — exhibit potential issues with their claims volumes and/or enrollment data. Therefore, I conduct a sensitivity check by excluding these states from the main analysis. The results are presented in Columns 2-4 of Appendix A, Table A10. I find that the excluding these states slightly change the magnitude of the coefficient estimates but the direction of the estimates are consistent with the results in the main analysis.

Third, to ensure that no single state is driving the results in our main analysis beyond the issues described above, I conduct a sensitivity check by sequentially leaving out one state from the main sample using the Callaway and Sant'Anna (2021) method. The results are presented in Appendix A Figure A1 and Appendix A Table A11. I find that the estimates obtained at each step in this sensitivity analysis are qualitatively similar and the main results using the Callaway and Sant'Anna (2021) estimator (presented in Table 1.2, Column 2) are not driven by the inclusion of any particular state in the sample.

8. Discussion and Conclusion

In this study, I provide empirical estimates of the effects of prior authorization policies on access to high-value care, using the repeal of prior authorization for Buprenorphine in Medicaid programs as an example. The results contribute to ongoing policy debates about implementing prior authorization policies to contain rising health care costs without restricting access to essential treatments and services for vulnerable populations.

While access increases by 56 percent relative to baseline, this corresponds to a rise from approximately 5.5 percent to about 8.5 percent, indicating that gains in Buprenorphine access associated with the policy change, reflect only modest increases in Buprenorphine access for Medicaid beneficiaries with opioid use disorders. A back of the envelope calculation — based on estimates in Table 1.2 — suggests that on average, the prior authorization repeal for prescribing Buprenorphine resulted in approximately 88,000 more Medicaid enrollees with opioid use disorder getting access to some formulation of Buprenorphine within a year. The results also partially support the theoretical claim that higher Buprenorphine access reduces downstream health care utilization for opioid-using individuals. I show that compared to the baseline, prior authorization repeal is associated with a 19 percent in decrease in the number of opioid-use related hospitalizations. The effects I find on the estimates for Buprenorphine access (see Table 2, Column 3) are consistent with other studies on the prior authorization repeal for Buprenorphine (Keshwani et al. 2022) and also consistent with other studies of reduced administrative burden for prescribing Buprenorphine (Christine et al. 2024).

I do not find any statistically significant results for opioid-use related emergency department visits. This might suggest two things. First, it might suggest that the marginal patient with opioid use disorder affected by prior authorization might not be responsive to greater Buprenorphine prescribing. Thus, simply increasing Buprenorphine access — without addressing systemic barriers in access to care — might not be enough to reduce emergency department usage in this population. Second, it might suggest that despite a more conducive policy environment for prescribing Buprenorphine in office-based settings, a significant portion of Buprenorphine treatment continues to be accessed through the emergency department. This may indicate broader issues related to limited acceptance of Medicaid by providers and lack of care

coordination between emergency departments and outpatient opioid treatment programs. In this case, the health system should make efforts to optimize linkages between emergency departments and outpatient addiction treatment programs to provide appropriate treatment for opioid-using individuals. In tests of heterogeneity, I found that the estimated effects are stronger for enrollees in Medicaid managed care plans. I also found slightly greater estimated effects in states where the policy change was implemented without restrictions on which Buprenorphine products or formulations required prior authorization.

This study highlights that removing time and resource-intensive ordeals like prior authorization for high-value health care services can improve access to essential health care services for vulnerable populations, in this case Medicaid beneficiaries with opioid use disorders. While, the ordeals mechanism offers policymakers an assurance that burdens fulfill a useful social function by optimally targeting scarce resources to those most in need, ordeals for high-value, life-saving treatments like Buprenorphine may have unintended consequences as impeding acces to essential care for high-risk patients, generate downstream health care costs (Herd et al. 2023). However, using the example of Buprenorphine prescribing for opioid using patients, the study findings demonstrate that easing administrative barriers positively affects access to essential health care services (Dunn et al. 2024) and fosters a more cost-effective care system by reducing acute health care utilization. Further suggesting that imposing authorization restrictions on low-cost, high-value treatments (like Buprenorphine), tradesoff arduous administrative burden for little value and are likely a deterrent to essential care access (Brot-Goldberg et al. 2023).

The findings from this study should be interpreted in light of several study limitations. First, I only studied one set of patient outcomes and provided suggestive evidence towards cost-

savings. A more nuanced analysis, with better spending data can provide better insight into the tradeoffs at play between bureaucracy, cost-savings and access to care. Second, due to lack of data on claims denials and lack of good quality data on overdose diagnoses codes in the TAF, I was not able to fully examine the impact of prior authorization on provider behavior and health outcomes, both of which are likely to be affected by repealing prior authorization for prescribing Buprenorphine. Future research with better quality data and/or mixed-methods research should shed some light on how prior authorization or the lack thereof for high-value treatments influences provider behavior and other pertinent patient and social outcomes. Third, using Buprenorphine as an example to argue against prior authorization for high-value care may lack external validity. While Buprenorphine is an effective intervention, its unique social and clinical context complicates its generalizability to other high-value treatments. Nevertheless, given demonstrated efficacy of Buprenorphine treatment and its significant underutilization, Buprenorphine serves as a salient example for exploring the broader issues of access to high-value care and the impact of prior authorization policies. Fourth, state TAF records varied in data quality, which may have influenced the results. To address this concern, I excluded some states on the basis of review of TAF data quality assessments using Medicaid's Data Quality Atlas and outcomes trends for each state (see Appendix A, Table A2). However, I could not rule out that some data quality issues remained. Lastly, compared to Medicaid data from state agencies, TAF is estimated to underreport opioid use disorder diagnoses by about 11 percent (Chughtai et al. 2025). Thus, the number of individuals with opioid use disorder in the study sample might be undercounted. However, the estimated prevalence of opioid use disorder (3.3%) in our study sample is consistent with estimates of opioid use disorder prevalence in other studies of Medicaid beneficiaries using TAF data (Lindner et al. 2023; 2024).

As prior authorization is more widely adopted in health insurance programs, policymakers must aim to startegically design cost-control measures to target low-value treatments and ensure access to essential care. This study — using the example of Buprenorphine access among Medicaid beneficiaries — shows that repealing prior authorization improves access, however, opportunities exist to correctly-target Buprenorphine formulations that might constitute as wasteful. An evidence-informed strategy using this example, could be to incentivize the prescription of generic Buprenoprhine formulations by requiring prior authorization for its more-costly, bio-equivalent brand-name formulation. Requiring prior authorization for close but expensive subsitiutes of high-value treatments, creates a manageable burden that can nudge providers towards more cost-effective treatment choices without impeding access to essential care and adversely affecting patient health. This study highlights that easing administrative barriers for high-value yet undertilized treatments can significantly increase patient access to evidence-informed treatments. However, to ensure appropriate utilization of services, strategically refining prior authorization requirements offers a more cost-effective solution. In conclusion, with increasing use of prior authorization across health insurance programs, policymakers — by requiring prior authorization for treatments that are truly wasteful and repealing prior authorization for services that are high-value and cost-effective — can strike a balance that ensures care access while controlling costs in a fiscally strained health care system.

Chapter 2: Can Value-Based Payment Models improve access to evidence-informed High-Value Treatments?

1. Introduction

Despite its many benefits, patients experience problems in accessing high-value services, and high-value care continues to be underutilized (Levine et al. 2019; N. K. Smith and Fendrick 2022). Such patterns often arise due to misaligned incentives, whereby payment contracts reward volume of care rather than value of care (McClellan et al. 2017). Value-based payment (VBP) models seek to address this misalignment by linking provider reimbursement to measures of quality, outcomes and cost-effectiveness. Therefore, VBP models are often used in health systems to facilitate access to evidence-informed treatments and to improve health outcomes. VBP models provide financial incentives to providers who perform well on accepted measures of quality such as improving health outcomes, making organizational improvements and facilitating access to evidence-informed high-value treatments (Holmstrom and Milgrom 1991; Milad et al. 2022; Konetzka et al. 2018; Werner et al. 2013; Norton 2018). The use of VBP in health care has become increasingly common among public and commercial insurers. Especially since the passage of the Patient Protection and Affordable Care Act of 2010, both the Medicare and Medicaid programs have expanded the use of VBP models that link provider reimbursement to performance on standardized quality metrics and patient outcomes, reflecting a broader policy shift toward improving care quality, accountability, and cost-effectiveness (Figueroa et al. 2025).

Economic theory posits that VBP models in health care — by tying reimbursement to quality metrics — can promote the provision and utilization of essential and evidence-informed high-value treatments (Holmstrom and Milgrom 1991). However, adhering to VBP models can be onerous and poorly designed VBP programs with weak incentives, inadequate performance

measures and regulatory barriers can distort incentives and result in increased health care spending without notable improvements in the quality of care (McClellan et al. 2017). In health care, VBP models typically fall into four broad categories (a) public reporting programs (b) pay-for-performance models (c) episode-based models and (d) population-based models. Empirical evidence from observational studies on the effectiveness of each of these VBP models is mixed. Evidence suggests that public reporting programs in hospitals achieved modest improvements in process-based measures for a select medical conditions (Lindenauer et al. 2007) but failed to generate meaningful improvements in patient outcomes (Joynt et al. 2016). Evidence from pay-for-performance models implemented in hospitals show that the models had little or no significant impacts on quality, patient safety, mortality, or patient experience (Figueroa et al. 2016; Ryan et al. 2015, 2017; Sankaran et al. 2019). Pay-for-performance models in nursing homes achieved modest gains with noted improvements for some measures of quality and no change — or even declines — for others (Werner et al. 2013). Similarly, evidence on the effectiveness of population-based models has also been mixed. Evidence shows that some population-based models such as the Medicare Shared Savings Program (MSSP) achieved small but meaningful reductions in spending, with unchanged or improved quality of care (McWilliams et al. 2016). Evidence shows that episode-based (bundled) payment models resulted in small reductions in clinical spending, with the best results for lower-extremity joint replacements and modest results for other episodes involving more complex surgeries and medical conditions (Barnett et al. 2020; Agarwal et al. 2020; Navathe et al. 2020). Thus, empirical evidence on the impact of VBP models in health care is inconsistent and varies across programs, care domains and health care settings. This heterogeneity in findings underscores that a more robust evidence base is needed to further the understanding of whether, how and what

type of VBP models work in practice, which patient populations benefit and under what conditions these models are most effective.

In this study, I seek to fill this gap in the domain of addiction treatment, by examining whether implementation of Delivery System Reform Incentive Payment (DSRIP) programs — a type of pay-for-performance VBP in Medicaid — improved access to high-value effective yet underutilized medications for opioid use disorders (MOUD) for Medicaid beneficiaries with opioid use disorders. Exploiting geographical and temporal variation in the implementation of DSRIP programs and applying a staggered difference-in-differences framework, I estimate the causal effects of implementing DSRIP on access to MOUD. Using MOUD as an example, this study broadly aims to provide evidence on whether delivery system reform programs can improve access to high-value yet underutilized treatments.

In addition to contributing to the broader economics literature on improving access to high-value care, this study contributes to two strands of the literature. First, this study contributes to the literature on VBP models. VBP models in health care aim to align provider incentives with patient outcomes, which in turn should encourage and promote the provision and utilization of essential and evidence informed high-value treatments. However, with variation in provider incentives, program design, and patient-level constraints, the extent to which VBP models improve access to care for which particular patient population remains uncertain (Norton et al. 2018; Figueroa et al. 2025; Ryan et al. 2015). In this study using the example of MOUD, I show that a DSRIP-like VBP model can be an effective in improving access to high-value yet underutilized treatments. The findings from this study are consistent with studies that show that pay-for-performance models are associated with improved performance for standardized quality measures, supporting their role in advancing outcomes for patients, clinicians, and payers.

Second, I contribute directly to the specific literature that explores the effects of DSRIP implementation. The DSRIP program is the most expansive effort to implement Medicaid VBPs to date. By 2020, 12 states had pursued or were pursuing DSRIP contracts, amounting to over $55.4 billion in joint state-federal funding (Medicaid and CHIP Payment and Access Commission 2020). Despite substantial investments in Medicaid delivery and payment reform, there is limited evidence on its impacts. Early studies reported that DSRIP reduced emergency department visits, and hospitalizations, and was associated with an increase in behavioral health visits and a reduction in mental health emergency department visits for patients with mental illnesses (Lewis et al. 2023). No study yet has examined the effect of DSRIP implementation on access to MOUD for beneficiaries with opioid use disorders. This study addresses that gap by examining the impact of DSRIP demonstrations on access to MOUD. By directly evaluating the relationship between DSRIP implementation and MOUD access, this study provides evidence on whether large-scale delivery system reform initiatives can expand access to evidence-based treatments for opioid use disorder. In doing so, it highlights the potential role of Medicaid delivery system reform programs as meaningful policy levers for improving access to evidence-informed treatments for vulnerable populations.

I find that states that implemented DSRIP for improving access to medication assisted treatments for Medicaid beneficiaries with opioid use disorders displayed higher MOUD access. These results were primarily driven by an increase in the likelihood of receiving Buprenorphine and to a small extent by an increase in the likelihood of receiving Naltrexone. I found no effect of the policy change on the likelihood of receiving Methadone treatment. Thus, this study provides evidence that implementing VBPs models such as delivery and payment system reform can be an effective tool to improve access to high-value, evidence informed treatments.

The paper proceeds as follows. In section 2, I describe the background and setting. In section 3, I discuss the conceptual model and resulting theoretical predictions for subsequent empirical analysis. I describe the data in Section 4 and discuss empirical strategy in Section 5. I present the results in Section 6 and robustness checks in Section 7. In Section 8, I conclude.

2. Background and Setting

2.1 Opioid Epidemic in the United States

Drug overdose deaths are one of the leading cause of deaths in the United States. Approximately 900,000 Americans have died as result of opioid overdoses since 1999 (Abraham et al. 2022; Biondi et al. 2022). Despite recent declines in the absolute number of opioid overdose deaths, more than 45,000 Americans died from opioid overdose between October 1, 2024 and October 31, 2025 (Ahamd et al. 2026). The persistence of opioid-related overdose deaths underscores the urgent need to connect individuals who use opioids with effective addiction treatments, such as medications for opioid use disorder.

MOUD — Buprenorphine, Naltrexone and Methadone — are Food and Drug Administration (FDA) approved drugs used for treating individuals with opioid use disorders (Clark et al. 2015; Hser et al. 2016; Wakeman et al. 2020; Weiss et al. 2015). MOUD has been shown to be cost-effective and is considered to be the first-line treatment in assisting the recovery of individuals suffering from opioid use disorders. Although all three MOUD are effective, differences in their pharmacological profiles and differing clinical realities of their administration make MOUD prescribing challenging. Naltrexone can be prescribed in office-based settings without enrollment in specialized opioid treatment programs, but its requirement for full detoxification and potential side effects often reduces patient preference. In contrast,

Buprenorphine and methadone — as opioid agonist therapies —generally have higher acceptability and better retention rates; however, their prescribing is constrained by stringent regulatory oversight. Adequate access to MOUD is further impeded by pervasive stigma about MOUD use among patients and providers and administrative barriers that delay and/or restrict timely MOUD treatment. Thus, to expand access to MOUD, Medicaid programs across the country have pursued different policies to link opioid-using patients to medication assisted treatments. In some states, prior authorization requirements for select MOUD were repealed to facilitate access. In some states telehealth coverage was expanded to ease MOUD prescribing, and in a select few states a program of performance-based payments — Delivery System Reform Incentive Payment (DSRIP) — was introduced to incentivize among other things, the provision of MOUD for Medicaid beneficiaries with opioid use disorders.

2.2 Delivery System Reform Incentive Payment (DSRIP) and MOUD Access

DSRIP initiatives are part of Section 1115 Waiver programs and provide states with funding that can be used to support providers in changing how they provide care to Medicaid beneficiaries. DSRIP programs aim to improve quality of care and health outcomes by incentivizing providers to transition care to focus on prevention and management of health and wellness in patient populations (Gates et al. 2014). DSRIP programs tend to focus on providing better care in outpatient, ambulatory care, and community-based settings in order to reduce the need for and use of inpatient hospital services (Heider et al. 2017). While the exact structure and requirements of each DSRIP initiative differ, demonstrations across states share a broad operational framework and many of the same goals such as meeting milestones on process-based metrics, and outcome-based metrics (Hinton et al. 2022). DSRIP demonstrations across 4 states — New Hampshire, Massachusetts, Arizona and Washington — reward providers for expanding

access to MOUD treatments for Medicaid beneficiaries with opioid use disorder. An overview of DSRIP demonstrations in these select Medicaid programs and the metrics on which performance is evaluated are detailed below.

