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**Ohio Addiction Treatment Program Evaluation
Final Report**

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Table of Contents

Executive Summary.....	3
Introduction	6
Evaluation Overview	6
Overview of Evaluation Participation	8
Introduction	8
Six-month Outcome Analysis	11
Introduction	11
Data Collection.....	11
Outcome Definitions	13
Data Analysis.....	15
Participants	16
Results.....	19
Discussion.....	23
Qualitative Methods	25
Focus Groups.....	25
Surveys.....	30
Discussion.....	46
Cost-Efficiency Study Outcomes	48
Introduction	48
Methods.....	48
Cost of Ohio State Criminal Justice System and Medicaid-Eligible Services.....	49
Sample Selection.....	51
Analytic Approach	53
Results.....	57
Discussion.....	61
References	64
Appendix	66

Executive Summary

Given the devastating effects of the opioid crisis and the growing support for both the drug court model and medication assisted treatments (MAT), the Ohio Department of Mental Health and Addiction Services (OhioMHAS) along with the Supreme Court of Ohio as well as other State agencies and certified drug courts designed an innovative program to provide addiction treatment, including MAT, to non-violent adult offenders with opioid use disorder, alcohol use disorder, or both who are entering drug courts throughout the state. In 2016, the Ohio Legislature invested an additional \$11 million to sustain and expand the programming.

This report details outcomes from a one-year mixed-methods evaluation of this novel, empirically-based State-funded initiative conducted within 25 drug courts across 13 Ohio counties. The primary goals of the evaluation were to examine the effectiveness of providing MAT to drug court participants on multidimensional client outcomes, identify obstacles and barriers to program implementation and sustainability, and to determine the cost savings and efficiency associated with the programs.

Quantitative Results

- The six month outcomes evaluation sample contained 595 drug court clients, 350 (59%) of whom received some form of MAT during the first 6 months of their drug court program participation.
- Extended release naltrexone was, by far, the most frequently adopted form of MAT with 89% of MAT clients receiving it during this time period.
- Examination of the six-month drug court outcomes indicated that MAT had a significant effect on drug court retention. Clients who received MAT were more likely to be retained in drug court than those who were not.
- Non-significant trends favoring the MAT group were observed for urinalysis-confirmed drug abstinence and criminal recidivism.
- No differences were observed between clients who did and did not receive MAT on self-reported psychosocial outcomes and program satisfaction.

- Further research is required to examine the comparative effectiveness of agonist, partial agonist, and antagonist medications within this population.

Qualitative Results

- Findings support the criminal justice system's continued negative perceptions of agonist or partial agonist medications such as buprenorphine over antagonist forms of MAT. Nearly half reported that they disliked buprenorphine because it is often diverted. Several networks also reported that clients on MAT often start using other psychoactive substances that are not blocked by MAT and that clients on MAT might gain false premature sense of recovery causing them to stop taking their medication too early and relapsing.
- Still, although stakeholders generally reported a preference for extended-release naltrexone over other forms of MAT, the majority of stakeholders reported relatively positive feelings towards MAT, and that MAT helped reduce cravings, encouraged sobriety, reduced the incidence of relapse, and increased treatment retention and engagement.
- The majority of networks reported that they would strongly encourage others to start using MAT, but emphasized that MAT alone is not enough and that it should be combined with evidence-base psychotherapy.
- Regarding client perceptions, the majority of respondents expressed that their clients were appreciative and grateful for the opportunity to have MAT, and that it helped them gain stability and gave them more confidence in their recovery.
- Participating networks reported many negative perceptions from the community regarding MAT including impressions of MAT as a crutch or as replacing one drug with another.

Cost Efficiency

- Results revealed a consistent and overall positive cost impact on Ohio Medicaid spending.

- Clients receiving MAT spent more on substance use disorder treatment; however, they utilized less health care services (both physical and behavioral health). Over the course of the program, clients receiving MAT spent on an average \$4,384 less on Medicaid health expenditures, but \$606 more on all treatment compared to those who did not receive MAT.
- Similarly, criminal justice costs were consistently higher for the non-MAT-participants compared to their matched MAT counterparts. Nevertheless, the gap in costs between the two groups was narrowed between baseline and 9 months post entry. This result was likely due to a growing concordance in the amount of arrest activity between the two groups over time.

Summary

Overall, findings of the evaluation provide statistically and clinically significant support for the incremental utility of incorporating MAT into the already very well supported efficacious drug court model. Results of this study indicate that drug court clients who received MAT had significantly higher rates of drug court retention and incurred significantly lower expenses related to medical care and criminal justice services. With regards to the qualitative analysis, the data appear to support stakeholders' generally positive feelings towards MAT, including its ability to reduce cravings, encourage sobriety, reduce relapse, and increase treatment retention and engagement. Nevertheless, the data also support criminal justice stakeholders' continued preference for antagonist medications such as extended-release naltrexone over partial agonist medications such as buprenorphine. This preference likely contributed to the evaluations inability to examine the comparative efficacy of antagonist vs. partial agonist forms of MAT as only a small number of participants received partial agonist medications. Taken as a whole, the evaluation results provide convincing support for the continuation and expansion of this enhanced drug court model. The findings also indicate the need for efforts to educate both criminal justice stakeholders and community members on the use of other forms of MAT (i.e., agonist and partial agonist) to increase acceptability and use of the full range of MAT options.

Introduction

Evaluation Overview

Use of illegal opiates such as heroin and the non-medical use of prescription opioid pain medications have risen to epidemic levels, with rates continuing to soar (Centers for Disease Control and Prevention, 2011). In fact, rates of heroin use in the United States have increased 62% between 2002 and 2013 (Jones et al., 2015). Recent estimates indicate that approximately 914,000 individuals used heroin in the past year and 4.3 million individuals used prescription opioids non-medically during the same timeframe (Center for Behavioral Health Statistics and Quality, 2016). From 2002 to 2015, heroin overdose deaths have increased 6-fold and prescription opioid deaths have increased 2-fold (National Institute on Drug Abuse, 2017). In addition to escalating rates of mortality, opioid misuse and addiction are associated with significant negative consequences – including the spread of transmittable disease such as tuberculosis, HIV and HCV, increased rates of criminal justice and child welfare involvement, and incalculable social and emotional costs to affected families and communities (Inocencio et al., 2013; Paulozzi et al., 2011; Rudd et al., 2015). There is no doubt that the escalation of opioid addiction and overdoses in this country constitute a public health epidemic. Ohio has been particularly affected by the opioid epidemic. In 2015, 3,050 Ohio residents died as a result of drug poisoning or overdose, of which 46.7% were heroin-related (Ohio Department of Health, 2015).

In 2014, members of the Ohio General Assembly provided \$5 million in funding to establish pilot programs in seven counties throughout the state to help address this burgeoning crisis. The Ohio Department of Mental Health and Addiction Services (OhioMHAS) worked with the Supreme Court of Ohio as well as other State agencies and certified drug courts to develop a program to provide addiction treatment, including medication-assisted treatment (MAT), to non-violent adult offenders with a dependence on opioids, alcohol, or both. In 2016, the Ohio Legislature invested an additional \$11 million to sustain and expand the programming. The Addiction Treatment Program (ATP) has expanded to 21 counties across the State. Of these 21

counties, 13 were included in the current evaluation: Allen, Clinton, Cuyahoga, Franklin, Gallia, Hardin, Hocking, Jackson, Marion, Mercer, Montgomery, Summit, and Warren.

Figure 1. Map of counties participating in the evaluation of the Addiction Treatment Program



This evaluation used a state-of-the-art mixed methods approach (both quantitative and qualitative methods) designed to examine the effectiveness of participating MAT to drug court participants. The primary goals of the evaluation were to examine the effectiveness of providing MAT to drug court participants on multidimensional client outcomes, identify obstacles and barriers to program implementation and sustainability, and to determine the cost savings and efficiency associated with the programs.

David Festinger, Ph.D. and Karen Dugosh, Ph.D. of the Treatment Research Institute served as Principal Investigators on the evaluation project. Jenna Jones, Ph.D. served as the primary Health Economist Consultant. Other project staff included: Brook Singletary as Project Coordinator; Jessica Lipkin and Esther Choi as Research Assistants; Meghan Love as Senior Program Manager; and Van Lam as Senior Software Developer. Finally, David Gastfriend, M.D. and Kyle Kampman, M.D. served as Medication Assisted Treatment Consultants.

Overview of Evaluation Participation

Introduction

The ATP evaluation commenced on January 1, 2016, and drug court program participation occurred on a rolling basis. A total of 26 drug courts and their associated service providers agreed to participate in the ATP program and associated evaluation; however, only 25 of these courts provided evaluation data.

To be eligible for the evaluation, clients had to meet the following inclusion criteria:

- Entered the drug court on or after January 1, 2016
- Identified as having an opioid and/or alcohol use disorder
- Determined to be appropriate for MAT by the care provider

A total of 790 drug court clients entered the evaluation between January 1, 2016 and April 30, 2017. At the time of entry into the program, 543 agreed to receive MAT and 247 declined MAT. The number of participants overall and the initial MAT classification (i.e., MAT vs. no MAT) are presented in Table 1 below.

Table 1. Participant flow and MAT status by court.

	Overall (n = 790)	MAT (n = 543)	No MAT (n = 247)
	n (%)	n (%)	n (%)
Allen County Common Pleas	23 (2.9)	15 (65.2)	8 (34.8)
Lima Municipal	14 (1.7)	10 (71.4)	4 (28.6)
Clinton County Common Pleas	3 (0.4)	3 (100)	0 (0)
Cleveland Municipal	3 (0.4)	2 (66.7)	1 (33.3)
Cuyahoga Drug Court	16 (2.0)	13 (81.3)	3 (18.8)
Cuyahoga Recovery Court	30 (3.8)	14 (46.7)	16 (53.3)
Franklin County Common Pleas	15 (1.9)	8 (53.3)	7 (46.7)
Franklin Family Dependency	14 (1.8)	6 (42.9)	8 (57.1)
Franklin Municipal	44 (5.6)	40 (90.9)	4 (9.1)
Gallipolis Municipal	31 (3.9)	31 (100)	0 (0)
Hardin Recovery Court	32 (4.1)	10 (21.3)	22 (68.7)
Hardin Family Recovery Court	13 (1.6)	11 (84.6)	2 (15.4)

Hocking Municipal	61 (7.7)	59 (96.7)	2 (2.3)
Jackson Municipal	21 (2.7)	20 (95.2)	1 (4.8)
Marion County Common Pleas	30 (3.8)	23 (76.7)	7 (23.3)
Marion County Family Dependency	2 (0.3)	1 (50)	1 (50)
Marion Municipal	24 (3.0)	23 (95.8)	1 (4.2)
Mercer County Common Pleas	14 (1.8)	8 (57.1)	6 (42.9)
Montgomery County Men's Drug Court	90 (11.4)	80 (88.9)	10 (11.1)
Montgomery County Women's Drug Court	72 (9.1)	46 (63.9)	26 (36.1)
Montgomery Juvenile	0 (0)	0 (0)	0 (0)
Akron Municipal	56 (7.1)	21 (37.5)	35 (62.5)
Barberton Municipal	14 (1.8)	10 (71.4)	4 (28.6)
Summit County Common Pleas	125 (15.8)	51 (40.8)	74 (59.2)
Summit County Juvenile Court	6 (0.8)	2 (33.3)	4 (66.7)
Warren County Common Pleas	37 (4.7)	35 (95.6)	2 (5.4)

The specific type of MAT that individuals agreed to receive was as follows:

- 456 extended release naltrexone
- 64 buprenorphine-based
- 12 oral naltrexone
- 11 methadone

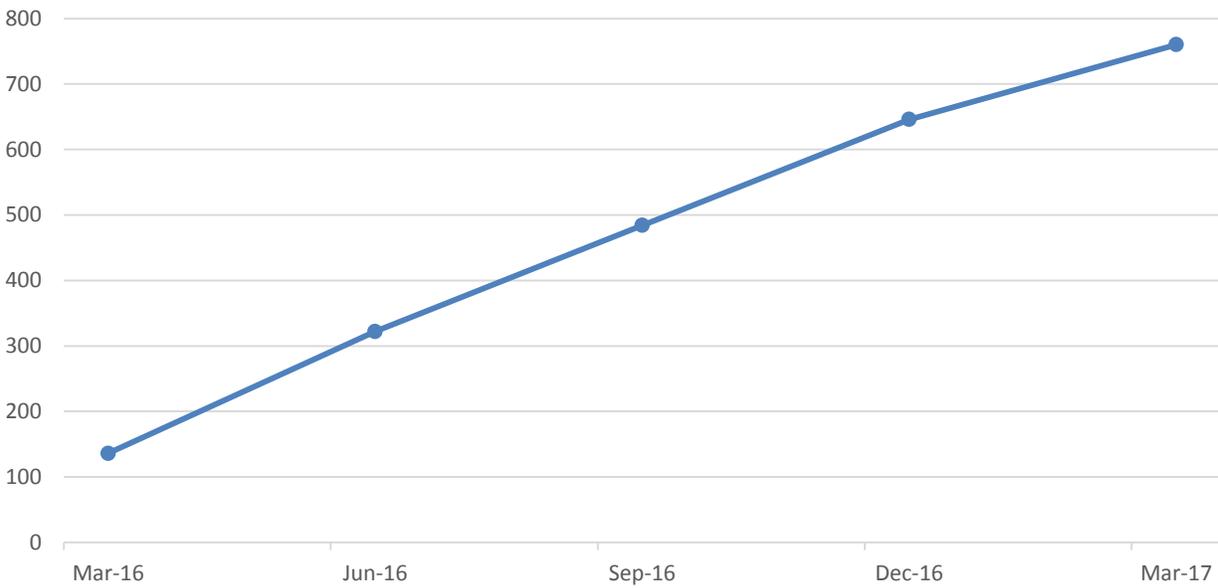
The actual medication received within the first six months of the drug court program (or from the time of drug court entry through May 31, 2017 – at which time data collection ceased – for those who entered the program on or after December 1, 2016) varied substantially from the initial determination. A total of 453 drug court participants received medication during this period and 337 did not. The types of medication(s) actually received are as follows:

- 294 extended release naltrexone
- 39 buprenorphine-based
- 11 oral naltrexone
- 16 methadone
- 83 oral naltrexone and extended release naltrexone
- 15 extended release naltrexone and buprenorphine-based
- 3 oral naltrexone and buprenorphine-based

- 2 extended release naltrexone, oral naltrexone, and buprenorphine-based

Because of the rolling basis of client entry into the evaluation, clients were observed for varying amounts of time. The flow of participants into the evaluation over time is depicted in Figure 2 below.

Figure 2. Participant entry into the evaluation



Six-month Outcomes Analysis

Introduction

The goal of the quantitative evaluation was to determine the effectiveness of providing MAT to drug court clients in improving drug court program retention and reducing substance use and criminal justice involvement. Secondary outcomes included substance abuse treatment attendance, psychosocial functioning (i.e., employment status, mental health problems, physical health problems, social problems, and sober housing living arrangements) and overall drug court satisfaction. Because entry into the evaluation occurred on a rolling basis and, consequently, individuals were observed for varying amounts of time, we chose to examine 6-month outcomes for participants which provided a reasonable sample size (n = 595) for the evaluation.

Data Collection

Programmatic and performance data

TRI-CEP. Baseline and performance data were collected using the TRI Court Evaluation Program (TRI-CEP™) and the TRI Client Assessment (TRI-CA™) web-based systems. The TRI-CEP is a performance monitoring and reporting system for drug courts that captures critical performance indicators endorsed by the National Drug Court Institute. All programmatic data necessary for an evaluation is entered directly into TRI-CEP by designated staff from the courts, treatment programs, and associated programs. Specifically, TRI-CEP provides individualized screens on which stakeholders are responsible for entering only information relevant to clients' responsibilities within their specific program. For example, the treatment program screens collect information on weekly treatment scheduling and attendance, urinalysis scheduling and results, and compliance with MAT. Similarly, the court screen collects information about status hearing scheduling and attendance, and current program status (i.e., active, capias, terminated, graduated). The TRI-CEP screens were designed to be user-friendly and resemble weekly scheduling calendars that can be completed in 1-2 minutes per client. Data collected through the TRI-CEP provided key baseline status variables as well as process and outcome variables

(i.e., medication status, program status at 6-months, urinalysis results, substance abuse treatment attendance).

