Medical Necessity Standardization and Treatment Capacity: Evidence from Substance Use Disorders

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Abstract

Health plans can set arbitrary medical necessity criteria to restrict care in utilization review, creating uncertainty in medical billing. This paper examines whether standardizing these criteria affects the treatment capacity of healthcare facilities. Exploiting the staggered enactment of state laws mandating uniform, evidence-based criteria for commercial insurance plans covering substance use disorder treatment, I find this standardization significantly increases facilities' treatment capacity: the likelihood that such specialty facilities offer outpatient services increases by 1.9%; the probability of having facility-induced medical delay drops by 31.3%. I provide evidence that these improvements cannot be fully explained by changes in patient selection, over-utilization of care, provider-insurer contracting, or physicians' prescribing behaviors. These findings thus suggest that reducing billing-related uncertainties can incentivize providers to expand provision of life-saving behavioral health services, offering new insights into the design of regulations simplifying administrative hassles in health insurance.

Keywords: substance use disorder, medical necessity criteria, medical billing

Classification: I13, I18

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1 Introduction

A growing concern in the U.S. healthcare system is the rising frequency with which health insurers deny coverage for essential medications. Between 2022 and 2023, medical denials for commercial insurance claims increased by approximately 20.2% (American Hospital Association, 2024).[1] These denials can significantly restrict patients' access to necessary treatments, often leading to serious health and financial consequences.[2] Among the various categories of denials, those based on medical necessity are particularly common. For example, approximately 9.1% of in-network claim denials by HealthCare.gov plans are classified as "not medically necessary."[3] Such denials occur when an insurer determines that a specific medical service or treatment is not required for diagnosing or treating the patient's condition.

For substance use disorders (SUDs), health plans have historically had broad discretion in selecting and applying medical necessity criteria. Many plans either develop their own criteria or adopt those created by non-profit clinical specialty associations (Weber, 2020). The lack of regulatory oversight has allowed insurers to implement overly restrictive criteria, effectively limiting or denying access to SUD treatment in an effort to control costs.[4] As a result, patients often face substantial barriers to accessing affordable, life-saving care.

In response, a growing number of states have taken actions to regulate medical necessity determinations for SUD treatment. These state-level mandates typically require health plans to apply standardized, evidence-based criteria and, in some cases, specific level-of-care assessment tools to promote more consistent and equitable coverage decisions. By limiting insurers' discretion, these reforms aim to reduce inappropriate treatment denials and improve access to timely, clinically appropriate care. As of 2022, 15 states had enacted such requirements, signaling a broader policy shift toward stronger oversight of behavioral health coverage.

This paper presents new empirical evidence on how reducing billing uncertainty influences the provi-

[1] See https://www.aha.org/news/perspective/2024-09-20-increasing-administrative-costs-burdensome-commercial-insurer-practices-create-patient-care, last accessed January 26, 2026.

[2] See https://www.ajmc.com/view/how-insurance-claim-denials-harm-patients-health-finances, last accessed January 26, 2026.

[3] See https://www.kff.org/private-insurance/issue-brief/claims-denials-and-appeals-in-aca-marketplace-plans-in-2023/, last accessed January 26, 2026.

[4] See *Wit v. United Behavioral Health*, No. 14-cv-02346-JCS, 2019 WL 1033730, at page 53.

sion of behavioral healthcare services, focusing on the standardization of medical necessity criteria. I leverage the staggered implementation of state laws between 2015 and 2022 that required commercial health plans to apply uniform, evidence-based criteria when determining coverage for substance use disorder (SUD) treatment. These policy changes provide a quasi-experimental setting to examine how lowering administrative frictions affects provider behavior and service delivery patterns in the behavioral health sector.

Using a staggered difference-in-differences design and drawing on multiple data sources, I examine how the standardization of medical necessity criteria affects the supply of substance abuse treatment (SAT) services.[5] I find that the policy significantly increases the likelihood that a facility offers any type of outpatient SAT services, with an average increase of 1.9%, largely driven by non-profit SUD treatment facilities. In addition, among facilities that offer inpatient services, the incidence of treatment delays due to limited capacity declines by 31.33%. Both findings suggest an improvement in the provision of SAT in response to the adoption of uniform medical necessity criteria.

To better assess the mechanisms driving this shift in service provision, I first examine whether the implementation of uniform medical necessity criteria affected the composition or characteristics of patients receiving SUD treatment. Leveraging client-level data from the Treatment Episode Data Set (TEDS), I find no statistically significant changes in the total number of admissions or discharges, nor in the demographic or clinical profiles of newly admitted or discharged patients. These null effects suggest that the expansion of services is unlikely to be driven by demand-side factors such as adverse selection into private plans or moral hazard at the point of admission.

I then explore whether the rise in SUD treatment could reflect the over-utilization of care among existing patients. Specifically, whether individuals with higher g risk were more likely to remain in treatment once admitted, when the uncertainty in medical billing is mitigated. Using the discharge module of TEDS (TEDS-D), I construct a measure of *ex-post* moral hazard based on whether the discharge was voluntary. If medical necessity standardization incentivized marginal patients to stay in treatment longer, we would expect a decline in voluntary discharges. However, I find no statistically significant change along this margin, further ruling out demand-side behavioral responses as

[5]Note that SAT is termed as Substance Abuse Treatment, following https://www.samhsa.gov/data/data-we-collect/n-sumhss-national-substance-use-and-mental-health-services-survey/datafiles/n-ssats-2020?year=2020.

the primary driver of service expansion.

Further, I assess more supply-side explanations. First, I check if changes in medical billing can shift individual physicians' financial incentives and, in turn, influence their prescribing and diagnostic behaviors. Using medication-assisted treatment as a proxy (MAT), I find that medical necessity standardization are associated with little changes in the utilization and provision of MAT, suggesting financial incentives of individual providers could not fully explain the rise in SAT provision.

Second, I explore whether the adoption of standardized medical necessity criteria may incentivize facilities to selectively contract with private insurers, when medical billing uncertainty among commercial plans is reduced. To assess this, I examine facility-level insurance acceptance patterns, including whether a facility reports accepting private insurance, Medicaid, Medicare, or uninsured patients. Across all specifications, I find no statistically significant changes in commercial insurance acceptance rate following the implementation of medical necessity standardization laws. These null results indicate that selective network participation is unlikely to be the primary channel through which the policy influenced SAT service provision.

Finally, I examine whether the increase in SAT provision is driven by substantial, immediate shifts in local market structure following the adoption of standardized medical necessity criteria. Using both state-level facility counts and county-level counts of relevant treatment establishments, I find no statistically significant evidence. Taken together, these results indicate that the observed expansion in SAT services is unlikely to be resulted from shifts in the above demand and supply factors. Instead, the evidence points to a key mechanism: the reduction of administrative uncertainty associated with arbitrary and inconsistent medical necessity determinations directly lower the operational barriers for existing facilities to deliver care.

This paper contributes to a growing strand of literature discussing the consequences of administrative processes/requirements in the healthcare sector. Brot-Goldberg et al. (2023) study the key trade-off (reducing moral hazard vs. imposing bureaucratic costs) related to prior authorization requirements in Medicare Part D, and find the cost savings resulting from PA likely exceed beneficiaries' willingness to pay for foregone drugs. Dunn et al. (2023) documented that more aggressive use of claim denials reduce the willingness of providers to contract with insurers. Burn and Ristovska (2025) found prior authorizations can lead to large reductions in utilization of drugs and suggest prior au-

thorization is not a well-targeted design. League and Shi (2025) find that reducing the administrative fragmentation of billing and payment does not largely improve health care efficiency.

Building on this literature, my study highlights investigate an under-explored factor for US health care's productive inefficiency: medical necessity criteria and the relevant hassles. Focusing on behavioral health, a unique setting where timely access to care is critical, I show that the lack of standardized criteria can constrain service provision by increasing uncertainty in treatment approval and reimbursement. These findings provide new evidence that unregulated medical necessity criteria impose additional administrative frictions by intensifying the billing uncertainty among providers, insurers, and patients.

My findings relates to another literature in health economics, discussing the key determinants of substance use disorder treatment capacity. Prior work highlights the role of equal coverage laws for private insurance (Maclean, Popovici and Stern, 2018) and public health insurance expansion (Hamersma and Maclean, 2021; Agniel et al., 2023). Most relevant to this work, Xing (2025) discusses the consequences of removing prior authorization requirements and finds a resulting expansion in SAT facilities' treatment capacity. My empirical evidence serves as a complementary analysis and demonstrates removing administrative hassles within private insurance can also influence providers' behaviors.

The rest of this paper proceeds as follows: section 2 provides the institutional background. Section 3 specified the primary empirical strategies. Section 4 describes the primary datasets I use in the empirical analysis; section 5 presents the main results. Section 6 describes and tests relevant mechanisms. Eventually, section 7 concludes and highlights some future work, as well as policy implications.

2 Background: Medical Necessity Criteria

In this section, I briefly discuss the institutional details regarding medical necessity criteria for SAT and how recent state legislation targets the use of medical necessity criteria, by requiring uniform, evidence-based standards.

2.1 Medical Necessity Criteria in Health Insurance

Health insurance plans provide coverage only for benefits and services that they consider to be *medically necessary*. Health plans typically evaluate medical necessity through a process called "utilization management" or "utilization review," whereby the health plan assesses, prior to the delivery of the service and over the course of a patient's care, whether the practitioner's recommended service meets its medical necessity criteria based on documentation of the patient's condition. The concept of medical necessity is foundational to UM programs. Medically necessary services are those that can be expected to produce the intended results for the patient and are expected to have benefits that outweigh any potential harmful effects.

As mentioned in Giardino and Wadhwa (2025), utilization management (UM) "remains a well-recognized component of a cost management approach in the health care service delivery and payment arenas. UM processes include interventions that take place before, during, and after the clinical encounter." It is a set of techniques used by payers on behalf of purchasers of healthcare benefits to manage healthcare costs, ensure services align with payers' medical necessity criteria, and reduce or eliminate care that is wasteful, inefficient, or unnecessary. According to Giardino and Wadhwa (2025), there are multiple types of UM, including:

Prior Authorization: this is a process in which a treatment or service (e.g., a prescription medication) must be reviewed and approved before it is eligible for insurance coverage. This process typically requires documentation demonstrating medical necessity and confirming that the treatment is appropriate for the patient.

Concurrent Review: as the name suggests, typically occurs while the patient is still receiving care in a healthcare facility. It aims to provide oversight by evaluating the type of care being delivered, the necessity of that care, and whether the level and setting are appropriate. Concurrent review can also help identify patients who may benefit from case management, disease management, or other population health strategies tailored to their diagnosis or clinical needs. Like other utilization management tools, concurrent review relies on established medical necessity criteria.

Retrospective Review: this is a form of utilization management that takes place after care has been provided and the billing claim has been submitted. Its primary purpose is to verify that the care was

appropriate and delivered at the most efficient and effective level. In addition, the review assesses whether the billing codes used accurately reflect the services provided. Ideally, retrospective review should reveal only minimal discrepancies, especially when pre-authorization and concurrent review processes have been conducted and documented.

The determinations of any of the above UM types can result in a denial of either the request or for the payment for the service or procedure. Typically, there are two broad types of denials, *benefit denials*, and *medical necessity denials*. The former focuses on the coverage benefits to which the patient is entitled (e.g., fertility services may not be covered benefit so such a service may be denied because of a lack of coverage) and medical necessity denials highlights the need for a specific service or procedure (e.g., a methadone-assisted treatment for a patient with low-level of SUD issues may be denied as not medically necessary).

2.2 State Regulations of Medical Necessity Criteria

In response to the escalating opioid crisis, several states have implemented policies requiring state-regulated commercial insurance plans to adopt uniform, evidence-based medical necessity criteria for substance use disorder (SUD) treatment (Weber, 2020). These measures are intended to improve both access to and the effectiveness of substance abuse treatment (SAT). As of December 2022, 15 states have enacted legislation or issued administrative regulations that limit insurers' discretion by mandating the use of specific clinical guidelines or standards.[6] [7] Additionally, some states require insurers to use standardized patient assessment tools to determine the appropriate level of care, aiming to improve consistency and clinical accuracy in treatment planning. A detailed summary of these state-level regulations is provided in Table A1.

It is worth noting that these state-level regulations do not apply to enrollees in self-insured plans offered by private employers. Only employees covered by fully-insured plans and non-employed individuals fall under these state regulations. While determining the precise share of state-regulated plans among SUD patients is challenging, I conduct the following exercise to demonstrate the scope

[6] For distinctions between state- and federally regulated private insurance, and for policies limiting prior authorization in SUD care, see: https://www.kff.org/private-insurance/, last accessed January 26, 2026.

[7] The states include California, Colorado, Connecticut, Delaware, Illinois, Maryland, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, Tennessee, Texas, Washington, and West Virginia.

of these state regulations. First, among all SUD admissions reporting insurance plan status in 2012 and 2013, 24.46% are identified as employed and within this group, 25.55% are using any private plans to cover SUD service (TED-A). If we draw additional information from the 2013 KFF Employer Health Benefits Survey,[8] 40% of workers are covered by fully funded employer-sponsored health insurance. Thus as of 2013, approximately 10.22% (=25.55%$\times$40%) of workers have state-regulated health plans. In terms of individuals without a job, the share of admissions covered by private plans is 9.01%. Taken together, this calculation suggests among all new admissions to a specialized SUD treatment facility, approximately 9.4%(= 10.22% $\times$ 24.46%+9.01% $\times$ 75.54%)are directly affected by these state medical necessity regulations. Importantly, this estimate captures only direct exposure; to the extent that facilities adjust treatment practices at the facility level, spillover effects may substantially increase the share of SUD treatment facilities influenced by these regulations.[9]

A number of evidence-based guidelines and criteria have been developed to determine medical necessity for mental health and substance use disorder treatment. There is variation in the type of medical necessity criteria across states.

ASAM criteria: developed by the American Society of Addiction Medicine (ASAM), is a widely adopted framework used by providers to guide clinical decision-making and to support determinations of level of care and medical necessity.[10] The Centers for Medicare and Medicaid Services (CMS) has recognized the ASAM Criteria as an evidence-based standard for SUD treatment, and courts have cited it as reflecting generally accepted standards of care.[11] As of now, eleven states require commercial insurance plans to use the ASAM Criteria when determining the medical necessity of SUD services: Colorado, Connecticut, Delaware, Illinois, Maryland, New Hampshire, New Jersey, North Carolina, Rhode Island, Tennessee, and Washington.

LOCADTR criteria: The Level of Care for Alcohol and Drug Treatment Referral (LOCADTR) was developed by the New York State Office of Addiction Services and Supports (OASAS) and

[8] See https://www.kff.org/private-insurance/2013-employer-health-benefits/, last accessed January 26, 2026.

[9] In terms of spillovers, if state medical necessity rules require longer authorization periods or prohibit early discharge for regulated plans, a facility may standardize minimum length of stay across all patients, or apply the same clinical review thresholds to Medicaid, self-insured, or cash-pay patients.

[10] See https://www.asam.org/, last accessed January 26, 2026.

[11] See https://www.medicaid.gov/state-resource-center/innovation-accelerator-program/iap-downloads/reducing-substance-use-disorders/asam-resource-guide.pdf, last accessed January 26, 2026.

Partnership to End Addiction. LOCADTR is a web-based tool that guides level of care determinations. New York requires both providers and state-regulated commercial and Medicaid plans to use LOCADTR for medical necessity determinations.

Meanwhile, 24 states have mandated the use of specific criteria or assessment tools for medical necessity determinations under their Medicaid programs. These requirements generally stem from either (1) state legislation or (2) the Section 1115 waiver programs targeting SUD treatment within Medicaid. Between 2012 and 2022, 12 states incorporated such requirements directly through 1115 waivers: Alaska (2019), Delaware (2017), Indiana (2018), Kentucky (2018), Louisiana (2019), Maryland (2017), Michigan (2019), New Mexico (2019), Ohio (2019), Pennsylvania (2018), Vermont (2018), and West Virginia (2019).

