

INTRODUCTION

Expanding opportunities to identify substance use and initiate members into treatment is an important component of our management of the Medicaid behavioral health plan. One of our primary targets is opioid use disorder and expanding access to medication-assisted treatment specifically. It was proposed that the county jail may be a strong candidate for this purpose--that if members with opioid use disorder were encountering the criminal justice system at a high rate, and if they were in the jail long enough for induction to occur, this may represent a prime opportunity.

We first set out to assess the overall relationship of opioid use to the jail system--in terms of numbers of arrests and numbers of opportunities to engage previously-unaffiliated opioid users--and the fitness of the jail setting as a potential induction site for MAT--primarily, how long the average member with opioid use disorder spent in jail before being released. This expanded into also assessing the impact of treatment on reducing recidivism, with attention to demographic disparities and co-occurring behavioral health issues.

However, it also quickly became apparent that, while the intent of this project was to focus on opioids, neglecting other substances would be irresponsible--especially given the history of racial disparities in the "war on drugs" and the whitewashed nature of the "opioid crisis" in America. Therefore, while expanding access to MAT and treating growing opioid use is critical for public health, we would be remiss if we did not also address needs in other areas, even briefly.

DATA OVERVIEW

There were 58,299 MCSO jail bookings in 2017 and 2018. A quarter had at least one substance-related charge involved; one in five

25% of the 58,000+ bookings of the last two years had a substance-use related charge attached.

QUICK LIST OF ACRONYMS

SUD: substance use disorder (for the purposes of this paper, includes not only abuse/dependence diagnoses, but also poisonings/overdoses)

BH: behavioral health

OP: outpatient treatment

MAT: medication-assisted treatment (e.g. methadone, suboxone)

OBOT: office-based opioid treatment--medications prescribed through a primary care physician

OTP: opioid treatment program--program licensed to provide methadone

HSO: Health Share of Oregon

MCSO: Multnomah County Sheriff's Office

MHASD: Mental Health & Addiction Services Division (of Multnomah County)

of those arrests had at least one charge specifically mentioning opioids.

In order to discover SUD not included in a charge, as well as connect inmates to data on treatment utilization, we matched the arrestees to Multnomah Health Share members. Half of all bookings could be matched¹ to HSO members, and this formed the basis for most of our analyses.

SUBSTANCE USE'S IMPACT ON ARRESTS

First: what is the impact of substance use on the likelihood of arrest? While the aforementioned count of substance-related charges suggests a substantial connection, there are also other factors to consider. Using the entire Health Share population² and

1. Matched by last name, first 3 letters of first name, and age/date of birth to match. If a single booking could potentially be matched to multiple members, we did not include it.

2. This dataset included members 18 years old or older as of January 1, 2017, with at least one period of insurance eligibility that was at least 120 days long and covered for at least 75% of

HSO members with a substance use disorder were 6.7 times more likely to be arrested.

Meth had the single highest associated risk, followed by cocaine, alcohol, and then opioids.

the arrests attached to any of those individuals, we analyzed the impact of substance use on likelihood of arrest³ while controlling for demographics, homelessness, disability, and other mental health conditions.⁴

Individuals with any documented substance use of any kind in that two year period⁵ were 6.7 times more likely to be arrested. This was compounded where certain mental health conditions were also present--schizophrenia and other psychoses, conduct and personality disorders, and intellectual disabilities all had an interactive effect with substance use that heightened the risk further. E.g., the addition of schizophrenia to a member with substance use increased the risk by over 15 times.

Homeless or housing unstable members were also substantially more likely to be arrested, regardless of substance use. Those with disabilities⁶ were far less likely to be arrested. Younger members and males were far more likely to be arrested than older members or females.⁷

that time. While this doesn't rule out all arrests (where they may have occurred under a different jurisdiction or did occur here but data issues resulted in a non-match), it is a fairly comprehensive approach.

3. Any results from any statistical model throughout this report are only reported if they meet statistical significance of $p < 0.1$.