TRI-CA. The TRI-CA is a web-based system that directly collects information from clients related to their substance use and criminal histories, current level of psychosocial functioning, and perceptions of the program. The TRI-CA was designed to be a user-friendly and self-administered program to reduce response bias when collecting personal and potentially sensitive information. It takes approximately 15 minutes to complete the assessment and has been found to be acceptable to drug court clients. The TRI-CA assessments were completed by individuals at entry into the court and at subsequent three-month intervals until graduation or termination from the program. The TRI-CA served as the method of data collection for key baseline status and outcome variables (i.e., employment status, mental health problems, physical health problems, social problems, and sober housing living arrangements) in the quantitative evaluation.

Data entry monitoring. TRI staff closely monitored each network's data entry status during the evaluation period. We generated weekly reports highlighting each network's missing TRI-CEP elements and identifying clients who were due to complete TRI-CA assessments. We sent these weekly progress reports to each court and their providers via email and outlined their overall data entry status (e.g., how many clients were missing each TRI-CEP data entry element, how many TRI-CA surveys were missing). Later in the week, TRI staff also sent specific reports to providers and court staff members who were four or more weeks behind in data entry. These reports identified the specific clients with outstanding data elements, the individual responsible for the data entry, and the exact number of weeks the individual was behind in data entry. Additionally, TRI staff made weekly phone calls to address data entry barriers and motivate timely data entry. To further incentivize timely data entry, TRI offered five stipends at quarterly intervals throughout the course of the evaluation. We identified a list of "essential data elements" and provided courts with a date by which these data elements should be entered. Specifically, we emailed courts a detailed account of the essential data elements and a calendar

showing (1) the date through which data should be up-to-date and (2) the date on which TRI would review the data for completeness.

Criminal activity data

Criminal recidivism data for all evaluation participants were provided by the Ohio Attorney General, Bureau of Criminal Identification Office. These data included date(s) of arrest(s), type of charge(s), disposition information, conviction information, and sentencing information. Because of the relatively short time frame for the outcomes evaluation, the analyses presented focus specifically on arrest data rather than disposition or conviction information.

Outcome Definitions

The operational definition for each outcome variable is presented below.

Criminal recidivism

This binary outcome reflects whether an arrest was recorded in the criminal record data base for the six-month period following drug court entry. The outcome variable was coded with a value of 1 reflecting a new arrest and a value of 0 reflecting no new arrest.

Program retention

This binary outcome reflects whether a client has been retained in the drug court at the 6-month assessment point. The variable was based on the drug court status variable in the TRI-CEP system. The outcome variable was coded as 1 for clients who are active or graduated at 6-months post entry and as 0 for clients who have been terminated or on warrant.

Drug abstinence

This continuous outcome reflects the proportion of scheduled urinalysis screens that were determined to be drug-negative. Scheduled urines that were missed and unexcused were treated as drug-positive. The variable was based on the substance monitoring data that was entered in the TRI-CEP system.

Employment

This count outcome reflects the number of days of employment or school that the client reported engaging in during the past thirty days. This variable was collected through the TRI-CA system at 3- and 6-months post-drug court entry.

Mental health functioning

This count outcome reflects the number of mental health-related symptoms that the client reported experiencing in the past thirty days (i.e., sleep disturbances, depression, anxiety, hallucinations, attentional difficulties, anger management issues, aggression, suicidal thoughts, suicide attempts). This variable was collected through the TRI-CA system at 3- and 6-months post-drug court entry.

Physical health functioning

This binary outcome reflects whether the client reported experiencing any physical or medical problems in the past 30 days. The variable is coded as 1 for clients who reported having experienced a problem and as 0 for those who did not. This variable is collected through the TRI-CA system at 3- and 6-months post-drug court entry.

Social functioning

This count outcome reflects the number of people (i.e., mother, father, siblings, spouse/partner, children, other family members) the client reports having serious problems getting along with in the past 30 days. This variable was collected through the TRI-CA system at 3- and 6-months post-drug court entry.

Sober housing

This binary outcome reflects whether the client reported living in a sober housing facility in the past 30 days. This variable was collected through the TRI-CA system at 3- and 6-months post-drug court entry.

Program satisfaction

This continuous outcome reflects the scaled score for the following 4-point Likert-scaled items:

1. I am satisfied with the services I am receiving in the drug court program.
2. I have been helped by the judge.
3. I have been helped by my counselor.
4. I have been helped by my case manager.
5. I have been helped by urine testing.
6. The drug court program helped me get the services I needed.
7. I understand what is happening during the drug court hearings.

Scale scores could range from 0 to 3. Items comprising the scale score were collected through the TRI-CA system at 3- and 6-months post-drug court entry.

Data Analysis

Participants who did and did not receive MAT in the 6-month period following study entry were compared on key demographic and baseline status variables. A logistic regression analysis was used to identify key predictors of MAT status. Predictors in the model included the following demographic and status variables: age, gender, ethnicity, employment status, homeless status, number of prior felony offenses, age of onset of substance abuse, and the model accounted for the nesting of clients within court. Age was the only predictor to reach statistical significance ($Z = 3.66, p < .001$). Correlational analyses were performed to identify the extent to which age was related to each of the outcome variables described below. Age was significantly correlated with social functioning, physical health functioning, and program satisfaction and, consequently, was included as a covariate in the respective outcome analysis described below.

Cross-sectional outcomes

Logistic regression analyses were used to compare MAT and no MAT clients on cross-sectional binary outcomes (i.e., criminal recidivism, program retention) using SAS's PROC GENMOD. Linear mixed effects models were used to compare MAT and no MAT clients on cross-sectional continuous outcomes (i.e., treatment attendance) and longitudinal continuous outcomes (i.e.,

program satisfaction) using PROC MIXED. The models included terms group and accounted for the nesting of clients within drug court.

Longitudinal outcomes

Non-linear mixed effects models were used to compare MAT and no MAT clients on binary (i.e., physical health functioning) and count-based (i.e., employment, mental health functioning, social functioning) longitudinal outcomes. Analyses were performed using SAS’s PROC GLIMMIX and models included terms for group, time, and their interaction and included random effects for client and court. Importantly, the baseline variable related to the outcome was included in the analysis. Unfortunately, the low rate of reporting sober living arrangements precluded statistical analysis for that variable and only rates are reported.

Participants

A total of 595 drug court clients who entered the program between January 1 and November 30, 2016 comprised the sample for the 6-month outcomes evaluation. TRI-CA completion rates were 48% at month 3 and 39% at month 6. As seen in Table 2, clients represented 25 different courts and the number of clients from each court varied substantially (i.e., range = 1-99). Within this sample, 350 received some form of MAT during the 6-month post-entry period.

Table 2. Six-month outcomes evaluation sample sizes by court and MAT status.

	Overall (n = 595)	MAT (n = 350)	No MAT (n = 245)
	n (%)	n (%)	n (%)
Allen County Common Pleas	14 (0.3)	12 (85.7)	2 (14.3)
Lima Municipal	8 (1.3)	5 (62.5)	3 (37.5)
Clinton County Common Pleas	3 (0.5)	2 (66.7)	1 (33.3)
Cleveland Municipal	3 (0.5)	3 (100)	0 (0)
Cuyahoga Drug Court	13 (2.2)	11 (84.6)	2 (15.4)
Cuyahoga Recovery Court	22 (3.7)	11 (50)	11 (50)
Franklin County Common Pleas	5 (0.8)	5 (100)	0 (0)
Franklin Family Dependency	14 (2.4)	2 (14.3)	12 (85.7)
Franklin Municipal	33 (5.5)	27 (81.8)	6 (18.2)
Gallipolis Municipal	25 (4.2)	24 (96)	1 (4)
Hardin Recovery Court	25 (4.2)	10 (40)	15 (60)

Hardin Family Recovery Court	11 (1.8)	10 (90.9)	1 (9.1)
Hocking Municipal	41 (6.9)	38 (92.7)	3 (7.3)
Jackson Municipal	20 (3.4)	14 (70)	6 (30)
Marion County Common Pleas	29 (4.9)	18 (62)	11 (38)
Marion County Family Dependency	1 (0.2)	1 (100)	0 (0)
Marion Municipal	14 (2.4)	13 (92.9)	1 (7.1)
Mercer County Common Pleas	11 (1.8)	7 (63.6)	4 (36.4)
Montgomery County Men's Drug Court	70 (11.8)	45 (64.3)	25 (35.7)
Montgomery County Women's Drug Court	48 (8.1)	21 (43.8)	27 (56.2)
Montgomery Juvenile	0 (0)	0 (0)	0 (0)
Akron Municipal	44 (7.4)	8 (18.2)	36 (81.8)
Barberton Municipal	10 (1.7)	2 (20)	8 (80)
Summit County Common Pleas	99 (16.6)	36 (36.4)	63 (63.6)
Summit County Juvenile Court	5 (0.8)	2 (40)	3 (60)
Warren County Common Pleas	27 (4.5)	23 (85.2)	4 (14.8)

MAT type

Using data entered into the TRI-CEP system, we examined the type(s) of medication reported for clients in the 6-month evaluation sample. Of the 350 participants who received some form of MAT:

- 234 received extended release naltrexone (XR-NTX)
- 8 received oral naltrexone (O-NTX)
- 27 received buprenorphine (BUP)
- 5 received methadone (MTD)
- 62 received both extended release and oral naltrexone
- 13 received both buprenorphine and extended release naltrexone
- 2 received buprenorphine and oral naltrexone
- 2 received extended release and oral naltrexone and buprenorphine

The medication breakdown for each court is presented in Table 3 below.

Table 3. Type of medication received by court.

	XR_NTX (n = 234)	O_NTX (n = 8)	Bup (n = 27)	MTD (n = 5)	XR_NTX + O_NTX (n = 62)	Bup + XR_NTX (n = 13)	Bup + O_NTX (n=2)	Bup + XR_NTX+ O_NTX (n=2)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Allen County Common Pleas	6 (50)	1 (8.3)	2 (16.7)	0 (0)	3 (25)	0 (0)	0 (0)	0 (0)
Lima Municipal	3 (60)	0 (0)	1 (20)	0 (0)	1 (20)	0 (0)	0 (0)	0 (0)
Clinton County Common Pleas	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cleveland Municipal	3 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cuyahoga Drug Court	11 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cuyahoga Recovery Court	11 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Franklin County Common Pleas	3 (60)	1 (20)	0 (0)	0 (0)	1 (20)	0 (0)	0 (0)	0 (0)
Franklin Family Dependency	1 (50)	0 (0)	0 (0)	1 (50)	0 (0)	0 (0)	0 (0)	0 (0)
Franklin Municipal	21 (77.8)	0 (0)	0 (0)	0 (0)	5 (18.5)	1 (3.7)	0 (0)	0 (0)
Gallipolis Municipal	24 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hardin Recovery Court	9 (90)	0 (0)	0 (0)	0 (0)	1 (10)	0 (0)	0 (0)	0 (0)
Hardin Family Recovery Court	4 (40)	0 (0)	2 (20)	0 (0)	0 (0)	4 (40)	0 (0)	0(0)
Hocking Municipal	11 (28.9)	0 (0)	0 (0)	0 (0)	27 (71.1)	0 (0)	0 (0)	0 (0)
Jackson Municipal	14 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Marion County Common Pleas	14 (77.8)	0 (0)	0 (0)	0 (0)	2 (11.1)	2 (11.1)	0 (0)	0 (0)
Marion County Family Dep.	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Marion Municipal	9 (69.2)	1 (7.7)	1 (7.7)	0 (0)	1 (7.7)	1 (7.7)	0 (0)	0 (0)
Mercer County Common Pleas	7 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mont. County Men's Drug Court	26 (57.8)	1 (2.2)	7 (15.6)	0 (0)	3 (6.7)	4 (8.9)	2 (4.4)	2 (4.4)
Mont. County Women's Drug Court	12 (57.1)	1 (4.8)	6 (28.6)	0 (0)	1 (4.8)	1 (4.8)	0 (0)	0 (0)
Mont. Juvenile	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Akron Municipal	2 (25)	0 (0)	2 (25)	1 (12.5)	3 (37.5)	0 (0)	0 (0)	0 (0)

Barberton Municipal	1 (50)	0 (0)	1 (50)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Summit County Common Pleas	18 (50)	3 (8.3)	4 (11.1)	1 (2.8)	10 (27.8)	0 (0)	0 (0)	0 (0)
Summit County Juvenile Court	0 (0)	0 (0)	0 (0)	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)
Warren County Common Pleas	22 (95.7)	0 (0)	0 (0)	1 (4.3)	0 (0)	0 (0)	0 (0)	0 (0)

Abbreviations: XR_NTX=Extended-release Naltrexone; O_NTX=Oral Naltrexone; Bup=Buprenorphine; MTD=Metadone

Client characteristics

As seen in Table 4 below, the large majority of drug court clients were Caucasian and non-Hispanic. They were approximately 30 years old and generally had a history of prior treatment and felony offenses. The sample was 55% male and the age of onset for both drug use and criminal involvement was approximately 18 years. Over 25% of the sample were homeless.

Table 4. Demographic and baseline status variables.

	Overall (n = 595)	MAT (n = 350)	No MAT (n = 245)
	M/n (SD/%)	M/n (SD/%)	M/n (SD/%)
Age	29.9 (7.5)	29.2 (7.1)	30.8 (8.0)
Caucasian	569 (95.6%)	341 (97.4%)	228 (93.1%)
Hispanic / Latino	6 (1.0%)	4 (1.1%)	2 (0.8%)
Male	326 (54.8%)	188 (53.7%)	138 (56.3%)
# prior felony convictions	1.4 (2.2)	1.3 (2.0)	1.6 (2.4)
# prior treatment attempts	2.01 (2.5)	2.1 (2.75)	1.83 (2.0)
Age onset substance abuse	17.5 (9.2)	17.5 (11.1)	17.5 (5.7)
Age onset criminal activity	17.6 (6.2)	17.5 (5.3)	17.8 (7.4)
Homeless (past year)	163 (28.8%)	96 (29.2%)	67 (28.4%)
Currently employed	157 (27.4%)	99 (29.6%)	58 (24.4%)

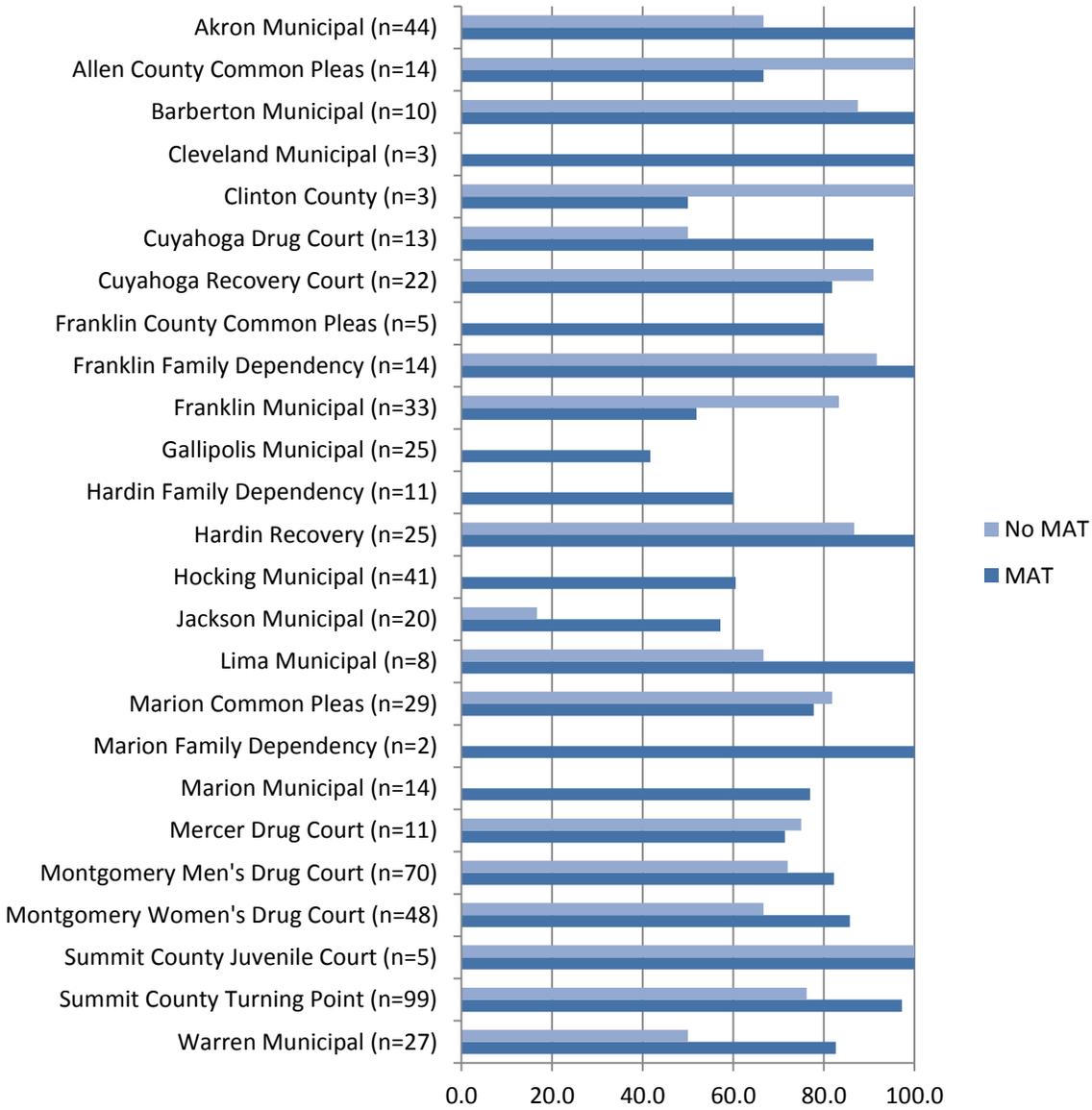
Results

Program retention

At the 6-month post-entry assessment point, 441 (74%) individuals were active (n = 434; 73%) or had graduated (n = 7; 1%) and 154 had been terminated (n = 104; 17%), were on warrant (n = 38; 6%), were deceased (n = 9; 2%), or withdrew their plea (n = 3; 1%). A total of 263 (75%)

individuals in the MAT group were active or graduated compared with 178 (73%) in the no MAT group. Retention rates for each court are depicted in Figure 3 below.

