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Do Medication-Assisted Treatment for Prescription Drug and Opioid Addiction Grants Reduce Homelessness?

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## **Abstract**

The opioid crisis has worsened economic conditions, increased unemployment, evictions, and homelessness in the United States. Medication-assisted treatment (MAT) provides evidence-based medications integrated with counseling and behavioral therapies to reduce adverse effects of opioid misuse (e.g., withdrawal symptoms) among individuals with opioid use disorder. The federal government awarded \$115 million in medication-assisted treatment for prescription drug and opioid addiction (MAT-PDOA) grants to local entities between 2015 and 2018. The grants were intended to enhance MAT access in the communities. However, it is unknown whether MAT-PDOA decreases an important consequence of the epidemic in communities: homelessness. Using an interaction weighted difference-in-differences event study design, we find MAT-PDOA grants did not relate to changes in homelessness in communities. Although MAT may be effective at treating opioid use disorder at the individual level, more efforts are needed to scale up its effectiveness toward alleviating homelessness at the community level.

Keywords: medication-assisted treatment; homelessness; opioid use disorder; interaction weighted estimator; continuums of care

## **Introduction**

Between 1999 and 2019, approximately 841,000 deaths induced by drug overdose were reported in the United States (CDC 2020). Approximately 2 million people, aged 12 years or over, presented opioid use disorder (OUD) - uncontrollable use of opioids that results in loss of social functioning - in the previous year according to the 2018 National Survey on Drug Use and Health (SAMHSA 2019). The increasing severity of the people with OUD has spilled over to exacerbate problems in the communities, such as poor health outcomes, unemployment, and child maltreatment (Chapman 2022; Harris et al. 2019; Langford 2021; Maclean et al. 2022). An additional consequence has been an increase of homelessness, partially through the above mechanisms like unemployment (Lozano-Rojas et al. 2020).

An effective intervention to tackle the opioid crisis is to provide medication-assisted treatment (MAT) to individuals experiencing OUD, which could decrease the epidemic's effect on communities. MAT utilizes evidence-based medications and behavioral therapies to treat OUD by reducing withdrawal symptoms to become less dependent on opioids. To expand the utilization of MAT in communities, the federal government implemented multi-faceted policies. The U.S. Department of Health and Human Services allocated \$9 billion in grants to state and local governments between 2016 and 2019 through the nation's 14,000 substance abuse facilities (HHS 2021). The Substance Abuse and Mental Health Services Administration (SAMHSA) has provided medication-assisted treatment for prescription drug and opioid addiction (MAT-PDOA) grants to communities since 2015. These grants are meant to enhance integrated patient care programs, increase the number of people with opioid use disorder receiving MAT, and eventually decrease the number of people with opioid use disorder. SAMHSA targeted these grants to local governments, nonprofits, and/or for-profits in states with either the highest rates of

primary treatment admission for opioids or dramatic increasing trend in the rate. Between 2015 and 2018, SAMHSA distributed about \$115 million in grants. As of February 2021, MAT is provided to 1.27 million people (HHS 2021).

In this study, we asked whether these MAT-PDOA grants decreased the number of people experiencing homelessness in communities. To our knowledge, this study will be the first empirical outcome analysis at the community level regarding MAT-PDOA grants. Nonetheless, a plethora of previous studies examined the association between opioid misuse and the homelessness. Bradford and Bradford (2020) studied the relationship between county-level eviction rates and mortality induced by all opioids (prescription and heroin), cocaine, psychostimulant, benzodiazepine, antidepressant, and alcohol poisoning. They found higher eviction rates significantly related to increased deaths in these categories, with the largest effects for opioids, heroin, and benzodiazepines.

Several other studies suggested that the consequences of the opioid crisis intertwine with homelessness. The supply-side restriction of prescription opioids could be related to decreasing homelessness, possibly through alterations in poverty and the labor market (Lozano-Rojas et al. 2020). Shifting controlled substance classification schedules of hydrocodone from III to II reduced its supply as schedule II substances have more restrictions on its use because schedule II means higher abuse and addiction potential than schedule III (U.S. Department of Justice 2022). This led to a decrease in homelessness in communities with high exposure to hydrocodone compared to those with low exposure. As hydrocodone was one of the prescription opioid pain relievers that fueled the current opioid crisis, the finding suggests changes in policies related to opioids may have spilled over to homelessness. They found that the underlying mechanism was likely through lowering unemployment rates, which increased economic prospects and decreased

homelessness. Research on whether substance abuse causes homelessness also typically suggests economic conditions drive homelessness, even among those with substance use disorder. One study showed that preceding substance abuse typically does not relate with homelessness after adjusting for other observed and unobserved factors that can cause people to enter homelessness (McVicar et al. 2015).

