Journal of Experimental Criminology
https://doi.org/10.1007/s11292-020-09434-x

Assessing the capability of a co-responding police-mental health program to connect emotionally disturbed people with community resources and decrease police use-of-force

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Published online: 12 June 2020
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Abstract

Objectives The objective of the study is to assess the capability of a mobile crisis intervention team (MCIT) to connect emotionally disturbed people (EDP) with community resources and decrease police use-of-force.
Method In order to have equivalent groups, interventions managed by the MCIT were matched to incidents handled by traditional police officers with similar propensity scores.
Results Average treatment effects (ATEs) were computed to assess the impact of the MCIT. The MCIT was associated with decreases in police use-of-force (ATE = − 0.08; $p \leq 0.01$), EDP transported to the hospital against their will (ATE = − 0.06; $p \leq 0.10$), and EDP transported to the hospital in general (ATE = − 0.42; $p \leq 0.01$). EDP were more likely to be referred to community resources (ATE = 0.19; $p \leq 0.01$) or managed by their social network (ATE = 0.22; $p \leq 0.01$) when the MCIT was involved in the intervention.
Conclusion The MCIT was effective in connecting EDP with community resources, avoiding unnecessary transports to the hospital, and reducing police use-of-force.

Keywords Community resources · co-responding police-mental health programs · Crisis de-escalation · Emotionally disturbed person · Evaluation · Police use-of-force · Propensity score matching

Introduction

The changing role of police officers—from warriors to peacekeepers—has been documented since the 1960s (Wood et al. 2017). This aspect was documented by Bittner

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(1967) when police officers had to provide psychiatric first aid in several encounters involving mentally ill individuals, that is "monitoring the transition of a state of affairs from its dangerous phase to a phase of relative safety and normalcy" (Bittner 1967: 288). It is estimated that between 7% and 31% of all police calls in North America involve an emotionally disturbed person (EDP) (Deane et al. 1999; Livingston 2016).[1] Hence, police officers are not only the first responders in several mental health emergencies, but also the first point of entry into the criminal justice system (Steadman et al. 2000).

The overrepresentation of people with mental illness in the criminal justice system led some police organizations to develop specialized programs (Wood and Watson 2017). These programs have been developed, among other things, to prevent police use-of-force and arrests of EDPs. Despite these efforts, people with serious mental illness are still overrepresented in prison populations (Steadman et al. 2009; Fazel et al. 2016) and are more likely to be killed by police officers than people without any mental illness (Fuller et al. 2015).

In fact, evidence about the effectiveness of these specialized programs remains sparse (Shapiro et al. 2015; Taheri 2016). Few studies have estimated the effect of such programs on their core elements such as their ability to offer timely and improved services to EDPs and decrease police use-of-force (Compton et al. 2008; Shapiro et al. 2015; Taheri 2016). The present study was conducted within the scope of a broader research project seeking to assess the implementation and impact of a co-responding police-mental health program recently deployed in the city of Sherbrooke (Quebec, Canada) (Landry et. al. 2018). Our study used propensity score matching techniques to assess the impact of this program on five outcomes: (1) EDPs transported to the hospital, (2) EDPs referred to community resources, (3) EDPs managed by their own social network, (4) police use-of-force against EDPs, and (5) EDPs transported to the hospital against their will.

Literature review

Many studies have documented an upward trend in the criminalization of people experiencing mental health problems since the 1950–1960s (see Wood et al. (2011) for a review). Deinstitutionalization, the closure of psychiatric hospitals, legislative changes, and a general decrease in psychiatric services have all contributed to this situation where people suffering from mental health problems struggle to access medical, social, and community services (Cotton and Coleman 2006; Fisher et al. 2006; Lamb et al. 2002). As a result, contacts between police officers and EDPs have increased significantly (Cotton and Coleman 2010).

Frequent contacts between police officers and EDPs, combined with extensive media coverage of episodes of EDPs mortally injured by police officers, raised concerns about the potential criminalization of mental health and officer's ability to provide psychiatric first aid (Wood and Watson 2017). By the 1980s, several training programs were implemented in American police organizations to improve "officer's

[1] This expression, emotionally disturbed person (EDP), is used throughout the article. Most of the time, the diagnosis of mental illness or disorder is made by the police officer, based on his/her perception and not on a formal diagnosis. The person can be impaired by alcohol, medication, mental illness or a combination of factors. The police officer may maintain that the person is emotionally disturbed but not necessarily suffering from a mental health problem.

knowledge and attitudes towards mental health vulnerabilities while shaping their decision-making in favor of appropriate de-escalation techniques" (Wood and Watson 2017: 270).

Also known as the Memphis model or crisis intervention team (CIT), the first and most popular type of program consists of providing 40 h of training to volunteer police officers on mental health issues and de-escalation techniques (Borum 2000; Cross et al. 2014). More specifically, police officers learn about symptoms associated with mental illness, effective interventions and communication strategies, services offered by different agencies, and risk assessment. While CITs can initiate proactive interventions, they are generally called on the scene when a traditional patrol considers that the situation can benefit from the CIT. The CIT will assess the situation and transport the EDP in a specialized center for further psychiatric evaluation (Ellis 2014).

Several studies have examined the impact of CIT programs. Some studies have evaluated the capability of CIT programs to change police attitudes and knowledge about mental health issues (see Compton et al. (2008) for a review). Conducting such studies is of paramount importance since police officers often misinterpret mental health crisis as acts of resistance or hostility (Morabito et al. 2012), and perceive interactions with EDP as more dangerous and unpredictable (Canada et al. 2012; Green 1997). Evaluations that have focused on the core objectives of CIT programs—such as their ability to connect people with treatment programs, reduce arrests and the risk of injuries for civilians and police officers—have reported mixed findings (see Kane et al. (2018), Schucan Bird and Shemilt (2019), and Taheri (2016) for reviews). Some studies have even observed adverse findings (Morabito et al. 2012; Broner et al. 2004). In Chicago, CIT officers were more likely to use the force against EPDs than non-CIT officers (Morabito et al. 2012). Arrest and hospitalization risks were increased when interventions were conducted by CIT officers in Memphis and Portland (Broner et al. 2004).

While scholars call for additional evidence about the impact of CIT programs, they also highlight the need to improve the curriculum of these programs (Kane et al. 2018; Puntis et al. 2018). Hence, some studies have also questioned the effectiveness of training police officers in de-escalation techniques (see Engel et al. (2020) for a review), and their findings could explain the limited effectiveness of CITs. The CIT training is counter to the more traditional police operational response, where "a quick and decisive action is typically taught to be the safest approach for officers faced with dangerous and unpredictable circumstances" (Engel et al. 2020: 2-3). The 40-h curriculum training of the CIT may not be enough to change police approaches during their encounters with EDPs (Borum 2000). Volatile encounters also involve additional psychological constraints on the officer's decision-making process (Johnson et al. 2014), limiting the effectiveness of de-escalation training (Engel et al. 2020). During encounters with EDPs, police officers have to consider multiple and sometimes competing issues such as ensuring the security and safety of all individuals involved in the situation while attempting to defuse the crisis.

