NBER WORKING PAPER SERIES

TACKLING THE SUBSTANCE ABUSE CRISIS: THE ROLE OF ACCESS TO TREATMENT FACILITIES

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Working Paper 28862
http://www.nber.org/papers/w28862

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2021

We would like to thank Barbara Bolden, Darrin Goldman, and Yong Sung Lee from the New Jersey Department of Health, Sarah Kaplan from the New Jersey Department of Human Services, and Siobhan Dugan from the U.S. Substance Abuse and Mental Health Services Administration for assistance in accessing the data. Hamzah Shah and Sungho Park contributed excellent research assistance. All interpretations and any errors are solely our own responsibility. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 28862
May 2021
JEL No. I12

ABSTRACT

The continuing drug overdose crisis in the U.S. has highlighted the urgent need for greater access to treatment. This paper examines the impact of openings and closings of substance abuse treatment facilities in New Jersey on emergency room visits for substance abuse issues among nearby residents. We find that drug-related ER visits increase by 16.6% after a facility closure and decrease by 9.5%after an opening. The effects are largest in relatively under-served areas, among Black residents, and among males. They are smaller for the middle aged than for either younger or older people. The results suggest that expanding access to treatment results in significant reductions in morbidity related to drug abuse.

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U.S. deaths due to drug overdoses, mainly involving opioids, have more than tripled since 1999, and reached 81,000 in the 12 months ending in May 2020 (CDC, 2020). The number of deaths due to opioids dwarfs the toll from previous drug epidemics in the U.S. Currie and Schwandt (2021) show that without these overdose deaths, U.S. life expectancy would have continued to rise after 2013 instead of falling. Aside from the death toll, it is estimated that nearly 1 in 15 individuals aged 12 and older (20.4 million individuals in 2019) are living with a substance abuse disorder in the U.S. These stark statistics have fueled calls for increased access to substance abuse treatment (US DHHS, 2016).

Yet it is unclear what, in an ideal world, expanded access to care would look like. In practice, the number of inpatient psychiatric beds available for in-patient detox and care of substance abuse patients has fallen, while the number of outpatient clinics for substance abuse has been growing over time. Still, there are many reports that long waiting lists remain a major impediment to treatment (Stirling, 2014). Others argue that outpatient treatment is inadequate and more in-patient hospital beds are needed (Mulford, 2015). In New Jersey, only 243 out of 28,350 people treated for substance abuse received in-patient treatment in 2008, while in 2015 the number was 401 out of 34,951 individuals (N-SSATS, 2008-2015).

However, some research suggests that there is little difference between inpatient and residential or outpatient care in terms of treatment effectiveness so that lower cost outpatient care is to be preferred (Mojtabai and Graff Zivin, 2003). Still, residential treatment centers and outpatient clinics are lightly regulated in terms of treatment modalities, staff training, and fees, and there have been reports of shoddy care and outright insurance fraud, sometimes with lethal consequences for patients (Seville et al., 2017). Hence, it is not clear to what extent the expansion

of substance abuse treatment facilities has actually improved the availability of effective treatments.

We examine this question using data on the openings and closings of substance abuse treatment centers in New Jersey from 2005-2020, combined with information about all Emergency Room (ER) visits from 2008-2015. Emergency room visits are an important outcome both because drug overdoses and related morbidities place a significant burden on emergency medical services, and because ER data offers one of the more reliable ways to track the toll of drug abuse (Samuels, 2019). McGeary and French (2000) find that chronic illicit drug use increases patient's use of ERs by about a third. The ER data also allow us to distinguish between visits for substance abuse, visits for mental health, visits for co-occurring mental health and substance abuse, and visits for other reasons. Since many people have co-morbid mental health and substance abuse conditions, it is possible that access to substance abuse treatment centers could also impact ER visits for mental health, and to a lesser extent, illness and injury.

We consider several dimensions of access, starting with proximity. Previous research has suggested that patients who need to travel more than about four miles to receive substance abuse treatment are more likely to drop out of treatment (Beardsley et al., 2003). By examining changes in distance to the nearest clinic as well as clinic openings in previously un-served zip code tabulation areas (ZCTAs), we verify the importance of distance. We find that drug-related ER visits fall by 9.5% after a first clinic opening in a ZCTA. However, even in areas with several clinics, treatment slots may be rationed. We find that clinic closures increase drug-related ER visits by 16.6% even though the geographic clustering of clinics means that most closings occur in areas with other clinics.

Another important question is whether the type of treatment matters. Over our sample period, the majority of the substance abuse treatment facilities in New Jersey were outpatient clinics (rather than residential facilities) and relatively few facilities offered medication assisted treatment (MAT) even though MAT has been shown to save lives by preventing overdoses (National Academy of Sciences, 2019). Hence our power to measure the effectiveness of different types of treatment is limited. However, we show that our main results are robust to excluding these types of facilities, suggesting that improving access to even ordinary outpatient treatment facilities without MAT effectively reduces drug-related ER visits.

Lastly, we examine the impact of openings and closings separately by demographic group. The results suggest that Black people and youths 15-24 are most affected by proximity, in keeping with the idea that they may face larger transportation barriers. Males are also more impacted than females, in keeping with higher rates of ER use for drug-abuse.

The rest of the paper is organized as follows: Section 2 provides some background. Sections 3 and 4 provide an overview of the data and empirical methods, respectively. The results are in Section 5 and Section 6 concludes.

2. Background

Substance abuse is now thought to be a disease that involves both physical and psychological dependence. As such, recovery from substance abuse usually requires intensive treatment. There are different treatment modalities, but they all typically involve frequent visits to a facility, which suggests that proximity may be especially important for the success of substance abuse treatment.

Substance abuse treatment facilities differ from the typical healthcare facility: Most care, measured in terms of hours of service, is provided by counseling staff (66% across all facilities). Counseling staff and other support staff (e.g. peer support staff, social workers, and care managers) represent 42% and 21% of paid FTEs. Medical staff represents 19%. Only MAT facilities are required to have a physician as medical director, but the physician does not need to be present at all times (N-SSATS 2016, Health Workforce Module).

New Jersey regulates patient-to-staff ratios. All substance abuse treatment facilities are required to maintain an average ratio of substance abuse counselors to clients, which changes with the type of facility. For example, outpatient facilities without MAT must maintain a 1:35 ratio while centers with MAT are required to maintain a 1:50 ratio. (NJ 10:161B-10.1). If facilities do not comply with these requirements their licenses may be at risk. Thus, is not evident that surrounding facilities can take the clients from the closed facility when a facility shuts down.

Although the effectiveness of typical community care for substance abuse is an urgent question, it is difficult to find data that allows it to be studied. Because of the stigma associated with drug abuse (in addition to possible legal issues for patients) the U.S. Substance Abuse and Mental Health Services Administration has removed geographical information from its machine-readable data sets in order to protect patient privacy. Hence, there is no existing publicly available data set with comprehensive information about facility locations and dates of operation.

Moreover, it is difficult to find large-scale administrative data with information about an individual's substance abuse, care received, and subsequent outcomes. As a result, much of the existing literature focuses on data on admissions to treatment and outcomes at the county level. For example, Bondurant, Lindo and Swensen (2018) use county-level data to examine the impact of the openings and closings of treatment centers on crime rates. They find some evidence that

substance abuse centers reduced crime in the most populous counties. Swensen (2015) uses county-year level data and also focuses on openings and closings. He finds that a 10% increase in the number of facilities lowers a county's drug-induced mortality rate by 2%.

Ettner et al. (2006) collected their own longitudinal data from 43 treatment centers in California in 2000-2001 to follow 2,567 patients before and after their treatment. They used a design in which each patient served as their own control. They find that over the following nine months, treatment reduced arrests as well hospital days and ER visits and increased earnings. Using the actual costs of treatment (which averaged $1583) they calculate that the ratio of social benefits to costs was seven to one.

Our study improves on the existing literature by using much more detailed information about openings and closings, as well as exact locations of patients and clinics, and by examining the impacts of clinics on the universe of ER admissions (and hospitalizations that come through the ER) in New Jersey.

3. Data

We have constructed a novel dataset on treatment facility locations and we use rich individual-level data on Emergency Room visits to estimate the effect of changes in proximity to substance abuse treatment on ER visits for substance abuse, mental health, and all other reasons. Facility information comes from the National Directory of Drug and Alcohol Abuse Treatment Facilities, New Jersey facilities licensing information from 2020, and New Jersey Yellow Pages from 2000-2019. Data on patients comes from hospital uniform billings records from New Jersey for 2008 to 2015. We end the sample in 2015 because in 2016, New Jersey adopted ICD10 codes which involved substantial changes in the way that substance abuse and mental health visits were coded.