The DSRIP demonstration in New Hampshire — implemented in 2016 with a funding of $150 million in incentive payments — sought to improve access to and quality of behavioral health services for individuals at risk for or already diagnosed with mental health and substance use disorders. In addition to focusing the state's DSRIP demonstration on Medicaid beneficiaries with these disorders, a key feature of the DSRIP demonstration included a plan to implement evidence-based programs combining behavioral and MOUD treatment for people with substance use disorders. The demonstration aimed to increase access to MOUD programs through multiple care settings — primary care offices and clinics, traditional addiction treatment programs, mental health treatment programs — with the goal of successfully treating more Medicaid beneficiaries with addiction disorders. (Smith et al. 2020)

In Massachusetts, the DSRIP program — implemented in July 2017 with a funding of $1.8 billion — provided incentives to Medicaid accountable care organizations (ACOs) and community-based entities to provide care coordination supports for members with high behavioral health and long-term care needs. In terms of behavioral health needs, the Massachusetts program focused on enhancing the state's behavioral health infrastructure and capacity for Medicaid beneficiaries by funding the creation of behavioral health community partners, which would support and provide services such as psychiatric care and MOUD for Medicaid beneficiaries with serious mental illness and/or substance use disorders. In addition, the program incentivized providers to provide coverage for health care services that addressed

health related social needs especially for aging individuals transitioning from an institution to the community (Hinton et al. 2022).

In Arizona, the DSRIP program called Targeted Investments (TI) Program — implemented in 2017 with a funding of $300 million — aimed to support physical and behavioral health care integration and coordination for Medicaid beneficiaries with behavioral health needs. The program provided incentives in two primary settings: hospitals and ambulatory care. Under the demonstration, hospitals received incentives for delivering care to adults with behavioral health diagnoses and serious mental illness. Ambulatory care providers were incentivized based on their performance in serving three key populations: adults with behavioral health needs; children and youth with behavioral health needs, including those involved in the child welfare system, and adults transitioning from criminal justice settings. The program incentivized primary care practices to screen for depression, drug and alcohol misuse, anxiety, developmental delays in infancy and early childhood, and suicide risk. The program also incentivized ambulatory care providers who achieved milestones by showing that their practice had reliable and consistent access to at least one physician who can prescribe MOUD. Further, ambulatory care providers also had to demonstrate how they were in compliance with the states' medication assisted treatment guidelines for beneficiaries with opioid addiction (Hinton et al. 2022).

In Washington State the DSRIP program called Medicaid Transformation Projected — implemented in 2017 with a funding of $1.1 billion — aimed to transform its health care delivery system and targeted services for Medicaid beneficiaries. This demonstration sought to integrate physical and behavioral health purchasing and service delivery to better meet whole-person needs; to convert 90 percent of Medicaid provider payments to reward outcomes instead of

volume; to support provider capacity to adopt new payment and care models; to implement population health strategies that improve health equity; and to provide new targeted services that address the needs of the state's aging populations and address key determinants of health (Hinton et al. 2022; Heider et al. 2017). In terms of outcome-based metrics, the demonstration focuses on prevention and health promotion and incentivizes providers for improving access to reproductive and maternal/child health; improving access to oral health services; chronic disease prevention and control (Washington State Health Care Authority 2017) and supporting the achievement of the state's goals to reduce opioid-related morbidity and mortality through strategies that target prevention, treatment and recovery supports. In particular, Washington State sought to reward providers on metrics related to medication assisted therapy with Buprenorphine and Methadone (Washington State Health Care Authority 2018).

3. Conceptual Framework

I conceptualize the implementation of DSRIP initiatives to improve access to MOUD treatment using a simple multitasking model (Holmstrom and Milgrom 1991). In this framework, physicians face a finite workday and allocate their effort across competing clinical activities to maximize their overall payoff.

To maximize their payoff — subject to constraints related to time, resources, and effort — physicians are incentivized to allocate effort towards activities that are more easily delivered, less time-intensive, or more directly reimbursed. In particular, providing high-value treatments to patients may require additional physician effort. If reimbursement does not sufficiently reward high-effort activities, physicians may allocate time towards other clinical tasks that require less effort and are more directly compensated. As a result, some patients who could benefit from

high-value therapies may not receive these therapies, and high-value treatments would go underutilized. VBP models attempt to address this misalignment by linking physician reimbursement more closely to measures of patient outcomes, quality, or overall healthcare value (Zaki et al. 2021). By providing financial incentives for targeted activities, VBP models can incentivize physicians to allocate effort towards delivering high-value treatments. As a result, physicians — assuming that incentives offered in the VBP contract are compatible and aligned with physician objectives — have stronger incentives to facilitate access to high-value care that would otherwise be underprovided and underutilized.

In the context of Medicaid implementing DSRIP with incentives tied to improving access to MOUD, Medicaid — the public payer — aims to maximize the health of beneficiaries subject to budget constraints, which implies allocating resources toward treatments that generate the greatest health value per dollar spent. Physicians, by contrast, aim to maximize their payoff by allocating effort across clinical activities based on a combination of patient benefit, financial incentives and time constraints. The literature notes that treating patients with opioid use disorders is difficult and requires additional effort from the physician (Slawek et al. 2019; Parish et al. 2025; Schuckit 2016). Further, physicians incur costs from government agencies and insurers by having to adhere to additional rules and regulations, thereby making it costly for them to engage with patients with opioid use disorder and prescribe appropriate treatments. Under traditional reimbursement models, these activities may not be fully compensated, limiting provider incentives to expand MOUD access. However, VBP models — by tying payments to improvements in treatment access and related outcomes — reward treatment choice and effort allocation that maximize patient benefit. Assuming that incentives in DSRIP are appropriately designed i.e., costs incurred in prescribing MOUD are reimbursed by Medicaid such that the

expected payoff from MOUD treatment exceeds that from any alternate or no treatment, then providers may appropriately respond to incentives, and allocate more effort towards initiating MOUD, thereby increasing the utilization of MOUD that would otherwise be underutilized among Medicaid beneficiaries with opioid use disorders.

Given this context, I hypothesize that the implementation of DSRIP will improve the likelihood of receiving any MOUD for Medicaid beneficiaries with opioid use disorders. However as noted in Section 2.1, Buprenorphine has higher patient acceptability and can be prescribed in office-based settings. Therefore, any meaningful increase in MOUD access associated with DSRIP implementation will be likely driven by increases in the likelihood of receiving Buprenorphine. I also predict some small increases in Naltrexone access associated with DSRIP implementation as it can also be prescribed in office-based settings. However, given weaker patient preferences, the effect will likely be much smaller compared to Buprenorphine access. In similar fashion, since Methadone treatment is subject to rigid state and federal regulations, generally requires visits to specialized opioid treatment programs (OTPs) and can carry profound social stigma (Hsu et al. 2025). I therefore predict that DSRIP implementation will likely have no effect on Methadone treatment utilization by Medicaid beneficiaries with opioid use disorders.

4. Methods

4.1 Data Sources

The data for this study come from the Transformed Medicaid Statistical Information System Analytic Files (TAF) data from 17 U.S. Medicaid programs from 2015-2019, through an agreement with the Centers for Medicare and Medicaid Services. Demographic and enrollment

information for beneficiaries come from the demographic and eligibility files. Beneficiaries with opioid use disorders are identified using International Classification of Disease Codes (ICD)-9 and ICD-10 diagnoses codes (See Appendix B, Table B5) from the inpatient and other services claims files. Data on Buprenorphine use come from the pharmaceutical and other services claims files; data on Methadone use come from the other services claims files and data on Naltrexone use come from the pharmaceutical claims file.

4.2 Study Sample

The study sample includes a repeated cross-section of non-elderly — aged 18 to 64 years — Medicaid beneficiaries who have a claims-based diagnostic record of opioid use disorder. In 2015 for all states in the sample, I used ICD-9 codes to identify beneficiaries with opioid use disorders; after 2016, I used ICD-10 codes to identify beneficiaries with opioid use disorders. MOUD for dual eligible beneficiaries is largely covered by Medicare, and Medicaid only provides partial coverage for MOUD. I therefore exclude beneficiaries who are dual eligible. I build on the minimal data quality checks from DQ Atlas for the years 2015-2019 and further exclude states from the analysis — Kentucky, Florida, Massachusetts — in which I cannot reliably ascertain MOUD utilization (Centers for Medicare & Medicaid Services 2025). A detailed description of the inclusion criteria for states is noted in Appendix B, Tables B1 and B2. Further, I followed reporting guidelines for using TAF data developed by the Medicaid Data Learning Network (Schpero et al. 2025). Details are noted in Appendix B, Table B3.

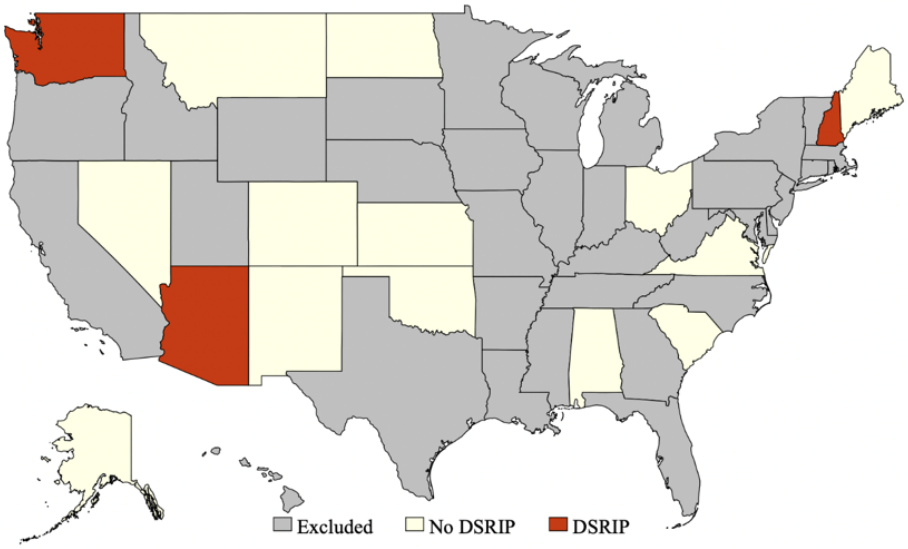
The final study sample includes cross-sectional data from 17 states for 614,796 unique Medicaid enrollees with a diagnostic record of opioid use disorder.

4.3 Study Variables

4.3.1 Treatment Variable: Indicator for DSRIP implementation for improving access to MOUD

The explanatory variable of interest in the study is whether or not a state Medicaid program implemented a DSRIP program with rewards for improved access to MOUD during the study period. I use a dichotomous indicator that equals 1 if an individual is in a state that implemented a DSRIP program for improving access to MOUD during the study period (treatment group) and 0 if an individual is in a state that did not implement a DSRIP program for improving access to MOUD (control group). States that implemented a DSRIP program prior to 2015 are excluded from the study. This results in three states — Arizona, New Hampshire, Washington — in the treatment group and 14 states in the control group. See Figure 2.1.

Figure 2.1: Implementation of DSRIP in State Medicaid Programs



Implementing inclusion restrictions, the final study sample consists of 60,934 unique opioid-using Medicaid beneficiaries in states with a DSRIP program and 553,862 unique opioid-using Medicaid beneficiaries in states without a DSRIP program.

4.3.2 Dependent Variables

The study examined the impact of implementing the DSRIP program on the likelihood of receiving any MOUD, likelihood of receiving Buprenorphine, likelihood of receiving Naltrexone and likelihood of receiving Methadone. MOUD use in the data is identified through National Drug Classification (NDC) codes and procedure codes (Appendix B, Table B6). These variables are dichotomized accordingly to explore the effects of the policy change on the likelihood of receiving any MOUD.

4.3.3 Other Variables

All models are estimated controlling for a beneficiary's age, sex and whether or not they were enrolled in a Medicaid managed care plan. I included state fixed effects and time (quarter) fixed effects across all models to account for unobserved heterogeneity across states and over time periods. The covariates are summarized in Table 2.1.

Table 2.1: Baseline Characteristics of Medicaid Beneficiaries with Opioid Use Disorders

	Full Sample	**States with DSRIP**	**States without DSRIP**
	N=614,796	**N=60,934**	**N=553,862**
Age, Mean (SD), Years	37.79 (11.78)	36.90 (12.19)	37.88 (11.73)
Sex, N (%)			
Male	52.87	52.00	53.74
Female	47.13	48.00	46.26
Insurance Status, N (%)			
Managed Care	62.92	83.23	60.69
Fee-For-Service	37.08	16.77	39.31

Medicaid beneficiaries with opioid use disorders across both (treatment group) and without a DRSIP program (treatment group) for prescribing Buprenorphine were on average 37

years old. In both the treatment and control groups, Medicaid beneficiaries with opioid use disorders were more likely to be male with a disproportionately higher proportion of men in the treatment group. Beneficiaries in the treatment group were more likely — 83% vs. 61% — to be enrolled in Medicaid managed care compared to fee-for-service Medicaid.

5. Empirical Strategy

I use a difference-in-differences regression framework with staggered timing to estimate the effect of DSRIP implementation on MOUD prescribing among Medicaid beneficiaries, employing multiple estimators for transparency and comparison. The main source of identifying variation is whether a state Medicaid program implemented a DSRIP program to improve access to MOUD. The identifying assumption in this research design is the parallel-trends assumption. In the context of this study, the assumption warrants that trends in outcomes across states that implemented a DSRIP program to improve MOUD access and states that did not implement a DSRIP program should follow similar trends in absence of the policy change. While inherently untestable after the policy change, a standard way to assess the credibility of this assumption is to examine whether trends are parallel prior to implementation. I additionally test the parallel-trends assumption by plotting the pre-trends in covariates-adjusted outcomes using a difference-in-differences model with an event study specification. The research design also requires that the stable unit treatment value assumption (SUTVA) and the assumption of common shocks is satisfied (Cliff 2022). To satisfy SUTVA — which requires no interference between treatment and control units — I exclude beneficiaries who move across states from the analysis. To ensure that the common shocks assumption is satisfied I conduct a robustness check in Section 7 by

excluding two states — Arizona and Washington — that in addition to implementing DSRIP simultaneously implemented other Medicaid policies aimed at expanding MOUD access.

To analyze the impact of DSRIP on MOUD access, I estimate the following linear-probability model for all outcomes:

$$\boldsymbol{Y_{ist} = \alpha + \beta_1 (DSRIP)_{st} + X'_{ist}\gamma + \theta_s + \delta_t + u_{ist}}$$

In the above equation $\boldsymbol{Y_{ist}}$ is a binary indicator of whether or not a patient with opioid use disorder received any MOUD. $\boldsymbol{X'_{ist}}$ is a vector of time varying controls (age, sex, enrollment in a managed care plan); $\boldsymbol{\theta_s}$ and $\boldsymbol{\delta_t}$ are state fixed effects and quarter fixed effects, respectively. $\boldsymbol{DSRIP_{st}}$ equals 1 if individual i is in state s with a DSRIP program in period t. $\boldsymbol{u_{ist}}$ is a mean zero error term. The coefficient of interest is $\boldsymbol{\beta_1}$, which provides the estimate of how change in MOUD access differ across states that did and not implement DSRIP. The equation is estimated separately for any MOUD, Buprenorphine, Naltrexone and Methadone.

Recent advances in econometric theory suggest that standard two-way fixed effects models can provide biased estimates when there is variation in treatment timing. More specifically, the use of earlier-treated units as controls for later-treated will bias the treatment effect if the impact of earlier implementation grows or wanes over time (De Chaisemartin and D'Haultfœuille 2020; Goodman-Bacon 2021; Roth et al. 2023; Callaway and Sant'Anna 2021). Since DSRIP was implemented across different states in different quarters, using a two-way fixed effects model without accounting for variation in treatment timing might violate the parallel trends assumption and provide incorrect estimates (Goodman-Bacon 2021). In order to account for any bias arising from variation in treatment timing across the study period, the models are estimated using methods described in Callaway and Sant 'Anna (2021). The staggered difference-in-differences models specified using Callaway and Sant'Anna (2021)

ensure that the parallel trends assumption holds when there is variation in treatment timing across units. To formally test the parallel-trends assumption, a dynamic event study is estimated for of all years for each outcome.