In addition, 14 states enacted legislation requiring Medicaid plans to adopt the ASAM Criteria or other evidence-based clinical assessment tools: California (2015), Delaware (2017), Idaho (2020), Kansas (2019), Minnesota (2021), New Hampshire (2018), New Jersey (2018), New Mexico (2020), New York (2019), North Carolina (2019), Ohio (2017), Utah (2019), Virginia (2016), and Washington (2018).

In my analysis, I treat these policy developments as key confounding factors and explicitly control for them when estimating treatment effects of medical necessity standardization for commercial plans.[12] In Figure 1, I mapped the geographic distribution of the requirements for medical necessity criteria in state-regulated commercial plans. Figure 2 summarizes the geographic distribution of the 1115 waiver for SUD treatment in Medicaid; Figure 3 presents the distribution of state requirements for using ASAM criteria in Medicaid for SUD treatment.

Admittedly, I am currently framing the adoption of standardized medical necessity criteria as *coverage standardization*, but it is also reasonable to value the laws closer to *coverage mandates*. *A priori,* however, there are several reasons to favor the former interpretation. First, coverage mandates expand the statutory set of benefits that insurers are required to cover. In contrast, standardized medical-necessity criteria do not introduce new covered services or populations. Instead, they reg-

[12]Note that in states implementing 1115 waivers for SUD services, it is often difficult to isolate the specific impact of ASAM criteria from other elements of the waiver. Therefore, I control for the presence of a 1115 waiver directly in the empirical analysis.

ulate the process by which insurers evaluate claims for services that are already nominally covered, constraining discretionary denials without guaranteeing approval of any particular service. Moreover, insurers retain substantial discretion over pricing, network design, and utilization management, and coverage remains conditional on meeting the standardized criteria. For these reasons, I conceptualize these policies as coverage standardization rather than coverage mandates. From the empirical perspective, I tested the coverage adjustment margin in Section 6.4 in detail.

3 Empirical Strategy

The primary identification strategy hinges on the adoption of standardized medical necessity criteria across states over time, from 2015 to 2022. In the baseline analysis, I exploit the following staggered difference-in-difference (DID) model to identify their causal effects:

$$y_{ist} = \alpha + \beta \text{Medical Necessity Criteria}_{st} + X_{ist}^{'}\gamma + \rho_{st} + \eta_t + \psi_s + \varepsilon_{ist} \tag{1}$$

where i denotes facilities, s represents states, and t indexes years. y_{ist} is the key outcome of interest, the likelihood of offering a variety of SUD services in facility i located in state s in year t. *Medical Necessity Criteria*$_{st}$ is an indicator whether there is a state law standardizing the medical necessity criteria for SAT services in state s in year t. X_{ist} is a set of facility-specific controls, and ρ_{sc} represents a collection of state-specific control. I also include state fixed effects (ψ_s) and year fixed effects η_t, respectively. Therefore, β would identify the impact of standardized medical necessity criteria on the provision of facilities' service.

In a similar vein, when using individual-level outcomes of interest (such as the waiting time prior to the SUD treatment setting), i refers to individuals and X_{ist} represents a set of individual-level demographic information (e.g., gender, education, race, and prior utilization of SUD). Others remain the same.

The key assumption of this difference-in-differences model is that controlling for state and year-fixed effects, changes in key outcomes would have been comparable among different states in the absence of adopting standardized medical necessity criteria. To directly test this assumption, I estimate a

stylized event study model as follows in equation 2:

$$y_{ist} = \alpha + \sum_{i=-5}^{5} \beta_{t+i} Treat_{st} \times year_{t+i} + \rho_{st} + \eta_t + \mu_s + \varepsilon_{ist} \tag{2}$$

where $year_{t+i}$ is a set of indicators denoting whether a year is the i^{th} year relative to the enactment of a medical necessity criteria law. In this specification, the estimate associated with one year prior to the treatment is normalized to zero. This way, $\beta_{Pt} + i$ also captures the dynamic effects.

Another threat to identification is the reverse causality issue. For example, one might imagine that states enacting relevant laws are also those with a higher level of demand for SUD treatment and/or a smaller amount of specialty facilities providing behavioral health services in the first place. If these policy shocks are correlated with underlying legal, economic, political, or social trends, it would be challenging to use such variation to isolate causal effects. In subsequent analysis, I corroborate the evidence that the provision of SAT services does not differentially change in years prior to changes in medical necessity standardization. Meanwhile, I also provide supplementary analyses by testing whether other changes in political, social, and economic features predict medicate necessity standardization.

4 Data

This section summarizes the data assembled from multiple resources and provides motivational evidence. To implement the empirical analysis, I collect data on (1) the timing of adopting the state-level limits on substance abuse treatment (SAT) in state-regulated commercial health insurance, and (2) measures of the facilities' capacity to provide various types of treatments, as well as one's likelihood of accepting commercial health plans. I then describe how to construct each measure, enabling me to conduct the empirical analysis in turn.

4.1 Adoption of Medical Necessity Criteria for SAT

Information on state laws/regulations regarding medical necessity in SUD primarily comes from the Legal Action Center (LAC).[13] I also complement this data by tracking changes in relevant laws for each state from Westlaw via text mining.[14] I construct a panel policy database including the timing of change, the specific medical necessity criteria required, and whether there's also a requirement for uniform medical necessity criteria in Medicaid.

There is some variation in the state legal language regarding what types of criteria are required/recommended. In 11 states, ASAM criteria serve as the primary tool. I thus consider a state as being treated if one has ever adopted a uniform medical necessity criteria requirement in commercial plans and do not check the policy heterogeneity. In the appendix, Table A1 lists all relevant state laws/regulations, including the corresponding states, the effective dates, and a brief summary of the scope.

4.2 Substance Abuse Treatment Facility Data

The primary data sources for this empirical analysis are the 2012–2020 National Survey of Substance Abuse Treatment Services (N-SSATS)[15] and the 2021–2022 National Substance Use and Mental Health Services Survey (N-SUMHSS).[16] These surveys are the most comprehensive and nationally representative sources of information on specialty substance abuse treatment (SAT) facilities. They are widely used in economics and public health research to examine substance use disorder (SUD) treatment access, capacity, and outcomes (see, for example, Markowitz and Grossman, 2000; Carpenter, 2007; Popovici, Maclean and French, 2017; Hamersma and Maclean, 2021).

The sampling frame for the N-SSATS is the Inventory of Behavioral Health Services (I-BHS), which represents the universe of specialty substance abuse treatment (SAT) facilities known to the Substance Abuse and Mental Health Services Administration (SAMHSA). Each year, from late March to November, surveys are administered to all facilities listed in the I-BHS. Facilities newly iden-

[13] See https://www.lac.org/assets/files/Spotlight-on-Medical-Necessity-Criteria-for-Substance-Use-Disorder-Treatment.pdf, last accessed January 26, 2026.

[14] See https://legal.thomsonreuters.com/en/westlaw, last accessed January 26, 2026.

[15] Dataset available at https://www.datafiles.samhsa.gov/dataset/national-survey-substance-abuse-treatment-services-2020-n-ssats-2020-ds0001, last accessed January 26, 2026.

[16] See https://www.samhsa.gov/data/data-we-collect/n-sumhss-national-substance-use-and-mental-health-services-survey/datafiles, last accessed January 26, 2026.

tified during the data collection period are also surveyed and subsequently incorporated into the I-BHS for future survey cycles. Responding facilities report detailed information on the types of services offered, the number of clients currently receiving treatment, and, if applicable, the number of residential or hospital inpatient beds dedicated to SAT.[17]

Beginning in 2021, the National Survey of Substance Abuse Treatment Services (N-SSATS) and the National Mental Health Services Survey (N-MHSS) were consolidated into a single instrument: the National Substance Use and Mental Health Services Survey (N-SUMHSS). I utilize the 2021 and 2022 N-SUMHSS data, restricting the sample to facilities that report providing substance abuse treatment (SAT) services. Key variables in N-SUMHSS are constructed to be consistent with those in earlier N-SSATS waves. As a robustness check, I verify that estimates derived from the 2012–2020 N-SSATS data align with the main findings presented in this paper.

To measure the provision of SAT at the facility level, I focus on two categories of outcomes reported in both surveys: (1) whether a facility offers specific SAT modalities, and (2) whether it participates in private health insurance markets. Facilities included in these datasets may be hospitals or non-hospital settings (e.g., clinics) that offer one or more of the following services: outpatient, inpatient, or residential/rehabilitation treatment; detoxification; opioid treatment programs; and halfway-house services. Many also provide ancillary services such as mental health care. Importantly, inclusion in N-SSATS or N-SUMHSS requires that a facility delivers specialty substance use disorder (SUD) treatment, although this need not be its primary focus (Hamersma and Maclean, 2021).

A notable limitation is that, beginning in 2012, the publicly available N-SSATS and N-SUMHSS files no longer include facility-specific identifiers. As a result, it is not possible to construct a balanced panel of facilities over time, and the analysis must rely on repeated cross-sectional data.

4.3 Treatment Episode Data Set

Another primary data source for this study is the Treatment Episode Data Set (TEDS), which aggregates client-level information on admissions to and discharges from substance abuse treatment, as reported by state agency monitoring systems.[18]

[17] The reference date for bed and client counts is March 30 or 31.

[18] Public-use files are available at https://www.datafiles.samhsa.gov/dataset/teds-d-2020-ds0001-teds-d-2020-ds0001 and https://www.datafiles.samhsa.gov/dataset/treatment-episode-data-set-admissions-2020-teds-2020-ds0001, last ac-

TEDS is a cornerstone of SAMHSA's data infrastructure for monitoring the scale and performance of specialty SUD treatment nationwide. It captures roughly two million treatment admissions each year and covers nearly the universe of specialty facilities that (i) receive state or federal funding, (ii) are certified by a state to provide SUD services, or (iii) are monitored for other administrative or regulatory purposes. Consequently, TEDS encompasses a broad mix of payers—including self-pay, private insurance, Medicaid, and Medicare—and has been widely employed in policy research on SUD treatment patterns and service delivery (e.g., Anderson, 2010; Dave and Mukerjee, 2011; Pacula et al., 2015; Powell, Pacula and Jacobson, 2018). Federal agencies such as the Office of National Drug Control Policy also rely on TEDS to assess the fiscal impact of SUD treatment.

TEDS consists of two complementary files:

Admissions (TEDS-A): this part records every admission for individuals aged 12 and older, with detailed demographic information (age, sex, race/ethnicity, employment status) and substance-use histories (primary substances, age of first use, route, frequency, and prior treatment episodes). Because the unit of observation is the admission, the same individual may appear multiple times.

Discharges (TEDS-D): this file captures discharges for the same age group, retaining a parallel set of demographic and substance-use variables. These data support analyses of treatment completion and other episode-level outcomes.

Together, TEDS-A and TEDS-D provide rich, repeated cross-sectional snapshots of treatment patterns and client characteristics across the United States, an essential complement to facility-level surveys in evaluating the effects of policy interventions on SUD service provision.

4.4 County Business Patterns

To document changes in county-level market structure, I compile data from the County Business Patterns (CBP) between 2012 and 2022.[19] The CBP provides annual counts of business establishments by industry and geography, including the number of substance abuse treatment clinics (defined as single physical locations) in each U.S. county. Following Swensen (2015), I identify relevant establishments using six-digit NAICS codes: 621420 refers to outpatient mental health and substance

cessed January 26, 2026.

[19] See https://www.census.gov/programs-surveys/cbp.html, last accessed January 26, 2026.

abuse centers, while 623220 refers to residential mental health and substance abuse facilities.

Although many of these establishments also offer mental health services, the vast majority primarily focus on substance use treatment. According to the 2008 N-SSATS, only 8% of identified facilities reported a primary focus on mental health services, suggesting that these NAICS codes reliably capture SAT market activity (Swensen, 2015).

It is also worth noting that, relative to alternative data sources, CBP offers more comprehensive and consistent coverage of treatment facilities over time, as it is based on a near-universe census of employer establishments rather than voluntary reporting or survey participation. This feature makes CBP particularly well suited for analyzing longitudinal changes in local market structure across counties.

5 Main Results

In this section, I present my main results for the provision of healthcare services based on equation 1 and discuss how to interpret the magnitudes and the implications.

5.1 Effects on Treatment Capacity of SAT Facilities

In Table 1, I present the results for the effects of standardizing medical necessity criteria on SAT provision. In columns (1) - (3), the dependent variable is an indicator for whether a SAT facility offers any outpatient service. The key outcome of interest is the likelihood of providing intensive outpatient service through columns (4) (5) and (6). In the last three columns, the dependent variable is a dummy variable for providing inpatient service, including hospital-based and residential SAT.

In Table 1, we can observe a significant positive effect on the provision of outpatient SAT services in columns (1) - (3). In column (1), I focus on all SAT facilities and do not include other relevant state-level confounding factors. In Column (2), I restrict my attention to non-profit facilities (including all non-profit private facilities, as well as government-sponsored ones).[20] Finally in column (3), I control for state-level restrictions for prior authorization in commercial plans and Medicaid, as well as the 1115 waiver in Medicaid for substance use disorder treatment. These point estimates

[20]Results for for-profit, private facilities are statistically insignificant.

show that the standardizing medical necessity criteria for state-regulated commercial plans leads to a significant increase in the provision of outpatient service by at least 1.3 percentage points, which is equivalent to 1.9%. This positive effect is primarily driven by changes in non-profit providers.

Through column (4) to column (9), I also repeat the same exercise for the provision of care in other settings (i.e., intensive outpatient and inpatient). Interestingly, the provision of intensive outpatient SAT service does not change significantly, while the likelihood of having inpatient service declines in columns (7) and (8) by approximately 1.8 percentage points. Yet, when including more confounding factors in column (9), it turns out that the prior authorization restriction on commercial plans absorbed the significant effects. Notably, the magnitude of the inpatient decline closely mirrors the outpatient increase documented earlier, consistent with a shift from high-intensity to low-intensity treatment modalities

Another key measurement of healthcare provision is whether facilities have the capacity to offer timely SAT services.[21] I construct a relevant metric based on patient-level data in the TEDS-A (2012-2022): the likelihood of experiencing more than a two-week wait before treatment begins. It is worth noting that this waiting time variable reflects the number of days between a client's first contact or request for substance abuse treatment and the date of admission and first clinical service. As mentioned in TEDS-A codebook, this measure is intended to "*capture delays attributable to program capacity, treatment availability, admissions procedures, or other facility-related constraints and explicitly excludes delays due to client unavailability or failure to meet program requirements*."[22][23]

Table 2 shows the corresponding results. Columns (1) and (2) focus on all admissions to the regular outpatient settings. In columns (3) and (4), the outcome of interest is the likelihood of experiencing a medical delay in the intensive outpatient setting. In the last two columns, the dependent variable

[21] Note that other measure of treatment capacity is number of beds at SAT facilitates. However, such information is not consistently available in N-SSATS. In 2014, 2016, and 2018, such information is not available.

[22] See https://www.samhsa.gov/data/system/files/media-puf-file/TEDS-A-2022-DS0001-info-codebook_v1.pdf, last accessed January 26, 2026.

[23] Of course, there may be selection at the margin of admission: some patients could be deterred by long wait times and thus seek treatment elsewhere. In the presence of this selection bias, my estimates would likely understate the true effect. For instance, deterred patients may have more severe substance use disorders, be subject to more stringent utilization management requirements, or face greater barriers to access, making them especially vulnerable to delays in care. If so, the effect on treatment delays could be larger among those not deterred by wait times than among those who are. Failing to account for this would bias my results toward zero.

is whether one experienced any medical delay (defined above) in an inpatient SAT setting, which includes residential care and hospitalization. In all even-numbered columns, I control for state restrictions on prior authorization in commercial plans and Medicaid.

In columns (5) and (6), we observe a significant decrease in the likelihood of experiencing medical delays in an inpatient setting by 2.4 percentage points (a 28.9% reduction). This result holds after I control for more relevant SUD policies: the magnitude of this decline in medical delay is a bit larger, approximately 31.33%. Taken together with the findings from Table 1 and Table 2, these results suggest that mandating the adoption of uniform, evidence-based medical necessity criteria can effectively expand the provision of SUD treatment across both inpatient and outpatient settings. This expansion is likely driven by the reduction of billing uncertainties for providers, as standardized criteria clarify the scope of covered services within commercial insurance plans. In Section 6, I provide evidence to rule out a number of alternative explanations.