Fortunately, the period 2008 to 2015 involved substantial changes in the number of clinics available, as shown below. Moreover, the fact that we have information about substance abuse treatment centers from 2005 to 2020 offers us the ability to use areas that received a treatment center before or after the index period as control areas.

Figure 1 shows trends in ER visits for mental health, substance abuse, and co-occurring substance abuse and mental health disorders. Approximately 1 in 12 ER visits are for SA disorders. SA and MH related ER visits increased faster (a 47% increase) than all other ER visits, which increased by 11% over our sample period. The figure indicates that ER visits for SA, MH, and co-occurring SA and MH all grew relatively smoothly over the sample period.

3.1 Location of Substance Abuse Treatment Facilities

Data about the location of treatment facilities comes from a number of sources. First, we use the National Directories of Drug and Alcohol Abuse Treatment Facilities from 2005 to 2020. These directories are created by the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) every year. They include information about the location and services offered by all federal, state, local government, and private facilities that respond to the National Survey of Substance Abuse Treatment Services (N-SSATS).

The N-SSATS response rate has been consistently high in New Jersey, with 90% to 97% of facilities answering the survey (N-SSATS State Profile, 2005-2019). In order to create the most comprehensive list possible, we complemented the survey data with information on clinic license issue dates obtained through an Open Public Records Act request to the New Jersey Division of Mental Health and Addiction Services (DMHAS). The DMHAS list omits some treatment facilities operated by hospitals, primary health care facilities, and Ambulatory Care Outpatient

Drug Treatment Facilities because they are either not required to get a separate license, or DMHAS does not license them.

All of the facilities listed in either source were assigned geographic coordinates and a census block group using ArcGIS. The list was further cross-validated using the Historical Business database available from Wharton Research Data Services. This database gathers information from the Yellow Pages, web research, annual reports, and phone verification to provide business addresses and names for the period 2000 to 2019. The opening year is the first year suggested by any source and the closing year is the last year suggested by any source.

The final facility list includes 845 substance abuse treatment facilities that ever operated in New Jersey between 2005 and 2020. Figure 2 shows the timing of openings and closings between 2008 and 2015. Figure 2 shows the strong growth in substance abuse clinics over time since openings exceeded closings in every year except 2013.

An interesting feature of our data is that treatment facilities are highly clustered: The mean distance from one facility to the next closest facility was only 1.3 miles and the maximum distance between one facility and the next closest was only 15.8 miles. Between 2008 and 2015 most new facilities opened in areas that were already served by at least one facility—only 24 opening facilities were located more than 3 miles from another facility.

Table 1 presents the demographic characteristics of those living in census block groups with and without at least one treatment facility. Block groups with a facility are poorer, more densely populated, and have a higher fraction of Black residents than block groups without a facility. ER visits per 100,000 are higher across all types of visits for census block groups with a facility than for those without one. In particular, substance-abuse related visits are noticeably higher for block groups with a facility *versus* those without one: 3,696 and 2,241 respectively. This finding suggests

a positive cross-sectional relationship between ER visits and treatment facility proximity, other things being equal.

3.2 New Jersey Emergency Room Data

In order to regulate hospitals, state governments maintain records on all Emergency Room (ER) and hospital inpatient visits. We use Emergency Room data from the New Jersey Uniform Billing Records from 2008 to 2015. These data include all visits to ERs at general medical and surgical hospitals in New Jersey including those that involved an inpatient admission from the ER. The sample includes individuals 15 to 64 years old and excludes events related to childbirth. We are able to use these data to assign each patient to a census block group.

Clinical Classification Software (CCS) was used to group related International Classification of Disease (ICD9-CM) codes into broader categories. Appendix Table A1 shows the 12 CCS categories used to classify substance abuse (SA) and mental health (MH) conditions.[1] Since SA and MH are often co-morbid, many facilities offer treatment for both types of conditions so we look separately at the effects of facilities on visits for SA, MH, and co-morbid conditions. A visit is coded as being related to a SA or MH condition if any of the listed diagnoses belong to the relevant CCS categories. Dementia and intellectual disability/developmental disorders are excluded as these conditions are not generally treated in SA-MH clinics (Owens, Mutter and Stocks, 2006). In some specifications, we also break down substance abuse into visits that involved alcohol, and those that involved drugs. These are not coded as mutually exclusive categories – many visits involve both alcohol and drugs.

[1] SA includes alcohol-related (660) and drug-related (661) conditions while MH includes adjustment disorders (650), anxiety disorder (651), ADHD (652), disorders diagnosed in infancy (655), impulse control disorders (656), mood disorders (657), personality disorders (658), schizophrenia (659), intentional self-harm (662), and miscellaneous disorders (670).

In addition, we examine all other ER visits. Other ER visits cannot strictly be considered as a placebo group—it is possible, for example, that substance abuse could predispose people to other diseases such as hepatitis and HIV or to injuries from events like car crashes. However, one might reasonably expect substance abuse clinics to have larger effects on substance abuse visits than on other types of visits.

4. Empirical Models

We focus on two different units of analysis. First, we collapse the ER data to obtain a panel at the census block group-year level. We use these data to ask how ER use varies as the distance to the nearest treatment facility changes. We compute the distance from each census block group centroid to the closest treatment facility on a yearly basis. Specifically, for census block group c in calendar year t, the impact of facility distance on ER visits is estimated as:

$$\left(\frac{ER\ Visits}{Population/100{,}000}\right)_{c,t} = \alpha_c + \rho_t + \beta Distance_{c,t} + \epsilon_{c,t} \quad (1)$$

Where the α_c are census block group fixed effects, and ρ_t are calendar year fixed effects. The census block group fixed effects control for other characteristics of neighborhoods (such as median income and education levels), while the year dummies flexibly account for trends in ER visits over time. Assuming that the included fixed effects adequately control for fixed characteristics of neighborhoods and trends, and that there is sufficient variation in distance to the nearest clinic to identify its effects, the coefficient β represents the causal effect of facility distance on ER use. Conditional on the census block group fixed effects (α_c), β is identified by clinic openings and closings that induce changes in $Distance_{c,t}$. We also control for distance to the closest hospital every year and cluster standard errors at the census block group level. All regressions are weighted by the census block group population in 2010.

To allow for non-linearities in the relationship between distance and ER use, we re-estimate equation (1) with indicator variables for each 1-mile distance band:

$$\left(\frac{ER\ Visits}{Population/100{,}000}\right)_{c,t} = \alpha_c + \rho_t + \sum_{b=1}^{B} D_{c,t}^{b}\beta^{b} + \epsilon_{c,t} \quad (2)$$

where

$$D_{c,t}^{b}=\mathbf{1}[(b-1) < Distance_{c,t} \leq b].$$

Figure 3 gives an example of the type of variation that is used to estimate the effect of distance. Conditional on block group fixed effects, the identifying variation comes from within-block group facility changes, i.e. openings and closings of facilities. The census block group shown in green in Figure 3, has three different facilities that served as the closest facility over the period 2008-2015. From 2008-2010 the closest facility was 1.75 miles away from the centroid of the block group. In 2011, a new facility opened, and the closest facility was 1.6 miles away. Then in 2013, the distance became much shorter when a new facility opened 0.6 miles away.

Our second estimation strategy groups facilities and ER patient data into zip code tabulation area (ZCTAs) and focuses on the first time a substance abuse treatment facility opened in a ZCTA and on the first time a facility in a ZCTA closed. New Jersey has 6320 census block groups and 595 ZCTAs, indicating that there is an average of 10.6 block groups per ZCTA. To get a sense of size, the average New Jersey ZCTA is about five square miles.

Figure 4 shows the distribution of facility openings (Panel A) and how we mapped them into ZCTAs (Panel B). Some ZCTAs had facilities that opened prior to 2008, some had facilities that opened during the 2008-2015 interval, and others only had a facility after 2015. The white areas in the figure never had a facility: They are mainly rural and sparsely populated. We leverage variation in the timing of changes in facility operating status, both openings and closures, to

estimate the causal effect of having any substance abuse treatment facility in the ZCTA on ER utilization.

Figure 5 shows both openings and closings at the ZCTA level. This figure shows that there were consistently more ZCTAs that had a first closure in each year than there were ZCTAs that had a first opening. This pattern is quite different from that shown in Figure 2, which indicated that the number of facility openings was consistently greater than the number of facility closings in each year.