Figure 3. Six-month retention rates by court.



Results from the logistic regression analysis indicated a main effect of MAT ($\chi^2(1) = 2.71, p < .01$; OR = 1.73 (95% CI = 1.16-2.57)) with a greater likelihood of being retained in the drug court program for clients receiving MAT than those who did not.

Criminal recidivism

A total of 52 (9%) of individuals were re-arrested in the 6 month post-entry period. A total of 27 were in the MAT group compared with 23 in the no MAT group (52% vs. 48%). While not statistically significant, results from the logistic regression analysis indicated a trend for the effect of MAT ($\chi^2(1) = 2.69, p = .10$; OR = .62 (95% CI = .35-1.10)). After controlling for the random effect of court, the likelihood of re-arrest tended to be lower among clients who received MAT than those who did not receive MAT.

Drug abstinence

Overall, the average percentage of clean urines provided during the first 6 months of the drug court program was .73 ($SD = .33$). Rates were .75 ($SD = .31$) on average for MAT clients compared with .69 ($SD = .36$) for clients who did not receive MAT. Results from the linear mixed effects model indicated a non-significant trend of MAT ($F(1, 545) = 3.69, p = .05$) with MAT clients providing a greater percentage of clean urines than no MAT clients.

Employment

In the overall sample, 43% ($n = 120$) of participants had not worked in the past month at 3 months post-study entry compared with 32% at 6 months post-study entry. The mean number of days worked was 11.23 ($SD = 11.55$) at month 3 and 13.64 ($SD = 11.53$) at month 6. At month 3, MAT clients reported 10.94 days of work on average ($SD = 11.66$) compared with 11.88 ($SD = 11.35$) for clients who did not receive MAT. At month 6, MAT clients reported 14.51 days of work on average ($SD = 11.74$) compared with 11.89 ($SD = 11.10$) for those who did not receive MAT. Results of the non-linear mixed effects model indicated no effect of MAT ($F(1, 152) = .56, ns$), a main effect of time with higher counts at month 6 than month 3 ($F(1, 152) = 25.25, p < .0001$), and trend for the MAT by time interaction ($F(1, 152) = 3.12, p = .08$) with increases observed in the MAT group but not the no MAT group.

Mental health functioning

In the overall sample, clients reported experiencing an average of 2.37 ($SD = 1.86$) health issues in the past 30 days at month 3 and .63 ($SD = 1.01$) at month 6. At month 3, clients who received MAT reported 2.62 ($SD = 1.69$) problems compared with 2.53 ($SD = 2.05$) among those who did

not receive MAT. At month 6, MAT clients reported an average of 2.44 ($SD = 1.91$) issues compared with 2.23 ($SD = 1.76$) among those who did not receive MAT. Results of the non-linear mixed effects model indicated no effect of MAT ($F(1, 159) = .66, ns$) and no MAT by time interaction ($F(1, 159) = .59, ns$). There was a non-significant interaction trend for time ($F(1, 159) = 3.08, p = .08$) with lower scores at month 6 than month 3.

Physical health functioning

Overall, 39% ($n = 112$) of participants reported experiencing a physical health problem at month 3 compared with 36% ($n = 85$) at month 6. At month 3, 40% ($n = 77$) of MAT clients experienced a health problem in the past 30 days compared with 37% ($n = 35$) of no MAT clients. At month 6, 36% ($n = 56$) of MAT clients reported a health problem in the past 30 days compared with 37% ($n = 29$) of no MAT clients. Results of the non-linear mixed effects model indicated no significant effect of MAT ($F(1, 158) = .57, ns$) or time ($F(1, 158) = .34, ns$) and no MAT by time interaction ($F(1, 158) = .09, ns$).

Social functioning

In the overall sample, clients reported experiencing an average of .84 ($SD = 1.13$) people with whom they had serious trouble getting along in the past 30 days at month 3 and .63 ($SD = 1.01$) at month 6. At month 3, MAT clients reported having problems with .89 ($SD = 1.09$) persons on average compared with .74 ($SD = 1.20$) for no MAT clients. At month 6, MAT clients reported problems with an average of .71 ($SD = 1.09$) persons compared with .48 ($SD = 1.76$) among no MAT clients. Results indicated a main effect for time with greater social problems at month 3 than month 6 ($F(1, 151) = 8.90, p < .01$). The effect for MAT ($F(1, 151) = 1.67, ns$) and the MAT by time interaction ($F(1, 151) = .29, ns$) were not significant.

Sober housing

Overall, 11 clients (5%) reported living in sober housing during the past 30 days at month 3 compared with 7 (3%) at month 6. At month 3, 7 MAT clients (4%) reported living in sober housing compared with 4 (5%) clients who did not receive MAT. At month 6, 6 MAT clients (4%) reported living in sober housing compared with 1 (1%) of clients who did not receive MAT.

Program satisfaction

Average satisfaction scores were 2.38 ($SD = .51$) at month 3 and 2.55 ($SD = .48$) at month 6. Scores for MAT clients were 2.55 ($SD = .49$) at month 3 and 2.58 ($SD = .44$) at month 5. Scores for clients who did not receive MAT were 2.52 ($SD = .55$) at month 3 and 2.50 ($SD = .57$) at month 6. Results from the linear mixed effects model indicated no significant effects of MAT ($F(1, 157) = .56, ns$) or time ($F(1, 157) = .43, ns$) and no MAT by time interaction ($F(1, 157) = .45, ns$).

Discussion

Findings from the quantitative analyses indicate that 59% of evaluation participants received some form of MAT during the first 6 months of their drug court program participation. Extended release naltrexone was, by far, the most frequently adopted form of MAT with 89% of MAT clients receiving it during this time period. Examination of the six-month drug court outcomes indicated that MAT had a significant effect on drug court retention. Clients who received MAT were more likely to be retained in drug court than those who were not. Non-significant trends favoring the MAT group were observed for urinalysis-confirmed drug abstinence and criminal recidivism. No differences were observed between clients who did and did not receive MAT on self-reported psychosocial outcomes and program satisfaction.

The quantitative evaluation has several limitations. First and foremost, the low rates of adoption of agonist forms of MAT (only 13% of clients received any type of agonist medication) precluded the evaluation of the comparative effectiveness of different types of MAT. Second, TRI-CA data were not available for a substantial proportion of clients, limiting the generalizability of the findings related to self-reported psychosocial functioning and satisfaction. Finally, the limited timeframe of the evaluation coupled with the rolling admission of clients over time precluded an analysis of longer term outcomes.

Overall, the use of MAT in drug courts appears to be an effective strategy for improving client retention. Furthermore, it shows promise in decreasing drug use and criminal recidivism. These findings underscore the importance of developing strategies to increase the use of MAT in

criminal justice populations. Further research is required to examine the comparative effectiveness of agonist, partial agonist, and antagonist medications within this population.

Qualitative Methods

A two-pronged qualitative approach was undertaken to increase the breath of information that could be gleaned from stakeholders (i.e., judges, court staff, treatment providers, attorneys). Specifically, we sought to understand their perceptions of the use of MAT and the program as a whole. This approach included the use of stakeholder focus groups and structured stakeholder surveys conducted during the final stages of the program. The primary aim of these qualitative efforts was to obtain additional insight into stakeholder experiences, opinions, and observations.

Focus Groups

Methods

In February and March 2017, TRI conducted 21 follow-up focus groups, with representation from 24 of the 26 participating courts. The purpose of the focus groups was to assess perceptions of MAT from stakeholders, clients, and the community a year after the initial implementation of the Addiction Treatment Program. Of special interest was whether perceptions of MAT, and operations of the Addiction Treatment Program, had changed over the past year. The focus groups were conducted via conference call and were audio-recorded with the participants' verbal consent. Participants were informed that their responses would remain confidential. The recordings were transcribed and de-identified to ensure confidentiality. The transcripts were then coded qualitatively for prevailing themes. TRI developed a moderator's guide (i.e., the list of questions and prompts to be used during the focus groups) to best capture the stakeholders' perceptions of their own experiences as well as those of their clients and community members. The moderator's guide contained two sets of questions: the first pertained to perceptions, both positive and negative, about the use of medication-assisted treatment, and the second asked about stakeholders' experience with the Addiction Treatment Program as a whole.

Results

What perceptions do you have about the use of MAT in your drug court or agency?

The vast majority of stakeholders reported positive feelings towards MAT, with 16 of the 21 participating networks (76%) stating that they thought MAT was effective and that they supported its use for people with substance use disorders. Specifically, 43% (n=9) of the networks reported a preference for extended release naltrexone over other forms of MAT because it could not be diverted, and that clients only have to go to one appointment per month (as opposed to daily or weekly appointments). In addition, 57% (n = 12) of the networks felt that MAT helped reduce cravings, which encouraged sobriety and reduced the incidence of relapse. Twelve of the 21 networks (57%) also reported that MAT increased treatment retention and engagement among drug court clients. Eight networks (38%) stated that MAT offered support during clients' transition into sobriety, and another 38% said that MAT allowed clients to focus on other aspects of their lives, such as family, relationships, and employment. One-third of the participating networks (n = 7, 33%) said that MAT helped clients achieve stability, and maintain focus and clarity of mind. Stakeholders also reported seeing a reduction in stigma towards MAT (n = 3, 14%) and reported that MAT saved lives (n = 2, 10%).

Although participants' perceptions of MAT were largely positive, many stakeholders did report negative feelings towards MAT. Nearly half (n = 10, 48%) reported that they disliked Suboxone because it gets diverted, meaning that clients have previously not taken their medication and sold the pills instead. Nine networks (43%) alleged that clients have started using other substances, such as cocaine and alcohol, which are not blocked by MAT. Another 43% (n = 9) stated that clients will gain a false sense of recovery, or become overconfident when they maintain sobriety, which causes them to stop taking their medication too early and can lead to relapse. It seems, therefore, that stakeholder's negative perceptions of MAT stem largely from abuse and misuse of MAT, as opposed to MAT itself. Other negative perceptions of MAT from the participating stakeholders pertained to resource access. Four networks (19%) stated that clients needed other resources besides MAT, and therefore MAT was not enough to address the root cause of a clients' substance use. Three networks (14%) reported that the cost of the medication was a problem, and 10% (n = 2) stated that clients with private insurance, who were not covered by Medicaid expansion and/or ATP funds, were unable to afford MAT as it was not

covered by their plans. Finally, 10% (n = 2) expressed concerns that poor communication and coordination between providers allowed clients to “triangulate”, or to get medication from multiple places and potentially get extra medication.

What are clients’ perceptions about the use of MAT in your drug court agency?

The stakeholders reported a variety of positive and negative perceptions from their clients regarding MAT. About 52% (n = 11) of the networks expressed that their clients were appreciative and grateful for the opportunity to have MAT. Ten networks (48%) said that clients gained stability and support from the MAT program and 8 networks (38%) said MAT had given their clients more confidence in their recovery. Further, one-third of networks (n = 7) reported that their MAT has saved their clients lives, and that clients felt they would not have been able to recover without MAT. Four networks (19%) reported that clients like the structure and accountability of the program, and 1 network (5%) reported that clients liked having an alternative to incarceration.

The most common negative feedback from clients, according to the focus group participants, was the dislike of side effects of MAT, with nearly 62% of networks (n = 13) reporting this. Eight networks (38%) stated that clients often felt like MAT was a crutch, or replacing one drug with another one, and that being on MAT was a sign of weakness. Other negative feedback from clients regarding MAT alluded to the structure of the Addiction Treatment Program itself; three networks (14%) reported that the time requirements for therapy were burdensome for clients, another 3 reported that clients felt pressured or coerced into using MAT, or that they had no other choices, and 3 networks also reported that clients wanted more information about MAT prior to starting treatment. In addition, 1 network (5%) stated that clients felt like medical experiments, and 1 other network reported that the cost of MAT was onerous for clients. Importantly, 4 networks (19%) reported that clients’ decisions about whether or not to participate in MAT was largely shaped by the opinions of other clients, for both support of and opposition to MAT.

What perceptions exist in the community (the public, families, other people at your agency, recovery community) about the use of MAT in your drug court or agency?

Overall, stakeholders reported fewer positive perceptions among community members than among stakeholders and clients. About 38% (n = 8) reported that the primary support for MAT in the community came from family members of drug court clients, and another 38% (n = 8) reported community engagement in advocacy for MAT (e.g., PSA's on TV, recognizing the need to address the opioid epidemic, and awareness campaigns). Additionally, 29% of networks (n = 6) stated that they had seen an increase in information and understanding of MAT in their communities.

Conversely, participating networks reported a large range of negative perceptions from the community regarding MAT. Over 71% of networks (n = 15) reported widespread misconceptions and misinformation about MAT, which caused people to base their negative opinions of MAT on false information. In addition, 48% (n = 10) reported that community members, like clients, often saw MAT as a crutch, or the replacing of one drug for another. This perception impacted clients' ability to participate in treatment, as over 38% of networks (n = 8) reported that 12-step recovery communities (such as Alcoholics Anonymous and Narcotics Anonymous) do not allow MAT clients to attend treatment. Twelve-step communities require participants to be sober and do not see MAT clients as drug-free. This makes it very challenging for clients to attend treatment and gain support in their recovery efforts. In addition, 29% (n = 6) expressed that the community was concerned about the cost of MAT to taxpayers, with another 19% (n = 4) not willing to engage or offer help to people in drug court. Furthermore, 0.1% (n = 2) even reported that their communities opposed the use of Narcan, thinking that people who have overdosed should not be revived. Interestingly, 24% (n = 5) reported that the prevalent misinformation about MAT caused community members, including family members of drug court clients, to see MAT as a "magic bullet" which would cure a person of addiction without the need for other changes, such as therapy and social support. While this may garner more support for MAT, this false information can be deleterious to clients who struggle to address the root causes of their substance use.