Reducing the rates of OUD in a community may lower homelessness by enhancing the economic prospects and opportunities inferred from the following findings. The increasing severity of the opioid crisis in communities has been shown to increase poverty and eliminate job opportunities (Langford 2021; Harris et al. 2019). As poverty and its relationship with housing costs is a leading cause of homelessness, the opioid crisis could precipitate spillovers into the community and increase homelessness (Kim and Sullivan 2021; O’Flaherty 2019). Therefore, the aim of this study is to evaluate the impact of grants to expand MAT-PDOA access and utilization on homelessness in communities. We hypothesized that, via the aforementioned causal pathway, receipt of MAT-PDOA grants in communities reduces the number of people with OUD and decreases homelessness by spillover effect. To test this hypothesis, we studied Continuums of Care, local planning bodies for homeless services. Although MAT is provided to individuals, our study shows the scaled-up effect of MAT at the community-level. Contrary to our hypothesis, we found by estimating an interaction weighted generalized difference-in-differences event study that MAT-PDOA grants did not significantly relate to homelessness relative to communities not receiving grants and before receiving a grant. Overall, MAT-PDOA grants do not seem to have spillovers into decreasing homelessness.

## **Medication Assisted Treatment – Prescription Drug and Opioid Addiction**

### *Medication-Assisted Treatment*

Medication Assisted Treatment (MAT) has become a prominent individual-level intervention to address the opioid epidemic (Haegerich et al. 2019). Prescription opioid supply-side targeting policies prevented people from using unnecessary opioid pain relievers, specifically those who have never used opioids. However, individuals who already had OUD still remain on the street and are at risk of using illicit opioids. MAT attempts to help these people overcome OUD, using a “whole-patient” approach and to prevent or reduce opioid misuse by managing withdrawal symptoms (SAMHSA 2021). Standard care through MAT consists of mental health services along with three FDA-approved medications, which are methadone, buprenorphine, and naltrexone. The share of substance use disorder treatment facilities offering MAT increased from 20 percent in 2007 to 36 percent in 2016 (Mojtabai et al. 2019); over half of community health centers in the states hit hardest by the opioid epidemic provided on-site MAT services in 2018 (Zur et al. 2018).

Research finds MAT to be effective at reducing the need for inpatient detoxification services for people with OUD (SAMHSA 2021). A meta-analysis of MAT in prison and jail settings found MAT using methadone to significantly reduce illicit opioid use and injection drug use (Moore et al. 2018). More recently, many healthcare and homeless service providers have also implemented MAT for people experiencing homelessness who have OUD (DiPietro et al. 2019). For example, almost 40 percent of veterans experiencing homelessness with co-occurring opioid use disorder received MAT (Midboe et al. 2019). This has come after findings showing MAT to have similar rates of success for both housed and unhoused people. It has also been found to be largely successful at ending opioid use disorder overall (Alford et al. 2007).

Despite the effectiveness of MAT supported by empirical evidence, it is underutilized in practices due to multiple barriers. The barriers include the lack of appropriate training for



providers, inadequate reimbursement, concerns about diversion of medication (e.g., methadone), abstinence treatment preferences, lack of institutional support, lack of mental health services, and lack of treatment availability (Ghanem et al. 2022). MAT-PDOA grants are one of the federal government's efforts to improve accessibility on the treatment approach.

### *MAT-PDOA Grants*

The federal MAT-PDOA grants are a useful policy tool to connect patients in need to MAT services - individualized care integrated with pharmacological and psychosocial support. The objective of this grant program was to increase accessibility to MAT services to treat OUD, which will in turn decrease illicit drug use and prescription opioid misuse (SAMHSA 2015). In 2015, the SAMHSA, through the U.S. Department of Health and Human Services, began distributing grants to states, political subdivisions, and public, nonprofit, and/or for-profit organizations. Each entity had to apply to receive a grant, with SAMHSA prioritizing organizations from communities with a high rate of primary treatment for opioids or large increases in the rate. Entities that received a grant typically received between \$500,000 to \$1 million per year for three years. A total of \$11 million was distributed in 2015 and 2016, \$28 million in 2017, and \$65 million in 2018. Funds had to go towards expanding programs, such as increasing the number of people receiving services, enhancing the number of recipients retained in the services, implementing engagement strategies for diverse populations with OUD, and screening and coordinating co-occurring disorders. This means that existing funds could not directly be substituted away from as services needed to increase. Although other grants to increase OUD treatment exist, this represents a large-scale, federal effort to increase MAT utilization in communities that have high rates of OUD (SAMHSA 2015). Further, as research

typically finds MAT to be effective for individuals, MAT-PDOA grants represent a feasible policy to increase its utilization that could be expanded.

### **Homeless Services, Continuums of Care, and OUD**

To test whether the MAT-PDOA grants decreased homelessness at the local level, we studied Continuums of Care. Continuums of Care are local planning bodies for homeless services, where all service providers within a given Continuum must coordinate and jointly apply for federal funding. Continuums of Care cover specific geographic areas ranging from about a single county to an entire state. However, essentially everywhere within the United States is within a Continuum of Care.

Homeless services in this context generally take one of four types. First, emergency shelters provide temporary shelter, typically with few additional services besides necessities such as food. Second, transitional housing offers shelter and services for a longer period up to about two years. Services often include education or job-training to help people experiencing homelessness to permanent, independent housing. Third, rapid rehousing intends to quickly rehouse persons who enter homelessness. Often, this may be in the form of housing vouchers or short-term housing subsidies. Last, the most common form of homeless service is permanent supportive housing. Permanent supportive housing typically implements a “Housing First” model. Housing First, as the name implies, first puts people experiencing homelessness into supportive housing which offers long-term stays. Only after people are provided stable housing do services offer additional support, such as substance abuse treatment. Housing First has proven effective at both ending homelessness and helping people overcome chronic substance abuse (Rosenheck 2010).