I consider the Callaway and Sant'Anna (2021) estimator for the main results, since it effectively avoids the problematic 2 × 2 difference-in-differences comparisons that violate the parallel-trends assumption and allows the estimation of average treatment effects on the treated using inverse probability weighting.

6. Results

Table 2.2 shows estimated coefficients from the Callaway and Sant'Anna (2021) estimator. Within this specification, implementing DSRIP is associated with an estimated 4.5 percentage point increase in the likelihood of receiving any MOUD.

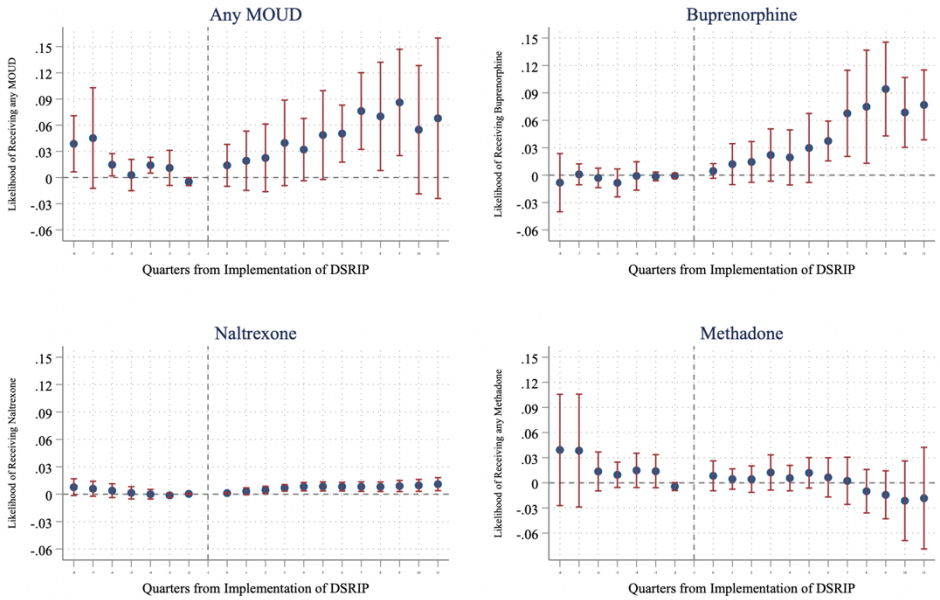
Table 2.2: Effect of DSRIP on Likelihood of Receiving MOUD

	Any MOUD	**Any Buprenorphine**	**Any Naltrexone**	**Any Methadone**
Effect of DSRIP (percentage points)	**0.045****	**0.040****	**0.007***	-0.0001
Fixed Effects				
State	Yes	Yes	Yes	Yes
Time (Quarter)	Yes	Yes	Yes	Yes
Baseline (%)	12.09	6.83	0.42	4.90
Observations	5,163,836	5,163,836	5,163,836	5,163,836

Figure 2.2 graphically presents the dynamic event study effects of implementing DSRIP estimated from the Callaway and Sant'Anna (2021) method. Event study plots in Figure 2.2

shows that estimated effects in most of the pre-treatment periods are not significantly different from zero for the outcome, suggesting no obvious violation of the parallel-trends assumption.

Figure 2.2: Event Study Plots for Likelihood of Receiving MOUD



I find that the estimated effect of DSRIP implementation on MOUD access is primarily driven by an increase in access to Buprenorphine and to a small extent by an increase in access to Naltrexone. DSRIP implementation is associated with a 4-percentage point increase in the likelihood of receiving Buprenorphine; a 0.7 percentage point increase in the likelihood of receiving Naltrexone; and has no effect on the likelihood of receiving Methadone treatment.

Two — Arizona and Washington — out of three treatment states in the analysis are confounded by other MOUD access policies that were implemented by Medicaid around the same time. Thus, it is likely that the average treatment effect on the treated is potentially confounded when pooling across all states. Given that New Hampshire is the only state in the sample with just the DSRIP program aimed at improving MOUD access, I check the robustness

of the main results by excluding both Arizona and Washington from the main sample frame. Restricting the sample to one treatment state (New Hampshire) reduces the size of the estimate obtained in Section 6 to 1.9 percentage points. This suggests that the estimate obtained from pooling across all states is to some extent biased by the other policy changes in Arizona and Washington, and a more precise effect of DSRIP implementation on the likelihood of receiving any MOUD lies in the range of 1.9 and 4.5 percentage points. See Appendix B Table B9.

7. Robustness Checks

I conducted several robustness checks. First, a large number of beneficiaries appear to be enrolled in managed care plans in state Medicaid programs that eventually implemented DSRIP. To ensure that DSRIP implementation does not coincide with increases in Medicaid managed care enrollment in these states, we assess whether managed care penetration changed following DSRIP implementation. If managed care enrollment increases disproportionately, the results may be biased. To test for this, we compare the proportions of enrollees in managed care plans before and after DSRIP was implemented. We find that in the pre-period, 62.5 percent and post-period 63.4 percent of the beneficiaries were enrolled in managed care plans. The approximately 1 percent difference between the two groups provides some evidence that the treatment and controls groups are unlikely to be differentially selected by enrollment in managed care plans. Further use of the Callaway and Sant'Anna (2021) estimator implemented with inverse probability weighting mitigates additional concerns related to differential selection into treatment and control groups leading to biased results.

Second, due to a lack of consensus on which difference-in-differences estimator is most appropriate in estimations with variation in treatment timing. I test the robustness of the

estimates obtained in Section 6 using methods described in de Chaisemartin and D'Haultfoeuille (2020). The results are presented in Appendix B, Table B8. I find that results obtained using the Callaway and Sant'Anna (2021) estimator are robust to results using the de Chaisemartin and D'Haultfoeuille (2020) method.

Third, given that I am not able to exclude duals due to poor data quality of the dual eligibility status variable for Alabama, I conducted a sensitivity analysis by excluding Alabama from the main sample. The results are presented in Column 1 of Appendix B, Table B10. I find that our results are robust to the exclusion of Alabama from the main sample, which suggests either that there are few opioid-using dual eligible beneficiaries in the state of Alabama or that the potential inclusion of duals in a single state does not significantly influence the study outcomes. In addition, one other state in the dataset — Maine — exhibits potential issues with their enrollment data. Therefore, I conduct a sensitivity check by excluding Maine from our main analysis. The results are presented in Column 2 of Appendix B, Table B10. I find that the exclusion of these states only slightly changes the magnitude of the point estimates and results obtained with their exclusion is consistent with the results of our main analysis. Further to ensure that no single state is driving the results in our main analysis beyond the issues described above, I conduct a sensitivity check by sequentially leaving out one state from the main sample using the Callaway and Sant'Anna (2021) method. The results are presented in B, Table 11. I find that the estimates obtained at each step in this analysis are qualitatively similar.

Fourth, a common issue with analyses of state policies is unobserved confounding, in particular if implementation of DSRIP occurred at the same time as other policies that could affect MOUD access. To mitigate this concern, I collect information on other Medicaid policies related to MOUD access that occurred at the same time. In Arizona, I find that prior

authorization was repealed for prescribing Buprenorphine and in Washington I find that (a) prior authorization was repealed for prescribing Buprenorphine and (b) a hub and spoke model was implemented to expand access to MOUD treatment. I exclude Arizona and Washington from the main analyses to test the robustness of our results to the inclusion of these states in our data. I find that excluding Arizona and Washington from the main sample does not affect the point estimate, but the result obtained becomes statistically insignificant, likely due to loss of statistical power stemming from a reduced sample size. See Appendix B, Table B9, Columns 1 and 2.

8. Discussion and Conclusion

In this study, I provide empirical estimates of the effects of implementing a VBP model on access to MOUD, using the implementation of DSRIP to improve MOUD access in state select Medicaid programs as an example. Our results provide evidence that VBP models such as DSRIP can be an effective policy measure for improving access to high-value yet underutilized treatments like MOUD. Though the magnitude of the effect may vary depending on the choice of treatment states, results from this analysis indicates that DSRIP implementation is associated with a 1.9 to 4.5 percentage point increase in the likelihood of receiving MOUD among Medicaid beneficiaries with opioid use disorders. This corresponds to a 15 to 34 percent relative increase in MOUD utilization following the policy change.

The results are consistent with the theoretical prediction that implementing DSRIP is associated with an increase in the likelihood of receiving any MOUD, with results primarily being driven by an increase in the likelihood of receiving Buprenorphine and an increase in the likelihood of receiving Naltrexone. The findings are in line with the evidence that Buprenorphine has higher patient acceptability than Naltrexone and is easier to access than Methadone (Harris et

al. 2026). I do not observe statistically significant effects on access to Methadone treatment. This underscores that DSRIP-style VBP models might not be best positioned to improve access to Methadone. Other VBP models and policy measures with incentives that align more closely with the incentives of Methadone treatment providers, might be better suited to facilitate access to timely and essential Methadone treatment for Medicaid beneficiaries with opioid use disorders. This finding also points to the fact that regulatory oversight imposed by the Drug Enforcement Administration, as well as other clinical and operational constraints associated with Methadone administration, may limit the extent to which VBP models can meaningfully improve access to Methadone (Krawczyk et al. 2023; Shahlapour et al. 2024; Harris et al. 2026). Nevertheless, expanding access to Buprenorphine remains critically important, as it can play a substantial role in preventing opioid overdoses and reducing avoidable health care utilization.

The findings from this study should be interpreted in light of several study limitations. First, I only examine one set of patient outcomes and did not provide any evidence on the cost-effectiveness of the DSRIP program. A more nuanced analysis, with better spending and overdose data can provide better insight into how effective — from both a cost and outcomes perspective — the VBP program was at improving outcomes. Second, this analysis considers a binary indicator of whether or not DSRIP was implemented in a state. Although important, future analysis could consider the role of differing incentives across states and overall program design in each state and provide a more comprehensive overview of not just whether but also how DSRIP programs are influencing access to essential care for Medicaid beneficiaries. Third, this analysis includes evidence from only a handful of state Medicaid programs. As a result, choice of control and treatment groups may influence the estimates on the effect of DSRIP implementation on MOUD access. Nevertheless, robustness checks leaving one state out

indicates that the exclusion or inclusion of any one state in the control group did not influence the overall results. Fourth, using MOUD as an example may lack external validity. While MOUD are effective treatments, their unique social and clinical context complicate their generalizability to other high-value treatments. Nevertheless, given demonstrated efficacy of MOUD treatment and their significant underutilization, MOUD serve as a salient example for exploring the broader issues of access to high-value care and the impact of VBP policy initiatives. Fourth, state TAF records varied in data quality, which may have influenced the results. To address this concern, I excluded some states on the basis of our review of TAF data quality assessments using Medicaid's Data Quality Atlas (see Appendix B Table B2). However, I could not rule out that some data quality issues remained.

This study is the first to show that implementation of DSRIP programs is associated with improved access to MOUD. The observed increases in Buprenorphine and Naltrexone utilization indicate that VBP models — payment and delivery system reforms — can be effective in expanding access to high-value treatments, especially those treatments that can be prescribed in office-based settings. The findings for Methadone treatment highlight that structural and regulatory barriers associated with Methadone treatment delivery impedes its access. Thus, this particular type of VBP reform might not be appropriate to expand Methadone access. In conclusion, although a more developed evidence base is needed to facilitate access to Methadone treatment, findings from this study suggest that VBP reforms have the potential to improve access to some types of high-value yet underutilized treatments.

Chapter 3: Improving Access to Medications for Opioid Use Disorders: Insights from a Qualitative Study

1. Introduction

Medications for opioid use disorders (MOUD) are widely recognized as clinically- and cost-effective therapies for supporting the treatment and recovery of persons with for opioid use disorders. Reflecting the growing consensus that improving access to MOUD is central to addressing the opioid crisis, over the past decade, policymakers at both the state and federal level have implemented a range of reforms aimed at expanding treatment capacity and reducing barriers to prescribing these medications. However, evidence suggests that these policy changes have produced only modest improvements in MOUD access.

Policy evaluations relying on administrative claims and/or prescribing data have offered critical insight into changes in MOUD utilization. Studies examining the repeal of prior authorization requirements and the elimination of the federal X-waiver for Buprenorphine prescribing have found limited effects on treatment uptake. While expansions in telehealth and remote prescribing have been associated with reductions in overdose risk but overall utilization remains low, with only 1 in 5 Medicaid beneficiaries (Maxwell 2023) and 1 in 8 Medicare beneficiaries with opioid use disorders receiving any MOUD (Jones et al. 2022). Thus, it remains unclear as to why MOUD treatment — despite the many policies intended to improve access — continues to be underutilized. Quantitative analyses on the topic — although essential and insightful — have not been able to explain how policies intended to improve MOUD access have shaped the tactile realities of providing care to individuals with opioid use disorders.

As a result, critical questions regarding the mechanisms through which policy levers succeed or fail to improve MOUD access remain unanswered. To address this gap, this study

using semi-structured interviews with key informants in the addiction care domain identifies mechanisms through which policies aimed at improving MOUD access constrain or facilitate care delivery of MOUD to opioid-using individuals.

2. Background

Despite recent declines in the number of opioid overdose deaths, more than 45,000 Americans died from opioid overdoses between October 2024 and October 2025 (Ahmad et al. 2026). The rising number of opioid-related overdose deaths increased the urgency to link opioid-using patients to effective addiction treatments such as MOUD.

At the federal level, the Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities (SUPPORT) Act of 2018 required state Medicaid programs to cover all three FDA-approved MOUD (H.R.6 Substance Use-Disorder Prevention That Promotes Opioid Recovery and Treatment for Patients and Communities Act or the SUPPORT for Patients and Communities Act 2018). More recently, the Mainstreaming Addiction Treatment (MAT) Act, signed into law in late 2022, eliminated the federal requirement for practitioners to require additional training to prescribe Buprenorphine for opioid use disorders, making it easier to integrate addiction treatment into primary care and expanding patient access to MOUD (Mainstreaming Addiction Treatment Act of 2021). At the state-level, some Medicaid programs introduced value-based payment models like the Delivery System Reform Incentive Payment (DSRIP) to improve access to MOUD (Elizabeth Hinton et al. 2022) whereas in other states previously instituted prior authorization requirements for prescribing Buprenorphine were repealed to improve access to the medication (Christine et al.

2023). Further in the wake of the COVID-19 pandemic, policies such as expanded telehealth coverage, remote prescribing of Buprenorphine, and expanded take-home doses of Methadone from opioid treatment programs were enacted to improve access to MOUD (Jones et al. 2022). Despite these policy efforts, access to MOUD has been inadequate.

3. Methods

3.1 Recruitment

We recruited key informants — addiction-care physicians, nurse practitioners and social workers — across eight states in the United States. While only addiction-care physicians and nurse practitioners are allowed to prescribe MOUD to opioid-using patients, social workers — being at the intersection of working actively with opioid-using patients, the health care system and policy — are uniquely placed to provide insights into patient-level barriers to MOUD initiation, how institutional policies influence access to MOUD treatment and gaps between policy intent and implementation in practice. We focused on recruiting key informants from states where the Medicaid program implemented some policy targeting the expansion of MOUD treatments to opioid-using individuals between 2015 and 2023.

The study used a purposive sampling strategy, supplemented by snowball sampling to recruit key informants from multiple states. Key informants were contacted via email and asked to participate in a 30 – 45-minute interview over zoom. The goals of the study and other pertinent information were mentioned in the recruitment email (Appendix C,1).

3.2 Data Collection

Pilot interviews were conducted with two key informants to refine the interview guide. Based on feedback, interview guides were revised and participants (N=18) were subsequently recruited for the study. Interviews lasted between 20 and 60 minutes. Interviews were audio-recorded and transcribed using an online software. SS reviewed transcripts for quality and ensured de-identification. Audio recordings were destroyed after transcription, review and de-identification.