What advice or opinions would you offer to others who are considering using MAT?

Ten of the 21 networks (48%) said they would strongly encourage others to start using MAT. However, the stakeholders cautioned that MAT alone is not enough, and 48% (n = 10) emphasized the importance of combining MAT with therapy. Collaboration also emerged as a theme from this question: 24% of networks (n = 5) stated that clients and stakeholders alike must consult with doctors when administering MAT, and 19% (n = 4) said that it was essential to build strong relationships between the drug court and providers to have a cohesive interdisciplinary team. Other responses to this question pertained to the planning process and structure of the MAT program, with 19% (n = 4) saying there was a need to have consistency across all treatment providers, and 14% (n = 3) saying that the network must establish a strong knowledge base through training and education to keep each other and the community informed. Two other networks (10%) stated the importance of proper planning.

What factors have helped to make the ATP program successful for the drug court or agency?

Nearly 62% of networks (n = 13) cited funding as a factor that helped them maintain the Addiction Treatment Program. About 57% (12 networks) said that the program brought people together from different organizations to form a multidisciplinary team. Specifically, 38% (n = 8) said communication helped carry out the Addiction Treatment Program, and 33% (n = 7) said that community collaboration and buy-in helped to make the Addiction Treatment Program successful. Similarly, 14% (n = 3) cited teamwork as a reason for success. Another theme that emerged from this question was the importance of information; 24% (n = 5) discussed the importance of training and education, another 24% (n = 5) expressed that the TRI-CEP system helped them keep information organized, and 10% (n = 2) appreciated the organization and structure of the Addiction Treatment Program. Stakeholders also expressed that their feelings of efficacy helped ensure the success of their program. Six networks (29%) stated that they felt the program bridged service gaps for clients, 14% of networks (n = 3) said they liked being able to treat clients who were still in jail, and 14% described feeling as if the work they did was important and had value. Finally, 14% of networks (n = 3) stated that flexibility and patience on the part of staff was necessary to ensure success with the Addiction Treatment Program.

What barriers have made the Addiction Treatment Program challenging for their drug court or treatment agency?

Nearly half of the networks (n = 10; 48%) reported that the restrictions on the use of funding made operating the Addiction Treatment Program difficult, and that they would like to have the state expand what the funds could be used for. Eight networks (38%) said that a major obstacle was the lack of other services for clients; specifically, 5 networks (24%) said that clients needed greater access to transportation, and 4 networks (19%) reported no local detoxification facility, which meant that clients had to detoxify in jail or on their own. Seven of the 21 networks discussed insufficient staffing as a barrier. This included having too few staff to handle the workload and having a high rate of staff turnover. Six networks (29%) reported struggling with communication and collaboration across agencies, and another 6 reported issues with billing and coordinating insurance for clients. Five networks (24%) said that all treatment providers were so different, which made it hard to know what services were available for clients. Other responses included negative perceptions of MAT, lack of money for the courts, narrow client eligibility criteria, and the lack of time given to courts to implement ATP.

What recommendations would you offer to the State of Ohio to improve the ATP?

Eight networks (38%) said they would like to see the program expanded to offer more resources and services to clients, and 6 (29%) said they wanted to see the eligibility criteria for the program be more inclusive and allow more clients to participate. Four networks (19%) requested more training, and 3 (14%) said there was a need for more planning. Additionally, 3 networks (14%) requested ATP funds for the courts, and another 3 (14%) said the program should offer help for clients who are not Medicaid eligible to cover the cost of MAT.

Surveys

Methods

To collect more robust data regarding stakeholder perception of MAT and the Addiction Treatment Program, TRI created an online survey open to all relevant evaluation stakeholders (e.g., Judges, prosecutors, defense attorneys, ADAMHS Board members, court staff, and

treatment staff). Data were collected during March to April 2017. A total of 68 stakeholders, with at least one representative from each of the 26 networks, responded to the follow-up stakeholder survey. Of these respondents, 43 (64.2%) identified their gender as female, and 24 (35.8%) identified as male. No participants selected other or declined to answer the question. Over 87% (58 participants) identified their race as White, 8 participants (12.1%) identified as Black, and 1 (1.5%) preferred not to answer. Three participants (4.6%) identified their ethnicity as Hispanic or Latino. No participants identified as American Indian or Alaskan Native, Asian, Native Hawaiian, or Pacific Islander. Six participants (9.5%) reported an age of 20-29, and 17 (27.0%) reported an age of 30-39. Eighteen people (28.6%) stated that their age was 40-49 years, and 9 (14.3%) said they were between 50 and 59 years of age. Thirteen participants (20.6%) reported an age of 60-69, and nobody reported an age of 70 year or above.

The sample contained a wide range of educational attainment, professions within the drug court, and experience working with people with substance use disorder, indicating a range of perspectives within the survey as well as in the ATP as a whole. Two respondents reported having a high school diploma or equivalent (9.9%), and 7 (10.3%) stated that they had an Associate's Degree. Twenty-five of the 68 respondents (36.8%) had a Bachelor's degree and 27 (39.7%) reported a Master's Degree. Six reported a J.D. (8.8%), 1 (1.5%) reported a Ph.D. or a Psy.D., and nobody reported to have an M.D. Respondents belonged to a range of professional roles within the drug courts and treatment providers. One-fourth (n = 17) of the participants were court coordinators, and 11.8% (n = 8) were addictions counselors. Other professions represented were Probation Officer (n = 6, 8.82%), Board Representative (n = 5, 7.4%), Director (n = 6, 8.8%), Supervisor (n = 6, 8.8%), Judge (n = 5, 7.4%), and Case Manager (n = 2, 2.9%). No respondents identified as a Defense Attorney or Prosecutor. About 20% (n = 13) selected the option "other", and identified a range of positions including Research Coordinator, Magistrate, Court Liaison, Mental Health Counselor, and Evaluator.

The participants also reported a wide range in the number of years of experience that they had in working with people with substance use disorders. Six respondents (8.8%) reported having two years of experience or less. Over 20% reported having between 2 and 5 years of

experience, and 11 people (16.2%) reported 5-10 years of experience. Almost one-fifth (n = 13, 19.1%) reported 10-15 years of experience. Nine people (13.2%) had worked with people with substance use disorders for between 15 and 20 years of experience, 7 (10.3%) for 20-25 years, 3 (4.4%) for 25-30 years, and 5 (7.4%) reported over 30 years of experience.

Over 64% of the respondents (41 people) reported that their court or agency had an MAT program prior to the Addiction Treatment Program, and 23 people (35.9%) said that did not have an MAT program previously. Participants who answered yes were then asked to state for how long their MAT program had been in existence. Ten people (21.3%) said that their MAT program has existed for 2 years or less. Over 38% (n = 18) said that their MAT program was between 3-5 years old. Four people (8.5%) said that the program was 5-10 years old. Nine people (19.2%) were unsure how of long their program had existed.

How many full time staff at your court or agency work with the ATP Initiative?

Over 37% of the respondents said that they had only 1 or 2 people working with the ATP initiative at their drug court or agency. Eleven people (17.7%) reported between 2-5 ATP staff members. Fifteen people (24.2%) said that their court or agency had 5-10 ATP staff, and 8 people (12.9%) reported more than 10 ATP staff. Five respondents (8.1%) reported that they did not know.

How many clients has your court or agency served through the ATP initiative?

Two people (3.3%) reported that they had not had any clients under the Addiction Treatment Program. Six (9.8%) reported having between 1 and 10 clients, and 7 (11.5%) reported between 10-20 clients. Thirteen respondents (21.3%) said that their court or agency served between 20 and 30 clients through the ATP, and 7 (11.5%) said they served between 30 and 50 clients. Four people (6.6%) reported having served 50-100 clients, and 12 (19.7%) reported having 100 clients or more. Ten people (16.4%) said that they did not know how many people had been served by their court or agency through the Addiction Treatment Program.

Factors used to determine the type of medication clients should receive. Check all that apply.

The vast majority of respondents indicated that physician’s recommendations (n = 53, 86.9%) and patient preference (n = 50, 82.0%) determined the type of medication given to clients. Over half reported that medication was determined by insurance coverage (n = 38, 62.3%), access to providers (n = 34, 55.7%), or court policy (n = 31, 50.8%). Nine respondents (14.8%) said that the clients’ family, spouse, or significant other played a role in determining the type of MAT received by a client. Five people (8.2%) said that MAT was determined by the client’s employer, school, or housing requirements.

MAT perceptions matrix

Please indicate your familiarity with each of the following by checking the appropriate box:

	Not at all familiar	Slightly familiar	Moderately familiar	Extremely familiar	Total
	n (%)	n (%)	n (%)	n (%)	
Medications used to treat opioid and/or alcohol use disorder, in general	0 (0.0)	1 (1.6)	18 (28.1)	45 (70.3)	64
Oral naltrexone (ReVia)	2 (3.1)	7 (10.9)	19 (29.7)	36 (56.3)	64
Extended-release naltrexone (Vivitrol)	0 (0.0)	1 (1.6)	17 (26.6)	46 (71.9)	64
Methadone	2 (3.1)	22 (34.4)	25 (39.1)	15 (23.4)	64
Buprenorphine (Subutex)	1 (1.6)	11 (17.5)	24 (38.1)	27 (42.9)	63
Buprenorphine with Naloxone (e.g. Suboxone)	0 (0.0)	8 (12.5)	23 (35.9)	33 (51.6)	64
Naloxone	0 (0.0)	7 (10.9)	26 (40.4)	31 (48.4)	64

To what extent have you received specific training on the use of each of the following medications for the treatment of addiction? Including but not limited to attending a conference presentation, completing an online training, or attending a talk at your organization.

	No training at all	A little training	Moderate training	Extensive training	Don't know	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	
Oral naltrexone (ReVia)	15 (23.8)	13 (20.6)	21 (33.3)	13 (20.6)	1 (1.6)	63
Extended-release naltrexone (Vivitrol)	8 (12.7)	7 (11.1)	19 (30.2)	28 (44.4)	1 (1.6)	63
Methadone	17 (27.0)	27 (42.9)	15 (23.8)	3 (4.8)	1 (1.6)	63
Buprenorphine (Subutex)	12 (19.1)	16 (25.4)	26 (41.3)	7 (11.1)	2 (3.2)	63
Buprenorphine with Naloxone (e.g. Suboxone)	9 (14.3)	14 (22.2)	27 (42.9)	12 (19.1)	1 (1.6)	63
Naloxone	10 (16.1)	15 (24.2)	19 (30.7)	18 (29.0)	0 (0.0)	62
Medication, in general	5 (8.0)	12 (19.1)	26 (41.3)	20 (31.8)	0 (0.0)	63

If you have received training, what type(s) of training have you received? (n = 49)

Participants described a wide range of training types, including conference, continuing education classes, conferences, webinars and other online trainings, information training through employment, and presentations from pharmaceutical representatives.

If you have received training, was the training provided as a part of the ATP initiative? (n = 61)

Only 9 (14.8%) participants stated that they had received training as part of the ATP Initiative. Forty-five people (73.8%) stated that they received no training as part of the ATP Initiative. Seven people (11.5%) said they were unsure if they received training or not. Seven people chose not to answer this question.

Based on your knowledge and personal experience, how effective is each of the following treatment techniques overall? Please select the appropriate response option.

	Totally unacceptable	Unacceptable	Slightly unacceptable	Slightly acceptable	Acceptable	Completely acceptable	Don't Know	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Oral naltrexone (ReVia)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.2)	30 (48.4)	22 (35.5)	8 (12.9)	62
Extended-release naltrexone (Vivitrol)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.6)	26 (41.9)	35 (56.5)	0 (0.0)	62
Methadone	3 (4.8)	4 (6.5)	7 (11.3)	13 (21.0)	16 (25.8)	10 (16.1)	9 (14.5)	62
Buprenorphine (Subutex)	0 (0.0)	3 (4.8)	5 (8.1)	10 (16.1)	26 (41.9)	12 (19.4)	6 (9.7)	62
Buprenorphine with Naloxone (e.g. Suboxone)	0 (0.0)	3 (4.8)	6 (9.7)	10 (16.1)	27 (42.6)	12 (19.4)	4 (6.5)	62
Naloxone	0 (0.0)	0 (0.0)	4 (6.5)	5 (8.1)	28 (45.2)	21 (33.9)	4 (6.5)	62
Medication, in general	0 (0.0)	0 (0.0)	1 (1.6)	7 (11.5)	27 (44.3)	21 (34.4)	5 (8.2)	61

Based on your knowledge and personal experience, how effective is each of the following treatment techniques in reducing relapse while participants are in the drug court program? Please select the appropriate response option.

	Totally ineffective	Ineffective	Slightly ineffective	Slightly ineffective	Effective	Completely effective	Don't Know	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Oral naltrexone (ReVia)	0 (0.0)	1 (1.6)	1 (25.8)	16 (45.2)	28 (6.5)	4 (19.4)	12 (19.4)	62
Extended-release naltrexone (Vivitrol)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.6)	48 (77.4)	12 (19.4)	1 (1.6)	62
Methadone	3 (4.8)	1 (1.6)	5 (8.1)	17 (27.4)	10 (16.1)	2 (3.2)	24 (38.7)	62
Buprenorphine (Subutex)	1 (1.6)	1 (1.6)	7 (11.3)	17 (27.4)	20 (32.3)	2 (3.2)	14 (22.6)	62
Buprenorphine with Naloxone (e.g. Suboxone)	1 (1.6)	2 (3.2)	8 (12.9)	21 (33.9)	19 (30.7)	2 (3.2)	9 (14.5)	62
Naloxone	4 (6.5)	4 (6.5)	4 (6.5)	13 (21.0)	16 (25.8)	3 (4.8)	18 (29.0)	62
Medication, in general	0 (0.0)	1 (1.7)	0 (0.0)	16 (26.7)	30 (50.0)	3 (5.0)	10 (16.7)	60

Based on your knowledge and personal experience, how effective is each of the following treatment techniques in reducing violations and re-arrests while participants are in the drug court program? Please select the appropriate response option.

	Totally unacceptable	Unacceptable	Slightly unacceptable	Slightly acceptable	Acceptable	Completely acceptable	Don't Know	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Oral naltrexone (ReVia)	0 (0.0)	1 (1.7)	2 (3.3)	16 (26.7)	22 (36.7)	3 (5.0)	16 (26.7)	60
Extended-release naltrexone (Vivitrol)	0 (0.0)	1 (1.7)	0 (0.0)	7 (11.7)	40 (66.7)	7 (11.7)	5 (8.3)	60
Methadone	2 (3.3)	3 (5.0)	2 (3.3)	17 (28.3)	10 (16.7)	1 (1.7)	25 (41.7)	60
Buprenorphine (Subutex)	1 (1.7)	3 (5.0)	3 (5.0)	19 (31.7)	16 (26.7)	2 (3.3)	16 (26.7)	60
Buprenorphine with Naloxone (e.g. Suboxone)	1 (1.7)	5 (8.3)	2 (3.3)	22 (36.7)	16 (26.7)	2 (3.3)	12 (20.0)	60
Naloxone	3 (5.0)	3 (5.0)	2 (3.3)	12 (20.0)	12 (20.0)	2 (3.3)	26 (43.3)	60
Medication, in general	0 (0.0)	1 (1.8)	1 (1.8)	20 (35.1)	21 (36.8)	2 (3.5)	12 (21.1)	57

Based on your knowledge and personal experience, how effective is each of the following treatment techniques in helping clients make positive changes in their lives (e.g. gain employment, fulfill familial and social obligations) while participants are in the drug court program? Please select the appropriate response option.