As part of a Continuum of Care, homeless service providers must collectively create a plan and describe for federal funding (Continuum of Care grants) applications how they coordinate with additional types of organizations related to homelessness, such as law enforcement, healthcare providers, and organizations offering substance abuse treatment. Federal grants help fund the above homeless services Continuums provide, along with data management and administration. However, although organizations within a given Continuum jointly apply for federal funding, grants go to specific organizations after being assigned to the Continuum. Funding mostly goes toward providing services for people experiencing homelessness. Collectively making up Continuums of Care, homeless services coordinate services to offer coordinated entry so people entering homelessness can access services best fitting their needs. Specialized services can be needed given the multitude of reasons someone enters homelessness (Sullivan, Kim, and Lee 2021).

While substance use can co-occur with homelessness, possibly due to the associated stress, most people enter homelessness due to poverty and lack of affordable housing. McVicar (2015) found that alcohol abuse increases the likelihood someone would become homeless. However, this is the exception; observed and unobserved characteristics related to both substance abuse and the likelihood of experiencing homelessness. For example, experiencing unemployment increases the probability someone begins abusing substances. However, unemployment can simultaneously increase the likelihood of entering homelessness due to the decrease in economic stability. Thus, although substance abuse may precede a person's experience of homelessness, becoming unemployed was the root cause. Likewise, Scutella and Johnson (2018) found that entering homelessness significantly increases psychological distress. The new psychological distress is likely to increase substance abuse, loss of relationships, or

similar negative consequences. However, these negative consequences are those of homelessness rather than determinants. Although related, treating individuals' substance abuse likely will not end their homelessness and vice versa. On the other hand, treating the common causes, like poverty, may more effectively end both (O'Flaherty 2019).

Instead of directly causing someone to enter homelessness, research suggests OUD is more likely to affect communities' rates of homelessness by worsening economic conditions. Langford (2021) found regional opioid use rates to decrease net firm entry, suggesting less economic opportunity in the region. High opioid use rates also decreased the regional labor market by forcing people to exit the market. These negative effects can create a negative feedback loop, where long-term economic decline increases OUD, which then furthers the decline. Results from Lozano-Rojas et al. (2020) suggested these worsening conditions from OUD in the community likely spillover onto homelessness.

Research in the present issue provides additional pathways through which OUD may increase homelessness. Studying Canada, Cheung, Marchand, and Mark (2022) applied a human capital model to estimate the effect of opioid overdose deaths on the economy. They discovered that the over 15,000 deaths from 2016-2019 caused a productivity loss of \$5.71 billion, suggesting a large, negative impact from each opioid overdose death. This finding echoes Langford (2021): opioid overdose deaths are likely to worsen labor market outcomes and productivity. Focusing on living arrangements, Caudillo, Villarreal, and Cohen (2022) found communities' having a higher opioid-overdose death rates associated with an increase in children living in less stable arrangements, such as living with adults other than parents, i.e., doubling-up. As doubling-up is often a precursor to homelessness, this suggests an additional mechanism through which OUD in a community could increase homelessness.

Given the multitude of ways through which OUD can worsen communities' outcomes, such as employment and housing stability, expanding MAT in communities may decrease OUD and relieve communities of these negative outcomes, thereby decreasing homelessness. In other words, OUD has severe, negative consequences for communities which could increase homelessness. Policies and programs decreasing OUD in communities may then lessen these negative consequences and decrease homelessness (e.g., Lozano-Rojas et al. 2020).

As research suggests MAT to be effective at treating opioid use disorder at the individual level, expansions of these programs through federal grants may increase their use and effectiveness for entire communities. Winograd et al. (2020) studied MAT expansion in Missouri which reduced barriers to accessing treatment and increased funding to MAT providers. They found utilization almost doubled, with increased program retention at six months after initial treatment. Reif et al. (2020) similarly found the expansion of MAT in Washington State increased community uptake of MAT for those with OUD. Given the strong evidence that MAT helps people with OUD cope with their symptoms and possibly overcome OUD (Moore et al. 2018), these studies provide evidence expanding MAT can help those in the community with OUD be treated. Increasing the utilization of services could then lower OUD in communities. MAT-PDOA grants are meant to increase utilization by expanding its use or who is served. Doing so may decrease rates of opioid use disorder in the community. Decreasing OUD in the community may then lessen the negative social and community consequences of the opioid epidemic and decrease homelessness. We therefore hypothesized that a community receiving a MAT-PDOA expansion grant will decrease homelessness.

## **Empirical Approach**

### *Data*

Data on homelessness came from the United States Department of Housing and Urban Development's point-in-time counts (HUD 2013). Each Continuum of Care annually counts the number of individuals experiencing homelessness. One night every January, each Continuum of Care has volunteers go into shelters and comb the streets to estimate the number of people experiencing homelessness. Homelessness in this context refers to those sleeping in a place not meant for habitation, such as a car or an encampment, or in an emergency shelter or transitional housing. Our analytical sample consisted of 376 Continuums of Care from 2011-2019. We converted the number of people experiencing homelessness into inverse hyperbolic sines, which approximate logs. We chose to do so as the residuals from a linear model were positively right-skewed. As such, coefficients are interpreted as log-linear models.