While CIT programs mainly focus on providing additional training to police officers, co-responding police-mental health programs team-up police officers with mental health specialists. These programs have the potential to overcome limitations found in CIT programs (Helfgott et al. 2016). In co-responding programs, a mental health specialist ride along with a trained police officer. While the officer is in charge of

handling situations involving a potential risk for violence or injury, the specialist provides mental health advice and assistance to the EDP (Forchuk et al. 2010; Rosenbaum 2010). In the co-responding program, the mental health specialist can conduct a timely assessment and immediately connect the EDP to the appropriate service, in comparison with the CIT program where the officer brings the EDP to a crisis triage center for further evaluation. At last, co-response programs also enhance collaboration and the sharing of information between organizations intervening with EDPs (Helfgott et al. 2016).

The effectiveness of co-responding programs is, however, not well established. Co-responding programs have four main objectives: (1) reduce pressure on the criminal justice system, (2) connect EDPs with community services, (3) avert crisis escalation and injury, and (4) reduce hospital admissions (Shapiro et al. 2015). Reviews suggest that there is some evidence that co-responding programs reduce pressure on the criminal justice system while evidence is mixed about their capability to reduce hospital admissions. Few studies have investigated the effect of these programs on objectives (2) and (3), or on the use-of-force (see Shapiro et al. (2015), Schucan Bird and Shemilt (2019) Puntis et al. (2018) for reviews).

While there is some evidence about the beneficial effects of co-responding police-mental health programs, studies using well-designed trials and considering a variety of outcomes remain underdeveloped (Shapiro et al. 2015). For instance, almost all studies estimating the effect of co-responding police-mental health programs on hospital admissions are either descriptive (Helfgott et al. 2016; Baess 2005; Lamb et al. 2002; Landeen et al. 2004) or do not control for covariates (Lamanna et al. 2018; Scott 2000; The Allen Consulting Group 2012). Some studies also selected observations for their control group from samples exposed to the intervention (see Lamanna et al. (2018) for an example), subjecting their conclusions to a contamination bias (Farrington 2003). As underlined by Puntis et al. (2018: 45): "(d)ue to the design of the studies one cannot determine whether this is due to the intervention or other factors such as changes in policy, changes in mental health provision, or greater public scrutiny of mental health detentions."

The present study

The main objective of this study was to learn more about the effects of co-responding police-mental health programs. To do so, we assessed the impact of a mobile crisis intervention team (MCIT) deployed in the city of Sherbrooke (Quebec, Canada) on the following outcomes: (1) EDPs transported to the hospital, (2) EDPs referred to community resources, (3) EDPs managed by their own social network, (4) police use-of-force against EDPs, and (5) EDPs transported to the hospital against their will.

To overcome previous limitations, this study incorporated three features. First, it used propensity score matching to create a control group sharing similar characteristics with the intervention group (Apel and Sweeten 2010; Puntis et al. 2018). With this technique, it is possible to match observations in the treatment group with one or many observations in the control group having a similar probability of being allocated to the intervention group.

Second, the effect of the MCIT was estimated for the first 6 and last 6 months. This strategy was used to determine whether implementation issues could account for inconclusive results regarding the impact of some co-responding police-mental health programs. Some studies suggested that the effect of such teams improves over time (Helfgott et al. 2016; Kirst et al. 2015; Kisely et al. 2010). Thus, the effect of the program could increase as police officers and psychosocial workers learn about each other and collaborate more effectively (Helfgott et al. 2016). Similarly, awareness can increase among police officers as they become exposed to the program and learn about its mission and value. Positive experiences with the program could lead police officers to call the joint team when facing situations involving mental health issues (Kirst et al. 2015). While their study focused on different outcomes, Kisely et al. (2010) showed that time at the scene and call-to-door time both decreased between the first and second years of a MCIT pilot project in Nova Scotia, Canada.

Third, the effect of the program was estimated, on the one hand, with observations collected only in the pre-treatment period and, on the other hand, with observations gathered only in the treatment period. This strategy was used to address potential contamination biases. The MCIT was widely publicized, and police officers were invited to get involved. Also, one of the objectives of the MCIT was to support other police officers in their interventions with EDPs. One could argue that such officers will gain experience and knowledge by consulting MCIT members. However, contamination is a major threat to construct validity. It occurs when control group participants have knowledge of the intervention (Farrington 2003). It remains of paramount importance to also select controls without any contact with the experiment.

Sherbrooke mobile crisis intervention team

A memorandum of understanding (MOU) was signed between the city of Sherbrooke and a center that manages and provides health care and social services to the citizens of Sherbrooke. This MOU led to the introduction of a 1-year pilot project. On April 1, 2016, a MCIT, consisting of a trained police officer and a social worker, operated two evenings per week (from 4 p.m. to midnight on Wednesday and Friday). The MCIT's mission was to enhance collaboration between police and health care agencies during interventions with EDPs in order to provide them with improved and adapted services at the criminal justice system, health care system, or community level. The pilot project ended on March 31, 2017.

All police officers and social workers involved in the MCIT participated in a 2-day training (7 h per day) session provided by members of another police organization where a similar program had been implemented. On the first day, the training covered (1) situations likely to be encountered by the MCIT, (2) challenges experienced by the other police organization's team, (3) realities faced by police and social workers, and (4) the law and confidentiality. The second training day focused on mental health and legislative issues such as (1) interventions among EDPs, (2) community partners, and (3) components and application of the *Act respecting the protection of persons whose mental state presents a danger to themselves or the others* (Law P-38).

The MCIT had the following objectives: (1) support front-line police officers in their interventions with EDPs, (2) develop improved and adapted police strategies for

interventions with EDPs, (3) establish partnerships with other public health care and community partners delivering services to EDPs, (4) prevent repeat service calls by the same person, and (5) decrease time devoted to such interventions by regular patrol officers.

The MCIT only intervened after the scene was secured and when the police officers originally dispatched to the scene judged that the MCIT was required. To achieve their objectives, members of the MCIT had the following responsibilities: (1) provide advice to police officers; (2) support front-line police officers in their interventions with the EDP after the scene is secured; (3) assess the situation and free up the police officers when possible; (4) work and intervene with the EDP to identify the best intervention; (5) link up, when required, the EDP with agencies providing different services; (6) document the situation and events leading to the intervention; and (7) direct the EDP to appropriate services and conduct follow-up activities.