The difference between the two figures reflects the extent of geographical clustering in facility locations. Although many facilities opened, it was relatively rare for an opening to occur in a ZCTA that had no other facilities. Hence, estimates using the ZCTA-level strategy emphasize openings in areas that were facility-poor (since we look at the first opening in a ZCTA). Similarly, although many facilities closed, it was relatively rare for a closure to occur in an area that had no other facilities. Hence, we chose to look at the impact of the first facility to close during our sample period rather than the last. This means that our closure measure is examining the impact of a closure regardless of whether there were other facilities in the area. These slightly different measures of openings and closings may help us to get at the difference between not being able to get to a clinic (because the nearest one is far away) and not being able to get admitted to a clinic in your area because treatment spots are scarce.

The treatment group in these comparisons consists of ZCTAs with a first opening or closing (as defined above) during our sample period. The control group consists of ZCTAs that do not have a first opening or closing between 2008 and 2015. This includes ZCTAs that had a facility prior to 2008 but that did not have an opening or closing between 2008 and 2015 and ZCTAs with an opening/closing after 2015. We also include ZCTAs in the same hospital area as ZCTAs with

a facility even if they had no facility themselves. This means that we have excluded 120 ZCTAs that either never had a facility over the entire period or are located far from those ZCTAs that ever had a facility. These tend to be the most rural and sparsely populated areas of the state. To identify hospital areas, we take all the hospital discharge records and find the hospital that the majority of the residents of each ZCTA went to during our sample period.

Table 2 presents summary statistics for the treatment group and each component of the control group. Looking at the difference between ZCTAs with an opening and those with a closure, shown in columns 1 and 2, we observe that compared to ZCTAs with closures, those with openings were wealthier and less densely populated areas and had a higher fraction of White Non-Hispanic residents. ZCTAs with closures have the lowest median income and the highest SA visit rate among all groups. Columns 3 to 5 report statistics for each sub-group in our control group. As can be seen, ZCTAs with an opening after 2015 (column 4) and ZCTAs without a facility but in the same hospital area as ZCTAs with a facility (column 5) are wealthier and have lower ER visit rates than ZCTAs that ever had a facility.

These level differences between the different areas are less concerning if each type of area shows parallel trends in ER admissions. The validity of our research design relies on the assumption that treatment and control areas would have shown similar growth in ER utilization for substance abuse in the absence of facility openings/closures. Hence, before implementing our difference-in-difference approach we test for the presence of differential pre-trends.

We estimate event study models separately for openings and closings to investigate the validity of this assumption. Specifically, we estimate the following model:

$$\left(\frac{ER\ Visits}{\frac{Population}{100{,}000}}\right)_{z,t} = \alpha_z + \rho_t + \sum_{j=-3}^{+3} \beta_k I\{t = e_z + j\} + \bar{\beta} I\{t < e_z - 3\} + \underline{\beta} I\{t > e_z + 2\} + \epsilon_{z,t}, \quad (3)$$

where the coefficients β_k show the evolution of ER visits with respect to the year before the first substance abuse center opened or closed, e_z. We bin the years outside the effect window [-3,3], represented by $\bar{\beta} I\{t < e_{c(z)} - 3\}$ and $\underline{\beta} I\{t > e_{c(z)} + 2\}$, to separate treatment and secular time effects (Schmidheiny and Siegloch, 2019). Standard errors are clustered at the ZCTA level.

We then estimate a difference-in-difference model that averages the year-specific effects estimated in equation (3). The model takes the following form:

$$\left(\frac{ER\ Visits}{Population/100{,}000}\right)_{z,t} = \alpha_z + \rho_t + \beta\ Facility\ Opened_{z,t} + \delta\ Facility\ Closed_{z,t} + \epsilon_{z,t} \quad (4)$$

where $Facility\ Opened_{z,t}$ is an indicator equal to one if year t is greater than or equal to the first year a facility is observed in ZCTA z. In contrast, $Facility\ Closed_{z,t}$ equals one if year t is greater than or equal to the first year a closure is observed in the ZCTA. The coefficient β represents the causal effect of a facility opening on ER use, and δ captures the effects of closures. Equation (4) also includes calendar year ρ_t fixed effects to flexibly account for trends in ER visits over time, and ZCTA fixed effects α_z to control for time-invariant characteristics. Standard errors are clustered by ZCTA, and all regressions are population weighted using 2010 census population numbers.

5. Results

We begin by asking how ER use varies as distance to the nearest treatment facility changes. The identifying variation is coming from within-block group facility changes over time as equation (1) includes block group fixed effects. Table 3 shows the results of estimating equation (1), which also includes controls for distance to the closest hospital. As shown in column 1, each additional mile from the closest SA facility increases the number of SA-related (SA) visits per 100,000 individuals by 46.9 yearly visits. Relative to the mean number of visits of 2,624, this represents

an increase of approximately 1.8%. Columns 3 and 5 show the same analysis for MH and "all other" visits. Although there is a statistically significant change for "all other" ER visits, the effects are smaller than for SA visits in percentage terms (0.5%).

As for the role of facility selection into neighborhoods, columns 2, 4, and 6 show estimates of equation (1) that exclude the block group fixed effects. These estimates have the opposite sign. Table 1 suggested that facilities are disproportionately likely to be located in poor neighborhoods with many ER visits for substance abuse. The contrast between the OLS and fixed effects estimates suggests that it is important to control for the selection of facilities into specific types of neighborhoods.

Figure 6, panel A shows the effect of distance on SA visits when we allow for non-linearities and replace the $\text{Distance}_{c,t}$ variable with 1-mile distance bins (see equation (2)). These estimates also suggest that block groups that are further from a treatment facility have higher SA visits relative to block groups that have a facility within 1 mile. However, SA visits are only significantly higher in census block groups that are more than 4 miles away from a facility. The facility effect is the same for block groups within 0-3 miles (*F-statistics*: 0.05). These findings are remarkably similar to those of Beardsley et al. (2003), who found (in a much smaller sample) that patients who had to travel more than four miles had significantly shorter length of stay in treatment than clients who traveled less than 1 mile.

Panel B shows the same analysis for MH visits and "all other" ER visits and shows that distance to SA clinics has little effect on these types of ER visits. We can also split the SA visits into those involving alcohol, and those involving drugs. Figure 7 shows that the point estimates are positive for both substances, but that drug visits respond more strongly to proximity to a treatment facility.

This difference could reflect the fact that people often receive treatment for alcohol abuse in settings outside substance abuse centers such as local Alcoholics Anonymous groups.

We also estimate the effects of openings and closings at a higher level of aggregation, the ZCTA. We take the first opening and the first closure and examine how SA visits changed around these events. Once again, we first examine trends in advance of the openings or closings to judge the validity of our difference-in-differences design. Figure 8 plots the event study coefficients for two separate regressions of equation (3). Panel A illustrates the trends around openings, and panel B does it for closings. They both support the design's validity as the pre-trends in SA visits are very similar in the treated and control ZCTAs. Panel A shows that treatment facility openings lead to a decrease in SA visits in the year the facility opened and over subsequent years. Panel B shows clear evidence that facility closings led to increased SA visits in the year of the closure and in the following years. We replicate the analysis for drug and alcohol visits separately in Figure 9. The estimates again suggest that visits related to drug abuse are more responsive to the presence of substance above treatment facilities than visits related to alcohol abuse.

Table 4 reports the pooled difference-in-difference estimates derived from equation (4). As Figure 8 suggests, the estimates in column 1 show that facility openings decrease SA visits while closings increase these visits. The effects are medically and economically significant as SA visits to the ER fall by 6.7% after an opening and increase by 10.7% after a closing. It is interesting that closures have effects that are larger in absolute value than openings even though most of these closures are occurring in areas that had other facilities. This finding indicates that scarce treatment spaces are a real constraint in areas that suffer closures. Closures may also have larger effects than openings because they reflect the fully "ramped up" impact of a center, whereas new centers may take some time to reach their full capacity.

Columns 2 and 3 of Table 4 show that openings have no effect on visits for MH and "all other" ER visits. However, we do find an increase in MH and "all other" ER visits when a facility closes, again suggesting that changes in access to spaces may be more a binding constraint on receipt of treatment than proximity, at least in New Jersey.

Table 5 breaks down substance abuse visits by type. The estimates for all substance abuse visits are repeated from Table 4 in column (1) of Table 5. Column 2 shows that the estimates are similar for patients visiting only for substance abuse (i.e. patients who do not have substance abuse along with some other reason for the visit) and for those with co-occurring substance abuse and mental health diagnoses (column 3). Column 4 shows that our main results are driven by drug-related visits rather than alcohol-related visits. Drug-related ER visits increase by 16.6% after a facility closure and decrease by 9.5% after an opening. In contrast, the effects on visits involving alcohol are not statistically significant, and the point estimates also suggest smaller impacts (column 5).

