Behavioral Frictions in Persistent, Repeat Behaviors: A Zero Friction Approach to Addressing the Opioid Crisis*

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Behavioral science has established that frictions lead to a substantial decision-action gap when it comes to one-time decisions, such as retirement savings choices and organ donations. However, it is unclear whether the removal of decision frictions can meaningfully impact behaviors that involve repeat, daily decisions, which in turn account for many of our most pressing social problems. In this paper, we focus on a particularly important and on its face exceptionally hard-to-break behavior—drug use. Prior efforts to reduce decision frictions and shepherd drug users into treatment have led to largely disappointing results, however these efforts missed the key insight we examine in our study—that behavioral responses to frictions might very well be non-linear. We study the largest police-led drug diversion program in the United States, a zero friction approach to linking drug arrestees with substance use treatment immediately within police stations. We find that this approach leads to exceptionally high treatment take-up rates even for a population with especially hard to change behavior. We use a triple difference design to show the beneficial downstream impact of this linkage on the individual and society—lower likelihood of arrest (including for violent and drug offenses) and suggestive increases in connections with some shelter services, albeit no discernible impact on fatal or non-fatal overdose risk.

Keywords: opioids, diversion, criminal justice, recidivism, substance use

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1 Introduction

Behavioral science has established that people's actions often don't align with their intentions, such as when frictions introduce effort to make or carry out a decision. Even small frictions can have an outsized influence on a choice's downstream consequences, as evidence on default options and information search costs in retirement saving choices, in organ donations, and in healthcare and prescription drug plan enrollment decisions shows (Madrian & Shea, 2001; Choi *et al.*, 2003; Kling *et al.*, 2012; Benartzi & Thaler, 2013; Goldin *et al.*, 2020; Domurat *et al.*, 2021; Brot-Goldberg *et al.*, 2023). The evidence suggests that removing frictions via "nudges" can help a great deal with these sorts of one-time decisions.

But what about behaviors that involve countless ongoing decision-making, day after day? These sorts of repeated decisions account for many of our most pressing social problems. To what degree can behavioral economics help address those problems?

In this paper we try to answer that question for a socially costly behavior—drug use, or more specifically, opioid use, which is responsible for about 100,000 American deaths per year. This is about as remote from a one-time decision as one can be, since individuals experience withdrawal every few hours after use. Opioid use also seems to be a behavior to which people are deeply committed, which on its face would seem to make it one that would be hard to "nudge" someone away from. For example, when offered adjudication in drug court to have access to drug treatment and avoid regular sentencing, only 32% of New Yorkers accepted, and 46% failed out of programming, a rate nearly identical to patterns nationwide (Criminal Court of the City of New York, 2017; Brown, 2010).

This paper takes a fundamentally different approach by accounting for the fact that behavioral responses to friction may be non-linear. That is, the effect of going from some friction to less friction may well be much less impactful than going from less friction to *no* friction. For example, drug courts attempt to reduce this friction by offering direct access to a substance use treatment provider; however, it actually takes an average of 101 days after an arrest to be accepted into drug court in New York (Criminal Court of the City of New York, 2017).

Even for police-led efforts to connect individuals with treatment (i.e., after an arrest, so earlier within the criminal justice system process), starting treatment takes 33 days on average (Bastomski *et al.*, 2019).

In this paper, we evaluate a zero friction approach to address arrestees' dependence on illicit drugs. To do so, we examine the impact of removing friction in a way that on its face may seem small, or even trivial: after an arrest, rather than referring someone to a drug treatment program that they must show up to subsequently, make an immediate referral to a drug treatment provider situated within the police station itself. This is the approach adopted by the US's largest police-led drug diversion effort, based in Chicago. We show that this approach results in a treatment take up rate of 87%, well above the upper bound of previous evidence (Bastomski *et al.*, 2019; Elliott, 2020; Mitchell, 2024; Zhang *et al.*, 2024; Gilbert *et al.*, 2025). This take up rate is documented in a setting where officers do not select specific individuals for treatment referrals (i.e., eligibility is predetermined) and threats of future prosecution for noncompliance are nonexistent. Notably, this demonstrates large impacts of small changes in choice friction for a population whose behavioral choices may be particularly hard to influence.

Given that zero friction induces meaningful behavior change, the natural follow up question is whether high treatment take up rates benefit the individual and society at large. To address this question, we generate causal estimates using data from 2010 to 2022 in a triple difference design that exploits the staggered rollout of this approach across Chicago's police districts (starting in 2018) in combination with predetermined, individual-level variation in who was eligible for these connections with treatment providers within police stations.[1] Amongst those eligible for in-station connections with treatment, the overall re-arrest rate fell by 15%, including a 24% reduction in the probability of being re-arrested for drug charges and a 24% reduction in the probability of being re-arrested for violent charges.[2] We also document a large but noisy increase in the probability of being connected with day shelter or emergency shelter

[1] We explicitly account for biases that emerge in conventional three-way fixed effects designs with variable treatment timing by using Borusyak *et al.* (2024)'s imputation estimator.

[2] We implement several tests to show that this reduction is not driven by shifts in officer behavior in response to the program, discussed at length in Section 7.

services.[3] While we are unable to directly test for impacts on drug use, we are able to examine impacts on an arguably extreme manifestation of drug dependence – overdose.[4] Examining data on both fatal and non-fatal overdose, we show that this approach is, unfortunately, unable to affect this tail end outcome.

This paper makes several contributions: (1) it examines the potential of removing frictions in circumstances where downstream costs and benefits are magnitudes larger than the effort separating intention and action; (2) it examines a large-scale demonstration of reducing frictions in accessing treatment for a high-need population with low treatment engagement rates; indeed, Chicago is the largest implementer of police-led diversion, a popular but understudied criminal justice system approach to address the opioid crisis; (3) it accounts for selection on unobservables to generate causal estimates of the impact on fatal and non-fatal overdose risk;[5] (4) it finds suggestive evidence that this approach can have positive spillover effects on linkages with some housing services, a key outcome given the high rates of homelessness among individuals with substance use disorders; (5) it presents novel evidence on which individuals are served by police-led drug arrest diversion, not just in terms of demographic characteristics, but in terms of their history of substance use and engagement with post-diversion treatment; (6) it adds to the growing literature on the beneficial impacts of diversion of low-level offenses away from the criminal justice system (Agan *et al.*, 2021; Mueller-Smith & Schnepel, 2020) and to the literature highlighting the scarcity of effective demand-side policy solutions to reduce fatal drug overdoses (Swensen, 2015; Doleac & Mukherjee, 2022; Packham, 2022; Spencer, 2023).

The remainder of this paper is organized into seven sections. Section 2 describes the institutional setting, and Section 3 describes the datasets used in the empirical analysis. Section 4 outlines the empirical strategy and Section 5 discusses descriptive evidence. Section 6 presents

[3] We document a 2.4 percentage point (32%) increase with a p-value of 0.163. For more details about the distinction between these two types of services, see https://hmis.allchicago.org/hc/en-us/articles/115005113243-Project-Type-Descriptions.

[4] 6% of drug arrestees that are eligible for diversion in non-treatment districts experience a fatal overdose while 10% experience a non-fatal overdose that is captured in administrative data.

[5] Prior work shows that access to treatment can reduce drug-related morbidity and crime, but is largely silent on its impact on mortality (Swensen, 2015; Hefei *et al.*, 2017; Bondurant *et al.*, 2018; Vogler, 2020; Jacome, 2024; Corredor-Waldron & Currie, 2022)

causal evidence of the impact of drug arrest diversion. Section 7 discusses the potential mechanisms, and Section 8 concludes.

2 Setting

Opioid use is widespread in the U.S., and is associated with a range of adverse health and labor market outcomes as well as increased healthcare costs (Maclean *et al.*, 2020). Opioids also account for over two thirds of drug overdoses, which have skyrocketed in recent years (National Institute on Drug Abuse, 2024). Evidence on the impact of regulating the legal opioid market – where individuals' exposure to and dependence on opioids might begin – has been mixed, underscoring the need to connect individuals with substance use disorders to treatment at scale (Neumark & Savych, 2022; Powell *et al.*, 2020).[6]

2.1 Criminal Justice System Responses to Drug Use

The reach of the opioid crisis, as well as a shift in how drug use is viewed—a public health challenge in addition to a legal one—, have broadened criminal justice system responses to drug use beyond criminal indictments (Volkow *et al.*, 2017; Caulkins *et al.*, 2021). As a result of this, initiatives within the U.S. criminal justice system that consider courses of action beyond criminal conviction for certain crimes are increasingly prevalent. These primarily include connections to treatment at or even prior to an arrest (diversion programs), post-arrest (drug courts), and post-conviction (treatment within jails and prisons). While all three approaches share the same end goal of connecting more people with treatment, the latter two are only able to reach a small share of those could benefit from substance use treatment. For example, Chicago's drug court requires a guilty plea and a two-year probation period, and is only able to reach a few dozen people per year (Evans, 2022; Main, 2022). Along the same

[6]Prior research shows that the opening of additional treatment facilities can reduce substance use related mortality and crime (Swensen, 2015; Bondurant *et al.*, 2018). Improving insurance coverage of substance use treatment services has also been shown to be effective in some instances (Wen *et al.*, 2017; Maclean *et al.*, 2018; Dafny *et al.*, 2022; Maclean *et al.*, 2022). However, access to treatment is still stymied, regardless of coverage (Ali *et al.*, 2017).

lines, over 50% of prison and jail inmates meet the criteria for drug dependence or abuse, but less than 15% receive treatment while incarcerated, suggesting that in-prison treatment is rarely a viable alternative (Substance Abuse and Mental Health Services Administration, 2000; Bronson, 2017). Diversion programs, on the other hand, divert individuals away from the criminal justice system as early as possible (sometimes even before they are charged with a crime).[7] As such, they have the potential to connect far more people with treatment. Chicago's drug arrest diversion program, for instance, connected several hundred people with treatment over the same time period that its drug court reached a few dozen.

Diversion programs for narcotics offenses have proliferated at a rapid pace in recent years. By early 2023, there were 617 police departments (up from 153 in 2017) across 40 states with some form of non-arrest treatment linkage program, and over 45 full-fledged post-arrest programs across the country, making diversion one of the most popular policy levers to address drug use and increase treatment access (Beckett, 2014; ICJIA, 2017; LEAD Bureau, 2020).

Despite its popularity, causal evidence on the impact of diversion programs for drug offenses is non-existent. Where small sample or correlational evidence is available, it is largely positive. In Seattle (Washington) and four sites across North Carolina, diversion program participants were less likely to be re-arrested (Collins *et al.*, 2017, 2019; Gilbert *et al.*, 2023); participants in North Carolina also had more outpatient behavioral health visits and higher utilization of medications for treating opioid use disorder; in Contra Costa County (California), over half attended some treatment after being diverted; in San Francisco (California) misdemeanor arrests decreased, but citations increased (Collins *et al.*, 2017; Perry, 2018; Bastomski *et al.*, 2019; Malm *et al.*, 2020). Officer buy-in has been a challenge in some sites – Albany (New York) reported only 43 diversions in its first year, with Worden & McLean (2018) noting that officers believed the program was implemented too quickly.

[7] In addition to drug offenses, diversion programs are common for charges related to sex work (where diversion often takes the form of physical health care, housing, and legal employment support) and charges for individuals with mental health disorders (who usually receive mental health care) (Anglin *et al.*, 2013; Collins *et al.*, 2017; Bird & Shemilt, 2019).

2.2 Drug Arrest Diversion in Chicago

Chicago experiences rates of opioid overdose that are higher than both the state and national average (Illinois Department of Public Health, 2025).[8] The U.S. Department of Justice's Drug Enforcement Agency has also assessed that Chicago serves as the primary distribution hub for opioids and other illegal drugs in the Illinois, Indiana, and Wisconsin region, with the West Side of Chicago being the region's largest opioid market, easily accessed via Interstate 290, also called the *heroin highway* (DEA, 2017).[9] This fact is reflected in the geographic concentration of calls for service and deaths related to opioid overdoses within Chicago, as shown in Figure A2.

The Narcotics Arrest Diversion Program (NADP) emerged as a direct response to the spread of the opioid epidemic within Chicago. The program focuses on averting negative downstream consequences by addressing substance use through supportive instead of punitive interventions. District 11, home to three of five neighborhoods most impacted by the epidemic, was selected to be the first site; in mid-2018, individuals arrested for drug possession eligible for diversion began to be connected to substance use counselors stationed within police stations in lieu of criminal charges. By the end of 2020, NADP had expanded to three neighboring districts on the West Side, Districts 10, 15, and 25; by the end of 2021, the program expanded to serve the rest of the city.[10] Today, NADP is the largest criminal justice system-led drug arrest diversion effort in America.[11]

The program is implemented in participating districts as follows. When an individual is arrested for the possession of narcotics or cocaine, they are taken in to the police station

[8] Figure A1 shows trends in annual age-adjusted opioid overdose death rates for Illinois and the U.S. between 2000 and 2021. As of 2018, Chicago accounted for 37% of all opioid overdoses in the state of Illinois (CDPH 2019, NIDA 2020, Chicago Department of Public Health, 2023).

