

An economic evaluation of a police mental-health co-response program: Data from a pragmatic randomized controlled trial

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Abstract

Background. Alternative responses to behavioral health emergencies are increasingly common interventions to address the overrepresentation of people with mental illness in the criminal legal and health systems. We compared costs associated with receiving a crisis response from police-as-usual versus a police-mental health co-response team that occurred as part of a randomized controlled trial.

Methods. Eligible 911 calls-for-service were randomized to receive a police-as-usual or a co-response. Next, we record-linked randomized events to emergency medical services, jail, outpatient services, and emergency department data to assess outcomes. We calculated per-person costs of service utilization following the randomized event from a public-sector perspective.

Results. Our analysis revealed no cost-savings from the co-response. Persons who received a co-response team response had greater 12-month post-randomized incident costs associated with outpatient behavioral health encounters and emergency department visits.

Conclusions. Rigorous evaluations and cost analyses are important for determining whether alternative police response interventions achieve community goals.

Highlights: alternative police response; co-response teams; behavioral health; randomized controlled study; public-sector cost perspective

Introduction

Across the United States, persons with a mental illness are disproportionately represented in criminal-legal systems (Scheid & Wright, 2017; Bales et al., 2017; Hall et al., 2019; Skeem & Loudon, 2006; Wilper et al., 2009; Zgoba et al., 2020). In most jurisdictions, police are the *de facto* responders to emergency calls for service and, as such, routinely interact with persons in crisis and determine whether arrest or other deflection efforts are warranted (Lamb et al., 2002). However, police alone have limited training and options for handling behavioral health crises, often opting to apprehend in order to maintain perceived community order and safety (Hails & Borum, 2003). Alternative policing responses to behavioral health calls for service have become an increasingly popular approach to addressing the disproportionate number of people with mental illness in criminal-legal systems (Bales et al., 2017; Hall et al., 2019; Skeem & Loudon, 2006; Wilper et al., 2009; Zgoba et al., 2020). These programs also often aim to address harms that might result from contact with police (DeVylder et al., 2019; Deza et al., 2023; Geller et al., 2014; Sewell & Jefferson, 2016).

A co-response model is an alternative response program that pairs police officers with civilian healthcare professionals (e.g., nurse, paramedic, clinician), who jointly respond to emergency calls for service involving persons experiencing a behavioral health crisis (Baess, 2005; Hay, 2014; Kirst et al., 2015; Kisely et al., 2010; Ratansi, 2004; Rosenbaum, 2010; Saunders & Marchik, 2007; Scott, 2000; Shapiro et al., 2015; Steadman et al., 2000; The Allen Consulting Group, 2012). Co-response teams typically aim to utilize the clinician's mental health expertise to de-escalate behavioral health crises and reduce the likelihood of arrest as well as connect individuals with community services (Puntis et al., 2018). However, as detailed in a systematic review of co-response models (Puntis et al., 2018), these programs vary widely in

several key ways, including in timing of response (primary versus follow-up); target emergency-type, such as behavioral health crises broadly (Bailey et al., 2022), overdose (Formica et al., 2022), or suicide (Blais & Brisebois, 2021); personnel proximity (i.e., ride-along models whereby police and clinicians attend an incident in a single vehicle versus back-up or remote telephone assistance from a clinician); source of emergency response request (i.e., 911 dispatchers, officers in the field, or an alternative emergency phone line), and response policy (i.e., respond as dispatched, respond as requested, or self-select into some requests but not others).

Despite ongoing calls for the adoption of evidence-based policing approaches (Mitchell, 2019; Sherman, 1998), the proliferation of alternative response initiatives has largely occurred without any evidence-base informing effective policing practices (Marcus & Stergiopoulos, 2022), and co-response teams are no exception (Shapiro et al., 2015). Past studies have been largely descriptive and retrospective and often suggested positive perceptions and cost savings of co-responder programs (Blais et al., 2022; Blais & Brisebois, 2021; Lamanna et al., 2018; Saunders & Marchik, 2007; Scott, 2000; Shapiro et al., 2015). However, a recent review by Marcus and Stergiopoulos (2022) determined that these observational studies have been largely lacking control groups and were of low-moderate quality. Furthermore, when past studies examined costs, they typically only considered limited sets of cost outcomes such as psychiatric hospitalization (Scott, 2000), jail costs (Cobb, 1997 as cited in Rosenbaum [2010]), and emergency department visits (The Allen Consulting Group, 2012). Overall, past studies of co-response teams have not employed research designs with random assignment to determine program effectiveness nor estimated costs associated with predetermined outcomes.