Method

Data source and study design

This study was approved by the CIUSSS *de l'Estrie* (Integrated Centers for Health and Social Services of the Estrie Region). All data came from emergency service call cards and police reports. To be included in the study, police reports had to be identified with the code 425, indicating that the incidents involved an EDP. Emergency services call cards contain information about the time of the event, its duration, call priority, and the number of police patrol units dispatched to the scene. The police report is filled out after the intervention is completed. It contains a detailed narrative of the intervention and information about the EDP (e.g., age, sex, intoxication level), type of event (e.g., suicidal thoughts, suicide attempt, public assistance), location of the intervention (e.g., streets, hospital, private residence), and outcomes (e.g., use-of-force, arrest, transportation to the hospital). When the intervention was conducted by the MCIT, the social worker and police officer each wrote their own narrative.

This evaluation is based on a method known as propensity score matching. Propensity score matching is "a data reduction technique that has the advantage of allowing researchers to match treated and comparison individuals on a very large number of measured characteristics (…)" (Apel and Sweeten 2010: 543). It can be used to obtain balanced groups, making sure that interventions conducted by the MCIT are statistically equivalent to interventions managed by regular police officers on all background factors that are relevant for estimating the causal effect of interest. To act as a counterfactual, a control needs to have a propensity score close to one observation in the experimental group.

The treatment group included all interventions conducted by the MCIT between 4 p.m. and midnight on Wednesday and Friday between May 2016 and May 2017. The control group contained interventions handled by regular police officers between 4 p.m. and midnight on Wednesday and Friday between May 2015 and May 2017. Control observations were collected before and after the introduction of the MCIT to test for potential contamination effects. The MCIT was unable to respond to all calls involving an EDP. Regular police officers had to conduct the intervention without any special support when the MCIT was not available.

Variables under study

Three categories of variables were used in this study. Descriptive statistics for all variables are presented in Table 1.

Intervention variable

The independent variable of interest was the type of treatment. Interventions by the MCIT constituted the treatment group and were coded "1." Interventions by regular patrol units were assigned to the control group and coded "0." Data were available for 399 interventions, 35.8% of which were conducted by the MCIT (n = 143).

Variables used to compute the propensity score

Eleven variables were selected to compute the propensity score or used as controls in regression models.[2] Descriptive statistics for these variables are presented in Table 1. A first series of variables (n = 5) account for information collected by the call dispatcher. The "call priority" expresses the degree of emergency of a situation. It varies between "1" and "7" (1 = life in danger: crime/serious incident in fast progression, health-related call, or fire; 2 = fast intervention to safeguard safety, crime in progression with a possible arrest, protect the scene, or conserve proofs; 3 = absence of potential danger, but intervention needed in a short delay, alarming situation or out of control; 4 = crime or incident just occurred, unstable situation, or intervention needed to stabilize the situation; 5 = intervention or incident occurred, situation is relatively stable but could worsen; 6 = absence of risk, but there is a need to collect information or proofs; and 7 = no proof to collect, the call can be postponed). Since some categories had only few cases, the variable was recoded in three categories: (1) immediate intervention needed: a serious crime or incident in fast progression (including category 1), (2) fast intervention needed: the situation could escalate (including categories 2 to 4), and (3) intervention needed but can be postponed/situation relatively stable (including categories 5 to 7). Most interventions (68.4%) required an immediate intervention while 21.1% necessitated an intervention that could be postponed.

"Units dispatched" is a continuous variable, and it indicates the number of patrol cars who attended the scene. It varies between one and ten units, and, on average, 2.34 (SD = 1.46) patrol cars were dispatched on the scene. The distribution is, however, positively skewed as 84% of all calls involved three patrol cars or less. Location of the intervention indicates the place where the units conducted the intervention. "Location of the intervention" was dichotomized (1 = private residence; 0 = other), since 83.1% of all interventions occurred in a private residence. The category "other" includes

[2] In order to estimate the propensity score, one needs to select variables that may be relevant to the treatment and outcomes in question (Apel and Sweeten 2010). Despite their relevance, some variables found in police reports were not used to compute the propensity score. The presence of firearms and the race were almost constant. Only 1.5% of interventions involved the presence of a firearm on the scene, including cases where the firearm was stored and not accessible to the EDP. Almost all EDPs (97.5%) were Caucasians. Some other variables had many missing values. Information on the employment status, the first language (e.g., French, English, or Spanish) and on the prescribed medication was, respectively, missing in 49.1%, 46.6%, and 90.7% of the cases.

Table 1 Descriptive statistics, propensity score model, and balance diagnostic

Independent variables	Mean (SD)[a]	Logit model of MCIT		Balance diagnostic: standardized bias
		Odds ratio	95% CI	
Call priority (reference category = immediate intervention needed)				
Fast intervention needed (1 = yes)	10.5%	3.02	0.42; 21.86	− 4.9
Intervention needed but can be postponed (1 = yes)	21.1%	1.85	0.37; 9.29	2.6
Location of the intervention (1 = private residence)	84.3%	1.28	0.66; 2.51	9.3
Units dispatched	2.34 (1.46)	1.67***	1.38; 2.01	− 7.5
Duration of the intervention (min)	139.79 (106.39)	1.00	1.00; 1.00	8.1
Type of call (reference category = suicide-related)				
Public assistance (1 = yes)	14.0%	1.82	0.32; 10.49	3.9
Person is aggressive or in crisis (1 = yes)	8.3%	0.86	0.33; 2.24	− 4.0
Assistance to paramedics or police officers (1 = yes)	8.0%	0.43	0.05; 3.64	− 3.0
Other types of call (1 = yes)	9.8%	0.38	0.06; 2.27	4.6
EDP was aggressive (1 = yes)	7.0%	0.60	0.22; 1.65	− 3.2
Self-harm behaviors (1 = yes)	7.3%	0.17***	0.05; 0.56	0.9
Concrete suicide plan (1 = yes)	37.6%	0.42***	0.24; 0.73	− 10.2
EDP is under the influence (1 = yes)	33.6%	0.76	0.45; 1.28	− 6.0
Sex of the EDP (1 = man)	52.3%	0.68	0.42; 1.10	5.2
Age of the EDP	39.92 (17.83)	1.01	0.99; 1.02	9.2
Pseudo *r*-squared		17.2%		

Because of mission values, logistic regression model is based on 393 observations. Post-matching standardized biases are based on the uniform technique of the kernel matching protocol

[a] % is used for dichotomous variables

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

interventions that took place at the hospital, in a restaurant, or in a public place such as the street or a park. The "duration of the intervention" records the time of the intervention in minutes ($\overline{X}$ = 139.79; SD = 106.39), from when the units were dispatched until the last unit left the scene and became available to take another call.

The "type of call" documents the main reason for placing an emergency call. In some situations, the officers initiated the call. This variable contained 22 values. Since several types of call were uncommon, the variable was recoded in five categories: (1) suicide-related (e.g., suicide attempt, threat of committing suicide), (2) public assistance (e.g., someone with mental health problems is missing, someone on the street is talking to himself), (3) person in crisis or with an aggressive behavior (e.g., assault, verbal threats), (4) assistance to police or paramedics (e.g., paramedics need help to bring the EDP to the hospital), and (5) others (e.g.,

suspect vehicle or person, routine check). Suicide-related calls accounted for 59.9% of all interventions.

