Reducing Re-arrests through Light Touch Mental Health Outreach

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Abstract

One quarter of people in jail have a severe mental illness, and we study a county in a multi-state area that screens all inmates to identify those with this condition. Immediately after exit from jail, county staff attempt to contact and connect these individuals to a mental healthcare provider and they successfully connect clients to a provider in one quarter of the cases. As residents of neighboring counties are not eligible for outreach, we compare residents and non-residents exiting the same jail in a difference-in-differences design. When the mental health outreach program begins, 60-day recidivism rates fall by 8 percentage points more for residents than for non-residents. Measured effects at one year have a similar magnitude but less precision. These effects are consistent with a reduction in early recidivism persisting and are larger for people without a history of mental healthcare.

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1 Introduction

Over the past few decades, the large volume of interactions between those with mental illness and all sectors of the criminal justice system has challenged both the health profession and public safety. An estimated one-quarter of people in jails and one-seventh of people in prisons have some serious mental illness, numbers three to five times the rate in the general population (Bronson and Berzofsky, 2017). When the definition of mental illness is broadened to include more minor conditions, incidence rates are in excess of 50 percent for the incarcerated (James and Glaze, 2006). This problem has its roots in a number of different trends, including the increasing fraction of the population with a mental health condition, mass supervision by the criminal justice system, and the de-institutionalization of treatment of mental illness. The result is that many describe the criminal justice system as the modern alternative to mental hospitals of old. Roth (2018) argues that corrections facilities "...have become the nation's de facto mental healthcare providers, although they are hopelessly ill-equipped for the job."

The mental health crisis in the correctional system has led many communities to consider ways to diminish the harm the justice system has on those with mental illness or ways to reduce criminal behavior for those with mental illness. These alternatives are as diverse as mental health courts and "housing first" models that subsidize housing. This paper estimates the impact of a very different, low-cost intervention in Johnson County, Kansas. The county is a mostly suburban area on the southwestern side of Kansas City, Missouri. With over 600,000 residents, it is the largest county in Kansas and contains the second largest city in the Kansas City metro area (Overland Park).

In November of 2016, Johnson County started conducting a Brief Jail Mental Health Screen (BJMHS) to assess whether detainees in jail had severe mental illness. The BJMHS is a validated tool to identify severe mental illness and is considered particularly accurate for men (Steadman et al., 2005). The BJMHS is offered to all bookings at Johnson County Jail. Starting in March 2017, if the detainees' responses to the survey indicate Severe Mental Illness and they live within Johnson County, they are referred to the Johnson County Mental Health Center's (JCMHC) after-hours team for outreach. The goal of the outreach is to improve health and reduce recidivism by

encouraging the participants to re-establish ties with their mental health provider or to find them one immediately upon exiting jail. The delay between the start of the collection of the BJMHS and the medical intervention provides pre and post data on outcomes, including recidivism. More importantly, the fact that a sizable portion of Johnson County Jail detainees originate outside Johnson County and are thus ineligible for the intervention means a potential comparison group is available for use in a difference-in-differences model.

Within this framework, we measure the extent to which this light touch mental health outreach intervention connects exiting inmates with mental health services and reduces recidivism rates within a fixed time after release. Of eligible people exiting the jail, the mental health outreach team attempts to contact 95%, makes contact with 45%, and successfully connects 27% to mental health services. After the introduction of mental health outreach, the proportion of people re-booked into jail within 60 days of release falls by 7.8 percentage points more for people eligible for outreach than for people who have a severe mental illness but do not qualify for outreach because they live in other counties. This effect persists through one year after release and is similar, though noisier, for people living near the county border. Finally, we find evidence that outreach has larger effects on recidivism for people who report symptoms of severe mental illness but have no history of mental healthcare.

Our results add to a relatively small literature in economics on the effects of mental healthcare on crime. Deza et al. (2020) shows that crime decreases when the number of mental health offices in a county increases. Bondurant et al. (2018) show similar results for substance abuse treatment facilities. More broadly, studies link the cross-state expansion of Medicaid to incidence of crime (Vogler, 2020; Wen et al., 2017). Jácome (2020) takes a different approach to studying Medicaid by exploiting an age cutoff for single childless low-income men. In general, the economics literature focuses on broad measures of access to healthcare rather than particular interventions. One exception is the recent study of Vigliotti et al. (2020) of random assignment to therapists in mental health court. We add to this literature by focusing on the impact of a specific, policy-relevant intervention.

The criminology literature provides evidence on a wide variety of interventions addressing mental

illness before or after incarceration, but these tend to be more intense interventions such as diverting people from arrest toward social services (Collins et al., 2017), active intensive case management at re-entry (Morrissey et al., 2007; Cusack et al., 2010), and diverting people into mental health courts (McNiel and Binder, 2007; Steadman et al., 2011; Aldigé Hiday et al., 2016). Peters et al. (2017) provide a useful review of the evidence. Our paper adds to this literature by focusing on a light touch, low-cost intervention that works within the structure of the existing criminal justice system and thus may be broadly applicable to a wide variety of locations.

2 Background

2.1 The Mental Health Crisis in Corrections

The current situation surrounding serious mental illness in the criminal justice system takes root in three distinct trends. The first is the declining state of mental health in the country. By most aggregate measures, the mental health of the population has been in significant decline. The National Drug Use and Health Survey notes that the fraction of the population that has experienced any mental illness in the previous year increased from 17.7 percent in 2008 to 20.6 percent in 2019. Those with serious mental illness increased by 41 percent over that same period, from 3.7 to 5.2 percent. The fraction of people 12 and over using anti-depressants has increased from 7.7 percent in 1999 (Pratt et al., 2017) to 13.7 percent in 2017/18 (Brody and Gu, 2020). As an extreme measure of mental illness, the suicide rate increased by 38 percent from 1999 to 2019.[1] Finally, drug poisoning deaths increased by 258 percent in the past 20 years with these deaths claiming 70,000 lives in 2019.[2]

The second trend is the rise in mass incarceration. In 1970, there were 196,000 adults in US prisons (Langan, 1988). That number increased dramatically in the 1980s and 1990s and peaked at 1.62 million in 2009, about a 700 percent increase. The numbers have fallen in recent years, but

[1] Authors' calculation from the CDC Wonder multiple cause of death data.
[2] Authors' calculation from the CDC Wonder multiple cause of death data.

by 2018, there were still 1.47 million people in prison. Prison is but one part of the criminal justice system, and the number of people under correctional control is more than four times the prison population at 6.4 million with 738,000 in jails and 4.4 million under community supervision, i.e. parole and probation (Maruschak and Minton, 2020). About 2.5 percent of the adult population is under correctional control in the US. Some have described the US as having a problem of mass supervision, rather than mass incarceration.

A third trend has been the de-institutionalization of those with serious mental illness. In 1955, there were about 559,000 hospital beds in dedicated mental hospitals for those with serious mental illness (Mechanic and Aiken, 1987; Mechanic and Rochefort, 1990), or about one bed for every 300 people in the country. By 1980, the supply of beds had fallen to about 100,000 or one bed for every 2,300 people. Today, that number is 80,000 or 1 bed per 4,300.[3] Scholars have identified a number of factors that explain the trend towards de-institutionalization including the promise of anti-psychotic drugs, concerns about the quality of institutional care, the basic rights of people with mental illness, and growing Federal welfare programs encouraging states to shift patients off their rolls (Mechanic and Rochefort, 1990). Raphael and Stoll (2013) estimate that a small fraction of the increase in incarceration growth can be attributed to de-institutionalization. They do however estimate that up to a quarter of the people with mental illness in prison today would not have been there without de-institutionalization.

How each of these factors has contributed to the current situation has not been identified, but the fact is that those with mental illness make up a large share of criminal justice interactions. One in ten calls for police service involve someone with severe mental illness, and given these encounters, one in three people transported to emergency rooms for psychiatric reasons are taken there by police (Fuller et al., 2015). Estimates suggest that about 15 percent of people in prisons and 25 percent in jails have a serious mental illness (Fazel and Danesh, 2002; Steadman et al., 2009; Bronson and Berzofsky, 2017), numbers that are three to six times higher than the rate of 5.2 percent for adults in the general population.[4] These numbers vary considerably across states and localities.

[3]Source: https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NMHSS-2018.pdf
[4]https://www.nimh.nih.gov/health/statistics/mental-illness.shtml

One report from California put the fraction of state prisoners with a serious mental illness at 30 percent (Romano, 2017). In Harris County, Texas, 17 percent of jail inmates were on psychotropic medications. In one prison in Oklahoma, that number was 40 percent, the same fraction for the New York City jail, Riker's Island (Winerip and Schwirtz, 2014). A survey of all prisoners in Iowa found that 48 percent were diagnosed with a mental illness and 99 percent of these diagnoses occurred while the person was incarcerated (Al-Rousan et al., 2017). Using a broader definition of mental illness and one that includes more minor conditions and substance abuse issues, James and Glaze (2006) estimate that 56 percent of people in state prisons and 64 percent in local jails have some mental illness.

A number of observers have noted that the criminal justice system has replaced state mental hospitals as the de facto treatment system for those with a serious mental illness. Sisti et al. (2015) argue that de-institutionalization was effectively trans-institutionalization where "prisons appear to offer the default option and an inexpensive solution for housing and treating the mentally ill." Al-Rousan et al. (2017) claim that "[c]orrectional facilities have become a front line for mental health care." Others argue there is a "revolving door" involving corrections, health services and social services. Torrey et al. (2010) estimates that there are three times as many people with serious mental illness in prisons than in hospitals. The Cook County jail in Chicago has the distinction of being the nation's largest inpatient mental health facility (Ford, 2015) with one-third of its 10,000 inmates having a psychiatric illness (Kuehn, 2014).

The human toll of correction on people with mental illness is large. Many people with mental illness enter the criminal justice system on minor charges such as public nuisance. However, their repeat offenses means their offenses soon escalate into jail time. One study estimates that those with mental illness have a 40 percent chance of serving time in jail or in prison before the age of 40 (Torrey et al., 2010). To give some frame of reference for this number, Pettit and Western (2004) use data from the National Longitudinal Survey of Youth 1979 to estimate that 30 percent of black males are incarcerated by age 34. Conditional on the crime, those with a mental illness are sentenced to longer terms in jail and once in jail, those with a mental illness tend to have

more facility violations, leading to still longer sentences. A survey of inmates at the New York City Riker's Island jail found that average stay for all inmates was 42 days but the average stay for those with a mental illness was 215 days. The formerly incarcerated are ten times more likely to be homeless than the general population (Couloute, 2018). In confinement, people with mental illness are much more likely to be sexually assaulted, much more likely to be spend time in solitary confinement, and have substantially higher suicide attempts. Finally, despite their need, they tend to have a difficult time getting appropriate treatment. In one large-scale survey, 50 percent of prison inmates taking medications for a mental health condition at the time of incarceration were not receiving those medications inside. A Bureau of Justice Statistics report found that of those incarcerated with mental illness, only one in three in prisons and one in six in jails report receiving mental healthcare since admission (James and Glaze, 2006).