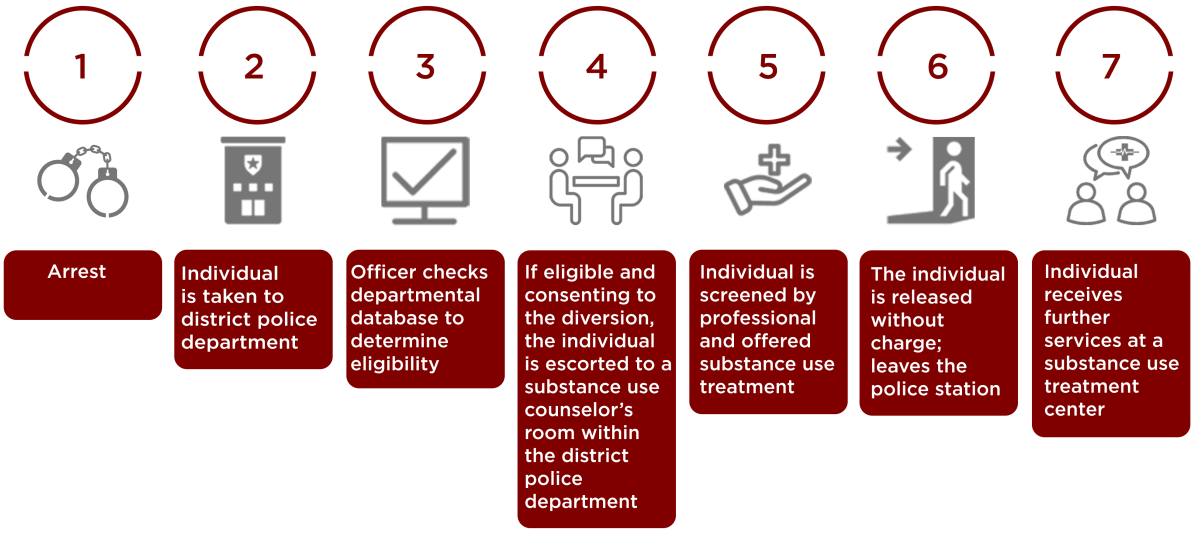
[9] The West Side is also home to a large open-air drug market. For more details about open-air drug markets in the country see Harocopos & Hough (2012). See Chicago High Intensity Drug Trafficking Area (2009) for more details about drug dealing and trafficking in Chicago specifically.

[10] Figures A3 and A4 outline the expansion of NADP in detail. Figure A5 provides additional information on homicide rates across Chicago Police Department districts.

[11] To the best of our knowledge, the only other large (population>1,000,000) cities with narcotics arrest diversion programs are Los Angeles, Philadelphia, and Phoenix, and each of them have served fewer individuals than NADP has in Chicago.

for processing, and placed in lockup.[12] Then, the arresting officer evaluates whether the individual is eligible for diversion. Individuals are eligible if they are at least 18 years old, are arrested with one gram or less of the drug in question, and have a valid form of identification; individuals are ineligible including if the arrest includes a violent offense or felony offense or misdemeanor offense involving a victim in *addition* to the drug offense, or if they have a prior violent felony conviction.[13]

Figure 1: The Diversion Process



Source: Chicago Police Department. Department Notice D18-03.

When an individual is deemed eligible for diversion, they are asked if they are interested in receiving substance use treatment. If they agree, they are connected with a treatment provider called Thresholds located inside the police station. If they do not consent, they are processed as they otherwise would be without the program's presence. During this introductory meeting with the substance use counselor, the individual is assessed for service eligibility, which includes assessing whether they have a substance use disorder. In the rare case where

[12] In the absence of a diversion program, at this point the individual would stay in lockup, be charged with the drug crime, then be moved to bail court. At bail court, they would either be released or held in jail while the prosecutor's office decided whether to bring or dismiss charges against the individual.

[13] As a benchmark, 1 gram of heroin would last an individual with a severe substance use disorder 1-2 days (Addiction Center, 2021). The complete list of qualifying and disqualifying characteristics are listed in Figure A6.

they do not, they are processed as they would otherwise be. An in-depth needs assessment follows, after which the provider offers to connect the individual with the most appropriate substance use treatment service.[14] This usually involves one of two outcomes: the individual is offered substance use treatment by the same treatment provider (Thresholds) or is referred out to another treatment provider; in the latter case, the provider is chosen based on the individual's potential prior engagement with an alternative agency, proximity to their home address, and other considerations.[15] Once the provider is identified, the individual is offered to be taken to a treatment center directly from the police station, or they can opt to go home and attend an appointment scheduled within a few days. Notably, both Thresholds and alternative agencies provide drug-assisted de-addiction services as well as wrap-around services that connect individuals with services such as housing and insurance enrollment. Finally, the diverted individual is officially removed from lockup, and is released without charge.[16] The diversion process from a qualifying individual's perspective is summarized in Figure 1.

NADP is innovative compared to preexisting diversion programs in three ways. First, it places substance use treatment providers within police stations, maximizing the probability of a warm hand-off to a treatment provider, an approach recommended by behavioral health experts (Pace *et al.*, 2018). Second, it does not include the threat of deferred prosecution; in Chicago, diverted individuals are released without charge with no risk of future prosecution as long as they meet with the counselor stationed within the police station (i.e., they do not need to return for treatment after the initial meeting to avoid criminal charges).[17] Figure 2

[14]The conversation opens with the provider going through some basic questions to ask the individual how they are doing in that moment, about their housing and other circumstances, their current and prior drug use, and their potential experiences with overdose and Naloxone, an overdose reversal drug. Once the provider has a clear understanding of the individual's circumstances and needs, the provider and the individual have an active exchange about what kinds of services the individual might be most interested in. This could involve medication assisted treatment, inpatient treatment, outpatient treatment, and additional potential wraparound services such as housing or employment assistance.

[15]A list of the most popular treatment providers is included in Table B1. Table B2 lists the types of services offered by each of these providers; Table B3 provides counts of individuals served by each of these service types.

[16]Those who are not diverted are transported to the Cook County jail and held until further processing at the Cook County courthouse.

[17]Deferred prosecution—where officers file charges with the prosecutor's office but charges are not brought as long as individuals fulfill city-specific treatment-related criteria—are part of most drug diversion programs, including those in Seattle, Santa Fe, San Francisco, and Albany (Collins *et al.*, 2017; New Mexico Sentencing

highlights the stage at which NADP offers a route out of criminal justice system processing. Third, individual-level eligibility for diversion is determined at the program's onset, rather than by officers making a case-by-case determination, a fact we leverage in our empirical strategy.

Figure 2: The Criminal Justice System Process



Source: District of Columbia Statistical Analysis Center (2017).

Overall, NADP presents a fresh alternative to prosecution. Its evaluation will allow us to understand whether long-term, active, and costly criminal justice monitoring (to ensure individuals are meeting the conditions for deferred prosecution) is a necessary component of effective diversion efforts. Its evaluation also allows us to test how crucial the immediate offer of treatment in lieu of further criminal justice system processing is in advancing the well-being of arrestees and of their communities.

3 Data

We rely on seven data sources, described in detail below.

Chicago Police Department Data 2010-22. To measure eligibility for diversion, whether an individual is released without charge, as well as arrests following diversion, we rely on data from the Chicago Police Department (CPD). These data include descriptive information about both the offense and the individuals involved in criminal arrests within the city of Chicago.

Commission, 2018; Worden & McLean, 2018; Malm *et al.*, 2020).

Thresholds Data 2018-23. To track whether individuals are connected with treatment following diversion, we rely on the service provider Thresholds' data.[18] This data is restricted to individuals that consent to having their health information included in the study, and includes participant demographics, substance use history, and length of engagement with Thresholds' counselors. Appearances in Thresholds data are merged with CPD data using using personally identifiable information and the recently developed machine learning matching algorithm, Name Match (Jelveh *et al.*, 2024; Tahamont *et al.*, 2023).

Cook County Sheriff's Office Data 2014-22. We use this dataset to measure appearances in jail and on electronic monitoring. Note that these appearances can cover the pretrial as well as the post-trial period. These records are merged with CPD data using Identification Record (IR) numbers, a fingerprint-based method of identifying arrestees.

Homeless Management Information System Data 2015-22. The Homeless Management Information System (HMIS) in Chicago, managed by the organization All Chicago, tracks interactions with Chicago's homeless service providers. These interactions fall into two broad categories – service seeking (e.g., shelter or temporary housing stays) and service receipt (e.g., via community outreach). Variables in the dataset record the type of linkage, as well as the date of entry into and exit from services. Appearances in HMIS data are merged with CPD data using using personally identifiable information such as name and dare of birth and the recently developed machine learning matching algorithm, Name Match.

Cook County Medical Examiner Data 2010-22. To track the impact of drug arrest diversion on fatal overdoses, we obtained death records from the Cook County Medical Examiner's Office (CCMEO) via a Freedom of Information Act (FOIA) request.[19] This dataset includes case

[18] This includes connections with Thresholds counselors as well as the alternative service providers listed in Tables B1-B3.

[19] CCMEO investigates all human deaths in Cook County within the following categories: criminal violence; suicide; accident; suddenly when in apparent good condition; unattended by a practicing licensed physician; suspicious or unusual circumstances; unlawful fetal death as provided in Public Act 101-0013 of the 101st General Assembly of Illinois; poisoning or attributable to an adverse reaction to drugs and/or alcohol; disease constituting a threat to public health; injury or toxic agent resulting from employment; during some medical

level information on all sudden deaths between 2010 and 2022 within Cook County, including name, date of birth, demographic information, cause of death, date, and location of the incident. These records are merged with CPD data as above using personally identifiable information and the algorithm Name Match.

Chicago Fire Department Data 2016-2020. To examine impacts on overdose events other than fatal overdoses, we rely on 911 calls for service that require an ambulance. This data includes information on the timing, location (latitude and longitude), and description code for the call (e.g., whether it was an overdose). These records are merged with CPD data as above using personally identifiable information and the algorithm Name Match.

2019 CPD Beat Officer Survey Data. To assess opinions about drug arrest diversion among CPD officers, an in-person survey was conducted in District 11 in June 2019 (a year into its operation). Respondents comprised of 115 beat officers—those who patrol and make arrests—and responses were anonymized. Opinions gathered through the survey are used to assess how officers implementing the diversion program perceive its benefits and drawbacks, and how many were implementing it with fidelity.

4 Empirical Strategy

Our empirical strategy compares outcomes for individuals arrested for narcotics possession in districts with and without NADP, pre- and post implementation. We also exploit individual-level variation in eligibility for diversion. This section specifies the difference-in-difference-in-differences (DDD) framework used to identify the impact of arrest diversion on subsequent outcomes. This technique compares drug arrests eligible for diversion with those that were ineligible, before and after the expansion of the diversion program into each CPD district. The

diagnostic or therapeutic procedures; in any prison or penal institution; when involuntarily confined in jail, prison hospitals or other institutions or in police custody; when any human body is to be cremated, dissected or buried at sea; when a dead body is brought into a new medico-legal jurisdiction without proper medical certification.

DDD estimate relies on the assumption that in the absence of the NADP, the difference in outcomes between eligible and ineligible individuals in treatment districts would have evolved similarly to that in control districts.

Central Specification. Figure A3 specifies when police officers were trained in how to implement diversion in their respective CPD districts. This information is used to estimate the following equation:

$$Y_{i,d,t} = \beta_0 + \beta_1 Elig_i * Treat_d * After_{dt} + \gamma_{ed} + \gamma_{dt} + \gamma_{et} + \varepsilon_{i,d,t}$$

$Y_{i,d,t}$ is a criminal justice, housing, or health outcome for individual i in district d in year t. Eligibility-district interactions γ_{ed} allow for permanent differences between eligible and ineligible individuals in different districts. Eligibility-time interactions γ_{et} control flexibly for temporal shocks that may affect eligible individuals more or less than those ineligible for diversion in Chicago. District-time interactions γ_{dt} control flexibly for factors changing at the district-time level that could affect the outcome of interest. Since treatment varies at the individual level, standard errors are clustered at the individual level to account for serial correlation in the outcome variable.

