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OFFICE OF BEHAVIORAL HEALTH, DISABILITY, AND AGING POLICY

Evaluation of the Assisted Outpatient Treatment Grant Program for Individuals with Serious Mental Illness: Summary Evaluation Report

Prepared for
the Office of the Assistant Secretary for Planning and Evaluation (ASPE)
at the U.S. Department of Health & Human Services

by
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Office of the Assistant Secretary for Planning and Evaluation

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EVALUATION OF THE ASSISTED OUTPATIENT TREATMENT GRANT PROGRAM FOR INDIVIDUALS WITH SERIOUS MENTAL ILLNESS:

SUMMARY EVALUATION REPORT

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EXECUTIVE SUMMARY

Assisted outpatient treatment (AOT) is a civil court procedure whereby a judge orders an adult with serious mental illness (SMI) to comply with community-based treatment. Developed as a less restrictive alternative to involuntary hospitalization, AOT targets individuals at risk of clinical deterioration or rehospitalization because they do not voluntarily comply with prescribed treatment. At present, AOT is authorized in nearly all U.S. states and territories, though statutory variation and uneven implementation of AOT means that no two implementations look exactly alike.

The purpose of the project carried out by RTI International, in partnership with Duke University and Policy Research Associates (PRA), was to conduct an implementation and outcome evaluation of the Substance Abuse and Mental Health Services Administration's (SAMHSA's) Assisted Outpatient Treatment Grant Program for Individuals with Serious Mental Illness, a 4-year pilot program that funded AOT grants set forth in the 2014 Protecting Access to Medicare Act (PAMA). The implementation evaluation, conducted from November 2016 to August 2017, gathered information related to the processes and practices of AOT across six of the 18 SAMHSA-funded AOT sites. The outcome evaluation, conducted from September 2017 to March 2021, addressed research questions around AOT program outcomes, client and family perceptions, and resources and costs at six of the AOT sites, three of which were retained from the implementation evaluation. Findings were augmented by comparison analyses using primary data at one locality and secondary data from three sites.

Implementation Evaluation

Findings from the implementation evaluation identified many sources of heterogeneity in and across AOT programs, resulting from differing statutory characteristics and site-level determinations. Overall, the outcome evaluation showed significant improvements across a range of client outcomes, including appointment and medication adherence, symptomology, perceived mental health, life satisfaction, and therapeutic alliance during AOT and following the order. AOT clients also demonstrate reductions in violent behaviors, suicidal thinking, arrests, drug use, and homelessness, as well as number of inpatient hospitalizations and days in the hospital.

Outcome Evaluation

The outcome evaluation additionally assessed the impact of select client and programmatic characteristics identified in the implementation evaluation on subsequent outcomes. AOT characteristics associated with subsequent outcomes include length of time of the order, as spending at least 6 months on an AOT order is associated with a further reduced likelihood of violent behavior, suicidal thoughts, number of psychiatric inpatient nights, and homelessness. Moreover, those who successfully complete their AOT order show greater improvements around symptomology, homelessness, and illicit drug use. Findings also suggest that a sizable proportion of changes observed in clinical and social functioning outcomes can be attributed to having at least one judicial status hearing over the course of the order and changes in medication and appointment adherence.

Findings around client and family perceptions do not raise any pressing concerns around civil liberties from the perspective of the consumer. Indeed, the majority of clients and family members surveyed believe that AOT is an effective way to improve treatment and medication adherence and keep clients out of the hospital. Finally, findings around costs and resources indicate that AOT is associated with reductions in psychiatric emergency department and inpatient costs. These findings represent a conservative estimate and would be greater if public safety outcomes like reductions in criminal justice involvement were also taken into account. The initial investment to establish a new AOT program varies widely, in part as a function of staff time, and is larger in cases where the court is involved over the course of the order. While judicial status hearings are not required

to achieve positive client outcomes, our findings suggest that this may be an effective practice at sites with the ability to coordinate and fund the additional judicial contacts during the order.

1. SUMMARY EVALUATION REPORT

1.1. Introduction

Assisted outpatient treatment (AOT) is a civil court procedure whereby a judge orders an adult with serious mental illness (SMI) to comply with community-based treatment. Developed as a less restrictive alternative to involuntary hospitalization, AOT targets individuals at risk of clinical deterioration or rehospitalization because they do not voluntarily comply with prescribed treatment. AOT is meant to circumvent the costly revolving-door syndrome, which is marked by numerous arrests or inpatient hospitalizations among adults with SMI, often following disengagement from community care.

AOT has been endorsed by the American Psychiatric Association as a practice that, "if systematically implemented and resourced, can be a useful tool to promote recovery through a program of intensive outpatient services designed to improve treatment adherence, reduce relapse and rehospitalization, and decrease the likelihood of dangerous behavior or severe deterioration among a sub-population of patients with SMI."[1]

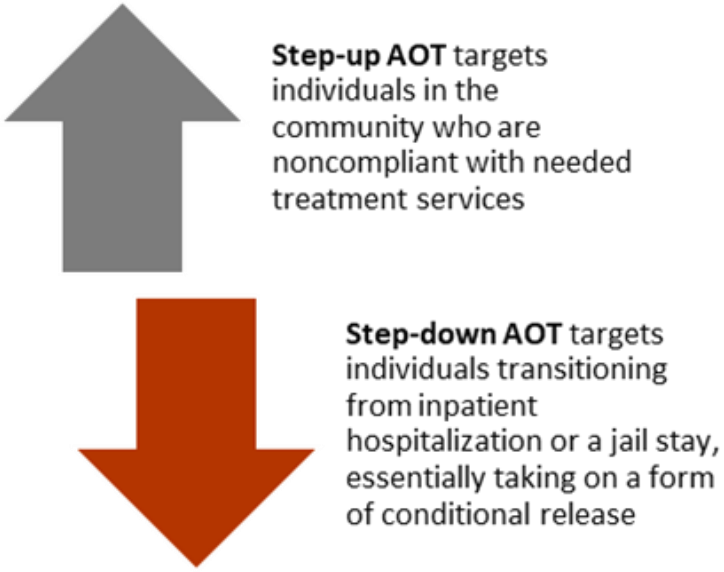
General Criteria

- *18+ years of age*
- *SMI diagnosis*
- *Assessed to be unable to live safely in community without supervision*

At present, AOT is authorized in most U.S. states and territories; exceptions include Connecticut, Maryland, and Massachusetts. However, statutory variation and variability in site-level determinations of AOT both within and across jurisdictions means that no two implementations of AOT look exactly alike. Rather, programs differ in their application of elements of AOT, including, but not limited to, eligibility criteria and associated target populations; approach to treatment and judicial involvement during the order; and renewal or closeout processes. Indeed, even length of time spent on AOT differs in and across program sites. Although all AOT orders are of limited duration, the length of the initial order is subject to state statute and subsequent determinations for renewal and completion are subject to clinical and judicial decision-making.