Here I should note that there is a key distinction between *facility treatment capacity* and *effective access to treatment*. My results suggest that standardized medical necessity criteria improve the efficiency with which existing capacity is utilized. Prior authorization requirements and ambiguous medical necessity criteria can create administrative barriers that prevent facilities from effectively utilizing one's physical capacity: beds may sit empty while patients await insurance approval, or staff time is diverted to documentation rather than treatment provision. This results in reduced annual patient counts (extensive margins) or a delay in being treated (intensive margins) despite unchanged bed counts or facility numbers. By eliminating these administrative bottlenecks, medical necessity standardization allows the same physical infrastructure to serve more patients per year or enable faster processing with higher capacity utilization rates, which in turn can create mortality reductions.

5.2 Robustness

In this subsection, I discussed and addressed some threats to the identification strategy listed in Section 3, including the policy endogeneity, parallel trends assumption, alternative DD specification, the composition of sample, and different frames of various datasets.

5.2.1 Policy Endogeneity

The first concerns about my identification strategy is that the adoption of standardized medical necessity criteria is determined by prior state-level outcomes, especially the mortality rate due to substance use disorders. If so, the issue of reverse causality can arise and bias my estimate shown in Tables 1 and 2.

To address this concern, I follow Johnson, Lavetti and Lipsitz (2023) and assess what are the determinants of standardization. Key data on state social, political and economic factors are drawn from the University of Kentucky Center for Poverty Research (2023).[24] I also compile data on mortality rates due to "mental and behavioral disorders caused by psychoactive substance use" from the CDC WONDER online databases.[25] The specification is shown as follows:

$$MedicalNecessityCriteria_{st+1} = \alpha + \beta X_{st} + \phi_s + \mu_t + \varepsilon_{st} \tag{3}$$

where s represents state and t refers to year. $MedicalNecessityCriteria_{st+1}$ is an indicator for whether there is a law mandating the adoption of evidence-based, uniform medical necessity criteria in state s in year $t+1$. X_{st} represents a vector of state-level socia, economic, and political factors in the previous calendar year t. In particular, I consider the population, state GDP, state unemployment rate, the level of state minimum wage, the level of workers' compensation, the number of SNAP/TANF/Medicaid recipients/beneficiaries, the annual number of deaths due to SUD, state Prescription Drug Monitoring Program (PDMP), state restriction on prior authorization in Medicaid/commercial plans, the 1115 waiver in Medicaid for substance abuse treatment, the state requirement for ASAM criteria in Medicaid via legislation, the fraction of state house that is democratic, the fraction of state senate that is democratic, and whether the state governor is democratic.

Based on the estimates in Table 3, it suggest that among all these variables, only the enactment of state prior authorization restrictions on commercial plans and state requirements for ASAM in Medicaid are significantly associated with the standardization of medical necessity criteria. Intuitively, this is a reasonable pattern: as a crucial part of utilization review (UR), states adopting the standardized medical necessity criteria are more likely to also introduce requirements for prior authorization.

[24] See https://cpr.uky.edu/resources/national-welfare-data, last accessed January 26, 2026.
[25] See https://wonder.cdc.gov/, last accessed January 26, 2026.

Throughout my primary analysis, I thus include these two confounders to attenuate this endogeneity issue.

5.2.2 Parallel Trends Assumption

Another key assumption for a difference-in-differences framework is the parallel trends assumption. That means, in the absence of the treatment, trends in key outcomes of interest should be identical/similar in the treatment and control groups. To test it, I estimate the event-study specification shown in Equation 2. Through Figures 4-6, the outcome is the probability of offering outpatient/intensive outpatient/inpatient settings, respectively. In Figures 7-9, I focus on the likelihood of experiencing medical delay among newly admissions by the type of care.

Based on the figures, we can barely observe strong evidence for violating this parallel trends assumption. In Figure 4, it shows that the probability of offering regular outpatient SUD services began to increase soon when the standardization is in place, while in Figure 6, the trend is negative but insignificant. Turning to the capacity margin, we also document a quite flat pre-treatment trend and a statistically significant, persistent drop in the inpatient setting for substance use disorder treatment (Figure 9).

Another concern regarding the staggered DD specification is about the structure of my sample: as shown in Appendix Figure 1, the number of pre- and post-ban years varies between treatment states. Consequently, for the twenty states implementing PA bans, I restrict the sample to a balanced set of pre- and post-ban years common to all states, which is 4 years before the bans' implementation and 3 years afterwards. I present both the average effect estimates and the event-study estimates accordingly.

5.2.3 Alternative DID Specifications

One critic for the staggered difference-in-differences model is mentioned in recent papers (see for example, Goodman-Bacon (2021)). To address this issue, I use Callaway and Sant'Anna (2021) to demonstrate the robustness of my main estimates. In Table 4, we can see the increased provision of low-intensity SAT services is still statistically significant and the magnitude remain consistent compared to the main result shown in Table 2. Meanwhile, results in intensive outpatient and inpatient

services are also insignificant and similar.

5.2.4 Composition of Sample

Another concern regarding the staggered DD specification is about the structure of my sample: the number of pre- and post-treatment years varies between treatment states. Consequently, for the states enacted medical necessity regulation, I restrict the sample to a balanced set of pre- and post-ban years common to all states, which is 4 years before the bans' implementation and 3 years afterwards. I present the event-study estimates accordingly in the Appendix A.4. (Figures A5-A10).

5.2.5 Different Frames of Datasets

By design, TEDS covers only a subset of facilities included in N-SSATS. As a result, estimates based on these two data sources are not directly comparable. This difference in sample coverage may help reconcile the divergent patterns observed between inpatient and outpatient care discussed above. As a robustness check, I restrict the N-SSATS sample to facilities that receive federal, state, or local government funding, yielding a sample that more closely resembles the set of providers observed in TEDS. The results from this restricted sample are reported in Table A3 and Figures A11–A13. The main findings remain unchanged.

6 Mechanisms

In this section, I show the results for testing several mechanisms through which the standardization can influence the provision of SAT services. Respectively, I rule out explanations from both the demand and supply sides. As a results, these suggest the main findings are likely to be driven by a reduction in billing uncertainties.

6.1 Patient Selection

To begin, I explore whether changes in patient composition and quantity can explain the observed increase in the provision of substance abuse treatment (SAT) services. This hypothesis is plausible, as patients may directly respond to the policy shock. By reducing uncertainties in medical billing through the adoption of standardized medical necessity criteria, the policy could incentivize more

individuals to enroll in regulated commercial plans and increase their likelihood of utilizing SUD treatment services.[26]

I use client-level data from TEDS to test whether the aggregate number of treatment admissions and discharges changes in response to the standardization of medical necessity criteria. To do so, I collapse the data to the state-year level, constructing a balanced panel that documents the total number of new admissions and discharges across SAT facilities.[27] To focus on voluntary treatment, I exclude all observations where the referral source is identified as a police officer, judge, prosecutor, probation officer, or other judicial authority.[28]

Based on this sample, I estimate the following regression model:

$$y_{st} = \alpha + \beta MedicalNecessityCriteria_{st} + X_{st} + \mu_s + \phi_t + \varepsilon_{st} \tag{4}$$

where y_{st} is the aggregate number of admissions/discharges per 100,000 persons within a state in year t.

Results are presented in Table 5. Columns 1 and 2 focus on admissions to outpatient settings, and Columns 3 and 4 focus on inpatient settings. From Column 5 to Column 8, I repeat this exercise but focus on the number of discharges. Although the estimates are somewhat imprecise, the overall takeaway is clear: there is little evidence that medical necessity standardization significantly reduce the number of new patients receiving SAT services. These findings suggest that the observed decline in high-intensity SAT provision is unlikely to be driven by an immediate, mechanical drop in demand.

In the second stage, I examine whether medical necessity standardization alters key characteristics of newly admitted and discharged patients. Table 6 reports the relevant point estimates, none of which indicate statistically significant effects of the law. This suggests minimal changes in the composition

[26] It is important to acknowledge that regulated insurers might strategically adjust other aspects of utilization review, such as prior authorization requirements or network design. In equilibrium, it is thus challenging to predict the direction or magnitude of changes on the patient side, as these dynamics involve both supply and demand responses.

[27] From 2012 to 2022, SAMHSA consistently collected admission and discharge data from 44 states.

[28] Including such admissions could confound intrinsic patient responses to the policy with referrals mandated by the criminal justice system. For a discussion of the intersection between SUD treatment and the legal system, see https://nida.nih.gov/sites/default/files/podat_1.pdf, last accessed January 26, 2026.

of patients within facilities in terms of demographics, pre-existing conditions, or insurance coverage. These findings further alleviate concerns that the observed redirection in the provision of SAT services is driven by shifts in the private insurance market. Instead, the shift toward lower-intensity care is more likely to result from interactions between providers and patients who are already engaged in treatment.

6.2 (Over-)utilization of Services among Existing Patients

Beyond affecting the likelihood of initial admission, policy shocks such as mandating uniform medical necessity criteria can also influence patient behaviors during treatment. By reducing billing uncertainties and improving access to care, such policies may introduce a new form of *ex-post moral hazard:* once admitted, patients may have stronger incentives to prolong treatment beyond what is clinically necessary. With fewer administrative hurdles and greater clarity around coverage decisions, there is an increased risk of over-utilization, as extended treatment episodes become easier to justify and sustain.

A central question regarding this channel is whether moral hazard in medical utilization should be a major concern in the context of behavioral healthcare. A priori, I would argue that treatments for substance use disorders (SUDs) are less susceptible to such concerns. These services typically entail substantial personal and psychological costs and require sustained patient engagement. Consequently, the likelihood that individuals would over-utilize care simply due to reduced insurance oversight may be relatively limited in this setting.

First, both policymakers and researchers have long been more concerned with the underutilization—rather than overutilization—of substance abuse treatment (SAT). For instance, recent studies report that fewer than 41% of individuals treated for opioid use disorder (OUD) in the United States receive medications used to treat opioid use disorder (MOUD), such as methadone or buprenorphine. When the referral originates from the criminal justice system—a setting characterized by coercion—the share of individuals receiving MOUD falls to under 5% (Krawczyk et al., 2017). These striking patterns are likely driven by demand-side psychological barriers, including public stigma, self-stigma, and structural stigma (Allen, Nolan and Paone, 2019), rather than by excessive or opportunistic service use.

Second, evidence from nationally representative surveys also suggests that concerns about the overutilization of SAT services are minimal. According to the 2021 National Survey on Drug Use and Health (NSDUH), 94% of individuals aged 12 or older with a diagnosed substance use disorder (SUD) did not receive any form of treatment. Among those untreated, the vast majority reported that they did not perceive a need for care. This pattern reinforces the view that, rather than exhibiting tendencies toward overuse, individuals with SUDs frequently encounter substantial barriers—including social stigma, cultural norms, psychological resistance, and structural access issues—that inhibit treatment uptake.

To provide more suggestive, causal evidence, I draw on data from TEDS-D to construct a relatively coarse proxy for moral hazard at the treatment margin: an indicator for whether a patient was discharged due to voluntary dropout. This measure captures instances in which clients choose not to complete their treatment program, either against clinical advice or without a specific recommendation to continue.

In Table 7, I show that the overall probability of voluntary dropout declines slightly following the standardization of medical necessity criteria among discharged patients. However, this effect is not statistically significant for outpatient and inpatient settings (columns 1, 2, 5, and 6). Among patients receiving intensive outpatient services, this probability dropped significantly by 4 percentage points (column 4), but did not leading to substantial changes in the provision of relevant service (see Table 1). Taken together, these findings thus suggest that it is unlikely the results presented in Section 5 are driven by substantial changes in moral hazard among existing patients at SAT facilities.

6.3 Physicians' Prescribing Behaviors

Besides the mechanisms related to demand-side factors, I also explore whether changes in the provision of SUD treatment can be driven by supply-side forces.

The first mechanism builds on the theory of *provider-induced demand* (Arrow, 1978), which suggests that changes in medical prices can shift providers' financial incentives and, in turn, influence their prescribing and diagnostic behaviors. In the case of medical necessity standardization, reducing billing uncertainty may effectively change the perceived price of substance use disorder (SUD) treatment (Dunn et al., 2023), thereby altering provider behavior. Given that SUD care typically

combines medication with behavioral interventions (e.g., counseling, therapy), increases in treatment provision may reflect not only facilities' decisions to expand services, but also individual physicians' responses to improved reimbursement predictability and financial returns. Thus, observed improvements in treatment uptake may be driven, at least in part, by shifts in prescribing behavior rather than purely supply-side expansions.

To disentangle facility-based versus provider-based incentives, I focus on the medication-assisted treatment (MAT): First, utilization review (e.g., the use of medical necessity criteria) for MAT is very common. For example, clinicians often criticize prior authorization as one of the most significant barriers to prescribing buprenorphine (Barbara Andraka-Christou and Stein, 2023). Second, MAT prescribing is restricted to specific licensed healthcare providers (e.g., physicians, physician assistants, or nurse practitioners), who must complete mandatory training and obtain authorization from SAMHSA. This provider-level regulation increases the likelihood that observed treatment decisions reflect individual clinician behavior rather than the coordinated actions of a multidisciplinary care team within a facility.

It is important to note that empirically testing physician-induced demand is challenging, primarily because it is difficult to disentangle supply-side behavior from demand-side preferences in most healthcare data. As Currie, Lin and Meng (2014) points out, the overuse of medical procedures or medications may reflect not only provider incentives, but also patient preferences or physicians' perceptions thereof.

I construct several metrics/proxies to address this issue, using data from the 2012-2022 N-SSAT data and the TEDS-D data as follows: (1) the likelihood that a facility provides low-intensity MAT services (as a proxy for provider's decisions); (2) the actual utilization of low-intensity MAT services (as a proxy for the equilibrium outcome), and (3) the probability of voluntarily dropping out of outpatient MAT services (as a proxy for consumer demand). Information on voluntary dropout comes from the TEDS-D: *whether one has been discharged due to a voluntary dropout*. This type of dropout includes clients choosing not to complete one's treatment program, with or without specific advice to continue treatment. I thus argue it reflects consumers' own willingness to continue the medical services.

These results are shown in Table 8. In column (1), the dependent variable is the probability of offer-

ing outpatient MAT service. Information on the provision of outpatient MAT (defined as outpatient methadone/buprenorphine maintenance or naltrexone treatment) is extracted from N-SSATS.[29] In columns (2) and (3), the dependent variables are the probability of receiving MAT service in an outpatient/inpatient setting among patients who got discharged. In the last two columns, I focus on the likelihood of voluntarily dropping out, conditional on getting admitted to an outpatient and inpatient setting, respectively.

The point estimates shown here indicate that standardizing medical necessity criteria on commercial insurance plans leads to an increase by 1.3 percentage points in the utilization of inpatient MAT (column (3)), and this is likely to be driven by an increased demand for such service: the incidence of voluntary dropout from inpatient setting just dropping by 3.1 percentage points (as shown in column (6)). These results indicate that by reducing the uncertainty in medical billing, patients within a SAT facility are more likely to continue one's treatment. This is consistent with the *moral hazard* argument: when the insurance plan is more generous (i.e., without the administrative hassles), patients would over-utilize certain medical services.

6.4 Facilities' Contracting with Commercial Plans

A second plausible supply-side mechanism is that the adoption of standardized medical necessity criteria may incentivize facilities to selectively contract with private insurers. Specifically, when utilization review processes are arbitrary and unpredictable, facilities may be less willing to participate in insurers' networks that impose such reviews. This mechanism is conceptually consistent with the findings of Dunn et al. (2023), who shows that aggressive claim denials reduce providers' willingness to engage in contractual relationships with insurers.