β_1 captures the impact of having NADP-trained patrol officers on our outcomes of interest (i.e., the intent-to-treat estimate). $Elig_i$ is an indicator variable that equals one for individuals eligible for diversion. $Treat_d$ is an indicator variable that equals one if district d trained its patrol officers on how to implement the NADP within its boundaries during the study period. $After_{dt}$ is an indicator variable that equals one if NADP-trained officers were patrolling within district d's boundaries in period t. To account for biases that emerge in conventional three-way fixed effects designs, we generate point estimates and confidence intervals using Borusyak *et al.* (2023)'s imputation estimator.[20]

[20]This estimator is constructed in three steps—(1) group and time period fixed effects are fitted by regression on untreated observations only; (2) these are used to impute untreated potential outcomes, and obtain an estimated treatment effect for each treated observation; (3) a weighted average of these treatment effect estimates is taken, corresponding to the estimation target. This is implemented using the Stata command *did_imputation*.

Event Study Specification. In order to examine the year-by-year impact of diversion, we use the following event study specification:

$$Y_{i,d,t} = \sum_{\tau \geq -n} \beta_\tau Elig_i * Treat_d * After^\tau_{dt} + \gamma_{ed} + \gamma_{dt} + \gamma_{et} + \varepsilon_{i,d,t}$$

$Y_{i,d,t}, \gamma_{ed}, \gamma_{dt}$ and γ_{et} are defined exactly as above. $After^\tau_{dt}$ are indicator variables that equal one if officers were trained on how to divert individuals in district d exactly τ years before period t. For instance, District 11 trained its officers in how to implement the NADP in June 2018, so $After^1$ indicator equals one for District 11 during June 2018 - May 2019, the $After^2$ indicator equals one for District 11 during June 2019 - May 2020, and so on. τ can take on negative values, which allows us to test for (and rule out) differences prior to the policy's implementation.[21]

5 Descriptive Evidence

In this section, we present descriptive information about individuals connected with substance use treatment, and CPD officers' impressions of the diversion program. Overall, we find that the program is able to reach those with medically diagnosed substance use disorders and enjoys the support of CPD officers.

5.1 Individuals Connected With Treatment

To understand who is connected with substance use treatment via diversion, and how long they continue to engage with counselors, we rely on data collected by Thresholds, the service provider embedded within district police stations. We are only able to observe this information for individuals that consented to sharing their health data with the research team, and covers the period July 2018 - December 2023. In total, we are able to analyze data on 831 individuals that were diverted by CPD and 79 individuals that walked into a police station

[21] This is implemented using the Stata commands *did_imputation* and *event_plot*.

seeking treatment. The latter group is not the main focus of the analysis, but provides a useful benchmark against which to compare treatment take-up and engagement rates among those who are diverted by CPD—i.e. those who did not seek out substance use treatment themselves.[22]

Column (1) of Table 1 summarizes descriptive statistics for program participants; column (2) reflects the share of entries for which each variable is missing. 81% of diverted individuals were men, 60% Black, and on, average, 49 years old. 83% report being unemployed. 85% reported using narcotics in the year prior to their screening interview, and among those who did, 75% used it daily. 70% had previously experienced an overdose (though the rate of data missingness for this field is high at 66%). The majority of respondents – 53% – report living in a shelter, on the street, or in some form of non-permanent housing (such as in someone else's apartment). 23% of individuals had appeared in the HMIS data prior to their diversion, reflecting their demand for and/or receipt of housing services.

For individuals who choose to continue with Thresholds as their main treatment provider, there is also information available on their subsequent engagement with treatment services.[23] 98% of respondents for which this data field was filled were classified as meeting the medical criteria for a substance use disorder or a mental health disorder; the substance in question was most often an opioid, and the two leading mental health disorders were depression and bipolar disorder. 87% continued to engage with Thresholds after the initial meeting, and 64% remained engaged in treatment (attending therapy sessions and meetings with counselors) for

[22] Our analysis does not include individuals who needed to be taken to the hospital because of the severity of their withdrawal symptoms, as those individuals were not eligible for diversion under NADP.

[23] After completing the screening, the counselor, who is associated with the main substance use treatment organization, Thresholds, refers individuals for treatment to counselors within their own organization or to other organizations working in the substance use treatment field in Chicago. 18% of consenting individuals are referred to Thresholds during the study period. The substance use treatment offered by Thresholds for this population is fairly standard. Thresholds offers outpatient services which occasionally includes medication assisted treatment (using buprenorphine, brand name Suboxone) if warranted, and focused on providing wraparound services including facilitating access to housing. They also emphasize follow up, regularly reaching out to individuals to ensure sustained support. These characteristics make Thresholds a typical provider rather than an exceptionally service-intensive one, suggesting that the type of treatment access discussed in this paper can be replicated and scaled up in other cities.

Table 1: Individuals Connected With Treatment

	Diverted		Walk-in	
Served by Any Treatment Provider				
	Mean (1)	Missing (2)	Mean (3)	Missing (4)
Demographic characteristics				
Male	81%	0.24	78%	0.38
Average age	49	0.01	48	0.1
Unemployed	83%	0.23	90%	0.38
Race				
Black	60%	0.24	69%	0.39
White	28%	0.24	29%	0.39
Other	12%	0.24	2%	0.39
Substance use characteristics				
Currently experiencing withdrawl symptoms	36%	0.35	28%	0.46
Used narcotics in the past year	85%	0.23	79%	0.39
Narcotics use frequency: Daily	75%	0.28	75%	0.49
Age when first used narcotics	26	0.29	25	0.48
Ever overdosed	70%	0.66	94%	0.77
Overdosed in the past year	26%	0.65	50%	0.77
Ever witnessed another person overdose	68%	0.51	61%	0.52
Ever had naloxone administered to them	34%	0.53	39%	0.52
Has never attended substance use treatment	24%	0.24	13%	0.42
Housing characteristics and housing service engagement				
Lives in shelter or on the street	10%	0.25	38%	0.39
Non-permanent living situation	43%	0.25	38%	0.39
Prior engagement with housing services (HMIS)	23%	0.08	43%	0.56
Observations	831		79	
Served by Thresholds				
Medically diagnosed substance use disorder (SUD)	97%	0.86	100%	0.42
Medically diagnosed mental health disorder (MHD)	38%	0.59	92%	0.21
Medically diagnosed MHD or SUD	98%	0.75	100%	0.24
Engagement with Thresholds after diversion/walk-in	87%	0	82%	0
Observations	449		33	
Engaged with Thresholds 30 days or longer	64%	0.11	77%	0.09
Engaged with Thresholds 60 days or longer	36%	0.14	63%	0.09
Observations	391		27	

Note: Total observations between July 2018 - December 2023 are reported. Narcotics includes heroin, cocaine, and opioids. Variables "Narcotics use frequency: Daily" and "Age when first used narcotics" are only available for those who reported narcotics use in the past year. Variables under the "Served by Thresholds" section are available only for those who were offered services by Thresholds, rather than having been referred out to other providers. (Specifically, it includes observations where either in the referral column filled out at the assessment at the police station Thresholds is named, or if a person shows up as a Thresholds service user as part of the NADP program after their diversion.) Variable "Medically diagnosed mental health disorder" refers to additional disorders outside of substance use disorder. Data Source: Thresholds.

at least 30 days, with a median engagement length of 38 days.[24] The retention rate at 30 days—a measure often used to assess substance use program success—places the program into a similar success range as substance use treatment programs in general, where engagement rates vary between 53-83%, depending on the context (Condelli *et al.*, 2000; Petry & Bickel, 2000; Arfken *et al.*, 2001; Dakof *et al.*, 2001). Another sign of the diversion program's ability to engage individuals well after the initial contact is the favorable comparison to those who self-select into treatment in column (3). This is especially encouraging given that the program connects individuals who are not actively seeking treatment with de-addiction services, without any threat of legal ramifications for non-compliance.

5.2 CPD Beat Officer Survey

In June 2019, after NADP had been active in District 11 for a year, 115 beat officers from District 11 were surveyed to understand how they viewed the diversion effort. 86% of officers reported that did not believe that arrest discouraged future use.[25] When asked about the benefits of diversion, the most popular answers were that it could benefit CPD's relationship with the community, help redirect officer time to other public safety matters, and reduce substance use in the community. As a suggestion for program improvement, officers mentioned the expansion of the program to the rest of the city, which was completed by late 2021. 18% had arrested someone who was later referred to treatment. 40% had shared information about CPD's alternatives to arrest with the public, the vast majority doing so while on duty.

[24] We base the treatment engagement end date on the last date we observe associated with the individual and their service engagement.

[25] This finding is not unique to the Chicago context. Survey evidence from Baltimore, for instance, shows that officers do not believe that arrest is an effective way to discourage drug use (Rouhani *et al.*, 2019).

6 Results

In this section, we present intent-to-treat estimates of the diversion program's impact on eligible individuals.[26] We find that drug arrest diversion increased the probability of being connected with a substance use counselor as well as that of being released without criminal charges. Re-arrest rates fell, including a 24% reduction in the probability of being re-arrested for drug charges, and a 24% reduction in the probability of being re-arrested for violent charges. We also document an imprecise but large and positive impact on connections with day shelter and emergency shelters (32% increase; p-value = 0.16).

While we are unable to directly observe drug use, we take the reduction in drug re-arrest as a positive sign of reduced dependence. We are, however, able to examine two tail end outcomes related to drug use – fatal and non-fatal overdose – both of which are arguably harder to influence and may not be representative of most individuals served by the diversion effort. Unfortunately, we do not find any discernible impact of drug arrest diversion on overdose risk. We discuss each of these findings in detail below.

Throughout this section, we define District 11 as our treatment district and the remaining eighteen non-Westside districts as our comparison districts. These estimates remain informative about the overall impact of diversion as District 11 alone accounts for 40% of all eligible drug arrests in Chicago's 22 policing districts during 2018-2021. We exclude the other three Westside districts – 10, 15, and 25 – from our main sample as there seem to have been some spillover/anticipatory effects of drug arrest diversion in these districts, which we discuss below

[26] Figure A6 summarizes the eligibility criteria for diversion. There are at least three reasons why take-up might not be perfect, creating a wedge between the intent-to-treat and treatment-on-treated estimates. First, individuals were diverted only if the counselor assessing them determined that they would benefit from a substance use program. This is not a large concern because the implementation agency (Thresholds) reported that this was always the case. This is in line with Table 1—97% of consenting participants with non-missing data met the medical criteria for a substance use disorder. Second, when an individual was offered diversion, they could potentially opt to not participate, and elect to instead be charged with the crime of possession, and be taken to bond court the following morning. It was exceedingly rare for a person to decline participation; in the first 1.5 years of implementation, there were only 2 such individuals. Third, some individuals that were eligible did not get diverted because some police officers may not have known about the program, or on-site counselors were not available between the time of arrest and the arrival of the county bus that transports individuals to bond court every morning.

in Section 6.6.

6.1 Direct Impact

In this section, we show that drug arrest diversion increased the probability that an eligible individual was connected with a Thresholds counselor following a narcotics arrest, and made it more likely that they were released without criminal charges. Our estimation sample includes all arrests that include drug charges in Chicago between 2010-21.[27]

Panel A of Figure 3 reflects event study estimates of the impact of drug arrest diversion on connections with treatment providers – we observe a sharp, pronounced increase in the probability of being connected with an onsite counselor as soon as diversion becomes available as an option. Column (1) of Table 2 displays the corresponding point estimate – a precisely estimated increase of 21.9 percentage points (off of a base of 0) in the probability of being connected with an onsite counselor.

Panel B of Figure 3 displays a sharp increase in the probability of being released without criminal charges; corresponding estimates are displayed in Column (2) of Table 2.[28] This estimate – an increase of 31 percentage points – is higher than that observed in column (1) for two reasons. One, we are only able to observe health data for individuals that were diverted *and* consented to sharing their health data; two, the data used in column (1) had its collection temporarily paused largely due to the onset of the COVID-19 pandemic, and only restarted in 2021.

6.2 Subsequent Criminal Justice System Involvement

In this section, we discuss the impact of drug arrest diversion on the probability that an eligible individual was re-arrested following the initial drug arrest. We find that the probability of

[27] We exclude arrests where the drug charges were exclusively marijuana offenses since marijuana was legalized during the study period.

[28] Outside of NADP, being released without charge following a drug arrest is exceedingly rare. Prior to 2018, 0.07% of drug arrests were released without charge in District 11, and 0.09% citywide. Figure A7 depicts the raw data corresponding to this variable.