The incidence of substance abuse disorders differs by demographic group and it is important to identify those groups that are more responsive to changes in access to treatment facilities. Proximity to treatment facilities is likely to impact ER use through decreasing transportation costs. If this is an important channel, then sub-groups who face greater transportation barriers should show larger responses to changes in facility location. To ask whether the effects of openings and closings differentially affect subgroups, we re-estimated equation (1) separately by gender, race, and age group.

Table 6 presents the estimates by gender and race. As can be seen in panel A, treatment effects are stronger for males and for Black individuals. In particular, the response of Black individuals to openings is higher than for any other group, with SA visits decreasing by 9.41% for this group

vs. 6.7% for the entire sample. Black individuals are the only ones who see larger effects for openings than for closings. The effects on ER visits for MH and All Other ER visits (panels B-C) are driven by non-Black individuals, while males continue to drive the results for all types of visits.

Table 7 shows the estimates for different age groups. Panel A shows that there are larger impacts on SA visits among young people (15 to 24) and among older adults (45 to 64), while those in the middle age range (25-44) show the smallest effects. It is possible that people of prime working age are more likely to seek treatment close to work, for example. Openings have larger effects than closings on young people, suggesting that proximity may be especially important for them. For older adults, closings have much larger effects than openings, suggesting that lack of access to treatment spots may be most important for this group.

There are essentially three possible types of substance abuse treatment: in-patient hospital care, outpatient clinics, and residential treatment centers. Over our sample period, the majority of the substance abuse treatment facilities in New Jersey were outpatient clinics. As noted above, the number of patients treated in in-patient facilities was extremely small. The fraction of facilities that were residential declined from 17% in 2008 to 14.6% in 2015, with the change being driven by increases in outpatient facilities rather than decreases in residential ones. Since residential facilities are also smaller on average, the fraction of outpatient patients treated in residential facilities was also relatively small: 7.0% in 2008 and 9.7% in 2015. We have re-estimated the main results from Table 4 excluding residential treatment facilities. The results, shown in Table 8, are quite similar to those discussed above.

It was also relatively unusual for clinics in our sample to offer medication-assisted treatment (e.g. methadone or buprenorphine). Over this time period, a stable 10% of clinics offered methadone, while the fraction offering buprenorphine rose from 17.4% to 24.9%. Hence our

power to measure the effectiveness of different types of treatment is somewhat limited. An additional difficulty is that data on whether a clinic offered MAT or not is not available for every year. However, in Table 9 we show the results of first estimating models excluding clinics that ever offered MAT, and second, focusing only on clinics that we know offered MAT at some point in time. The aim is to see whether the estimated effects of openings and closings are similar. The estimates suggest that we generally find similar effects in both subsamples, though the standard errors are larger in the MAT sub-sample. The only exception is that openings of clinics offering MAT are associated with reductions in ER visits for other causes as well as with reductions in visits for substance abuse.

6. Robustness

Finally, the evidence presented so far is "reduced form" in the sense that we show that openings have an effect on ER visits for substance abuse, but presumably this occurs by getting people into treatment. Hence, we would like to see evidence that openings and closings affect the probability that individuals receive substance abuse treatment. Unfortunately, information on the number of individuals served in substance abuse treatment facilities is available only at the county level, and there are only 21 counties in New Jersey suggesting that county-level regressions are likely to be underpowered.

Table A2 shows a log-log specification where we control for county and year fixed effects. Columns 1 and 2 use all of the available years of data. Column 1 shows that a 1% increase in the number of facilities in a county is related to a statistically significant 27.1% increase in the number of individuals treated. The point estimate in column 2 suggests a rise of 20.6% in admissions, although the coefficient is not statistically significant. Columns 3 and 4 repeat the exercise for

2008-2015 only. The point estimates are similar to those in Columns 1 and 2 but are not statistically significant. Columns 5 to 7 show county-level estimates for ER visits. The point estimates are remarkably similar to those shown above, but this exercise shows that we lack the power to detect effects in county-level data. Even though in these county-level data we lack the power to detect changes, the point estimates for ER utilization are all sizeable and negative.

We also test the robustness of the main results to changes in specification. Table A3 shows the results when we constrain openings and closings have symmetric effects. We replace the opening and closing indicators in equation (2) with an indicator variable, $Open_2$, that takes the value of 1 when a facility opens, -1 when a facility closes, and is 0 otherwise. As it can be seen, the main results hold with the effects on ER visits being driven by SA visits.

Given that areas in New Jersey can vary widely in terms of population, one might be concerned that the results in Table 4 are driven by a few larger areas. Appendix Table A4 reports unweighted regressions. As can be seen, the estimated effects are quite similar to those reported above.

Another possible concern is that other factors could be changing at the same time as the facility openings/closings. To address this issue, in Appendix Table A5 we present estimates of models similar to those above except that they also include county-specific linear trends. The coefficient estimates for openings and closings are about 25% smaller than those in Table 4, but they convey the same message. Thus, our estimates are economically and statistically significant even after controlling for county-specific trends.

6. Discussion and Conclusions

Our study confirms that access to substance abuse treatment facilities has significant effects on drug-related ER visits. Openings in previously unserved areas had large effects: They reduced

drug-related ER visits by 6.7% overall, while they reduced drug-related ER visits among Black people by 9.4%. Closures had even larger effects, even in areas with other facilities, increasing drug-related ER visits by 16.7% overall. These results suggest that constraints on the number of available spaces in treatment facilities were an important barrier to care over our sample period.

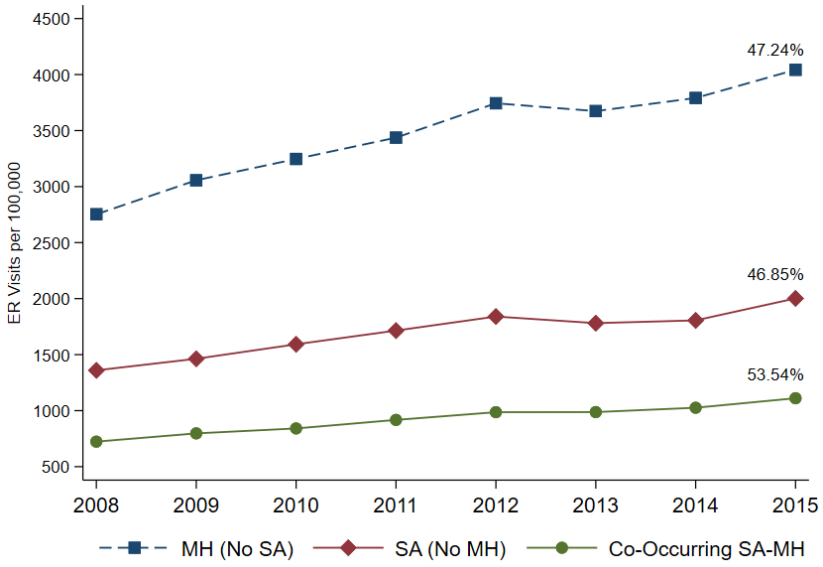
Given the incompleteness of the available data, it is difficult to value the care provided by substance abuse treatment facilities. Karaca and Moore (2020) report that the cost per ER visit for opioid use disorder was about $528 (converted to 2020 dollars). If we take the estimated number of overdoses associated with a facility closing from Table 4 (285), it would suggest that the dollar value of ER visits incurred when a facility closes is $150,480 (2020 dollars) per year. However, to the extent that successful treatment prevents loss of life due to drug overdose, reduces other outpatient and inpatient costs associated with substance abuse, and reduces social costs due to crime and lost wages as well, this figure is clearly an extreme lower bound.

Our results suggest that both physical proximity, and constraints on the capacity of centers are important determinants of access. They further suggest that disruptions in treatment access due to COVID-19 are likely to have had significant negative effects on individuals suffering from substance abuse consistent with recent evidence (Holland et al., 2021; Hulsey, Mello and Kelly, 2020; Currie et al., 2021).

An encouraging finding is that even “garden variety” community care without MAT was shown to have significant positive effects in terms of reducing ER visits for substance abuse. Hence, these results provide support for efforts to scale up the availability of outpatient substance abuse treatment generally.