A recent study of the Mobile Crisis Assistance Team (MCAT) is the first randomized controlled trial (RCT) of co-response mental health team at the point of dispatch (Lowder et al., 2024; Bailey et al., 2023). Compared to the police-as-usual response alone, MCAT was found to have no significant impact on emergency medical services (EMS) events, jail bookings, outpatient behavioral health treatment encounters, or emergency department (ED) visits. The purpose of the current study is to examine the substantive economic value of MCAT. Regardless of whether effect (or cost) differences are statistically significant, a rigorous analysis of the uncertainty surrounding the net monetary benefits is needed for decision-makers to understand the intervention's relative costs and benefits. The net monetary benefit analysis was examined from the perspective of the public sector (i.e., local, state, and federal government).

Data and Methodology

Study overview

The co-response team examined in this study operated in Indianapolis, Indiana, United States (US), the state capital and 15th largest city in the nation, which shares the same boundaries as Marion County, the largest county in the state with a population of nearly one million (US Census Bureau, 2022). At the time of the study, the co-response program was called the Mobile Crisis Assistance Team (MCAT), and its primary objective was to divert persons experiencing a behavioral or mental health crisis from arrest and emergency hospitalization through de-escalation, attending to individual's immediate needs, and linkage to treatment and community services. Each MCAT unit consisted of a crisis intervention trained police officer from the Indianapolis Metropolitan Police Department (IMPD) and a mental health clinician from the local community mental health provider. MCAT members wore plain-clothes uniforms and operated out of an emergent police patrol vehicle Monday through Friday between 10 a.m. and 5

p.m. The MCAT self-dispatched to 911 calls reported through police dispatch radio and sometimes assisted with calls for service at the request of other police units.

MCAT units operated in each of the city's six police districts; however, a single district was selected for the RCT study due to its relatively high rates of behavioral health calls. To randomize calls for MCAT service, researchers were provided a police dispatch radio on a channel tuned to the studied police district. The researchers listened to the dispatch radio during co-response team operating hours and, after establishing a 911 call was eligible based on pre-determined criteria, randomized the co-response team to respond (experimental group [MCAT]) or not respond (treatment as usual [TAU]) to eligible behavioral health calls for service. To determine what constituted a behavioral health call for service eligible for randomization, the research team worked with co-response team leadership to develop policies and procedures that outlined key terms, phrases, and situations indicating a behavioral health-related emergency as described elsewhere (Lowder et al., 2024). With eligible calls as the unit of randomization, persons in crisis were included in the study if and only if responding units made contact with a person in crisis. All crisis incident information was recorded in REDCap by the co-response teams as described previously (Lowder et al., 2024), and included crisis type, date of crisis incident, and person-in-crisis information that allowed for record linkage with outcome data.

Over a 15-month period (January 2020 – March 2021) 686 eligible emergency calls for service were randomized. Of these calls, 531 (77.4%) made contact with a person in crisis who was therefore eligible to receive a MCAT or TAU response. As described elsewhere, some of the eligible calls in which emergency responders made contact with an eligible person in crisis were removed from analysis due to repeat encounters (n=52), missing identifiable data for record linkage (n=29), and death (n=15) which precluded outcome assessment (Lowder et al., 2024).

Our final analysis included 435 calls and responses to persons in crisis representing 211 MCAT responses and 224 TAU responses.

The research team developed randomization and data sharing protocols to obtain outcome information from administrative sources. These protocols were reviewed and approved by the Indiana University (IU) institutional review board (IRB; Protocol #1808931230). The funder (Arnold Ventures) required pre-registration of the main RCT study with the Open Science Foundation (OSF) (Ray et al., 2019), of which the present cost-benefit analysis was not part. Arnold Ventures otherwise had no role in study design, data collection, data analysis, data interpretation, or writing of reports.

Outcome measures and associated cost estimates

Unlike previous studies, which have primarily focused on singular outcomes, this study includes a broader set of cost categories that could be impacted by the intervention. Outcome measures included EMS events, jail bookings, outpatient behavioral health treatment encounters, and ED visits. These measures were obtained from administrative data systems including Indianapolis EMS, the Marion County Sheriff's Office, and the Regenstrief Institute Center for Biomedical Informatics. Study data was record-linked with these administrative data systems using individual-level unique identifiers that began with names and dates of birth. We included six-month pre-response measures of the respective outcome as controls variables (i.e., costs of EMS events, jail bookings, outpatient behavioral health treatment encounters, and ED visits in the six months preceding the randomized event) for each person-in-crisis who received an MCAT or TAU response. We also collected post-incident data at six and 12 months following the eligible crisis incident.