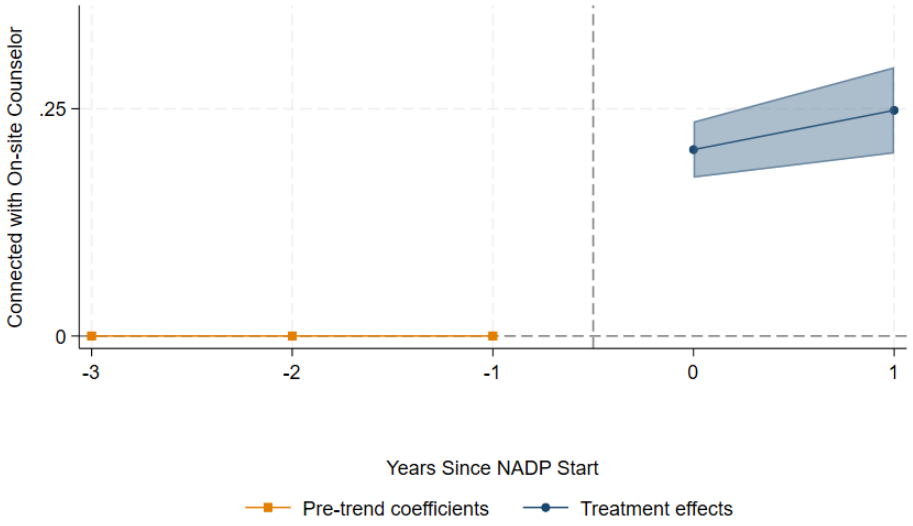
Table 2: Impact of Drug Arrest Diversion

Panel A	*Direct Effect*		*Criminal Justice System*		
	Connected with Counselor	Released without Charge	Any Re-arrest	Drug Re-arrest	Violent Re-arrest
	(1)	(2)	(3)	(4)	(5)
Estimate	0.219***	0.310***	-0.089***	-0.087***	-0.035**
	(0.013)	(0.013)	(0.023)	(0.021)	(0.015)
Mean	0.000	0.000	0.595	0.360	0.144
$\frac{\text{DDD Estimate}}{\text{Mean}}$	.%	.%	-14.9%	-24.2%	-24.2%
N	80,538	85,921	85,921	85,921	85,921
Pretrend Test	.	0.087	0.326	0.226	0.343
Panel B	*Housing*		*Health*		
	Any Housing Services	Day or Emergency Shelter	Fatal Overdose	Any EMS Incident	Substance Overdose Incident
	(6)	(7)	(8)	(9)	(10)
Estimate	-0.012	0.024	0.008	0.014	0.011
	(0.025)	(0.017)	(0.011)	(0.026)	(0.023)
Mean	0.180	0.076	0.059	0.144	0.100
$\frac{\text{DDD Estimate}}{\text{Mean}}$	-6.5%	31.5%	14.2%	9.7%	10.9%
N	33,574	33,574	85,921	25,476	25,476
Pretrend Test	0.180	0.114	0.430	0.721	0.830

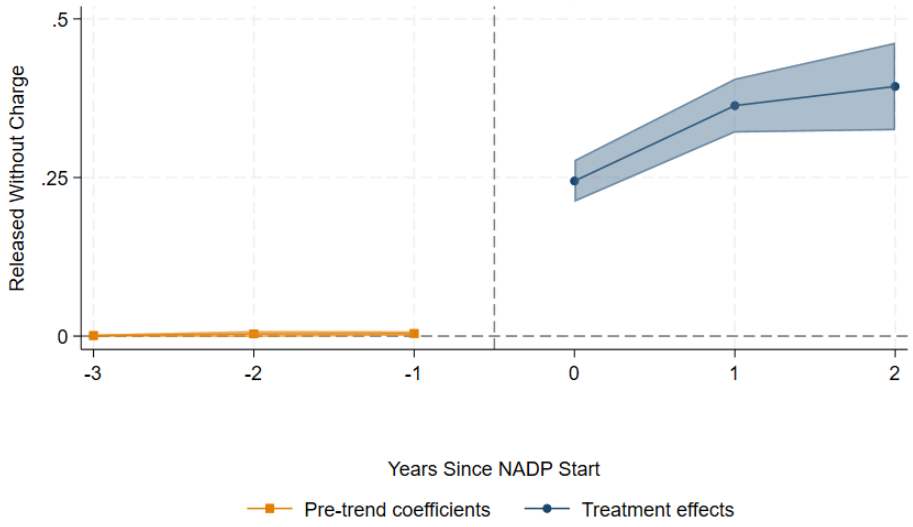
Notes: This table displays the estimated impact of drug arrest diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects. Standard errors are clustered at the individual level, and reported in parentheses. Mean reflects the mean of the dependent variable amongst untreated eligible individuals in control districts. The parallel pre-trends test is based on three pre-treatment periods following Borusyak *et al.* (2023) who recommend not using all pre-treatment periods for this test; results based on the inclusion of more pre-treatment periods are qualitatively similar and available on request. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Data sources: All Chicago, Chicago Fire Department, Chicago Police Department, Cook County Medical Examiner's Office, Thresholds.

Figure 3: Direct Impact of Drug Arrest Diversion

Panel A: Connection with a Counselor + Consent to Share Health Data



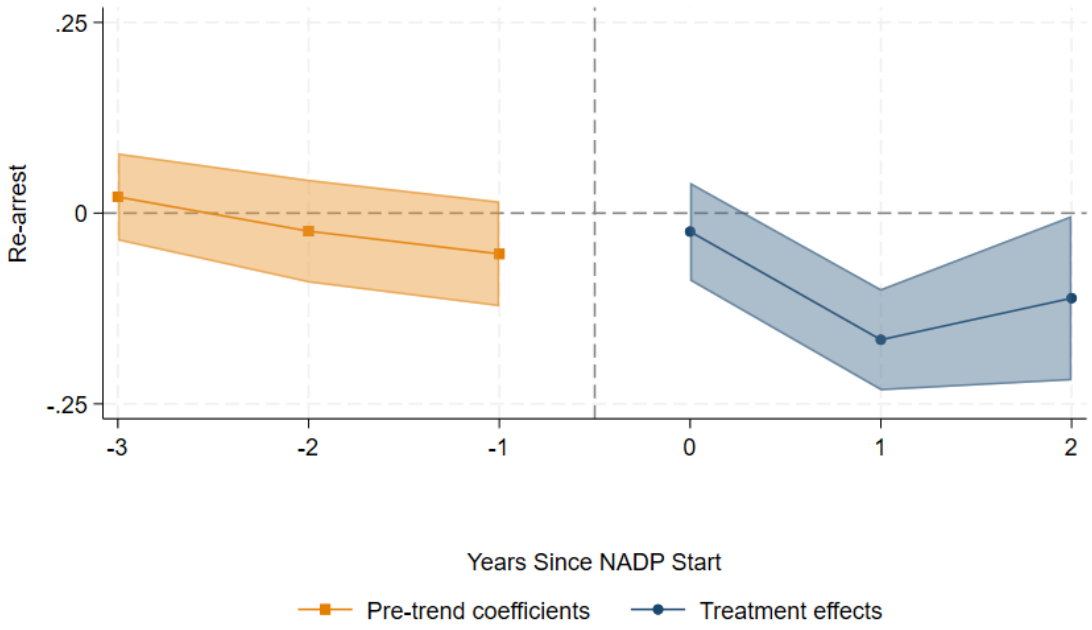
Panel B: Release Without Criminal Charge



Notes: These figures display DDD point estimates and 95% confidence intervals of the impact of diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects, and standard errors are clustered at the individual level. Data Sources: Chicago Police Department, Thresholds.

re-arrest falls (column (3) of Table 2; event study depicted in Figure 4), driven at least in part by reductions in re-arrest for drug and violent charges (columns (4) and (5) of Table 2 respectively). Overall, eligible individuals are 8.9 percentage points less likely to be re-arrested for any offense, 8.7 percentage points less likely for drug offenses, and 3.5 percentage points less likely for violent offenses; these are economically meaningful and amount to reductions of 15, 24, and 24% of their respective means.

Figure 4: Impact of Drug Arrest Diversion on Recidivism



Notes: This figure displays DDD point estimates and 95% confidence intervals of the impact of drug arrest diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects, and standard errors are clustered at the individual level. Data Source: Chicago Police Department.

6.3 Housing Services

In this section, we discuss the impact of drug arrest diversion on the probability of being connected with housing services. Besides substance use treatment and mental health counseling, Thresholds counselors also provided service referrals to address client needs, including

the need for stable housing. This is unsurprising given the discussion in Section 5 – 53% of diverted individuals were not stably housed at the time of diversion, and 23% had had prior engagement with housing services (captured by an appearance in the HMIS data). As such, it is natural examine whether diversion facilitated access to housing services.

Column (6) of Table 2 shows that the probability of appearing in Chicago's Homeless Management Information System (HMIS) is unchanged for the treatment group (the point estimate is small in magnitude and statistically indistinguishable from zero). Column (7) shows, however, that the probability of being connected with day shelter or emergency shelter services may have increased (point estimate equivalent to 2.4 percentage points or 32% of the control mean) but is noisy (i.e., not significant at conventional levels; p-value=0.16).[29] We interpret this as suggestive evidence that the program may have improved individuals' access to services beyond those intended to address substance use.

6.4 Fatal Overdose Risk

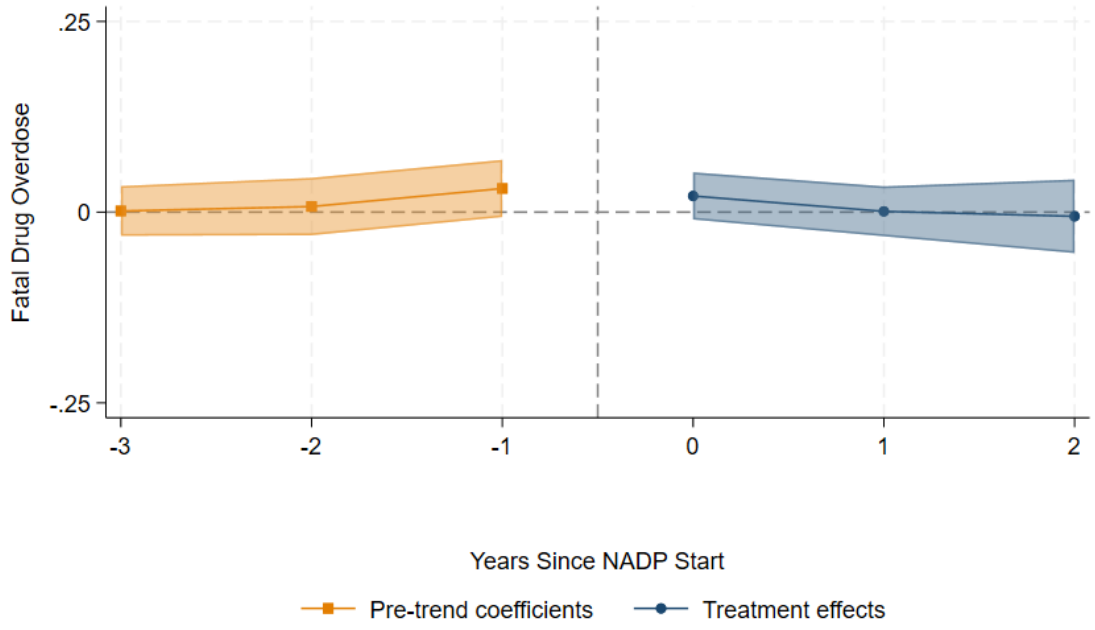
In this section, we discuss the impact of drug arrest diversion on the probability that an eligible individual went on to experience a fatal overdose. This outcome captures the worst possible manifestation of drug use, and is arguably a reasonable proxy for intense and/or prolonged drug use. Of course, those at highest risk of fatal overdose may not overlap perfectly with those who use drugs in large quantities and/or over prolonged periods. As such, this outcome presents a partial test for whether diversion influences extreme drug use.

Figure 5 summarizes our main findings – event study estimates show that diversion does not impact the risk of fatal overdose. Column (8) of Table 2 displays corresponding point estimates. The control mean indicates that approximately 6% of individuals would have gone on to experience a fatal overdose in the absence of the diversion effort. The triple-difference

[29] Chicago's Homeless Management Information System (HMIS) includes records for both service-seeking as well as service-receipt of street outreach, assessments, shelters, transitional housing, etc. For more information about the HMIS, see https://www.hudexchange.info/programs/hmis/. For more details about the distinction between day shelters and emergency shelters, see https://hmis.allchicago.org/hc/en-us/articles/115005113243-Project-Type-Descriptions

point estimate is positive (0.8 percentage points) but is not statistically distinguishable from zero at conventional significance levels. To show that this result is not sensitive to how we define fatal overdose, Table A1 tests for impacts on three additional, closely related measures of fatality: column (1) is identical to the outcome included in Table 2, while columns (2)-(4) show that these results remain unchanged when we include all drug-related deaths (irrespective of whether the case is explicity identified as an overdose), include alcohol-related deaths, or restrict attention just to opioid-related deaths. As such, we conclude that drug arrest diversion did not have a discernible impact on drug-related fatality during the study period.