As a result, with more transparent medical necessity criteria in place, one would expect facilities to be more inclined to accept private insurance plans. A key caveat, admittedly, is that due to the limitations of my data and empirical design, I am unable to observe other important margins related to network formation and bargaining over reimbursement rates between providers and insurers (see, e.g., Ho and Lee (2017)). Incorporating these dimensions would significantly complicate the analysis. For instance, if adoption uniform medical necessity criteria lead to substantial changes in

[29] Unfortunately, we don't have information on the provision of inpatient MAT in N-SSATS.

private-plan reimbursement rates, providers may respond by strategically adjusting admission and discharge decisions in response to altered financial incentives. To fully assess the welfare implications of such dynamics, future research should leverage detailed claims or client-level data, ideally in combination with structural models of provider-insurer interactions.

I present the primary results in Table 9, which show changes in the propensity of SAT facilities to accept different types of payment. Columns (1)-(2) report results from a baseline OLS regression, where the outcome is an indicator for whether the facility accepts private health insurance as one's primary method of payment. In columns (3)-(8), I extend the analysis to other payer types, with the dependent variable indicating whether the facility accepts Medicaid, Medicare, or cash/self-payment, respectively. In odd-numbered columns, I focus on all facilities and in even-numbered columns, I check if results change among non-profit facilities. Based on these estimated coefficients, one can tell that the enactment of medical necessity criteria laws has imposed insignificant effects on the composition of accepted methods of payments at all.

In Figures 10, 11, 12, and 13, I also plot the event-study dynamics to the dynamic effects. Overall, these estimates are insignificant, ruling out the possibility that medical necessity standardization in commercial plans lead to changes in self-pay or private market participation or public market participation among providers in affected states.

The null effects on payment acceptance patterns warrant several interpretations. First, the N-SSATS data measure whether facilities accept broad payment categories (private insurance, Medicaid, Medicare), not whether they participate in specific insurer networks. If medical necessity standardization affects selective contracting with particular insurers rather than categorical payment acceptance, this margin would not be captured in these data. Second, baseline acceptance rates are high across all payer types, leaving limited scope for extensive margin adjustment. Third, network contracts are typically multi-year agreements, and the event study window may be insufficient to capture the full dynamics of contract renegotiation. Finally, if standardization simultaneously affects both network participation incentives and reimbursement rates, countervailing forces could produce offsetting effects on payment acceptance. In future work, it would be more helpful to use insurance claims data to document more adjustable margins.

6.5 Local Market Structure

I also compile aggregate-level data to assess whether changes in local market structure (specifically, competition among specialty SAT facilities) may partially explain facilities' treatment and contracting decisions.[30] A long-standing literature in healthcare economics has shown that increased competitive pressure can influence the provision, quality, and cost of medical services (see, for example, Kessler and Geppert, 2005; Karlsson, 2007; Gaynor, Moreno-Serra and Propper, 2013). The key concern in this context is that the structural factors discussed earlier in this section may also drive significant changes in the market landscape for specialty behavioral health facilities, which in turn may affect individual facilities' strategic decisions regarding service provision and payer participation.

In this empirical exercise, I examine whether the number of facilities offering any SAT per 100,000 population within a state changes following the implementation of standardized medical necessity criteria.[31] To do so, I aggregate all facilities reporting to the N-SSATS each year to the state-year level and normalize the count by the corresponding state population.

The results are presented in Table 10, where the dependent variable in all columns is the number of SAT facilities per 100,000 state residents. Columns (1)-(3) include all specialty care facilities offering any SAT services. Columns (4)-(6) focus on facilities providing low-intensity services (e.g., regular outpatient care), while columns (7)-(9) capture high-intensity, inpatient services, including residential and hospital-based SAT. For each setting, I also provides separate estimates for the number of for-profit and non-profits ones. Across all specifications, I find no statistically significant changes in the number of local specialty treatment facilities following the policy shock. This suggests that mandating the use of uniform medical necessity criteria does not induce substantial shifts in local market structure, at least in the short run.

As mentioned in Swensen (2015), N-SSSATS has several shortcomings: It is essentially a *voluntary* survey-based dataset, and it spans a shorter time-period (from March to November of each calendar year). I thus complement this local market structure using the CBP data. Results are shown in Table

[30] Admittedly, without a structural model to explicitly disentangle alternative mechanisms, I cannot fully rule out the role of market competition.

[31] This approach is consistent with Knowles (2022).

10: across all columns, we do not observe a significant and substantial change in the number of facilities, both outpatient and inpatient settings.

From Figures 14 to 16, I plot my estimates from an event-study specification for three types of facilities using the N-SSATS data: facilities offering any SAT service, facilities offering any outpatient SAT service, and facilities offering inpatient SAT service. For the CBP-based estimates, I show these results in Figures 17 and 18. None of these metrics change substantially after five years of standardizing medical necessity criteria in SUD.

7 Concluding Remarks

This paper examines how the standardization of medical necessity criteria for state-regulated commercial insurance plans affects the supply of behavioral health services. Medical necessity criteria are a central component of utilization management and are applied throughout the treatment episode to determine the appropriateness of care. Although designed to control costs and reduce over-utilization, discretionary and non-transparent determinations have been widely criticized for creating billing uncertainties and delaying access to necessary treatment. Despite the widespread use of medical necessity standards in both commercial and public insurance programs, empirical evidence on their implications remains limited, especially in the context of behavioral healthcare, where timely and sustained access to services is critical.

Leveraging policy changes that mandate the use of standardized medical necessity criteria in commercial insurance plans, I examine their effects on the provision of various substance use treatment (SAT) modalities. I find that uniform medical necessity determinations lead to a significant increase in the supply of outpatient services, as well as a rise in the treatment capacity of inpatient care. To assess the underlying mechanisms, I show that the observed effects are not driven by changes in patient composition or volume, the over-utilization of care, individual physicians' prescribing behavior, strategic contracting between facilities and insurers, or substantial shifts in local market structure. Ruling out these alternative explanations suggests that the expansion in SAT services is most likely attributable to a reduction in medical billing uncertainty.

This work contributes to the growing literature on the consequences of administrative processes in

healthcare markets by highlighting an under-explored channel: unregulated, arbitrary medical necessity criteria can hinder the provision of healthcare service, largely due to the high billing uncertainties. The policy implications are substantial. By allowing insurers to define and apply their own medical necessity criteria without strict oversight, current policy frameworks create a fragmented system in which providers face significant uncertainty regarding reimbursement. This uncertainty can discourage the provision of services, particularly in behavioral health settings where treatment decisions often need to be made quickly to save life.

As policymakers face the growing demand for behavioral healthcare and seek to address the ongoing substance use disorder crisis, these findings highlight the importance of critically reassessing current utilization management practices. While originally intended to prevent the over-utilization of medical resources and control costs, discretionary gatekeeping mechanisms may introduce frictions that hinder patients from timely access to necessary care. A more coordinated regulatory approach is to mandate the use of standardized, evidence-based criteria, promoting transparency in coverage decisions. It could reduce provider-side uncertainty and support more stable treatment capacity. In this light, the simplification and standardization of administrative procedures should be viewed not merely as a technical reform, but as a key structural lever for enhancing access and equity in behavioral health systems.

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Figures and Tables

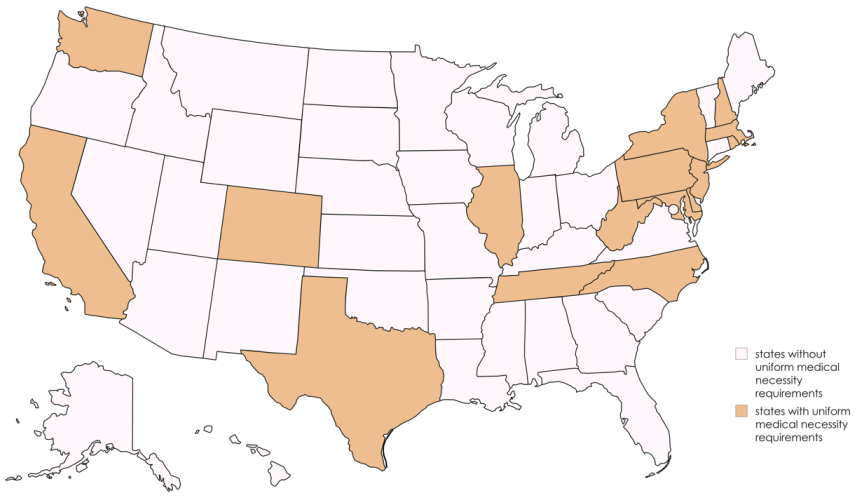


Figure 1: Distribution of State Requiring SUD Medical Necessity Standardization in Commercial Plans

Notes: Data are collected from Westlaw and Weber (2020). This map is drawn by the author. See Appendix Section A.1 for details.

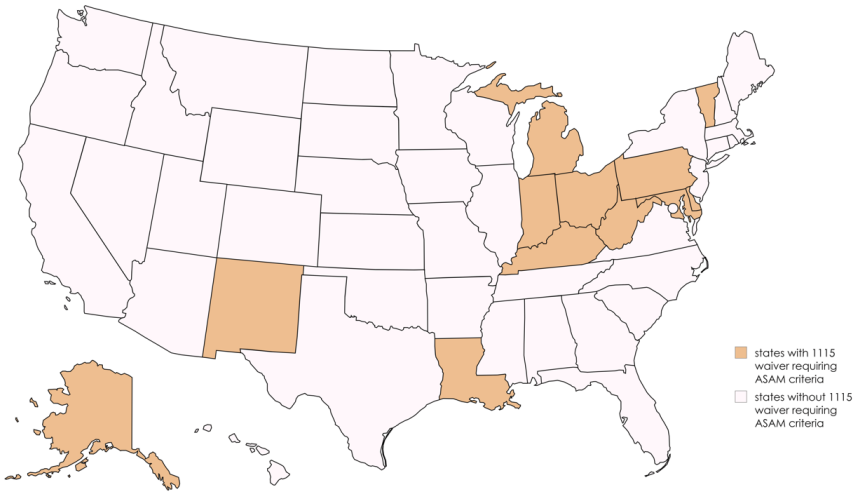


Figure 2: Distribution of 1115 Waiver for SUD in State Medicaid

Notes: Data are collected from Westlaw and Weber (2020). This map is drawn by the author. See Appendix Section A.2 for details.

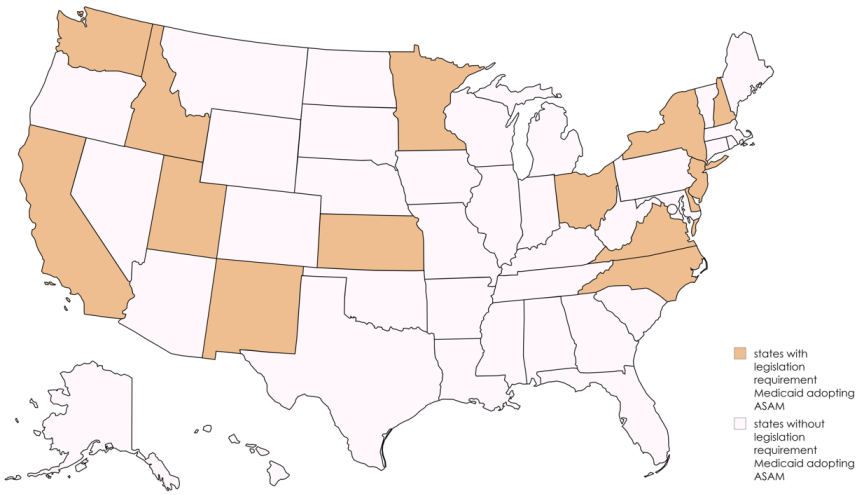


Figure 3: Distribution of State Legislation Requiring ASAM Criteria in Medicaid Plans

Notes: Data are collected from Westlaw and Weber (2020). This map is drawn by the author. See Appendix Section A.2 for details.

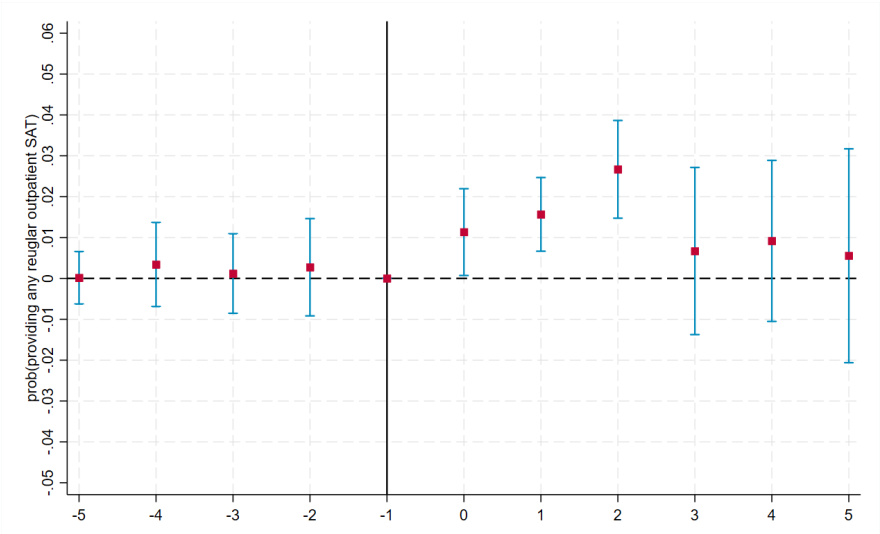


Figure 4: event-study estimates for providing any outpatient SAT

Notes: The dependent variable is the probability of providing any outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

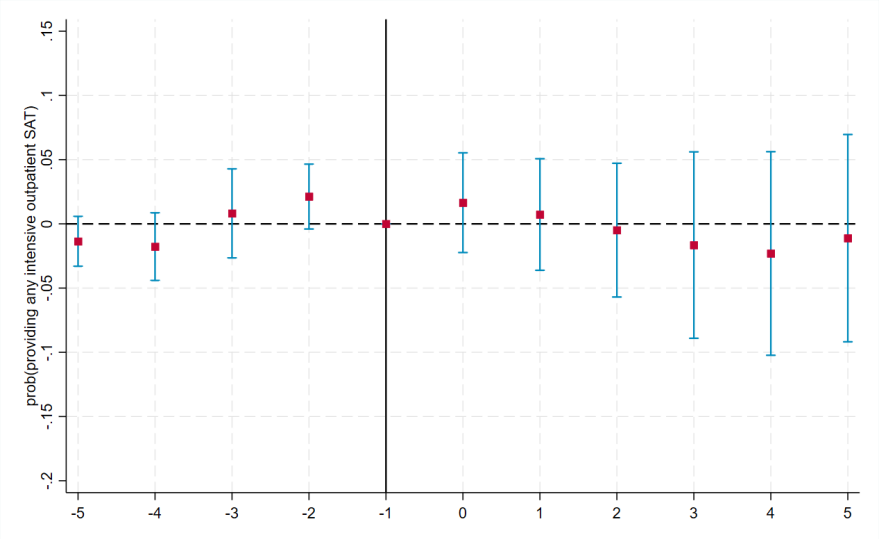


Figure 5: event-study estimates for providing intensive outpatient SAT

Notes: The dependent variable is the probability of providing intensive outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

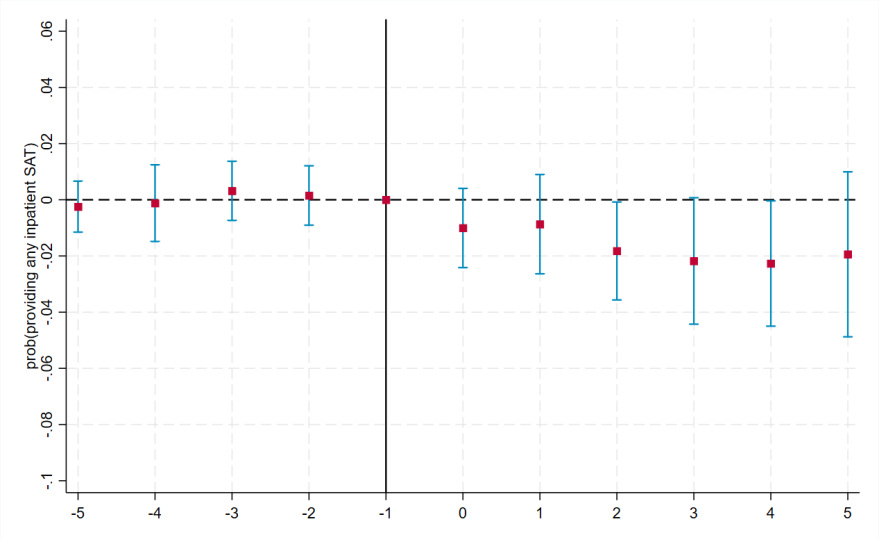


Figure 6: event-study estimates for providing inpatient SAT

Notes: The dependent variable is the probability of providing any inpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