To value the associated costs, the resource costing method was applied. This method involves multiplying the number of units of each resource utilized, by the respective unit cost. Unit costs were derived from administrative data in the local health system and from published literature (Centers for Medicare & Medicaid Services, n.d.; McCollister et al., 2017), and are presented in Table 1. All costs were adjusted to 2022 US dollars.

< Table 1 here >

Co-response team measures

We included key descriptive variables of emergency calls for service as controls in our analyses. Emergency response types included self-harm, mental/behavioral health, substance use, and other. Response day of the week was extracted from crisis incident date information recorded in REDCap.

Economic evaluation methods

The economic evaluation was conducted from a public-sector perspective following well-established guidelines for societal perspectives (Glick et al., 2014). This perspective includes all expenditures incurred on behalf of participants and borne by the public sector. The predicted mean costs of each outcome category were estimated using the recycled predictions method with multivariable generalized linear model (GLM) regressions and clustered standard errors at the participant level (Glick et al., 2014). Multivariate analysis is a common approach in RCTs to condition estimates on sample strata not known prior to randomization and other covariates that may differ by study group in spite of randomization (Ciolino et al., 2019; P. H. Lee, 2016; Van Lancker et al., 2024), particularly controlling for the baseline outcome of the dependent variable being analyzed (Austin et al., 2010). In this study, we controlled for factors such as past healthcare costs, the type of 911 crisis needs, and response day of the week. Past healthcare cost

and the 911 crisis needs are proxies for underlying health status and thus are an important adjustment to calculate the average costs of healthcare utilization across individuals.

Furthermore, cost data is known for its highly skewed (Malehi et al., 2015; Thompson & Barber, 2000), thus, a simple average calculation would not be able to reflect the true average cost.

The distribution family and link function were chosen according to the fit of the data. To estimate the standard error around the predicted means, we performed a nonparametric bootstrap procedure with 1,000 repetitions. In each regression, we controlled for non-mutually exclusive emergency response types, response day of the week, and the six-month pre-randomized response measure of the respective outcome. Analyses were conducted for (i) a six-month period following baseline and (ii) a cumulative 12-month follow-up. The predicted means costs for each resource category for the 12-month follow-up period were calculated by summing each of the 6-month predictions.

Results

The total estimated direct intervention cost of receiving an MCAT response was \$2,687. This intervention cost included personnel costs (mental health clinicians and police officers) and the purchase and operation of specialized MCAT vehicles.

Table 2 presents descriptive statistics of outcome measures in the six months prior to the eligible crisis incidents. Overall, there were no differences in total costs nor any of the individual cost categories during the six-month period preceding eligible crisis incidents. The per-person costs of all services in the six months prior to randomization were \$9,878 for those who received an MCAT response and \$9,603 for those who received a TAU response. Specifically, the per-person costs of jail bookings, EMS, ED, and outpatient behavioral health treatment in the six

months prior to randomization were \$21, \$626, \$8,062, and \$1,169 for those who received an MCAT cost versus \$23, \$497, \$7,951, and \$1,132 for those who received a TAU response.

<Table 2 here>

Table 3 presents the results from economic evaluation conducted from public sector perspective including the predicted mean costs for each of the study outcomes, controlling for emergency type, response day of the week, and six-month pre-randomized response outcome measures. We found no cost differences per person for the EMS and jail bookings outcomes for MCAT relative to TAU for either the 6- or 12-month follow-up periods ($p \geq .757$). The incremental ED costs associated with MCAT were \$4,450 at 6 months ($p=.002$) and \$5,377 at 12 months ($p=.005$) per person.

<Table 3 here>

Although we detected no outpatient behavioral health treatment encounter cost differences for MCAT relative to TAU at six months ($p=.509$), by the 12-month follow-up period the incremental costs associated with MCAT were significantly greater, with a difference of \$8,813 ($p < .001$) per person. The total per-person costs were higher but not statistically significant for MCAT relative to TAU for the six-month follow-up period. For the 12-month follow-up period, MCAT costs were \$14,604 (29%) higher per person and statistically significant ($p=0.001$)¹. Since we did not find the MCAT intervention reduced total costs or any of the cost categories relative to the TAU, we did not calculate a cost-benefit ratio point estimate.

¹ For a comparison of these results to the unadjusted means at 6- and 12- months, please refer to Table S-1 in the Supplemental Materials, which shows that in, almost all cases, unadjusted means produced smaller cost estimates compared to estimates produced from the main results of the multivariate analysis. This pattern of results is consistent with the cost data being highly skewed, confirming that a simple comparison of average costs might underreport the true cost difference, providing support to our choice of statistical model.