There is conflicting evidence on recidivism rates among recently-released detainees. For one large urban jail, Wilson et al. (2011) found no difference in recidivism rates for those with only a mental illness and those without. However, rates were substantially higher for those with a mental illness and a co-occurring substance abuse issue. These basic results were replicated with 3-year recidivism rates for 10,000 prisoners released from New Jersey prisons in 2013 (Zgoba et al., 2020). In contrast, a study of 200,000 inmates released from Florida prisons from 2004-2011 found substantially higher recidivism rates for those with a mental health diagnosis (Bales et al., 2017).

2.2 The Current Situation in Johnson County

We study the intersection of mental health and criminal justice policy in the Kansas City Metro area, which is fairly representative of the United States as a whole. According to 2016-2019 5-year American Community Survey estimates, the Kansas City Metropolitan Statistical Area has 2.1 million people. Median household income is $66,632, and 11% of the population is poor, compared to values of $62,843 and 13% for the entire United States. The median age is 38 years, which is equal to the national average. The population is somewhat less racially diverse than the nation as a whole with 9% identifying as Hispanic and 12% as Black.

We focus on Johnson County, Kansas, a suburban portion of the metro area that includes 602,401 people, or 28% of the Kansas City metro area. It is the largest county in Kansas and the second most populous county in the metro area, trailing only Jackson County, MO, which contains Kansas City, MO and has a slightly larger population of almost 700,000. Johnson County has greater median income ($89,087), a lower poverty rate (5.4%), and somewhat lower representation of Hispanic (8%) and Black (5%) residents than the metro area as a whole.

Despite its affluence, incarceration trends in Johnson County make it of particular interest in considering criminal justice policy. First, the jail population of Johnson County has been rising. The average daily jail population in Johnson County was 793 in 2018, or 13 people per 10,000 residents.[5] That rate is lower than the national rate of 22 per 10,000 residents (Zeng, 2020). However, national jail incarceration rates decreased slightly from 2014 to 2018 while Johnson County's average daily jail population increased by 14% over that period. Second, as a suburban county, Johnson County's criminal justice policy affects residents of other counties. As we discuss in more detail below, the majority of Johnson County Jail inmates originate from other counties.

Johnson County provides a particularly useful location to examine the state of mental health in jails as they screen all entering inmates for severe mental illness. Since November 2016, as part of the booking process, the Johnson County Jail assessment team completes the BJMHS with each entering inmate. This tool asks 8 simple questions to identify inmates with severe mental illness, including 6 questions about symptoms of serious mental illness (schizophrenia, bipolar disorder, and major depression) and 2 questions about past use of medication and inpatient mental healthcare. People are identified as a good candidate for referral to mental health services if they answer "yes" to at least 2 questions about symptoms or either question about prior mental healthcare. We reproduce the screen questions in Appendix Figure A.1. See Steadman et al. (2005) for more details on this tool.

As is the case in other parts of the United States, people with severe mental illness frequently pass through Johnson County Jail. In our sample, the mental health screen identifiers 25% of people

[5]Source: http://jocosheriff.org/sites/default/files/docs/2018%20Annual%20Report.pdf

passing through Johnson County jail as candidates for referral to mental health services. As a point of comparison, Steadman et al. (2005) find that the same mental health screen identifies 11% of inmates in four jails in Maryland and New York as having mental illness. Table 1 shows average characteristics for inmates qualifying for a referral based on the screening, compared to a nationally representative sample of people in jail with mental illness.[6] Columns 2 and 3 display statistics for those qualifying as having severe mental illness based on their responses to the BJMHS, whether by presently exhibiting symptoms or by reporting prior mental healthcare. Columns 4 and 5 are perhaps more directly comparable to the national sample because they only include those who qualify for outreach on the BJMHS by presently exhibiting two or more symptoms (by responding "yes" to at least two of questions 1 through 6). The overall severity of mental illness appears similar to national numbers: 49% of people screening for severe mental illness, and 43% of those presently exhibiting symptoms, in Johnson County Jail have been hospitalized previously due to mental or emotional health, compared to 43% nationally. Jail inmates with a mental illness in Johnson County and nationally also have similar age and marital status. They differ on a few dimensions. In Johnson County, such inmates are more likely to be currently taking mental health medication, female, and white.

2.3 The Johnson County Mental Health Outreach Intervention

We study an intervention directed toward exiting jail inmates who screen as having severe mental illness and who normally reside in Johnson County, KS. The program requires presence of severe mental illness, as measured at the time of booking using the BJMHS described above. The residency requirement eliminates inmates of other counties, mostly residents of Jackson County, MO and Wyandotte County, KS, which are the two halves of Kansas City. Figure 1 shows counts of jail inmates with a severe mental illness in the three-county area by Zip code tabulation area (ZCTA) of residence in the three-county area. In our main analysis sample, 66% of inmates are residents of Johnson County. The remaining 34% are split among Jackson County (21%) and Wyandotte

[6] We take nationwide estimates for jail inmates meeting the threshold for serious psychological distress from Bronson and Berzofsky (2017), based on the 2011-12 National Inmate Survey.

County (13%).

The staff of Johnson County immediately attempt to contact eligible people exiting Johnson County Jail to connect them with a specific mental healthcare resource. Figure 2 gives a sense of how quickly staff contact exiting inmates. The navy bars show the number of days between exiting the jail and the first contact attempt. The gold bars show time lapse until contact is actually made. Most contact happens within 1 day of release. Staff make up to three attempts. If phone outreach is unsuccessful and the person is identified as likely having a particularly severe mental illness,[7] the County's Mobile Crisis Response Team attempts to make contact in-person. If the team successfully makes contact either by phone or in person, they attempt to connect that person to a specific mental healthcare resource. The resource is tailored to the person's situation and as such can vary considerably. The most common successful outcomes are referrals to the county's mental health center or reconnecting the person to their past mental healthcare provider. In other cases, the person may decline services.

Contacting people is relatively low cost. Johnson County estimates that staff time, supervisory time, and overhead required to attempt to contact someone costs $2.85 per minute. The average person in our data receives 1.13 contact attempts; 97% are by phone and 3% in person. Consultations with the outreach team indicate that the average phone contact averages 4 minutes while an in-person contact lasts much longer, roughly 25 minutes per attempt, mostly due to driving time. Altogether, the contact team spends an average of 5 minutes on each eligible person, or about $15 per person. Of course, this number does not include the cost of mental health services received after contact. However, the cost of contacting eligible people itself is quite low.

Of note, Johnson County has somewhat more extensive mental healthcare resources than the average county. According to 2018 Census County Business Patterns data, Johnson County had 105 mental health offices in 2018, or 1.74 per 10,000 residents.[8] That value is about 50% larger than the values for both the Kansas City Metro (1.13) and the United States as a whole (1.16). Since we study

[7] This is defined as answering yes to 4 or more screening questions or being identified as high risk via chart review.

[8] We follow Deza et al. (2020) and count the number of establishments that are offices of mental health physicians or non-physician practitioners.

an intervention that aims to connect exiting jail inmates with existing mental healthcare resources, the availability of mental healthcare is almost certainly a complementary input. Studying such an intervention in a place with a relatively well-developed network of mental healthcare providers allows us to abstract from the concern that the intervention lacks resources with which to connect the person exiting jail.

3 Empirical Strategy

3.1 Data

The primary sample is the set of individuals booking at the Johnson County Jail for the first time from November 1, 2016 and released on or before November 30, 2018. The earlier date corresponds to the launch of the BJMHS. We link each person in this sample to past and future jail bookings in Johnson County Jail and the jails in two adjacent counties, Wyandotte County, KS and Jackson County, MO, allowing us to track local arrests. In all three counties, we observe all arrests from November 1, 2013 through November 30, 2019, or three full years before the intervention plus one full year after the latest release date in our sample. We obtained this data directly from each of the counties.

The Johnson County sample is connected to their full arrest record through a unique identification number assigned in Johnson County's record system. To connect the individuals to their arrest records in the other two counties, we link based on personally identifying information: the last four digits of social security number and date of birth for Wyandotte County, and first and last name and date of birth for Jackson County.

The county jail bookings allow us to track local arrests. One limitation is that we are not able to see whether someone was arrested outside the three counties if they were never booked in these jails. We thus limit our sample to people who live within the three county area at time of their booking in Johnson County. We also do not observe state prison bookings. However, as prison inmates generally serve pre-trial time in the county jail, we would observe most such arrests in our

data.

Table 2 shows how we refine the Johnson County bookings data to obtain our final analysis sample. There are 32,130 bookings within the study period, and of those, we take the 20,030 who were entering the jail for the first time during the period. This is to remove any bias associated with repeated treatment. We further refine the sample by dropping those who refused to take the screening; those who did not have a plausible phone number or were sent to either work release or state prison and therefore could not be included for outreach; and those living outside of the three counties at time of booking. The resulting sample is 10,466 individuals, for whom 3,518 the screen identifies a major mental health concern.

Table 3 describes baseline characteristics of this sample of inmates, by county of residence and whether the screen identifies a severe mental illness. For example, the first column shows that 31% of non-Johnson County residents who screen negative for mental illness are female. For those identified by the screen as having a mental illness, the third column shows that 46% are female. The inmates testing positive are more likely to be women, white, non-Hispanic, unemployed, and residents of Johnson County. However, they are similar on age and prior criminal history.

3.2 Identification Strategy

We seek to test the effect of the mental health outreach program on recidivism in subsequent months. Individuals screening positive for severe mental illness when they enter jail are only eligible for the program if they are Johnson County residents. Hence, our main identification strategy is a differences-in-differences approach comparing the changes in outcomes between qualifying Johnson County residents and would-be-qualifying non-Johnson County residents before and after the intervention. Figure 1 shows the three-county area on which we focus our attention. We first test whether qualifying for the intervention increases contact attempts by program workers and whether it increases confirmed or intended follow-up with mental health services.[9] We then move to measuring recidivism rates.

[9]For a full list of outcomes we code as treatment, see Table 7.

We estimate the following econometric specification by ordinary least squares:

$$Y_{ijt} = \beta_0 + \beta_1 * Post_t * JC_j + \beta_2 * JC_j + \beta_3 * Post_t + \mathbf{X}_{ijt} * \gamma + \epsilon_{ijt} \quad (1)$$

Y_{ijt} is an outcome, such as a dummy for whether the person recidivated within 360 days of release, for person i in county j released from jail in month t. We include separate indicators for Johnson County resident (JC_j) and being released after the health outreach intervention began ($Post_t$). The coefficient on the interaction, β_1, is the coefficient of interest. $\hat{\beta}_1$ is the difference-in-differences estimate of the intent-to-treat (ITT) effect of being eligible for outreach. Some specifications include a set of demographic controls represented by X_{ijt}. These controls are the first nine characteristics listed in Table 3 plus an indicator for having a disability.

The difference-in-differences approach relies on the assumption that the Johnson County Jail inmates who test positive for severe mental illness but reside outside of Johnson County provide a reasonable counterfactual for their counterparts residing in Johnson County. These two groups are similar on many dimensions. As shown in the third and fourth columns of Table 3, 41% of the Johnson County residents in our sample are female, compared to 46% of residents of the neighboring counties. They are also similar in age, disability status, employment history, and time spent in jail after the booking. On the other hand, Johnson County residents are less likely to be Black and had fewer bookings from November 1, 2014 through October 31, 2015, i.e. during the lagged year before our main analysis sample starts.