These differences in implementation underscore a degree of adaptability for AOT, which may be used to meet the needs of the population to be served within each program site. For example, programs may apply preventive or non-preventive step-up and/or step-down models of AOT to determine who is petitioned for AOT (see ***Figure 1-1***). Variability in implementation prompts questions about not only the effectiveness of AOT, but also which elements of AOT may influence health and social outcomes among recipients.

Figure 1-1. Step-Up and Step-Down AOT Models



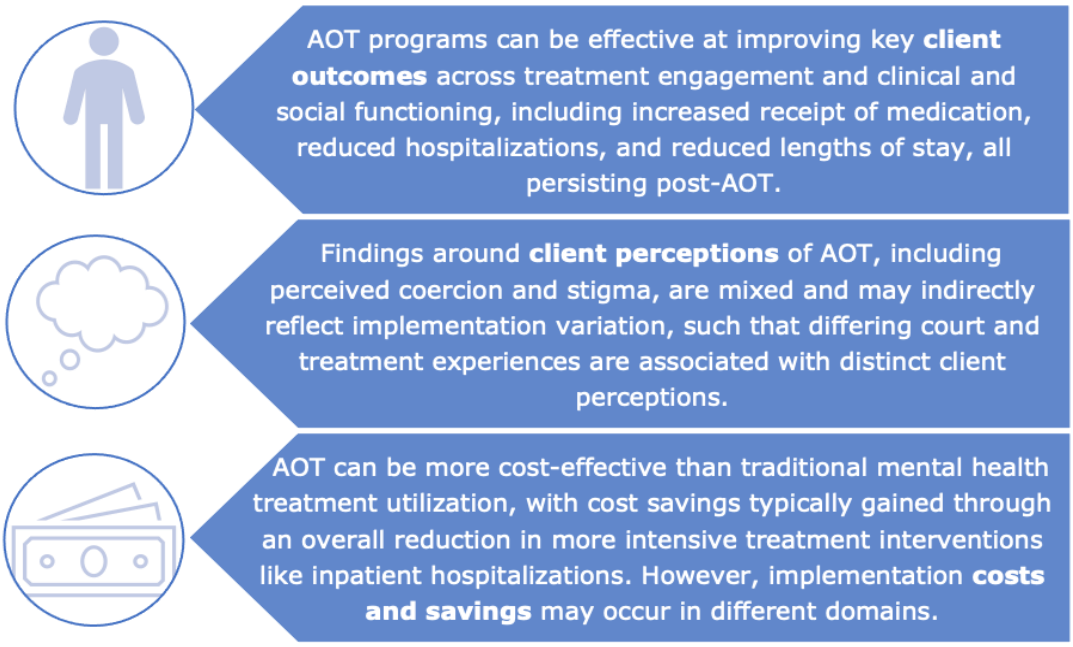
1.2. Assisted Outpatient Treatment Research and Evaluation History

Previous research on the implementation and effectiveness of AOT has been conducted both in the United States and internationally. Domestic studies, including randomized controlled trials (RCTs) in North Carolina[2-7] and New York,[8-11] compose the bulk of research on AOT. Findings from prior studies are illustrated in ***Figure 1-2***.

However, limitations in prior AOT research have left some questions unanswered, and the validity or generalizability of other findings remain unclear. Methodological critiques of observational studies have cited small sample sizes; selection bias vis-à-vis emphasis on clients with the greatest likelihood of success in the community; no or non-equivalent comparison groups; lack of valid, non-self-report data prior to AOT; retrospective designs; and lack of consistent enforcement of court orders. In RCTs on AOT, limitations have included small sample sizes, non-equivalent comparison groups, and AOT implementation challenges (e.g., inconsistent enforcement of court orders).

Notably, some of these limitations reflect the reality of how, and for whom, AOT is implemented. Because AOT is a complex community intervention intended for a select population (e.g., adults with SMI), small samples are expected. Additionally, random assignment of treatment type and duration is not always feasible, nor is the approximation of a true comparison group. In response to these challenges, and in recognition that AOT's effectiveness will likely vary depending on the ways in which it is implemented, researchers have advocated for **multisite observational studies using an array of data to consider those varying contexts and outcomes**. Indeed, single-site studies have been limited in their ability to identify and incorporate potentially important variations in AOT characteristics into statistical models.

Figure 1-2. Summary of Prior AOT Research Findings



1.3. Background for the Present Study

To better understand best practices related to the implementation and effectiveness of AOT, the Office of the Assistant Secretary for Planning and Evaluation, in consultation with the Substance Abuse and Mental Health Services Administration (SAMHSA) and the National Institute of Mental Health, supported this important examination. The purpose of the project carried out by RTI International, in partnership with Duke University and PRA, was to conduct an implementation and outcome evaluation of SAMHSA's Assisted Outpatient Treatment Grant Program for Individuals with Serious Mental Illness, a 4-year pilot program that funded AOT grants set forth in the PAMA. The in-depth implementation and outcome evaluations focus on six of the 18 SAMHSA-funded AOT sites.

1.3.1. Implementation Evaluation

The implementation evaluation, conducted November 2016 through August 2017, gathered information related to the processes and practices of AOT across six sites in the following areas of investigation:

AOT programs and civil court processes
• Are there differences across the pilot programs, their implementation, and the civil court procedures used?
Target populations
• Who did the programs intend to serve and who are they actually serving?
Service infrastructures and clinical approaches
• What existing and newly established clinical services and infrastructure are supporting AOT program participants?
Stakeholder involvement
• Which stakeholders were involved in the development and implementation of the AOT program, and have their roles changed over time? • What stakeholders are involved in the civil court process, and what are their roles?

Person-centered practices and procedural justice
• To what extent do the programs retain due processes and choices for individuals and families?
Innovation
• What are some of the innovative practices and arrangements to implementing AOT that have emerged from the pilot grants?
Evaluation capacities
• What is the data collection capacity of the program sites? • What supports will need to be in place to collect valid and complete data regarding the nature, intensity, and quality of services and health and social outcomes, if the site is also selected for the outcome evaluation?

1.3.2. Outcome Evaluation

The outcome evaluation, conducted September 2017 through March 2021, addressed research questions in the following domains:

AOT program outcomes
• Does AOT affect treatment, clinical functioning, and social functioning outcomes? • Do outcomes differ by AOT duration or scope of services? • Which models of AOT lead to better outcomes? • Which specific intervention components, including the use of evidence-based practice, lead to better outcomes? • Do outcomes differ based on the intensity of services offered or intensity of resources available to providers?
Client and family perceptions
• What do clients report about AOT? • Are families satisfied with AOT? With treatment providers? With judicial/legal personnel?
Resources and costs
• What costs are associated with the implementation of AOT? • Are cost savings associated with outcomes attributable to AOT? • How do sites plan to sustain AOT once grant funding ends?