For treatment, we considered a Continuum of Care to be treated if at least one organization within its boundaries received a MAT-PDOA grant. Importantly, the grants do not go directly to Continuums of Care. While the organization in theory could be affiliated with a Continuum, most do not directly provide homeless services. Instead, having an organization receive a grant in a Continuum could have spillovers to homelessness by decreasing opioid use disorder in the broader community, which then decreases homelessness. We used SAMHSA's Grant Awards Archive to determine organizations and locations to assign recipients to a Continuum of Care based on geographic location. A total of 89 out of 391 Continuums (23 percent) had an organization that received a grant between 2015 and 2018 and are thus considered treated. Of those treated, 10 received a grant in 2015, 11 in 2016, six in 2017, and 62 in 2018. Thus, the majority of Continuums of Care that had an organization within its boundaries receive a grant were in 2018.

We also controlled for a variety of socio-economic factors that could relate to treatment and homelessness. Control variables included homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, unemployment rate, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. We chose these variables based on past research on determinants of homelessness at the community-level (Byrne et al. 2013). All of these variables except beds and low-income housing tax credit units came at the county level. As Continuums of Care typically consist of multiple counties, we population-weighted the county-level variables and aggregated them to the Continuum of Care level, following standard practice in the literature (Kim and Sullivan 2021; Sullivan, Kim, Lee 2021).

### *Statistical Analysis*

To test the effect of MAT-PDOA grants on homelessness, we implemented an interaction weighted (IW) estimator proposed by Sun and Abraham (2021). As Continuums of Care received grants in different years between 2015 and 2018, estimating a traditional two-way fixed effects estimation, which compares the average difference in outcomes between treatment and control pre and post treatment, could result in biased and uninterpretable results, particularly by comparing late recipients to early recipients (Goodman-Bacon 2021). This bias occurs due to heterogeneous effects across treatment cohorts. Bias can still occur when conducting an event study analysis, which shows dynamic effects by years from treatment (Sun and Abraham 2021).

An IW estimator adjusts for this potential bias by estimating cohort-specific dynamic treatment effects. This method interacts the traditional relative time indicators from an event study model with cohort specific indicators. It then takes the underlying weights from each cohort based on each cohort's relative share of observations in relative time and weights the

results to arrive at a single coefficient for each event. The resulting coefficients are then interpreted as the difference in the outcome relative to the base year and the difference between treated and never treated units in the base year.

Following Sun and Abraham (2021) and using the Stata 17 “eventstudyinteract” package (Sun 2021), we estimate the IW estimator as:

$$Y_{i,t} = \alpha_i + \lambda_{s,t} + \theta X_{i,t} + \sum_{\substack{e \in \{2015, 2016, \\ 2017, 2018\}}} \sum_{\ell = -4, \neq -1}^2 \delta_{e,\ell} \mathbf{1}\{E_i = e\} \cdot D_{i,t}^{\ell} + \epsilon_{i,t}$$

$Y_{i,t}$  is the inverse hyperbolic sine of the number of people experiencing homelessness for Continuum of Care  $i$  in year  $t$ .  $\alpha_i$  are Continuum fixed effects, controlling for any time-invariant characteristics of each. These include many potential sources of bias, including attitude toward homelessness, size, geographic, location, and fixed levels of services, economic, and demographic characteristics relative to other Continuums.  $\lambda_{s,t}$  are state-by-calendar year fixed effects, controlling for anything common to all Continuums with a given state and given year, such as the state’s economy, policy, or changes in count methodology. This would also control for any state-wide initiatives that may relate with MAT, homelessness, or opioid use disorder.  $X_{i,t}$  is a vector of time-varying control variables at the Continuum of Care level with  $\theta$  the relationship between each and  $Y_{i,t}$ . Last,  $\epsilon_{i,t}$  are standard errors clustered at the Continuum of Care level.

$\delta_{e,\ell}$  are the coefficients of interest as each shows the effect of MAT-PDOA grants  $\ell$  years from treatment, comparing the differences between treatment and control Continuums to differences in the base year. Estimates are initially by treatment cohort,  $e$ , and then aggregated, weighted by share of total treatments that occurred in the respective cohort. When  $\ell$  is negative, coefficients should be close to zero and statistically insignificant to provide evidence for the



parallel trends assumption: the trends in outcomes between treatment and control would be the same but for treatment.

## Results

### *MAT and Homelessness*

Figure 1 shows the results for the main model where the inverse hyperbolic sine of the number of people experiencing homelessness is the outcome. Each marker shows the difference-in-differences estimate for  $l$  years from treatment on the x-axis. The coefficients are interpreted as a  $100*\beta$  percent change in homelessness  $l$  years from treatment relative to the base year and Continuums not receiving a grant. On the x-axis, -1 is the year before a Continuum receives a grant and 1 is the first year after. The 95 percent confidence intervals are shown by the shaded areas. The coefficient is statistically different from zero if it does not cross the horizontal dashed line.

The results suggest there is no change in homelessness after an organization within the CoC received a MAT-PDOA grant. The coefficients are consistently 0.01 or 0.02, with 95 percent confidence intervals typically within -0.10 and 0.10 and statistically insignificant. The estimated coefficients are constant over time, suggesting the relationship does not change over time. Thus, a community's receiving a MAT-PDOA grant does not seem to significantly relate with homelessness.