4. Cox multiple-failure proportional hazards modeling (survival analysis) was used to generate estimated impact. Logistic regression was used to calculate overall power of these sets of variables in predicting arrests--with an area under the ROC curve of 0.85 for each, they would be considered highly predictive. Models included age, sex, homelessness, disability, race, primary language, and six categories of mental health diagnoses (schizophrenia/other psychoses, intellectual disabilities, developmental disabilities, anxiety, mood disorders, and conduct and personality disorders).

5. Arrests were taken from Jan. 1, 2017 to Dec. 31, 2018. Healthcare data was searched back to September 1, 2016--four months in advance--for substance use diagnoses.

6. Disability was measured by reason for Medicaid eligibility. This is not a comprehensive measure--one can have a disability and be on Medicaid for other reasons. This result goes against other existing research showing disability as a risk factor in arrest, and should be interpreted with caution.

7. At this time, more specific gender identity data beyond biological sex is unavailable.

Racial disparities were very clear, with black/African-American and Native American members being substantially more likely to be arrested (85% more and 50% more likely than the average, respectively). Asian members were the least likely to be arrested. Hispanic members were also less likely to be arrested until introducing a variable for English as primary language, when that relationship disappeared. (Introducing this variable also decreased the effect for Asian members, although it remained significant. An examination of the data showed that Asian and Hispanic members were the most likely to speak something other than English for their native language, compared to other races/ethnicities.) Those not speaking English were substantially less likely to be arrested (nearly 70% less likely⁸). White members were somewhat less likely to be arrested, although not substantially below the mean--perhaps unsurprising, given demographic distributions.

What of specific substances? Four substances were selected for a more specific analysis: opioids, alcohol, methamphetamines, and cocaine. While opioid use increased the risk of arrest by 2.9 times, alcohol increased it by 3, cocaine by 3.4, and meth by 9.5, while still controlling for demographics, housing, disabilities, and other mental health conditions. Significant interaction effects were also seen between substances on the likelihood of arrest; combining these substances into all possible pairings, this pattern still follows, with the addition of meth to any other sub-

Homelessness, race, and several mental health diagnoses also predicted increased risk. African-Americans and Native Americans had substantially increased risk; schizophrenia, conduct and personality disorders, and intellectual disabilities also predicted increased risk. The combination of schizophrenia and SUD increased the risk of arrest by 15 times.

stance yielding the greatest risk. This suggests that,

8. This may lend additional support to the research that shows immigrant/refugee populations are far less likely to commit crimes than native-born Americans. However, we must also remember that arrests are not necessarily representative of crimes committed--e.g., the disparities that exist between different races, apart from the actual rate of crimes committed, on who is actually arrested for their crimes. Just as we have to use caution in healthcare in equating diagnosed illness with actual illness prevalence, we must also be careful not to equate arrest with population criminality.

while multiple outcomes besides arrest must also be considered in estimating the societal impact of opioid use, its effect on the criminal justice system may not be as substantial as other substances' impact.

DESCRIBING OPIOID USE AND ARRESTS

There were nearly 11,000 active Health Share members with an opioid-related diagnosis attached to at least one healthcare encounter in 2017 or 2018.⁹ Over 20% of those had at least one jail booking, with an average of 3.1 bookings per arrested person within that two year time frame. Over 12% of all MCSO bookings were by someone on our opioid list.

Of all the bookings mentioned earlier that had opioid-specific charges present that we were able to match to an HSO member, only 60% were attached to one of our known OUD members. Even discounting cases where a person may not be using (e.g., only dealing or delivering), or using at a level worthy of a formal diagnosis, this could imply a significant portion of HSO members for whom we are simply completely unaware of opioid use disorders.

Two-thirds of those with opioid use disorder had at least one encounter with the substance use treatment system at some point during that two years--residential, outpatient, or MAT (both via OTPs and OBOT). This could be immediately before or after arrest, or as far from it as two years, however.