Another series of variables (n = 4) report observations made by police officers during their intervention. Police officers generally added these observations in their report to describe the nature of the danger or to support their decisions to use the force or transport the EDP to the hospital. The "EDP was aggressive" measures aggressive manifestations by the EDP such as making threats (e.g., assault or homicide), having a weapon, assaulting another person, or destroying the property. Only 7.0% of EDPs showed aggressive behaviors. "Self-harm behaviors" refer to cases where EDPs injured themselves (e.g., self-inflicted wounds) or had health-threatening behaviors such as consuming a large number of pills, mixing medications with alcohol, or drinking poisonous substances (e.g., windshield washer). They were reported in 7.3% of cases. Another variable, "concrete suicide plan" identifies cases where the EDP had the intention to commit suicide with a specific mean. EDPs with a concrete suicide plan account for 37.6% of the sample. "EDP is under the influence" indicates whether the person was intoxicated by alcohol, drugs, or other medications. This is a dichotomous variable (1 = yes; 0 = no), and police officers judged that 33.6% of EDPs were under the influence.

A last series of variables (n = 2) account for the EDP's demographic characteristics. "Sex" is a dichotomous variable (1 = male; 0 = female), and 52.3% of interventions targeted a male. "Age of the EDP" is a continuous variable, and EDPs targeted by police interventions in this study ranged from 11 to 91 years old ($\overline{X}$ = 39.92; SD = 17.83).

Dependent variables

Five dichotomous outcome variables were selected.[3] A first series of variables estimate the MCIT's capability of de-escalating the situation or preventing the use-of-force, which is a core objective of such programs (Shapiro et al. 2015). The first variable measures whether police officers used the force to manage the situation (1 = yes; 0 = no). The use of force includes a wide range of actions such as escorting the EDP to the ambulance, using contentions (e.g., handcuffs or straps to maintain the EDP on the stretcher), striking, and taking the EDP to the ground. Since only 9.3% (n = 37) of all interventions involved the use-of-force, this outcome was dichotomized.[4] Second, a variable measuring EDPs transported to the hospital against their will was created. In the province of Quebec (Canada), under Chapter P-38.001 art. 8, police officers can force the transportation to hospital for individuals whose mental state presents a danger to themselves or to others. However, EDPs are not systematically hospitalized; they must be held, even if against their will, until assessed by a physician, who may subsequently decide to release them, following the application of P-38.001. Transportation to hospital against the EDP's will (1 = yes; 0 = no) was reported in 9.0% of all interventions.[5]

[3] While MCITs seek to reduce pressure on the criminal justice system, arrests were not analyzed in this study. Only 3.0% (n = 12) of all interventions were followed by an arrest or incarceration. Only one of them occurred when the intervention was conducted by the MCIT.

[4] Among the 37 interventions involving the use-of-force, the force was mainly used to contain the EDP, either with straps or handcuffs (64.9%), or with physical control techniques such as joint locks or takedowns (18.9%). Escorting the EDP (10.8%), giving orders (2.7%), and using intermediate weapons (2.7%) were the other techniques.

[5] The force was used in 66.7% of interventions where transportation to the hospital against the will of EDP occurred in comparison with 3.6% for other interventions not involving the application of P-38.

A second series of variables evaluate how the EDP is managed following the intervention. These variables estimate the capability of the MCIT to connect EDP with community resources and avoid transportation to the hospital when possible. While they prevent undesirable consequences associated with the criminalization process (e.g., stigmatization, lack of appropriate psychological services in prison settings), some visits to the emergency department are unnecessary and EDPs are not necessarily connected to community agencies providing mental health services. Under some circumstances, mental health specialists can refuse to admit (Matheson et al. 2005) or quickly release a person considered a menace to community safety by police officers (Lamb et al. 2002), hence contributing to the revolving door effect. Emergency departments are not always equipped or prepared to manage individuals in crisis (Landry et. al. 2018). The effect of the MCIT was therefore estimated on three outcomes reflecting how the EDP was managed.

The first variable indicates whether the EPD was transported to the hospital (1 = yes; 0 = no); 59.6% of EDPs were transported to the hospital.[6] The second variable determines whether the EDP was referred to community resources. Such resources include agencies providing services for people experiencing mental distress (e.g., depression, suicidal thoughts), substance abuse problems, or difficult family and domestic situations (e.g., divorce, problems with their children). Interventions led to a referral to a community resource in 21.1% of all cases. The third variable indicates whether the EDP was managed by his/her social network. It includes cases where the EDP was returned home or taken in charge by friends or relatives. Such an outcome occurred when a security net was in place. It means that the risk was contained, and follow-up calls would be made in the upcoming days, and if necessary, the EDP would be referred to appropriate services. EDPs were managed by their social network in 13.0% of all interventions.

Analytical strategy

Three main analytical strategies were used to assess the effect of the MCIT on intervention outcomes. First, 11 control variables were incorporated in a logistic regression model to predict group membership (i.e., control or treatment group) (see Table 1). The propensity score varies between 0 and 1, and it represents the probability of being allocated to the treatment group (Rosenbaum and Rubin 1983). Second, chi-squared analyses were conducted to compare the distribution of all five outcomes according to the type of intervention. These analyses provide a benchmark for assessing and interpreting the average treatment effect (ATE). Third, once a propensity score is computed for each case, various techniques can be used to match treatment to control cases. It is generally recommended to use kernel matching techniques with small samples since cases with the closest score are given more weight (Apel and Sweeten 2010; Becker and Ichino 2002). Once cases were matched, an ATE, corresponding to the average difference in potential outcomes across the entire sample, was computed (Apel and Sweeten 2010). ATEs were also computed using regression adjustments to appraise estimates' sensitivity to matching techniques.[7]

[6] EDPs transported to the hospital against their will were also included in this variable.

[7] Nearest neighbor matching was also used but results were inconsistent. Some estimates were not computed when the bootstrap was used. It was also impossible to compute ATEs for several outcomes when subsamples were used, especially when small calipers, and 3 to 5 neighbors were used.

ATEs were also computed with different subsamples to account for a potential contamination effect and temporal variations in the effect of the MCIT. ATEs were computed, respectively, with two control groups: (1) one where observations were collected before the introduction of the MCIT (pre-treatment period) and (2) one where observations were collected after the introduction of the MCIT (treatment period). The two sets of ATE were compared to test for contamination effects. Similarly, ATEs were computed with two treatment groups: (1) one using observations from the first 6 months of the pilot project and (2) one using observations collected in the last 6 months. Both series of ATEs were used to compare the effect of the MCIT at different time points. All analyses were conducted with STATA 12.1.