2. METHODOLOGY

Although SAMHSA funded the implementation of 18 pilot AOT programs across the nation, the implementation and outcome evaluations focus on a subset of case study sites, as shown in ***Table 2-1***. The program sites included in the implementation evaluation were selected by the U.S. Department of Health and Human Services (HHS) AOT program advisory committee per several criteria, including geographic diversity, AOT program type, AOT program size, data availability, and suitability for potential participation in the outcome evaluation. Ultimately, three of the implementation case study sites were included in the outcome evaluation; the other three were replaced, having been deemed to have insufficient capacity for data collection or other programmatic limitations that rendered them unlikely to yield complete and suitable data.

TABLE 2-1. Case Study Sites in Implementation and Outcome Evaluations

Implementation Evaluation	Outcome Evaluation
AltaPointe Health Systems, Inc. (Baldwin County, AL) Doña Ana County (Las Cruces, NM) Oklahoma Department of Mental Health & Substance Abuse Services (Oklahoma City, OK; Tulsa, OK; & Rogers, Washington, Ottawa, & Delaware Counties, OK)	
Cook County Health & Hospital System (Chicago, IL) Hinds County Mental Health Commission (Jackson, MS) Alcohol, Drug Addiction & Mental Health Services Board of Cuyahoga County (Cleveland, OH)	LifeStream Behavioral Center (Leesburg, FL) Pine Belt Mental Healthcare Resources (Hattiesburg, MS) Northern Nevada Adult Mental Health Services (Sparks, NV)

In the following sections, we describe the methodological approach undertaken for each evaluation, as well as ways in which findings from the implementation evaluation were used to inform the subsequent outcome evaluation design and analysis plan.

2.1. Implementation Evaluation

The first stage of the evaluation began with a review of grant applications and consultations with all grantees to facilitate HHS AOT program advisory committee's selection of in-depth sites. Following recruitment of the sites, site visit protocols were created to guide interviews with various stakeholder groups and observations of court processes during visits to each of the six sites. The 2-day site visits consisted of interviews and observations conducted by three-person teams comprising staff from RTI, PRA, and Duke University Medical Center.

Research question findings were synthesized and analyzed across sites using the integrated-Promoting Action of Research Implementation in Health Services (i-PARIHS) model,[12] which attends to core constructs of facilitation, innovation, recipients, and context to capture the dynamic and multifaceted nature of implementation. Within this framework, facilitation is considered the active ingredient by which innovation is assessed and aligned with recipients and in varied contexts. The system's outputs are thus derived from the relationship between the what (e.g., AOT program characteristics such as peer-involved outreach, patient-centered treatment planning), the who (e.g., AOT coordinators who meet monthly, clinicians trained in trauma-informed care), and the where (e.g., AOT site characteristics such as single point of access for petitions, geographic location). These factors were considered in interviews and observations and described in the site visit summaries, which were reviewed by each site, and a final implementation report.

2.2. Outcome Evaluation

An outcome evaluation design and analysis plan was developed following the completion of the implementation evaluation, in consultation with the HHS AOT program advisory committee. An AOT Technical Advisory Group (TAG) reviewed and recommended potential design options that were integrated into the preliminary design and analysis plan. This plan was further revised over time to maximize collection of interpretable data (e.g., identification of secondary sources to augment primary data), given practical concerns around limited availability of credible comparison groups at each locality. The plan design was ultimately modified to include: (1) a single comparison site with appropriate primary and secondary data collection capacity; and (2) enhanced secondary data collection (e.g., Medicaid/non-Medicaid service encounters, arrest and hospitalization records) to supplement primary data in pre-post and comparison analyses within and across the six sites.

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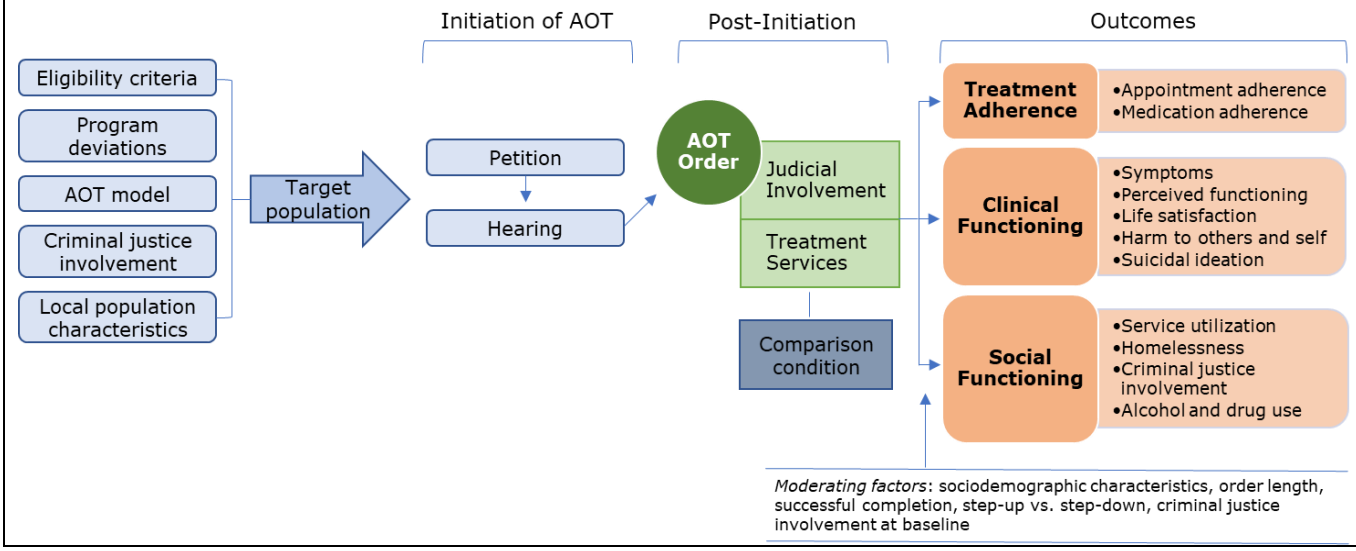
2.2.1. Outcome Evaluation Framework and Design

Figure 2-1 presents the evaluation framework used to inform data collection and analysis. The items presented in the left side of the figure depict some of the site-level factors, identified in the implementation evaluation, that influence the target population that is petitioned and subsequently placed on AOT. The intervention process comprises both: (1) AOT program services, including initiation and post-initiation program implementation (e.g., step-up vs. step-down models, judicial involvement); and (2) treatment services (e.g., medication management, psychosocial interventions) provided to individual consumers. The comparison condition used in select analyses comprised non AOT clients receiving intensive, community-based outpatient services like those provided on AOT but without court mandate. The right side of the figure outlines outcomes of interest, separated into treatment adherence, clinical functioning, and social functioning outcomes.