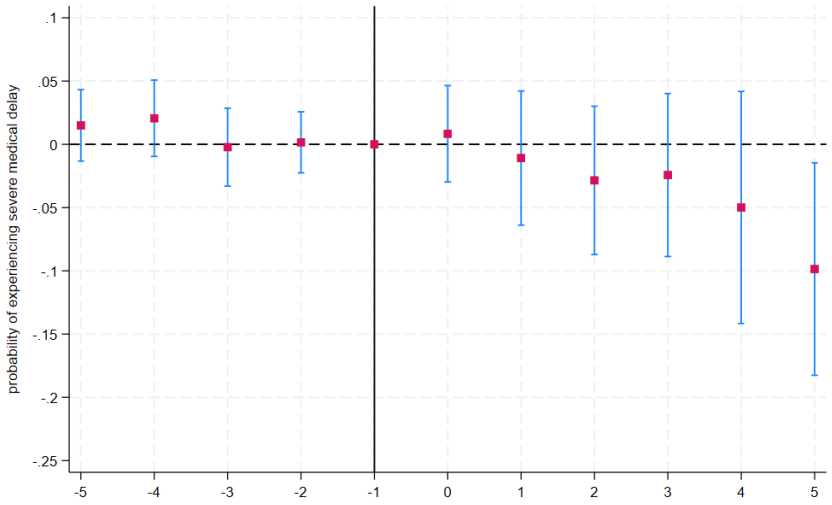


Figure 7: event-study estimates for experiencing medical delay in regular outpatient SAT setting

Notes: The dependent variable is the probability of experiencing medical delay in regular outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

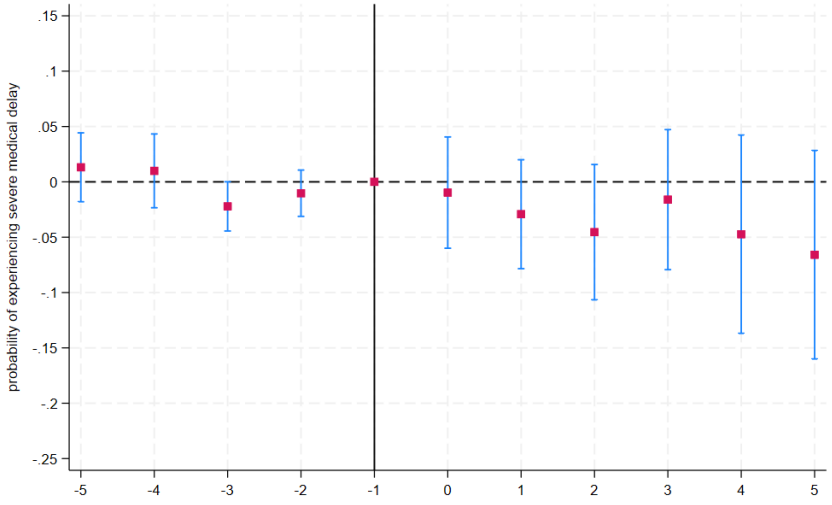


Figure 8: event-study estimates for experiencing medical delay in intensive outpatient SAT setting

Notes: The dependent variable is the probability of experiencing medical delay in intensive outpatient service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

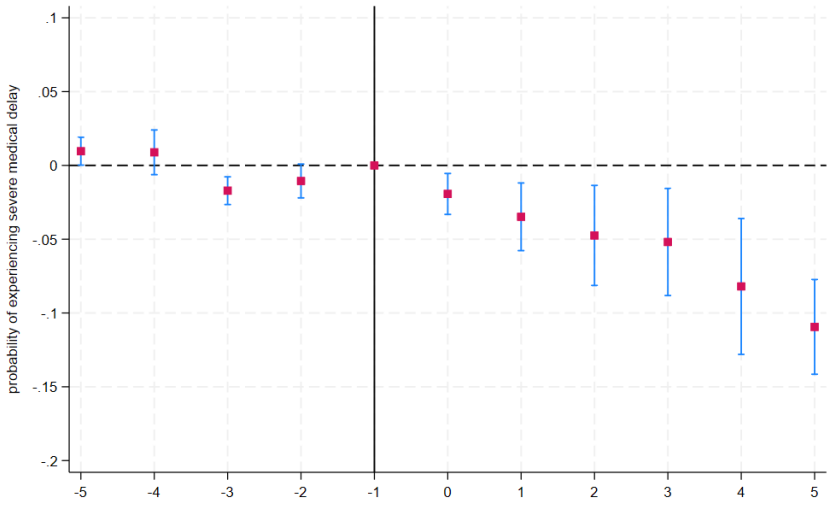


Figure 9: event-study estimates for experiencing medical delay in inpatient SAT setting

Notes: The dependent variable is the probability of experiencing medical delay in inpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

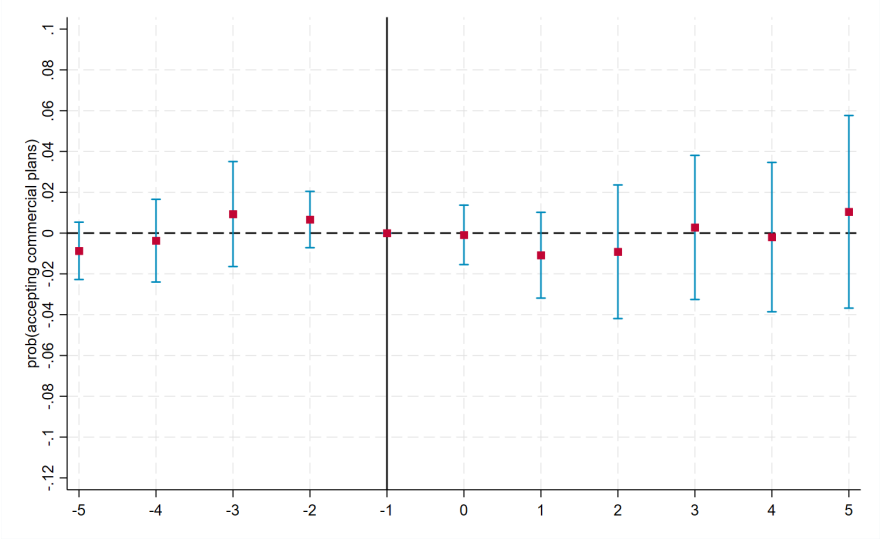


Figure 10: event-study estimates for accepting commercial plans (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the probability of accepting commercial plans. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

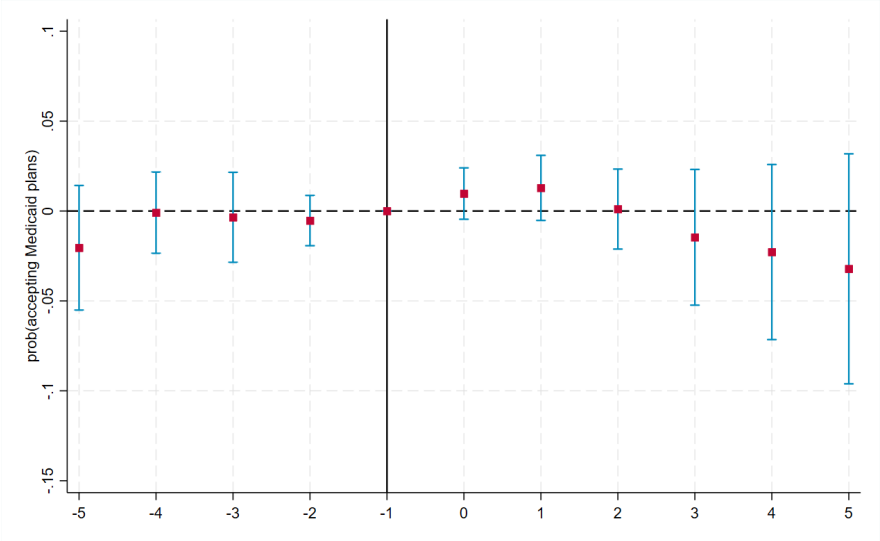


Figure 11: event-study estimates for accepting Medicaid plans (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the probability of accepting Medicaid. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

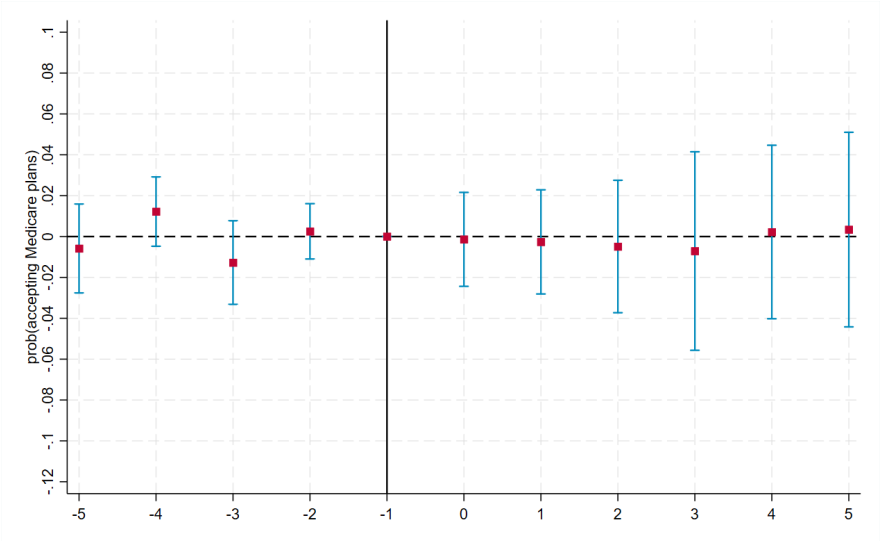


Figure 12: event-study estimates for accepting Medicare plans (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the probability of accepting Medicare. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

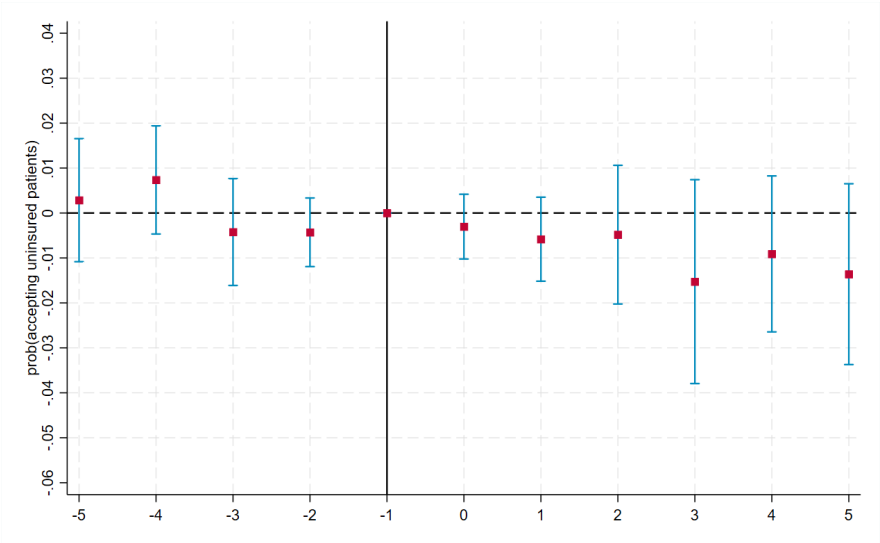


Figure 13: event-study estimates for accepting uninsured patients (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the probability of accepting uninsured patients. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

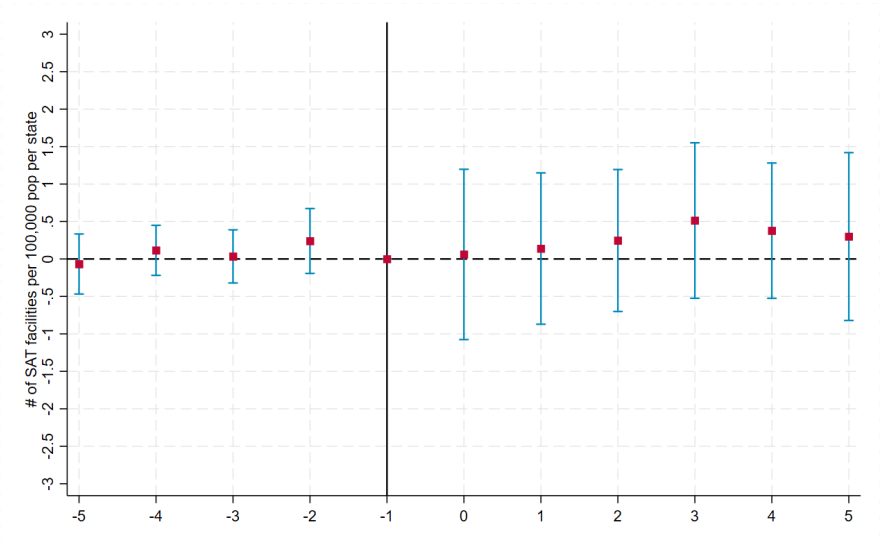


Figure 14: event-study estimates for the number of all SAT facilities per 100,000 state population (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the number of all SAT facilities per 100,000 state population. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

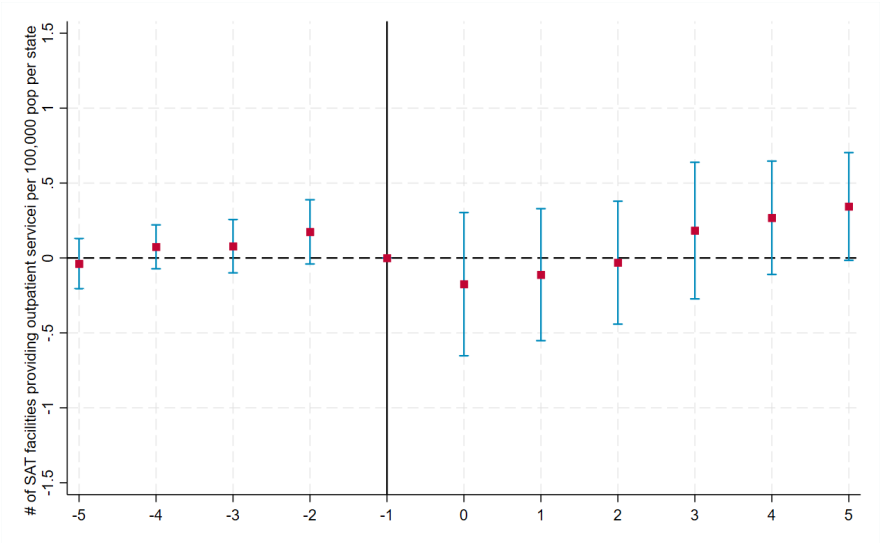


Figure 15: event-study estimates for the number of state-level outpatient facilities per 100,000 population (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the number of state-level outpatient facilities per 100,000 population. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