Results

Results are divided in two sections. The first one reports results to the logistic regression analysis. Variables in Table 1 predict the probability of being allocated to the treatment group. Table 1 also contains the balance diagnostic. The second section reports the effect of the MCIT on all five outcomes. Table 2 presents the distribution for each dependent variable for the treatment and control group. Table 3 displays ATEs associated with different outcomes.

Estimating the propensity score

The probability of being "treated" by the MCIT—the propensity score—was estimated from the logistic regression model outlined in Table 1. According to the pseudo *r*-squared, the model explains 17.2% of the variance. Only three variables were significantly associated with the treatment condition. On the one hand, the probability of involving the MCIT in the intervention was positively associated with the number of units dispatched on the scene (OR = 1.67; 1.38, 2.01). On the other hand, interventions were less likely to be conducted by the MCIT when the EDP had exhibited self-harm behaviors (OR = 0.17; 0.05, 0.56) or had a concrete suicide plan (OR = 0.42; 0.24, 0.73). All standardized biases were below 20, indicating that treatment and control groups were balanced following the matching procedure (Rosenbaum and Rubin 1985). The average standardized bias was 5.5.

Impact of the crisis mobile intervention team

Table 2 compares the distribution of the five dependent variables according to the treatment received, i.e., regular intervention or one by the MCIT. EDPs were more likely to be transported to the hospital against their will when the case was handled by regular police patrols (10.9%) than when the intervention was managed by the MCIT (5.6%) (phi = 0.09; $p \leq 0.10$). The force was used in 12.1% of EDP encounters involving regular patrols compared with 4.2% when the MCIT attended the call for service (phi = 0.13; $p \leq 0.01$).

The percentage of EDPs transported to the hospital decreased significantly from 81.2 to 28.1% when cases were handled by the MCIT (phi = 0.53; $p \leq 0.01$). Similarly, 29.5% of EDPs were taken in charge by their social network when the MCIT made the

intervention in comparison with 4.5% for those managed by traditional police patrols (phi = 0.35; $p \leq 0.01$). At last, the MCTI referred 39.6% of all EDPs to community resources versus 11.8% for EDPs handled by regular police patrols (phi = 0.32; $p \leq 0.01$). Increases in the percentage of EDPs managed by their social network and EDPs referred to community resources appear to be, in part, related to the MCIT's ability to de-escalate the situation. These two outcomes were never reported in interventions where the force was involved. Similarly, 97.3% of all EDPs were transported to the hospital when police officers used the force compared with 55.8% when they did not (phi = 0.25; $p \leq 0.01$) (not shown in Table 2).

Table 3 shows ATEs for the five outcomes. Since all models led to similar estimates and that kernel matching is deemed the most appropriate technique for small samples (Apel and Sweeten 2010), results are only reported for the uniform kernel model. According to propensity score models, the MCIT was effective in averting crisis escalation. The estimation based on uniform kernel shows that police officers were less likely to use the force when the MCIT was involved in the intervention (ATE = − 0.08; $p \leq 0.01$). The probability of transporting EPDs to the hospital against their will also decreased by 6 points of percentage ($p \leq 0.10$) when the intervention was managed by the MCIT.

The MCIT was also successful in decreasing visits to the hospital. The EDP's probability of being transported to the hospital was 42 points lower when the MCIT managed the intervention ($p \leq 0.01$). The MCIT was also effective in connecting EDPs with community resources. The probability of referring EDPs to community resources was increased by 22 points ($p \leq 0.01$) when the intervention was handled by the MCIT. At last, EDPs were also more likely to be managed by their social network when the intervention was conducted by the MCIT (ATE = 0.19; $p \leq 0.01$).

Additional sensitivity analyses were conducted to estimate potential improvements of the MCIT throughout time (see Tables 4 and 5 in Appendix). Although slight decreases were observed in ATEs when they were computed with the last 6 months of the treatment period compared with the first 6 months, estimations remained quite similar. The MCIT was still associated with a significant decrease (all p values ≤ 0.01) of EDPs transported to the hospital (− 0.45 vs. − 0.42), and significant increases in EDPs referred to community resources (0.27 vs. 0.20) and EDPs managed by their social network (0.21 vs. 0.19). For the use-of-force, the ATE declined from − 0.11 ($p \leq$

Table 2 Outcomes associated with interventions by the MCIT or traditional patrol units

Outcomes	Control group	MCIT group	Phi
Police use of force	12.1%	4.2%	0.14***
EDPs transported to the hospital against their will	10.9%	5.6%	0.09*
EDPs transported to the hospital	81.2%	28.1%	0.53***
EDPs referred to a community resource	4.5%	29.5%	0.35***
EDPs managed by their social network	11.8%	39.6%	0.32***

Base rates are 399 for the use-of-force against EDPs and EDPs transported to the hospital against their will. Base rate is 384 for EDPs transported to the hospital, EDPs referred to community resources, and EDPs managed by their social network

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

Table 3 Average treatment effect (ATE) of the MCIT on five outcomes

	Police use-of-force against the EDP	EDP transported to the hospital against his/her will	EDP transported to the hospital	EDP referred to a community resource	EDP managed by his/her social network
(A) Standard regression adjustment					
No control variable	− 0.08*** (0.03)	− 0.05* (0.03)	− 0.53*** (0.04)	0.28*** (0.04)	0.25*** (0.04)
All control variables	− 0.08** (0.03)	− 0.06* (0.03)	− 0.44*** (0.05)	0.23*** (0.05)	0.20*** (0.04)
(B) Propensity score models					
No trimming	− 0.09*** (0.03)	− 0.08*** (0.03)	− 0.36*** (0.08)	0.20*** (0.06)	0.19*** (0.06)
With common support	− 0.08*** (0.0)	− 0.07** (0.03)	− 0.42*** (0.06)	0.23*** (0.05)	0.20*** (0.04)
Trim upper and lower 10%	− 0.09** (0.04)	− 0.08** (0.04)	− 0.42*** (0.07)	0.22*** (0.06)	0.19*** (0.05)
(C) Propensity score models: kernel matching					
Uniform kernel	− 0.08*** (0.03)	− 0.06* (0.03)	− 0.42*** (0.05)	0.22*** (0.05)	0.19*** (0.05)
Gaussian kernel	− 0.08** (0.03)	− 0.05 (0.03)	− 0.43*** (0.06)	0.23*** (0.06)	0.20*** (0.05)
Epanechnikov kernel	− 0.08*** (0.03)	− 0.06* (0.03)	− 0.42*** (0.06)	0.22*** (0.05)	0.19*** (0.05)

Standard errors are presented in brackets. Analyses are based on 393 observations for the police use-of-force against EDPs and the EDP transported to the hospital against his/her will. Analyses are based on 381 observations for the EDP transported to the hospital, the EDP managed by his/her social network, and the EDP referred to a community resource. For the propensity score regression and matching models, bootstrapped standard errors with 100 replications are provided

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

0.01) in the first 6 to − 0.05 ($p > 0.10$) in the last 6 months. Similarly, the ATE for EDPs transported to the hospital against their will diminished by 4 points of percent in the last 6-month period. One could argue that this decline in ATEs was related to an increased demand for the MCIT. The joint team managed 110 interventions in the first 6 months in comparison with 143 in the last six. However, the average time to manage a case was similar for both periods, respectively, 140.99 (SD = 89.99) and 152.99 (SD = 122.88) minutes for the first 6 and the last 6 months (t value = 0.86; $p = 0.390$). A decrease in the time dedicated to each intervention conducted by the MCIT was probably not responsible for the lower ATEs observed for the last 6 months.