An event study differences-in-differences method also allows testing for parallel trends, a crucial assumption of difference-in-differences models. The assumption is that, but for treatment occurring, trends in the outcomes between treatment and control groups would have been parallel and continued to be parallel post-treatment. While this counterfactual can typically never be verified, a requirement is that trends were parallel prior to treatment. In figure 1, estimates prior

to treatment are near zero and statistically insignificant, consistent with the parallel trends assumption.

**FIGURE 1**  
**MAT-PDOA Grants and Homelessness**

*Single-County Continuums of Care*

It is possible we did not find a relationship between MAT-PDOA grants and homelessness as Continuums of Care can cover too large of an area whereas the effect is localized. For example, many Continuums cover large, rural areas. To test whether the size of Continuums moderates the effect, we re-estimated the model but limited the sample to Continuums with only one county. This included 200 Continuums, whereas the full sample included 362.

Figure 2 presents the results. Although coefficients are slightly more positive relative to figure 1, they are still statistically insignificant from zero at the 95 percent confidence level and from results in the main model. Additionally, as the pre-trends are also slightly positive, the effect would likely be small. Therefore, the null results in the main model are likely not driven by a localized effect of MAT-PDOA grants.

**FIGURE 2**  
**MAT-PDOA Grants and Homelessness in Continuums of Care with One County**

*Sensitivity Checks*

We conducted several sensitivity checks to ensure the results are not sensitive to alternative specifications. First, shown in figure 3, we estimated results where we did not include state-by-year fixed effects. Instead, we only included Continuum of Care fixed effects and year fixed effects. We did this as controlling for anything common to all Continuums within a state and year removes some variation, although it also likely removes many sources of bias. In this

model, homelessness increases statistically at the 95 percent confidence level in the first year after treatment by 4 percent relative to the base year and Continuums that did not receive a MAT-PDOA grant. However, there are multiple reasons this likely is not a true increase in homelessness. First, the results are not statistically different from the main model (figure 1). Second, while statistically significant, the estimated impact would be a 1-8 percent increase in homelessness, a relatively small effect. Third, the estimated coefficients before treatment are 0.02, meaning the effect would be even smaller relative to before treatment. Last, given the number of hypothesis tests conducted, the significance may be from Type I error. Therefore, figure 3 provides evidence that the model is likely not sensitive to the inclusion of state-by-year fixed effects.

**FIGURE 3**  
**Sensitivity Check: Removing State-by-Year Fixed Effects**

Our second sensitivity check, presented in figure 4, used the rate of homelessness (number of people experiencing homelessness per 10,000 population) to test whether the estimates are sensitive to the functional form homelessness takes. It is also a common alternative form in the Continuum of Care literature (e.g., Sullivan, Kim, and Lee 2021). Importantly, the results are now interpreted as a change in the rate, rather than as a percentage change. In figure 4, no coefficients are statistically significant at the 95 percent confidence level. Additionally, the average rate of homelessness in the sample is 19.0. Considering this context, the maximum relationship is still small, providing evidence that our results are not sensitive to the functional form of the outcome.

**FIGURE 4**  
**Sensitivity Check: Rate of Homelessness**

Third, we estimated a more traditional event study difference-in-differences models instead of the interaction weighted estimator. These results potentially have bias from staggered treatment, but this approach has been more widely used in the literature. The results, shown in figure 5, are very similar to the main model, suggesting little bias is present from the staggered implementation of grants.

**FIGURE 5**  
**Sensitivity Check: Event Study Estimation**

Last, we re-estimated the main model without control variables. Although the IW estimator only uses control variables before treatment, they could mask the effect of MAT on homelessness, particularly economic control variables. Figure 6 shows estimates to again be similar to the main results. In other words, it does not seem MAT affects homelessness even when not controlling for Continuums' of Cares time-varying conditions.

**FIGURE 6**  
**Sensitivity Check: Removing Control Variables**

**Discussion**

As the opioid epidemic has led to a multitude of negative social and community consequences, housing insecurity has not been spared, with the epidemic both contributing to and being exacerbated by it. As a combination of poverty and lack of affordable housing typically drive homelessness, evidence suggests the opioid epidemic has worsened these determinants of homelessness. A growing consensus suggests the opioid epidemic to have increased homelessness, largely through its effects on economic conditions and housing insecurity (Bradford and Bradford 2020; Langford 2021; Lozano-Rojas et al. 2020). Further, the extant research generally found some treatments, such as MAT, to be effective at reducing dependency on opioids and homelessness at the individual level (Midboe et al. 2019). However,

scholars have yet to explore how scaling up access to individual level treatments affect homelessness at the community level and successful policies to do so.

We explored how the expansion of MAT-PDOA programs, which facilitate access to treatment to those with opioid use disorder, affects homelessness at the community level. We found MAT-PDOA grants do not relate to changes in homelessness at the community level, with results close to a precise zero. This finding offers several implications for both policies related to social and community consequences of the opioid epidemic and homeless assistance.

First, while MAT-PDOA may be effective at treating OUD for individuals, MAT may not be effective at decreasing the consequences of the opioid epidemic at the community level even when access and utilization increases. To demonstrate this, we re-estimated the model using the unemployment rate in a Continuum of Care as the outcome instead of a control variable. Compared to the base year and Continuums not receiving a grant, receiving a MAT-PDOA grant does not relate to a Continuum's unemployment rate, shown in figure 7. While not shown, results are consistent for a Continuum's poverty rate and per capita median income.