A better measure may be analyzing the time periods immediately before and after arrest. Over 85% were not on any form of MAT either in the 30 days immediately before booking or the 30 days immediately after release. 3.5% had at least one MAT encounter beforehand, but no MAT encounters in the 30 days after booking. Between these two groups, only 6.2% had a residential or outpatient encounter in lieu of MAT after release. Only 10.8% had a MAT encounter after their booking, and most of those also had an encounter

Over 20% of members with documented opioid use had at least one arrest in the last two years. Nearly 85% had no substance use treatment of any kind in the 30 days immediately after their release from jail.

9. Included Sep. through Dec. 2016 for all categories of services except OBOT, for which data was not available.

before their booking.¹⁰

Of all of those with no treatment within 30 days of release, over 60% were in jail for 24 or more hours. Nearly 50% were there for 48 or more hours. This represents our window of opportunity for connection.

The above is technical--counting arrests, not people. If we were able to successfully intervene in the jail setting, and if that intervention helped prevent future arrests (as the next analysis explores)--how many individuals are we talking about reaching? If we attempt to reach each person there for at least 24 hours, that represents a substantial count of opportunities to reach over 1,500 unique individuals with known opioid use disorder over a two-year timeframe--and that is only among the Health Share half of the inmate population, and not counting that third of opioid arrests among HSO individuals for whom we did not previously know of their opioid use. If we presumed a relatively even distribution of opioid use among the non-HSO inmates, as well as the unaccounted-for arrests, there could be three times as many opportunities and individuals to reach. These are important numbers to consider as we discuss the possibility of jails as an MAT induction site and estimate the potential need.

A connection in the jails may give opportunity to reach as many as 4,500 opioid users not otherwise connected to treatment over a two-year period.

TREATMENT'S IMPACT ON ARRESTS

While there are definite health and humanitarian reasons to try to connect individuals to treatment for substance use, what is the impact of treatment on risk of arrest among opioid users?

Having at least one encounter in any SUD level of care--residential, outpatient, or MAT¹¹--reduced the risk of arrest by over 70%, when controlling for the

10. Arrests from Jan. 2017 and Dec. 2018 were omitted from this part of the analysis, due to missing OBOT data from pre-2017/post-2018, in order to be able to examine a full 30 days pre- and post-arrest. Estimates of counts of opportunities to reach clients take this reduction into account.

11 Behavioral health encounters in an OTP setting--e.g., psychotherapy at CODA or Allied--count under outpatient. The MAT metric counts only medication administration and prescriptions, whether via OTP or OBOT.

Treatment connection after release from jail decreased the risk of rearrest by over 70%.

same demographics as earlier.¹² However, is there a minimum

threshold required to achieve this reduction in risk? The above includes a range from the very engaged, long term treatment client to the one visit and never seen again; specific risk will likely vary by treatment combination and dosage. There are many ways one could look at treatment combinations and dosages; after comparing multiple models, we settled on two.

For the first model, we created definitions for engagement and retention for each level of care, based upon past work elsewhere. We then analyzed each of these while still controlling for engagement and retention (or lack thereof) in the other levels of care and all previous demographics, comorbidities, and other covariates. Each type of treatment utilization significantly reduced the risk of arrest, compared to no treatment, with one exception. (See Table I, below.)

Outpatient dips between low and retention, whereas residential and MAT seem to increase their effectiveness at reducing arrest risk as dosage increases. At the minimal level, there does not appear to be substantial differences between outpatient or residential--a handful of encounters in either appears to have a positive impact on risk reduction, ranging from about 30% to 45%, with the greatest impact in MAT. Outpatient has the most substantial impact long-term, with little difference between residential and MAT--the three levels of care range from approximately 50% to 60% reductions in risk of arrest.

However, this approach still yields questions. A per-

son's access to, type, and duration of treatment are also dependent on acuity, which in turn may influence risk of arrest. In other words, more treatment may be more helpful, but it may also only be accessed by those at highest baseline risk, which can confuse our comparisons to other individuals with lower risk to begin with. Also, are our categories of treatment engagement correct? And how well are we capturing the interactive effects between different treatments?