Figure 2-1. Evaluation Framework



Main analyses, described in detail in ***Section 2.2.3***, involved pre-post and comparison group analyses. The non-AOT comparison condition used in select analyses comprised clients receiving intensive, community-based outpatient services like those provided under AOT but without court mandate at one case study site. Client

outcomes were assessed at baseline, 6-month follow-up, and 12-month follow-up. Additional analyses assessed the relationship between judicial status hearings and treatment adherence and clinical and social functioning, as well as examination of other client-level moderators of AOT effectiveness.

2.2.2. Outcome Data Sources

The outcome evaluation used an array of data sources (***Table 2-2***) to capture the AOT characteristics and outcomes presented in the evaluation framework and address the research questions outlined in ***Section 1.3.2***. First, findings from the implementation evaluation guided the development of a set of prospective survey instruments, described below, to facilitate primary data collection at each of the six case study sites. Sites were also asked to provide secondary data obtained from county-level or state-level agencies. Finally, primary and secondary comparison group data were collected from non-AOT assertive community treatment (ACT) and Bridge Team clients at one case study site; some secondary data were also collected for non AOT ACT clients at two additional sites.

TABLE 2-2. Overview of Outcome Evaluation Data Sources

Data Source	Collection Interval/Timeframe	Total N	Comparison Data?
Primary Data			
AOT characteristics form	Once per month	N/A	
AOT docket monitoring form	Each AOT hearing	765	
Structured client interview	Baseline and every 6 months while on the order, 6 months post-AOT	392	✓ (N=108)
Family satisfaction survey	Once, approximately 6 months after client's entry into AOT	46	
Cost questionnaire	Once	N/A	
Secondary Data			
Medicaid and non-Medicaid service encounters	Spanning up to 2 years before services and 6 months post-services	1,037	✓ (N=513)
Local and state arrest records	Spanning up to 2 years before services and 6 months post-services	744	✓ (N=156)
Public and private hospitalizations	Spanning up to 2 years before services and 6 months post-services	1,053	✓ (N=278)

Note: Total N includes all AOT and non-AOT data gathered for each respective data source.

Prospective Survey Instruments

- **AOT characteristics form**. The AOT characteristics form was completed by program staff to provide information on target populations, initiation, and post-initiation of AOT. Items were intended to track the civil and legal processes of AOT across sites and over time.

- **AOT docket monitoring form**. The AOT docket monitoring form was completed by program staff present at AOT hearings. This form collected information on the date of the court hearing, the presiding judge, and the court location, as well as client-level information on hearing type, respondent attendance, hearing representatives, hearing length, verbal interaction between judge and respondent and between judge and treatment team, hearing outcome, warnings or reminders, response to non-compliance, and next hearing date.

- **Structured client interview**. The structured client interview was administered to AOT clients by program staff (most frequently, non-primary treating clinicians, although some sites used local evaluators) at baseline and during follow-up periods. These interviews gathered information across numerous domains, including housing, perceived functioning and well-being, clinical symptoms, treatment history and service use, medication use, substance use, satisfaction with treatment, perceived coercion to adhere to treatment, general pressures to adhere to treatment, AOT experiences, and criminal justice experiences.

- **Family satisfaction survey**. The family satisfaction survey was administered to a subsample of AOT clients' family members to gather information related to their perceptions of AOT, involvement in and satisfaction with the civil process, satisfaction with treatment services received under the AOT court order, client behaviors, and family well-being.

- **Cost questionnaire**. The cost questionnaire was completed by representatives at each of the six case study sites. The questionnaire gathered data on labor and non-labor resources used to provide treatment services to AOT participants. For three sites, court representatives provided information to approximate labor and non-labor costs associated with AOT hearings.

In most cases, measures were specified from primary data sources; however, these measures were supplemented in analyses by secondary data when feasible. The specific constructs and measures used to address different research questions are presented in Appendix A.

2.2.3. Data Analysis

Data analysis leveraged a range of qualitative and quantitative methodologies to address research questions around AOT program outcomes, client and family perceptions, and resources and costs. The outcome evaluation expanded upon the qualitative work first conducted during the implementation evaluation to capture variability in implementation and, when appropriate, model differences in quantitative analyses.

AOT Program Outcomes. The quantitative approach used to evaluate AOT program outcomes was rooted in a set of complementary pre-post and comparison group regression analyses:

- **Pre-post analyses** measured changes in client outcomes from: (1) baseline to 6-month follow-up; and (2) baseline to 12-month follow-up. Analyses controlled for confounders, including gender, age, race/ethnicity, marital status, parenthood status, education, and indicators for in school and employed; differences in length of AOT enrollment; and moderators to be tested in subsequent models. Results highlighted regression-adjusted changes in key outcomes observed among AOT participants.

- **Comparison group analyses** used difference-in-differences specifications to estimate relative change in client outcomes from baseline to 6-month follow-up. As with pre-post analyses, controls were included for client demographics, including gender, age, race/ethnicity, marital status, parenthood status, education, and indicators for in school and employed. Comparison group analyses further control for confounding through propensity-score weights. Results indicate the extent to which changes observed among AOT clients may be greater (in absolute value) than changes observed among a voluntary treatment population.

In addition to measuring changes in key outcomes, we also evaluated the extent to which judicial status hearings and changes in treatment adherences during and after an AOT order can explain changes in

subsequent clinical and social functioning outcomes. Finally, client-level factors identified to be potentially important in prior research or implementation findings were assessed as moderators.

Client and Family Perceptions. Pre-post analyses were conducted to assess any changes in client perceptions of AOT from: (1) baseline to 6-month follow-up; and (2) baseline to 12-month follow-up. We also conducted a regression analysis to determine the extent to which changes may be influenced by the client's understanding of AOT, therapeutic alliance, or judicial status hearings during the order. Finally, we used results of family satisfaction surveys to assess a range of family perceptions of AOT.

Resources and Costs. Descriptions and analysis of resources and associated costs were developed using interview and cost data from a subset of three case study sites. Potential cost savings were calculated based on changes in utilization and associated reductions in medical care spending. Preliminary sustainability plans were obtained via qualitative interviews with key informants at all six case study sites.