A last series of sensitivity analyses were conducted to account for potential contamination effects (see Tables 6 and 7 in Appendix). With the media coverage surrounding the introduction of the MCIT, the internal recruitment activities among the Sherbrooke Police Department, and the role of the joint team, all police officers were exposed to the intervention. A contamination effect would translate into a decrease in the ATE when controls are only selected in the treatment period. Such controls correspond to interventions managed by regular patrol teams when the MCIT was already answering a call for service. On the one hand, small decreases in ATEs were observed (when comparing estimations from the pre-treatment period with those of the treatment

period) for hospital transports (− 0.45 vs. − 0.39), referrals to community resources (0.25 vs. 0.20), and EDPs managed by their social network (0.25 to 0.16). All ATEs remained statistically significant ($p \leq 0.01$). On the other hand, large increases were recorded in ATEs for police use-of-force (− 0.05 vs. − 0.17) and transportation to the hospital against the will of the EDP (− 0.04 vs. − 0.12).

Discussion

Using an approach known as propensity score matching, the main objective of this study was to assess the effect of a MCIT on five outcomes: (1) EDPs transported to the hospital, (2) EDPs referred to community services, (3) EDPs managed by their social network, (4) police use-of-force against EDPs, and (5) EDPs transported to the hospital against their will.

Our results first indicate that the MCIT was effective in de-escalating crises and connecting EDPs with community resources. Situations handled by the joint team were less likely to involve the use-of-force by police officers and transportation to the hospital against the will of the EDP. Similarly, the MCIT was successful in diverting EDPs from the hospital. This was a major concern for the health care system of the ity of Sherbrooke as more than 10% of all hospital admissions involved individuals with mental health or psychosocial issues (Landry et. al. 2018). This concern was echoed in other publications mentioning that hospital visits were sometimes unnecessary, and that potentially dangerous individuals were not always hospitalized (Matheson et al. 2005; Lamb et al. 2002). Our results show that implementing a MCIT represents an effective strategy to connect EDPs with community resources. Furthermore, our findings indicate that several situations were managed by the EDP's social network when a security net was in place.

Our findings also show the relevance of using certain techniques in an attempt to reproduce conditions of a randomized control trial. As long as data about management outcomes (e.g., transport to hospital, referral to community resources), strategies used to manage the EDP (e.g., use-of-force), and potential confounders (e.g. behaviors of the EDP, call priority) are collected in police reports, it remains possible to retrospectively match interventions handled by a MCIT with controls sharing similar characteristics (Puntis et al. 2018). Using such a design is also important as situations managed by specialized teams are not necessarily identical to those involving traditional patrols; other factors could account for benefits likely to be attributed to a MCIT (Puntis et al. 2018). Hence, Weisburd et al. (2001) observed that evaluations of criminal justice programs with a limited internal validity were more likely to report findings in favor of the intervention. Our results indicate that the probability for an intervention to be handled by the MCIT was positively associated with the number of patrol cars dispatched. The MCIT was also less likely to manage situations involving a concrete suicide plan and self-harm behaviors, probability because the EDP needed urgent medical care and an immediate psychological assessment. Accounting for such confounders is also important as several factors affect the decision-making process of police officers. Being under the influence generally increases the risk of being arrested (Engel and Silver 2001; Engel et al. 2000). Some studies have shown that police use-of-

force was more likely when individuals were aggressive or unstable (Boivin 2017; Kaminski et al. 2004; Morabito et al. 2012; Rossler and Terrill 2017).

Additional analyses were conducted to identify factors likely to affect the impact of the MCIT. Hence, a first series of sensitivity analysis attempted to identify potential contamination bias. Compared with ATEs computed with controls selected only in the pre-treatment period, slight decreases in the impact of the MCIT on management outcomes (i.e., EDPs transported to the hospital or referred to community resources) were observed when ATEs were estimated with controls solely chosen from the treatment period. While these results can be interpreted as a potential contamination bias when one refers to the literature on causal inference (Farrington 2003; Shadish et al. 2002), our results need to be discussed in keeping with the specific objectives of the MCIT. In the city of Sherbrooke, members of the MCIT had the specific responsibilities of providing advice and supporting front-line police officers in their interventions with EDPs. A contamination effect was highly likely and desirable by all stakeholders (Landry et. al. 2018). This "contamination effect" can then be interpreted as a diffusion of benefits, a central concept in situational crime prevention studies (Clarke and Weisburd 1994; Guerette and Bowers 2009). In their review of situational crime prevention initiatives, Guerette and Bowers (2009) indicate that target diffusion of benefits was quite common. Regular contacts between the MCIT and regular police officers probably improved their knowledge about community resources and alternatives to hospitalization. Accordingly, for police use-of-force and EPDs transported to the hospital against their will, large increases in ATEs were observed when controls were selected only in the treatment period. In the presence of an alternative, it is likely that police officers facing volatile situations were inclined to contact the MCIT. Such findings were observed by Kirst et al. (2015) where police officers were more likely to call the joint team following positive experiences.

In the last series of sensitivity analyses, ATEs were computed using interventions from the first 6 and last 6 months, respectively, of the pilot project. Conversely to studies reporting increased effects of MCITs throughout time (Helfgott et al. 2016; Kirst et al. 2015; Kisely et al. 2010), declines were observed in all outcomes. The decreases in police use-of-force and EDPs transported to the hospital against their will were no longer significant but improvements in management outcomes remained significant. These reductions in ATEs remain difficult to explain. The MCIT devoted similar time, on average, to its interventions in the first and last 6 months. A close examination of standard deviations, however, indicates that the variation in management time was greater for the last six compared to the first six months.

This latest observation calls for additional studies attempting to pinpoint factors likely to influence effects produced by MCITs (Kane et al. 2018; Shapiro et al. 2015). For instance, theory-driven evaluations are required. Theory-driven evaluation is conceptually and operationally premised on "(…) an explicit theory or model of how the program causes the intended or observed outcomes and an evaluation that is at least partly guided by this model" (Rogers 2000: 5). Most studies focus on one aspect of the theory of change, such as changes in police attitudes, knowledge about mental health issues, client satisfaction with the program, or results (e.g., police use-of-force, arrest or transportation to the hospital). Studies do not investigate the whole chain of events, from the training police officers receive to changes in attitudes, development of new skills, and how these skills are used during the intervention. Additional attention needs to be

paid to interactions between police officers and psychosocial workers. Establishment of trust and information-sharing are two important but neglected outcomes in the evaluation of co-responding police-mental health programs (Helfgott et al. 2016).