While residents of Johnson County and non-residents differ on some dimensions, they show similar time trends in recidivism prior to the start of mental health outreach. Figure 4 compares recidivism rates of Johnson County residents and non-residents by month of release. Figures 4.a and 4.b show 60-day and recidivism for the full sample and the border sample, respectively, while Figures 4.c and 4.d show 360-day recidivism. We observe similar recidivism trends for Johnson County and non-Johnson County residents during the four months after the mental health screen started but before outreach began. This pre-period is short because we can only observe outcomes conditional on mental health status after the screen began, but Figure 5 shows similar pre-trends

for all inmates to the beginning of 2016.

Because county of residence correlates with some demographic characteristics, we sometimes limit our attention to people who reside near county borders. In these cases, we run our estimation using a restricted sample of individuals residing in ZCTAs on the borders between Johnson and Wyandotte/Jackson Counties.[10] As shown in Table 3, limiting attention to the border reduces the sample size to about one-quarter of our main sample but generates groups that are more similar in racial composition. As shown in Figures 4.c and 4.d, trends in recidivism during the pre-intervention period are similar across ZCTAs that are barely inside versus barely outside Johnson County.

4 Results

4.1 Effects on Use of Mental Healthcare

Rates at which the program connects people to mental healthcare increase sharply at the onset of the program and only for residents of Johnson County. Figure 3 displays the simple trends over time. In March 2017, contact attempts in Figure 3.a increase sharply among Johnson County residents exiting the jail, but not among residents of Wyandotte and Jackson Counties. Successful connections to mental healthcare, mostly setting appointments with the County's own mental health services or with a person's existing healthcare provider, also increase sharply at that time, shown in Figure 3.c. Figures 3.b and 3.d show similar trends if we limit attention to ZCTAs on county borders.

The mental health outreach intervention attempts to contact nearly all eligible people and successfully connects one-quarter to one-third of them with mental health treatment. The first three columns of Table 4 estimate these effects using a difference-in-differences specification with controls for demographics and criminal history. At the onset of the program, attempts to contact exiting

[10] See Appendix Figure A.2 for a map showing the ZCTAs included in the border sample. See Appendix Figures A.3 through A.8 for a series of maps characterizing the ZCTAs in the three counties. We see that population dense ZCTAs spill into all three counties but that Johnson County neighborhoods have higher housing values, higher college graduation rates, and are older and whiter than Jackson and Wyandotte Counties.

inmates increase by 94 percentage points more for Johnson County residents than for non-residents. Successfully contacting people with severe mental illness who have recently been incarcerated is non-trivial. Contact information may be invalid or out of date; people may choose to ignore contact attempts. Still, attempts to contact people lead the rate of making contact to increase by 44 percentage points. When contact is made, some respondents will accept services and others refuse. We find that the program increases the rate at which people are connected by the program to mental healthcare by 27 percentage points. As shown in columns (4)-(6), results are similar in the sample of ZCTAs on the county border.

4.2 Effects on Recidivism

After outreach starts, recidivism rates fall more for Johnson County residents than for non-residents. Figure 4 displays the main idea. Panels 4.a and 4.c show 60-day and 360-day recidivism, respectively, as measured by being booked into jail in one of the three counties after being released in Johnson County. Recidivism rates are similar for Johnson County and non-Johnson County residents released prior to March 2017. However, after the start of outreach, recidivism rates tend to be lower. When we narrow attention to ZCTAs on the county borders in Figures 4.b and 4.d, we see similar but noisier results.

Large declines in recidivism appear immediately after release. Table 5 shows reduced form, intent-to-treat estimates of the effect of being eligible for outreach on recidivism. Column (1) shows difference-in-difference estimates for recidivism within 60 days for the full 3-county sample. Prior to the start of outreach, about 12% of non-Johnson County residents are booked within 60 days of release. That value is about 7 percentage points higher for Johnson County residents. However, after the start of outreach, the gap reverses: 60-day recidivism decreases by 7.8 percentage points more over time for Johnson County residents than for non-residents. We interpret this 7.8 percentage point difference-in-differences estimate, which is statistically significant at the 5% level, as the effect of being eligible for outreach on recidivism. Since the program attempts to contact nearly all eligible people, the ITT effect also measures the return to attempting to make contact.

Most of the decrease in recidivism persists at least one year after release. Columns (2) and (3) show difference-in-differences estimates for recidivism within 180 and 360 days of release, respectively. At these time horizons, recidivism still falls by 8-10 percentage points, though the effects loses statistical significance at 360 days as the base recidivism rate and the standard error grow. These results suggest that, in most cases, mental health outreach does not simply delay jail bookings but instead persistently reduces contact with the criminal justice system.

These effects are large in magnitude. Of inmates who have a severe mental illness, are Johnson County residents, and exit the jail prior to March 2017, 46.3% are re-booked within 360 days. The intent-to-treat effect of 7.6 percentage points that we measure is thus 16% of the base rate. We do not directly estimate a treatment-on-the-treated effect via instrumental variables because that model would exclude any effects of mental health outreach beyond the direct connection to a mental healthcare appointment. Such effects may exist if contact influences mental health directly or leads the person to follow-up later on their own. However, if we assume the entire effect operates through assistance in setting up an appointment and use Table 4 as a first stage, then successfully setting up a plan for treatment would reduce recidivism by 28 percentage points (0.076/0.273), i.e. by 60%.

4.3 Robustness of Recidivism Results

If we limit attention to people residing near county borders, we measure treatment effects on recidivism consistent with our main results. Columns (4)-(6) of Table 5 show these results. The estimated effects are somewhat larger in magnitude but also more noisily estimated due to the smaller sample. For example, for a 360-day time horizon, we estimate that recidivism falls by 10.5 percentage points more for Johnson County residents than for non-residents, but the 95% confidence interval for this estimate includes the full-sample estimate of 7.6 percentage points. The results in our preferred specification are robust to a fully saturated model including ZCTA and month-year fixed effects; see Appendix Table A.1 for these results.[11]

[11]We also estimate an event study model in which we estimate the marginal effect by month relative to February 2017, the month before the intervention began. We show the results in Appendix Figure A.9. While some power is lost by having separate coefficients for each month interaction, all post-period coefficients are below zero, with the

While we are not able to extend the pre-period further back in time for inmates screening positive for mental health issues, because the county did not implement the BJMHS until November 2016, we can consider a longer pre-period of recidivism rates for all individuals entering the county jail regardless of mental health status. In Figure 5, we show the recidivism rates for all inmates who enter the Johnson County jail for the first time on or after January 1, 2016. These simple monthly means of 60- and 360-day recidivism rates make clear that Johnson County and non-Johnson County residents had similar recidivism trends and levels in the year leading up to the mental health outreach program. This result reinforces our confidence that there were not diverging pre-trends in the recidivism patterns of our treatment and comparison groups.

Using this larger sample, we estimate using differences in differences the impact of being an eligible Johnson County resident in the post period on recidivism. We instrument for eligibility in the post period with an interaction term between Johnson County resident and post period. We find a reduction in 60-day recidivism for Johnson County residents in the post period by 5.3 pp, with a standard error of 3.3 pp. For the full set of results, see Appendix Table A.2.

As a placebo test, we estimate Equation 1 on the sample of people who did not qualify as having a severe mental illness on the BJMHS. Because they do not qualify for outreach, we do not expect there to be changes in this group's recidivism rates once the intervention begins. The results are consistent with similar changes in recidivism over time for Johnson County residents relative to non-Johnson County residents in this placebo sample. For 60-day recidivism, we find that the coefficient on the post period interacted with Johnson County resident is -0.7 percentage points with a standard error of 1.7. Within the border sample, the coefficient is 2.1 percentage points with a standard error of 3.9. For the full set of placebo results, see Appendix Table A.3.

4.4 Heterogeneity by Prior Healthcare Use

The program we study directs outreach to both people with and without a history of using mental healthcare. Recall from above and Appendix Figure A.1, the BJMHS identifies people to refer to

exception of month 9 (November 2017).

mental healthcare based on either stated symptoms or a history of mental health medication or inpatient care. We can divide the sample into those who qualify for outreach based on a history of care versus those who have symptoms but no history of care.

Outreach is more effective at connecting people with a prior history of care to mental health treatment. Table 6 shows the first-stage estimates, split by whether the person answered "yes" to a history of using inpatient care or medication for mental health, i.e. questions 7 and 8 on the BJMHS. The program attempts to contact people with and without a history of mental healthcare at similar rates, 95% and 97%, respectively. Program staff make a successful contact 44 and 46% of the time. However, the rates at which those contacts lead to concrete plans for mental healthcare differ considerably. Among those with a history of mental healthcare, the program connects 29% to services, but this value is only 16% for those who have no history of care. Most of this difference results from the program more frequently re-connecting the former group to an existing healthcare relationship and from the latter being more likely to refuse services. Table 7 shows the likelihood of different treatment outcomes among qualifying Johnson County residents in the post period. Panel A separates the eight outcomes qualifying as treated, while Panel B separates the five outcomes qualifying as not treated. We see that, upon receiving the outreach call, those with prior mental healthcare are particularly likely to connect to an existing private provider or schedule an appointment with the Johnson County Mental Health Center. On the other hand, rates of planning to make use of the County's walk-in intake are similar. Finally, they are also less likely to decline care upon outreach.

While connecting people with no history of mental healthcare to services is more difficult, their recidivism rates actually respond more elastically. Table 8 splits out treatment effects on recidivism by history of mental healthcare use. For example recall that, as shows in column (1), recidivism within 60-days of release falls by 8 percentage points for the full sample. Column (2) shows that this value is similar for those with a history of mental healthcare. For those with no history of mental healthcare, column (3) shows this effect is nearly twice as large. These differences only grow with the longer time horizon in columns (4)-(9). The sample of people with untreated mental illness is

small, only 427 of the 3,518 people in our sample. This small sample makes the estimated effects quite noisy and suggests caution in interpreting the large point estimates. However, the results suggest that connecting people who are exiting jail with untreated mental illness to services, while difficult to do successfully, has very high returns.

5 Discussion and Conclusion

This study finds that low-cost mental health outreach to exiting jail inmates can reduce recidivism. We study an intervention conducted by Johnson County, KS, based on the Brief Jail Mental Health Screen. They immediately call exiting inmates who have a severe mental illness to match them with appropriate mental healthcare. Outreach successfully connects one-quarter of eligible people with mental health services. Since this service is only provided to Johnson County residents and many inmates come from neighboring counties, we evaluate the effectiveness of mental health outreach by comparing residents to non-residents. Recidivism with 60 days of release falls by 8 percentage points more for residents than non-residents after the introduction of mental health outreach. Most of this effect persists for at least one year after release. We observe larger effects for those with a severe mental illness but without a prior history of mental healthcare.

A formal cost benefit would require us to estimate the impact of the brief intervention on health care costs. As Medicaid likely pays for healthcare for the majority of those with severe mental illness, this would require claims data from two states. This is an interesting question and subject of future work but beyond the scope of our efforts at this point.