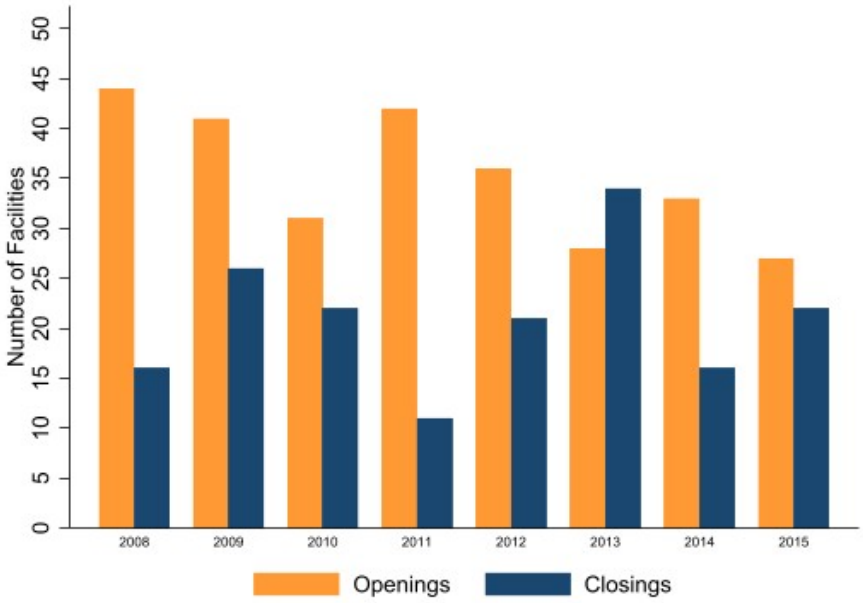
Main Figures and Tables

Figure 1: Substance Abuse and Mental Health ER Visits in New Jersey



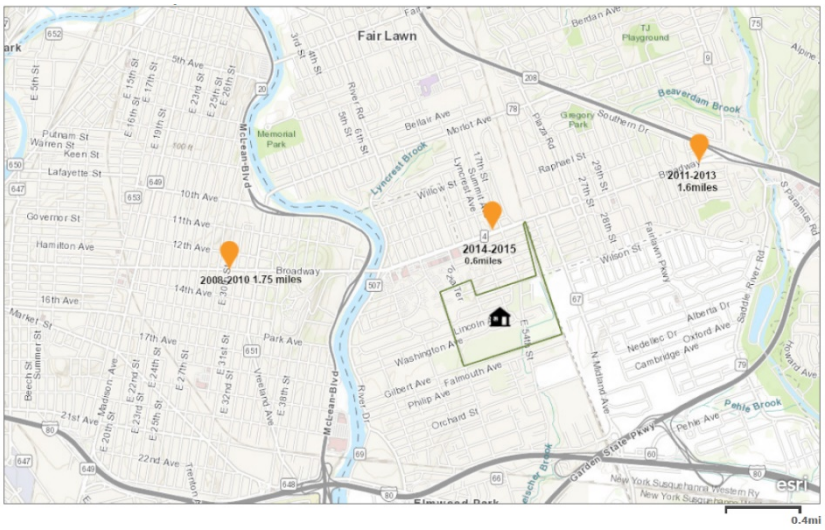
Notes: Figure plots the evolution of substance abuse and mental health related ER visits during our sample period, 2008 to 2015. The numbers at the right side represent the cumulative growth for each condition. 'SA' denotes substance abuse; 'MH' denotes mental health.

Figure 2: New Jersey Substance Abuse Treatment Facilities: Timing of Openings and Closings



Notes: Figure plots the years in which treatment facilities opened and closed in New Jersey between 2008 and 2015.

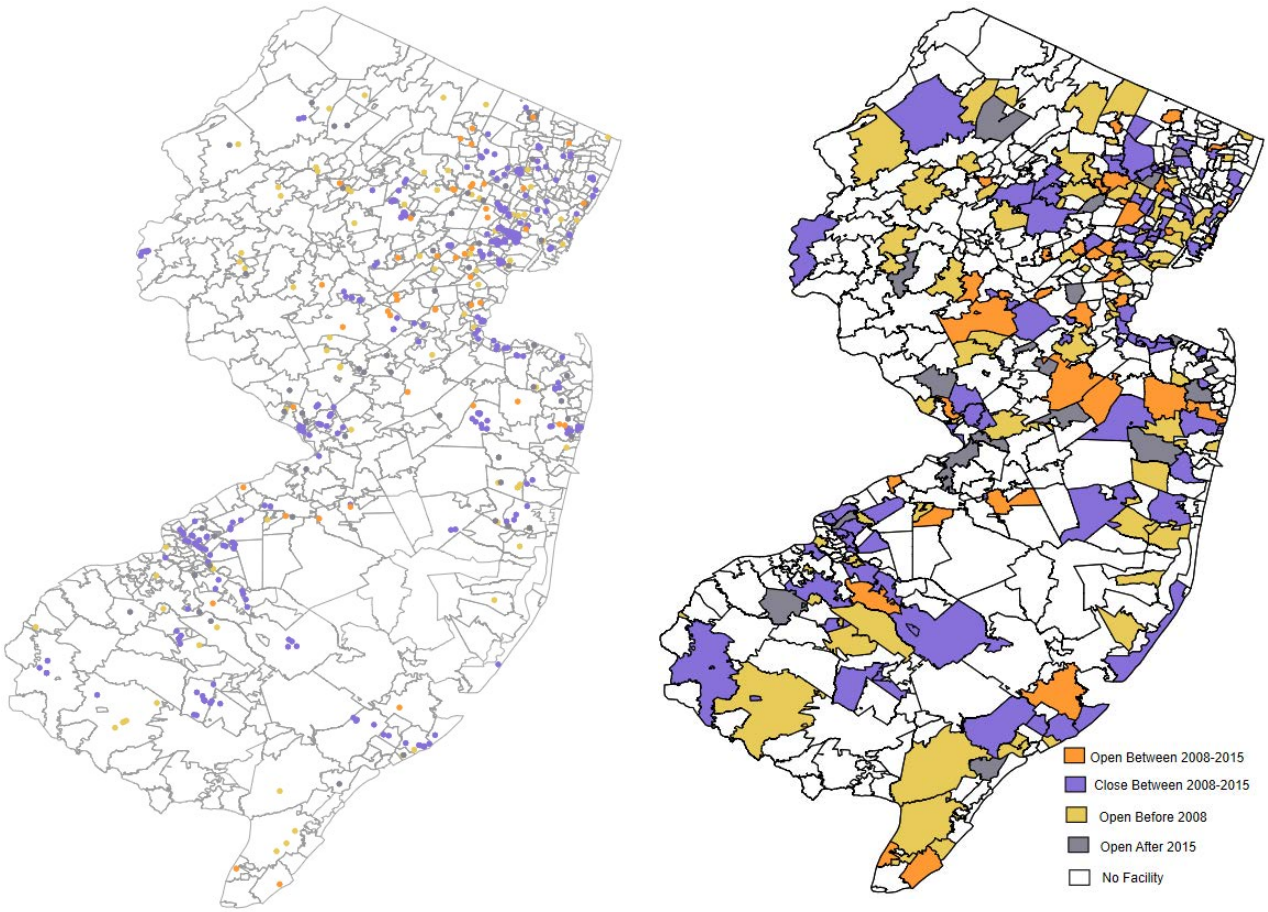
Figure 3: Example of Variation Used in Census Block Group Analysis



Notes: The figure plots the nearest treatment facility to the census block group delineated in green. The house symbol represents the centroid of the census block group. We compute the distance from the census block group centroid to the closest treatment facility for each year. In this example the distance to the closest facility is different in 2000-2010, 2011-2013, and 2014-2015.

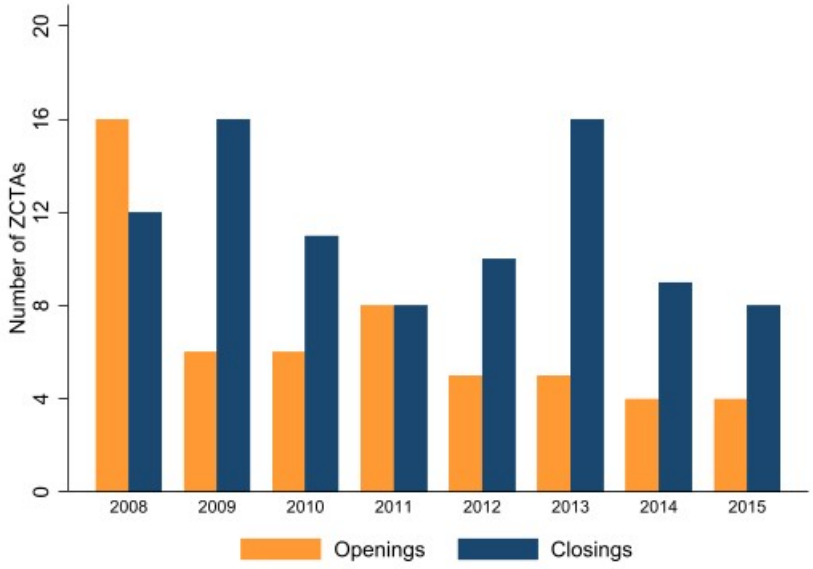
Figure 4: Mapping of Substance Abuse Treatment Facility Openings to ZCTAs

a) Facilities b) ZCTAs



Note: Panel A displays the location and opening dates of the substance abuse facilities that ever operated in New Jersey from 2005 to 2020, and panel B shows the aggregation at the ZCTA level. The opening year at the ZCTA level corresponds to the first time a facility operated in the ZCTA.