## **FIGURE 7**

### **MAT-PDOA Grants and Unemployment Rate**

One reason expanding MAT-PDOA does not reduce communities' consequences of the opioid epidemic may be because MAT-PDOA does not prevent OUD. MAT instead only treats those already diagnosed with OUD. While helpful for those undergoing MAT, it may do little for the community if the rate at which people newly suffer from OUD outpaces the rate at which people successfully exit MAT. This is similar to homeless services which typically only help those who already entered homelessness (O'Flaherty 2019). Rather than treatments for OUD, prevention mechanisms may have a stronger impact on reducing negative consequences. Putting

our results in conversation with Lozano-Rojas et al. (2020) may further explain results. Lozano-Rojas et al. (2020) studied a policy - rescheduling of hydrocodone from III to II - which could reduce the supply of opioids in communities. Adding barriers to accessing opioids could then prevent people from misusing opioids, decreasing OUD in communities, and thereby negative consequences including unemployment and homelessness. Additionally, expansion grants were relatively small, typically being under \$1 million per year over three years, meaning the increase in access and utilization could be limited. Therefore, policymakers may need to look toward larger changes or programs that prevent OUD rather than increasing access to treatment in order to see changes in its consequences.

Second, we add to the growing literature that forms of substance use disorder, such as OUD, likely do not directly increase homelessness (O’Flaherty 2019). Previous studies have only looked at individual-level homelessness as opposed to community-wide programs and homelessness (e.g., Midboe et al. 2018; Scutella and Johnson 2018). As demonstrated in this issue, the opioid epidemic has led to a variety of negative social and community consequences (Cheung, Marchand, and Mark 2022; Caudillo, Villarreal, and Cohen 2022). However, despite MAT-PDOA grants’ expanding treatment for OUD, we find no change in homelessness. Given the lack of a change in economic conditions, there could have still been an effect on homelessness through decreasing OUD in communities. However, the lack of an effect suggests this mechanism to be unlikely, providing additional evidence that OUD does not increase a community’s homelessness.

In terms of policy, this suggests that communities seeking to decrease homelessness will likely find more success through other programs than treatment for OUD, particularly those related to housing (O’Flaherty 2019). For example, recent studies suggest rapid rehousing and

emergency assistance, which offer short-term rental assistance, to be effective at quickly rehousing people who entered homelessness (Byrne et al. 2016). Expanding programs such as these could expand the housing safety net, breaking the connection between OUD, economic conditions, and homelessness, limiting a potential negative consequence.

Our study has some potential limitations. First, our study depends on the quality of the underlying data on homelessness. The annual point-in-time counts provide estimates and are likely prone to some error, particularly for those experiencing unsheltered homelessness. Using Continuum of Care fixed effects and clustering at that level helps adjust for some error across communities. Likewise, receiving a MAT-PDOA grant in the year a Continuum of Care would have to systematically correlate with changes in estimates of homelessness after controlling for time-invariant and observable, time-varying factors, which is unlikely as MAT-PDOA grants are separate from Continuum of Care funding.

Second, MAT-PDOA grants could affect homelessness and economic conditions in a more localized area. Continuums of Care are generally at least one county. However, MAT-PDOA grants go to specific organizations which could have targeted service areas smaller than counties and few spillovers outside of the service area. As such, the grants may have a larger effect on negative consequences and homelessness closer to the organizations. Homelessness data, however, only systematically come at the Continuum of Care level, meaning we could not see effects in smaller areas.

Third, although a different question, it could be that MAT-PDOA expansion decreases homelessness for those with OUD at the community level. Some research suggests this conclusion for individuals undergoing MAT, although its outcome at the community level remains unknown (DiPietro et al. 2019). In other words, out of the subset of the population with

OUD, could MAT-PDOA expansion reduce the prevalence of homelessness? However, answering this question would need data on OUD by housing status at the community level, which future research could explore. On the other hand, multiple programs related to homelessness could be effective at reducing homelessness among those with OUD. Reducing homelessness among these people could be crucial given the large share of people who die while experiencing homelessness due to drug overdoses, roughly 25 percent (Bauer et al. 2016; Fine et al. 2022). Further, if homelessness causes people to experience OUD due to the associated stress and trauma, programs helping this subpopulation become stably housed may be necessary. A likely policy to do so is Housing First, a prominent form of homeless service which places people into permanent housing and then works with them to stay housed (Evans, Phillips, and Ruffini 2021). While not requiring users to undergo additional services, such as substance abuse treatment, Housing First services have been found to be effective both at keeping people housed and overcoming substance use disorder. A second potential policy relates to funding for Continuums of Care. Currently, the Continuum of Care grants have no sections relating to OUD, although Continuums are required to report on those experiencing homelessness and substance use disorder. The U.S. Department of Housing and Urban Development, which funds Continuums of Care, could give increased funding to programs specifically serving people with co-occurring homelessness and OUD.

Overall, we add to the growing literature on homelessness's relationship with the opioid crisis by studying targeted federal grants and communities' levels of homelessness. MAT-PDOA grants do not seem to affect homelessness; scholars and practitioners can look toward other policies and programs preventing opioid use disorder or increasing the housing safety net to address the opioid epidemic's worsening effect on homelessness.