However, the cost data available suggest mental health outreach compares favorably with other criminal justice interventions for people with mental illness. As discussed above, the marginal cost to the county of staffing one additional mental health outreach case is $15. Based on our estimates, it then costs $197 to eliminate one future jail booking. The MacArthur Mental Health Court Study found that mental health courts spend about $25,000 per arrest averted.[12] Their numbers

[12]Arrests declined by 0.2 per year (Steadman et al., 2011) at a cost of about $5,000 per year (Steadman et al., 2014).

include the cost of mental healthcare, which ours do not, but to close the cost gap jail mental health outreach would have to induce a hospitalization for nearly every person connected to care.[13] Jail-based mental health outreach even compares favorably to pre-arrest diversion. For example, Seattle's Law Enforcement Assisted Diversion program costs $257-434 per jail booking averted.[14] While we cannot provide a full cost-benefit analysis, both public safety and the welfare of people with mental illness are of great value, and our results provide a first suggestion that mental health outreach can be a cost-effective option.

More generally, our results show that more cooperation between criminal justice and healthcare systems can help stop the cycle of incarcerating people with mental illness. Because of the expansion of the criminal justice system over the past few decades, local jails lock up large numbers of people with mental illness, with huge human costs. However, this situation also means that local jails have the ability to identify people who need mental healthcare. The criminal justice system has already paid the large fixed cost of finding people and screening for mental illness; connecting these people to mental healthcare is then relatively inexpensive. To work, mental health outreach from jails likely requires sufficient capacity in the local mental healthcare system. But given this context, mental health outreach through jails can break the cycle of arrest and incarceration of people with mental illness.

[13] According to 2018 Healthcare Cost and Utilization Project data, the average inpatient discharge for mental healthcare in the West North Central region costs $6,381. Mental health outreach connects 27.5% of people to any care, so it would cost $1,742 if these were all inpatient hospital stays. That cost scales to $22,921 per jail booking averted.

[14] Jail bookings decline for program participants by 1.43 per year relative to a matched comparison group. The cost of staffing, overhead, and direct client assistance (but not substance use treatment) for the program is $532-899 per participant-month. For comparability with our estimates, we deflate these costs by 31% to exclude direct assistance to clients (Collins et al., 2019).

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6 Tables and Figures

Table 1: Characteristics of People in Jail with Mental Illness, Nation versus Johnson County

		Johnson County Jail			
		All Qualified		Presently Symptomatic	
	National	All	Analysis Sample	All	Analysis Sample
	(1)	(2)	(3)	(4)	(5)
Ever Hospitalized	43.1	50.4	49.5	43.3	41.8
Age	33.7	34.2	33.7	34.5	34.3
Married	20.2	18.6	20.7	17.8	19.2
Current Prescriptions	25.7	67.0	65.7	42.2	41.3
Female	15.6	39.4	43.0	34.6	38.9
White	40.0	75.9	74.0	64.5	62.9
Black	28.1	19.7	21.9	29.1	31.4
Hispanic	19.5	4.4	4.0	6.4	5.6
Observations	1	15,912	3,518	4,072	976

Notes: Column (1) shows values for jail inmates with serious psychological distress from the 2011-2012 National Inmate Survey, as reported in Bronson and Berzofsky (2017). The other four columns show Johnson County bookings data for people who screen positive on the BJMHS. Column (2) shows all such bookings after the start of the BJMHS and column (3) shows those in our analysis sample, as defined in Table 2. Column (4) shows a subset of column (2) by restricting to those who are presently exhibiting two or more symptoms (by responding "yes" to at least two of questions 1 through 6), and column (5) further restricts to the analysis sample.

Table 2: Sample Construction Observation Count

Refinement	Observation Loss	Resulting Count
Raw bookings (1/1/2013-9/9/2020)	-	122,184
Drop release dates after 11/30/2018	32,219	89,965
Drop book dates prior to BJMHS (11/1/2016)	57,835	32,130
Keep only first book date within study period	12,100	20,030
Drop if refused screening	2,240	17,790
Drop if no plausible phone number	551	17,239
Drop if disposition is state institution or work release	409	16,830
Drop those living outside 3 counties	2,866	13,964
Drop those who do not screen positive on BJMHS	10,446	3,518

Table 3: Summary Statistics

			Screen Positive for Mental Illness			
	Screen Negative		Full Sample		Border Sample	
	Non-JoCo	JoCo	Non-JoCo	JoCo	Non-JoCo	JoCo
Female	0.31	0.25	0.46	0.41	0.47	0.39
	(0.46)	(0.43)	(0.50)	(0.49)	(0.50)	(0.49)
Age	31.4	33.6	33.5	33.8	33.9	34.9
	(10.0)	(11.7)	(11.3)	(11.7)	(11.5)	(12.0)
Black	0.54	0.20	0.39	0.13	0.17	0.10
	(0.50)	(0.40)	(0.49)	(0.34)	(0.38)	(0.30)
Hispanic	0.10	0.10	0.04	0.04	0.05	0.04
	(0.30)	(0.29)	(0.19)	(0.20)	(0.21)	(0.20)
Married	0.15	0.23	0.16	0.23	0.15	0.23
	(0.36)	(0.42)	(0.37)	(0.42)	(0.36)	(0.42)
Employed	0.64	0.66	0.51	0.54	0.50	0.52
	(0.48)	(0.48)	(0.50)	(0.50)	(0.50)	(0.50)
Num. Arrests in Previous Year	0.37	0.28	0.39	0.28	0.50	0.28
	(0.90)	(0.77)	(0.91)	(0.75)	(1.10)	(0.83)
Any Arrest in Previous Year	0.21	0.16	0.21	0.17	0.23	0.16
	(0.41)	(0.37)	(0.41)	(0.37)	(0.42)	(0.37)
Time in Jail in Days	7.7	6.0	10.7	8.8	9.4	9.9
	(29.1)	(23.7)	(33.1)	(33.1)	(37.8)	(41.3)
Attempted to Contact			0.00	0.77	0.00	0.77
			(0.05)	(0.42)	(0.06)	(0.42)
Made Contact			0.00	0.36	0.00	0.36
			(0.03)	(0.48)	(0.00)	(0.48)
Connected to Care			0.00	0.22	0.00	0.21
			(0.00)	(0.42)	(0.00)	(0.41)

Notes: Based on calculations using for people booked into Johnson County Jail. We report means with standard deviations in parentheses. The sample varies by column. The first two columns report on bookings that meet all criteria for our analysis sample except screening positive for mental illness. The next two columns show the main sample, as defined in Table 2. The final two columns further restrict to people residing in ZCTAs on county borders.

Table 4: Effect of Eligibility on Outreach Activity, Difference-in-Difference Estimates

	Full Sample			Border Sample		
	Attempted Contact (1)	Made Contact (2)	Connect to Care (3)	Attempted Contact (4)	Made Contact (5)	Connect to Care (6)
Post period x JC resident	0.946	0.443	0.273	0.960	0.452	0.278
	(0.005)	(0.012)	(0.011)	(0.011)	(0.026)	(0.024)
JC resident	-0.000	-0.004	-0.004	0.000	-0.005	-0.012
	(0.002)	(0.005)	(0.004)	(0.005)	(0.014)	(0.013)
Post period	0.004	0.003	0.004	0.004	-0.008	-0.006
	(0.003)	(0.003)	(0.003)	(0.006)	(0.012)	(0.011)
Adjusted R^2	0.894	0.275	0.149	0.914	0.268	0.140
Observations	3,518	3,518	3,518	849	849	849

Notes: Each column shows the results of a separate regression estimated by OLS. The sample in columns (1)-(3) is constructed as in Table 2. Columns (4)-(6) also restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties. The outcomes are dummies coded using contact logs for the mental health outreach team. See Table 7 for detailed sub-categories. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Table 5: Effect of Eligibility on Recidivism, Difference-in-Difference Estimates

	Full Sample			Border Sample		
	60 Days	180 Days	360 Days	60 Days	180 Days	360 Days
	(1)	(2)	(3)	(4)	(5)	(6)
Post period x JC resident	-0.078*	-0.099*	-0.076	-0.060	-0.142	-0.105
	(0.032)	(0.043)	(0.047)	(0.058)	(0.085)	(0.095)
JC resident	0.071*	0.083*	0.040	0.060	0.121	0.074
	(0.030)	(0.040)	(0.043)	(0.052)	(0.077)	(0.087)
Post period	0.029	0.029	0.004	0.055	0.090	0.056
	(0.026)	(0.036)	(0.039)	(0.045)	(0.069)	(0.080)
Non-JC sample mean, pre-period	0.119	0.285	0.440	0.087	0.217	0.391
Adjusted R^2	0.033	0.052	0.051	0.023	0.029	0.038
Observations	3,518	3,518	3,518	849	849	849

Notes: Each column shows the results of a separate regression estimated by OLS. The sample in columns (1)-(3) is constructed as in Table 2. Columns (4)-(6) also restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties. The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Table 6: Effect of Eligibility on Outreach Activity, by Prior Mental Healthcare

	Attempted Contact			Made Contact			Connected to Care		
	All	Prior Healthcare	No Prior Healthcare	All	Prior Healthcare	No Prior Healthcare	All	Prior Healthcare	No Prior Healthcare
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post period x JC resident	0.946	0.945	0.966	0.443	0.442	0.463	0.273	0.287	0.163
	(0.005)	(0.006)	(0.014)	(0.012)	(0.013)	(0.039)	(0.011)	(0.011)	(0.029)
JC resident	-0.000	0.000	-0.015	-0.004	-0.003	-0.011	-0.004	-0.003	-0.002
	(0.002)	(0.002)	(0.011)	(0.005)	(0.005)	(0.023)	(0.004)	(0.005)	(0.016)
Post period	0.004	0.005	-0.005	0.003	0.002	0.004	0.004	0.003	0.005
	(0.003)	(0.003)	(0.009)	(0.003)	(0.004)	(0.014)	(0.003)	(0.003)	(0.009)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Criminal History Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.894	0.890	0.918	0.275	0.269	0.311	0.149	0.155	0.079
Observations	3,518	3,091	427	3,518	3,091	427	3,518	3,091	427

Notes: Each column shows the results of a separate regression estimated by OLS. The sample in columns (1), (4), and (7) is constructed as in Table 2. In the other columns, we split the sample by whether the person has a history of using inpatient care or medication for mental health, based on questions 7 and 8 of the BJMS. The outcomes are dummies coded using contact logs for the mental health outreach team. See Table 7 for detailed sub-categories. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Table 7: Prevalence of Detailed Outreach Outcome Categories, Relative Difference for Those with Prior Mental Healthcare

	Prior Care vs. Not		No Prior Care	Total in	
	Difference	Std. error	Share in Category	Category	Observations
	(1)	(2)	(3)	(4)	(5)
Panel A. Connected to Care					
Substance abuse treatment	0.004	0.002	0.000	7	1,886
Adult residential center	0.008	0.005	0.005	21	1,886
Court-ordered treatment	-0.003	0.006	0.005	6	1,886
Going to hospital	0.005	0.002	0.000	7	1,886
Medical appt. scheduled	0.009	0.003	0.000	15	1,886
Will schedule medical appt.	0.042	0.010	0.010	109	1,886
Will come for intake	-0.012	0.021	0.089	140	1,886
Has private provider	0.064	0.018	0.050	209	1,886
Panel B. Not Connected to Care					
Declined	-0.095	0.034	0.282	361	1,886
No response	0.027	0.038	0.386	770	1,886
Phone not working	-0.004	0.022	0.099	175	1,886
Jail or prison	0.006	0.002	0.000	11	1,886
Other, N/A	-0.033	0.015	0.045	29	1,886