Given these questions and the nearly infinite number of combinations one could have of treatment services, especially over time periods ranging from a few days to two years, we used latent profile analysis¹³ for the next model. Our model divided people into five categories of monthly treatment utilization patterns (not counting no treatment whatsoever). We then used these five categories to predict the impact on risk of arrest, relative to no treatment.

These classes can be organized into a rough progression through the major levels of care, based on the average treatment utilization of each class. (See Graph I, next page.)

These were then used as predictors in the same multivariate model described earlier, instead of our definitions of engagement and retention for each level of care. Interestingly, there is little variation between the classes; they all range from between a roughly 60% to 75% reduction in arrest risk. This may suggest some selection bias: for example, that those who do choose to enter treatment have a common commitment to ending their substance use that is more important to reduced recidivism than the actual treatment itself.

Table I: CHANGES IN RISK OF ARREST, BY LEVELS OF TREATMENT

		Low	Engagement	Retention
Residential	Definition	0<	7+ consecutive days	21+ consecutive days
	Change in risk	-30.4%	-35%	-51.1%
Outpatient	Definition	0<	3+ encounters	12+ encounters
	Change in risk	-29.4%	N/A	-58%
MAT	Definition	0<	.5 MPR and 30+ days	.9 MPR and 30+ days
	Change in risk	-44.3%	-44.5%	-50.9%

12. Cox multiple-failure proportional hazards modeling (survival analysis) was used once again, for all three treatment models, and with the same covariates as the earlier models (age, sex, homelessness, disability, race, primary language, and six categories of mental health diagnoses).

13. Treatment encounters were standardized to a 30-day average to account for varying lengths of observation; utilized generalized structural equation modeling to identify the classes and their traits. Class identification was then used as a predictor for another Cox multiple-failure proportional hazards model.

GRAPH I: PATTERNS OF TREATMENT ENGAGEMENT BY CLASS

Treatment engagement by class

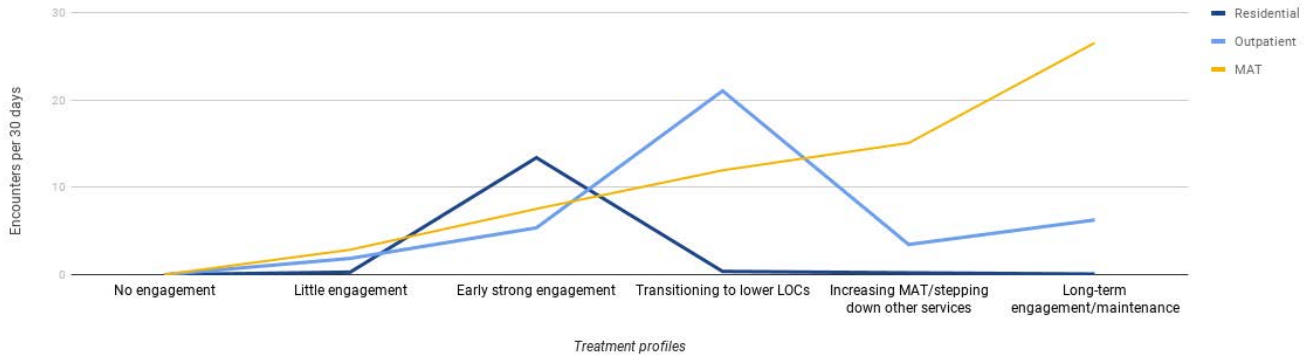


TABLE II: TREATMENT CLASS CHARACTERISTICS AND CHANGES IN RISK

Class characteristics (percent of population)	Change in risk, relative to no treatment
No engagement (39.8%) Zero encounters at any level of care	N/A
Little engagement (28.8%) Low residential, OP, MAT utilization	-69.7%
Early strong engagement (1.5%) High residential utilization; moderate OP, MAT utilization	-58.9%
Transitioning to lower LOCs (5.7%) Low residential utilization; heavy OP utilization; moderate MAT utilization	-71.8%
Increasing MAT and stepping down services (3.8%) Low residential utilization; moderate OP, MAT utilization	-74.8%
Long-term engagement/maintenance (20.5%) Low residential utilization; moderate OP utilization; heavy MAT utilization	-70.9%

treatment connections within 30 days of release among all SUD members (not just opioid) revealed that race, disability, mental health, and homelessness significantly impacted a person’s likelihood of making that connection. Whether these disparities exist at the jail level, the county level (in terms of outreach efforts or programs like LEAD), the treatment level (in terms of access), or all three, they exist and warrant further investigation.