In keeping with the need for theory-driven evaluations, some authors have highlighted the need to develop guardian scripts. Scripts refer to the sequence of steps taken by an offender to commit a specific offense (Cornish 1994). Each step provides a rich description about casting and roles, the setting, facilitators, and disinhibitors. All these elements are prerequisites for the offender to move from one step to the next. For a crime to occur, offender and victim scripts need to crossover in the absence of a guardian script (Leclerc 2014; Leclerc and Reynald 2017). Police officers are among the most prominent guardians. Script analysis represents a novel approach to document actions taken by police officers throughout their interventions and how they interact with other actors in specific settings (Leclerc 2014). Goffman's dramaturgical framework is also a useful framework for ethnographic studies seeking to understand interactions between police officers, psychosocial workers and EDPs in specific settings (Goffman 1959). Scripts could be used to investigate interactions between police officers and EDPs. Since members of MCITs are trained in crisis management and de-escalation techniques, scripts could shed light on how some police actions (e.g., give an order) trigger specific responses from EDPs (e.g., hostile verbal response) and how such responses affect police reactions (e.g., use-of-force) (Blais et. al. 2019). Conducting such research could be particularly useful to connect de-escalation techniques to specific outcomes, since there is a lack of agreement about what a de-escalation technique is and limited empirical evidence about their impact (Engel et al. 2020; Price et al. 2018). Scripts could lead to a better understanding of situational and dynamic factors leading to the use-of-force by officers. While the use-of-force is supposed to be situationally justified, the dynamic nature such factors are seldom considered in statistical models (Alpert and Dunham 2004; Terrill 2005).

Despite the positive findings associated with the Sherbrooke MCIT, some limitations call for additional studies. Further evaluations are needed to assess with more precision the ability of co-responding police-mental health programs to reduce pressure on the criminal justice system and improve the safety of EDPs and police officers during their interventions (Shapiro et al. 2015). In fact, few incidents involving aggressive individuals were managed by the MCIT in Sherbrooke. Similarly, very few incidents involved the use-of-force by police officers or an arrest of the EDP.

Also, one drawback of such teams is that they can respond to only one situation at a time and during specific periods (Helfgott et al. 2016; Steadman et al. 2000). The same limitation applied in Sherbrooke. Only one team was in operation for two shifts per week. In keeping with this limitation, studies are needed to investigate the ability of community services to manage a sudden increase in referrals by MCITs. Following the success of the pilot project, the MCIT is now operating 7 days a week. Its success is closely linked to the availability of community resources. Long-term evaluations are therefore needed to examine the relationship between joint-team interventions and EDPs diverted from the criminal justice system or emergency services.

Another issue also warrants additional attention. One objective of MCITs is to connect EDPs with appropriate community services and to follow-up to make sure that EDPs have received and are still engaged in appropriate services. Interventions managed by MCITs should ultimately lead to fewer

contacts (or more time between contacts) with emergency services and the criminal justice system and prevent the revolving door effect. Evaluations linking criminal justice, police, and hospital data are needed to address this issue (Shapiro et al. 2015).

At last, since matching techniques cannot control for all extraneous variables responsible for an outcome (Farrington and Welsh 2005; Weisburd 2000), there is an urgent need to assess the impact of co-response police-mental health programs with a randomized control trial (RTC). RCTs are generally conducted once pilot and feasibility studies have been successfully conducted (Rounsaville et al. 2001). Co-response police-mental programs have been implemented with fidelity in several police organizations, and conditions for their successful implementation have been reported in several studies (Kirst et al. 2015; Lamanna et al. 2018; Robertson et al. 2019).

Without further elaborating, some authors have questioned the possibility of rigorously studying programs, such as the Sherbrooke's co-response team, implemented in real-world settings (Compton et al. 2008; Helfgott et al. 2016). Conversely, Weisburd (2010) have shown that RCTs can be implemented in real-world settings; feasibility concerns are mainly based in folklore rather than on scientific evidence. In the present study, the evaluation was simultaneously planned with the implementation of the program, precluding any randomization. In that regard, developing a sound evaluation plan often facilitates conducting RCTs (Weisburd 2000; Farrington et al. 2019). Based on the available evidence, conducting RCTs to assess the impact of co-response programs seems more than feasible. Such a trial would not affect the autonomy or authority of police officers, which could facilitate the acceptance of an experimental design (Weisburd 2000, 2010). The dispatcher could randomly assign calls to the MCIT or the "treatment as usual" condition. The decision to arrest or refer the EDP to a community agency would still belong to police officers or members of the MCIT. In general, simple experiments that do not introduce major changes in actors' practices are more likely to be accepted by stakeholders (Blais and Bacher 2007; Weisburd 2000).

Conclusion

Our findings highlight the potential of MCITs, on the one hand, to reduce pressure on health care emergency services by connecting EDPs with community resources and, on the other, de-escalate crises. In fact, EDPs were less likely to be transported to the hospital when interventions were managed by the MCIT (with or without their consent) and to involve police use-of-force. Additional evaluations using experimental and quasi-experimental designs are still needed (Shapiro et al. 2015; Taheri 2016; Wood et al. 2011), especially with respect to limitations found in the present evaluation.

Law P-38.001—act respecting the protection of persons whose mental state presents a danger to themselves or to others.

Acknowledgments This study was supported by a grant from the Vitae Foundation. The authors thank Bernadette Wilson for editing this manuscript. The authors are also grateful to three anonymous reviewers for their constructive and helpful comments.

Appendix

Table 4 Average treatment effect (ATE) of the MCIT on five outcomes: first 6 months

	Police use-of-force against the EDP	EDP transported to the hospital against his/her will	EDP transported to the hospital	EDP referred to a community resource	EDP managed by his/her social network
(A) Standard regression adjustment					
No control variable	− 0.10** (0.04)	− 0.03 (0.04)	− 0.54*** (0.06)	0.27*** (0.05)	0.29*** (0.05)
All control variables	− 0.11** (0.05)	− 0.05 (0.05)	− 0.48*** (0.06)	0.25*** (0.06)	0.26*** (0.05)
(B) Propensity score models					
No trimming	− 0.08*** (0.03)	− 0.05 (0.04)	− 0.46*** (0.12)	0.29*** (0.11)	0.21*** (0.06)
With common support	− 0.09*** (0.03)	− 0.05 (0.05)	− 0.40*** (0.11)	0.20*** (0.08)	0.23*** (0.08)
Trim upper and lower 10%	− 0.10*** (0.03)	− 0.05 (0.05)	− 0.43*** (0.11)	0.26*** (0.09)	0.21*** (0.06)
(C) Propensity score models: kernel matching					
Uniform kernel	− 0.11*** (0.03)	− 0.06* (0.04)	− 0.44*** (0.09)	0.27*** (0.09)	0.21*** (0.08)
Gaussian kernel	− 0.11*** (0.03)	− 0.06 (0.04)	− 0.45*** (0.09)	0.26*** (0.08)	0.23*** (0.07)
Epanechnikov kernel	− 0.09*** (0.03)	− 0.06 (0.04)	− 0.44*** (0.10)	0.27*** (0.09)	0.22*** (0.08)