Once key informants agreed to participate in the interview via email and provided verbal consent to being audio-recorded, they completed semi-structured interviews conducted via video conference using Zoom. The investigator of the study (SS), a health services research doctoral student used a semi-structured interview guide containing open-ended questions and optional probes to elicit information on key domains of interest. The interview guide was developed according to the study objectives and included questions about (a) how state- and federal-level policies to expand MOUD coverage have been perceived by providers (b) challenges faced in accessing MOUD treatment and (c) recommendations for facilitating access to MOUD treatment. Example questions for physicians and nurse practitioners included: “Illinois repealed prior authorization for prescribing Buprenorphine in 2015, how has that affected you as provider and have your patients benefitted from the policy change?/ In spite of so many policies to increase access to MOUD, why is access still a problem for opioid using individuals?/ What policy solutions should be pursued to improve access to MOUD care for opioid-using individuals? (See Appendix C,2 and 3).

3.3 Data Analysis

Analyses used rapid turn-around qualitative methods to efficiently generate actionable findings while maintaining analytic rigor (Hamilton and Maietta 2016). This approach included the creation of structured, templated summaries of interview transcripts, organized around key analytic domains, to facilitate timely identification of barriers and facilitators to ensuring adequate access to MOUD treatment.

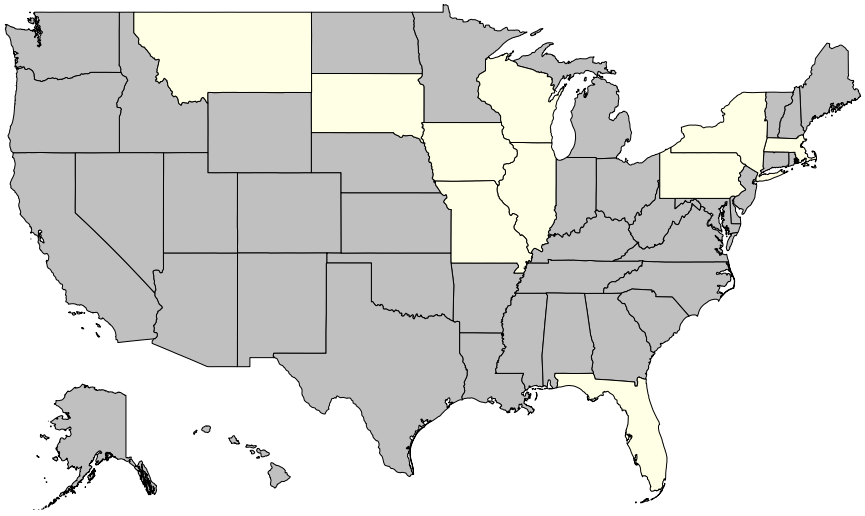
Two researchers (SS and JL) conducted line-by-line coding of all interview transcripts. Coding was conducted independently to enhance analytic reliability. Following completion of independent coding, SS and JL met regularly in group coding meetings to review coded transcripts, compare interpretations, and reconcile discrepancies through discussion and consensus. These meetings served to refine code definitions and ensure consistent application across transcripts. A preliminary codebook was developed *a priori* using a deductive approach (Robinson and Bailey-Rodriguez 2025), informed by the study's research questions and relevant literature. The initial code list was developed by SS and reflected key domains related to MOUD access as well as other concepts identified during study planning. Consistent with best practices the analytic process remained flexible, allowing for identification of new codes that emerged directly from the data (Ramanadhan et al. 2021). These emergent codes were discussed and incorporated into the codebook as appropriate. After three iterative coding meetings, a finalized code list was established. Using this refined codebook, four final themes were identified through analytic discussions involving SS and JL. The identified themes were also discussed between SS, ECP, and HAP, to ensure depth and credibility (Goldberg et al. 2025). NVivo qualitative research software was used to support data management, coding, and retrieval, Microsoft Excel

was used to assist with data organization and Otter.ai — an online transcription service — was used to transcribe interview recordings.

4. Results

Interviews (including pilot interviews) were conducted with 20 key informants — physicians, nurse practitioners and social workers — across 10 states. These states include Wisconsin, Illinois, Missouri, New York, Florida, Massachusetts, Pennsylvania, Montana, South Dakota. (See Figure 3.1).

Figure 3.1: States where Key Informants work or provide MOUD care



Of these twenty key informants, 11 were internal medicine physicians with a specialization in addiction medicine and 4 were family medicine physicians. Interviews were also conducted with 2 nurse practitioners and 3 social workers. (See Table 3.1).

Table 3.1: Characteristics of Key Informants

	N=20
Type	
Addiction Medicine Physician	11
Family Medicine Physician	4
Nurse Practitioner	2
Social Worker	3
Geography	
Urban	16
Rural	4
Place of Practice [a]	
Federally Qualified Health Centers (FQHC)	6
Academic Medical Center	12
Community Clinics	3

Note: (a) Most physicians in the sample worked in at least 2 places of practice, the most likely combination was FQHC and academic medical center.

The physicians and nurse practitioners interviewed for the study worked at large academic health centers, federally qualified health centers (FQHCs) or community clinics. The social workers interviewed for the study were project leads for studies on MOUD expansion among justice-involved opioid-using individuals. Four key informants were located in rural areas and the remaining 16 were located in urban areas. Majority of the opioid-using patients treated by providers in urban locations were African American men between the ages of 40 and 54. Their patients were primarily using heroin and synthetic opiates, and also had co-occurring cocaine use disorders. They usually presented at emergency departments or outpatient clinics for Suboxone treatment. These patients also had social determinants of health related to unstable housing, low-income and criminal-legal involvement. In rural areas, the opioid-using population was mostly white or Native American men between the ages of 40 and 45. The patients were primarily using heroin and synthetic opiates, and they had co-occurring methamphetamine use disorders. Patients in rural areas usually presented in outpatient clinics for Suboxone or

Methadone treatment. These patients in addition to issues related to unstable housing and income, were situated in the range of 20 to 45 miles from the clinic sites.

Interview participants were asked about their perceptions on the policies aimed at expanding MOUD coverage, share their thoughts on why policies were not translating into improved access to care, and they were also asked to share their views on solutions that could bridge the gap between policy intent and expanded MOUD access in practice. Four key themes emerged from the interviews: (1) Physicians were positive but skeptical on easing regulatory environments; (2) Barriers faced in MOUD prescribing: Interview participants noted the role of stigma from patients, stigma from physicians and the lack of logistical flexibility in impeding access to MOUD treatment; (3) Recommendations to facilitate MOUD treatment: Interview participants suggested strengthening emergency department infrastructure with the inclusion of behavioral health staff, expansion of alternate care delivery models and engaging persons with lived experiences in the opioid-use care continuum to improve access to MOUD treatment; (4) Expanding access to MOUD treatment for older adults with opioid use disorders.

4.1 Physicians were positive but skeptical about easing regulatory environments for prescribing MOUD

Interviews highlighted easing regulations such as the elimination of the X-waiver for prescribing Buprenorphine and repealing prior authorization for prescribing Buprenorphine were perceived positively by all informants. They noted that such an oversight was never required for a safe medication like Buprenorphine. However, providers expressed skepticism about the impact of these policies in practice. With new policies, physicians should be able to prescribe MOUD to more opioid-using patients, but prescribing a higher volume of Buprenorphine or Methadone could result in physicians/nurses getting flagged by their local pharmacies and the

DEA. This stringent level of DEA oversight puts providers at risk of losing the authority to prescribe MOUD or losing their medical license. Therefore, physicians now having the ability to prescribe MOUD were not sure as to how the new policies would interact with oversight from the DEA and other regulations still in place.

"There is no medical reason for a prior authorization for prescribing Buprenorphine. Every time prior authorization is repealed it makes life easier for both me and my patients."

"The time I spend filling out PA forms can be used to see at least 2-3 more patients."

"A lot of doctors are simply scared [to prescribe Buprenorphine] because they do not want to get flagged by the DEA. I was flagged by my local Walmart because I was prescribing too much Bup. I was able to sort it out with the pharmacy, but I could have gotten into a lot of trouble."

4.2 Barriers faced in accessing MOUD treatment

Barrier 1: Provider stigma in treating patients with opioid-use disorders

Interview participants described pervasive stigma toward patients with opioid use disorders. Participants noted that when patients were not seen by addiction medicine specialists or physicians working in FQHCs or other settings with higher volumes of patients who use opioids, they were frequently treated poorly. Key informants described opioid using patients experiencing class stigma associated with addiction-related disorders. In some extreme cases key informants described situations where negative provider attitudes towards opioid-using patients led to denied medical care. As a result, these negative experiences with some physicians contributed to a broader mistrust of the entire medical system, thus making it difficult to engage patients in MOUD treatment.

"Most doctors lack the training or education to treat people with opioid use disorders."

"I have a patient who has been using Heroin for the last 20 years. They have been on and off Suboxone. Recently, they wanted to go on Suboxone again. I made their appointments to initiate and continue Suboxone but then they missed 4 consecutive appointments… turns out this patient had vascular necrosis and needed a hip replacement but was told by their orthopedic surgeon that he will operate on her only if she is sober for the next few months. Because of that one bad experience with that one bad doctor, my patient stopped coming to her Suboxone appointments and all the work I had done over 5-6 months to get her into the addiction clinic and start Suboxone went down the drain."

Barrier 2: Patient stigma in starting MOUD treatment

Interview participants reported that patients with opioid use disorder experience substantial stigma surrounding the initiation of MOUD. Many patients resist MOUD due to the misperception that it merely substitutes one addiction to one substance for another rather than constituting evidence-based treatment. Negative attitudes toward MOUD within families and broader communities further reinforce these misconceptions, creating barriers to treatment initiation. Consequently, despite widespread availability of Suboxone and other MOUD — particularly in urban settings — stigma due to misinformation surrounding MOUD continue to impede access to and uptake of essential MOUD treatments.

"Getting access to Suboxone is very easy in cities like Chicago and Baltimore, but some patients just don't want to get the drug. They don't want more drugs to treat a drug problem."

"It took me a lot of time and effort to convince a patient to get on Suboxone. I gave them a prescription, but their boyfriend was not in favor of it, so he convinced her to not take it."

Barrier 3: Lack of flexibility in engaging with addiction related care

Interview participants positively perceived the idea of expanding office-based MOUD prescribing. However, they also noted some tactile challenges individuals with opioid-use disorders face in accessing office-based MOUD care. First, in line with previous research, I find that patients with opioid use disorders face transport-related challenges in accessing MOUD care (Mitchell et al. 2023; Saloner et al. 2022). I found that even in cities like Chicago, opioid-using patients have to (sometimes) travel up to 12-15 miles to access addiction-related care because clinics near them do not have walk-in appointments or they do not accept Medicaid for addiction services. In rural areas distances travelled for accessing MOUD care ranged from 30-45 miles. Further, clinics providing MOUD care were scarce and only operated during regular business hours i.e., nine to five, and getting appointments was difficult and frustrating. As a result, most opioid-using individuals presented in emergency departments during overdose events and as a result were able to access some short-term access to usually oral Buprenorphine medication.

"A lot of these clinics are very far from where these individuals live, and they have to take 1-2 buses to get there, and it's a lot for them to do a long bus journey and then wait outside a doctor's office."

"I have patients who travel 45 miles to see me. It's often like, 20 below zero and windy here, and people are walking through storms to get their Suboxone, and if they showed up late for appointments, they wouldn't get their script. And sometimes they would just, like, sleep on the street there to wait for it the next morning."

"One patient spent two hours just securing an appointment to see his doctor. Upon arriving at the clinic, he had to complete paperwork and wait an additional 40 minutes to see the doctor. On

the flipside, if he called his drug dealer, the dealer would home-deliver the drugs and provide better customer service than the outpatient clinic"

4.3 Recommendations to facilitate access to MOUD treatment

Recommendation 1: Strengthening emergency room infrastructure to facilitate addiction-related care

Interview participants emphasized that, despite efforts to expand access to office-based prescribing, most individuals with opioid use disorder continue to access MOUD through emergency departments. Participants described emergency departments as accessible settings where patients are not turned away and can receive short-term Buprenorphine prescriptions, typically lasting three to seven days. However, linkages from the emergency departments to ongoing outpatient MOUD care — such as opioid treatment programs or community clinics — were described as rare. Participants described emergency departments as a critical but underutilized setting for improving continuity of addiction care and reducing repeat emergency departments utilization. They emphasized that while emergency physicians are well positioned to initiate MOUD, they often lack the time and resources to address a patients' broader behavioral health and social needs. Participants suggested that integrating behavioral health specialists and social workers into emergency departments care teams would allow these team members to facilitate referrals and warm handoffs to outpatient MOUD providers, helping patients transition from short-term encounters to sustained engagement in community-based addiction care.

"The beauty of the emergency department is that is open 24 hours a day and you can walk in at any point. I think there are two principles in addiction medicine which sort of make the [emergency department] a good place sometimes to initiate treatment. One is meeting patients

where they're at, and that means, like meeting them, like, physically where they're and so if someone shows up in the emergency room like, that's an opportunity. I think the other thing that we think about in addiction medicine low barrier treatment, like trying to decrease those barriers that patients might encounter as they're trying to access treatment"

"…the [emergency department], very well could be a place in time for someone who's, you know, not considered treatment before, to be receptive to the idea that they try it out. And you know, I think if you are going to start buprenorphine in the ER you certainly need to have a linkage to care strategy, you can't just write a prescription and then have them leave with no thought to the follow up plan. Some [emergency department] do have some pathway for the patients to follow, to, you know, receive a refill, to have a visit with an outpatient provider. And I think, you know, we should be doing more of that."

Recommendation 2: Alternative models of care delivery to provide addiction related care

One of the reasons accessing MOUD care has been challenge is due to the fact that accessing the offices where MOUD is being prescribed is a challenge. Interview participants noted that alternative models of care such mobile treatment vans offer a solution. These vans are usually situated in opioid-use hotspots in cities and operate as harm reduction sites. These vans are able to attract opioid-using individuals for MOUD treatment and are also able to operate as spaces of safe-use with physicians and experts on site to prevent and/or reverse opioid-related overdoses. More importantly, the mobile vans by being present in locations that are at the highest risk of opioid-use, help a large number of opioid-using individuals avoid transportation costs and other logistical barriers faced in accessing MOUD care at brick-and-mortar clinics.

"The mobile clinic moves around, so it's at set sites throughout the week. So, people know, like Wednesdays, we're at location [X] and location [Y]. So, if they need to either initiate MOUD or get a prescription refill or do whatever follow-up they need, they can just come to the site. And again, it's first come, first serve. So, you know, if somebody was like, I want to start Suboxone today, most of the time they can do that and [the vans] have the medications on board. So, they would, see the patient, evaluate them, and then if it was appropriate, they can do induction."

"I think one of the biggest challenges for me with opioid use disorder is that in my brick-and-mortar clinic, because patient volume is so high, I really don't have the ability to catch someone on a walk-in basis when they are actually ready for treatment. And so much of treatment of opioid use disorder is being able to match the prescription or the therapy when the patient is ready. And that readiness is very random and unpredictable. And so, and then if you don't catch them in that moment, they may go use again, because they're having withdrawal and they're suffering and they're going to use so I think these mobile and community-based treatment should be made more accessible and just have this sort of army of people out providing treatment in a very regular way where opioid-using patients are."

Recommendation 3: Engaging persons with lived experience in the opioid care continuum

In this study, persons with lived experience are individuals directly affected by opioid use and related intervention strategies. They help develop a deeper understanding of the conditions affecting opioid-using populations, the solutions that are most appropriate for those impacted, and the potential harmful unintended consequences of the current and past actions taken by the existing system on the people it aims to serve. They are essential for addressing stigma among patients about MOUD treatment for opioid use disorders. Interview participants noted that

persons with lived experiences (sometimes referred to as peer recovery coaches) are essential not only to support recovery for those in use, but efforts to include peer coaches have been successful in reducing opioid-use among users. However, funding for peer coaches in treatment is inconsistent and dependent on grant-funding and other temporary finances. Participants noted that allowing the billing of peer coaches through health insurance would be a good way to consistently engage persons with lived experience in the opioid care continuum.

"...how non-judgmental, non-stigmatizing I am, no matter how much I think I'm a good doctor, peer support coaches can just engage with people in a totally different way, build rapport. They have similar like, life experiences. Like someone was saying, the peer at one of our FQHCs, like, was interacting with a new patient and, like, actually knew him from prison, you know? Really shared experiences. So, I feel like they're so valuable in that way, and they understand the community in which they're serving, too in a totally different way. They serve a very important role, but it's hard to keep them around without regular funding."