Figure 5: Impact of Drug Arrest Diversion on Fatal Overdose Risk



Notes: This figure displays DDD point estimates and 95% confidence intervals of the impact of drug arrest diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects, and standard errors are clustered at the individual level. Data Source: Chicago Police Department, Cook County Medical Examiner's Office.

6.5 Non-Fatal Overdose Risk

In this section, we discuss the impact of drug arrest diversion on the probability that an eligible individual went on to experience a non-fatal overdose. As in the previous section, this outcome provides a useful proxy for serious drug use, a phenomenon we cannot observe directly. As it is an imperfect proxy, we continue to interpret the results as suggestive of whether diversion can influence serious drug use.[30]

To do this, we use administrative data on all calls for Emergency Medical Services (EMS) in Chicago between 2016 and 2020. We examine impacts on being involved in (1) any EMS incident; (2) any EMS incident where EMS responders assessed the scene as an overdose.[31] We find that diversion does not appear to reduce the probabilities of a medical emergency in general or non-fatal overdoses (summarized by Figure 6). Columns (9) and (10) of Table 2 present the triple-difference point estimates. These are equivalent to 1.4 and 1.1 percentage points respectively (10-11% of their respective means), but are not statistically distinguishable from zero at conventional significance levels. We take this as evidence consistent with the previous analysis on fatal overdose risk – while diversion is effective at connecting people with ongoing treatment, it may not be able to address drug use for those at highest risk of (fatal or non-fatal) overdose.

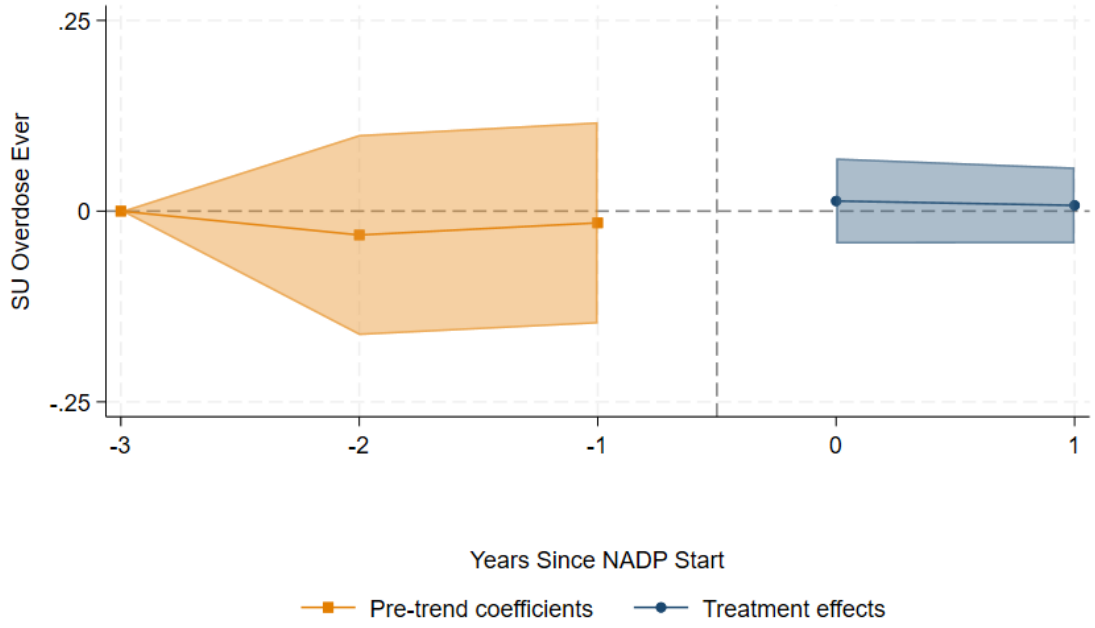
6.6 Expansion of Drug Arrest Diversion

After drug arrest diversion had been active in District 11 for eighteen months, it was gradually expanded to the entire West Side starting with District 10 in December 2019, and Districts 15 and 25 in 2020 (displayed in Figure A4). Our estimates using all the staggered treatment rollout dates and all four treatment districts are displayed in Table A2. This exercise broadly replicates the findings documented above, with the estimated impact on being connected with

[30] Another measure of individual well-being is crime victimization that is reported to the police. Diversion does not appear to influence this outcome; these results are available on request.

[31] Substance overdoses encompass incidents where the patient was experiencing an overdose or other substance use-related event (including alcohol).

Figure 6: Impact of Drug Arrest Diversion on Non-Fatal Overdose Risk



Notes: This figure displays DDD point estimates and 95% confidence intervals of the impact of drug arrest diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects, and standard errors are clustered at the individual level. Data Source: Chicago Police Department, Chicago Fire Department.

day shelters or emergency shelters now significant at the 10% level. The last row, however, shows that the parallel pretrend tests are rejected for several outcomes for this sample. As such, we include these results for transparency but rely on the estimates in Table 2 for our main conclusions.

7 Mechanisms

In this section, we discuss several mechanisms that may explain our findings. We argue that substance use treatment is likely driving the effects we observe by ruling out four alternative explanations. Specifically, we present evidence that changes in police officer behavior, incapacitation, jail time, and being released without criminal charges are unlikely to explain the

patterns we document. We argue that the results are most consistent with the increase in access to substance use treatment, both because of how well this approach identifies individuals who could benefit from treatment as well as prior literature that documents the crime-reducing benefits of expanded healthcare in a variety of contexts.

7.1 Changes in Policing

A potential explanation for the observed reduction in recidivism is that police officers may be less likely to re-arrest someone that they know will end up being diverted. We argue that this explanation is unlikely to hold in our setting for four reasons.

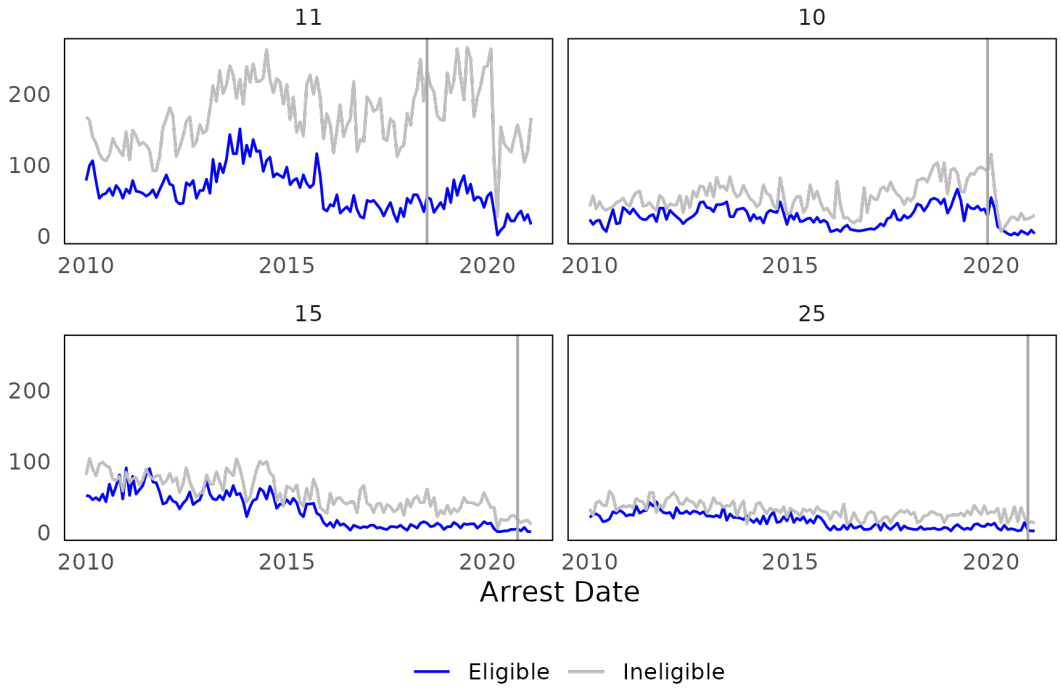
First, it is actually not possible for an officer to assess an individual's eligibility status prior to making an arrest. For instance, prior violent convictions render arrestees ineligible for diversion, but each individual's criminal history can only be determined via the departmental database which can only be accessed once the arrestee has been transported to a police station (i.e., not at the scene of the arrest).[32]

Second, as Figure 7 shows, officers were no less likely to make eligible drug arrests relative to ineligible drug arrests after drug arrest diversion rolled out in each district. We also verify this using statistical tests – in District 11, for instance, the ratio of eligible to ineligible arrests was 0.228 in the year prior to the introduction of drug arrest diversion, and 0.225 in the year after. A t-test is unable to reject the hypothesis of equality of these two coefficients (p-value = 0.89).

Third, any degree of de-policing of all drug arrests would bias our estimates towards zero. This is because the vast majority (four-fifths) of drug arrests are *not* eligible for diversion, and de-policing would result in a reduction in recidivism for the comparison group in addition too the treatment group.

[32] One could also argue that police officers remember specific individuals that are eligible for diversion and have been diverted in the past, and are less likely to re-arrest them. However, for this to be the mechanism driving the results, the same officer would have to be the only officer that had the chance to interface with and re-arrest the individual over a period of 2.5 years (i.e. the length of our follow-up period). Additionally, this would require a substantial share of diverted individuals to arrested repeatedly on diversion-eligible charges, which we rarely observe in the data.

Figure 7: Eligible and Ineligible Arrests



Note: These graphs shows that the monthly count of eligible (blue) and ineligible (gray) arrests did not change discontinuously following the start of drug arrest diversion in each district (demarcated by the vertical line in each graph). The reduction in both eligible and ineligible drug arrests in early 2020 is explained by the COVID-19 pandemic. Source: Chicago Police Department.

Fourth, arrest-avoidance behavior is not consistent with the 2019 officer survey discussed in Section **??**. A sample of 115 officers in District 11 were surveyed a year after the start of drug arrest diversion. The survey found that 86% of officers did not believe arrest discouraged drug use, and 72% agreed that diversion had at least one benefit (including the potential to reduce addiction, free up police time for other public safety matters, and improve community relations).

7.2 Incapacitation

Another channel that may drive the observed reduction in recidivism is incapacitation – i.e., diverted individuals are enrolled in inpatient services and cannot be re-arrested, leading to a

mechanical decrease in recidivism. This argument is inconsistent with how drug arrest diversion was implemented – the vast majority of diverted individuals were referred to outpatient services. Additionally, the recidivism reduction lasts well beyond treatment engagement (median length of 38 days); we show this explicitly in Appendix Table A3, which presents nearly identical reductions in recidivism based on a follow-up period that excludes the first 38 days post diversion.

7.3 Criminogenic Impact of Jail Time

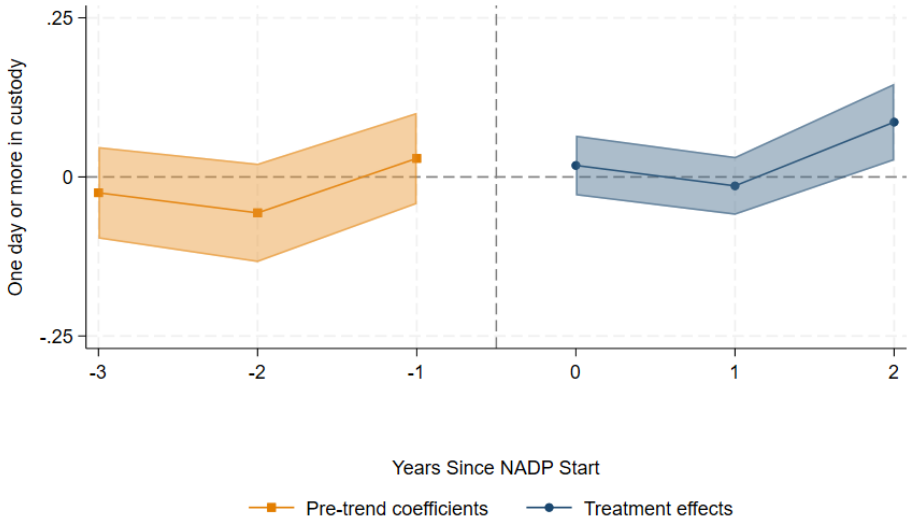
A third explanation for the estimated reduction in recidivism may be that comparison group individuals (i.e., the diversion-ineligible) are more likely to be re-arrested due to the criminogenic impact of jail time. This channel is unlikely to play a major role in our setting—as Table 3 and Figure 8 show, drug arrest diversion reduces the probability of jail time for those who are eligible for diversion, but this reduction is entirely driven by jail time of less than one day. Specifically, we differentiate between those who have at least one overnight stay in Cook County Jail, and those who appear to have been released following their appearance at Bond court (i.e., spend a few hours in jail, but do not continue on to stay overnight), and show that reductions in jail time are driven solely by the latter group.[33] This is because the local prosecutor's office (the Cook County State's Attorney's Office) has deprioritized the prosecution of low-level drug offenses since the mid-2010s.[34] As a result, most low-level drug offenses (i.e., individuals in the comparison group) end in non-prosecution at bond court the day following the arrest.