	Totally Ineffective	Ineffective	Slightly Ineffective	Slightly Effective	Effective	Completely Effective	Don't know	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Oral naltrexone (ReVia)	0 (0.0)	1 (1.6)	1 (1.6)	13 (21.3)	28 (45.9)	4 (6.6)	14 (23.0)	61
Extended-release naltrexone (Vivitrol)	0 (0.0)	1 (1.6)	0 (0.0)	3 (4.9)	39 (62.9)	19 (30.7)	0 (0.0)	62
Methadone	2 (3.2)	2 (3.2)	5 (8.1)	16 (25.8)	13 (20.9)	2 (3.2)	22 (35.5)	62
Buprenorphine (Subutex)	1 (1.6)	2 (3.2)	4 (6.5)	14 (22.6)	29 (46.8)	1 (1.6)	11 (17.8)	62
Buprenorphine with Naloxone (e.g., Suboxone)	2 (3.2)	3 (4.8)	4 (6.5)	16 (25.8)	30 (48.4)	1 (1.6)	6 (9.7)	62
Naloxone	2 (3.3)	4 (6.6)	1 (1.6)	15 (24.6)	19 (31.2)	0 (0.0)	20 (32.8)	61
Medication, in general	0 (0.0)	1 (1.7)	0 (0.0)	19 (31.7)	27 (45.0)	5 (8.3)	8 (13.3)	60

Open-ended questions:

What are some positive comments or impressions that you and/or other stakeholders have voiced about their experience with ATP?

The primary positive impressions from stakeholders pertained to the benefits that the Addiction Treatment Program offered to clients, which clients would otherwise be able to experience. First, 18 respondents (38.3%) said that the ATP granted clients access to treatment that they otherwise would be unable to access. Over 21% of respondents (n = 10) stated that the ATP helped clients make positive life changes; they stated that the ATP gave clients a “second chance at life”, the opportunity to “get back on track”. Some even cited reductions in recidivism. Five respondents (10.7%) said that the program offered structure, stability, and accountability, citing that it allowed clients to maintain stability while they withdrew from substances. Three stakeholders specifically mentioned a preference for Vivitrol over other forms of MAT. Nearly 20% (n = 9) discussed the benefits of ATP funding, with 4 (8.5%) describing how funding was also used to assist clients with transportation, a factor critical for adherence to drug court treatment and attendance requirements. Other stakeholders (n = 6, 12.8%) cited benefits that the ATP has afforded to their agency, such as training, data tracking systems, community changes, and a general positive feeling towards the program. Four participants (8.5%) answered none or “NA”.

What are some concerns or negative impressions that you and/or other stakeholders have about the ATP?

Stakeholders’ concerns and negative impressions centered on themes of implementation, funding, and client participation. First, about 15% of stakeholders (n = 7) expressed concerns that the guidelines for implementing the ATP were unclear. Several also cited resource shortages and an increased workload, which coupled together made implementation challenging: 6 (13.6%) said that data entry was burdensome, 5 (11.4%) said they had too few staff to manage the workload, and 3 (6.8%) said that the program was too time consuming. Together, it seems, stakeholders felt that the lack of staff to handle the workload of the ATP, coupled with additional work responsibilities and lack of clear instruction, resulted in an unmanageable workload for them, and therefore made implementing the ATP very difficult.

Stakeholders also expressed concerns about ATP funds, with 13.6% of respondents (6 people) stating that it was difficult to use funds due to the stringent terms associated with ATP funds. Three respondents (6.8%) said that they had trouble with the billing process, and 2 (4.6%) said that MAT was too expensive. Participating stakeholders also expressed concerns with clients' behaviors and perceptions of MAT, with 4 (9.1%) saying that some stakeholders (not necessarily themselves) felt that MAT was just substituting one drug of choice for another, and three stakeholders (6.8%) saying that clients were not truly invested in the treatment process. Other less common responses included concerns that the program was not always effective, that the courts had no opportunity to treat clients while they were incarcerated, that clients feel pressured and/or even coerced, to participate even if they do not want to. Eight people (18.2%) answered "none".

What are some positive comments or impressions that you and/or other stakeholders have voiced about their experience with MAT?

Regarding MAT, 43.5% of respondents (n = 20) stated that they felt MAT was needed, and that it was the best option for treating opioid-dependent clients. Over 26% (n = 12) said that MAT resulted in increased treatment engagement by clients, and 17.4% stated that MAT was saving lives, or changing them for the better. Other stakeholders specifically stated that MAT reduced their clients' cravings (n = 6, 13.0%), offered stability and mental clarity (n = 6, 13.0%), and reduced relapse (10.9%). Two people stated that MAT offered an option to clients that did not previously exist, and 2 stated that MAT reduced recidivism. Three stakeholders answered "none".

What are some concerns or negative impressions that you and/or other stakeholders have about the MAT?

The primary negative concern that stakeholders reported regarding MAT was the potential for medication abuse (n = 9, 22.5%). Specifically, 6 stakeholders (15%) stated that the diversion of Suboxone was a concern for them. As mentioned above, diversion occurs when patients do not take their medication, and sell it instead. Similarly, 5 stakeholders (12.5%) described concerns over relapse potential during and after the program, as clients may use other non-opiate

substances such as cocaine while on MAT, or may stop taking MAT too early. Two respondents (5%) stated that MAT was simply the replacement of one substance with another. Other concerns pertained to shortcomings of the program at addressing community and client needs. Seven participants (17.5%) stated that MAT was not available to enough people, saying that people who are on methadone maintenance or are incarcerated should be included in the drug court program so that they can access the support, structure, and resources offered by the program. Stakeholders also described challenges with resources including coordinating insurance (n = 4, 10%), the cost of the medication (n = 4, 10%), and the need for more funding and staff to manage the time and work requirements of the APT (n = 3, 7.5%). Seven people (17.5%) responded “none”.

What are some positive comments or impressions that drug court clients have voiced about their experience with MAT?

The positive impressions of drug court clients about MAT mirrored those of stakeholders, with 26.1% stating that MAT gave them the opportunity to change their life and get back on track, and another 26.1% (n = 12) stating that MAT allowed them to stay sober and stable enough to adhere to their treatment requirements, and have clearer thinking. Furthermore, 11 participants (23.9%) reported that clients felt like MAT saved their lives, and that they would not have been able to recover without it. Eight participants (17.4%) stated that clients felt that MAT reduced cravings and relapse, and 5 (10.9%) replied with “none”.

What are some concerns or negative impressions that drug court clients have about the MAT?

The concerns and negative impressions of drug court clients regarding MAT largely revolved around the requirements of the program, and concerns over the medications themselves. Over 30% of respondents said that the time and reporting requirements of the program were burdensome for clients (e.g. a lot of time spent in meetings, which could potentially interrupt employment). In addition, over 30% reported that clients struggled with the side effects of MAT. Over one-fourth (n = 13) said that controversy in the community around MAT negatively impacted clients. For example, 4 stakeholders (9.3%) said that clients began to feel that MAT did not constitute “real recovery”, 4 (9.3%) said that clients began to use other substances that

were not blocked by MAT. Three (7.0%) said there was stigma around using MAT, and another 3 (7.0%) said that clients wanted to recover on their own. Also, 6 stakeholders said that clients did not know when to stop MAT, and were concerned about relapse and cravings following program completion. Eight (18.6%) answered “none.”

What are some positive comments or impressions that the community has voiced about the ATP?

One-third of participants (n = 11, 33.3%) reported hearing no positive impressions from the community about the ATP, and 6 (18.2%) said that the community was unaware of the ATP. However, about 21% said that the community at large was pleased that services were being offered to address a need for treatment. An additional 21.2% (n = 7) expressed a general sense of appreciation by the community, and 15.2% (n = 5) said that community saw the positive outcomes of the program.

What are some concerns or negative impressions that the community has voiced about the ATP?

Stakeholders also reported few negative concerns from the community, with 68.6% of respondents (n = 24) reporting no negative concerns, and another 8.6% (n = 3) saying that the community was unaware of the ATP. Of those who reported concerns or negativity from the community, comments centered on perceptions of MAT and the nature of substance use in general. Over 17% reported that the community disapproved of the program, saying that people with substance use disorder cannot and should not be helped. Three (8.6%) reported community concerns over the cost of MAT. One person reported concerns that such resources were not available during the crack epidemic.

What are some positive comments or impressions that the community has voiced about MAT?

Nearly one-fourth of the respondents reported that the community felt there was a high need for services, another 24.3% stated that MAT resulted in positive outcomes. About 21% (n = 8) said that the community supported MAT and were hopeful that it could help. Two people (5.4%) said the community wants more information about MAT, and 9 people (24.3%) reported no positive comments or impressions from the community.

What are some concerns or negative impressions that the community has voiced about MAT?

Fourteen participants (37.8%) reported that the community felt that people on MAT were not truly sober or abstaining from substance use. As with the ATP, the community also was reported to feel that people on MAT were unworthy of help (n = 6, 16.2%). Five stakeholders (13.5%) said that the community was concerned about the potential for medication abuse, and 3 (8.1%) expressed concerns over the cost of MAT to taxpayers. On the contrary, 4 people (10.8%) expressed that the community wished to see MAT available for more people outside of drug court. Over 21% reported no negative perceptions.

What has helped you and your team to keep the ATP running on a daily basis?

Stakeholders reported that communication, collaboration, and the hard work of staff were the primary factors that facilitated successful operation of the ATP. Eleven participants (26.8%) reported each of these factors individually. Other less common, but equally important factors, included having guidance and support from other agencies, such as the ADAMHS Board (n = 4, 9.8%), funding, and previously having an MAT program. Six participants (14.4%) replied “none.”

What challenges have you faced with the ongoing operation with the ATP initiative?

The largest challenge cited by stakeholders that hindered the ongoing operation with the ATP initiative was data entry, with 47.5% (n = 19) reporting this as a challenge. Several stakeholders also cited a lack of time and staff available to complete the additional work requirements of the ATP initiative. One-fourth of participants (n = 10) reported that poor communication made the ongoing operation challenging. Seven stakeholders (17.5%) reported difficulty with restrictions on the use of funding, and 3 (7.5%) suggested the need to offer more resources to clients. Other challenges included the need to find more eligible participants, and clients using other substances not blocked by MAT.

How could the ATP program be improved?

Over 36% of respondents reported that less data entry would make the ATP program better. This is consistent with prior findings that many stakeholders found the data entry to be a challenge for ongoing operations, and that shortages of time and staff made the ATP program

challenging. Six participants (16.7%) suggested that the eligibility criteria for drug court clients should be expanded and more inclusive so that more people could participate and get treatment. Six people said that more funding was needed. Five (13.9%) requested clearer guidelines and expectations, should the program continue, and 4 (11.1%) cited a need more better communication. Other feedback included the need for more staff and more training. Eight people (22.2%) answered “none.”

What advice or opinions would you offer to a drug court or agency that wanted to start using MAT?

Stakeholders offered a wide variety of advice. Nine people (23.1%) generally supported the use of MAT and said they would encourage others to use it, as it is the best option for treatment opioid-dependent clients. Over 20% (8 people) stressed the importance of communication and collaboration across the various agencies. Seven people (18.0%) said that teamwork and having strong relationships between staff was important. Six stakeholders (15.4%) discussed the necessity of vetting providers and prescribing physicians to ensure high quality of treatment, and 15.4% said that training, information gathering, and research would be helpful. Five people (12.8%) reported that it was critical to foster buy-in from the Judge, community, and staff. This included such things as believing that the program was valuable, and being willing to do the hard work associated with the program. Five people also cited the importance of clear protocol. Four people (10.3%) cited the need for hard working staff, and another 4 discussed the need for flexibility and patience.

In what ways do you think that the information collected through the TRI-CEP System could help your drug court or agency?

Sixteen participants (44.4%) responded that they felt the TRI-CEP system would help to provide feedback about their drug court program that may help to improve it for the future. This included feedback about the operations of the drug court program and MAT in general. Further, 11 participants (30.6%) said that the data entry into the TRI-CEP system could help provide evidence of the effectiveness of MAT. An additional 3 people (8.3%) reported that the data entered in the TRI-CEP system could be used to secure funding in the future for the MAT

program, and 11 people (30.6%) said they were unsure of how the data in the TRI-CEP system could be used.

Organizational Readiness to Implement Change

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	
We are committed to implementing this change	2 (4.0)	0 (0.0)	2 (4.0)	38 (76.0)	8 (16.0)	50
We are determined to implement this change	1 (2.1)	0 (0.0)	2 (4.2)	38 (79.0)	7 (14.6)	48
We are motivated to implement this change	2 (4.1)	0 (0.0)	2 (4.1)	38 (77.6)	7 (14.3)	49
We will do whatever it takes to implement this change	2 (4.1)	0 (0.0)	6 (12.2)	35 (71.4)	6 (12.2)	49
We can keep the momentum going in implementing this change	2 (4.1)	0 (0.0)	3 (6.1)	38 (77.6)	6 (12.2)	49
We can manage the politics of implementing this change	2 (4.1)	0 (0.0)	11 (22.5)	31 (63.3)	5 (10.2)	49
We can support people as they adjust to this change	2 (4.1)	0 (0.0)	3 (6.1)	38 (77.6)	6 (12.2)	49
We can get people invested in implementing this change	2 (4.0)	1 (2.0)	4 (8.0)	37 (74.0)	6 (12.0)	50
We can coordinate tasks so that implementation goes smoothly	2 (4.1)	0 (0.0)	8 (16.3)	34 (69.4)	5 (10.2)	49
We can keep track of progress in implementing this change	2 (4.1)	0 (0.0)	9 (18.4)	33 (67.4)	5 (10.2)	49

The large majority of survey respondents reflected a high level of readiness for change, with over 90% endorsing that they were committed, determined, and motivated to implement the programmatic changes related to this project. Correspondingly, over 85% reported that they would do whatever it took, could maintain the momentum, would support others, and could get people invested in implementing change. Although still supported by the majority of respondents, the only organizational readiness for change items with less than an 80%

endorsement were being able to manage the politics of implementing change (73% agree or strongly agree), coordinating the tasks so that implementing change goes smoothly (79% agree or strongly agree), and keeping track of progress in implementing change (78% agree or strongly agree).

Discussion

Overall, qualitative findings from the stakeholder focus groups tended to comport well with those of the survey. Overall the findings appear to support the criminal justice system's continued negative perceptions of agonist or partial agonist medications such as buprenorphine over antagonist forms of MAT. Nearly half reported that they disliked buprenorphine because it is often diverted. Several networks also reported that clients on MAT often start using other psychoactive substances that are not blocked by MAT and that clients on MAT might gain false premature sense of recovery causing them to stop taking their medication too early and relapse.

Still, although stakeholders generally reported a preference for extended-release naltrexone over other forms of MAT, the vast majority of stakeholders reported relatively positive feelings towards MAT, and that MAT helped reduce cravings, encouraged sobriety, reduced the incidence of relapse, and increased treatment retention and engagement. Overall, the majority of networks reported that they would strongly encourage others to start using MAT, but emphasized that MAT alone is not enough and that it should be combined with evidence-based psychotherapy.

Regarding client perceptions, the majority of respondents expressed that their clients were appreciative and grateful for the opportunity to have MAT, and that it helped them gain stability and gave them more confidence in their recovery. However, participating networks reported many negative perceptions from the community regarding MAT including impressions of MAT as a crutch, or as replacing one drug with another.

Finally, the majority of networks cited funding as a factor that helped them maintain the ATP, indicating that the program brought people together from different organizations to form a multidisciplinary team. However about half reported that the restrictions on the use of funding

made operating the ATP initiative somewhat difficult, and that they would like to have the state expand the scope of services for which the funds could be used.

Cost-Efficiency Study Outcomes

Introduction

This cost-benefit analysis is a part of a larger program evaluation of the medication-assisted treatment (MAT) drug court program by Ohio's Department of Mental Health and Addiction Services (OhioMHAS). Drug courts are hybrids of criminal justice and drug treatment programs that are intended not only to determine punitive responses for crimes committed by nonviolent drug-dependent offenders but also to solve the underlying drivers of criminal behavior (Cheesman et al., 2012). The goals of significantly reducing Medicaid costs, reducing recidivism rates, and increasing productivity among previous offenders may be met when best practices are integrated into state drug court programs (Carey et al., 2012).

Testing drug courts against alternatives (i.e., other rehabilitation methods or the status quo of "do nothing") will help Ohio policymakers determine whether continued investment of time, effort, and public funding in the MAT drug court program is justifiable (Carey et al., 2012). Cost-benefit analysis quantifies the degree to which developing, implementing, and maintaining a program produces monetary benefits in the form of opportunities for cost savings (Translating Drug Court Research Into Practice).

The purpose of this study was to estimate the opportunities for cost savings in the presence of an Ohio MAT program by comparing MAT participation and nonparticipation. Our analysis was performed from the perspective of Medicaid (both the federal and state shares).