"We need to recognize the research and acknowledge that peer coaches can, may be bend the curve on opioid use and overdose deaths, it might be a better strategy than just telling doctors to just prescribe more Buprenorphine. But we need to, you know, build a career structure for peer coaches too, right? And not just say, oh yeah, we'll pay you as long as we have a grant. That's what's happening with us. We have a grant that expires June 30. I can only pay my peer coach for another two months. But I'm not just saying, oh, we're just going to fund peers. It has to be tied to accountability and leading to something right? It needs to be leading to, you know, some sort of proof of engagement, proof of sustainability, proof of remission, all that type of thing. But I think that's, I think that's very possible."

4.4 Expanding access to MOUD treatment for older adults

Interview participants noted that the rise of substance use disorders among older adults — 65 to 85 years olds — and drug-related fatalities among older adults have increased exponentially over the past two decades. However, this group of patients have historically struggled to receive any treatment for substance use disorders and evidence shows that only one-third of the 8.5 million adults over age 60 in need of substance use treatment received any treatment for such disorders (Pollack et al. 2025). Interview participants noted that opioid use is largely overlooked in the aging population, they noted how skilled nursing facilities make it difficult to continue MOUD treatment among older adults and they called for strategies to make MOUD care related age-friendly for older adults with substance use disorders to notably bend the curve on overdose deaths.

"You never assume that this 80-year-old was using heroin, and so you don't even think about the opioid use disorder. There was a study that showed like, 80% of people over the age of 65 did not receive Narcan as they died of an overdose. They are dying from a bowel obstruction or bowel ischemia but that obstruction is coming from opioid use or withdrawal."

"Access to skilled nursing facilities care is a huge inequity in the lives of older adults with opioid use disorder. 40% ultimately never even got to go to a SNF. If sometimes they do get in, they are oftentimes asked to change from methadone to buprenorphine, because that is easier for the facility. It's a patient's preference, and so I'll go in and see what they think about it, but I can't make them go on to buprenorphine. We've had patients go to a skilled nursing facility and I discharge them on buprenorphine, and when they came back to the hospital for readmission for something else, we're like, Oh, how's the buprenorphine? And the skilled nursing facility is like, oh, that patient never got any for like two weeks."

5. Discussion and Conclusion

In qualitative interviews with physicians, nurse practitioners and social workers I identified themes highlighting barriers to and facilitators of MOUD treatment. I also identified a theme on expanding access to MOUD treatment for older adults with opioid use disorders. The first theme on perceptions about easing policy environments for expanded access to MOUD treatment pointed out that easing regulations — repealing prior authorization and elimination of the X-waiver for prescribing buprenorphine — were perceived positively. Key informants noted that these policy changes reduced administrative burdens and allowed physicians more time to practice, see patients and prescribe appropriate MOUD. They also noted that easing regulations for MOUD would help reduce the stigma around these medications. However, interview participants were skeptical as to whether these changes would influence the tactile realities of providing MOUD care to individuals with opioid use disorders. They noted that given the widespread stigma surrounding opioid-use and opioid-using individuals, easing regulations while necessary were not likely to be sufficient policy levers to expand access to MOUD treatment.

The second theme identified three pertinent barriers to accessing MOUD treatments. The first and foremost was provider stigma towards opioid use disorders. Key informants noted that physicians often acted in a manner that dehumanized and marginalized patients seeking treatment for opioid use. Participants noted that physicians often used stigmatizing language when speaking with opioid-using patients, and in many cases, physicians asked patients to be "sober" or "clean" before providing treatment. Thus, forcing abstinence instead of using a harm-reduction approach in treatment ultimately discouraged a number of opioid-using individuals to discontinue or never start MOUD treatment. Interview participants further noted that a number of physicians providing treatment or eligible to provide treatment for opioid use disorders lacked

both training and compassion to engage with opioid-using individuals. As a result, there is a failure to establish a relationship with the patient and access to MOUD care is impeded. Interview participants also noted pervasive stigma among patients in initiating or continuing MOUD care. On the patient side, stigma stems from two factors. First, many patients, families and communities view MOUD treatment as substituting one addiction for another addiction. This belief is reinforced by the fact that these medications act on the same opioid receptors as illicit opioids, which can make them seem no different from the drugs they replace. Thus, many individuals unaware of the numerous benefits of MOUD treatment, fail to recognize MOUD as an effective therapy against preventing overdoses. Second, opioid using patients — most likely being low-income, belonging racial-ethnic minorities, having co-occurring substance use and mental health problems — have often been treated poorly by the medical system. For long they have been dehumanized and marginalized and this has led to patients developing a deep mistrust of the system, and this has led to them miss their MOUD appointments and forgo MOUD and health care treatment altogether. Lastly, informants note that accessing offices and clinics where MOUD is prescribed are impeded by several logistical challenges. Depending on the location of an opioid-using patient, most of the times travel 10-15 miles or 30-45 miles to reach a clinic for their prescriptions. Previous research has extensively documented the acute burden of transportation barriers for individuals with opioid use disorder (Howell et al. 2026; Kim et al. 2024). In line with findings from previous studies, this study corroborates the many` transport-related accessibility issues faced by individuals with opioid use disorders in accessing Buprenorphine and Methadone treatment. Thus, highlighting that opening new treatment sites that accept Medicaid or extending hours of operation at existing sites may ameliorate the travel burden for opioid-using individuals. Failure to do so would continue to lead opioid-using patients

to present at emergency departments during episodes of overdose. The emergency room provides an opportunity to initiate MOUD care but given that very few emergency departments are linked to outpatient opioid treatment implies that the MOUD regimen started in the emergency department is short-term, and the patient remains at high risk of a repeat opioid-use related emergency department visit.

The third theme identified three recommendations to facilitate and expand access to MOUD treatments. First, informants recommend strengthening the infrastructure at emergency departments to better support care for opioid use disorders. Emergency departments play a pivotal role in mitigating adverse effects of the opioid crisis and provide an opportunity for many opioid-using patients — who not have a primary care physician, lack medical insurance, or feel too ashamed to see a doctor about their addiction — to seek addiction-related care which includes but is not limited to starting MOUD. Emergency medicine physicians frequently encounter patients with opioid-use problems, but they also express the highest levels of stigma towards patients with opioid use disorders, mostly owing to the reality that these patients sometimes impose practical burdens in the emergency room setting (Parish et al. 2025). Thus, to better facilitate opioid-related care in the emergency department, interview participants suggested staffing emergency departments with behavioral health care professionals to help provide and manage care during overdose episodes and more importantly, ensure linkages to treatment programs in the community or other non-emergent settings to ensure access to continued MOUD treatment. Evidence shows that starting Buprenorphine in the emergency department can lead to long term care for opioid use treatments (D'Onofrio et al. 2017), but with logistical challenges, MOUD treatment has usually been accessed due to emergency (overdose-related) episodes which were in essence avoidable repeat emergency room visits. Interview

participants noted that a big part of initiating MOUD care is characterized by meeting *"patients in the moment"*, the emergency department offers one such opportunity, the other such opportunity is offered by alternative treatment models of care delivery such as mobile vans. Often located in and moving around neighborhoods with high opioid users, these vans literally meet patients where they are and can be accessed without any significant barriers. Thus, these mobile vans already operational in some towns and cities are crucial for delivering MOUD treatment and harm reduction services to patients with opioid use disorders. Staffed with both medical staff and social workers, these vans save patients from the hassles of transportation and other costs of accessing a MOUD clinic and provide MOUD on-site, and the social workers at these vans are a crucial resource for linking patients with social supports, health insurance and providing other requisite assistance (Chatterjee et al. 2024). Thus, participants noted that expanding funding and resources for mobile vans especially in areas with high prevalence of opioid use as a way to expand access to MOUD treatment. Lastly, interview participants strongly recommended the sustained inclusion of persons with lived experiences in MOUD treatment and other opioid recovery program. Participants noted that the shared life experiences of peer coaches, and opioid-using patients serve as a solution to destigmatizing MOUD treatment and improving access to MOUD treatment. However, participants also noted that funding for such coaches is temporary, which leads to treatment programs losing coaches mid-recovery leading to treatment discontinuation among patients. They recommend billing for coaches as a part of insurance to ensure that peer coaches are integrated into the opioid treatment care continuum. Most states currently do not reimburse for peer support services through its Medicaid program. However, that is gradually changing as states are enacting statutes and laws to provide reimbursement for peer support services. For example, in the State of Illinois, Public Act 102-

0004 (HB0158) directs the state to add peer support services as a covered benefit under the state's Medicaid program (Illinois Health Care and Human Service Reform Act 2021).

The last theme identified how older adults are overlooked for MOUD and other opioid treatments. Key informants pointed to the evidence that drug-overdose deaths among the elderly have quadrupled in the last two decades, but this population at the highest risk opioid-related mortality are often overlooked for opioid related care due to ageism, stigma and lack of information. Further, due to stigma and resource constraints, opioid-using older adults also face inequities in accessing long term care facilities and they also face numerous difficulties in continuing MOUD treatment in these settings. Thus, participants pointed out that to achieve decreases in opioid related overdoses, MOUD care needs to be made more age friendly. At present, most research on substance use disorders and policy innovations are designed to meet the needs of adolescents or working age adults. As the population ages, effective responses to the opioid epidemic must develop and pursue evidence-informed, respectful, and person-centered interventions that meet the distinctive needs of older adults (Pollack et al. 2025).

This study adds to the prior literature by explaining how policies intended to improve MOUD access have shaped the tactile realities of providing care to individuals with opioid-use disorders. This study by highlighting the barriers and facilitators of MOUD access offers (a) an explanation as to why despite a conducive policy environment expanded MOUD access has failed to materialize in practice and (b) a way forward for expanded MOUD access for individuals with opioid using disorders. However, several limitations should be noted. First, study participants may not have been fully representative of MOUD providers across the country. Overall, this is judged to be only a minor limitation, as qualitative research does not seek to be fully generalizable as much as it seeks to produce useful information that is

transferable to other contexts (Curry and Nunez-Smith 2015). Further, I was able to recruit providers practicing across multiple state Medicaid programs and provide a more comprehensive view of MOUD access for Medicaid beneficiaries with opioid use disorders. Second, using key informants as a proxy to understand patient related access issues in accessing MOUD care, only highlight provider-perceived barriers in accessing MOUD care. In this study, we cannot ascertain the extent of overlap between patient related and provider-perceived barriers in accessing MOUD care. However, key informants in this study have firsthand information about patients engaging or discontinuing in MOUD care. Lastly, volunteer bias might have impacted our results. I tried to limit volunteer bias by using purposive sampling with predefined selection criteria to ensure inclusion of diverse participants rather than relying on volunteers, though there may have still been bias in who ultimately agreed to participate.

In this study, I found that while easing regulations for prescribing MOUD are perceived positively, the policies do not adequately influence the tactile realities of providing MOUD care to opioid-using individuals rendering access to MOUD a continued issue. Even though policies such as repealing prior authorization and eliminating X-waivers make it easier to prescribe and access MOUD, pervasive stigma from providers, pervasive stigma among patients and logistical challenges act as barriers to accessing MOUD care. Thus, to facilitate MOUD care, participants recommend (a) staffing behavioral health professionals in emergency departments, administering MOUD in the emergency department and linking patients to outpatient MOUD treatment after emergency department to facilitate MOUD treatment; (b) expanding mobile opioid treatment services especially in high opioid-use, and underserved areas and (c) integrating persons with lived experiences into the opioid treatment care continuum. Lastly, the study found that despite increasing drug-related overdose deaths among older adults, older adults are often overlooked for

MOUD opioid treatments. Given that older adults are at the highest risk of opioid-related mortality and other age-related adverse health events, key informants called for the creation of age-friendly MOUD treatment programs. Going forward policymakers must take note of this evidence and pursue policies that meaningfully bridge the gap between policy intent and the tactile realities of providing MOUD care to individuals with opioid-use disorders.

Conclusion

This dissertation aimed to evaluate and inform Medicaid policy on improving access to MOUD treatment for Medicaid beneficiaries with opioid use disorders. The analysis presented in this dissertation underscores two things: first that repealing administrative ordeals like prior authorization and implementing value-based payment models are useful policy tools for improving access to high-value and underutilized treatments such as MOUD. However, these policy levers — within the context of MOUD — operate in a complex care landscape marked by pervasive stigma, social determinants of health, and other care delivery constraints, and therefore may not be adequate to improve access to MOUD.

In the first essay, using Medicaid claims, I exploit time variation in repeal of state Medicaid program prior authorization policies to explore the causal impact of repealing prior authorization for prescribing Buprenorphine on Buprenorphine access and downstream opioid-use related health care utilization among Medicaid beneficiaries with opioid use disorders. I find that repealing prior authorization increases Buprenorphine access and reduces opioid-use related hospitalizations but has no effect on opioid-use related emergency department visits. The effects are larger for beneficiaries in managed care plans and in states with less restrictive prior authorization repeals for Buprenorphine formulations. Findings imply that although prior authorization has been effective in curbing wasteful utilization and containing rising health care expenditures in some contexts, its application to high-value treatments may generate barriers in access to essential care especially for vulnerable populations, and do more harm than good.

In the second essay, using Medicaid claims, I exploit time variation in the implementation of a particular value-based payment program in Medicaid to causally measure the impact of the policy on access to MOUD. I find that the policy change — DSRIP

implementation — improved access to Buprenorphine and Naltrexone treatment but had no effect on Methadone treatment. Findings imply that VBP reforms can be effective in expanding access to high-value treatments, especially those that can be prescribed in general office-based health care settings.

These two essays demonstrate that repealing administrative ordeals like prior authorization and implementing value-based payment models can be useful policy tools for improving access to high-value and underutilized treatments like MOUD. However, evidence shows that MOUD use among opioid-using individuals remains inadequate and policies intended to expand access have not fully addressed the opioid use disorder treatment gap.

Although quantitative evaluations are essential in documenting the effects of recent policy reforms on MOUD uptake, these studies are not well suited to explain *why* despite a conducive policy environment, expanded access has failed to materialize in practice. Analyses relying on administrative claims or prescribing data offer critical insight into changes in MOUD utilization and resulting implications on acute health care utilization, but these studies have not been able to explain how policies intended to improve MOUD access have shaped the tactile realities of providing care to individuals with opioid-use disorders. As a result, quantitative analyses on the topic — although essential and insightful — have offered only limited insights into how providers interpret regulatory changes, how health system workflows and capacity constraints affect MOUD delivery, or how stigma and risk perceptions influence prescribing decisions. Consequently, critical questions regarding the mechanisms through which policy levers succeed or fail to improve MOUD access remain unaddressed.

To address this gap, the third essay using semi-structured interviews with key informants identifies mechanisms through which policies aimed at improving MOUD access constrain or

facilitate care delivery of MOUD to persons living with opioid use disorders. Four key themes emerged from the interviews: (1) Physicians were positive but skeptical on easing regulatory environments. (2) Barriers remain in MOUD prescribing: Interview participants noted the role of stigma from patients, stigma from physicians and the lack of logistical flexibility in easing access to MOUD treatment. (3) Respondents offered concrete recommendations to facilitate MOUD treatment: Interview participants suggested strengthening emergency department infrastructure with the inclusion of behavioral health staff, expansion of alternate care delivery models and engaging persons with lived experiences in the opioid-use care continuum to improve access to MOUD treatment. (4) Respondents noted the specific importance of expanding MOUD treatment access for older adults with opioid use disorders. Study findings highlight the need for comprehensive policy reform, including easing regulatory barriers, expanding community-based care models such as mobile vans and harm reduction sites, integrating individuals with lived experience in treatment delivery, investing in age-friendly MOUD care and strengthening the emergency room infrastructure and social supports to reduce stigma and improve access to MOUD for persons with opioid use disorders.