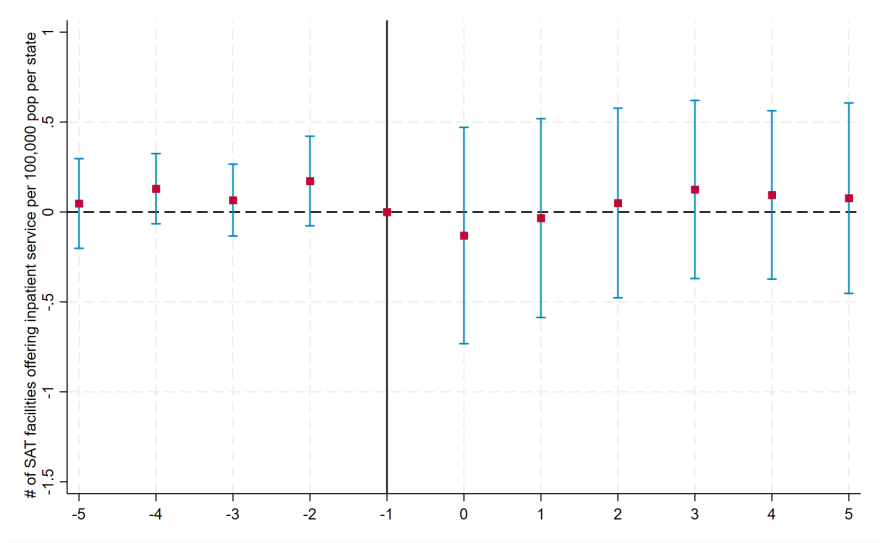


Figure 16: event-study estimates for the number of state-level inpatient facilities (2012-2022)

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variable is the number of state-level inpatient facilities per 100,000 population. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

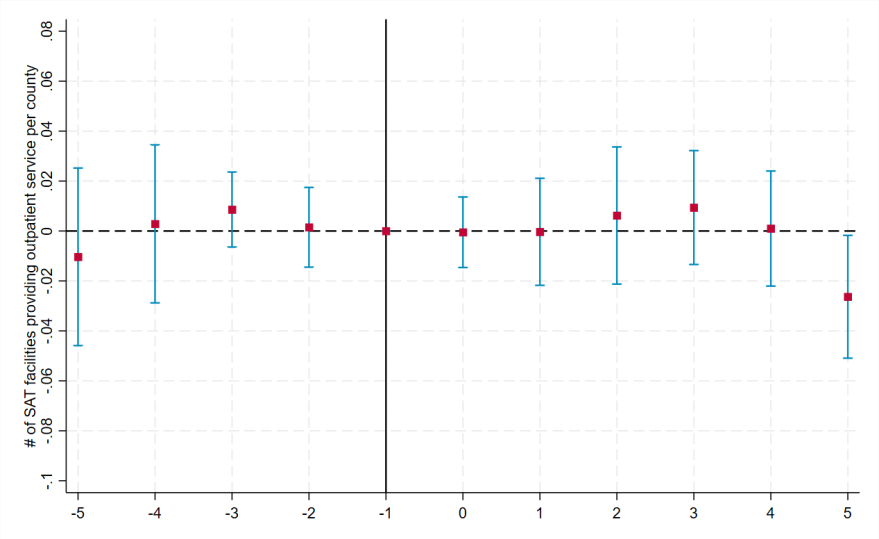


Figure 17: event-study estimates for the number of county-level outpatient facilities (2012-2022)

Notes: Data are drawn from the CBP (2012-2022). The dependent variable is the number of county-level outpatient facilities. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

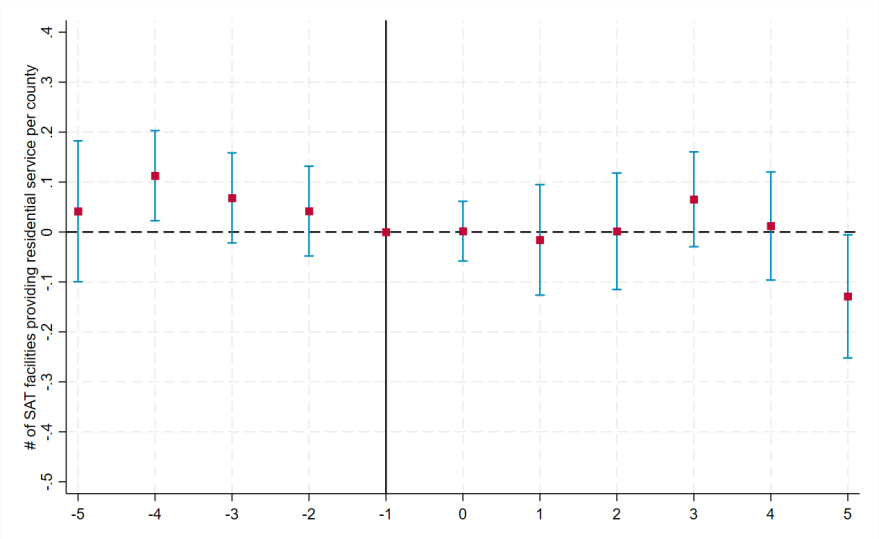


Figure 18: event-study estimates for the number of county-level residential facilities (2012-2022)

Notes: Data are drawn from the CBP (2012-2022). The dependent variable is the number of county-level residential facilities. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 1. Effects of Medical Necessity Standardization on the Provision of SAT Services

	outpatient			intensive outpatient			inpatient		
MNC_{st}	0.020**	0.018***	0.013**	-0.008	-0.016	-0.004	-0.019*	-0.018**	-0.013
	(0.009)	(0.006)	(0.006)	(0.018)	(0.026)	(0.020)	(0.010)	(0.009)	(0.008)
PA commercial restriction$_{st}$			0.019***			-0.045**			-0.017***
			(0.006)			(0.020)			(0.005)
PA Medicaid restriction$_{st}$			0.009			-0.025*			-0.010*
			(0.006)			(0.014)			(0.005)
1115 waiver$_{st}$			0.000			0.002			0.001
			(0.005)			(0.016)			(0.007)
Medicaid MNC$_{st}$			0.005			0.020			0.007
			(0.006)			(0.021)			(0.006)
state FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
other state SUD policies			✓			✓			✓
excluding for-profit facilities		✓	✓		✓	✓		✓	✓
mean (2012-2014)	0.818	0.773	0.773	0.552	0.557	0.557	0.289	0.350	0.350
# of clusters	48	48	48	48	48	48	48	48	48
# of obs.	133065	84141	84141	109325	65948	65948	133066	84142	84142

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variables are the probability of offering any outpatient services in columns (1)-(3), and the probability of offering intensive outpatient services in columns (4)-(6). In columns (7)-(9), the dependent variable is the probability of offering inpatient service (i.e., hospital SAT and residential SAT). State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. Facility-level control variables include whether a facility belongs to a hospital, and the ownership. All standard errors are clustered at the state level.

Table 2. Effects of Medical Necessity Criteria on Treatment Capacity

	regular outpatient		intensive outpatient		inpatient	
MNC_{st}	-0.014	-0.008	-0.011	-0.016	-0.024**	-0.026***
	(0.019)	(0.019)	(0.020)	(0.022)	(0.011)	(0.006)
PA commercial restriction$_{st}$		-0.026		0.000		-0.001
		(0.022)		(0.019)		(0.008)
PA Medicaid restriction$_{st}$		-0.034		-0.025		-0.006
		(0.034)		(0.031)		(0.014)
1115 waiver$_{st}$		0.029**		0.022		0.014
		(0.013)		(0.022)		(0.009)
Medicaid MNC$_{st}$		-0.034***		-0.025		-0.067***
		(0.012)		(0.019)		(0.007)
state FE	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓
other state SUD policies		✓		✓		✓
mean (2012-2014)	0.111	0.111	0.122	0.122	0.083	0.083
# of clusters	41	41	41	41	41	41
# of obs.	3851528	3851528	1087963	1087963	3169513	3169513

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Data are drawn from the TEDS-A (2012-2022). The dependent variables are the probability of experiencing medical delays (waiting for two weeks or more) in any outpatient services in columns (1) and (2), and the probability of experiencing medical delays (waiting for two weeks or more) in intensive outpatient services in column (3) and column (4). In column (5) and column (6), the dependent variable is the probability of experiencing medical delays (waiting for two weeks or more) in inpatient services (i.e., hospital SAT and residential SAT). State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. Facility-level control variables include whether a facility belongs to a hospital, and the ownership. All standard errors are clustered at the state level.

Table 3. Determinants of the Enactment of Medical Necessity Criteria Laws

	Medical Necessity Criteria Law		
log(population)	0.867	0.892	0.591
	(1.638)	(1.610)	(1.825)
log(# of SNAP recipients)	-0.207	-0.281	-0.324
	(0.185)	(0.189)	(0.206)
log(# of TANF recipients)	-0.045	-0.063	-0.052
	(0.055)	(0.052)	(0.062)
log(state GDP)	0.183	0.127	0.076
	(0.611)	(0.639)	(0.648)
state unemployment rate	0.005	0.003	0.002
	(0.021)	(0.021)	(0.021)
state minimum wage	-0.013	-0.017	-0.019
	(0.025)	(0.029)	(0.031)
state workers' compensation	-0.040	-0.059	-0.051
	(0.104)	(0.094)	(0.098)
log(# of state Medicaid beneficiaries)	0.118	0.117	0.074
	(0.116)	(0.109)	(0.135)
annual SUD deaths	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
state PDMP mandates	-0.012	-0.012	0.023
	(0.060)	(0.060)	(0.055)
1115 waiver	-0.059	-0.067	-0.051
	(0.078)	(0.077)	(0.079)
state Medicaid medical necessity law	-0.225**	-0.243***	-0.258***
	(0.091)	(0.085)	(0.091)
state PA commercial restriction	0.337***	0.327***	0.262**
	(0.102)	(0.105)	(0.102)
state PA Medicaid restriction	-0.022	-0.023	-0.010
	(0.093)	(0.094)	(0.095)
Fraction of State House that is Democrat		0.702*	0.586
		(0.355)	(0.378)
Fraction of State Senate that is Democrat		-0.346	-0.194
		(0.286)	(0.269)
state governor is Democrat		0.011	0.016
		(0.060)	(0.063)
R^2	0.636	0.646	0.679
state FEs	Yes	Yes	Yes
year FEs	Yes	Yes	No
region-year FEs	No	Yes	Yes
Observations	528	506	506

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the probability of enacting medical necessity criteria law for commercial plans in state s and year t. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 4. Alternative Difference-in-Differences Specification

	outpatient	**intensive outpatient**	**inpatient**
MNC_{st}	0.022**	-0.013	-0.019
	(0.011)	(0.015)	(0.013)
state FE	✓	✓	✓
year FE	✓	✓	✓
# of clusters	48	48	48
# of obs.	84158	65960	84159

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variables are the probability of offering any outpatient services in column (1), and the probability of offering intensive outpatient services in column (2). In column (3), the dependent variable is the probability of offering inpatient service (i.e., hospital SAT and residential SAT). Facility-level control variables include whether a facility belongs to a hospital. All standard errors are clustered at the state level.

Table 5. Effects of Medical Necessity Standardization on Admissions/Discharges

	admissions				discharges			
	outpatient		*inpatient*		*outpatient*		*inpatient*	
Medical Necessity Criteria$_{st}$	-50.646	-100.139	-33.271	-12.145	-71.762	-112.997	-18.653	-5.865
	(85.798)	(89.414)	(40.058)	(29.292)	(83.195)	(89.390)	(39.310)	(29.554)
Commercial PA restriction$_{st}$	83.817	144.853	3.036	-1.928	87.739	154.038	-4.838	7.271
	(119.766)	(128.808)	(23.083)	(22.565)	(120.629)	(134.924)	(26.905)	(18.153)
Medicaid PA restriction$_{st}$	-67.438	-109.076	-43.763*	-58.574*	-92.436	-122.929	-30.835	-53.914**
	(86.906)	(91.425)	(25.224)	(34.592)	(86.316)	(93.186)	(23.271)	(26.344)
1115 waiver$_{st}$	-48.275	-48.066	-23.966	7.796	-24.578	-30.515	-19.901	16.543
	(36.342)	(51.798)	(18.191)	(29.800)	(40.057)	(54.409)	(17.578)	(26.804)
Medicaid MNC$_{st}$	-36.579	-86.935**	15.540	-27.141	-34.121	-70.664*	12.612	-30.050
	(37.095)	(40.829)	(43.192)	(55.382)	(34.271)	(40.461)	(41.121)	(53.820)
state FE	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓	✓	✓	✓
# of clusters	41	41	41	41	41	41	41	41
# of observations	492	492	492	492	492	492	492	492
weighted by state pop	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variables are the number of initial admissions to an outpatient SAT setting per 100,000 state population in columns (1) and (2) and the number of initial admissions to an inpatient setting per 100,000 state population in column (3) and column (4). In column (5) and column (6), the dependent variable is the number of new discharges from an outpatient SAT setting per 100,000 state population. In column (7) and column (8), the dependent variable is the number of new discharges from an inpatient SAT setting per 100,000 state population. Data are obtained from the 2012-2022 TEDS-A/D. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 6. Effects of Medical Necessity Standardization on the Composition of Patients

	male	black	high school	over 40	prior arrests	private ins	public ins	self-paid
Panel A. Admissions								
Medical Necessity Criteria$_{st}$	0.006	0.000	-0.003	0.001	-0.003	0.000	-0.035	0.034
	(0.005)	(0.004)	(0.011)	(0.012)	(0.007)	(0.012)	(0.037)	(0.040)
state FE	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓	✓	✓	✓
# of clusters	41	41	41	41	41	23	23	23
N	10086749	10086749	10233968	11324269	9757342	3564576	3564576	3564576
Panel B. Discharges								
Medical Necessity Criteria$_{st}$	0.009**	-0.001	0.001	0.004	0.010	0.003	0.096	-0.099
	(0.004)	(0.004)	(0.009)	(0.012)	(0.007)	(0.009)	(0.061)	(0.066)
state FE	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓	✓	✓	✓
# of clusters	35	35	35	35	35	22	22	22
N	8297040	8297040	8406307	9292896	7832197	3448362	3448362	3448362

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variables are the indicator for being male, black, with at least a high-school diploma, with issues in both alcohol and drugs, with a history of prior arrests within 30 days, with coverage from a private plan/public plan/no plan through column (1) to column (8), respectively. Data are obtained from the 2012-2022 TEDS-A/D. State controls include ACA Medicaid Expansion, PA restrictions for SAT in Medicaid, SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level. The number of clusters vary across columns because of data availability. For example, the insurance coverage information is only consistently available in 22 states.