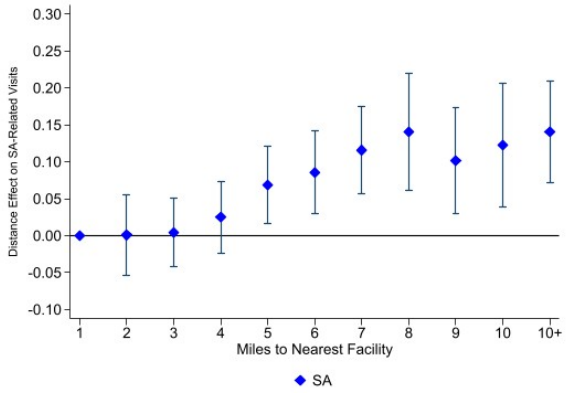
Figure 5: New Jersey Substance Abuse Treatment Facilities: Timing of First Opening and First Closing at the ZCTA Level



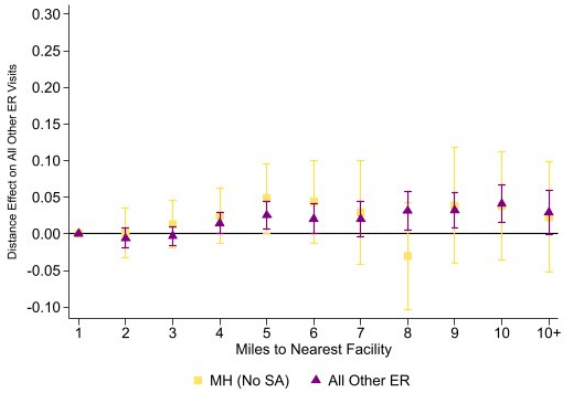
Notes: Figure plots the years in which a facility enters for the first time in a ZCTA, and the years of the first closure.

Figure 6: Effects of Treatment Facility Distance on ER Visits
(Unit: Census Block Group)

a) SA

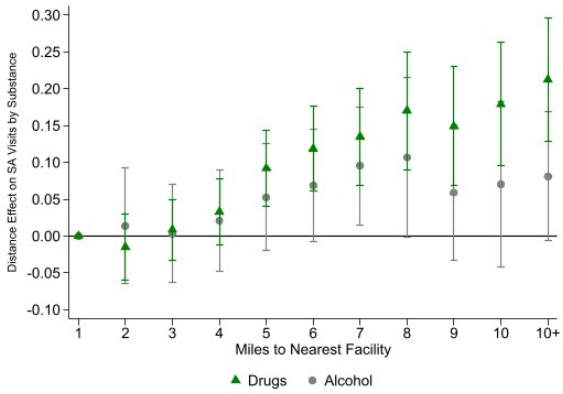


b) Other Visits



Notes: Each figure plots estimates for the indicator variables for each 1-mile distance from the nearest treatment facility. Specifically, each panel corresponds to a separate regression of the number of ER visits for a given condition on census block group fixed effects, year fixed effects, and a full set of 1-mile distance indicators. All regressions are population weighted and standard errors are clustered at census block group level. The vertical lines indicate 95% confidence intervals. 'SA' denotes substance abuse; 'MH' denotes mental health.

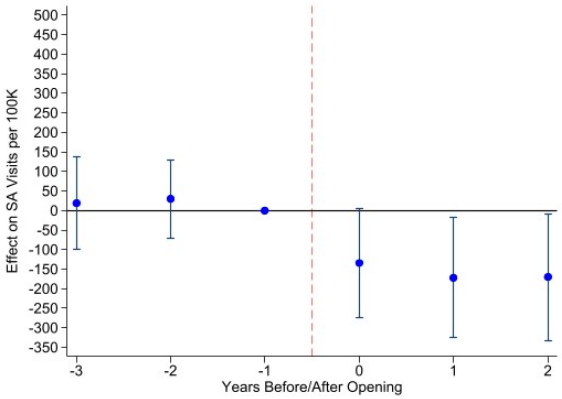
Figure 7: Effects of Treatment Facility Distance on Substance Abuse ER Visits, by Substance (Unit: Census Block Group)



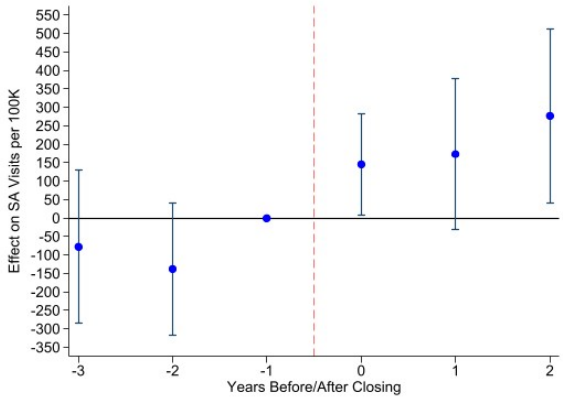
Notes: Each figure plots estimates for the indicator variables for each 1-mile distance from the nearest treatment facility. Specifically, each panel corresponds to a separate regression of the number of ER visits for a given condition on census block group fixed effects, year fixed effects, and a full set of 1-mile distance indicators. All regressions are population weighted and standard errors are clustered at census block group level. The vertical lines indicate 95% confidence intervals. 'SA' denotes substance abuse; 'MH' denotes mental health. “Drugs” indicates any ER visit with a drug code indicated. “Alcohol” indicates any visit where alcohol use is indicated. The two categories are not mutually exclusive.

Figure 8: Effects of Treatment Facilities on Substance Abuse ER Visits
(Unit: ZCTA)

a) SA: Facility Opened



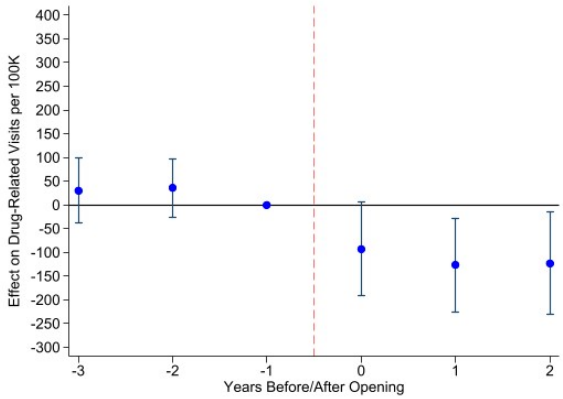
b) SA: Facility Closed



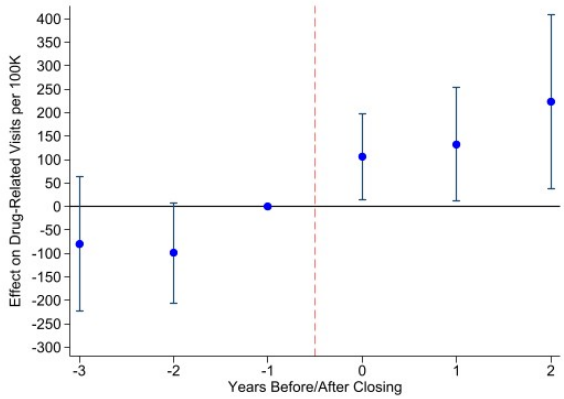
Notes: Each figure plots estimates of the event year indicators interacted with the treatment indicator. Specifically, each panel corresponds to a separate regression of the number of ER visits for a given condition on ZCTA fixed effects, year fixed effects, and a full set of event year indicators interacted with an indicator for opening/closing ZCTA. All regressions are population weighted and standard errors are clustered at ZCTA level. The vertical bars indicate 95% confidence intervals.