[33]Prior studies that document the crimonogenic impact of bail and pretrial jail incarceration include Gupta *et al.* (2016) and Dobbie *et al.* (2018), but the median length of incarceration is 200 days in the former, and pre-trial incarceration is defined as greater than 3 days by the latter.

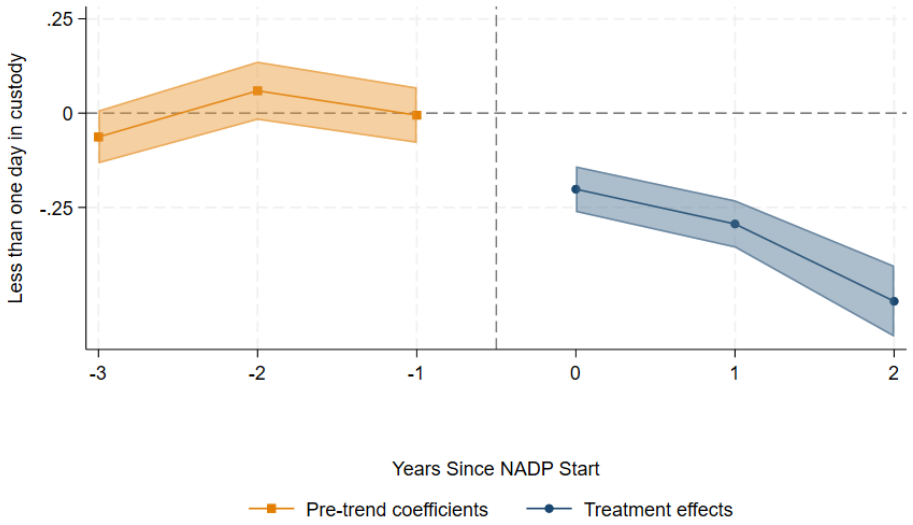
[34]For more details, see https://www.themarshallproject.org/2019/10/24/the-kim-foxx-effect-how-prosecutions-have-changed-in-cook-county.

Figure 8: Impact of Drug Arrest Diversion on Jail Time

A. Jail Time $\geq$ 1 Day (At Least One Overnight Stay in Jail)



B. Jail Time $<$ 1 Day (Likely Released after Bond Hearing)



Notes: This figure displays DDD point estimates and 95% confidence intervals of the impact of drug arrest diversion using drug arrests between 2014-2022 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects, and standard errors are clustered at the individual level. Data Source: Chicago Police Department, Cook County Sheriff's Office.

Table 3: Impact of Drug Arrest Diversion on Incarceration

	Jail $\geq$ 1 Day (at least one overnight stay in jail)	Jail $<$ 1 Day (likely released after bond hearing)
Estimate	0.017	-0.279***
	(0.018)	(0.023)
Mean	0.121	0.636
DDD Estimate / Mean	13.7%	-43.9%
N	40,587	40,586
Pretrend Test	0.132	0.044

Notes: This table displays DDD estimates of the impact of drug arrest diversion on jail outcomes using drug arrests between 2014-2022 in Chicago. Regressions include district-year, year-eligibility, and eligibility-district fixed effects. Standard errors are clustered at the individual level, and reported in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Source: Chicago Police Department, Cook County Sheriff's Office.

7.4 Substance Use Treatment

In this subsection, we argue that connections with substance use treatment providers are likely to explain the lion's share of the reduction in recidivism. This is both because of who drug arrest diversion reaches, as well as prior work on the crime-reducing benefits of healthcare access.

Table 1 summarizes descriptive characteristics of individuals diverted between 2018 and 2023. 98% of diverted individuals with non-missing data met the medical criteria for a substance use disorder or mental health disorder, and 75% reported using narcotics daily. The age at first drug use was 26 while the age at diversion was 49, indicating that drug arrest diversion is not reaching casual, infrequent drug users, but those who could stand to substantially benefit from treatment. Additionally, diverted individuals face no sanctions if they do not return to start treatment. Despite this, 87% of individuals engage with substance use treatment services after diversion, and 36% remain engaged 60 days out. These numbers are predictably lower than those for individuals who self-select into (i.e., walk in for) treatment, displayed in the last column of Table 1, but are encouragingly high. In sum, substance use treatment providers make efforts to continue to engage individuals well after the initial intake

process.

Relatedly, a large literature broadly documents the recidivism-reducing impact of healthcare access. Batistich *et al.* (2021), Deza *et al.* (2022), and Jacome (2024) show that access to mental healthcare reduces crime. On the other hand, a recent working paper by Finkelstein *et al.* (2024) suggests the effects are limited. This is relevant to the present study because of the meaningful overlap of substance use disorder and mental illness, both nationally (Center for Behavioral Health Statistics and Quality, 2019) and in our sample (see Table 1). Wen *et al.* (2017), Bondurant *et al.* (2018), and Aslim *et al.* (2022) show that access to substance use treatment reduces crime. Wilson *et al.* (2006) review 55 experimental and quasi-experimental studies and conclude that court-mandated treatment programs ("drug courts") also reduce recidivism. Kelly *et al.* (2017) use a nationally representative sample to show that those who go through drug courts are more likely to continue seeking out and using support services during their recovery journey; this suggests that diversion, which marries direct service linkage with substantially lower degree of criminal justice contact, may exert similar impacts.

Is this argyment inconsistent with the lack of impact on fatal or non-fatal overdose risk? Not necessarily. Within the pool of individuals with substance use disorders, there is likely to be variation in the risk of overdosing, fatally or non-fatally. Our findings on the recidivism reducing benefits of diversion, especially the reductions in rearrest for drug offenses, indicate that this approach may be chipping away at the demand for drugs amongst a population that uses illegal substances with regularity over long periods. At the same time, it does not appear to hold promise for every subset of this population – specifically, diversion did not reduce the risk of fatal or non-fatal overdose (experienced by 6 and 10% of the control group respectively during the study period).

8 Conclusion

Facing a drug use challenge like few other nations, the U.S. has began ramping up non-punitive approaches to illicit drug use in recent decades. These approaches have included the reclassi-

fication of drug possession charges from felonies to misdemeanors, outright decriminalization, and even full legalization. However, this has left unadressed a persistent and fundamental challenge—only one in eight drug users receive treatment services, without which recovery is exceptionally challenging. Treatment is especially under-supplied within the criminal justice system (Substance Abuse and Mental Health Services Administration, 2000; Bronson, 2017). Drug diversion, which simultaneously removes legal consequences for drug possession *and* provides direct linkage to treatment, is widely considered a promising avenue to address this challenge.

Chicago's approach to drug arrest diversion is currently the largest opioid diversion program in the U.S. Operated by the nation's second largest police department, drug arrest diversion has been connecting eligible individuals on the West Side of Chicago with treatment services since mid-2018. While drug arrest diversion started in District 11, home to the highest number of drug arrests in Chicago and one of the nation's few remaining open air drug markets, support from the Chicago Police Department and the Mayor's Office led to the city-wide expansion of this approach by the end of 2021. Then, the Mayor's Office of Chicago substantially expanded eligibility for the diversion program in May 2022, nearly doubling the number of eligible individuals – chiefly because the program began to permit drug types such as methamphetamine, PCP, and ecstasy; it increased the maximum allowable drug weight from one to two grams; and it made violent convictions within the past ten years (as opposed to at any time prior to the diversion) a disqualifying characteristic.

This paper provides descriptive evidence that drug arrest diversion is well-targeted. It serves individuals with very high rates of medically diagnosed substance use disorders, who could substantially benefit from participation in substance use treatment and counseling. Despite the fact that drug arrest diversion connects individuals who are not actively seeking treatment with counselors, we observe treatment engagement lengths similar to that documented in contexts where treatment is actively sought out by individuals themselves. The substance use treatment provided to participants is similar to what providers across the coun-

try supply, suggesting that a treatment-centric drug diversion approach can be successfully implemented elsewhere as well. Further, survey evidence indicates that drug arrest diversion enjoys favorable opinions among police officers; 4 out of 5 officers in our survey do not consider arrest to be helpful in discouraging future drug use, and a large majority consider drug arrest diversion to have several benefits, including the potential to reduce substance use and demand for drugs, and improve police-community relations. Finally, we use a triple difference framework to show causal evidence of this approach's impact on increasing the number of individuals arrested on low-level drug charges that are released without criminal charges, and the substantial downstream benefits in terms of reductions in subsequent re-arrest, including drops in re-arrest for drug and violent offenses. We also document an imprecise increase in linkages with some types of shelter services, but do not find that diversion is able to move the needle on reducing the risk of overdose.

Overall, these findings indicate that it is possible to proactively connect those with opioid use disorders with de-addiction treatment and other services, reduce the reach of the criminal justice system, and simultaneously increase public safety. More research is needed to understand how to help the subset of those with substance use issues that are at highest risk of overdose.

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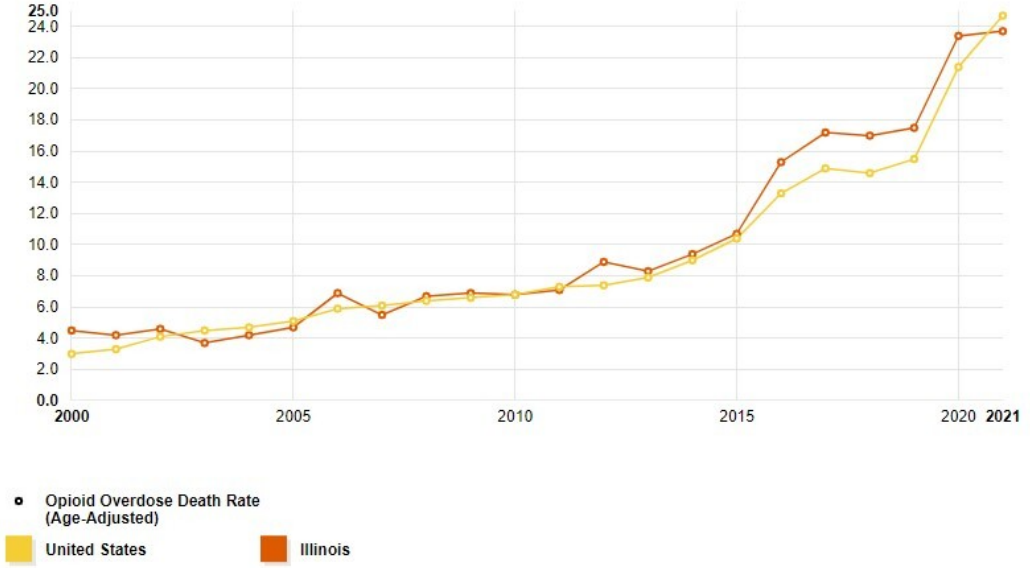
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Appendix A

Figures

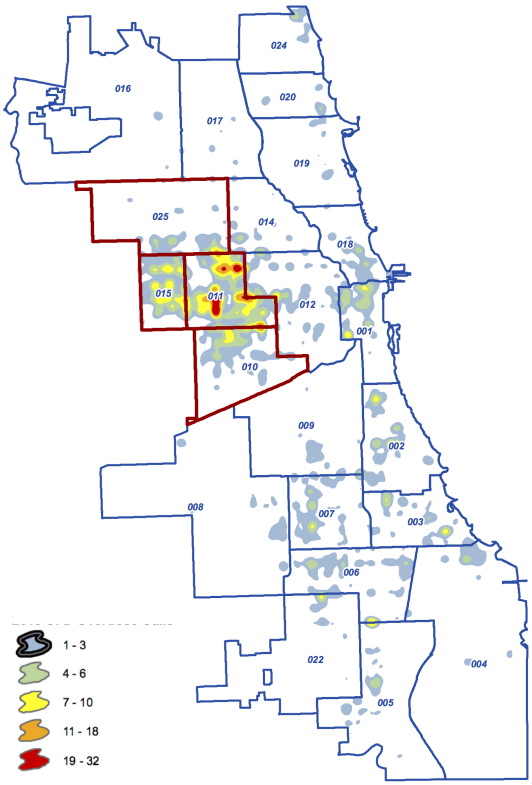
Figure A1: Age-Adjusted Opioid Overdose Death Rates: Illinois and the United States



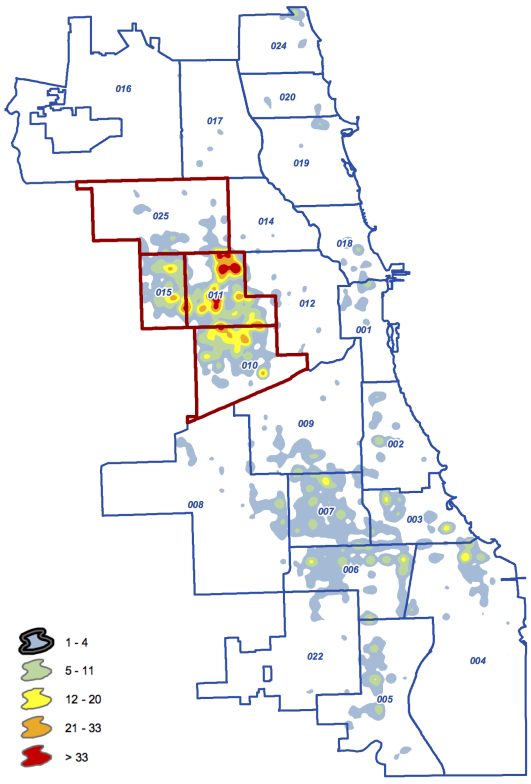
Source: Opioid Overdose Death Rates, State Health Facts, Kaiser Family Foundation.