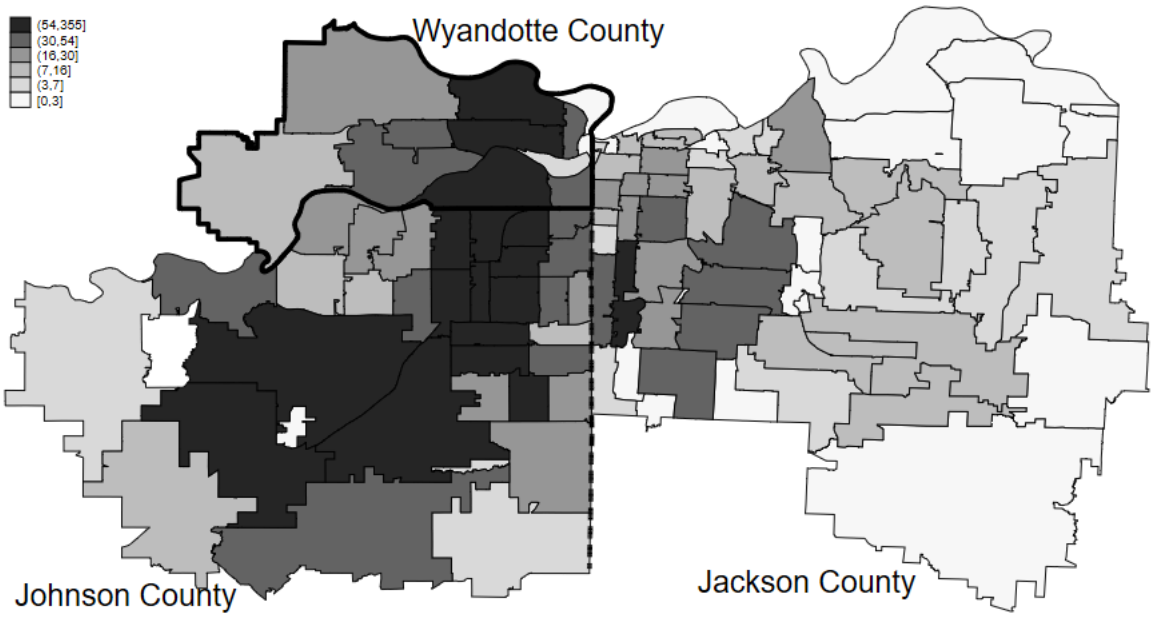
Notes: The sample restricts our main analysis sample to people eligible for mental health outreach, i.e. Johnson County residents in the post period. The outcomes are dummies coded using contact logs for the mental health outreach team. Panel A shows the detailed categories from the data that we categorize as successful connections to mental healthcare; Panel B shows those categorized as unsuccessful. Column (1) shows the difference in the probability of these outcome categories between people with prior history of mental healthcare versus not, as measured by questions 7 and 8 of the BJMHS. We estimate the difference by OLS using a regression of an outcome category dummy on an indicator for history of prior mental healthcare with heteroskedasticty robust standard errors and controls for indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year. Column (3) reports the mean dependent variable for Johnson County residents in the post period who qualify for outreach but have not indicated prior mental health care. "Total in Treatment" in Column (4) reports the sum of observations in the sample who had the outcome category.

Table 8: Effects of Eligibility on Recidivism, by Prior Mental Healthcare

	60 Days			180 Days			360 Days		
	All	Prior Healthcare	No Prior Healthcare	All	Prior Healthcare	No Prior Healthcare	All	Prior Healthcare	No Prior Healthcare
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post period x JC resident	-0.078	-0.077	-0.146	-0.099	-0.074	-0.342	-0.076	-0.055	-0.270
	(0.032)	(0.034)	(0.119)	(0.043)	(0.045)	(0.129)	(0.047)	(0.049)	(0.138)
JC resident	0.071	0.071	0.117	0.083	0.068	0.261	0.040	0.028	0.171
	(0.030)	(0.031)	(0.117)	(0.040)	(0.042)	(0.123)	(0.043)	(0.045)	(0.130)
Post period	0.029	0.041	-0.053	0.029	0.019	0.106	0.004	-0.006	0.074
	(0.026)	(0.027)	(0.089)	(0.036)	(0.038)	(0.102)	(0.039)	(0.042)	(0.109)
Adjusted R^2	0.033	0.030	0.070	0.052	0.045	0.113	0.051	0.047	0.084
Observations	3,518	3,091	427	3,518	3,091	427	3,518	3,091	427

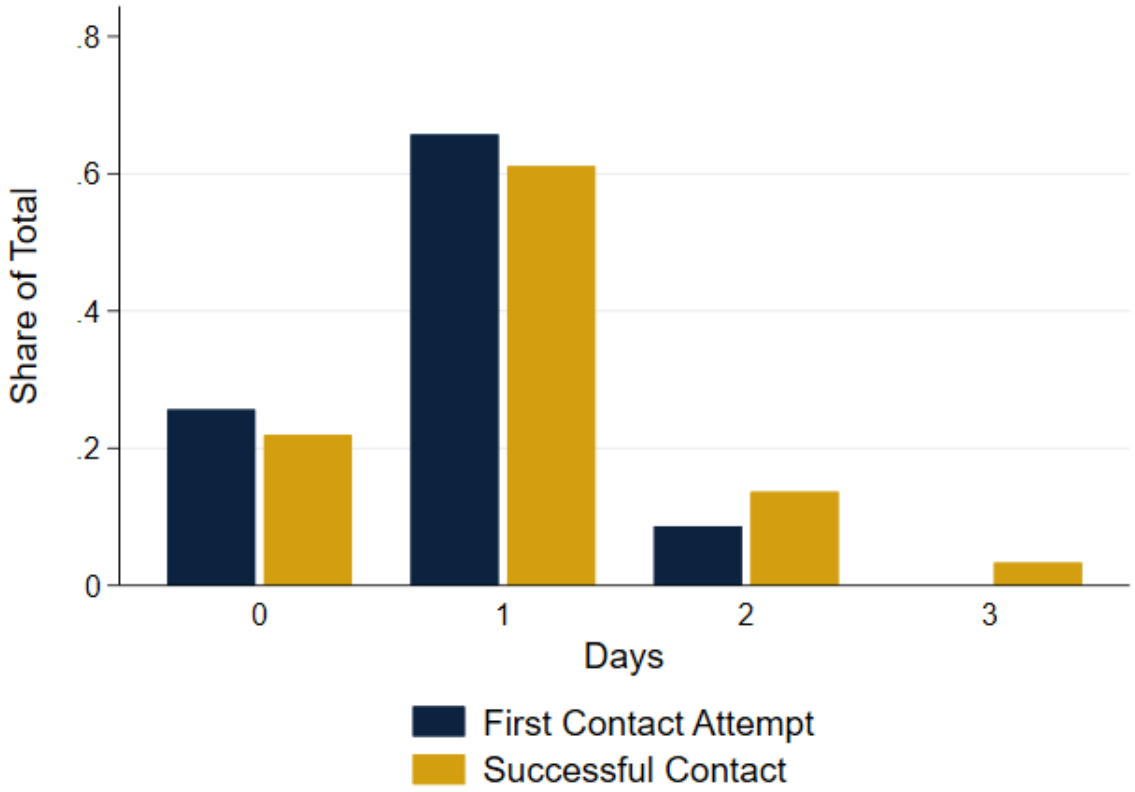
Notes: Each column shows the results of a separate regression estimated by OLS. The sample in columns (1), (4), and (7) is constructed as in Table 2. In the other columns, we split the sample by whether the person has a history of using inpatient care or medication for mental health, based on questions 7 and 8 of the BJMS. The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Figure 1: Counts of Johnson County Jail Arrestees with Severe Mental Illness by ZCTA



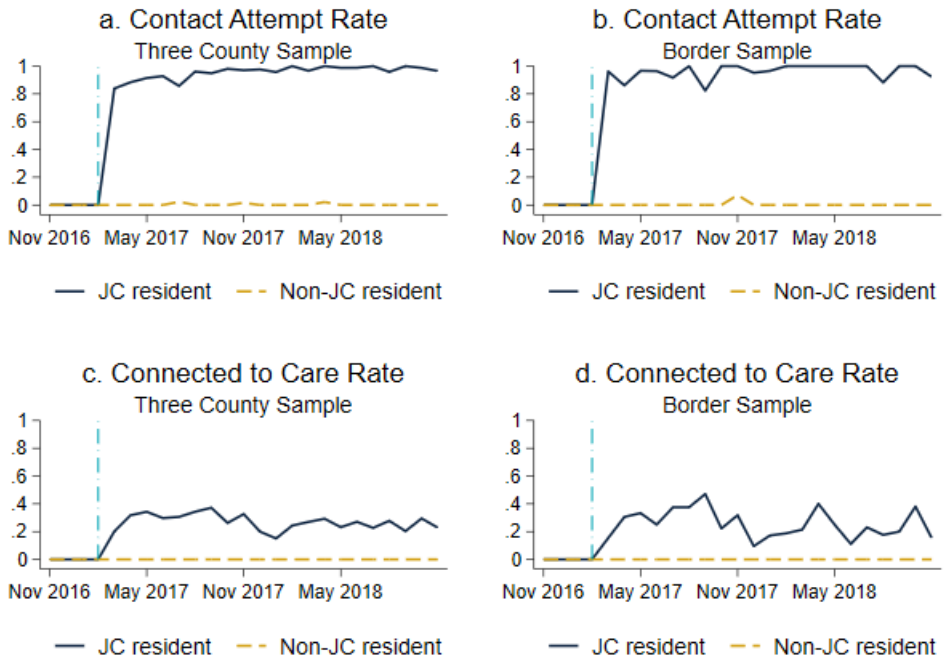
Notes: The map shows counts of observations in our main sample, as defined in Table 2. Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Darker colors represent ZCTAs with more observations.