3. FINDINGS

3.1. Implementation Evaluation

Findings from the implementation evaluation identified many sources of heterogeneity across and within the six case study AOT programs, capturing noted differences across the following seven areas of investigation:

AOT Programs and Civil Court Processes
• Case study sites developed and implemented a range of AOT programming in addition to varying pre-post AOT civil court processes. Most sites had a mix of step-up and step-down cases, although composition varied across programs. The variation in civil court procedures was common, as expected, because of statutory variation, including initiation (e.g., requirements for who is allowed to examine the respondent, whether that individual is required to testify, and whether the respondent can waive their right to appear) and post-initiation processes (e.g., use of judicial status hearings, responses to non-compliance via the use of pick-up orders or sanctions).
Target Populations
• Individuals placed under AOT orders generally matched each state's respective AOT statute, although there were instances in which sites used additional criteria that were not statutorily required (e.g., more conservative standard of inpatient hospitalizations in past 12 months) or implemented other clinical or judicial criteria (e.g., prioritization of voluntary agreements) with the potential to narrow the population of those eligible for AOT.
Service Infrastructures and Clinical Approaches
• All participating case study sites reported ACT as the primary evidence-based service delivered under the AOT order. However, ACT fidelity, in addition to the availability of other evidence-based services, varied across sites. Sites also differed regarding whether ACT and AOT were bundled as a single treatment modality, as opposed to the more traditional use of AOT as a court order, separate from treatment.
Stakeholder Involvement
• Across sites, a variety of stakeholders participated in the development and implementation of AOT programs. All sites reported strong involvement from the court and both outpatient and inpatient treatment providers. Stakeholder involvement from law enforcement, National Alliance on Mental Illness or peer advisory groups, and local housing authorities was less consistent across sites. Unlike past implementations of AOT, there appeared to be little opposition, including that from professional advocacy groups, to its implementation across sites.
Person-Centered Practices and Procedural Justice
• Most sites made concerted efforts to address a range of stakeholders' perspectives related to program fairness and effectiveness, while also attempting to minimize the perception that the judicial process underlying AOT was an attempt to criminalize client behavior. Most sites incorporated patient involvement in creating and modifying treatment plans, and some also stressed the importance of allowing clients the opportunity to create and incorporate a psychiatric advance directive. Multiple sites identified the use of trauma-informed care as a central component to prioritizing person-centered care and procedural justice.
Innovations
• Several innovations were integrated into development and ongoing implementation of specific AOT programs, including staffing, monitoring, and technology. The most commonly reported innovation across sites was the creation of AOT-specific positions, such as linkage case managers, liaisons, and systems navigators, although sites differed in whether positions were designed to be part of the treatment team. Additional changes in implementation included use of regular urine drug screens and use of iPads for facilitating communication and treatment.

Evaluation Capacities
• Sites varied in their ability to collect primary data and obtain secondary data necessary for the outcome evaluation. The implementation evaluation's findings about data collection and programmatic limitations prompted the replacement of three case study sites for the subsequent outcome evaluation.

Overall, the implementation evaluation found that the development and ongoing implementation of AOT programs were proceeding in a manner consistent with SAMHSA's grant program expectations. This first stage of the cross-site evaluation provided a rich array of qualitative data to inform the design and execution of the next stage of the project. Namely, the implementation evaluation identified many sources of heterogeneity across and within AOT programs, capturing differences in how AOT was being implemented across sites, both in terms of statutory characteristics and site-level determinations.

3.2. Outcome Evaluation

The outcome evaluation built upon findings from the implementation evaluation, particularly those that identified sources of heterogeneity across AOT programs, to address questions about AOT program outcomes, client and family perceptions, and resources and costs.

AOT Program Outcomes. Results show that AOT is associated with significant improvements in treatment, clinical functioning, and social functioning outcomes from baseline to 6-month and 12-month follow-ups. The strength of findings presented in ***Table 3-1*** is derived from a set of analyses, beginning with pooled, pre-post analyses with Bayesian specifications. These within-group analyses were supplemented with: (1) between-group analysis using a single site, non-AOT comparison condition; and (2) models with secondary data included, for a subset of sufficiently powered outcomes. If the direction and significance of comparison group or secondary data models were consistent with the association indicated by Bayes factors, we increased our assessment of the strength of evidence. In contrast, if supplemental analyses were inconsistent with pre-post analyses, we downgraded strength of the evidence accordingly.

Treatment Adherence. Appointment and medication adherence both increased from baseline to the 6-month and 12-month follow-ups. Appointment adherence increased by 25.9%, from an average of 67% at baseline to an average of 93% at 6-month follow-up. Medication adherence increased by 17.1% from an average 72% at baseline to an average of 89% at 6-month follow-up. The improvement from baseline to 12-month follow-up were similar for both outcomes.

Clinical Functioning. AOT was associated with significant improvements across all clinical functioning measures. Specifically, changes to symptom index scores showed that AOT clients, on average, experienced emotional distress several times each month at baseline and only once per month at 6-month follow-up. Results were similar when comparing the baseline and 12-month follow-up scores. Clients also reported greater perceptions of mental health and life satisfaction at follow-up than at baseline. On average, clients rated their mental health as between fair and good at baseline (on a four-point Likert scale ranging from poor, fair, good, and excellent). At 6-month follow-up there was a significant improvement, with the average client rating their mental health between good and excellent. Life satisfaction scores also increased over time, illustrating that AOT clients, on average, had mixed feelings about their lives as a whole at baseline and were satisfied with their lives in general at 6-month follow-up. Results were similar but stronger when comparing the 12-month follow-up and baseline life satisfaction. Therapeutic alliance also improved during and after completion of the AOT order. The goal, task, and bond scales of the working alliance inventory improved by 8.5%-11.5% over time, indicating that clients perceived that they were working more effectively to identify and achieve functioning goals; viewed treatment activities as beneficial; and felt that their therapeutic bond improved. Results from 12-month follow-up were similar. Clients were less likely to report any violent behavior and have suicidal thoughts at follow-up than at baseline. The percentage of clients who reported any violent

behavior decreased by 19%, from 23.9% at baseline to just 4.9% at 6-month follow-up. The percentage of clients who reported any suicidal thoughts decreased by 24.7%, from 31.4% at baseline to 6.7% at 6-month follow-up. Results for both outcomes were similar at 12-month follow-up.