The pattern of my findings underscore the necessity and limitations of removing regulatory barriers as a policy tool for improving access to MOUD care for Medicaid beneficiaries with opioid use disorders. The first two essays in this dissertation demonstrate that Medicaid policy can play an important role in expanding access to MOUD treatment, but policy reforms alone are not sufficient to address persistent treatment gaps. While changes such as repealing prior authorization requirements and implementing VBP models are associated with increased uptake of certain MOUD treatments, particularly in office-based settings, qualitative evidence suggests that these gains are often constrained by on-the-ground realities of care

delivery. As one interviewee noted, *"buying drugs in America is easier than accessing treatment for drugs, and your drug dealer provides better customer service,"* highlighting a profound disconnect between policy intent and the lived experiences of beneficiaries seeking addiction-related care. The lack of effects on outcomes such as emergency department utilization and Methadone access reflects structural barriers, fragmented care coordination, limited treatment infrastructure, and persistent stigma among both providers and patients. These findings suggest that quantitative estimates may capture only the upper bound of policy impact in well-resourced settings, while obscuring constraints in more limited or stigmatized environments. Qualitative insights thus illustrate the mechanisms through which policy effects are realized — or attenuated — demonstrating that policy reforms such as repealing prior authorization and implementing VBP models though necessary are likely to have limited impact on treatment access without complementary system-level supports.

Taken together, the findings from this dissertation suggest that easing administrative burdens and implementing payment reforms are necessary but not sufficient to expand MOUD access. Policy levers must therefore be complemented with investments in the behavioral health care ecosystem, stronger care coordination between emergency departments and outpatient providers, expansion of low-barrier and alternative MOUD delivery models, and integration of peer recovery coaches across the continuum of care. The findings also suggests that single-domain interventions are likely to yield only modest gains in MOUD access. Thus, health policy that simultaneously eases administrative burdens, aligns provider incentives, and addresses care delivery constraints is likely to be the most effective solution for improving access to MOUD care for Medicaid beneficiaries with opioid use disorders.

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Appendix-A: Chapter 1

Table A1: Cohort Size

	Number
Number of Beneficiaries ages 18-64 with Opioid Use Disorders	853,364
Excluded for DQ issues (FL,KY)	115,985
Final Sample (21 states)	**737,379**

Table A2: State Inclusion based on Key Variables

While the Transformed Medicaid Statistical Information System Analytic Files (TAF) represent an advance in harmonization among Medicaid programs compared with earlier datasets, quality is not uniform across all years and all states. We use the Data Quality Atlas (DQ Atlas), a website maintained by the Centers for Medicare and Medicaid Services, to check each variable we use in our analysis for quality in each state.1 The DQ Atlas is structured by variable, but does not include all variables in the data. For variables it does include, the DQ Atlas rates each state in each year as being low, medium or high concern, or unusable, on each variable or measurement concept (e.g. enrollment count). We use the DQ Atlas as a baseline for evaluating the quality of key variables in each state and year, paying specific attention when the DQ Atlas flags a variable or measurement as unusable or high concern. In keeping with best practices for data use, we additionally check each variable in our specific population. We note where our assessment differs from the DQ Atlas.

For variables without specific DQ Atlas guidance, we run checks in our baseline sample on percent of missingness in each state and either exclude states or include with a sensitivity check as described below.

Key Variable	Potential States Included	States Excluded due to Known Variable Quality Issues	States Included with Caution (Sensitivity Checks)	Notes
Beneficiary ID/TMSIS ID	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN, KS, KY, ME, MD,MT, NE, NV, NM, NC, ND, OK, RI,TX, WA, WI	None	None	No missingness noted. No DQ Atlas guidance on this

				specific variable.
Dual Eligibility Code	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN,KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI,TX, WA, WI		AL	DQ Atlas notes that dual eligibles cannot be identified reliably in AL. We include the state with caution.
Diagnosis Codes	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN,KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI,TX,WA, WI	None	None	No DQ Atlas guidance on this specific variable.
National Drug Classification Codes (NDC)	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN,KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI,TX, WA, WI	None	None	No DQ Atlas guidance on this specific variable.
Procedure Codes	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN, KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI,TX, WA, WI	None	ND (OT-2018; 2019), NE (OT; 2015)	For ND and NE, DQ Atlas notes less than 5% percent missingness for ND and NE in the mentioned years.
Type of Bill Code	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN, KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI,TX, WA, WI	None	None	DQ Atlas notes less than 5% missing Bill Type Codes in the IP file for the sample, and 98%

				percent of the bill type codes are expected.
Managed Care Encounter Data	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN, KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI, TX, WA, WI	FL		Managed Care Data is of poor quality in both the Rx and OT files for Florida.
Claims Volume	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN, KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI, TX, WA, WI	FL, KY	RI, NC	DQ atlas notes that FL and KY have low and high claims volumes respectively in the data
Medicaid Enrollment	AL, AK, AZ, CO, DE, DC, FL, HI, IL, IN, KS, KY, ME, MD, MT, NE, NV, NH, NM, NC, ND, OK, RI, TX, WA, WI	KY	ME, RI	DQ atlas notes that ME and RI have high concern enrollment data
Final State Sample	AL, AK, AZ, CO, DE, HI, IL, IN, KS, ME, MD, MT, NE, NV, NC, ND, OK, RI, TX, WA, WI	FL, KY	RI, NC, ME, AL	

Table A3: TAF Checklist

Category	Description	Specific to this study
Data		
Files, Years, and Release Versions	• Indicate which TAF files were used in the analysis (e.g., Demographic and Eligibility, Inpatient, Other Services, etc.). • Indicate which years of TAF data were included in the analysis. • Indicate which file versions were included in the analysis (e.g., preliminary, release 1, release 2, etc.). • Indicate whether the study drew from 100% TAF files or pre-specified extracts.	(a) Demographic and Eligibility, Inpatient, Other Services and Rx (b) 2015 -2019 (c) Final release (Release 2 for 2015-2018, Release 1 for 2019) (d) Received 100% TAF files
Analytic Sample		
Eligibility Criteria	• If applicable, describe what eligibility category codes were used to identify the study sample and whether they were used in combination with any other variables (e.g., age, receipt of specific medical services, etc.).	From full TAF files, we extracted enrollees ages 18-64, and identified individuals with a diagnostic record of opioid use disorder using ICD-9 and ICD-10 codes.

Enrollment Span	• If applicable, indicate the minimum period of enrollment required for an enrollee to be included in the study sample and how the enrollment period was defined.	No enrollment span criteria used for main analysis.
Scope of Benefits	• Indicate whether the analysis included enrollees with full scope, comprehensive, or restricted benefits.	No criteria used for main analysis.
Encounter Data	• Indicate whether the analysis excluded either fee-for-service or managed care enrolees. If managed care enrolees were excluded, define the criteria used to do so. • Indicate which types of claims records (e.g., fee-for-service claims, service tracking claims, capitation payments, etc., see variable CLM_TYPE_CD) were included in the analysis.	(a) For the purposes of this analysis, both managed care and FFS enrolees were included. (b) For encounter data, claims types codes 1,3, A and C were analyzed.

Dual Eligibility	• Describe whether individuals dually enrolled in Medicare and Medicaid were included in or excluded from the study sample and, if applicable, how dual eligibility was defined.	Dual eligibles were excluded from the study sample for all states in the sample except Alabama.
State and Territory Exclusions		
Criteria	• Indicate which states and/or territories were included (or excluded) from the analysis on the basis of data quality concerns. • Indicate the criteria by which state exclusions were made, including measures, data sources, and thresholds.	a) We exclude FL and KY b) FL and KY were excluded due to data quality issues related to poor quality data on managed care encounters and high claims volumes, respectively. c) Other states are excluded because they don't report data to TAF in 2015.
State variation table	• Consider including a state-level table (which may appear in an appendix) summarizing the number of observations, means, medians, and missingness for key study measures	See Appendix Table 2
Special Considerations		

Spending	• Indicate which types of claims records (e.g., fee-for-service claims, service tracking claims, capitation payments, etc., see variable CLM_TYPE_CD) were included to measure spending. • If including service-specific spending for managed care encounters, indicate how spending was imputed (payments from plans to providers on encounter records are generally redacted).	Spending was not assessed in this analysis
Using TAF with Predecessor Medicaid Analytic eXtract (MAX) Data	• Indicate if the analysis included data from the Medicaid Analytic eXtract (MAX) and, if so, for what years and which states. • If applicable, include an exhibit examining trends in key measures by state over time and particularly during any transition from MAX to TAF.	No linkages were made with MAX data.

Table A4: Details of Prior Authorization Repeal Policies

State	Repeal Month-Year	Description of Policy
Arizona	January-2018	PA not required for buprenorphine-naloxone sublingual films. PA still required for long-acting buprenorphine.
Delaware	July-2017	Buprenorphine-naloxone added to PDL without prior authorization, along with other preferred agents for OUD.
Hawaii	June-2017	PA removed for Buprenorphine prescribing.
Illinois	July-2015	Medicaid fee for service and managed care programs cover FDA-approved buprenorphine-naloxone for OUD without a PA
Indiana	December-2017	Repealed PA for buprenorphine-naloxone, PA still required for films.
Maryland	May-2017	PA not required for buprenorphine since May 2017.
Nebraska	November-2017	PA repealed for preferred formulations of buprenorphine
North Carolina	January-2018	PA removed for preferred generic buprenorphine tablet/film. PA still required for non-preferred formulations
Rhode Island	September-2015	PA removed for buprenorphine
Washington	January-2018	PA removed for preferred generic buprenorphine tablet/film. PA still required for non-preferred formulations
Wisconsin	July-2018	PA removed for preferred generic buprenorphine tablet/film. PA still required for non-preferred formulations

Table A5: Diagnosis Codes used to identify enrollees with Opioid Use Disorders

ICD Code	Description
304.00	Opioid type dependence, unspecified
304.01	Opioid type dependence, continuous
304.02	Opioid type dependence, episodic
304.03	Opioid type dependence, in remission
304.70	Combinations of opioid type drug with any other drug dependence, unspecified
304.71	Combinations of opioid type drug with any other drug dependence, continuous
304.72	Combinations of opioid type drug with any other drug dependence, episodic
304.73	Combinations of opioid type drug with any other drug dependence, in remission
305.50	Opioid abuse, unspecified
305.51	Opioid abuse, continuous
305.52	Opioid abuse, episodic
305.53	Opioid abuse, in remission
304.00	Opioid type dependence, unspecified
304.01	Opioid type dependence, continuous
304.02	Opioid type dependence, episodic
304.03	Opioid type dependence, in remission
304.70	Combinations of opioid type drug with any other drug dependence, unspecified
F11.10	Opioid abuse, uncomplicated
F11.120	Opioid abuse with intoxication, uncomplicated
F11.121	Opioid abuse with intoxication, delirium
F11.122	Opioid abuse with intoxication, with perceptual disturbance
F11.129	Opioid abuse with intoxication, unspecified
F11.14	Opioid abuse with opioid-induced mood disorder
F11.150	Opioid abuse with opioid-induced psychotic disorder, with delusions
F11.151	Opioid abuse with opioid-induced psychotic disorder, with hallucinations
F11.159	Opioid abuse with opioid-induced psychotic disorder, unspecified
F11.181	Opioid abuse with opioid-induced sexual dysfunction

F11.182	Opioid abuse with opioid-induced sleep disorder
F11.188	Opioid abuse with other opioid-induced disorder
F11.19	Opioid abuse with unspecified opioid-induced disorder
F11.20	Opioid dependence, uncomplicated
F11.220	Opioid dependence with intoxication, uncomplicated
F11.221	Opioid dependence with intoxication, delirium
F11.222	Opioid dependence with intoxication, with perceptual disturbance
F11.229	Opioid dependence with intoxication, unspecified
F11.23	Opioid dependence with withdrawal
F11.24	Opioid dependence with opioid-induced mood disorder
F11.250	Opioid dependence with opioid-induced psychotic disorder, with delusions
F11.251	Opioid dependence with opioid-induced psychotic disorder, with hallucinations
F11.259	Opioid dependence with opioid-induced psychotic disorder, unspecified
F11.281	Opioid dependence with opioid-induced sexual dysfunction
F11.282	Opioid dependence with opioid-induced sleep disorder
F11.288	Opioid dependence with other opioid-induced disorder
F11.29	Opioid dependence with unspecified opioid-induced disorder
F11.90	Opioid use, unspecified, uncomplicated
F11.920	Opioid use, unspecified with intoxication, uncomplicated
F11.921	Opioid use, unspecified with intoxication delirium
F11.922	Opioid use, unspecified with intoxication, with perceptual disturbance
F11.929	Opioid use, unspecified with intoxication, unspecified
F11.93	Opioid use, unspecified, with withdrawal
F11.94	Opioid use, unspecified, with opioid-induced mood disorder
F11.950	Opioid use, unspecified with opioid-induced psychotic disorder, with delusions
F11.951	Opioid use, unspecified with opioid-induced psychotic disorder, with hallucinations
F11.959	Opioid use, unspecified with opioid-induced psychotic disorder, unspecified

Table A6: Codes used to identify Medications for Opioid Use Disorders (MOUD)

	Code Type	Code
Buprenorphine	**NDC**	63481016101, 63481068501, 50383092493, 49999063830, 63481016160, 63481068560, 00093537956, 50383093093, 49999063930, 63481020701, 63481082001, 00228315303, 55700030230, 63874117303, 63481020760, 63481082060, 00228315603, 55700030330, 63481034801, 63481095201, 68308020230, 63481034860, 63481095260, 68308020830, 63481051901, 00054017613, 35356055530, 12496127802, 63481051960, 00054017713, 35356055630, 12496131002
	HCPCS	J0571, J0572, J0573, J0574, J0575
Naltrexone	**NDC**	00406009201, 16729008101, 68084029121, 51224020650, 00406117003, 00555090201, 51285027502, 00406009203, 16729008110, 52152010502, 68094085362, 00185003901, 42291063230, 52152010504, 68115068030, 00185003930, 43063059115, 52152010530, 00056001122, 00406117001, 47335032683, 54868557400, 00056001130, 47335032688, 65694010003, 00056001170, 50436010501, 65694010010, 00056007950, 00555090202, 51224020630, 68084029111, 51285027501
Naltrexone, extended-release injectable	**NDC**	63459030042, 65757030001, 65757030202

Table A7: Event Study Estimates using Chaisemartin and D'Haultfoeuille (2020) Estimator

t	Likelihood of Receiving Buprenorphine			No. Of Buprenorphine Claims			No. of Hospitalizations			No. of ED Visits		
	Coef.	95% CI		Coef.	95% CI		Coef.	95% CI		Coef.	95% CI	
-9	0.00	-0.09	0.09	0.02	-0.46	0.50	-0.02	-0.05	0.01	0.01	-0.05	0.07
-8	0.03	-0.05	0.11	0.13	-0.28	0.53	-0.01	-0.02	0.01	0.03	-0.01	0.07
-7	0.02	-0.03	0.08	0.07	-0.20	0.34	0.00	-0.02	0.01	0.03	-0.02	0.07
-6	0.02	-0.03	0.08	0.04	-0.19	0.27	0.00	-0.01	0.00	0.02	-0.02	0.07
-5	0.02	-0.03	0.07	0.04	-0.16	0.24	-0.01	-0.02	0.00	0.02	-0.03	0.06
-4	0.01	-0.02	0.04	-0.02	-0.16	0.13	0.00	-0.01	0.01	0.01	-0.02	0.04
-3	-0.01	-0.02	0.01	-0.03	-0.13	0.06	0.00	-0.01	0.01	0.00	-0.02	0.02
-2	-0.02	-0.03	0.00	-0.07	-0.13	-0.01	-0.01	-0.01	0.00	0.00	-0.01	0.01
0	0.00	-0.01	0.00	-0.04	-0.07	0.00	0.01	0.00	0.01	0.00	-0.01	0.01
1	0.00	-0.01	0.01	0.02	-0.02	0.06	-0.01	-0.03	0.01	0.00	0.00	0.01
2	0.01	0.00	0.01	0.04	0.00	0.09	-0.01	-0.03	0.01	0.00	-0.01	0.01
3	0.02	0.01	0.03	0.08	0.01	0.16	0.00	-0.02	0.01	0.00	-0.01	0.01
4	0.03	0.01	0.05	0.16	0.07	0.25	-0.01	-0.03	0.01	0.00	-0.01	0.01
5	0.03	0.01	0.05	0.14	0.03	0.26	-0.01	-0.04	0.01	0.00	-0.02	0.01
6	0.04	0.02	0.05	0.20	0.10	0.31	-0.01	-0.04	0.01	0.00	-0.01	0.01
7	0.05	0.03	0.07	0.34	0.15	0.54	-0.02	-0.05	0.01	0.00	-0.02	0.02
8	0.05	0.02	0.07	0.23	0.09	0.38	-0.03	-0.06	0.01	-0.01	-0.03	0.01
9	0.02	0.00	0.05	0.20	0.00	0.40	-0.03	-0.08	0.01	-0.01	-0.02	0.01
10	0.05	0.02	0.08	0.27	0.12	0.42	-0.03	-0.04	-0.02	-0.01	-0.02	0.00
11	0.04	0.01	0.07	0.25	0.09	0.42	-0.04	-0.04	-0.03	-0.07	-0.09	-0.05
12	0.04	-0.01	0.10	0.13	-0.14	0.40	-0.09	-0.10	-0.07	0.02	-0.02	0.05
13	0.04	-0.02	0.10	0.11	-0.21	0.42	-0.11	-0.13	-0.09	0.01	-0.02	0.05
14	0.04	-0.03	0.11	0.11	-0.27	0.50	-0.09	-0.10	-0.07	0.02	-0.02	0.06
15	0.06	-0.01	0.14	0.19	-0.22	0.60	-0.09	-0.10	-0.07	0.02	-0.03	0.06
16	0.05	-0.03	0.13	0.10	-0.33	0.54	-0.12	-0.14	-0.10	0.01	-0.03	0.06
17	0.02	-0.08	0.11	-0.02	-0.58	0.53	-0.13	-0.15	-0.12	0.01	-0.03	0.05
18	0.00	-0.10	0.10	-0.09	-0.65	0.48	-0.13	-0.15	-0.11	0.02	-0.03	0.06