Discussion

This study represents a major advance in our understanding of co-response police–mental health teams by presenting the economic values of the first RCT of this emerging alternative response to behavioral health calls for service. Results from the economic evaluation analysis suggested that the co-response team intervention did not reduce service costs relative to the police-as-usual response at six- and 12-months post-intervention. In fact, relative to TAU, ED service costs for the MCAT group were greater by the six-month mark. At 12 months, costs associated with services for the MCAT group were greater than those for the TAU group in terms of both ED visits and outpatient behavioral health encounters. The costs of EMS events and jail bookings were similar for MCAT and TAU groups at the 6- and 12-month follow-ups. Overall, the results of this study reflect previous findings of Cowell et al.'s (2004) economic evaluation of jail diversion programs serving individuals with mental illness. The authors found increases in the involvement with the community treatment system that raised overall treatment costs. As our analysis considered a broader set of cost outcomes than past research, this approach likely contributed to our results contrasting the cost savings estimated by past studies.

Provided the specialized MCAT response described in the present study represented a per-incident average cost of approximately \$2,700 to the public sector with no 12-month post-incident benefit, it will be important for communities to consider and test other interventions to promote the wellbeing of persons experiencing behavioral health emergencies. In the United States, emerging alternative response programs vary widely in terms of personnel, roles, responsibilities, purview, participating agencies, timing of response, and the extent to which these programs are connected with additional community services, among other factors. The variation in these alternative response efforts cannot be overstated and different models may

generate evidence of efficacy. For example, for the co-response team reported here, there was no specialized or dedicated dispatch, which would likely impact the types of calls to which the co-response team responds and ultimately influence model outcomes (Marshall et al., 2020). It is critical that communities adopting alternative response programs seek opportunities to evaluate these programs using similarly rigorous methods as those employed in this study. It is also important to carefully document the specific alternative response efforts being examined to build evidence that differentiates between models and their effectiveness.

The current co-response team model may not be a cost-saving strategy to the public sector for helping individuals in crisis in the current context or under current operations. For example, it has been argued that diversion efforts may primarily reduce organizational burden on the correctional and legal sectors rather than effectively restoring individuals within communities (Gittner et al., 2023). Alternative responses may require strong collaboration and alignment across systems and agencies that presuppose a high level of system coordination among behavioral health systems, general health systems, and law enforcement (Balfour et al., 2022). Given public concerns about reducing the role of police in the response to individuals experiencing a behavioral health crisis, there has been a focus on diversion at the front-end point of the crisis response system in recent years, where the emphasis has been on the appropriate initial routing of individuals in crisis. However, other aspects of the continuum of care have received much less attention, including post-crisis intervention services (Bonfine & Barrenger, 2022). The net monetary benefits of MCAT are dependent not only on the initial response of the MCAT unit, but also the subsequent coordination and linkage to stabilizing care, subacute crisis engagement and outreach, and the availability of wrap-around and prevention services. When these elements of community-based care are inadequate, the simple redirection of individuals in

crisis to community-based programs are unlikely to result in the desired outcomes. This effect could have further muted co-response efforts in Indianapolis where crisis response training and other curricula designed to improve police-as-usual responses to behavioral health calls for service have been implemented. Communities should also consider pre-crisis community service interventions to reduce police involvement in behavioral-health emergencies and subsequent high-cost service utilization (Munetz & Griffin, 2006). Additionally, cross-site comparisons of police training suggest their potential to improve public safety in the community (Willis et al., 2023).

Limitations

There were several limitations to this study. While a 12-month follow-up is a timeline appropriate for interventions related to criminal-legal involvement, a longer follow-up may be needed to assess net monetary benefits because mental and behavioral disorders are chronic medical conditions (Compton et al., 2023) that may not be ameliorated or resolved in a one-year period. Additionally, the data were insufficiently detailed to consider all taxpayer-supported agencies that would be of interest to decision-makers. Secondary agencies directly addressing the needs of individuals with mental and behavioral disorders may be economically impacted by the MCAT program and TAU in ways that are not considered in this study. For example, one of our studied outcomes, jail bookings, did not account for broader costly impacts of potential harms resulting from interactions with the criminal legal system (Ascher-Svanum et al., 2010; Swanson et al., 2013). While we found no significant differences in jail bookings between MCAT and TAU participants, we were unable to examine potential qualitative differences related to the nature of these interactions nor the effects and associated costs on communities. However, it is well-established that criminalization and incarceration have devastating consequences for

individuals, as well as their families and communities (H. Lee & Wildeman, 2021; Massoglia & Pridemore, 2015). An additional limitation of the public sector cost perspective was that benefits to the community were not measured. Co-response efforts may elicit much-needed follow-up for persons who are chronically ill and in need of services (Watson et al., 2019), and client perspectives on the service compared to police-as-usual were not assessed. These factors limit our ability to take a societal cost perspective and instead use a public sector perspective to reflect the evaluations focused on local police, jail, hospital, and emergency services utilization.