Figure 2: Days Until Outreach Attempt and Contact Made



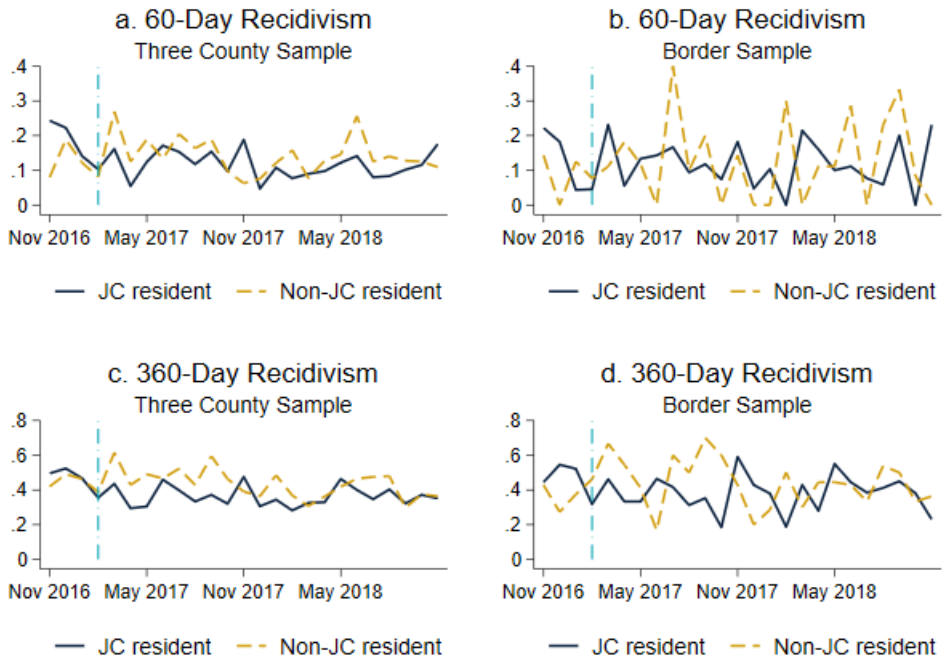
Notes: We measure duration as the difference between release date from Johnson County Jail and contact dates from contact logs of the mental health outreach team. We winsorize contact dates at the 2nd and 98th percentile to correct for apparent data entry errors. The sample is defined in Table 2.

Figure 3: Outreach Rates, by Month of Release and County of Residence



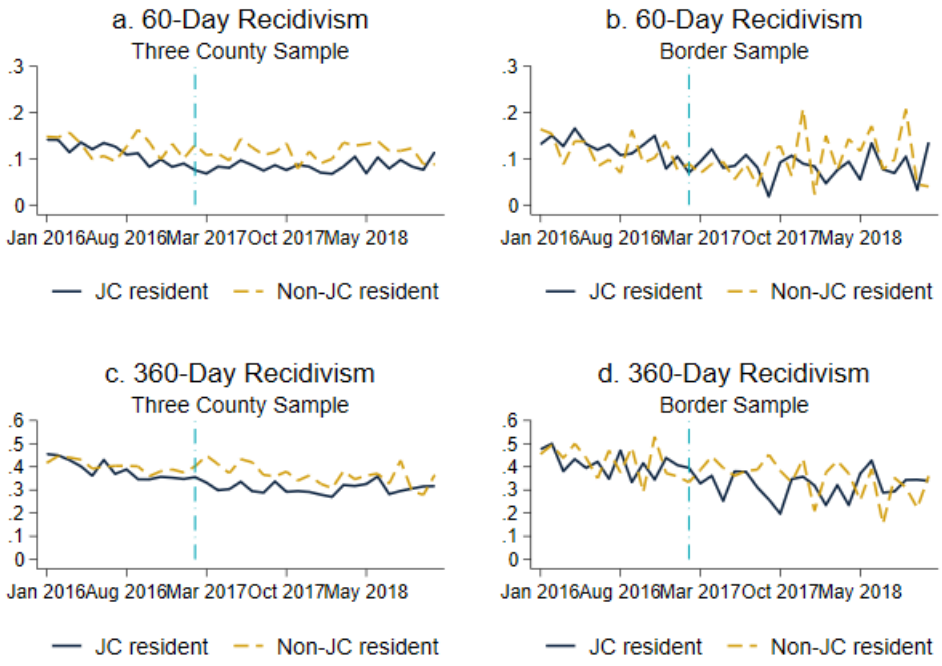
Notes: The outcomes are dummies coded using contact logs for the mental health outreach team. See Table 7 for detailed sub-categories. Each point shows an average for people released from Johnson County Jail in a given month, by county of residence. The vertical line marks the beginning of the outreach intervention in March 2017. The sample in (a) and (b) is defined in Table 2. Panels (c) and (d) restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties.

Figure 4: Recidivism Rates, by Month of Release and County of Residence



Notes: The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Each point shows an average for people released from Johnson County Jail in a given month, by county of residence. The vertical line marks the beginning of the outreach intervention in March 2017. The sample in (a) and (b) is defined in Table 2. Panels (c) and (d) restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties.

Figure 5: Recidivism Rates For All Inmates Entering for the First Time On or After Jan. 1, 2016, by Month of Release and County of Residence



Notes: The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Each point shows an average for people released from Johnson County Jail in a given month, by county of residence. The vertical line marks the beginning of the outreach intervention in March 2017. Panels (c) and (d) restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties.

7 Empirical Appendix

Table A.1: Effect of Eligibility on Recidivism, Fully Saturated Model, Difference-in-Difference Estimates

	Full Sample			Border Sample		
	60 Days	180 Days	360 Days	60 Days	180 Days	360 Days
	(1)	(2)	(3)	(4)	(5)	(6)
Post period x JC resident	-0.085	-0.107	-0.085	-0.047	-0.112	-0.056
	(0.033)	(0.044)	(0.047)	(0.060)	(0.086)	(0.098)
JC resident	-0.042	-0.084	0.018	0.107	0.323	0.459
	(0.173)	(0.189)	(0.196)	(0.052)	(0.097)	(0.086)
Post period	0.017	0.016	-0.048	-0.048	-0.048	-0.122
	(0.048)	(0.064)	(0.068)	(0.096)	(0.124)	(0.137)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Criminal History Controls	Yes	Yes	Yes	Yes	Yes	Yes
ZCTA FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Non-JC sample mean, pre-period	0.119	0.285	0.440	0.087	0.217	0.391
Adjusted R^2	0.041	0.061	0.062	0.024	0.044	0.030
Observations	3,518	3,518	3,518	849	849	849

Notes: Each column shows the results of a separate regression estimated by OLS. The sample in columns (1)-(3) is constructed as in Table 2. Columns (4)-(6) also restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties. The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for month, ZCTA, female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Table A.2: Effect of Eligibility on Recidivism, Two-Stage Least Squares Estimates

	Full Sample			Border Sample		
	60 Days	180 Days	360 Days	60 Days	180 Days	360 Days
	(1)	(2)	(3)	(4)	(5)	(6)
Post period X JC resident X Eligible	-0.053	-0.075	-0.127	-0.064	-0.075	-0.050
	(0.033)	(0.045)	(0.050)	(0.067)	(0.093)	(0.103)
JC resident	-0.008	-0.012	-0.006	0.016	-0.002	0.004
	(0.007)	(0.009)	(0.010)	(0.014)	(0.019)	(0.021)
Post period	0.001	-0.013	-0.008	0.000	-0.025	-0.035
	(0.007)	(0.009)	(0.010)	(0.015)	(0.021)	(0.023)
Non-JC sample mean, pre-period	0.127	0.288	0.405	0.115	0.292	0.425
Adjusted R^2	0.025	0.048	0.054	0.025	0.045	0.056
Observations	21,478	21,478	21,478	4,577	4,577	4,577

Notes: Each column shows the results of a separate regression estimated by 2SLS. Columns (4)-(6) also restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties. The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Table A.3: Effect of Intervention on Recidivism for Non-qualifying Individuals, Difference-in-Difference Estimates

	Full Sample			Border Sample		
	60 Days	180 Days	360 Days	60 Days	180 Days	360 Days
	(1)	(2)	(3)	(4)	(5)	(6)
Post period x JC resident	-0.007	-0.027	-0.039	0.021	0.038	0.024
	(0.017)	(0.023)	(0.025)	(0.039)	(0.052)	(0.056)
JC resident	-0.019	-0.006	0.010	-0.022	-0.056	-0.021
	(0.016)	(0.022)	(0.024)	(0.037)	(0.048)	(0.051)
Post period	-0.008	-0.023	-0.038	-0.045	-0.079	-0.089
	(0.013)	(0.018)	(0.019)	(0.031)	(0.042)	(0.044)
Non-JC sample mean, pre-period	0.132	0.286	0.419	0.154	0.343	0.462
Adjusted R^2	0.029	0.045	0.059	0.027	0.044	0.058
Observations	10,446	10,446	10,446	2,162	2,162	2,162

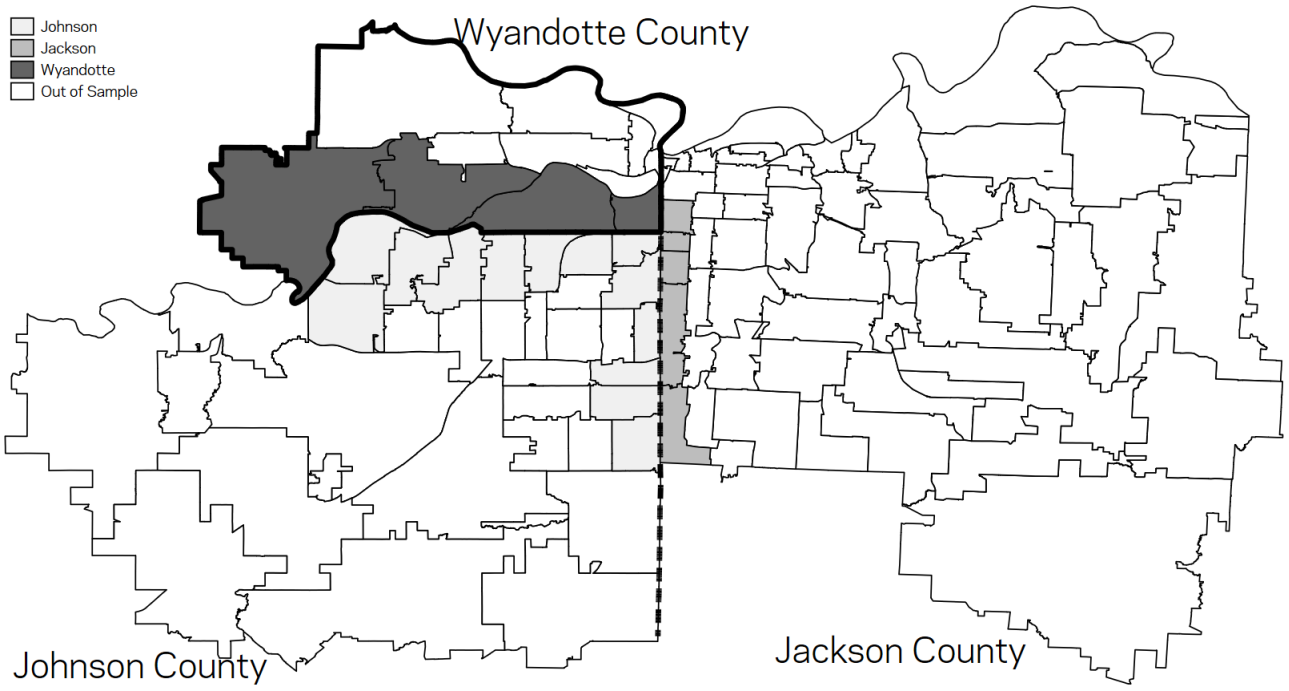
Notes: Each column shows the results of a separate regression estimated by OLS. The sample in columns (1)-(3) is constructed as in Table 2. Columns (4)-(6) also restrict the sample to people living in ZCTAs on the borders between Johnson County and either Wyandotte or Jackson Counties. The outcome is a dummy for whether the person was booked in Johnson, Jackson, or Wyandotte County Jails between release from Johnson County Jail and the listed number of days later. Heteroskedasticity robust standard errors are in parentheses. Each regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.