Methods

Data sources

TRI-CEP and TRI-CA. We used drug court participant data tracked by the Treatment Research Institute (TRI) data management system TRI Court Evaluation Program (TRI-CEP) and TRI Client Assessment (TRI-CA). The TRI-CEP and TRI-CA collect data on client demographics, drug court participation determination, supervision, and outcomes.

Medicaid claims and encounter data. To derive information on the cost of healthcare services, we used Medicaid claims and encounter data maintained by the Ohio Department of Medicaid.⁴ We captured healthcare utilization and cost information for the following major categories of Ohio Medicaid services: (a) total cost and utilization across treatment settings (i.e. inpatient, outpatient, and emergency department), and (b) cost and utilization total Substance Use Disorder (SUD) Treatment including medication assisted treatment (MAT).

To derive analytic variables, we used variables that appear in the following seven Ohio Medicaid Information Technology System – Business Intelligence Analytic Report Vendor Claims header files:

1. Inpatient (Header Paid and Crossover)
2. Inpatient Detailed Paid
3. Outpatient (Header Paid and Crossover)
4. Outpatient Detailed Paid
5. Long-term Care
6. Pharmacy (Detailed Paid)

We merged these files by using the Medicaid identification numbers within each file to obtain a full dataset of all required analytic elements. The data files included an indicator for Medicaid enrollment and whether the claim was for fee-for-service or managed care plan.

Cost of Ohio State Criminal Justice System and Medicaid-Eligible Services

We will estimate the cost related to the criminal justice system from data provided by the Ohio Attorney General’s Office and published literature.

Ohio Attorney General’s Office. The Ohio Attorney General’s Office provided data on our sample population’s criminal justice involvement from January 1, 2016 - Sept 1, 2016. A list of data elements is included in Table A of Appendix. The elements in the data allowed us to assess

the level of interaction with criminal justice system between two treatment groups during a baseline and post-treatment entry period.

Cost of jail days. Jails exist for the pre- and post-trial detention of individuals arrested, charged, and/or convicted of a crime. In Ohio, these jails are under the control of county governments, municipal governments, or both. There are several types of jails under Ohio law (see <http://codes.ohio.gov/oac/5120:1>). Jail type determines the length of the jail stay. Jails for long-term detention of individuals are referred to as full-service jails. Although full-service jails vary by the type and amount of programming they offer, only full-service jails have treatment opportunities for detained persons. For this reason, we only consider full-service jail cost in the current study.

A report produced by the Ohio Department of Rehabilitation and Correction states that in SFY 2015 the average per diem for full-service jails was \$67.31.¹

Cost of drug court and criminal justice cases. In 2005, researchers from the University of Cincinnati Center for Criminal Justice Research published a cost-benefit analysis of Ohio's drug courts.⁵ Using 2002 data from several sources, including Comprehensive Annual Financial Reports requested from all the counties in the State of Ohio, the researchers were able to collect annual expenditures for criminal justice data. Similar data were extracted from the Department of Rehabilitation and Correction and from drug courts throughout the state. These sources were used to calculate costs associated with each stage of criminal justice processing.

Researchers at the University of Cincinnati Center for Criminal Justice have calculated the costs for law enforcement and probation across five Ohio counties. For this current study, we will use the Consumer Price Index Inflation Index to adjust to 2017 all dollar estimates derived for previous study.

¹ A listing of Ohio full-service jails is available at <http://www.drc.state.oh.us/web/Ohio%20Full%20Service%20Jails.pdf>.

Table 5 lists each cost item associated with the criminal justice system and includes a description of each item and the information source.

Table 5. Criminal Justice System Cost Items, Information Source, and Description

Item	Source	Description
Law enforcement possessing costs (1 case)	Koetzle Shaffer et al., 2005	Average per transaction cost of arrest processing in the state of Ohio
Correction facility time, days	Ohio's Department of Mental Health and Addiction Services	Per transaction cost of one day in jail
Probation, days	Koetzle Shaffer et al, 2005	Per transaction cost of average probation time

Sample Selection

The study sample included Ohio Addiction Treatment Program MAT and non-MAT participants identified through Ohio Drug Court. We limited the sample to those who were eligible for Medicaid and eligible to participate in the Addiction Treatment Program from January 1, 2016 through September 30, 2016. We identified these individuals by first matching the participant data from the TRI-CEP and TRI-CA to Medicaid enrollment information on the basis of participants Medicaid identification (ID) numbers found in all three data sources. We then removed any participants who were not enrolled in Medicaid within 3 months of their start in the Addiction Treatment Program. We also excluded any participants without baseline TRI-CA survey data.

We categorized participants into either the treatment or the non-treatment group based on their alcohol and drug medication treatment status at baseline. Table 6 lists the source and description for each TRI variable in the analytic file. Table A in the Appendix lists the source and description for each Medicaid variable in the analytic file.

Table 6. Variable names, descriptions, and sources

Variable Name	Data Source	Description
MCD_NUMBER	TRI-CEP	MCD Medicaid Number
MED	TRI-CEP	Indicator of individuals' MAT treatment group status
RaceCode	TRI-CEP	Race

Ethnic	TRI-CEP	Ethnicity
DOB	TRI-CEP	Date of birth
GenderCode	TRI-CEP	Sex
COURT	TRI-CEP	Date of entry
PrimaryDrug	TRI-CEP	Primary drug
SecondaryDrug	TRI-CEP	Secondary drug
START	TRI-CEP	Week date start
END	TRI-CEP	Week date end
AOD_EXIT	TRI-CEP	AOD treatment exit date
MEDICATION	TRI-CEP	AOD medication; used to identify treatment group (MAT or non-MAT)
ATP4	TRI-CA	Age when you first committed a crime
ATP5	TRI-CA	How many times have you participated in a diversion program like drug court or Accelerated Rehabilitation Disposition?
ATP7	TRI-CA	Number of times convicted of a felony offense
ATP8	TRI-CA	Number of times convicted of a misdemeanor offense
ATP9	TRI-CA	Age when you first started using drugs and/or alcohol on a regular basis
ATP16	TRI-CA	Have you been diagnosed with a serious psychiatric disorder (such as bipolar disorder or manic-depression, major depressive disorder, psychosis, dementia, or organic brain syndrome)?
ATP22	TRI-CA	In the past 30 days, how many days did you have trouble falling asleep, staying asleep (sleeping through the night), or waking up too early?
ATP23	TRI-CA	In the past 30 days, how many days did you feel depressed or down for most of the day?
ATP24	TRI-CA	In the past 30 days, how many days did you feel anxious, nervous, or worried most of the day?
ATP25	TRI-CA	In the past 30 days, how many days did you have hallucinations (heard or saw things that other people couldn't see or hear)?
ATP26	TRI-CA	In the past 30 days, how many days have you had trouble thinking/concentrating, understanding, or remembering to the extent that it caused problems?
ATP27	TRI-CA	In the past 30 days, how many days have you had difficulty controlling your temper or urges to hit or harm someone?
ATP28	TRI-CA	In the past 30 days, how many days did you push, hit, throw something at, or use a weapon against someone?
ATP29	TRI-CA	In the past 30 days, how many days have you had serious thoughts of suicide or killing yourself?
ATP30	TRI-CA	In the past 30 days, how many times did you attempt suicide or try to kill yourself?
ATP17	TRI-CA	In the past 30 days, number of days worked for pay or gone to school
ATP34	TRI-CA	In the past 30 days, number of outpatient visits did you have with a doctor or healthcare provider
ATP35	TRI-CA	In the past 30 days, number of emergency room (ER) services for any type of problem visits (excluding ER visits resulting in hospital admissions)
ATP36	TRI-CA	In the past 30 days, number of hospitalizations (at least overnight) for physical or medical problems

Abbreviations: AOD, alcohol and other drug; ATP, Addiction Treatment Pilot; MAT, medication-assisted treatment; MCD, Medicare Coverage Database; TRI-CA, Treatment Research Institute Client Assessment; TRI-CEP, Treatment Research Institute Court Evaluation Plan.

Analytic Approach

Defining total Medicaid and SUD utilization and cost

We employed a quasi-experimental matched comparison group design in which we examined two categories of costs covered by Medicaid associated with participation in MAT drug court (treatment group) versus nonparticipation in MAT court (comparison group). The first category considers all health care utilization and the second category considers SUD-related treatment costs associated with claims tied to the participants' SUD ICD-10 codes and MAT treatment (Tables B-E in Appendix), MAT services was incorporated into overall SUD treatment by selecting claims that contain one of the Healthcare Common Procedure Coding System (HCPCS) procedure codes listed in Table D and procedure codes in Table E. We measured cost for the two categories for three months prior to intervention (baseline) and over the 9-month intervention time horizon. Thus, unadjusted and adjusted predicted costs are presented at baseline (defined as a 3-month prior treatment period), between baseline 3-months post entry period, up to 6-month post entry period, and up to 9-month post entry period. Since reimbursement data was available for both fee-for-service and managed care beneficiaries, both are represented in each category.

Propensity score matching

A matched data set exhibiting good balance in propensity scores (PS) in demographic characteristics, healthcare expenditures, and criminal and substance use behavior between groups ensured that the cost savings observed is due to the treatment program and not to any moderating influences (Ramsey et al., 2008; Roman, 2013; Wickizer et al., 2012). We used 1:1 PS matching with repeated sampling to match treatment group participants (MAT participants) to the comparison group (Non-MAT participants). To test the robustness of our propensity score based matches we produced five different sets of random matches to compare to the Non-MAT participant group.

Table 7 describes the baseline and pre-period variables used for PS matched treatment groups. Using these variables the propensity score model yielded 72.2% concordance. The total analytic

sample was 236 (155 MAT participants and 81 Non-MAT participants). The propensity score model tests for the likelihood of being in the non-participant group; thus, this group always stays the same but five samplings of MAT participants are matched to the non-participants. The matched sample size is 162 (81 MAT participants and 81 Non-MAT participants). We used the same set of variables as well as a binary indicator variable signifying did or did not have any healthcare utilization in the 3-month baseline period in a multivariate regression model to produced predicted adjusted costs. Prior SUD and medical spending was categorized into quartiles for regression analysis to provide more stable estimates and adjust for the skew in cost due to extreme variation in costs. Unadjusted costs for unmatched descriptive statistics are provided in Table D in the appendix.

Table 7. Baseline characteristics for matched overall sample, MAT participants and no MAT participants. (N=162)²

Patient Characteristics	Non-MAT Participants	MAT Participants	Total Sample
	n (%)	(n) [(%) (high-low)]	(n) [(%) (high-low)]
Percent male	39 (48.2)	(36 - 33) [(44-41)]	(75 - 72) [(46 - 44)]
Age, years			
18–25	17 (11)	(23-17) [(7 - 6)]	(40 - 34) [(25 - 21)]
25-40	50 (31)	(55-47) [(28-21)]	(105 - 97) [(65 - 60)]
40–64	14 (9)	(12-9) [(68-58)]	(26 - 23) [(16 - 14)]
Age, years (Average/SD)	33.1 (9.6)	(31 - 31) [(15-11)]	(32 - 32) [(8 - 9)]
Race/ethnicity			
White non-Hispanic	77 (95)	(78 - 78) [(96-96)]	(155 - 155) [(96 - 96)]
Black non-Hispanic	2 (2.5)	(3 - 3) [(3.7-3.7)]	(5 - 5) [(3 - 3)]
Hispanic	0 (0)	0 (0)	0 (0)
Asian/Pacific Islander	0 (0)	0 (0)	0 (0)
Other	2 (2.5)	(0 - 0) [(0 - 0)]	(2 - 2) [(1 - 1)]

² Table 7 displays results in ranges for MAT participants and the total sample due to the nature of creating five different sets of random matches to compare to the non-MAT participant group. The propensity score model tests for the likelihood of being in the non-participant group; thus, this group always stays the same but five samplings of MAT participants are matched to the non-participants. The ranges for all the variables used in our model reflect the range of possible results for these 5 sample matches. It is important to note that when the match sets are created some individuals may not have a close match and will not be used in the parings. Therefore, the percentages are out of the match sample size of 162 (81 non-participants and 81 participants).

Age of first criminal offense, years (Average/SD)	17 (8)	(17 - 17) [(7 - 6)]	(17 - 17) [(7 - 7)]
<15	30 (37)	(35 - 31) [(43-38)]	(65 - 61) [(40 - 38)]
15-17	24 (27)	(20 - 19) [(25-23)]	(44 - 43) [(27 - 27)]
18-25	15 (18)	(17 - 11) [(21-14)]	(32 - 26) [(18 - 16.0)]
>25	12 (15)	(16 - 12) [(20-15)]	(28 - 24) [(17 - 15)]
Age commencing regular drug/alcohol use, years (Average/SD)	17 (6)	(17 - 16) [(6 - 5)]	(17- 17) [(6 - 6)]
<15	21 (26)	(25 - 21) [(31-26)]	(46 - 42) [(28 - 26)]
15-17	29 (36)	(27 - 26) [(−33-32)]	(56 - 55) [(35 - 34)]
18-25	24 (30)	(26 - 23) [(−32-28)]	(50 - 47) [(31 - 29)]
>25	7 (2.5)	(8 - 7) [(−10-9)]	(15 - 14) [(9 - 9)]
Number of times convicted of a felony offense (Average/SD)	1.6 (2)	(1 - 1) [(2 - 2)]	(1 - 1) [(2 - 2)]
None	35 (43)	(35 - 33) [(−43-40)]	(70 - 68) [(43 - 42)]
1	17 (21)	(20 - 18) [(−24-22)]	(22 - 21)
2	11 (14)	(14 - 11) [(−17-14)]	(25 - 22) [(15 - 14)]
3 or more	18 (22)	(17 - 14) [(−21-17)]	(35 - 32) [(22 - 20)]
Number of times convicted of a misdemeanor offense (Average/SD)	5.2 (7)	(8 - 8) [(12 - 12)]	(6 - 6) [(10 - 10)]
None	14 (17)	(13 - 10) [(−16-12)]	(14 - 10) [(8 - 6)]
1	9 (11)	(11 - 8) [(−14-10)]	(11 - 8) [(6 - 4)]
2	10 (12)	(12 - 9) [(−15-11)]	(12 - 9) [(7 - 5)]
3 or more	48 (59)	(50 - 48) [(−62-59)]	(50 - 48) [(31 - 30)]
Primary drug use type			
Other	14 (17)	(9 - 8) [(−11-10)]	(14 - 8) [(9 - 5)]
Alcohol	57 (70)	(64 - 60) [(−79-74)]	(64 - 57) [(40 - 35)]
Marijuana	10 (12)	(12 - 9) [(−15-11)]	(12 - 9) [(7 - 6)]
Secondary drug use type			
Other	71 (88)	(71 - 70) [(−88-86)]	(71 - 70) [(44 - 43)]
Alcohol	4 (5)	(5 - 2) [(−6-2)]	(5 - 2) [(3 - 1)]
Marijuana	6 (7)	(9 - 6) [(−11-7)]	(9 - 6) [(6 - 4)]
Self-reported physical health status			
0 days missed	62 (77)	(−70-64) [(−86-79)]	(102 - 27) [(63 - 17)]
1-2 days missed	5 (6)	(3 - 1) [(−4-1)]	(8 - 6) [(5 - 4)]
3-4 days missed	7 (9)	(5 - 4) [(−6-5)]	(12 - 11) [(7 - 7)]
5 or more days missed	7 (9)	(10 - 7) [(12-9)]	(17 - 14) [(11 - 9)]
Self-reported mental health status			
0 days missed	15 (19)	(15 - 11) [(19-14)]	(30 - 26) [(19 - 16)]
1-3 days missed	22 (27)	(21 - 17) [(26-21)]	(43 - 39) [(27 - 24)]
4 days missed	26 (32)	(32 - 28) [(40-35)]	(58 - 54) [(36 - 33)]

5 or more days missed	18 (22)	(20 - 17) [(25-21)]	(38 - 35) [(24 - 22)]
Prior participation in diversion programs (Average/SD)	0.73 (2)	(1 - 1) [(1 - 1)]	(1 - 1) [(2 - 2)]
No Prior Program	48 (59)	(53 - 47) [(65-58)]	(101 - 95) [(62 - 59)]
Prior Program	33 (41)	(34 - 28) [(42-35)]	(67 - 61) [(41 - 38)]
Pre-period total Medicaid healthcare costs (\$, Average, SD)	\$10,989 (\$41,046)	(\$12,400 - \$5,730) [(\$49,837 - \$2,2947)]	(\$11,694 - \$8,360) [(\$45,517 - \$3,3253)]
No Spending (compared to spending)	20 (12)	(23 - 18) [(14 - 11)]	(43 - 38) [(27 - 24)]
Pre-period total SUD treatment costs (\$,Average, SD)	\$1,198 (\$3,067)	(\$752 - \$708) [(\$1,791 - \$1,558)]	(\$975 - \$953) [(\$2,515 - \$2438)]
No Spending (compared to spending)	41 (25)	(46 - 37) [(29 - 23)]	(87 - 78) [(54 - 48)]

Abbreviations: SUD, substance use disorder.