Figure 9: Effects of Treatment Facilities on Substance Abuse ER Visits, by Substance (Unit: ZCTA)

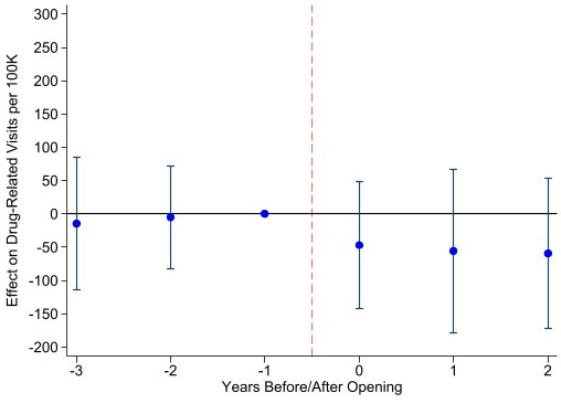
b) Drugs: Facility Opened



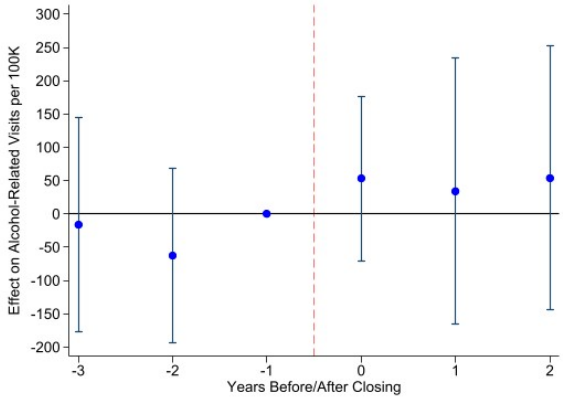
b) Drugs: Facility Closed



c) Alcohol: Facility Opened



d) Alcohol: Facility Closed



Notes: Figure plots estimates of the event year indicators interacted with the treatment indicator. Specifically, each panel corresponds to a separate regression of the number of ER visits for a given condition on ZCTA fixed effects, year fixed effects, and a full set of event year indicators interacted with an indicator for opening/closing ZCTA. All regressions are population weighted and standard errors are clustered at ZCTA level. The vertical bars show 95% confidence intervals. "Drugs" indicates any ER visit with a drug code indicated. "Alcohol" indicates any visit where alcohol use is indicated. The two categories are not mutually exclusive.

Table 1: Summary Statistics of Census Block Groups With and Without a Facility

	(1) With a Facility	(2) Without a Facility
a. Number Block Groups	645	5,640
b. Demographics		
Population	1,483	1,387
Pop.Density	8,722	9,014
Median Income ($)	69,547	80,506
Pct. Black	17.29	13.71
Pct. White Non-Hispanic	55.61	60.33
Pct. Male	48.78	48.42
Pct. High School	29.75	29.49
Pct. Children	18.34	18.50
Pct. Ages 15-24	13.64	12.47
Pct. Ages 25-44	27.41	26.30
Pct. Ages 45-64	26.99	28.16
Pct. Elderly	13.63	14.57
c. ER Use per 100,000 (2008)		
SA	3,696	2,241
Poisoning with Drugs	61	42
MH (No SA)	3,816	2,978
All Other ER Visits	37,890	31,171

Notes: The table presents the number of census block groups by facility status (Panel A), the average demographic information from the 2010 census (Panel B), and ER visits by condition (Panel C). The yearly ER visits are per 100,000 individuals and correspond to the values in 2008, the first year of our sample.

Table 2: Summary Statistics of Opening, Closing and Control ZCTAs in Sample

	Status Changes Between 2008-2015		**Status Is Invariant Between 2008-2015**		**Without a Facility**	
	(1)	(2)	(3)	(4)	(5)	(6)
	Openings	Closings	Open Before 2008 but No Opening/Closing	Open After 2015	Same Hospital Area	Outside Hospital Area
a. Number ZCTAs	54	90	81	22	248	41
b. Demographics						
Population	19,211	22,947	17,740	13,427	9,015	12,011
Pop.Density	3,829	5,355	4,441	2,133	2,597	1,805
Pct. Black	11.83	16.48	9.86	5.76	6.40	5.12
Pct. White Non-Hispanic	66.74	60.10	68.59	77.00	76.24	74.28
Pct. Male	49.56	48.22	48.70	49.47	48.99	49.85
Median Income ($)	86,977	74,068	79,019	100,449	88,344	95,323
Pct. High School	28.78	29.58	30.84	23.24	30.30	22.61
Pct. Children	18.23	17.95	18.63	19.40	18.00	19.98
Pct. Ages 15-24	11.96	12.50	12.09	11.98	11.35	13.16
Pct. Ages 25-44	26.49	26.35	25.76	23.97	24.61	23.86
Pct. Ages 45-64	28.42	28.31	28.89	30.49	29.79	31.70
Pct. Elderly	14.89	14.89	14.62	14.15	16.26	11.30
c. ER Use per 100,000 (2008)						
SA	1768	2576	1989	1424	1495	1128
Poisoning with Drugs	33	47	43	22	38	29
MH (No SA)	2612	3195	2872	2362	2458	1847
All Other ER Visits	24926	32749	28812	21007	23377	20398

Notes: The table presents the number of ZCTA by treatment status (Panel A), the average demographic information from the 2010 census (Panel B), and ER visits by condition (Panel C). The yearly ER visits are per 100,000 individuals and correspond to the values in 2008, the first year of our sample.

Table 3: Effects of Treatment Facility Distance on ER Visits
(Unit: Census Block Group)

	(1) SA $\widehat{\beta^{FE}}$	(2) SA $\widehat{\beta^{OLS}}$	(3) MH $\widehat{\beta^{FE}}$	(4) MH $\widehat{\beta^{OLS}}$	(5) All Other ER Visits $\widehat{\beta^{FE}}$	(6) All Other ER Visits $\widehat{\beta^{OLS}}$
Distance	46.97***	-108.49***	11.62	-55.35***	146.58**	-807.81***
	(10.60)	(12.10)	(14.79)	(15.70)	(61.29)	(93.77)
Demographic Controls	N	Y	N	Y	N	Y
Block Group FE	Y	N	Y	N	Y	N
% mean (+1mile)	1.79	-4.13	0.33	-1.59	0.47	-2.57
Mean per 100k	2624.32	2624.32	3476.94	3476.94	31410.37	31410.37
Observations	50192	50192	50192	50192	50192	50192
R-squared		0.25		0.86		0.96

Notes: Observations are at the census block group and year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year fixed effects and control for distance to closest hospital. Standard errors are clustered by census block group. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table 4: Effects of Treatment Facilities on ER Visits
(Unit: ZCTA)

	(1) All SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
Facility Opened	-179.611***	-46.729	-423.675
	(60.644)	(95.784)	(463.324)
Facility Closed	284.859***	297.678**	1061.673**
	(92.311)	(118.830)	(455.142)
Opened (% mean)	-6.77	-1.34	-1.37
Closed (% mean)	10.73	8.55	3.42
Mean	2653.67	3480.08	31021.61
ZCTAs	475	475	475
Observations	3800	3800	3800

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table 5: Effects of Substance Abuse Treatment Facilities on Types of ER Visits for Substance Abuse (Unit: ZCTA)

	(1) All SA Visits	(2) SA (No MH)	(3) Co-Occurring SA-MH	(4) Drugs	(5) Alcohol
Facility Opened	-179.611***	-120.702**	-58.909***	-125.833***	-60.765
	(60.644)	(49.705)	(21.681)	(37.909)	(46.838)
Facility Closed	284.859***	171.651**	113.208***	221.134***	79.136
	(92.311)	(70.928)	(34.359)	(71.201)	(69.246)
Opened (% mean)	-6.77	-7.02	-6.30	-9.47	-3.80
Closed (% mean)	10.73	9.99	12.11	16.64	4.95
Mean	2653.67	1718.54	935.13	1329.20	1599.35
ZCTAs	475	475	475	475	475
Observations	3800	3800	3800	3800	3800

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table 6: Effects of Substance Abuse Treatment Centers on ER Visits by Gender and Race (Unit: ZCTA)