Figure A.1: Brief Jail Mental Health Screen Survey Tool

Questions	No	Yes	General Comments
1. Do you *currently* believe that someone can control your mind by putting thoughts into your head or taking thoughts out of your head?			
2. Do you *currently* feel that other people know your thoughts and can read your mind?			
3. Have you *currently* lost or gained as much as two pounds a week for several weeks without even trying?			
4. Have you or your family or friends noticed that you are *currently* much more active than you usually are?			
5. Do you *currently* feel like you have to talk or move more slowly than you usually do?			
6. Have there *currently* been a few weeks when you felt like you were useless or sinful?			
7. Are you *currently* taking any medication prescribed for you by a physician for any emotional or mental health problems?			
8. Have you ever been in a hospital for emotional or mental health problems?			

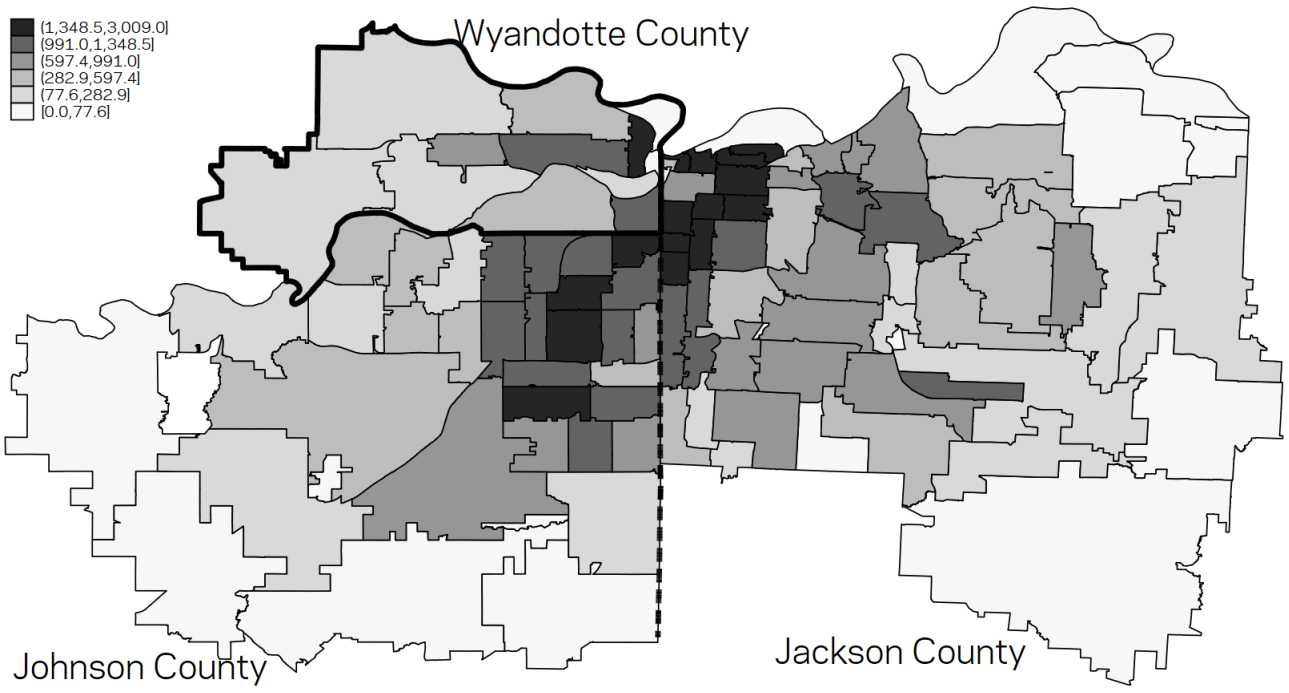
Notes: Mental Health Survey used at jail booking to identify inmates needing mental health services. See text for details.

Figure A.2: Map of Border Sample



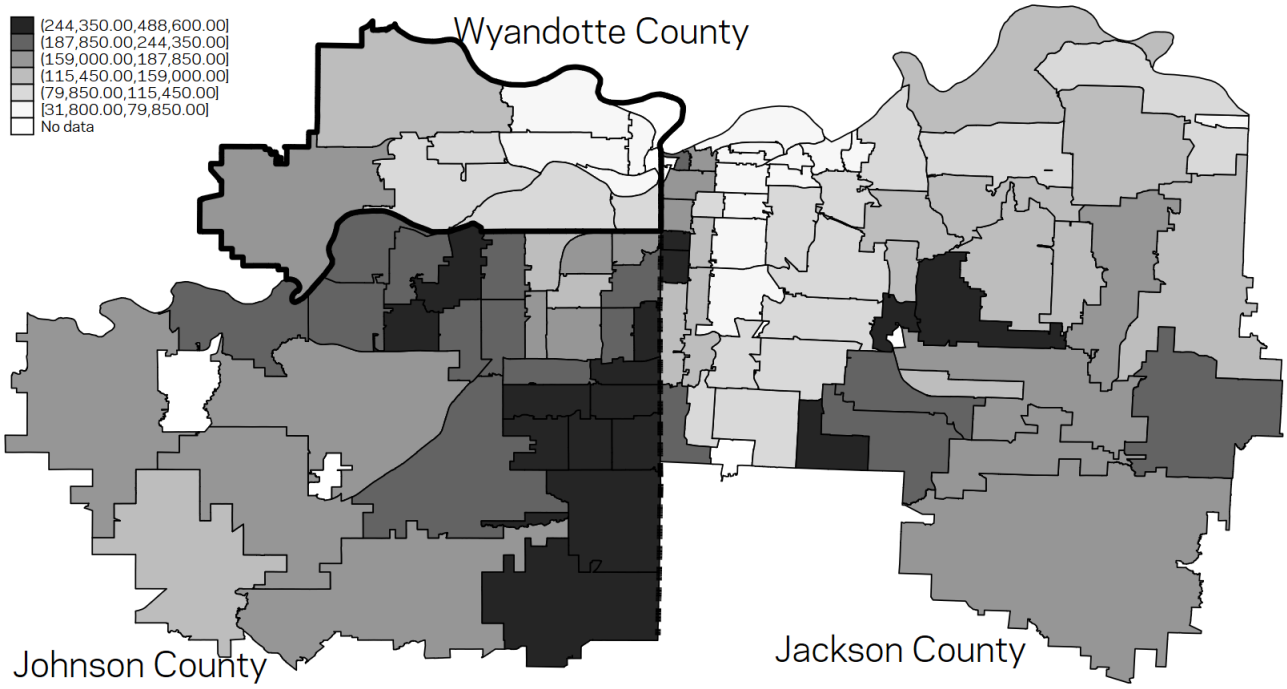
Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line.

Figure A.3: Map of Population Density



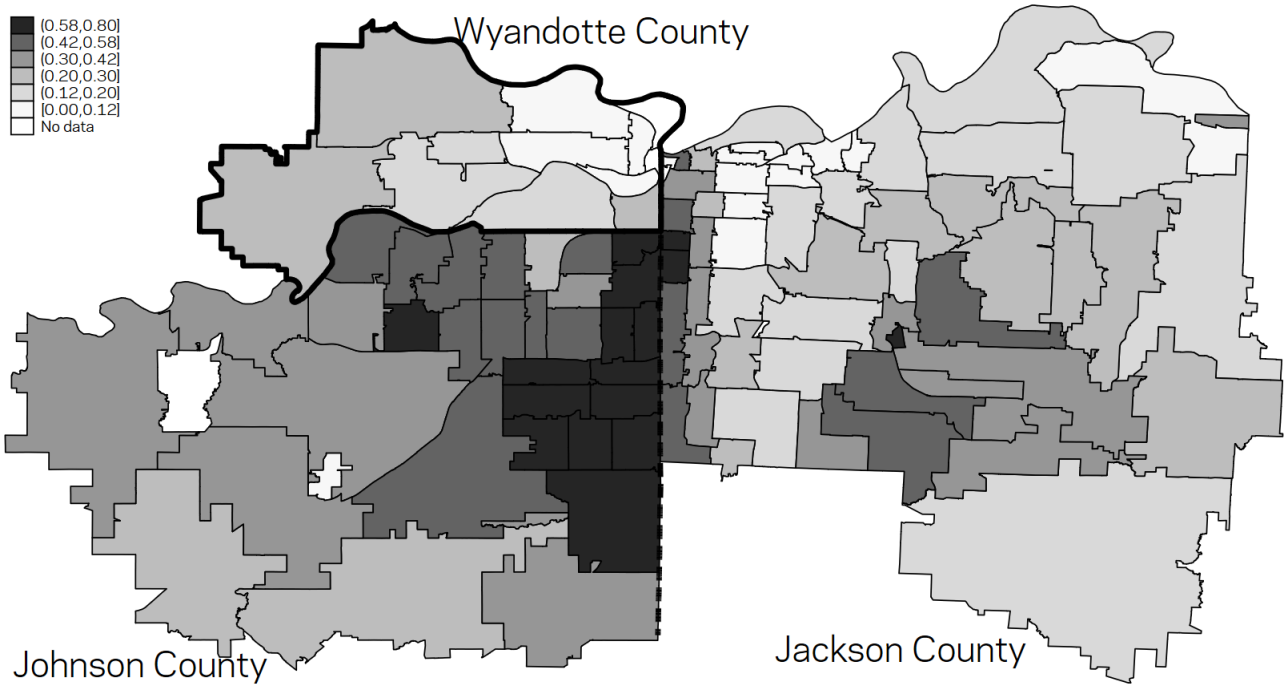
Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Population density is population per square kilometer calculated from the 2008-2012 5-year ACS. Data accessed through IPUMS NHGIS (Manson et al., 2020).