TABLE 3-1. Association Between AOT and Program Outcomes

Domain	Outcome	Strength of Findings
Treatment Adherence	Increased appointment adherence	
	Increased medication adherence	
Clinical Functioning	Improved symptomology	
	Improved perceived mental health	
	Improved life satisfaction	
	Increased therapeutic alliance	
	Reduced violence	
	Reduced suicidal ideation	
Social Functioning	Decreased psychiatric ED visits	
	Decreased psychiatric inpatient episodes	
	Decreased psychiatric inpatient (number of nights)	
	Decreased arrests	
	Reduced illicit drug use	
	Reduced homelessness	

NOTES: The following outcomes used a logistic regression to model the probability of the outcome: any psychiatric emergency department visits, any psychiatric inpatient episodes, any arrests, any illicit drug use, and homelessness. The remaining model used an ordinary least squares regression functional form. All models controlled for the following confounders: gender, age, race/ethnicity, marital status, parenthood status, education, indicators for in school or employed, criminal justice involvement at baseline, length of the AOT order, an indicator for whether the client was stepped-down from an institutional setting, and an indicator for whether the client appeared before the judge/magistrate for a status hearing during their AOT order. Marginal effects were calculated so that all estimates are interpreted as the percentage point change in the outcome observed at 6-month or 12-month follow-up.

Bayes factors were calculated using Bayesian analogs to the frequentist regression models using wide normal distributions for priors (i.e., with standard deviations of 100).

Strength of evidence was assessed using Bayes factors for each outcome in accordance with Kass and Raftery (1995), and further adjusted based on comparison group analyses, and (if available) any secondary data analyses.

 = strong evidence

 = decisive evidence

Social Functioning. AOT was associated with significant improvements across social functioning outcomes. Psychiatric inpatient utilization decreased significantly, with the percentage of clients with at least one psychiatric inpatient episode during the past 6 months dropping from 61.4% at baseline to 20.4% at 6-month follow-up. These reductions were greater among AOT clients compared to non-AOT participants. The number of nights spent in a psychiatric inpatient setting decreased from an average of 11.8 nights at baseline to 2.1 nights at 6-month follow-up. While not corroborated by secondary data, criminal justice involvement also

decreased, as the percentage of clients who reported at least one arrest in the past 6 months decreased from 26.0% at baseline to 6.8% at follow-up. The percentage of clients who reported any illicit drug use in the past 6 months decreased from 28.6% at baseline to 14.4% at 6-month follow-up. The percentage of clients who reported any homelessness during the past 6 months decreased from 17.3% at baseline to 5.1% at 6-month follow-up. Results for all social functioning outcomes were similar at 12-month follow-up, save for homelessness, which was not statistically significant.

	**Perceived coercion** was measured with a 5-point standardized scale from "strongly agree" to "strongly disagree," with statements such as "It was my idea to get treatment." Strong disagreement with this and other items indicated higher levels of perceived coercion. Client responses remained neutral (e.g., neither agree nor disagree), on average, from baseline to follow-up.
	Procedural justice under AOT was measured using 6 items rated on a 3-point scale ("not at all" to "definitely"), such as "When you received your court order, did they treat you respectfully?" Higher scores indicated greater perceptions of procedural justice. AOT clients reported high levels of procedural justice at both baseline and follow-up assessments.
	Perceived effectiveness of AOT was assessed using 3 yes/no items, such as "When people are under AOT, do you think they are more likely to keep their mental health or substance abuse appointments?" Mean scores were calculated, with higher scores reflecting greater perceived benefits. Client scores remained very high from baseline to follow-up.
	**General pressures to adhere to treatment** were assessed with 8 yes/no items, including "Did you feel that, if you did not keep your treatment appointments or take your prescribed medication, someone would make you go to the hospital?" Total scores ranged from 0 to 8, with higher scores indicating greater pressure exerted. AOT clients reported minimal levels of these pressures in the 6 months preceding AOT, and although perceived pressures increased over the first 6 months of AOT, they remained low, with an average of 2 items indicated per respondent.
	Perceived benefits and fairness of these pressures were measured with a 9-item scale, with item responses ranging from strongly agree to strongly disagree. A sample item included "Overall, the pressures or things people have done were for my own good." Lower scores reflect greater perceived benefits. These perceptions improved over time, with AOT clients reporting greater benefits at follow-up than at baseline.
	Treatment satisfaction was measured with 9 items rated on a 5-point scale, including "I was able to get all of the services I thought I needed." Mean scores were calculated, with higher scores reflecting greater satisfaction. Treatment satisfaction increased from an average of 3.59 at baseline to 3.93 at follow-up.
	**Perceived stigma** was measured with a single yes/no question: "When people are under AOT, do you think that most other people think less of them?" One in 3 clients endorsed this item at baseline, which decreased to roughly 1 in 5 at 6-month and 12-month follow-ups.

Role of Treatment Adherence and Judicial Status Hearings on Clinical and Social Functioning Outcomes. Analyses were conducted to assess the extent to which clinical and social functioning changes associated with AOT can be attributed to: (1) changes in treatment adherence; and (2) judicial status hearings over the course of the order. Results indicated that between 37% and 44% of the changes observed in clinical functioning outcomes can be attributed to changes in treatment adherence, having at least one status hearing, or both. A greater proportion of changes were attributed to judicial status hearings (21%-32%) than to treatment adherence (6%-14%). Among social functioning outcomes, 72% of the changes observed in mental health emergency department visits were attributable to both factors. Less than half of the changes observed among the remaining social functioning outcomes were attributed to changes in either factor. Results showed no clear indication of one factor playing a stronger role than the other for any one outcome.

Moderators of Changes in Clinical and Social Functioning Outcomes. The following factors were examined as potential moderators for clinical and social functioning outcomes: (1) having step-down status for each client; (2) having criminal justice involvement at baseline; (3) spending at least 6 months on an AOT order; and (4) successfully completing an AOT order. Results showed that the length of the AOT order moderated changes in violence, suicidal ideation, number of psychiatric inpatient nights, and homelessness, such that clients who spent at least 6 months under the AOT order had better outcomes than those with a shorter order. Step-down status was not associated with a statistically significant difference in changes in any outcome. Criminal justice involvement at baseline moderated more robust reductions in violent behavior and illicit drug use. Successful order completion moderated improved changes in symptomology, illicit drug use, and homelessness.

Client and Family Perceptions. Results of pre-post analyses from baseline to follow-up periods indicate that some client perceptions of AOT remained stable, whereas others changed over time.

Results of regression analyses showed that client agreement with items pertaining to therapeutic alliance tasks was associated with an increase in perceived benefits of pressures to adhere to treatment. Otherwise, therapeutic alliance did not moderate any other changes in client perceptions over time. There were additionally no significant impacts of AOT understanding or status hearings on changes to perceived stigma, pressure, benefits, or treatment satisfaction over time.