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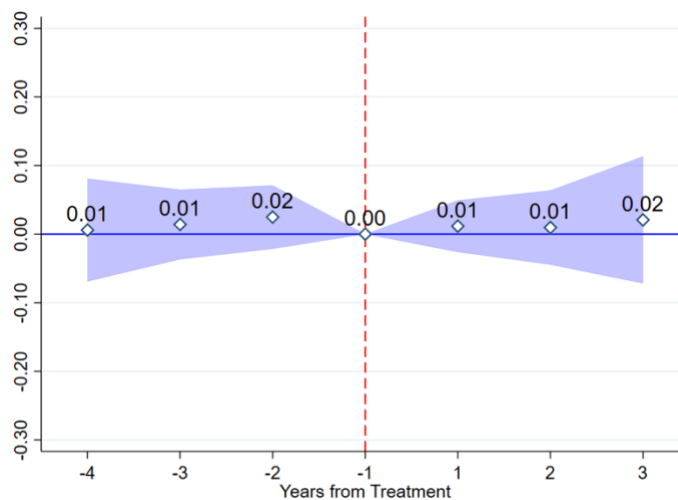
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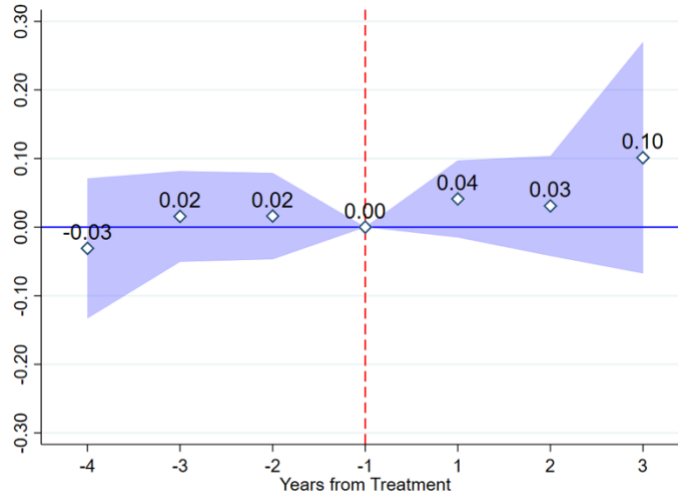
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**FIGURE 1**  
**MAT-PDOA Grants and Homelessness**



NOTES. The figure shows results from interaction weighted event study estimates. The outcome is the inverse hyperbolic sine of the number of people experiencing homelessness. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care. Data are for 2011-2019. Control variables include homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, unemployment rate, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. State-by-year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.

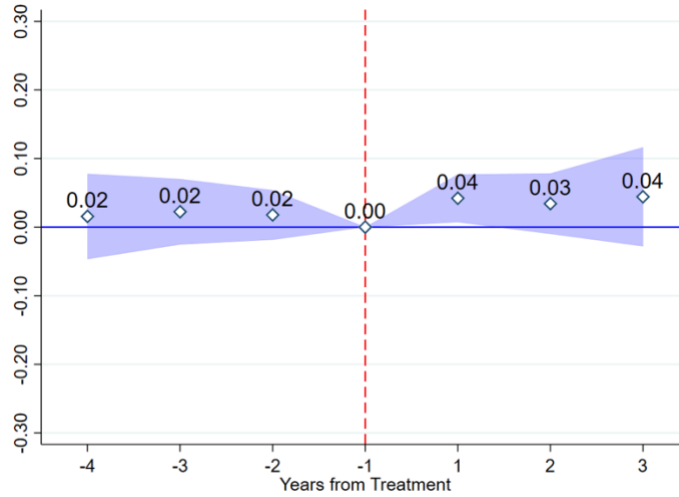
**FIGURE 2**  
**MAT-PDOA Grants and Homelessness in Continuums of Care with One County**



NOTES. The figure shows results from interaction weighted event study estimates. The outcome is the inverse hyperbolic sine of the number of people experiencing homelessness. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care and sample has been limited to Continuums with only one county. Data are for 2011-2019. Control variables include homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, unemployment rate, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. State-by-year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.