Figure A.4: Map of Median Housing Value



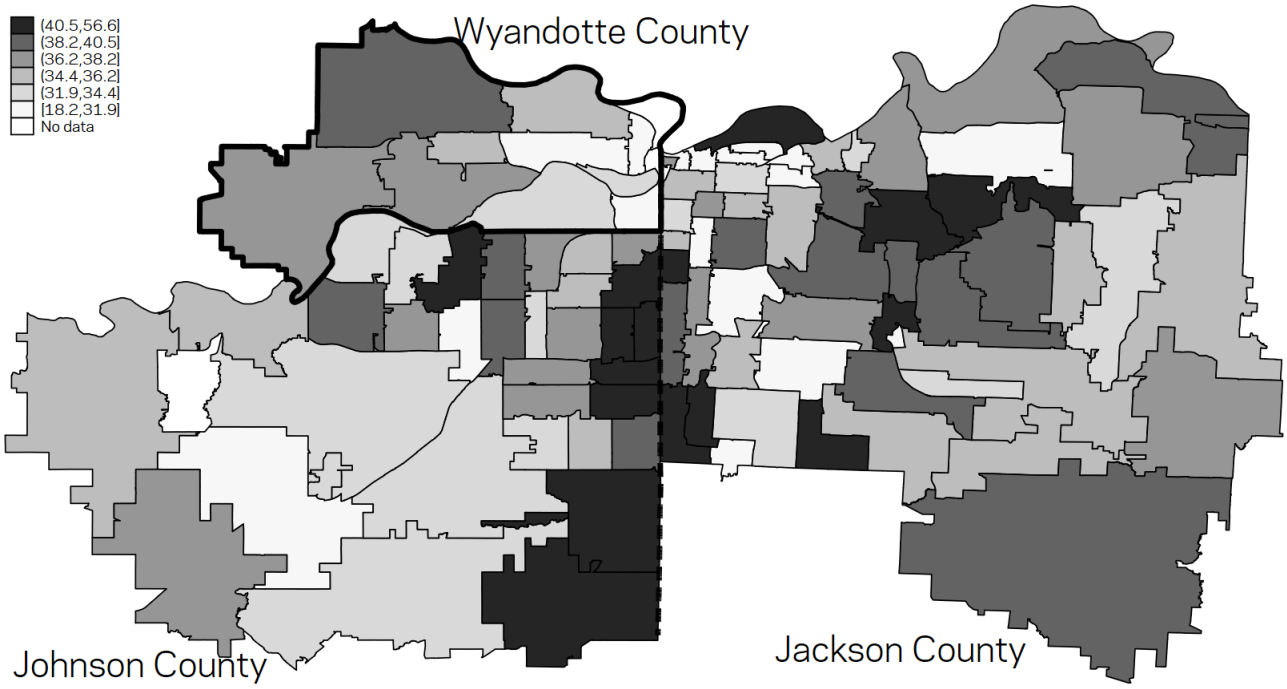
Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Median housing values are calculated across owner-occupied housing units from the 2008-2012 5-year ACS. Data accessed through IPUMS NHGIS (Manson et al., 2020).

Figure A.5: Map of College Graduation Rates Among Adults Ages 25+



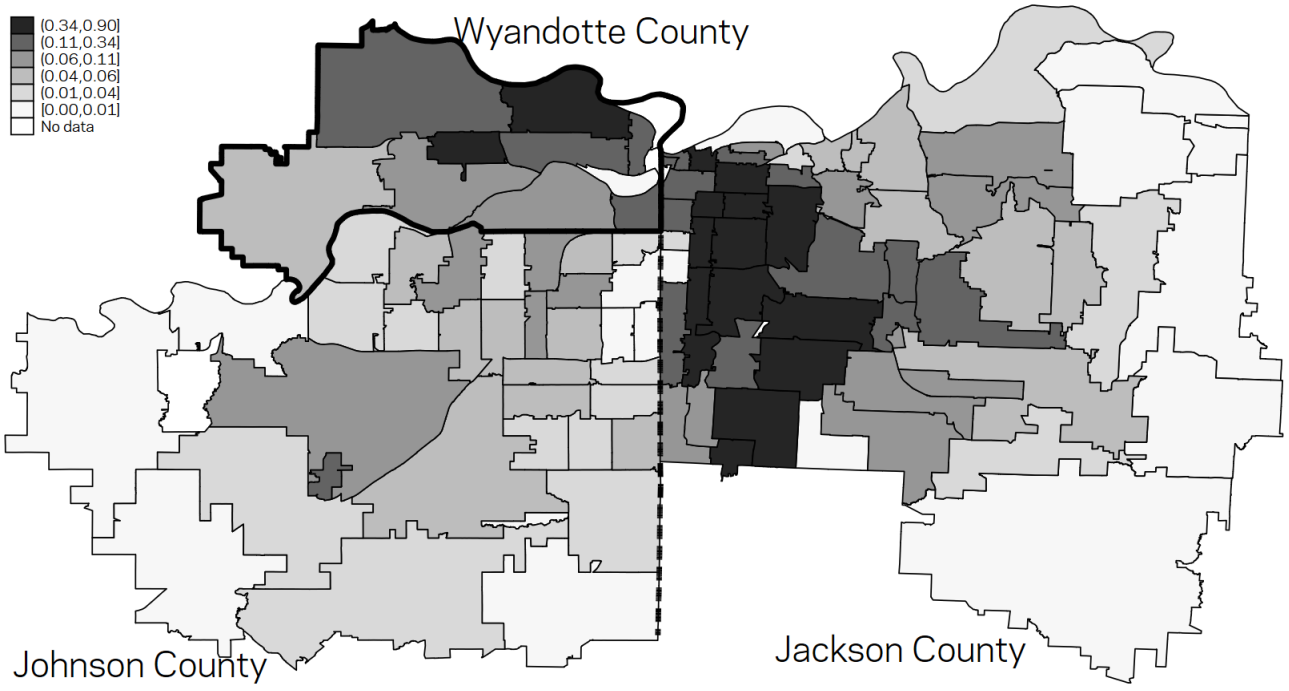
Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Share of college graduates calculated from the 2008-2012 5-year ACS. Data accessed through IPUMS NHGIS (Manson et al., 2020).

Figure A.6: Map of Median Age



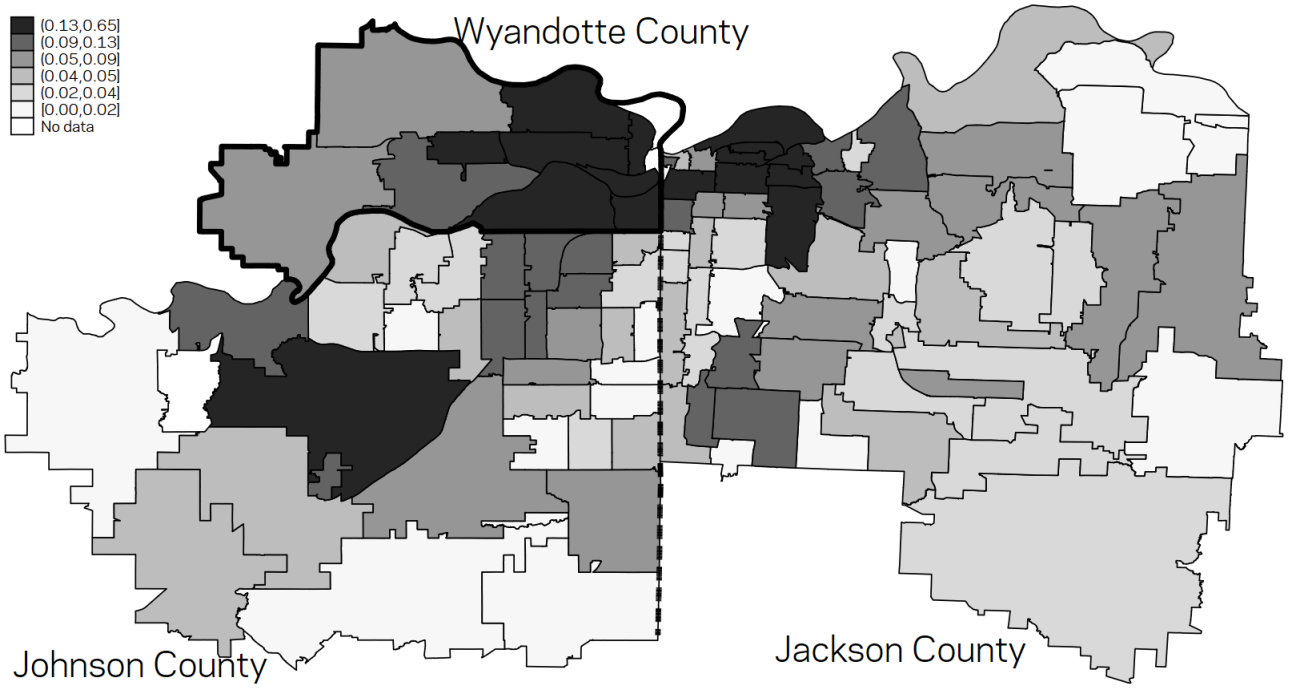
Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Median age calculated from the 2008-2012 5-year ACS. Data accessed through IPUMS NHGIS (Manson et al., 2020).

Figure A.7: Map of Black Share of Population



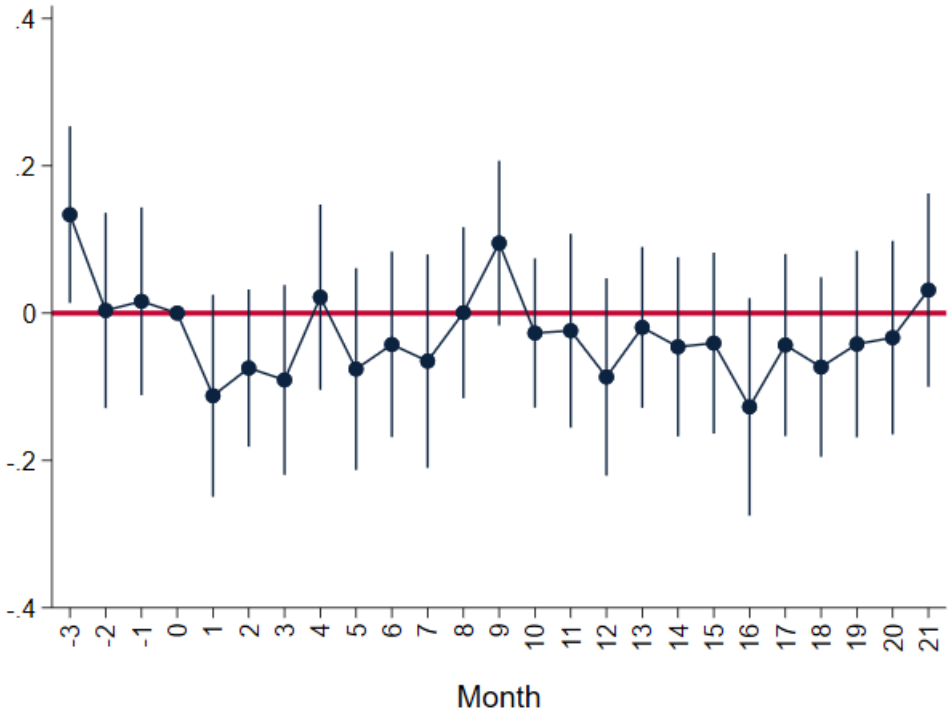
Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Black share of population calculated from the 2008-2012 5-year ACS. Data accessed through IPUMS NHGIS (Manson et al., 2020).

Figure A.8: Map of Hispanic Share of Population



Notes: Wyandotte County, KS is outlined in a thick border while the border between Johnson County, KS and Jackson County, MO is shown by a dashed line. Hispanic share of population calculated from the 2008-2012 5-year ACS. Data accessed through IPUMS NHGIS (Manson et al., 2020).

Figure A.9: Event Study Model: 60-day Recidivism Rates



Notes: Figure shows coefficients from a regression model estimating the differential recidivism rates by month for Johnson County residents relative to non-residents, with a 95 percent confidence interval. The base period is February 2017, the month prior to the beginning of the intervention. The regression includes indicators for female, Black, and Hispanic, employment status, and disability status, as well as controls for age, length of time in jail during current booking, an indicator for any arrests in the lagged year before the screening intervention, and the number of arrests in that lagged year.