African-Americans were nearly 20% less likely than the average to connect to treatment after release from jail. Those with schizophrenia

Other interpretations may include elements like the aforementioned confounder of acuity driving utilization. However, regardless of the variation between classes, it continues to support the idea that whether it is the act of choosing treatment or treatment itself, entering treatment has a substantial impact on reducing recidivism. (See Table II, above.)

ACCESS TO TREATMENT

If treatment is an important intervention, is it available to all equally? What factors impact the likelihood of treatment connection after release?

An analysis¹⁴ of the demographic factors impacting

14. Cox multiple-failure proportional hazards modeling (survival analysis) was used once again, with the same covariates as the earlier models (age, sex, homelessness, disability, race, primary language, and six categories of mental health diagnoses).

or other psychoses were over 35% less likely; those with intellectual disabilities almost 70% less likely; the homeless more than 30% less likely. (It comes as no surprise that those previously in treatment in the 30 days before arrest were far more likely to return to treatment than those who had not been starting new treatment.) While the result for disabilities in general failed to meet the statistically significant cutoff, it came close enough to warrant a mention, predicting a nearly 20% reduction in likelihood of treatment connection.

When adding in whether or not a person was an opioid user, opioids were shown to nearly double the odds of treatment connection; meanwhile, the racial disparity for African-Americans disappeared. (Homelessness, schizophrenia, and intellectual disabilities remained roughly the same; disabilities in general was no longer significant.) The predictive power of the

African-Americans, those with schizophrenia or intellectual disabilities, the homeless, and the disabled were significantly less likely to connect to treatment after jail. Opioid users were twice as likely to connect to treatment than non-opioid substance users, and the racial disparity disappeared when taking this into account--implying that the differences in opioid use among different races, and the way we have prioritized opioid treatment, may be furthering health disparities.

model remained roughly the same, suggesting that the addition of substances did not necessarily improve the model. This may suggest that substance of choice and what substances are targeted for treatment is intimately connected with racial disparities. Slightly less than a quarter of African-Americans who use substances and have an arrest have a documented opioid use disorder; nearly half of white arrestees do. (Approximately a quarter of Asians and a third of Hispanics and Native Americans have opioid use listed.) If we target a problem predominant among white people, and then control by how we address that problem, we will effectively mask some racial disparities--which, while further investigation is warranted, appears to be the case here. However, we must also note that the creation and growth of medication-assisted treatment, a relatively low-resource intervention in both cost and provider time, has greatly increased the capacity of the treatment system for opioid users, and no comparable option currently exists for other substances. This is a complication we must consider when weighing the numbers.

CONCLUSIONS

This analysis highlighted multiple opportunities, challenges, and areas for further inquiry. We drew four major conclusions, while reiterating the hope that further partnership and investigation can continue to occur.

- 1) Partnership with the jail appears to be a good opportunity to capitalize on the political drive to address opioid use and create new pathways to medication-assisted treatment.
- 2) We need to give increased attention and resources to other substances, especially when considering the evidence that neglecting to do so likely furthers disparities in health and justice.
- 3) We should continue explorations of the interaction of both substance use and mental health with the jail system, especially in terms of health and demographic disparities--e.g., ongoing explorations into race, disability, and homelessness in these sectors.
- 4) Better outreach at the time of release from jail may be key to effectively connecting individuals to treatment and reducing criminal justice system involvement long-term. While it should come as no surprise, substance use is a major contributor to arrests, and evidence suggests that local substance use-specific treatment is a highly effective method for reducing future arrests.

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