Table 7. Effects of Medical Necessity Standardization on Voluntary Dropout

	dependent variable: prob(voluntarily dropout)					
	outpatient		*intensive outpatient*		*inpatient*	
Medical necessity criteria$_{st}$	-0.014	-0.014	-0.031*	-0.040**	-0.019	-0.016
	(0.016)	(0.018)	(0.016)	(0.019)	(0.013)	(0.014)
commercial PA restriction$_{st}$		0.001		0.038**		-0.009
		(0.020)		(0.017)		(0.011)
Medicaid PA restriction$_{st}$		-0.025		-0.056***		-0.008
		(0.028)		(0.019)		(0.020)
1115 waiver$_{st}$		-0.014		-0.025		0.018
		(0.021)		(0.016)		(0.020)
state FE	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓	✓
# of clusters	35	35	34	34	35	35
# of observations	4426320	4426320	1203611	1203611	4494383	4494383

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variables are the probability of voluntarily dropping out of a program (vs. completing a program). In column (1) and column (2), the sample includes outpatient discharges of a specialty care facility. In column (3) and column (4), the sample includes all patients who initially receive intensive outpatient SAT services. In column (5) and column (6), the sample includes all patients who initially receive inpatient SAT services. Data are obtained from the 2012-2022 TEDS-D. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 8. Effects of Medical Necessity Standardization on Medication-Assisted Treatment

	provision	**treatment**		**voluntary dropout**	
	outpatient	*outpatient*	*inpatient*	*outpatient*	*inpatient*
Medical necessity criteria$_{st}$	0.001	-0.001	0.013***	-0.036***	-0.031**
	(0.019)	(0.006)	(0.004)	(0.012)	(0.015)
Commercial PA restriction$_{st}$	0.056**	0.008	0.004	0.036	-0.027
	(0.023)	(0.006)	(0.006)	(0.026)	(0.029)
Medicaid PA restriction$_{st}$	0.033	-0.001	0.017***	-0.050*	0.007
	(0.022)	(0.007)	(0.005)	(0.027)	(0.017)
1115 waiver$_{st}$	-0.039	-0.002	0.005	-0.026	0.041**
	(0.026)	(0.008)	(0.009)	(0.026)	(0.018)
state FE	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓
sample	N-SSATS	TEDS-D	TEDS-D	TEDS-D	TEDS-D
# of clusters	48	35	35	34	34
# of observations	60048	11664865	11664865	760371	320918

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the probability of offering outpatient, medication-based SAT service in column (1). The outcome of interest is the probability of receiving medication-assisted, low-intensity SAT services in column (2) and column (3). In the last two columns, the dependent variable is an indicator for voluntary dropout from an outpatient, medication-based SAT program. Data are obtained from the 2012-2022 N-SSATS and TEDS-D, respectively. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 9. Effects of Medical Necessity Standardization on the Participation in Insurance Market

	private plans		Medicaid		Medicare		self-payment	
MNC_{st}	-0.009	-0.003	0.010	0.005	-0.003	-0.009	-0.007	-0.012
	(0.014)	(0.015)	(0.011)	(0.017)	(0.014)	(0.018)	(0.005)	(0.007)
Commercial PA restriction$_{st}$	0.004	0.020**	-0.004	-0.020	0.023**	0.019	0.001	0.014*
	(0.010)	(0.010)	(0.016)	(0.016)	(0.011)	(0.016)	(0.005)	(0.008)
Medicaid PA restriction$_{st}$	-0.001	0.016*	-0.025*	-0.033**	0.004	0.010	0.008*	0.014**
	(0.010)	(0.009)	(0.014)	(0.016)	(0.011)	(0.015)	(0.004)	(0.007)
1115 waiver$_{st}$	0.005	-0.002	0.047***	0.039**	0.010	0.013	-0.009**	-0.009
	(0.010)	(0.011)	(0.013)	(0.017)	(0.009)	(0.014)	(0.005)	(0.007)
Medicaid MNC$_{st}$	-0.013	0.007	-0.003	-0.017	0.014	0.019	0.002	0.012*
	(0.013)	(0.013)	(0.020)	(0.016)	(0.015)	(0.020)	(0.005)	(0.006)
state FE	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓	✓	✓	✓
sample	all	non-profit	all	non-profit	all	non-profit	all	non-profit
# of clusters	48	48	48	48	48	48	48	48
# of observations	131330	82841	131180	82861	130573	82356	131943	83202

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variables are the probability of accepting commercial plans, Medicaid payments, Medicare payments, and any cash or self-payments. Data are obtained from the 2012-2022 N-SSATS. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 10. Effects of Medical Necessity Standardization on Local Market Structure (N-SSATS)

	all facilities			**outpatient facilities**			**inpatient facilities**		
	all	*for profit*	*non-profit*	*all*	*for profit*	*non-profit*	*all*	*for profit*	*non-profit*
MNC_{st}	-0.025	0.057	-0.177	0.283	0.078	0.204	-0.001	-0.013	0.051
	(0.341)	(0.188)	(0.200)	(0.305)	(0.183)	(0.157)	(0.042)	(0.029)	(0.062)
Commercial PA restriction$_{st}$	0.712	0.467*	0.628*	0.477	0.353*	0.123	-0.079	-0.084	-0.030
	(0.522)	(0.233)	(0.361)	(0.286)	(0.210)	(0.107)	(0.069)	(0.051)	(0.086)
Medicaid PA restriction$_{st}$	-0.349	-0.509***	-0.030	-0.393	-0.375**	-0.018	-0.195**	-0.128**	-0.094
	(0.363)	(0.154)	(0.296)	(0.251)	(0.140)	(0.143)	(0.086)	(0.055)	(0.059)
1115 waiver$_{st}$	0.153	0.038	0.166	-0.116	-0.046	-0.069	0.027	0.040	-0.055
	(0.334)	(0.144)	(0.229)	(0.223)	(0.143)	(0.115)	(0.056)	(0.043)	(0.058)
Medicaid MNC$_{st}$	0.109	0.193	-0.058	0.239	0.147	0.092	0.019	-0.021	0.025
	(0.429)	(0.221)	(0.280)	(0.329)	(0.223)	(0.132)	(0.087)	(0.057)	(0.060)
state FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
state controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
# of clusters	48	48	48	48	48	48	48	48	48
# of observations	528	528	528	528	528	528	528	528	528

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variables are the number of facilities providing relevant SAT service per 100,000 state population. Data are obtained from the 2012-2022 N-SSATS. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

Table 11. Effects of Medical Necessity Standardization on Local Market Structure (CBP)

	outpatient facility			residential facility		
MNC_{st}	-0.0041	-0.0037	-0.0050	-0.0047	0.0047	0.0056
	(0.0037)	(0.0033)	(0.0034)	(0.0049)	(0.0069)	(0.0067)
PA commercial restriction$_{st}$			0.0025			-0.0035
			(0.0033)			(0.0079)
PA Medicaid restriction$_{st}$			-0.0022			-0.0008
			(0.0045)			(0.0081)
1115 waiver$_{st}$			-0.0032			-0.0024
			(0.0028)			(0.0052)
Medicaid MNC$_{st}$			0.0114			-0.0030
			(0.0078)			(0.0106)
state FE	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓
other state SUD policies		✓	✓		✓	✓
mean (2012-2014)	0.937	0.937	0.937	0.652	0.652	0.652
# of clusters	48	48	48	48	48	48
# of obs.	13675	13667	13667	10141	10133	10133

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Data are drawn from the CBP (2012-2022). The dependent variables are the number of SAT facilities offering outpatient service per county in columns (1)-(3), and the number of SAT facilities offering residential service per county in columns (4)-(6). State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. Facility-level control variables include whether a facility belongs to a hospital, and the ownership. All standard errors are clustered at the state level.

Appendix

A.1. State Regulation of Medical Necessity Criteria in Commercial Plans

Table A1. State Regulation of Medical Necessity Criteria in Commercial Plans

State	Effective Date	Requirement
California	1/1/2021	Health plans are required to base any medical necessity determinations on generally accepted standards of care for MH/SUD. When conducting utilization review, health plans must use the "criteria and guidelines set forth in the most recent versions of treatment criteria developed by the nonprofit professional association for the relevant clinical specialty."
Colorado	1/1/2022	Health plans must utilize the ASAM Criteria for placement, medical necessity, and utilization management determinations for SUD treatment. If the ASAM Criteria are no longer available, relevant, or do not follow best practices for SUD, the insurance commissioner will designate an alternate nationally recognized and evidence-based SUDspecific criteria for placement, medical necessity, or utilization management.
Delaware	9/29/2018	SUD treatment facilities and carriers must use the ASAM Criteria to determine medical necessity. Health plans must cover unlimited, medically necessary residential, intensive outpatient, and inpatient withdrawal management treatment for SUD as determined by the use of the full set of ASAM Criteria.
Illinois	8/24/2017	Insurers must use the ASAM Criteria to make medical necessity determinations for SUD treatment and are prohibited from using any additional criteria for SUD medical necessity determinations. Insurers must use the ASAM Criteria to determine medical necessity for acute treatment services, clinical stabilization services, and medication-assisted treatment.
Maryland	1/2020	Health plans must use the ASAM Criteria for all medical necessity criteria and utilization management determinations for SUD benefits
Massachusetts	8/9/2018	Medical necessity for acute treatment services and clinical stabilization services shall be determined by the treating clinician in consultation with the patient

Table A1. State Regulation of Medical Necessity Criteria in Commercial Plans

State	Effective Date	Requirements for SUD Services
New Hampshire	1/1/2017	Health plans must rely on ASAM Criteria when determining medical necessity and developing utilization review standards for SUD benefits. Health plans must file an annual attestation of compliance with the insurance commissioner.
New Jersey	5/16/2017	State-regulated health insurance carriers, the State Health Benefits Program, and the School Employees' Health Benefits Program must use a state-designated evidence-based and peer-reviewed clinical review tool for medical necessity determinations.
New York	1/1/2017	Medical necessity for inpatient and outpatient SUD treatment is determined by a state-designated evidence-based and peer-reviewed clinical review tool, utilized by both the insurer and provider.
North Carolina	1999	Insurers must use either the ASAM Criteria or clinical review criteria adopted by the insurer or its utilization review organization when determining whether a patient needs to be placed in SUD treatment.
Rhode Island	7/10/2015	Health plans must rely on the ASAM Criteria when developing coverage for SUD levels of care.
Tennessee	1/1/2019	Health plans must use the ASAM Criteria or "other evidence-based clinical guidelines," such as those referenced by SAMHSA, as the clinical review criteria for all SUD utilization review or benefit determinations and may not use any additional criteria.
Texas	1991	Plans are required to comply with utilization review standards and guidelines established by the Texas Commission on Alcohol and Drug Abuse for SUD treatment admission to appropriate level of care, continued stay, and discharge (for inpatient or residential detoxification, inpatient rehabilitation/treatment (inpatient or residential), partial hospitalization, intensive outpatient, outpatient, and outpatient detoxification services).

Table A1. State Regulation of Medical Necessity Criteria in Commercial Plans

State	Effective Date	Requirements for SUD Services
Washington	12/14/2015	Health plans must rely on ASAM Criteria when determining medical necessity and developing utilization review standards for SUD benefits. Health plans must file an annual attestation of compliance with the insurance commissioner.
West Virginia	6/8/2018	Health plans must use an evidence-based and peer-reviewed clinical review tool, developed by the Insurance Commissioner, to conduct medical necessity reviews. The Insurance Commissioner must develop rules to ensure the tool is based on appropriate evidence-based criteria and has been peer reviewed. Medical necessity for inpatient and outpatient SUD treatment and outpatient prescription drugs to treat SUD is determined by the patient's physician, psychologist or psychiatrist.

A.2. State Regulations of Medical Necessity Criteria in Medicaid

Table A2. State Regulations of Medical Necessity Criteria in Medicaid

State	Requirement via 1115 waiver	Requirement via legislation
Alaska	2019	-
California	-	2015
Delaware	2017	2017
Idaho	-	2020
Indiana	2018	-
Kansas	-	2019
Kentucky	2018	-
Louisiana	2019	-
Maryland	2017	-
Minnesota	-	2021
Michigan	2019	-
New Hampshire	-	2018
New Jersey	-	2018
New Mexico	2019	2020
New York	-	2019
North Carolina	-	2019
Ohio	2019	2017
Pennsylvania	2018	
Utah	-	2019
Vermont	2018	-
Virginia	-	2016
Washington	-	2018
West Virginia	2019	-

A.3. Sample Construction

In this section, I describe how I constructed the samples, especially the states covered in the TEDS-A and TEDS-D, respectively. These results are also shown in Xing (2025).

In the TEDS-A dataset, 44 states constitute the sample including all patients admitted to SAT facilities and 24 states are included when the sample of interest is patients with commercial plans as their primary payment. The corresponding ones are mapped in Figures A1 and A2.

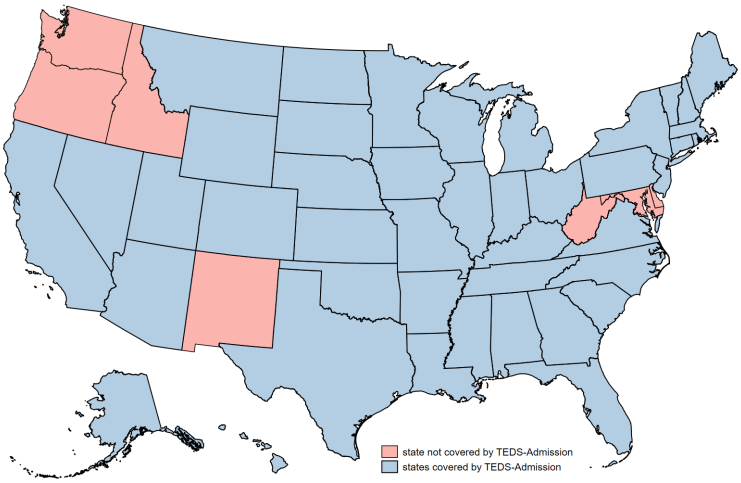


Figure A1: sample selection in TEDS-Admission (all patients)

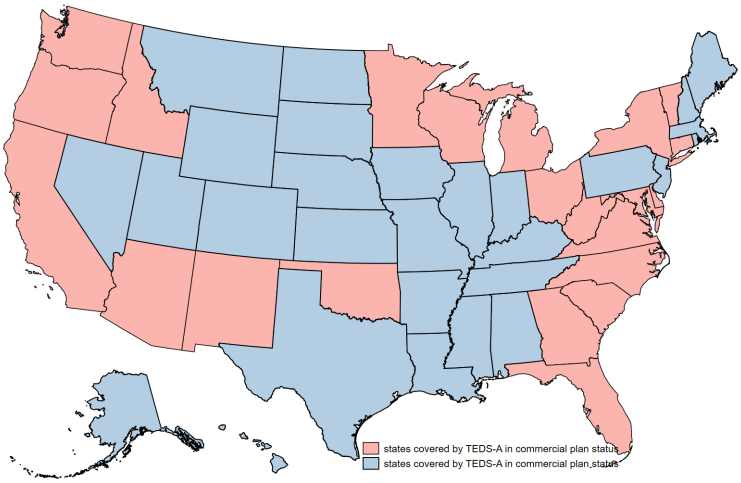


Figure A2: sample selection in TEDS-Admission (all patients with commercial plans)

In the TEDS-D dataset, 38 states constitute the sample including all patients discharged from SAT facilities and 24 states are included when the sample of interest is patients with commercial plans as their primary payment. The corresponding ones are mapped in Figures A3 and A4.

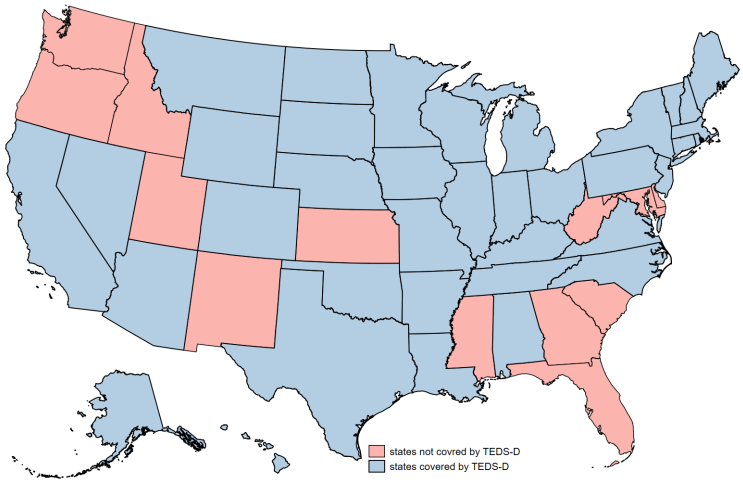


Figure A3: sample selection in TEDS-Discharge (all patients)

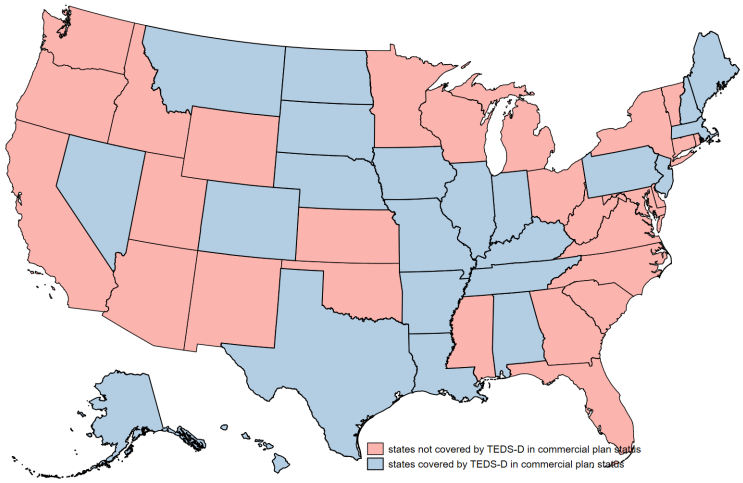


Figure A4: sample selection in TEDS-Discharge (all patients with commercial plans)