Family perceptions of AOT were assessed at a single time, roughly 6 months into the order. Most of the 46 family members who were surveyed reported perceptions that AOT helps clients stay well, with nearly all (91.5%) indicating agreement that people under AOT are more likely to retain their appointments at the mental health center. Most family members (93.6%) reported that clients were more likely to adhere to their medication while under AOT, and most (89.4%) believed that clients under AOT were more likely to stay out of the hospital.

Information was also gathered regarding family members' involvement in and satisfaction with the AOT civil process. Nearly one-third of family members surveyed (29.8%) had filed the petition for AOT, and roughly half (53.2%) attended the initial court hearing. In general, most (93.6%) reported satisfaction with the petition process regardless of their specific role or degree of involvement. Legal stakeholders at case study sites sought opinions of family members in nearly all instances, although less than half (44.7%) felt that those involved in the petition process valued their opinion, and even fewer (23.4%) stated that their opinion about the treatment plan, specifically, was valued leading up to the AOT docket.

Resources and Costs. Cost analyses showed substantial variation in total costs incurred within each AOT site over a 6-month early implementation period ($3,324-$14,182). These costs were driven by labor costs for personnel who participated in planning meetings, intended to map out responsibilities across courts and treatment teams. Total mid-adoption costs were calculated on a per client, per year basis, and were much more similar across sites, ranging from $12,300 to $13,261. Estimates showed that AOT was associated with almost $1,000 in net savings (i.e., savings after netting out mid-adoption costs), which is roughly an 8% return on investment. These savings reflect significant decreases in psychiatric inpatient and emergency room care.

4. CONCLUSIONS

Questions regarding the effectiveness and suitability of AOT have persisted since its inception, fueled by concerns related to restriction of personal freedoms, costs, and feasibility. Indeed, AOT was developed as a way to address the cyclical--and costly--pattern of arrests and involuntary hospitalizations among a subset of adults with SMI, and as a result, is situated in the middle of long-standing attempts to balance the need for treatment with the least-restrictive option.

Prior research on AOT, including observational studies and RCTs, has generally indicated improved outcomes for treatment engagement and clinical and social functioning, all persisting post-AOT. However, the methodological limitations inherent to these studies, and the recognition that effectiveness of AOT likely varies depending on how and for whom it is implemented, have led researchers to consider the search for any one definitive and generalizable RCT of AOT "a quixotic quest."[13] In light of these challenges, the present study provides a multisite evaluation of an array of data to better understand how AOT is implemented in practice and to explore the impact of select client characteristics and elements of AOT on associated outcomes. Additionally, this study builds upon prior research to further our understanding of client and family perceptions and costs of AOT.

4.1. Study Strengths and Weaknesses

Both the implementation and outcome evaluation have key strengths based on the longitudinal, multisite design and the types and array of data gathered from various respondents and sources. The qualitative methodology used in the implementation evaluation, facilitated by the well-specified i-PARIHS implementation model, was subsequently used to guide the design and analysis plan for the outcome evaluation, including the development of prospective survey instruments. This iterative approach was carried out throughout both stages of the evaluation, supported by ongoing involvement of key program staff across case study sites and continuous data monitoring procedures.

However, the study remains subject to methodological limitations in and across both evaluations. First, the examination of the full depth and breadth of the AOT process during the implementation evaluation was necessarily restricted by the timing and reach of the study. Specifically, because site visits were conducted during early implementation, we were unable to observe the entire AOT process (i.e., from petition to renewal or discontinuation of an AOT court order) or garner key informant perspectives on all aspects of the program. Because of between-site jurisdictional variation or, in some cases, court officials' preferences, we were not able to directly observe legal proceedings across all sites. We attempted to mitigate these issues by developing the AOT characteristics and docket monitoring forms in the outcome evaluation.

Second, the six sites included in the implementation and outcome evaluations are not meant to generalize to all SAMHSA-funded AOT sites or other sites implementing AOT, particularly given the rich heterogeneity observed in implementation. Moreover, the replacement of three sites at the conclusion of the implementation evaluation posed an obstacle in the transition to data collection activities. This decision was made because of the data collection needs of the outcome evaluation and was supported by an intensive on-boarding process of the three additional sites.

Third, because data collection capacity and engagement differed across sites, site reporting on primary data instruments varied and, in some cases, provided an incomplete picture of client-level outcomes. Our analytic approach incorporated secondary data whenever possible to fill the gaps left by primary data, including client outcomes (e.g., hospitalizations, arrests) experienced by those who did not complete follow-up interviews following attrition from the AOT order. Additionally, pre-post analyses pooled data across sites to assess the effectiveness of AOT and evaluate the impact of both site-level and client-level factors on outcomes.

Fourth, we were only able to derive data from a single non-AOT comparison group. Therefore, comparison group pre-post and regression analyses had less than adequate power to detect small differences in outcomes across the AOT and non-AOT sites. Similarly, although pooled pre-post and regression analyses were sufficiently powered for most constructs, sample sizes precluded examination of additional mediators and moderators of potential relevance, such as the client's willingness to engage in the court order. These smaller samples were, in part, due to fewer total AOT clients than originally expected across sites, and instances of missing or incomplete primary data due to program site evaluation capacity and, at one program site in particular, the effects of COVID-19 on data gathering efforts for both primary and secondary data. As a result, we used Bayes factors for both pre-post and comparison group analyses to provide additional understanding of the relative strength of the evidence.

Fifth, and finally, although site-level and client-level indicators were used to account for select differences in: (1) how AOT was implemented; and (2) characteristics of the population being served on key outcomes, other important questions undoubtedly remain around the "how" and "for whom" AOT works.

4.2. Implications

This section summarizes key takeaways from the implementation and outcome evaluation, contextualized by prior research and current policy and practice.

AOT implementation differs in and across program sites. Prior studies, including a national survey of active AOT programs in 20 U.S. states,[14] have documented varying (i.e., inconsistent) implementation within and across states, posing a challenge to developing a strong evidence base for or against AOT. To our knowledge, our cross-site study provides the most in-depth documentation of AOT implementation to date, including assessment of target population, initiation, and post-initiation procedures in and across multiple sites over time. As expected, results show that AOT program implementation differs from site to site as a function of both statutory variation and site-level determinations of civil court procedures.

AOT is associated with improvements in treatment adherence, clinical functioning, and social functioning. Previous observational studies[8-11,15-20] and RCTs[2-7,21-24] have generally shown that AOT can improve client engagement and functioning, although the strength of evidence for each outcome differs across studies. Our findings point to significant improvements across a range of client outcomes, including appointment and medication adherence, symptomology, perceived mental health, life satisfaction, and therapeutic alliance during and after AOT. AOT clients also demonstrate reductions in violent behaviors, suicidal thinking, arrests, drug use, homelessness, and number of inpatient hospitalizations and days in the hospital.