Also worthy of note, our randomization procedures began at the onset of the COVID-19 pandemic (January 2020) and proceeded during the first 18 months, which included the initial stay-at-home order period. The pandemic was associated with general reductions in calls for service and jail bookings in Indianapolis (Glober et al., 2020; Mohler et al., 2020; Stockman et al., 2021). Given random assignment, the consequences do not threaten the internal validity of the study design, but likely shaped event rates overall, reducing our ability to detect statistically significant effects.

Conclusions and Lessons Learned

The major strength of this study was our capacity to work with community partners across multiple agencies to develop and employ a randomized study in a real-world setting that allowed us to explore investments in a police-mental health co-response team compared to standard operating procedures. The analysis revealed no net monetary benefit in terms of reduced social and healthcare service utilization from the co-response program. However, researcher-practitioner partnerships are important for assessing these interventions and much more work is needed in this field. Provided the growth of alternative policing response programs, rigorous

evaluation of these programs will be necessary for understanding whether they have clinical impact and cost savings.

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Tables

Table 1. Economic evaluation inputs and outcomes cost estimates for a randomized controlled trial of a police-mental health co-response team.

	Unit cost per year (\$USD)	Source
Outcome		
Emergency medical services (EMS) event	452	Centers for Medicare & Medicaid Services, Ambulance Fee Schedule Public Use Files (Centers for Medicare & Medicaid Services, n.d.)
Emergency Department visit	1,052	Information provided by Sandra Eskenazi Mental Health Center (SEMHC)
Outpatient behavioral health treatment encounter	346	Information provided by SEMHC
Jail booking	106	Research article (McCollister et al., 2017)

Table 2. Descriptive statistics of TAU and MCAT average per-person service costs in the six months preceding randomization

Outcome	6-Month pre-randomization average per-person costs			
	TAU ^a	MCAT ^b	Difference	<i>p</i> -value
Costs				
Emergency Medical Services events	7,951	8,062	111	.936
Jail bookings	23	21	(2)	.737
Outpatient behavioral health treatment encounters	1,132	1,169	37	.887
Emergency Department visits	497	626	129	.271
Total	9,603	9,878	275	.868
<i>Notes:</i> ^a TAU = treatment as usual				
^b MCAT = Mobile Crisis Assistance Team				

Table 3. Predicated mean per-person six- and 12-month post-randomization outcome costs for TAU and MCAT responses from a public sector perspective

Outcome	Follow-Up							
	6-Month				12-Month			
	TAU ^a	MCAT ^b	Difference	<i>p</i> -value	TAU	MCAT	Difference	<i>p</i> -value
Costs								
Emergency Medical Services events	4,676	3,919	756	.757	6,001	6,411	409	.884
Jail bookings	22	18	5	.998	39	44	5	.998
Outpatient behavioral health treatment encounters	10,792	9,667	1,126	.509	12,693	21,506	8,813	< .001
Emergency Department visits	9,203	13,653	4,450	.002	17,081	22,458	5,377	.005
Total	24,693	27,257	2,564	.486	35,815	50,418	14,604	.001
<i>Notes:</i> ^a TAU = treatment as usual ^b MCAT = Mobile Crisis Assistance Team								

Supplemental Material

Table S-1. Unadjusted mean per-person six- and 12-month post-randomization outcome costs for TAU and MCAT responses from a public sector perspective

Outcome	Follow-Up							
	6-Month				12-Month			
	TAU ^a	MCAT ^b	Difference	<i>p-value</i>	TAU	MCAT	Difference	<i>p-value</i>
Costs								
Emergency Medical Services events	531	390	141	0.383	744	877	133	0.625
Jail bookings	26	17	9	0.205	43	38	5	0.677
Outpatient behavioral health treatment encounters	1,462	1,597	(135)	0.383	2,501	3,230	(731)	0.268
Emergency Department visits	10,013	9,847	166	0.917	16,682	19,689	(3,007)	0.320
Total	12,032	11,851	181	0.926	20,102	23,702	3,600	0.334
Notes: ^a TAU = treatment as usual								
^b MCAT = Mobile Crisis Assistance Team								