Recidivism

Criminal justice involvement is another outcome of interest. In order to assign costs to participants, we determined the number of arrests at baseline, up to 3 months, up to 6 months and up to 9 months post entry and the unit cost of law enforcement encounter including processing, a day's stay in a correctional facility, and the marginal costs of probation supervision. We used a data of arrest to truncate the data to our intervention period only. This time period was chosen for consistency with the Medicaid cost analysis. The marginal costs of these interactions were calculated by multiplying the cost per transaction (\$) by the average number of events or confinement (case or days). Similar to the Medicaid cost analysis, 5 samples of participants were matched to one consistent sample of non-participants using PS matching methods.

The Ohio Attorney General's Office provided two source of recidivism data: (1) data with all arrests and (2) arrests that resulted in a judicial outcome only. Both data sources provided expected confinement days rather than actual confinement days. Our primary model, includes law enforcement processing that result in a judicial outcome because this was deemed the most conservative scenario. Also, in this model, correctional facility time (in days) is defined as

the number of confinement days minus the number of suspension days. As previously indicated, all dollars were standardized to 2016 using the Consumer Price Index inflation index to control for inflation. This model estimates accrued cost over the intervention period because sentencing tends to spill over into the different time periods of the intervention.

Sensitivity analysis

Due to the two sources of recidivism data, we ran three sensitivity analysis scenarios under all arrest vs. arrest that resulted in a judicial outcome only. We also tested a published assumption about how interactions with Ohio Drug Court may modify actual confinement. In the study by Koetzle Shaffer et al., the authors state “once accepted into the drug court, participants are often given a suspended sentence of jail or prison time. The suspended sentence allows the courts the ability to impose the original sentence if the participant fails to comply with the conditions of the drug court.”⁸ Under the assumption that MAT participants would be granted full suspension, our three sensitive analysis models were as follows:

Scenario 1. Law enforcement processing with all arrests data and the inclusion of correctional time for MAT participants as defined in the primary model.

Scenario 2. Law enforcement processing with all arrests data allowing for full suspension of sentence (confinement days) for MAT participants.

Scenario 3. Law enforcement processing with arrest resulting in a judicial outcome allowing for full suspension of sentence (confinement days) for MAT participants.

Unlike the primary model, we did not accrue cost over the entire intervention period rather we split costs within periods (baseline, 0-3 months, 3-6 months, 6-9 months) in the sensitivity analysis to better illustrate where the assumptions about arrest versus arrests with judicial outcomes most impacts the estimated costs.

Results

We examined unadjusted and predicted spending at baseline, 3-, 6- and 9-month total Medicaid and total SUD treatment costs as shown in Table 3 and Table G of Appendix. A summary of results is described below for both the unadjusted and adjusted analysis controlling for baseline participant characteristics and prior health care utilization.

Unadjusted analysis

At baseline, our unadjusted analysis, revealed an overall total Medicaid average spending difference \$4,384 of the treatment group. Overall, total SUD treatment was on average \$605 less among MAT treatment participants. Three months after participant program initiation, average spending in the MAT treatment group was \$613 less overall but \$202 more for total SUD costs than non-MAT treatment group. By 6-months post program entry, average spending in the MAT groups was \$6,609.18 overall but \$362 more for SUD treatment. By the end of the study period, overall Medicaid spending was an average \$8,207.26 less than the non-treatment group. Overall total SUD treatment was on average \$1,631.58 more for the non-MAT participants.

Adjusted analysis

After adjusting for demographics, self-reported health status, and utilization during the baseline periods, total average spending among MAT participants across samplings was \$1,989.59 less and \$462.41 less for all SUD spending than non-MAT participants. At 3-months post entry, total on average spending among MAT participants was \$3,584 less compared to non-participants. Total SUD spending was on average \$167 less for MAT participants. By 6 months, total average Medicaid spending among MAT participants was \$3,701 less but \$493 more for total SUD than non-participants. Over the course of the program, MAT participants spent on an average \$4,384 less on Medicaid health expenditures, but \$606 more on all SUD treatment compared to non-participants.

Table 8. Net cost comparisons between adjusted matched MAT and no MAT participants

Cost Category ^a	MAT Participants ^b			Non-MAT Participants ^{b, c}		
	Average	Median	Standard Deviation	Average	Median	Standard Deviation
At baseline costs						
Total Medicaid costs, \$	\$5,731- \$12,401	\$437-\$695	\$22,947- \$49,837	\$10,989	\$649	\$41,046
Total SUD treatment, \$	\$708-\$752	\$0-\$96	\$1,558- \$1,792	\$1,198	\$0	\$3,069
At 3 months' costs^d						
Total Medicaid costs, \$	\$10,574 - \$16,865	\$3,925 - \$4,878	\$17,956 - \$30,781	\$26,947 - \$32,107	\$4,302 - \$6,457	\$65,128 - \$109,912
Total SUD treatment, \$	\$2,574 - \$9,887	\$3 - \$531	\$5,447 - \$58,438	\$3,878 - \$14,768	\$8 - \$568	\$8,075 - \$60,791
At 6 months' costs						
Total Medicaid costs, \$	\$24,886 - \$33,330	\$8,692 - \$10,363	\$43,714 - \$62,190	\$31,283 - \$42,109	\$9,276 - \$10,722	\$69,667 - \$143,219
Total SUD treatment, \$	\$4,192 - \$4,784	\$2,886 - \$3,237	\$4,378 - \$5,576	\$3,266 - \$3,424	\$1,778 - \$1,929	\$3,580 - \$4,033
At 9 months' costs						
Total Medicaid costs, \$	\$30,331 - \$37,111	\$14,509 - \$17,641	\$39,612 - \$61,550	\$35,961 - \$39,442	\$13,077 - \$17,523	\$64,841 - \$90,929
Total SUD treatment, \$	\$7,245 - \$7,762	\$5,323 - \$6,381	\$5,099 - \$6,320	\$4,641 - \$4,792	\$3,180 - \$3,482	\$3,513 - \$3,968

^a Categories are not mutually exclusive. Abbreviations: MAT, medication-assisted treatment; SUD, substance use disorder.^b Estimates are from predicted values from a generalized linear model with gamma distributed error that adjusted for demographics, self-reported health status (Table 7), and utilization during the baseline periods. The range from predicted values across multiple repeated draws. ^c Values for the pre-period are ranges of descriptive statistics (maximum and minimum) from the five propensity-score matched samples with the same 81 non-MAT participants included in all five samples. Estimates for the post period summarize predicted values from multivariable models from analysis of each of the five matched datasets, because estimated coefficients varied across datasets predicted values for both the non-MAT and MAT participants varied as well. ^d The standard deviations are noisiest at 3 months, because it has the least amount of data and highest number of zero utilizers.

Recidivism analysis

The marginal costs of criminal justice interactions for MAT participants compared to non-MAT participants at baseline, 3-, 6- and 9-months post entry are displayed in Table 8. At baseline, the average number of arrests that resulted in a judicial outcome were higher among the non-MAT participants compared to MAT participants (0.43 cases vs. 0.15-0.20 cases). The average

number of confinement days assigned per individual was higher among the MAT participants (6.04-8.65 days vs. 3.83 days). However, the average number of probation days was higher among the non-MAT participants (36.23 days vs. 4.28-12.99 days) producing a higher overall estimated baseline cost per individual among the non-treatment group (\$15,415 vs. \$2,640-\$6,217). By 9 months, the non-MAT group had higher average arrests resulting in a judicial outcome, but the difference in overall estimated cost were much less pronounced (\$9,694 vs. \$5,253-\$9,602)

Estimated costs produced under our sensitivity analysis scenarios are provided in Table I of Appendix.

Table 9. Criminal Justice System and Drug Court Participation Costs per Individual: Primary Model

Drug Court (DC) Participant Transaction	MAT Participants			Non-MAT Participants		
	Cost per Transaction, \$	Average No. of Events Before DC Entry	Average Cost, \$ (n = 162)	Cost per Transaction, \$	Average No. of Events Before DC Entry	Average Cost, \$ (n = 162)
Baseline						
Law enforcement possessing for arrests resulting in a judicial outcome (1 case)	\$4,459.29	(0.15, 0.20)	(\$661, \$881)	\$4,459.29	.43	\$1,927
Correction facility time, days	\$68.77	(6.04, 8.65)	(\$415, \$596)	\$68.77	3.83	\$263
Probation, days	\$356	(4.28, 12.99)	(\$1,564, \$4,741)	\$356	36.23	\$13,226
Total costs per person at baseline, \$			(\$2,640, \$6,217)			\$15,415
At 3 months						
Law enforcement possessing for arrests resulting in a judicial outcome (1 case)	\$4,459.29	(0.25, 0.31)	(\$1,101, \$1,376)	\$4,459.29	.09	\$385
Correction facility time, days	\$68.77	(4.47, 9.05)	(\$307, \$622)	\$68.77	.2	\$14
Probation, days	\$356	(5.96, 11.52)	(\$2,177, \$4,204)	\$356	9.88	\$3,605
Total cost per person during first 3 months,			(\$3,585,			\$4,004

\$			\$6,203			
From 3-6 months						
Law enforcement possessing for arrests resulting in a judicial outcome (1 case)	\$4,459.29	(0.16, 0.23)	(\$716, \$1,046)	\$4,459.29	.2	\$881
Correction facility time, days	\$68.77	(0.51, 1.59)	(\$35, \$110)	\$68.77	.38	\$26
Probation	\$356	(0.74, 2.56)	(\$270, \$933)	\$356	5.02	\$1,834
Total cost per person during first 6 months, \$			(\$4,606, \$8,291)			\$6,745
From 6-9 months						
Law enforcement possessing (1 case)	\$4,459.29	(0.04, 0.10)	(\$166, \$440.42)	\$4,459.29	.16	\$716
Correction facility time, days	\$68.77	(0.06, 0.21)	(\$4, \$14)	\$68.77	1.8	\$124
Probation	\$356	(1.31, 2.35)	(\$478, \$856)	\$356	5.78	\$2,109
Total cost per person over 9 month follow-up, \$			(\$5,253, \$9,602)			\$9,694

Abbreviation: MAT, medication-assisted treatment.

^a Significantly different between MAT and comparison groups ($p < .01$).

Discussion

Our results consistently indicated an overall positive cost impact on Ohio Medicaid spending. In our sample, MAT participants spent more on SUD treatment; however, they overall utilized less health care (both physical and behavioral health). This observation held true across the 9-month period between groups in favor of MAT participation.

Several limitations should be acknowledged. First, while the Treatment Research Institute collected data on over 400 clients, due to the analytic requirements to prepare comparable groups, the final analytic sample was only 255 clients. A smaller sample size makes it more difficult to generalize our results to a larger general population of potential MAT beneficiaries. Second, our SUD cost estimates are based on claims associated with diagnostic codes. While this method is a reasonable way of estimating utilization, we were unable to distinguish positive SUD treatment seeking cost from those resulting in negative SUD behaviors. Thus, the higher unadjusted cost observed among the treatment group may be due to higher likelihood of

appropriate treatment seeking rather than adverse effects of risky behavior. Likewise, we used all diagnostic fields on each claim to determine utilization. Therefore, in some cases SUD was not the primary reason for treatment and may overstate the cost in both groups. Third, HCPCS codes were only available in the inpatient file limiting our ability to observe MAT treatment across treatment settings. Therefore, cost may be underestimated in both groups. Third, variation in cost within treatment groups makes it difficult to conclude that the cost differences observed are statistically significant. The inclusion of propensity score matched group with regression adjusted predicted costs was introduced to account for some of this variation. Lastly, we did not account for recidivism. Future research should incorporate participant data on criminal justice interactions and correctional interventions. Although this is not a cost to the Medicaid program directly, state savings on health care utilization should not be counterbalanced with loss of savings from failing to reduce crime.

Despite these limitations, our study benefits from a comparable control group. Previous evaluations in the state of Ohio, did not specify whether the comparison group received treatment services (Center for Criminal Justice Research, 2005). In our current study, we looked at treatment for both groups and it was reported that the non-MAT participants did not have MAT paid for by the Medicaid program. Our study results are also consistent with other similar evaluations showing that drug courts are generally cost-beneficial (Center for Criminal Justice Research, 2005).

Recidivism analysis

Criminal justice costs were consistently higher for the non-participants compared to their matched participant counterparts. The gap in costs was reduced between baseline and 9 months post entry. This result was likely due to a similar amount of arrest activity between the two groups over time.

Several other caveats should be acknowledged with regard to the recidivism analysis. First, researchers were provided expected confinement days rather than actual confinement days. Since expected confinement days were provided in the data we examined only the 9-month intervention period, cost estimates closer to the end of the period are likely to be truncated

and underestimated. This along with delays in time between arrests versus confinement meant that some individual's confinement days may be full counted while others may be truncated due to the 9-month cut of period of our analysis. The 9-month time period was chosen for consistency with the Medicaid cost data and the program intervention period. Researchers were also not told whether the indicator for suspension in the provided data reflected the current intervention program. Sensitivity analysis scenarios were developed to test the assumption that the intervention would grant participants a full suspended sentence, but this assumption was not confirmed. Given these uncertainties in the data, researchers were cautious against concluding that the program had any impact on recidivism cost over the short intervention period.

Despite these limitations, our study benefits from a comparable control group. Previous evaluations in the state of Ohio, did not specify whether the comparison group received treatment services.⁸ In our current study, we looked at treatment for both groups and it was reported that the non-MAT participants did not have MAT paid for by the Medicaid program. Our study results in the Medicaid analysis are also consistent with other similar evaluations showing that drug courts are generally cost-beneficial.⁸

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Appendix

Table A. Variable names and descriptions for Ohio Medicaid claims.

Source Field Name ^a	Field Description
NUM_ICN	ICN—Unique control number assigned to the invoice to indicate its date of receipt. The format is RRYJJBBSS, where RR is the claim region; YY is the last two digits of the calendar year the claim was received; JJ is the Julian date of claim receipt; BBB is the batch number; and SSS is the sequence number of the invoice within the batch.
CDE_HDR_STATUS	Code that indicates if the claim is approved or rejected at the header of the claim. The values are as follows: P for Paid and D for Denied.
IND_CLAIM	Indicates if the claim is an FFS claim or Encounter. Valid values: E=Encounter, F=FFS claim.
ID_MEDICAID	The unique number assigned to the recipient (Medicaid ID)
CDE_CLM_TYPE	The claim type code for the claim
DTE_ADMISSION	Date that the recipient was admitted by the provider for inpatient care, outpatient services, or start of care.
DTE_DISCHARGE	Date that the recipient was discharged by the provider for inpatient care, outpatient services, or start of care
AMT_PAID_MCO	Note: This is populated only for Encounters and MyCare Encounters. This is the MCP Paid Amount from the header for header paid claims (claim type A, C, and I-DRG).
IND_HDR_DTL	This field indicates if the claims was paid at the header (value of H) or at the detail (value of D).
DTE_FIRST_SVC	Date on which the statement period on the claim began. For header paid claims (claim types A, C, and I-DRG), this will be the From Date Of Service from the header portion of the claim. For detail paid claims (claim types I-DRG exempt, L, and O), this will be the From Date Of Service from each detail on the claim.
DTE_LAST_SVC	Date on which the statement period on the claim ended. For header paid claims (claim types A, C, and I-DRG), this will be the To Date Of Service from the header portion of the claim. For detail paid claims (claim types I-DRG exempt, L, and O), this will be the From Date Of Service from each detail on the claim.
AMT_PAID	Note: This is populated only for FFS claims. This is the Paid Amount (Reimbursed Amount minus State Share) from the header for header paid claims (claim type A, C, and I-DRG.)
CDE_DTL_STATUS	MITS Claim Detail Status Code at the detail of the claim. The valid values are as follows: P = Paid and D = Denied.
CDE_REVENUE	Identifies code of a specific accommodation or ancillary service
CDE_PROC_PRIM	A code from the fee schedule to indicate the service performed
ID_PROVIDER_MCAID	This is the Billing Provider Medicaid ID.