Length of AOT order--and successful completion of the order--moderate client outcomes. The Duke Mental Health Study found that individuals who remained on AOT for at least 6 months had improved outcomes over those who were on AOT for shorter periods of time.[3] Our findings underscore the importance of length of order, as spending at least 6 months on an AOT order is associated with a further reduced likelihood of violent behavior, suicidal thoughts, number of psychiatric inpatient nights, and homelessness. Moreover, those who successfully complete AOT orders show greater improvements in symptomology, homelessness, and illicit drug use. These findings are important to consider with respect to state AOT statutes, as typical length of time under the initial order differs across locations, from 45 days to 5 years. Programs in states with shorter order length (<6 months) may elect to renew clients at the end of the initial order, irrespective of functioning, to achieve these better outcomes.

AOT shows similar levels of effectiveness for step-up and step-down populations. AOT programs vary in their approaches to establish pathways to enrollment, including preventive and non-preventive step-up (i.e., from the community to an AOT order), step-down (i.e., from an inpatient setting to an AOT order), and mixed

approaches (i.e., a combination of both step-up and step-down approaches). All case study sites' state statutes include eligibility criteria that are preventive in nature, thus allowing for an AOT order in situations where decompensation has not yet occurred but is likely. Our study finds no noted differences in outcomes between those who are referred from the community and those who are referred from inpatient hospitalization or jail stay, suggesting that preventive criteria in state statutes can be as effective as non-preventive criteria in identifying individuals suitable for AOT.

Criminal justice-involved individuals are within the scope of AOT's effectiveness. Adults with SMI are substantially overrepresented in the criminal justice system, resulting in many justice-involved individuals who encounter disruptions in evidence-based treatment as a result of jail stays and insufficient coordination between jails and community care providers upon release.[25,26] Although AOT is intended to intervene in cases of "revolving-door syndrome, wherein adults with SMI have numerous arrests or inpatient hospitalizations, in practice, AOT programs differ in their inclusion or exclusion of criminal justice-involved recipients. Our findings show that those with criminal justice involvement at the time of AOT initiation exhibit similar treatment adherence and clinical functioning improvements as those without, and additionally evince greater reductions in violent behavior and arrests.

Treatment mandated under AOT results in greater reductions in psychiatric inpatient hospitalizations than ACT or similar intensive case management. Psychiatric inpatient hospitalizations decreased in pre-post analyses for both AOT and non-AOT clients, but greater reductions were observed among AOT clients. This is a key consideration in determining individuals who would benefit from AOT over voluntary community-based treatment. Our findings suggest that AOT is appropriate in instances of repeated psychiatric hospitalizations. ACT or other intensive case management without a court order may still be suitable in cases where the client has demonstrated difficulties with adhering to treatment but does not reach the point of requiring hospitalization. In addition, improvements in perceived mental health status were greater among AOT clients than non-AOT clients. Though other between-group outcomes were not sufficiently powered, the pre-post change in means for AOT clients was significant for these outcomes. Moreover, we observed similar changes in pre-post means across AOT and non-AOT clients for treatment engagement, client symptomology, life satisfaction, violent behavior, suicidal ideation, arrests, drug use, and homelessness, suggesting comparable effectiveness across AOT and non-AOT programs.

Judicial status hearings and treatment adherence may augment clinical and social functioning outcomes. A recurring debate about AOT research and practice centers on the mechanism by which AOT works--namely, whether it is the court order or the services provided under the order. Our analyses are not poised to suitably answer this ongoing question, but rather to assess the extent to which the changes observed in clinical and social functioning outcomes may be attributed to two specific, client-level factors: (1) having at least one judicial status hearing over the course of the order; and (2) experiencing changes in medication and appointment adherence. Findings suggest that a sizable proportion of changes observed in clinical and social functioning outcomes can be attributed to these factors, with judicial status hearings playing a greater role in changes to clinical functioning. Notably, the changes attributable to both factors were frequently greater than the sum of their individual impacts, suggesting some degree of interaction. All told, findings suggest that, although judicial status hearings are not required to achieve positive client outcomes, they may be an effective practice at sites with the ability to coordinate and fund the additional judicial contacts during the order.

Client and family perceptions of AOT do not pose pressing concerns about civil liberties. Prior research assessing client perceptions associated with AOT has been mixed, with equivocal findings as to whether individuals on AOT report greater perceptions of coercion or stigma compared to individuals receiving voluntary case management services. To our knowledge, no research has examined how client perceptions of AOT change over time. Our findings show that clients record neutral responses to measures of perceived coercion at baseline and follow-up. Most individuals do not perceive that there is a stigma around AOT, and

the proportion of those who do lessens during the order. Clients typically endorse statements that AOT is effective at improving treatment and medication adherence and reducing likelihood of inpatient hospitalization, and although perceived pressures to adhere to treatment grow over the course of the order, the perceived benefits and fairness of pressures also increase over time, as does treatment satisfaction. Family perceptions of AOT--including satisfaction with the civil process and treatment services provided under the order--are largely positive and are unaffected by specific role (e.g., individual filing the petition) or level of involvement in the petition process (e.g., attending initial court hearing). Like AOT clients, most family members believe that AOT is effective at improving treatment and medication adherence and keeping clients out of the hospital.

AOT cost savings reflect a shift in service utilization, largely driven by reductions in costly psychiatric emergency department and inpatient visits. Prior research has suggested that AOT may be cost-effective,[2,27,28] although the costs--and savings--of establishing a new AOT program have not been well documented to date. Our findings indicate that AOT is associated with an approximately $129 reduction in psychiatric emergency department costs and a $14,000 reduction in psychiatric inpatient costs, per client. Because of treatment and court costs in implementation, this reduction in costs implies a net cost savings of nearly $1,000 per client and 8% return of investment. These estimates are conservative, as they do not incorporate cost savings of public safety outcomes like criminal justice involvement. However, it is important for prospective sites to consider that the initial investment to establish a new AOT program varies widely, often as a function of the amount of staff time used in planning and early adoption periods spanning the first 6 months. The level of investment is largely reflective of efforts needed to coordinate courts and treatment providers and is lessened in cases when the court is not involved over the course of the order.

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ACRONYMS

ACT	Assertive Community Treatment
AOT	Assisted Outpatient Treatment
COVID-19	Novel Coronavirus
ED	Emergency Department
HHS	U.S. Department of Health and Human Services
i-PARIHS	integrated-Promoting Action of Research Implementation in Health Services
PAMA	Protecting Access to Medicare Act
PRA	Policy Research Associates
RCT	Randomized Controlled Trial
SAMHSA	HHS Substance Abuse and Mental Health Services Administration
SMI	Serious Mental Illness
TAG	Technical Advisory Group

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