	(1) All	(2) Females	(3) Males	(4) Black	(5) Non-Black
			Panel A: SA Visits		
Facility Opened	-179.611***	-112.998***	-274.613**	-539.165***	-121.668*
	(60.644)	(40.249)	(120.474)	(186.774)	(63.390)
Facility Closed	284.859***	161.663***	471.926***	510.131*	152.146**
	(92.311)	(62.182)	(157.514)	(264.866)	(59.405)
Opened (% mean)	-6.77	-6.28	-7.05	-9.41	-5.59
Closed (% mean)	10.73	8.98	12.11	8.90	6.99
Mean	2653.67	1799.40	3895.66	5731.10	2176.78
			Panel B: MH (No SA) Visits		
Facility Opened	-46.729	-39.803	-57.988	338.114	-66.437
	(95.784)	(143.683)	(79.464)	(347.913)	(84.156)
Facility Closed	297.678**	288.058*	345.027***	334.146	209.847*
	(118.830)	(157.860)	(103.278)	(234.386)	(108.224)
Opened (% mean)	-1.34	-0.90	-1.95	6.66	-2.06
Closed (% mean)	8.55	6.50	11.62	6.58	6.49
Mean	3480.08	4433.91	2969.47	5075.58	3232.63
			Panel C: All Other ER Visits		
Facility Opened	-423.675	-468.474	-426.029	1134.447	-417.673
	(463.324)	(590.847)	(413.645)	(1156.038)	(438.475)
Facility Closed	1061.673**	1185.846**	1045.911**	161.807	668.490*
	(455.142)	(557.104)	(447.351)	(1196.257)	(401.169)
Opened (% mean)	-1.37	-1.26	-1.47	1.83	-1.59
Closed (% mean)	3.42	3.20	3.60	0.26	2.55
Mean	31021.61	37057.50	29014.11	61995.42	26219.99

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition and demographic group per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table 7: Effects of Substance Abuse Treatment Centers on ER Visits by Age Group
(Unit: ZCTA)

	(1) All	(2) 15-24	(3) 25-44	(4) 45-64
		Panel A: SA Visits		
Facility Opened	-179.611***	-221.243***	-121.302	-219.102**
	(60.644)	(58.331)	(76.910)	(100.963)
Facility Closed	284.859***	193.472**	191.255	444.326***
	(92.311)	(87.605)	(120.215)	(140.773)
Opened (% mean)	-6.77	-10.55	-4.46	-7.71
Closed (% mean)	10.73	9.22	7.03	15.63
Mean	2653.67	2097.67	2720.68	2843.43
		Panel B: MH (No SA)		
Facility Opened	-46.729	-192.679	-9.023	-16.364
	(95.784)	(120.834)	(102.099)	(120.849)
Facility Closed	297.678**	218.206**	232.852*	415.901***
	(118.830)	(105.562)	(122.553)	(151.450)
Opened (% mean)	-1.34	-5.76	-0.28	-0.44
Closed (% mean)	8.55	6.52	7.13	11.09
Mean	3480.08	3345.53	3264.16	3749.48
		Panel C: All Other ER Visits		
Facility Opened	-423.675	27.292	-563.222	-521.783
	(463.324)	(494.691)	(550.175)	(536.033)
Facility Closed	1061.673**	406.560	1073.337**	1555.337***
	(455.142)	(591.774)	(535.958)	(461.194)
Opened (% mean)	-1.37	0.07	-1.71	-1.96
Closed (% mean)	3.42	1.11	3.25	5.85
Mean	31021.61	36635.15	32975.67	26573.37

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition and age group per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table 8: Effects of Substance Abuse Treatment Centers on ER Visits, Openings and Closings of Outpatient Facilities (Unit: ZCTA)

	(1) SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
Facility Opened	-200.033***	-15.099	-414.725
	(60.513)	(110.031)	(518.502)
Facility Closed	226.097***	298.745**	1075.749**
	(79.287)	(125.748)	(474.294)
Opened (% mean)	-7.83	-0.44	-1.35
Closed (% mean)	8.85	8.69	3.51
Mean	2554.07	3437.06	30631.93
ZCTAs	457	457	457
Observations	3656	3656	3656

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table 9: Effects of Substance Abuse Treatment Centers on ER Visits, Openings and Closings
(Unit: ZCTA)

A: Excluding MAT Clinics	(1) SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
Facility Opened	-178.654**	59.955	515.708
	(84.077)	(126.740)	(663.245)
Facility Closed	282.021***	386.360***	1120.458**
	(91.029)	(145.587)	(548.902)
Opened (% mean)	-6.82	1.73	1.68
Closed (% mean)	10.77	11.15	3.65
Mean	2619.03	3466.41	30690.94
ZCTAs	439	439	439
Observations	3512	3512	3512

B: MAT Clinics	(1) SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
Facility Opened	-150.875*	-103.964	-1314.431***
	(78.597)	(124.403)	(434.113)
Facility Closed	329.021	109.282	930.494*
	(220.156)	(160.364)	(539.239)
Opened (% mean)	-6.19	-3.16	-4.45
Closed (% mean)	13.50	3.32	3.15
Mean	2437.75	3289.53	29520.57
ZCTAs	389	389	389
Observations	3112	3112	3112

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health; 'MAT' denotes clinics that ever offered medication assisted treatment such as buprenorphine and methadone.

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Appendix

Table A1: Clinical Classification Software Mental Health and Substance Abuse Categories

Clinical Classification Software	Condition
650	Adjustment disorders
651	Anxiety disorders
652	Attention-deficit, conduct, and disruptive behavior disorders
655	Disorders usually diagnosed in infancy, childhood, or adolescence including pervasive development disorders, tic disorders, and elimination disorders
656	Impulse control disorders, not elsewhere classified
657	Mood disorders
658	Personality disorders
659	Schizophrenia and other psychotic disorders
660	Alcohol-related disorders
661	Drug-related disorders
662	Intentional self-harm/suicide and intentional self-inflicted injury
670	Miscellaneous disorders, including eating disorders, dissociative disorders, factitious disorders, sleep disorders, and somatoform disorders

Note: Classification developed by the Healthcare Cost and Utilization Project (HCUP) of the Agency for Healthcare Research and Quality.

Table A2: Effects of Total Number of Facilities on Individuals Served at Treatment Facilities, Admissions to Treatment Facilities, and ER Visits

	(1) Individuals Served 2006-2018	(2) Admissions 2006-2018	(3) Individuals Served 2008-2015	(4) Admissions 2008-2015	(5) ER Visits For SA 2008-2015	(6) ER Visits For MH 2008-2015	(7) ER Visits All Other 2008-2015
Ln(Facilities)	0.271*	0.206	0.292	0.122	-0.183	-0.175	-0.043
	(0.147)	(0.149)	(0.190)	(0.203)	(0.229)	(0.259)	(0.097)
Mean	2389.42	3333.42	2397.06	3320.39	8372.38	10896.82	99513.23
Observations	272	272	168	168	168	168	168

Notes: Observations are at the county-year level. The dependent variable in each column is the logarithm of each variable. All regressions include calendar year and county fixed effects. Standard errors are clustered by county. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table A3: Effects of Substance Abuse Treatment Centers on ER Visits
[Symmetric Effect]

	(1) SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
$Open_2$	-168.921***	-34.079	-346.422
	(57.862)	(102.293)	(479.577)
Open (% mean)	-6.37	-0.98	-1.12
Mean	2653.67	3480.08	31021.61
ZCTAs	475	475	475
Observations	3800	3800	3800

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. $Open_2$ takes a value of 1 when a facility opens, -1 when a facility closes, and is 0 otherwise. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table A4: Effects of Substance Abuse Treatment Centers on ER Visits
(Unit: ZCTA) [Unweighted]

	(1) SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
Facility Opened	-136.248***	71.740	232.979
	(45.932)	(136.361)	(454.664)
Facility Closed	309.151***	215.273*	1597.007***
	(72.725)	(115.584)	(475.222)
Opened (% mean)	-6.17	2.17	0.85
Closed (% mean)	13.99	6.50	5.82
Mean	2209.93	3309.93	27420.99
ZCTAs	475	475	475
Observations	3800	3800	3800

Notes: Observations are at the ZCTA-year level and are unweighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include calendar year and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.

Table A5: Effects of Substance Abuse Treatment Centers on ER Visits
(Unit: ZCTA) [County Specific Time Trends]

	(1) SA Visits	(2) MH (No SA) Visits	(3) All Other ER Visits
Facility Opened	-143.255***	-41.314	-495.921
	(52.057)	(88.183)	(316.767)
Facility Closed	216.617***	292.469***	762.812**
	(79.108)	(109.710)	(381.069)
Opened (% mean)	-5.39	-1.19	-1.60
Closed (% mean)	8.16	8.40	2.46
Mean	2655.49	3481.11	31040.24
ZCTAs	474	474	474
Observations	3792	3792	3792

Notes: Observations are at the ZCTA-year level and are population weighted. The dependent variable in each column is the number of ER visits for a given condition per 100,000 individuals. All regressions include county specific linear time trends and ZCTA fixed effects. Standard errors are clustered by ZCTA. 'SA' denotes substance abuse; 'MH' denotes mental health.