CDE_DIAG_PRIM	Primary diagnosis code on the claim. Either this will be the diagnosis code associated with sequence 01 or, if the Treatment Indicator was used by the provider for the claim at the detail for the procedure code/diagnosis code combination, it will be the designated primary diagnosis code.
CDE_DIAG_2 - CDE_DIAG_4	Second through fourth diagnosis code on the claim. Either this will be the diagnosis code associated with sequence 02-04 or, if the Treatment Indicator was used by the provider for the claim at the detail for the procedure code/diagnosis code combination, it will be the designated second–fourth diagnosis code.
CDE_ICD_VERSION	This is the ICD Version associated with the diagnosis codes and inpatient procedure codes in order to differentiate between the ICD-9 and the ICD-10 diagnosis codes. Valid Values are 09 and 10.
CDE_THERA_CLS_AHFS	American Hospital Formulary Service (AHFS) classification, identifying the pharmacological therapeutic category of the drug product.
CDE_THERA_CLS_SPEC	Therapeutic Class Code, Specific (GC3, Alias, HIC3). The most specific therapeutic class code offered, intended for users who need a very definitive therapeutic classification system.

Abbreviations: DRG, diagnosis-related group; FFS, fee for service; MCP, monthly capitation payment; MITS, Medicaid Information Technology System
Notes: This table contains high-level source field names and definitions. The same field name may be used to represent several different provider IDs, for example. The formal analytic file programming will include the appropriate field starting and ending positions. This table is designed to be illustrative of the approach for each major service category.

Table B. Substance abuse disorder diagnoses codes.

ICD-10-Codes	Diagnosis Category
F10231, F1096, F1027, F10951, F10929, F10950, F10239, F10182, F101292, F10982, F10159, F10180, F10181, F10188, F10259, F10280, F10281, F10288, F10959, F10980, F10980	Alcoholic Psychoses
F19939, F19950, F19951, F15920, F19921, F1997, F1996, F1994, F11182, F11282, F11982, F13182, F13282, F13982, F14182, F14282, F14982, F15182, F15282, F15982, F19182, F19282, F19982, F11159, F11188, F11222, F11259, F11281, F11288, F11922, F11959, F11981, F11988, F12122, F12159, F12180, F12188, F12222, F12259, F12259, F12280, F12288, F12922, F12959, F12959, F12980, F12988, F13159, F13180, F13188, F13259, F13280, F13288, F13980, F13981, F13988, F14122, F14159, F14180, F14180, F14188, F14222, F14259, F14280, F14281, F14288, F14922, F14959, F14980, F14981, F14988, F15122, F15159, F15180, F15181, F15188, F15222, F15259, F15280, F15281, F15288, F15922, F15959, F15980, F15981, F15988, F16122, F16159, F16180, F16183, F16188, F16259, F16280, F16283, F16288, F16959, F16980, F16983, F16988, F17208, F17218, F17228, F17298, F18159, F18180, F18188, F18259, F18280, F18288, F18980, F18988, F19122, F19159, F19180, F19181, F19188, F19222, F19259, F19280, F19281, F19288, F19922, F19959, F19980, F19981, F19988, F1999	Drug Psychoses
F10229, F1020, F1021	Alcoholic Dependence Syndrome
F1120, F1121, F1320, F1321, F1420, F1421, F1220, F1221, F1520, F1521, F1620, F1621, F1920, F1921	Drug Dependence
F1010, F17200, F1210, F1290, F1210, F1290, F1610, F1310, F1110, F1410, F1510, F1910, F1810	Nondependent Abuse of Drugs

Table C. Prescription drugs by therapeutic class and target.

Therapeutic Class	SA	AA	DA
61: Anal/Antipyr, Opiate Part Agonist	Yes	No	Yes
63: Opiate Antagonists, NEC	Yes	Yes	No
234: Unclassified Agents, NEC <i>Label as "Alcohol Abuse Drugs"</i>	Yes	Yes	No
999: Other/unavailable	Yes	Yes	No

Table D. Healthcare common procedure coding system Medication-Assisted Treatment procedure codes.

Procedure Code	Procedure Title
H0033	Oral medication administration, direct observation
S0109	Methadone, oral, 5mg
J0592	Injection, buprenorphine hydrochloride, 0.1 mg
J1230	J1230-injection, methadone hcl, up to 10 mg
J2315	Injection, naltrexone, depot form, 1 mg
T1502	Administration of oral, intramuscular, and/or subcutaneous medication by healthcare agency/professional, per visit
H0020	Alcohol and/or drug services: methadone administration

Abbreviation: HCPCS, Healthcare Common Procedure Coding System

Table E. Medication management ICD-10 procedure codes.

Procedure Code	Procedure Title
HZ80ZZZ	Medication Management for Substance Abuse Treatment, Nicotine Replacement
HZ81ZZZ	Medication Management for Substance Abuse Treatment, Methadone Maintenance
HZ82ZZZ	Medication Management for Substance Abuse Treatment, Levo-alpha-acetyl-methadol (LAAM)
HZ83ZZZ	Medication Management for Substance Abuse Treatment, Antabuse
HZ84ZZZ	Medication Management for Substance Abuse Treatment, Naltrexone
HZ85ZZZ	Medication Management for Substance Abuse Treatment, Naloxone
HZ86ZZZ	Medication Management for Substance Abuse Treatment, Clonidine
HZ87ZZZ	Medication Management for Substance Abuse Treatment, Bupropion
HZ88ZZZ	Medication Management for Substance Abuse Treatment, Psychiatric Medication
HZ89ZZZ	Medication Management for Substance Abuse Treatment, Other Replacement Medication
HZ90ZZZ	Pharmacotherapy for Substance Abuse Treatment, Nicotine Replacement
HZ91ZZZ	Pharmacotherapy for Substance Abuse Treatment, Methadone Maintenance
HZ92ZZZ	Pharmacotherapy for Substance Abuse Treatment, Levo-alpha-acetyl-methadol (LAAM)
HZ93ZZZ	Pharmacotherapy for Substance Abuse Treatment, Antabuse
HZ94ZZZ	Pharmacotherapy for Substance Abuse Treatment, Naltrexone
HZ95ZZZ	Pharmacotherapy for Substance Abuse Treatment, Naloxone
HZ96ZZZ	Pharmacotherapy for Substance Abuse Treatment, Clonidine
HZ97ZZZ	Pharmacotherapy for Substance Abuse Treatment, Bupropion
HZ98ZZZ	Pharmacotherapy for Substance Abuse Treatment, Psychiatric Medication
HZ99ZZZ	Pharmacotherapy for Substance Abuse Treatment, Other Replacement Medication

Table F. Baseline characteristics for unmatched overall sample, MAT participants and no MAT participants.

Patient Characteristics	No MAT Participants	MAT Participants	Total Sample
	No. (%)	No. (%)	No. (%)
Percent male	39 (17)	68 (29)	107 (45)
Age, years			
18–25	17 (7)	34 (14)	51 (22)
25–40	50 (21)	104 (44)	154 (65)
40–64	14 (6)	17 (7)	31 (13)
Age, years (Average/SD)	32 (8)	30 (7)	31 (8)
Race/ethnicity			
White non-Hispanic	77 (33)	152 (64)	229 (97)
Black non-Hispanic	2 (1)	3 (1)	5 (2)
Hispanic	0 (0)	0 (0)	0 (0)
Asian/Pacific Islander	0 (0)	0 (0)	1 (0)
Other	2 (1)	0 (0)	2 (1)
Age of first criminal offense, years (Average/SD)	17 (8)	17 (7)	17 (7)
<15	30 (13)	58 (25)	88 (37)
15–17	24 (10)	25 (11)	49 (21)
18–25	15 (3)	51 (22)	66 (28)
>25	12 (5)	21 (9)	33 (14)
Age commencing regular drug/alcohol use, years (Average/SD)	17 (6)	17 (6)	17 (6)
<15	21 (9)	50 (21)	71 (30)
15–17	29 (12)	42 (18)	71 (30)
18–25	24 (10)	51 (22)	75 (32)
>25	7 (3)	12 (5)	19 (8)
Number of times convicted of a felony offense (Average/SD)	1.56 (2)	1.37 (1.89)	1.44 (2.02)
None	35 (15)	64 (27)	99 (42)
1	17 (7)	38 (16)	55 (23)
2	11 (5)	25 (11)	36 (15)
3 or more	18 (8)	28 (12)	46 (20)
Number of times convicted of a misdemeanor offense (Average/SD)	5 (8)	6 (9)	5 (7)
None	14 (6)	24 (10)	38 (16)
1	9 (4)	23 (10)	32 (14)
2	10 (4)	26 (11)	36 (15)

3 or more	48 (20)	82 (35)	130 (55)
Primary drug use type			
Other	14 (6)	9 (4)	23 (10)
Alcohol	57 (24)	118 (50)	175 (74)
Marijuana	10 (4)	28 (12)	38 (16)
Secondary drug use type			
Other	71 (30)	123 (52)	194 (82)
Alcohol	4 (2)	7 (3)	11 (5)
Marijuana	6 (3)	25 (11)	31 (13)
Self-reported physical health status (Average/SD)	1 (1)	1 (1)	1 (1)
0 days missed	48 (20)	98 (41)	146 (62)
1-2 days missed	5 (2)	17 (7)	22 (9)
3-4 days missed	7 (3)	7 (3)	14 (6)
5 or more days missed	7 (3)	14 (6)	21 (9)
Self-reported mental health status	6 (8)	6 (8)	6 (8)
0 days missed	15 (6)	24 (11)	39 (17)
1-3 days missed	22 (9)	45 (19)	67 (28)
4 days missed	26 (11)	52 (22)	78 (33)
5 or more days missed	18 (8)	34 (14)	52 (22)
Prior participation in diversion programs (Average/SD)	1 (2)	1 (1)	1 (2)
0	48 (20)	93 (40)	141 (60)
1	26 (11)	43 (18)	69 (29)
2	6 (3)	9 (4)	15 (6)
3	0 (0)	7 (3)	7 (3)
Preperiod total Medicaid healthcare costs (\$,Average,SD)	10,989.38 (51,045.91)	89,22.38 (37,802.62)	9,631.82 (38871.34)
No Spending (compared to spending)	20 (9)	36 (15)	56 (23)
Preperiod total SUD treatment costs (\$,Average, SD)	11,97.99 (3,068.74)	926.62 (2531.63)	1019.76 (2724.44)
No Spending (compared to spending)	41 (17)	74 (31)	115 (49)

Abbreviations: MAT, medication-assisted treatment; SUD, substance use disorder.

Table G. Net cost comparisons between un-adjusted matched MAT and no MAT participants

Cost Category ^a	MAT Participants ^b			No MAT Participants		
	Average	Median	Standard Deviation	Average	Median	Standard Deviation
At baseline costs						
Total Medicaid costs, \$	\$5,731 - \$12,401	\$438 - \$695	\$22,948 - \$49,838	\$10,989.38	\$649.64	\$41,045.91
Total SUD treatment, \$	\$709 - \$752	\$0 - \$99	\$1,558 - \$1,792	\$1,197.99	\$0.00	\$3,068.74
At 3 months' costs						
Total Medicaid costs, \$	\$12,548.60- \$19,525.14	\$1,947.45- \$2,549.34	\$37,633.04- \$57,486.82	\$14,568.22	\$3,099.69	\$43,208.63
Total SUD treatment, \$	\$1,521.84- \$1,777.66	\$415.29- \$492.74	\$2,770.20- \$3,399.39	\$1,838.40	\$422.78	\$3,581.84
At 6 months' costs						
Total Medicaid costs, \$	\$21,671.47- \$29,524.93	\$63,192.29- \$76,476.58	\$5,686.95- \$7,309.94	\$30,980.45	\$85,704.21	\$6,183.71
Total SUD treatment, \$	\$3,701.54- \$4,137.16	\$2,086.39- \$2,344.47	\$4,940.80- \$5,595.38	\$3,513.65	\$1,546.43	\$5,569.06
At 9 months' costs						
Total Medicaid costs, \$	\$26,905.25- \$34,337.81	\$10,012.64- \$11,354.11	\$64,273.17- \$77,892.77	\$37,399.48	\$8,049.81	\$9,0366.28
Total SUD treatment, \$	\$6,581.56- \$7,155.66	\$4686.89- \$4,749.01	\$6,962.92- \$7,670.49	\$5,132.30	\$2,409.85	\$7,274.53

^a Categories are not mutually exclusive. Abbreviations: MAT, medication-assisted treatment; SUD, substance use disorders. ^b table shows range of results from five random samplings for testing of robust matches

Table H. Ohio Attorney General’s Office data: variables used in analysis.

Variable Name	Variable Label	Variable Values	Type of Variable
Unique_Record_Number	TRI-Assigned Unique Record Number (ClientRecNo)	N/A	Numeric
Charge_Code	Level of felony or misdemeanor (e.g., F1, F2, M1, M2, etc.)	F = Felony M = Misdemeanor	Text
Confinement	Any jail time listed here	Length of time + D = Day M = Month Y = Year	Text
Suspended	If any of the sentence is suspended by the judiciary	Length of time + D = Day M = Month Y = Year	Text
Probation	Length of probation	Length of time + D = Day M = Month Y = Year	Text

Table I: Criminal Justice System and Drug Court Participation Costs per Individual: By Sensitivity Analysis Scenario and Time Period.¹

Model Scenario	Baseline		0-3 month		3-6 month		6-9 month	
	MAT Participant	Non-MAT Participant	Mat Participant	Non-MAT Participant	MAT Participant	Non-MAT Participant	MAT Participant	Non-MAT Participant
Law enforcement possessing all arrest with confinement for MAT ²	(\$2,869, \$6,717)	\$15,416a, b	(\$4,631, \$7,469)	\$5,105b	(\$2,067, \$3,134)	\$3,016b	(\$922, \$1,641)	\$2,949c
Law enforcement possessing all arrest, full suspension for MAT ³	(\$2,869, \$6,717)	\$15,416a, b	(\$2,147, \$2,643)	\$5,105b	(\$1,762, \$2,092)	\$3,016b	(\$440, \$771)	\$2,949c
Law enforcement possessing for arrests resulting in a judicial outcome, full suspension for MAT ⁴	(\$2,639, \$6,216)	\$15,416a, b	(\$1,101, \$1,376)	\$4,004b	(\$716, \$1,046)	\$2,741b	(\$165, \$440)	\$2,949c

1. Values are costs accrued during the mutually exclusive three-month period noted in the column header.
2. Law enforcement costs of \$4,459.29/arrest were applied to all recorded arrests for both the MAT and non-MAT groups. For the MAT group, there were 295 arrests without a corresponding judicial record. For the Non-MAT group, there were 95 additional arrests.
3. Correctional facility time and probation time were counted for both the MAT and Non-MAT group during the baseline period prior to the intervention. These costs were only applied to the Non-MAT group during the intervention period.
4. Values listed are costs accrued during noted three-month period. For the baseline period (3 months prior to MAT intervention), confinement and probation costs are applied. For the 0-3, 3-6, and 6-9 month intervention periods confinement and probation costs are only applied to the Non-MAT group.

A. There were 35 arrests for the Non-MAT group and all had corresponding judicial records. B. Assumptions regarding suspension of incarceration and probation for the MAT group do not impact costs incurred by the Non-MAT group. C. In the 6-9 month period, there were 13 arrests for the Non-MAT group, and all had corresponding judicial records.

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