Table A8: Event Study Estimates using Callaway and Sant'Anna (2021) Estimator

t	Likelihood of Receiving Buprenorphine			No. Of Buprenorphine Claims			No. of Hospitalizations			No. of ED Visits		
	Coef.	95% CI		Coef.	95% CI		Coef.	95% CI		Coef.	95% CI	
-12	-0.02	-0.09	0.05	-0.17	-0.45	0.12	-0.01	-0.04	0.02	0.04	0.01	0.06
-11	-0.02	-0.07	0.04	-0.09	-0.39	0.20	-0.03	-0.06	-0.01	0.03	0.00	0.07
-10	-0.02	-0.06	0.02	-0.12	-0.35	0.11	-0.03	-0.05	0.00	0.03	-0.01	0.06
-9	0.00	-0.04	0.04	-0.01	-0.22	0.19	0.00	-0.03	0.02	0.02	-0.01	0.04
-8	0.00	-0.04	0.04	-0.01	-0.22	0.20	-0.01	-0.03	0.01	0.02	-0.01	0.04
-7	0.01	-0.04	0.06	-0.02	-0.23	0.20	-0.02	-0.05	0.01	0.01	-0.01	0.03
-6	0.01	-0.03	0.05	0.00	-0.20	0.20	-0.01	-0.04	0.01	0.01	-0.02	0.03
-5	0.00	-0.02	0.02	-0.05	-0.15	0.06	-0.01	-0.03	0.01	0.00	-0.02	0.03
-4	-0.01	-0.02	0.01	-0.04	-0.13	0.05	-0.01	-0.02	0.01	0.00	-0.02	0.02
-3	-0.02	-0.03	0.00	-0.08	-0.13	-0.03	-0.01	-0.02	-0.01	0.00	-0.01	0.01
-2	0.00	-0.01	0.00	-0.04	-0.08	-0.01	0.00	-0.01	0.01	0.00	-0.01	0.01
0	0.00	0.00	0.01	0.03	-0.01	0.07	-0.01	-0.02	0.01	0.00	0.00	0.01
1	0.01	0.00	0.02	0.06	0.01	0.11	-0.01	-0.02	0.01	-0.01	-0.01	0.00
2	0.02	0.00	0.04	0.10	0.02	0.18	0.00	-0.02	0.02	-0.01	-0.02	0.01
3	0.03	0.00	0.05	0.16	0.05	0.27	0.00	-0.04	0.03	0.00	-0.02	0.01
4	0.03	0.00	0.05	0.14	0.01	0.28	-0.01	-0.04	0.03	-0.01	-0.03	0.01
5	0.04	0.01	0.07	0.21	0.09	0.33	-0.01	-0.04	0.03	-0.01	-0.03	0.01
6	0.05	0.02	0.08	0.35	0.14	0.56	-0.01	-0.05	0.04	-0.01	-0.03	0.02
7	0.06	0.02	0.09	0.30	0.12	0.48	-0.02	-0.06	0.03	-0.01	-0.04	0.01
8	0.04	-0.02	0.11	0.29	-0.07	0.65	-0.02	-0.08	0.04	-0.01	-0.03	0.01
9	0.07	0.00	0.13	0.38	0.00	0.75	-0.01	-0.08	0.05	-0.03	-0.06	0.01
10	0.09	0.03	0.14	0.49	0.19	0.78	-0.03	-0.10	0.05	0.02	-0.02	0.06
11	0.06	-0.05	0.17	0.23	-0.13	0.60	-0.08	-0.13	-0.03	0.02	-0.02	0.06
12	0.06	-0.05	0.16	0.21	-0.16	0.57	-0.11	-0.18	-0.04	0.01	-0.02	0.03
13	0.05	-0.05	0.15	0.19	-0.17	0.54	-0.09	-0.16	-0.02	0.02	-0.01	0.05
14	0.05	-0.05	0.16	0.19	-0.15	0.53	-0.08	-0.15	-0.02	0.01	-0.03	0.06
15	0.04	-0.05	0.13	0.12	-0.21	0.44	-0.11	-0.19	-0.04	0.01	-0.03	0.05
16	0.01	-0.09	0.11	0.01	-0.39	0.40	-0.13	-0.21	-0.05	0.01	-0.04	0.06
17	0.01	-0.10	0.11	-0.02	-0.39	0.35	-0.12	-0.21	-0.04	0.02	-0.03	0.06
18	-0.05	-0.08	-0.03	-0.23	-0.38	-0.08	-0.15	-0.17	-0.12	0.02	-0.02	0.06

Table A9: Robustness Check excluding States that implemented other MOUD access Policies

	Excluding AZ	Excluding WA	Excluding WA, AZ
	Effect of PA Repeal	**Effect of PA Repeal**	**Effect of PA Repeal**
Likelihood of Buprenorphine	**0.03*** **	**0.03*** **	**0.03*** **
Number of Buprenorphine Claims	**0.19*** **	**0.18*** **	**0.19*** **
Number of Hospitalizations	**-0.02*** **	**-0.02*** **	**-0.02*** **
Number of ED Visits	-0.007	-0.006	-0.009
Fixed Effects			
State	Yes	Yes	Yes
Time (Quarter)	Yes	Yes	Yes
Observations	5,415,638	5,245,472	4,534,255

*p<0.1; **p<0.05; ***p<0.01

Table A10: Robustness of excluding states with known Data Quality Issues in TAF

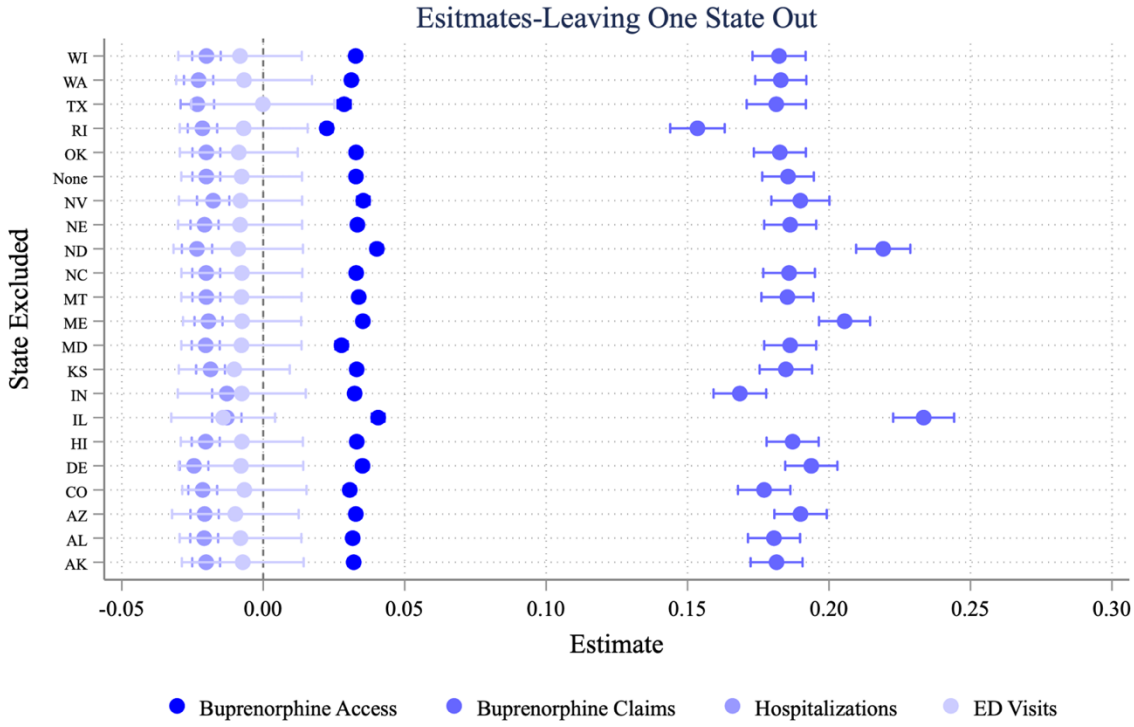
	Excluding AL	Excluding NC	Excluding ME	Excluding RI
Likelihood of Buprenorphine	**0.03*** **	**0.04*** **	**0.04*** **	**0.02*** **
Number of Buprenorphine Claims	**0.19** **	**0.22** **	**0.21*** **	**0.15*** **
Number of Hospitalizations	**-0.02*** **	**-0.02*** **	**-0.02*** **	**-0.02*** **
Number of ED Visits	-0.008	-0.008	-0.007	-0.007
Fixed Effects				
State	Yes	Yes	Yes	Yes
Time (Quarter)	Yes	Yes	Yes	Yes
Observations	5,822,669	5,482,838	5,787,610	5,814,312

*p<0.1; **p<0.05; ***p<0.01

Table A11: Robustness Leaving One State Out

State Excl.	Likelihood of Receiving Buprenorphine			No. Of Buprenorphine Claims			No. of Hospitalizations			No. of ED Visits		
	Coef.	95% CI		Coef.	95% CI		Coef.	95% CI		Coef.	95% CI	
None	**0.033**	**0.031**	**0.035**	**0.186**	**0.176**	**0.195**	**-0.020**	**-0.025**	**-0.015**	**-0.008**	**-0.029**	**0.014**
AK	0.032	0.030	0.034	0.181	0.172	0.191	-0.020	-0.025	-0.015	-0.007	-0.029	0.014
AL	0.032	0.030	0.034	0.181	0.171	0.190	-0.021	-0.026	-0.016	-0.008	-0.030	0.013
AZ	0.033	0.031	0.035	0.190	0.181	0.199	-0.021	-0.026	-0.016	-0.010	-0.032	0.013
CO	0.031	0.029	0.033	0.177	0.168	0.186	-0.021	-0.026	-0.016	-0.007	-0.029	0.015
DE	0.035	0.033	0.037	0.194	0.185	0.203	-0.024	-0.030	-0.019	-0.008	-0.030	0.014
HI	0.033	0.031	0.035	0.187	0.178	0.196	-0.020	-0.025	-0.015	-0.008	-0.029	0.014
IL	0.041	0.038	0.043	0.233	0.223	0.244	-0.013	-0.018	-0.008	-0.014	-0.033	0.004
IN	0.032	0.030	0.034	0.168	0.159	0.178	-0.013	-0.018	-0.008	-0.008	-0.030	0.015
KS	0.033	0.031	0.035	0.185	0.175	0.194	-0.019	-0.024	-0.014	-0.010	-0.030	0.009
ME	0.035	0.033	0.037	0.205	0.196	0.215	-0.019	-0.024	-0.014	-0.007	-0.028	0.013
MD	0.028	0.026	0.030	0.186	0.177	0.195	-0.020	-0.025	-0.015	-0.008	-0.029	0.014
MT	0.034	0.032	0.036	0.185	0.176	0.194	-0.020	-0.025	-0.015	-0.008	-0.029	0.014
NC	0.033	0.031	0.035	0.186	0.177	0.195	-0.020	-0.025	-0.015	-0.008	-0.029	0.014
ND	0.040	0.038	0.042	0.219	0.210	0.229	-0.023	-0.029	-0.018	-0.009	-0.032	0.014
NE	0.033	0.031	0.035	0.186	0.177	0.195	-0.021	-0.026	-0.016	-0.008	-0.030	0.014
NV	0.035	0.033	0.038	0.190	0.180	0.200	-0.018	-0.023	-0.012	-0.008	-0.030	0.014
OK	0.033	0.031	0.035	0.183	0.173	0.192	-0.020	-0.025	-0.015	-0.009	-0.029	0.012
RI	0.022	0.020	0.025	0.153	0.144	0.163	-0.021	-0.027	-0.016	-0.007	-0.030	0.016
TX	0.029	0.026	0.031	0.181	0.171	0.192	-0.023	-0.029	-0.017	0.000	-0.025	0.025
WA	0.031	0.029	0.033	0.183	0.174	0.192	-0.023	-0.028	-0.018	-0.007	-0.031	0.017
WI	0.033	0.031	0.035	0.182	0.173	0.192	-0.020	-0.025	-0.015	-0.008	-0.030	0.014

Figure A1: Robustness of Estimates excluding states with Data Quality Issues in TAF using Callaway and Sant'Anna (2021) Estimator



Appendix-B: Chapter 2

Table B1: Cohort Size*

	Number
Number of Beneficiaries ages 18-64 with Opioid Use Disorders	866,395
Excluded for DQ issues (3 states)	251,599
Final Sample (17 states)	**614,796**

*See Appendix B, Table B2 for details on states being excluded from the analysis

Table B2: State Inclusion based on Key Variables

While the Transformed Medicaid Statistical Information System Analytic Files (TAF) represent an advance in harmonization among Medicaid programs compared with earlier datasets, quality is not uniform across all years and all states. We use the Data Quality Atlas (DQ Atlas), a website maintained by the Centers for Medicare and Medicaid Services, to check each variable we use in our analysis for quality in each state. The DQ Atlas is structured by variable but does not include all variables in the data. For variables it does include, the DQ Atlas rates each state in each year as being low, medium or high concern, or unusable, on each variable or measurement concept (e.g. enrollment count). We use the DQ Atlas as a baseline for evaluating the quality of key variables in each state and year, paying specific attention when the DQ Atlas flags a variable or measurement as unusable or high concern. In keeping with best practices for data use, we additionally check each variable in our specific population. We note where our assessment differs from the DQ Atlas.

For variables without specific DQ Atlas guidance, we run checks in our baseline sample on percent of missingness in each state and either exclude states or include with a sensitivity check as described below.

Only 30 states and Washington D.C. Medicaid programs reported data to the TAF in 2015. Of these 30 states, 1 state Texas implemented a DSRIP program which rewarded providers for MOUD access. Other 9 states — Wisconsin, Illinois, Indiana, Delaware, Maryland, North Carolina, Rhode Island, Nebraska and Hawaii — repealed prior authorization restrictions for expanding access to Buprenorphine. Including these states as control groups in the analysis will confound the treatment and bias the estimates. Therefore, excluding these states, results in 20

eligible states for the analysis. Of these 20 state, 3 have flagged data concerns that render them unusable for the analysis, resulting in 17 states in the main analysis.

Key Variable	Potential States Included	States Excluded due to Known Variable Quality Issues	States Included with Caution (Sensitivity Checks)	Notes
Beneficiary ID/TMSIS ID	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	None	None	-
Dual Eligibility Code	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	None	AL	DQ Atlas notes that dual eligibles cannot be identified reliably in AL.
Diagnosis Codes	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	None	None	-
National Drug Classification Codes (NDC)	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	None	None	-
Procedure Codes	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	None	ND (OT-2018; 2019)	For ND and DQ Atlas notes less than 5% percent missingness.
Managed Care Encounter Data	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	FL	None	Managed Care Data is of poor quality in both the Rx and OT files for Florida.