A.4. Robustness to the Composition of Sample

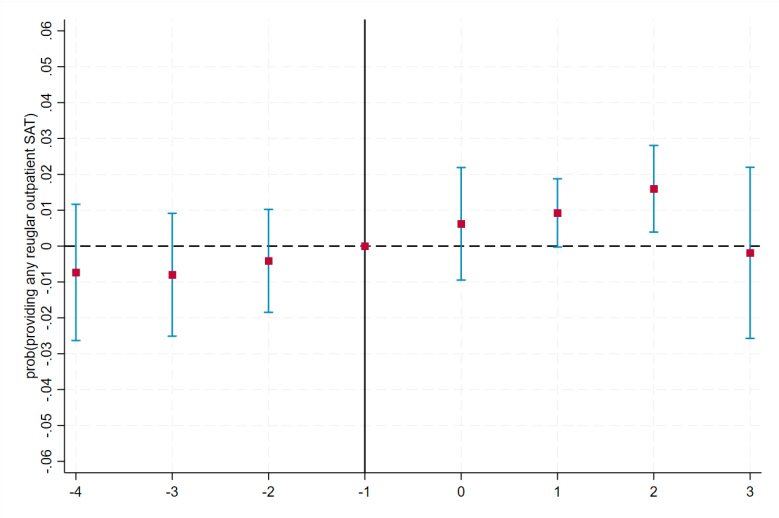


Figure A5: event-study estimates for providing any outpatient SAT (balanced panel)

Notes: The dependent variable is the probability of providing any outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

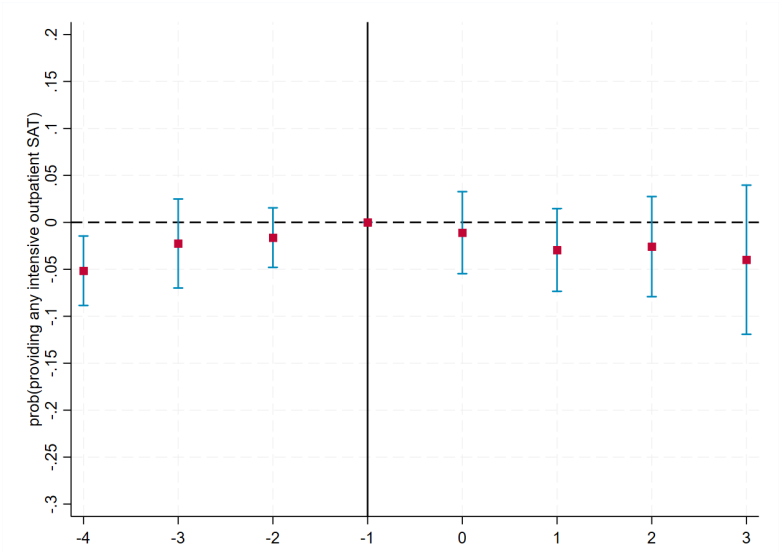


Figure A6: event-study estimates for providing intensive outpatient SAT (balanced panel)

Notes: The dependent variable is the probability of providing intensive outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

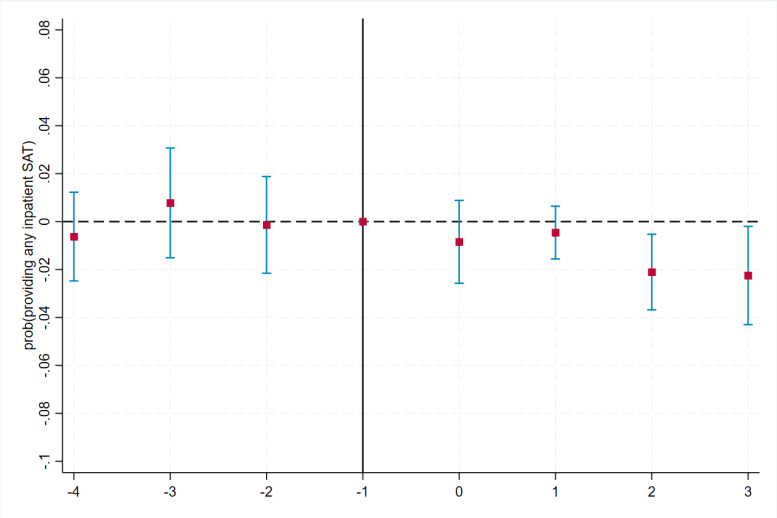


Figure A7: event-study estimates for providing inpatient SAT (balanced panel)

Notes: The dependent variable is the probability of providing any inpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

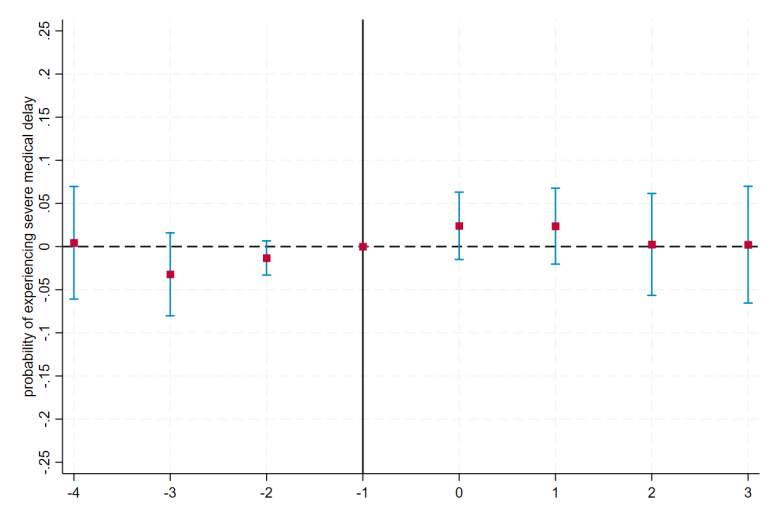


Figure A8: event-study estimates for experiencing medical delay in outpatient SAT (balanced panel)

Notes: The dependent variable is the probability of experiencing medical delay in any outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

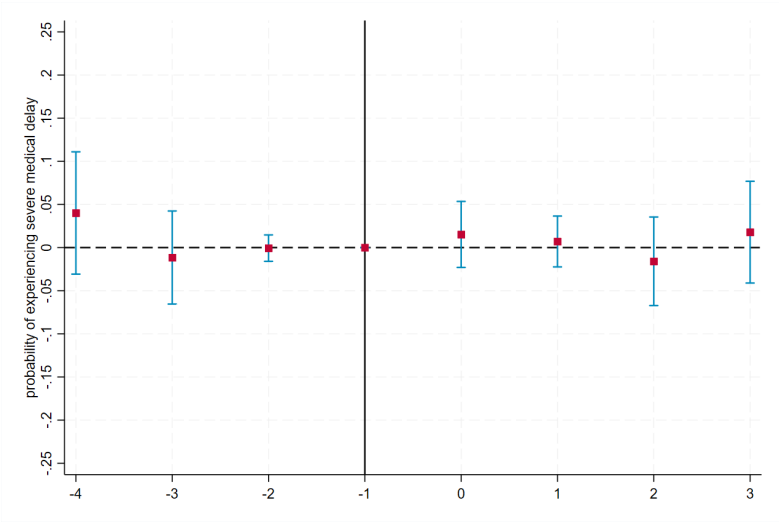


Figure A9: event-study estimates for providing inpatient SAT (balanced panel)

Notes: The dependent variable is the probability of experiencing medical delay in intensive outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

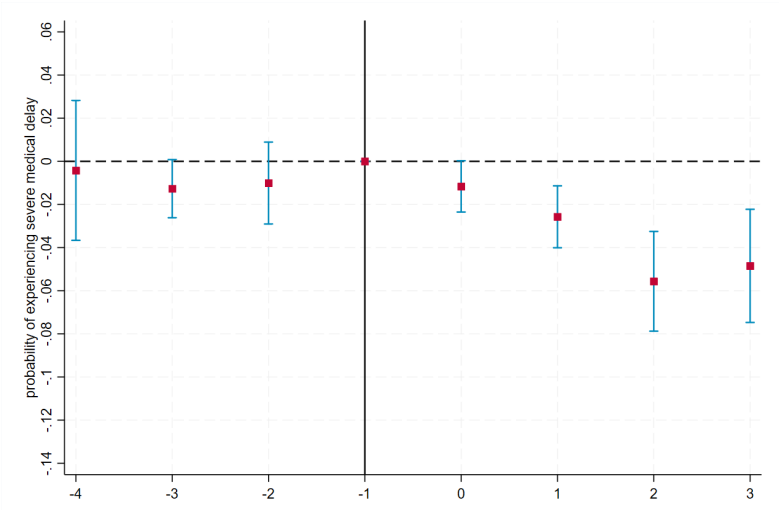


Figure A10: event-study estimates for providing inpatient SAT (balanced panel)

Notes: The dependent variable is the probability of experiencing medical delay in inpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

A.5. Robustness to the Framing of Datasets

Table A3. Effects of Medical Necessity Standardization on the Provision of SAT Services (facilities receiving funding from the federal, state, and local government)

	outpatient			intensive outpatient			inpatient		
MNC_{st}	0.024***	0.025***	0.020**	-0.001	-0.008	0.005	-0.027***	-0.028***	-0.023**
	(0.008)	(0.008)	(0.009)	(0.026)	(0.027)	(0.020)	(0.009)	(0.010)	(0.010)
PA commercial restriction$_{st}$			0.019**			-0.048**			-0.023***
			(0.008)			(0.021)			(0.006)
PA Medicaid restriction$_{st}$			0.008			-0.010			-0.005
			(0.008)			(0.014)			(0.006)
1115 waiver$_{st}$			-0.003			-0.005			0.002
			(0.006)			(0.016)			(0.008)
Medicaid MNC$_{st}$			0.005			0.025			0.010
			(0.009)			(0.020)			(0.011)
state FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
other state SUD policies			✓			✓			✓
excluding for-profit facilities		✓	✓		✓	✓		✓	✓
mean (2012-2014)	0.788	0.772	0.772	0.577	0.566	0.566	0.322	0.344	0.344
# of clusters	48	48	48	48	48	48	48	48	48
# of obs.	70586	61877	61877	57022	48918	48918	70587	61878	61878

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Data are drawn from the N-SSATS (2012-2022). The dependent variables are the probability of offering any outpatient services in columns (1)-(3), and the probability of offering intensive outpatient services in columns (4)-(6). In columns (7)-(9), the dependent variable is the probability of offering inpatient service (i.e., hospital SAT and residential SAT). State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. Facility-level control variables include whether a facility belongs to a hospital, and the ownership. All standard errors are clustered at the state level.

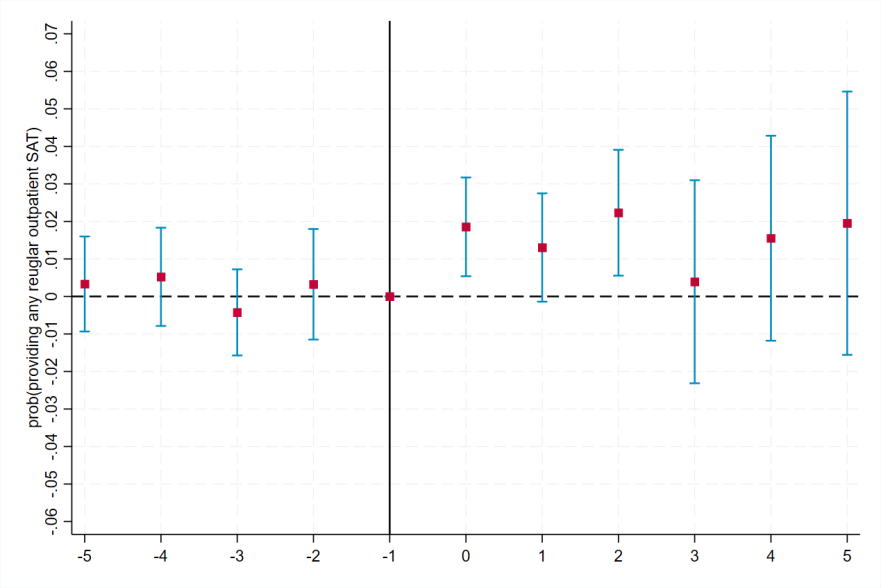


Figure A11: event-study estimates for providing any outpatient SAT

Notes: The dependent variable is the probability of providing any outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

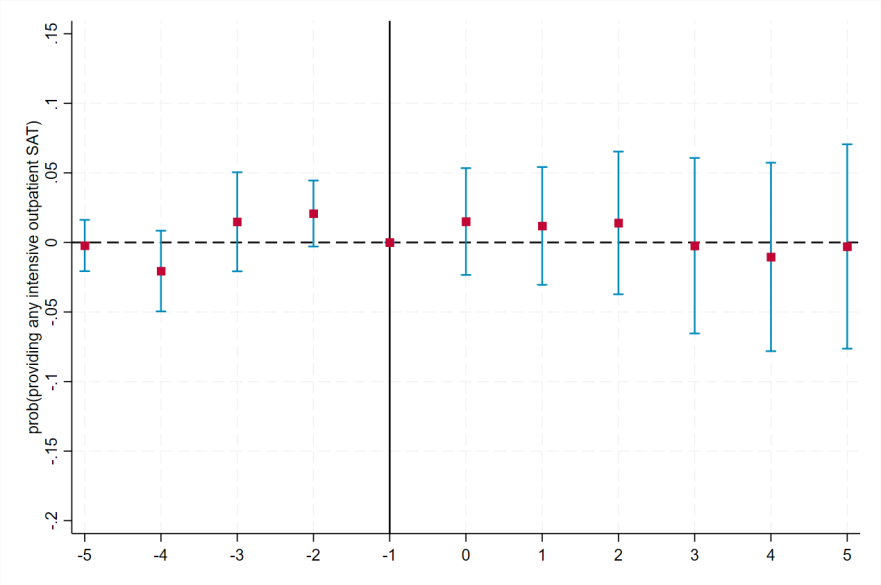


Figure A12: event-study estimates for providing intensive outpatient SAT

Notes: The dependent variable is the probability of providing intensive outpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.

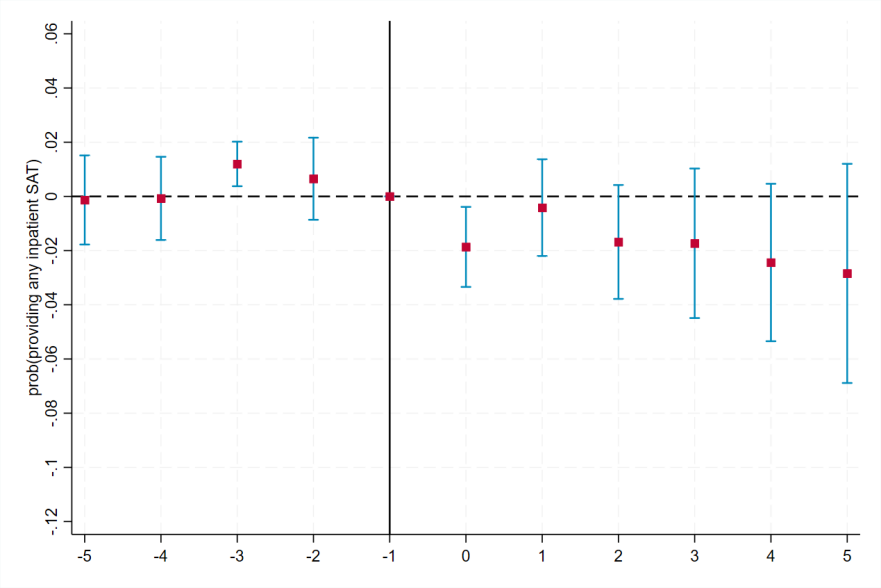


Figure A13: event-study estimates for providing inpatient SAT

Notes: The dependent variable is the probability of providing any inpatient SAT service. State controls include SAT parity laws, pain clinic regulation, PDMP mandates, state unemployment rates, natural log of the population, natural log of the state GDP, and the effective state-level minimum wage. All standard errors are clustered at the state level.