Figure A2: Overdose Calls for Service and Narcotics Arrests in Chicago in 2018

Panel A: Overdose Calls For Service

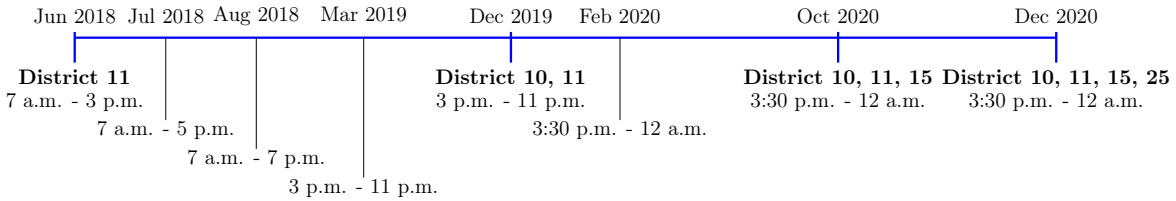


Panel B: Narcotics Arrests



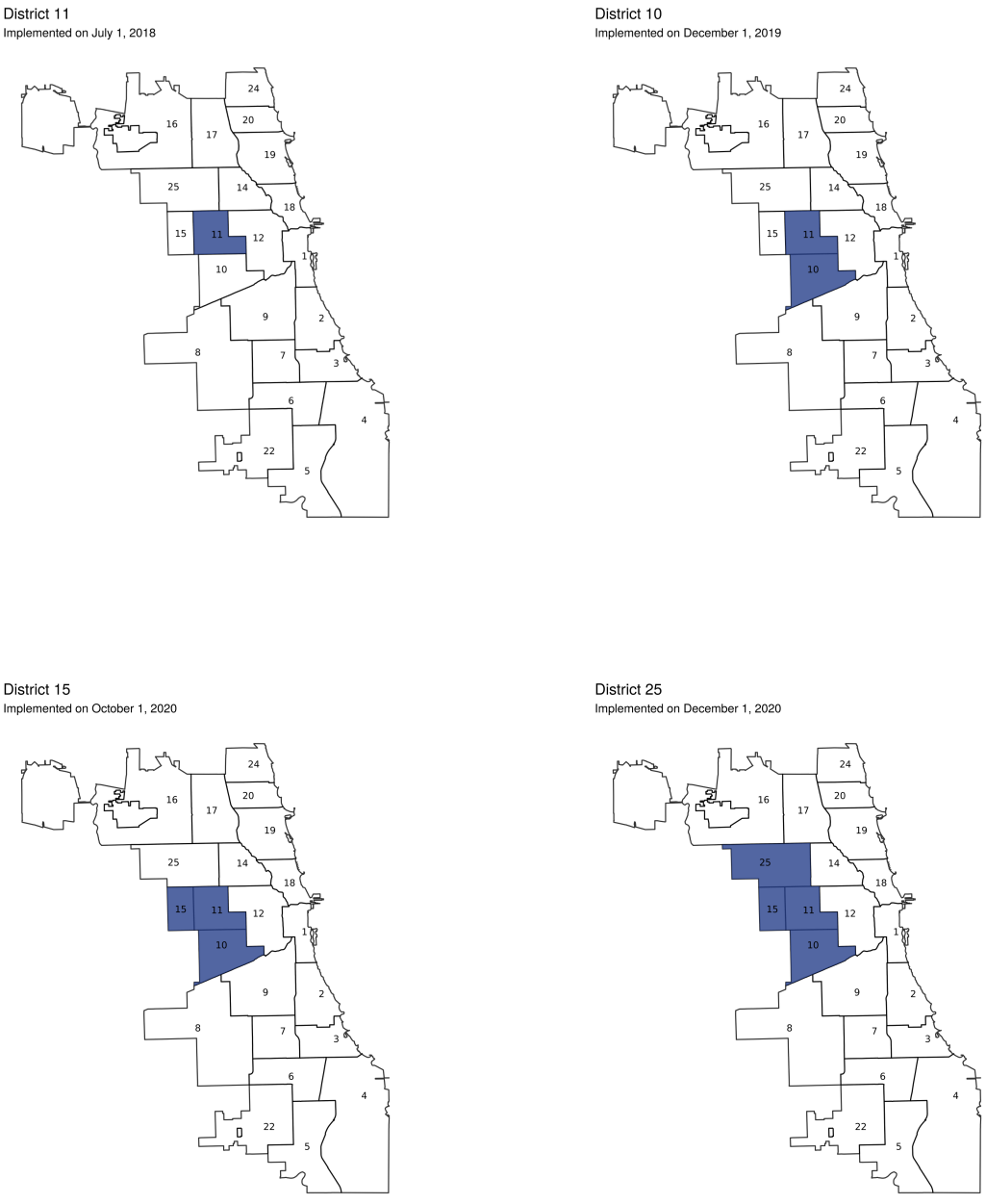
Source: Chicago Police Department CLEAR Data Warehouse, Office of Emergency Management and Communications Bureau of Technical Services PSIT GIS Print Date: 04-JUN-2019. West Side districts in red.

Figure A3: Implementation



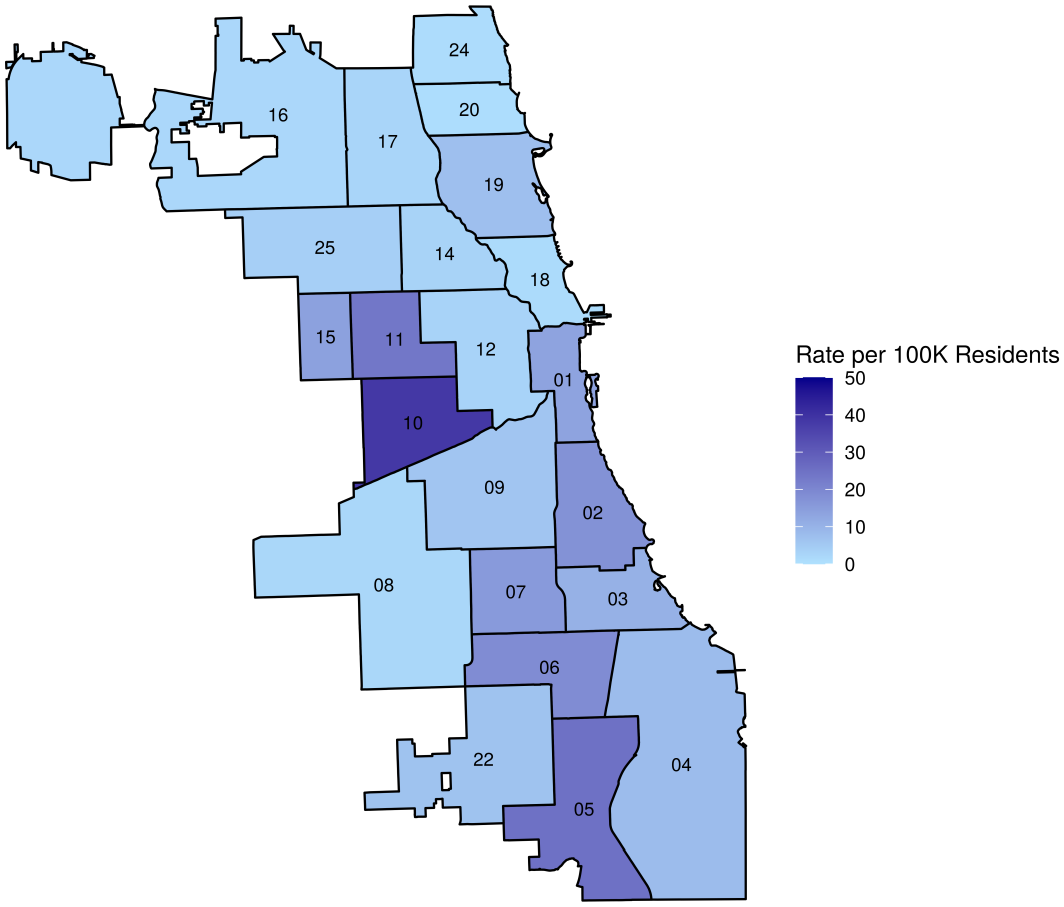
Notes: This figure depicts the expansion of the Narcotics Arrest Diversion Program across Chicago Police Department (CPD) districts between 2018 and 2020. CPD officers were trained on how to identify arrestees eligible for diversion in District 11, 10 and 15 during June 2018, December 2019, and October 2020 respectively. This figure also reflects changes in on-site counselor hours during the expansion; the change from 7 a.m. - 3 p.m in 2018 to 3:30 p.m. - 12 a.m. in 2020 was made in order for Thresholds (the addiction recovery agency providing on-site counseling services) to be able to screen and offer treatment to more individuals each day. However, we find that (a) counselors actively encouraged all officers during drug arrest diversion's roll out training to call them off hours as well if they have an eligible individual in custody, and (b), eligible individuals are indeed very often diverted outside of official hours too. Therefore, we do not differentiate treatment based on hours, but consider all times eligible.

Figure A4: NADP's Spatial Expansion Between 2018 and 2020



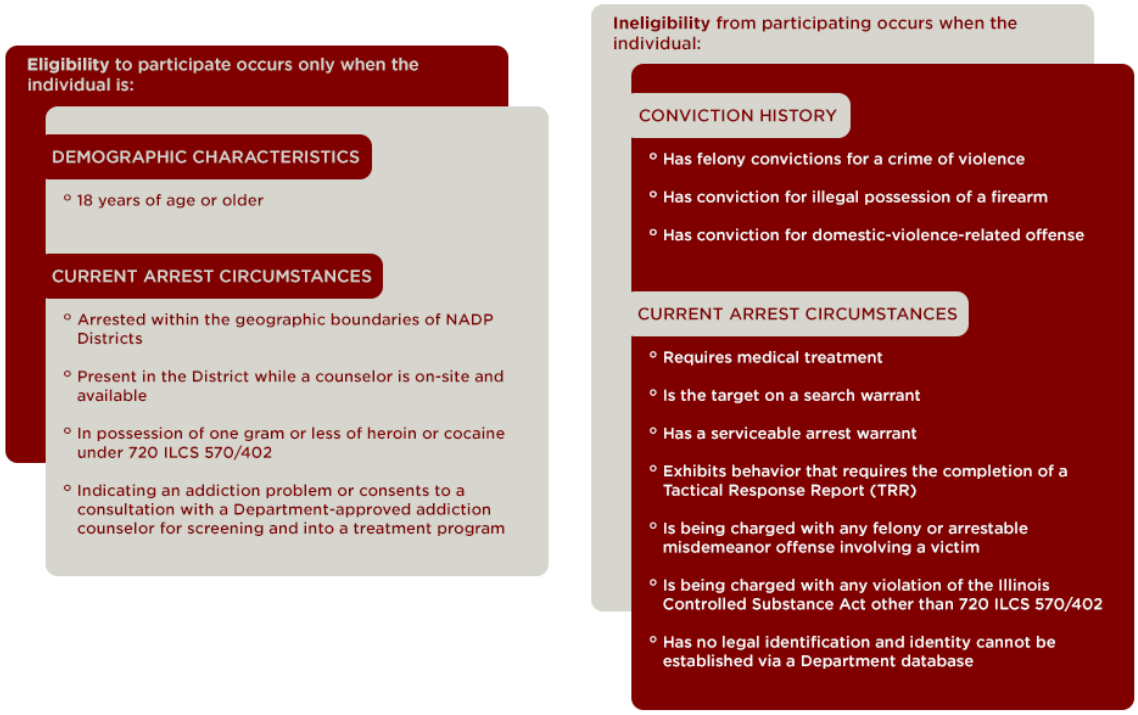
Source: Chicago Police Department.