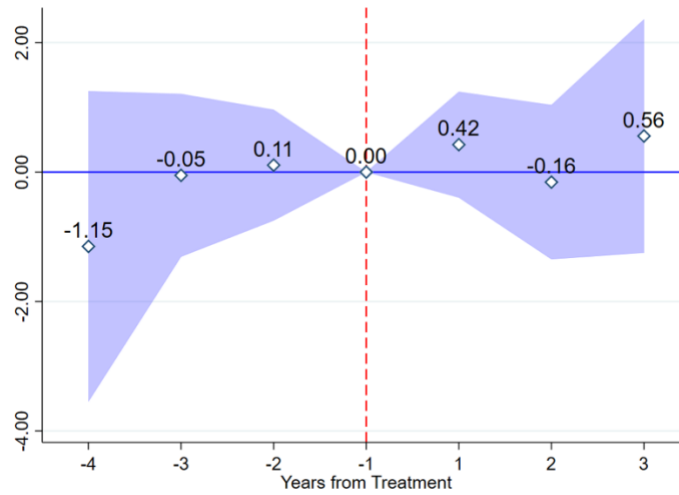


**FIGURE 3**  
**Sensitivity Check: Removing State-by-Year Fixed Effects**



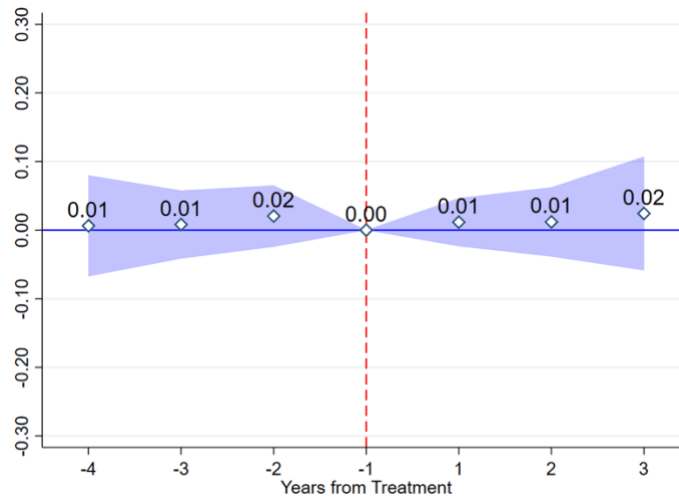
NOTES. The figure shows results from interaction weighted event study estimates. The outcome is the inverse hyperbolic sine of the number of people experiencing homelessness. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care. Data are for 2011-2019. Control variables include homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, unemployment rate, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. Year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.

**FIGURE 4**  
**Sensitivity Check: Rate of Homelessness**



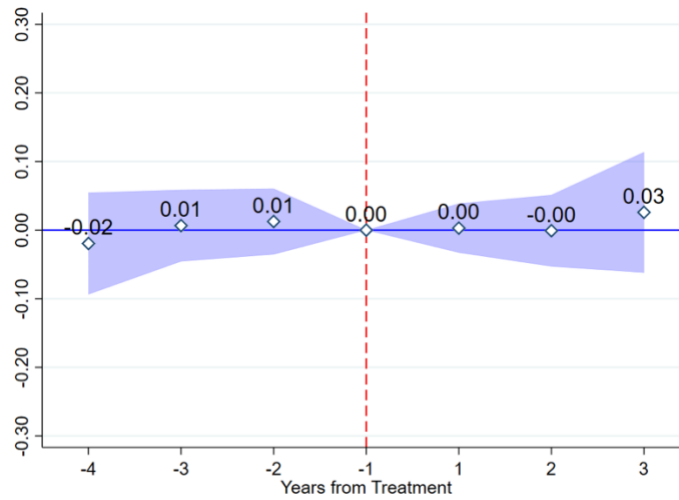
NOTES. The figure shows results from interaction weighted event study estimates. The outcome is the number of people experiencing homelessness per 10,000 population in the Continuum of Care. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care. Data are for 2011-2019. Control variables include homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, unemployment rate, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. State-by-year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.

**FIGURE 5**  
**Sensitivity Check: Event Study Estimation**



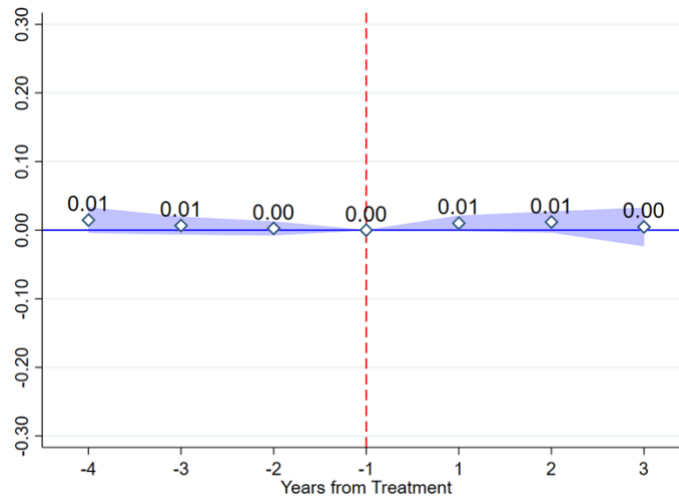
NOTES. The figure shows results from difference in differences event study estimates. The outcome is the inverse hyperbolic sine of the number of people experiencing homelessness. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care. Data are for 2011-2019. Control variables include homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, unemployment rate, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. State-by-year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.

**FIGURE 6**  
**Sensitivity Check: Removing Control Variables**



NOTES. The figure shows results from interaction weighted event study estimates. The outcome is the inverse hyperbolic sine of the number of people experiencing homelessness. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care. Data are for 2011-2019. No control variables are included. State-by-year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.

**FIGURE 7**  
**MAT-PDOA Grants and Unemployment Rate**



NOTES. The figure shows results from interaction weighted event study estimates. The outcome is the inverse hyperbolic sine of the Continuum of Care’s unemployment rate. Markers show coefficients with shaded regions the 95 percent confidence intervals. The base year is the last year prior to the treatment of receiving a MAT-PDOA grant. The unit of observation is Continuums of Care. Data are for 2011-2019. Control variables include homeless service beds, poverty rate, fair market rent, number of low-income housing tax credit units, per capita income, the share of the population Black, share Asian, share Hispanic, and population density. State-by-year and Continuum of Care fixed effects are also included. Standard errors are clustered at the Continuum of Care level.