Claims Volume	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	MA, FL, KY	None	DQ atlas notes that FL and KY, MA have low and high claims volumes respectively in the data
Medicaid Enrollment	AL, AK, AZ, CO, DC, FL, KS, KY, MA, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	None	ME	DQ atlas notes that ME has high concern enrollment data
Final State Sample	AL, AK, AZ, CO, DC, KS, ME, MT, NV, NH, NM, ND, OH, OK, SC, VA, WA	MA, FL, KY	ME, AL	

Table B3: TAF Checklist

Category	Description	Specific to this study
Data		
Files, Years, and Release Versions	• Indicate which TAF files were used in the analysis (e.g., Demographic and Eligibility, Inpatient, Other Services, etc.). • Indicate which years of TAF data were included in the analysis. • Indicate which file versions were included in the analysis (e.g., preliminary, release 1, release 2, etc.). • Indicate whether the study drew from 100% TAF files or pre-specified extracts.	(e) Demographic and Eligibility, Inpatient, Other Services and Rx (f) 2015 -2019 (g) Final release (Release 2 for 2015-2018, Release 1 for 2019) (h) Received 100% TAF files
Analytic Sample		
Eligibility Criteria	• If applicable, describe what eligibility category codes were used to identify the study sample and whether they were used in combination with any other variables (e.g., age, receipt of specific medical services, etc.).	From full TAF files, we extracted enrollees ages 18-64, and identified individuals with a diagnostic record of opioid use disorder using ICD-9 and ICD-10 codes.
Enrollment Span	• If applicable, indicate the minimum period of enrollment required for an enrollee to be included in the study sample and how the enrollment period was defined.	No enrollment span criteria used for main analysis.

Scope of Benefits	• Indicate whether the analysis included enrollees with full scope, comprehensive, or restricted benefits.	No criteria used for main analysis.
Encounter Data	• Indicate whether the analysis excluded either fee-for-service or managed care enrolees. If managed care enrolees were excluded, define the criteria used to do so. • Indicate which types of claims records (e.g., fee-for-service claims, service tracking claims, capitation payments, etc., see variable CLM_TYPE_CD) were included in the analysis.	(c) For the purposes of this analysis, both managed care and FFS enrolees were included. (d) For encounter data, claims types codes 1,3, A and C were analyzed.
Dual Eligibility	• Describe whether individuals dually enrolled in Medicare and Medicaid were included in or excluded from the study sample and, if applicable, how dual eligibility was defined.	Dual eligibles were excluded from the study sample for all states in the sample except Alabama.
State and Territory Exclusions		

Criteria	• Indicate which states and/or territories were included (or excluded) from the analysis on the basis of data quality concerns. • Indicate the criteria by which state exclusions were made, including measures, data sources, and thresholds.	d) We exclude MA,FL and KY e) MA,KY was excluded due to high claims volumes. f) FL was excluded because of poor managed care encounter data. See Appendix B, Table B2 for more details.
State variation table	• Consider including a state-level table (which may appear in an appendix) summarizing the number of observations, means, medians, and missingness for key study measures	See Appendix Table B2.
Special Considerations		
Spending	• Indicate which types of claims records (e.g., fee-for-service claims, service tracking claims, capitation payments, etc., see variable CLM_TYPE_CD) were included to measure spending. • If including service-specific spending for managed care encounters, indicate how spending was imputed (payments from plans to providers on encounter records are generally redacted).	Spending was not assessed in this analysis
Using TAF with Predecessor Medicaid Analytic eXtract (MAX) Data	• Indicate if the analysis included data from the Medicaid Analytic eXtract (MAX) and, if so, for what years and which states.	No linkages were made with MAX data.

	• If applicable, include an exhibit examining trends in key measures by state over time and particularly during any transition from MAX to TAF.	

Table B4: Implementation of DSRIP in Select State Medicaid Programs

State	DSRIP Month-Year	Goal of the DSRIP Program
New Hampshire	July 2016	improve access to and quality of behavioral health services for individuals at risk for or already diagnosed with mental health and substance use disorders. In addition to focusing the state's DSRIP demonstration on Medicaid beneficiaries with mental health and substance use disorders, a key feature of the DSRIP demonstration included a plan to implement evidence-based programs combining behavioral and MOUD treatment for people with substance use disorders.
Arizona	January 2017	Under the demonstration, hospitals received incentives for delivering care to adults with behavioral health diagnoses and serious mental illness. Ambulatory care providers were incentivized based on their performance in serving three key populations: adults with behavioral health needs; children and youth with behavioral health needs, including those involved in the child welfare system and adults transitioning from criminal justice settings. The program incentivized primary care practices to screen for depression, drug and alcohol misuse, anxiety, developmental delays in infancy and early childhood, and suicide risk. The program also incentivized ambulatory care providers who achieved milestones by showing that their practice had reliable and consistent access to at least one physician who can prescribe MOUD
Washington	January 2018	Demonstration focused on prevention and health promotion and incentivizes providers for improving access to reproductive and maternal/child health; improving access to oral health services; chronic disease prevention and control (Washington State Health Care Authority 2017) and supporting the achievement of the state's goals to reduce opioid-related morbidity and mortality through strategies that target prevention, treatment and recovery supports by facilitating access to Buprenorphine and Methadone.

Table B5: Diagnosis Codes used to identify enrollees with Opioid Use Disorders

ICD-Code	Description
304.00	Opioid type dependence, unspecified
304.01	Opioid type dependence, continuous
304.02	Opioid type dependence, episodic
304.03	Opioid type dependence, in remission
304.70	Combinations of opioid type drug with any other drug dependence, unspecified
304.71	Combinations of opioid type drug with any other drug dependence, continuous
304.72	Combinations of opioid type drug with any other drug dependence, episodic
304.73	Combinations of opioid type drug with any other drug dependence, in remission
305.50	Opioid abuse, unspecified
305.51	Opioid abuse, continuous
305.52	Opioid abuse, episodic
305.53	Opioid abuse, in remission
304.00	Opioid type dependence, unspecified
304.01	Opioid type dependence, continuous
304.02	Opioid type dependence, episodic
304.03	Opioid type dependence, in remission
304.70	Combinations of opioid type drug with any other drug dependence, unspecified
F11.10	Opioid abuse, uncomplicated
F11.120	Opioid abuse with intoxication, uncomplicated
F11.121	Opioid abuse with intoxication, delirium
F11.122	Opioid abuse with intoxication, with perceptual disturbance
F11.129	Opioid abuse with intoxication, unspecified
F11.14	Opioid abuse with opioid-induced mood disorder
F11.150	Opioid abuse with opioid-induced psychotic disorder, with delusions
F11.151	Opioid abuse with opioid-induced psychotic disorder, with hallucinations
F11.159	Opioid abuse with opioid-induced psychotic disorder, unspecified
F11.181	Opioid abuse with opioid-induced sexual dysfunction

F11.182	Opioid abuse with opioid-induced sleep disorder
F11.188	Opioid abuse with other opioid-induced disorder
F11.19	Opioid abuse with unspecified opioid-induced disorder
F11.20	Opioid dependence, uncomplicated
F11.220	Opioid dependence with intoxication, uncomplicated
F11.221	Opioid dependence with intoxication, delirium
F11.222	Opioid dependence with intoxication, with perceptual disturbance
F11.229	Opioid dependence with intoxication, unspecified
F11.23	Opioid dependence with withdrawal
F11.24	Opioid dependence with opioid-induced mood disorder
F11.250	Opioid dependence with opioid-induced psychotic disorder, with delusions
F11.251	Opioid dependence with opioid-induced psychotic disorder, with hallucinations
F11.259	Opioid dependence with opioid-induced psychotic disorder, unspecified
F11.281	Opioid dependence with opioid-induced sexual dysfunction
F11.282	Opioid dependence with opioid-induced sleep disorder
F11.288	Opioid dependence with other opioid-induced disorder
F11.29	Opioid dependence with unspecified opioid-induced disorder
F11.90	Opioid use, unspecified, uncomplicated
F11.920	Opioid use, unspecified with intoxication, uncomplicated
F11.921	Opioid use, unspecified with intoxication delirium
F11.922	Opioid use, unspecified with intoxication, with perceptual disturbance
F11.929	Opioid use, unspecified with intoxication, unspecified
F11.93	Opioid use, unspecified, with withdrawal
F11.94	Opioid use, unspecified, with opioid-induced mood disorder
F11.950	Opioid use, unspecified with opioid-induced psychotic disorder, with delusions
F11.951	Opioid use, unspecified with opioid-induced psychotic disorder, with hallucinations
F11.959	Opioid use, unspecified with opioid-induced psychotic disorder, unspecified

Table B6: Codes used to identify Medications for Opioid Use Disorders (MOUD)

	Code Type	Code
Buprenorphine	**NDC**	63481016101, 63481068501, 50383092493, 49999063830, 63481016160, 63481068560, 00093537956, 50383093093, 49999063930, 63481020701, 63481082001, 00228315303, 55700030230, 63874117303, 63481020760, 63481082060, 00228315603, 55700030330, 63481034801, 63481095201, 68308020230, 63481034860, 63481095260, 68308020830, 63481051901, 00054017613, 35356055530, 12496127802, 63481051960, 00054017713, 35356055630, 12496131002
	HCPCS	J0571, J0572, J0573, J0574, J0575
Naltrexone	**NDC**	00406009201, 16729008101, 68084029121, 51224020650, 00406117003, 00555090201, 51285027502, 00406009203, 16729008110, 52152010502, 68094085362, 00185003901, 42291063230, 52152010504, 68115068030, 00185003930, 43063059115, 52152010530, 00056001122, 00406117001, 47335032683, 54868557400, 00056001130, 47335032688, 65694010003, 00056001170, 50436010501, 65694010010, 00056007950, 00555090202, 51224020630, 68084029111, 51285027501
Naltrexone, extended-release injectable	**NDC**	63459030042, 65757030001, 65757030202

Table B7: Event Study Estimates using Callaway and Sant'Anna (2021)

t	Likelihood of Receiving Any MOUD		
	Coef.	95% CI	
-8	0.039	0.007	0.071
-7	0.045	-0.012	0.103
-6	0.015	0.002	0.028
-5	0.003	-0.015	0.021
-4	0.014	0.005	0.023
-3	0.011	-0.009	0.031
-2	-0.005	-0.009	0.000
0	0.014	-0.010	0.038
1	0.019	-0.015	0.053
2	0.023	-0.016	0.061
3	0.040	-0.009	0.089
4	0.032	-0.004	0.068
5	0.049	-0.002	0.100
6	0.050	0.018	0.083
7	0.076	0.032	0.120
8	0.070	0.008	0.132
9	0.086	0.025	0.147
10	0.055	-0.019	0.128
11	0.068	-0.024	0.160

Table B8: Robustness of Estimates using Alternate Difference in Differences Specification

	Any MOUD	Any Buprenorphine	Any Naltrexone	Any Methadone
Effect of DSRIP	**0.047****	**0.040****	**0.007***	-0.0001
Fixed Effects				
State	Yes	Yes	Yes	Yes
Time (Quarter)	Yes	Yes	Yes	Yes
Observations	5,163,836	5,163,836	5,163,836	5,163,836

*p<0.1; **p<0.05; ***p<0.01

Table B9: Robustness of main results excluding Treatment States that implemented other policies for enhancing MOUD access

	State(s) Excluded		
	Arizona	**Washington**	**Arizona and Washington**
	Effect of DSRIP	**Effect of DSRIP**	**Effect of DSRIP**
Likelihood of receiving any MOUD	0.048	0.045	0.019
Fixed Effects			
State	Yes	Yes	Yes
Time (Quarter)	Yes	Yes	Yes
Observations	4,575,600	4,390,612	3,803,832

*p<0.1; **p<0.05; ***p<0.01

Table B10: Robustness of Estimates excluding States with known Data Quality Issues

	State Excluded	
	Alabama	**Maine**
	Effect of DSRIP	**Effect of DSRIP**
Likelihood of receiving any MOUD	**0.045****	**0.045****
Fixed Effects		
State	Yes	Yes
Time (Quarter)	Yes	Yes
Observations	5,004,488	4,964,100

*p<0.1; **p<0.05; ***p<0.01

Table B11: Robustness of Estimates to Leaving One State Out using Callaway and Sant'Anna (2021) method

State Excluded	Likelihood of Receiving Any MOUD		
	Effect of DSRIP	95% CI	
None	**0.04597**	**0.00566**	**0.08628**
Alaska	0.04647	0.00635	0.08658
Alabama	0.04555	0.00550	0.08550
Colorado	0.04319	-0.00046	0.08684
District of Columbia	0.04494	0.00439	0.08550
Kansas	0.04494	0.00439	0.08550
Maine	0.04545	0.00562	0.08528
Montana	0.04740	0.00748	0.08733
North Dakota	0.04565	0.00477	0.08653
New Mexico	0.04807	0.00779	0.08836
Nevada	0.04989	0.01247	0.08731
Ohio	0.04494	0.00439	0.08550
Oklahoma	0.04613	0.00616	0.08610
South Carolina	0.04925	0.01085	0.08764
Virginia	0.04824	0.00869	0.08778

Appendix-C: Chapter 3

1: Invitation to Interview

Dear [insert name],

I hope this message finds you well! My name is Soham Sinha, and I am a doctoral candidate in the Department of Public Health Sciences. I am currently working on a study that aims to understand how policies designed to enhance MOUD access interface with the practical realities of providing care to patients with opioid use disorders.

Given your experience as [enter occupation of key informant], I would like to invite you to participate in an interview for our study. Your insights would be valuable in helping us understand the nuances and strategies for enhancing care access to Medicaid beneficiaries with opioid use disorders.

We will use interviews to inform our research, but at no time will we identify you or your organization, verbally or in the articles we publish. We will also be happy to email you a copy of any articles that result from this study.

If you are interested in participating, please respond to this message and I can schedule a 45-minute interview at your convenience.

Thank you for considering this invitation.

Kind regards,
Soham

Soham Sinha (he/him)
PhD Candidate, Health Services Research
Department of Public Health Sciences
The University of Chicago

2: Interview Guide – Physicians/Nurse Practitioners

General Questions

1. What is the care journey like for a beneficiary seeking care for opioid use disorder?
2. What is the usual demographic profile of your patients?
3. What opioids are they primarily using and do they have any co-occurring substance use disorders?
4. In addition to prescribing MOUD, what else do you do in your capacity as a physician to ensure that your patients are supported?

Organizational Characteristics

5. Do you work at a hospital, small or a big practice, or FQHC?
6. Does the place where you work pose any unique challenges for providing care?
7. Do you have adequate staff in the practice to help you with administrative tasks or do you yourself deal with insurance and payors when it comes to prior authorizations?

Policies to prescribe MOUD

8. How has prior authorization repeal in [state] for prescribing Buprenorphine affected you?
9. Without a lack of oversight, are you concerned about misuse of MOUD?
    a. If answered no, then probe

Other

10. In spite of so many policies to increase access to MOUD, why:
    a. is access still a problem for opioid using individuals?
    b. have overdose deaths continued to increase?
11. What else do you think needs to be done to improve access to MOUD and health outcomes for this population?
12. Is there anything that we have not ask you about that you would like to add?

3: Interview Guide – Social Workers

General Questions

1. Where in the care journey do you touch base with a client who has opioid use disorder?
2. What is the usual demographic profile of your clients?
3. What opioids are they primarily using and do they have any co-occurring substance use disorders?
4. Is it easy to find a Buprenorphine provider and/or an OTP?

Policies to prescribe MOUD

5. What are the barriers to accessing MOUD?
6. How do you motivate clients?
7. When in treatment, how does having access to MOUD change/does not change life?
8. What are the key social determinants and challenges in the clients life?
9. Do you think policies like repealing prior authorization and eliminating X-waivers has made a difference for your clients?
10. What kind of stigma expressed by clients, by people in client's life?
11. How does the stigma hinder patient engagement and/or retention?

Other

12. In spite of so many policies to increase access to MOUD, why:
    - **a.** is access still a problem for opioid using individuals?
    - **b.** have overdose deaths continued to increase?
13. What else do you think needs to be done to improve access and health outcomes for this population?
14. Is there anything that we have not ask you about that you would like to add?