Figure A5: Homicide Rate in Chicago in 2018



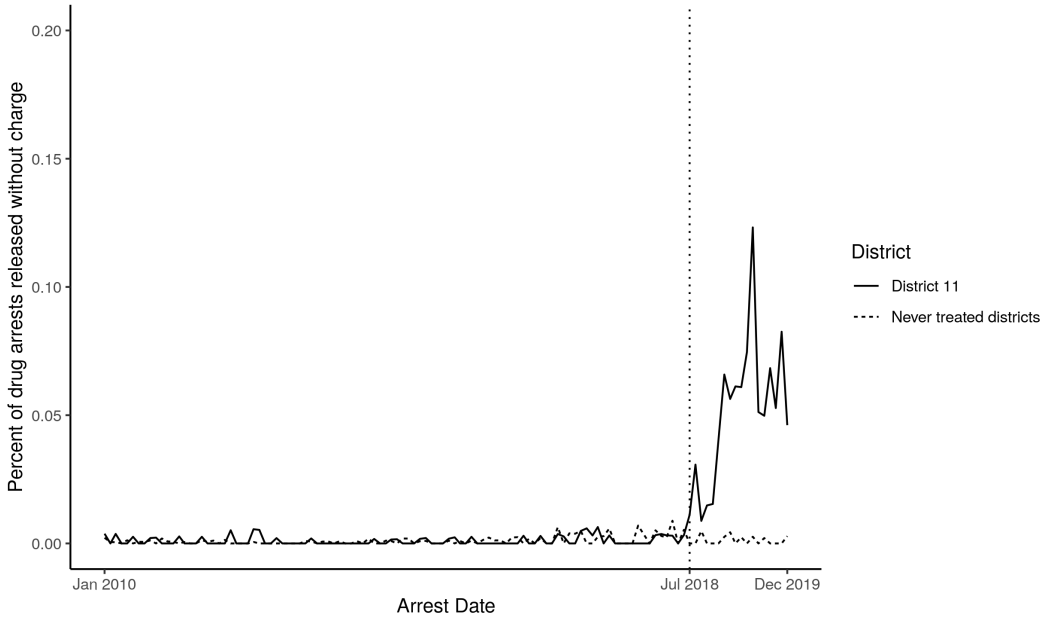
Source: Chicago Police Department.

Figure A6: Eligibility Criteria for Drug Arrest Diversion



Notes: An up-to-date list of qualifying and disqualifying circumstances are available via the CD Directive here. The restriction on repeated diversions was lifted in July 2020; individuals can now be diverted multiple times, regardless of previous program engagement. The results of this study focus on findings prior to this change. Source: Chicago Police Department.

Figure A7: Drug arrests released without charge



Note: Vertical line at District 11's implementation date. Source: Chicago Police Department.

Tables

Table A1: Impact of Drug Arrest Diversion – Drug-Related Deaths

	Fatal Drug Overdose	Any Drug-Related Death	Fatal Overdose (any substance)	Fatal Opioid Overdose
	(1)	(2)	(3)	(4)
Estimate	0.010	0.011	0.011	0.008
	(0.011)	(0.012)	(0.012)	(0.011)
Mean	0.059	0.061	0.060	0.059
$\frac{\text{DDD Estimate}}{\text{Mean}}$	16.8%	17.5%	18.1%	14.2%
N	85,921	85,921	85,921	85,921
Pretrend Test	0.443	0.591	0.435	0.430

Notes: This table displays the estimated impact of drug arrest diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Column (1) identifies deaths where the description mentions any drug type, excluding alcohol, and mentions the words "overdose," "intoxication," or "toxicity." Column (2) identifies deaths where the description mentions any drug type, excluding alcohol. Column (3) identifies deaths where the description mentions the words "overdose," "intoxication," or "toxicity." (Therefore, Column (1) captures the overlap of Columns (2) and (3).) Lastly, Column (4) identifies deaths where the description mentions an opioid, and the description mentions the words "overdose," "intoxication," or "toxicity." Regressions include district-year, year-eligibility, and eligibility-district fixed effects. Standard errors are clustered at the individual level, and reported in parentheses. Mean reflects the mean of the dependent variable amongst untreated eligible individuals in control districts. The parallel pre-trends test is based on three pre-treatment periods following Borusyak *et al.* (2021) who recommend not using all pre-treatment periods for this test; results based on the inclusion of more pre-treatment periods are qualitatively similar and available on request. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Data sources: Chicago Police Department, Cook County Medical Examiner's Office.

Table A2: Impact of Drug Arrest Diversion – Expansion

Panel A	*Direct Effect*		*Criminal Justice System*		
	Connected with Counselor	Released without Charge	Any Re-arrest	Drug Re-arrest	Violent Re-arrest
	(1)	(2)	(3)	(4)	(5)
Estimate	0.180***	0.258***	-0.067***	-0.078***	-0.022*
	(0.011)	(0.010)	(0.019)	(0.018)	(0.012)
Mean	0.000	0.000	0.595	0.360	0.144
$\frac{\text{DDD Estimate}}{\text{Mean}}$	.%	.%	-11.3%	-21.8%	-15.1%
N	107,762	114,554	114,554	114,554	114,554
Pretrend Test	0.800	0.070	0.022	0.004	0.166
Panel B	*Housing*			*Health*	
	Any Housing Services	Day or Emergency Shelter	Fatal Overdose	Any EMS Incident	Substance Overdose Incident
	(6)	(7)	(8)	(9)	(10)
Estimate	-0.000	0.026*	0.011	0.023	0.020
	(0.020)	(0.013)	(0.010)	(0.020)	(0.018)
Mean	0.180	0.076	0.059	0.144	0.100
$\frac{\text{DDD Estimate}}{\text{Mean}}$	-0.2%	33.6%	18.1%	15.8%	19.8%
N	43,986	43,986	114,554	33,814	33,814
Pretrend Test	0.760	0.982	0.367	0.842	0.664

Notes: This table displays the estimated impact of drug arrest diversion using drug arrests between 2010-2021 in District 10, 11, 15, and 25 as treatment districts, and the rest of the city's eighteen districts as control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects. Standard errors are clustered at the individual level, and reported in parentheses. Mean reflects the mean of the dependent variable amongst untreated eligible individuals in control districts. The parallel pre-trends test is based on three pre-treatment periods following Borusyak *et al.* (2023) who recommend not using all pre-treatment periods for this test; results based on the inclusion of more pre-treatment periods are qualitatively similar and available on request. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Data sources: All Chicago, Chicago Fire Department, Chicago Police Department, Cook County Medical Examiner's Office, Thresholds.

Table A3: Impact of Drug Arrest Diversion – Excluding the First 38 Days after Initial Arrest

Panel A	*Direct Effect*		*Criminal Justice System*		
	Connected with Counselor	Released without Charge	Any Re-arrest	Drug Re-arrest	Violent Re-arrest
	(1)	(2)	(3)	(4)	(5)
Estimate	0.219***	0.310***	-0.088***	-0.077***	-0.032**
	(0.013)	(0.013)	(0.023)	(0.021)	(0.015)
Mean	0.000	0.000	0.579	0.352	0.142
$\frac{\text{DDD Estimate}}{\text{Mean}}$	.%	.%	-15.2%	-21.9%	-22.2%
N	80,538	85,921	85,921	85,921	85,921
Pretrend Test	.	0.087	0.391	0.598	0.347

Panel B	*Housing*		*Health*		
	Any Housing Services	Day or Emergency Shelter	Fatal Overdose	Any EMS Incident	Substance Overdose Incident
	(6)	(7)	(8)	(9)	(10)
Estimate	-0.006	0.027	0.007	0.005	0.005
	(0.024)	(0.017)	(0.011)	(0.025)	(0.022)
Mean	0.174	0.073	0.059	0.133	0.092
$\frac{\text{DDD Estimate}}{\text{Mean}}$	-3.6%	36.7%	11.2%	3.8%	5.3%
N	33,574	33,574	85,921	26,153	26,153
Pretrend Test	0.228	0.105	0.418	0.702	0.509

Notes: This table displays the estimated impact of drug arrest diversion using drug arrests between 2010-2021 in District 11 and eighteen control districts. Regressions include district-year, year-eligibility, and eligibility-district fixed effects. Standard errors are clustered at the individual level, and reported in parentheses. Mean reflects the mean of the dependent variable amongst untreated eligible individuals in control districts. The parallel pre-trends test is based on three pre-treatment periods following Borusyak *et al.* (2023) who recommend not using all pre-treatment periods for this test; results based on the inclusion of more pre-treatment periods are qualitatively similar and available on request. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Data sources: All Chicago, Chicago Fire Department, Chicago Police Department, Cook County Medical Examiner's Office, Thresholds.

Appendix B

B1 Substance use treatment linkage and potential treatment characteristics among the diverted individuals

When an individual is diverted and connected with the treatment provider (Thresholds counselor) sitting in the police station, the extensive needs assessment conversation results in linkage to a specific provider agency around Chicago, depending on the individual's needs. In selecting the best fitting provider for the person, the counselor considers the person's needs beyond their substance use, as well as their geographical preferences within the city. We find in Table B1 that the Thresholds counselor links individuals to a total of 55 different providers, suggesting a highly personalized individual-provider match. Of all matches, 53% of individuals are linked to receive treatment from Thresholds itself, whose counselors sit in the police station.

Table B2 captures the types of services the top 15 treatment providers provide. Inpatient/residential services are provided by less than half of these providers, while the majority provide outpatient services. Medication assisted treatment is similarly available at the majority of providers, and so are mental health services. Medically managed detox is offered by 47% of these providers. Taking the combination of how many people were referred to a particular provider, and what services the provider offers, in Table B3 we calculate the upper bound of potential services received by diverted individual. (This upper bound assumes that everybody started treatment and use all treatment types available at a given provider, where both of this assumptions are unlikely to be entirely the case in practice.) We find that at the absolute most, 46% of individuals could have received inpatient services as a result of the diversion, while 51% could have received outpatient treatment and 41% medication assisted treatment. Similarly, half of individuals could have received mental health services.

Table B1: Top 10 Service Providers where Thresholds Referred Individuals

Service Provider	N	%
Thresholds	482	53%
Family Guidance	29	3%
Haymarket Center	19	2%
Gateway Foundation	16	2%
Loretto	9	1%
Pilsen Wellness Center	8	1%
Women's Treatment Center	8	1%
Healthcare Alternative Systems	7	1%
New Age	7	1%
St Anthony	7	1%
New Vision	6	1%
Total for Top 15 Service Providers	116	67%

[1] 910 individuals were diverted to Thresholds and consented to data sharing during the periods we received data, from July 2018 to December 2019, and May 2021 to Dec 2023.
[2] 193 individuals were sent to 55 different treatment providers by Thresholds.
[3] 39 individuals were referred to multiple service providers (e.g. for different service types). In these cases, for this table, if they were referred to Thresholds or served by Thresholds, we assign them as Thresholds referral, and otherwise we assign them to the first referral listed.
[4] 235 individuals were excluded from the table because they were referred to an unspecifed service provider, declined referral, or deferred the decision to a follow-up meeting with Thresholds since they were unable to make a decision at the time

Table B2: Services Offered by the Top 15 Service Providers

Service Provider	Inpatient	Residential	Outpatient	MAT	MH Services	MMD	Toxicology
Thresholds			X		X		
Family Guidance	X	X	X	X	X	X	X
Haymarket Center	X	X	X			X	
Gateway Foundation	X	X	X	X	X		
Loretto					X		
Pilsen Wellness Center				X	X	X	
Women's Treatment Center	X	X	X	X		X	
Healthcare Alternative Systems	X	X	X	X	X		
New Age			X	X	X		
St Anthony					X		
New Vision	X					X	
Rincon Family Services			X	X	X	X	X
Above and Beyond							
Chicago Family Health Center							
Southwood Interventions	X	X	X			X	
Garfield Counseling			X		X		
% of Top 15 Service Providers Offering Service	47%	40%	60%	47%	60%	47%	13%

[1] Family Guidance and New Vision also offer hospital handoff services.
[2] Information on services offered by each provider was hand-collected through reviewing each provider's website.

Table B3: Maximum Number of Individuals Receiving Services from Top 15 Service Providers

Services Offered	N	%
Inpatient	89	46%
Residential	83	43%
Outpatient	98	51%
MAT	80	41%
MH Services	91	47%
MMD	79	41%
Toxicology	34	18%

[1] Individuals referred to Thresholds are excluded.
[2] Denominator is the number of individuals referred to service providers other than Thresholds.
[3] 193 individuals were sent to 55 different treatment providers by Thresholds.
[4] Counts for each service are not mutually exclusive.