Standard errors are presented in brackets. Analyses are based on 234 observations for the police use-of-force against EPDS and hospitalizations against the will of the EDP. Analyses are based on 224 observations for EDPs transported to the hospital, EDPs referred to community resources, and EDPs managed by their social network. For the propensity score regression and matching models, bootstrapped standard errors with 100 replications are provided

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

Table 5 Average treatment effect (ATE) of the MCIT on five outcomes: last 6 months

	Police use-of-force against the EDP	EDP transported to the hospital against his/her will	EDP transported to the hospital	EDP referred to a community resource	EDP managed by his/her social network
(A) Standard regression adjustment					
No control variable	− 0.05 (0.04)	− 0.07* (0.04)	− 0.54*** (0.05)	0.29*** (0.05)	0.22*** (0.04)
All control variables	− 0.05 (0.04)	− 0.05 (0.04)	− 0.43*** (0.06)	0.21*** (0.06)	0.18*** (0.04)
(B) Propensity score models					
No trimming	− 0.05 (0.10)	− 0.06 (0.08)	− 0.27*** (0.12)	0.14 (0.12)	0.11** (0.04)
With common support	− 0.04 (0.05)	− 0.04 (0.05)	− 0.36*** (0.08)	0.20*** (0.06)	0.13** (0.06)
Trim upper and lower 10%	− 0.04 (0.08)	− 0.05 (0.08)	− 0.28*** (0.10)	0.16* (0.09)	0.09* (0.06)
(C) Propensity score models: kernel matching					
Uniform kernel	− 0.03 (0.05)	− 0.02 (0.05)	− 0.42*** (0.08)	0.20*** (0.06)	0.19*** (0.06)
Gaussian kernel	− 0.03 (0.06)	− 0.04 (0.05)	− 0.42*** (0.07)	0.21*** (0.06)	0.19*** (0.05)
Epanechnikov kernel	− 0.03 (0.05)	− 0.03 (0.05)	− 0.42*** (0.07)	0.20*** (0.07)	0.19*** (0.06)

Standard errors are presented in brackets. Analyses are based on 284 observations for the use-of-force against the EPD and the EDP transported to the hospital against his/her will. Analyses are based on 277 observations for the EDP transported to the hospital, the EDP referred to a community resource, and the EDP managed by his/her social network. For the propensity score regression and matching models, bootstrapped standard errors with 100 replications are provided

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

Table 6 Average treatment effect (ATE) of the MCIT on five outcomes: controls selected in the pre-treatment period only

	Police use-of-force against the EDP	EDP transported to the hospital against his/her will	EDP admitted to the hospital	EDP referred to a community resource	EDP managed by his/her social network
(A) Standard regression adjustment					
No control variable	− 0.06** (0.03)	− 0.05* (0.03)	− 0.56*** (0.05)	0.30*** (0.05)	0.26*** (0.04)
All control variables	− 0.05 (0.03)	− 0.05 (0.04)	− 0.47*** (0.05)	0.26*** (0.05)	0.20*** (0.05)
(B) Propensity score models					
No trimming	− 0.07* (0.04)	− 0.05 (0.04)	− 0.43*** (0.07)	0.23*** (0.08)	0.19*** (0.07)
With common support	− 0.06 (0.04)	− 0.05 (0.05)	− 0.47*** (0.07)	0.25*** (0.07)	0.20*** (0.05)
Trim upper and lower 10%	− 0.04 (0.04)	− 0.06 (0.05)	− 0.46*** (0.07)	0.25*** (0.06)	0.19*** (0.06)
(C) Propensity score models: kernel matching					
Uniform kernel	− 0.05 (0.04)	− 0.04 (0.04)	− 0.45*** (0.07)	0.25*** (0.05)	0.19*** (0.05)
Gaussian kernel	− 0.05 (0.04)	− 0.04 (0.04)	− 0.45*** (0.07)	0.24*** (0.06)	0.20*** (0.05)
Epanechnikov kernel	− 0.04 (0.04)	− 0.04 (0.04)	− 0.46*** (0.06)	0.25*** (0.07)	0.20*** (0.04)

Standard errors are presented in brackets. Analyses are based on 285 observations for the police use-of-force against the EDP and the EDP transported to the hospital against his/her will. Analyses are based 278 observations for the EDP transported to the hospital, the EDP referred to a community resource, and the EDP managed by his/her social network. For the propensity score regression and matching models, bootstrapped standard errors with 100 replications are provided

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

Table 7 Average treatment effect (ATE) of the MCIT on five outcomes: controls selected in the treatment period only

	Police use-of-force against the EDP	EDP transported to the hospital against his/her will	EDP transported to the hospital	EDP referred to a community resource	EDP managed by his/her social network
(A) Standard regression adjustment					
No control variable	− 0.10*** (0.04)	− 0.05 (0.03)	− 0.50*** (0.06)	0.24*** (0.06)	0.24*** (0.05)
All control variables	− 0.12*** (0.04)	− 0.09** (0.04)	− 0.42*** (0.06)	0.21*** (0.07)	0.19*** (0.06)
(B) Propensity score models					
No trimming	− 0.26*** (0.07)	− 0.19** (0.08)	− 0.42*** (0.09)	0.20*** (0.08)	0.21*** (0.06)
With common support	− 0.21*** (0.08)	− 0.14** (0.07)	− 0.30*** (0.08)	0.20*** (0.07)	0.08 (0.07)
Trim upper and lower 10%	− 0.22*** (0.06)	− 0.15** (0.07)	− 0.37*** (0.09)	0.21** (0.08)	0.15** (0.08)
(C) Propensity score models: kernel matching					
Uniform kernel	− 0.17*** (0.06)	− 0.12** (0.06)	− 0.39*** (0.06)	0.20*** (0.06)	0.16*** (0.05)
Gaussian kernel	− 0.16*** (0.05)	− 0.11** (0.05)	− 0.39*** (0.08)	0.20*** (0.08)	0.17*** (0.06)
Epanechnikov kernel	− 0.18*** (0.06)	− 0.13** (0.06)	− 0.37*** (0.08)	0.20*** (0.06)	0.16*** (0.06)

Standard errors are presented in brackets. Analyses are based on 249 observations for the police use-of-force against the EDP and the EDP transported to hospital against his/her will. Analyses are based on 242 observations for the EDP transported to the hospital, the EDP referred to a community resources, and the EDP managed by his/her social network. For the propensity score regression and matching models, bootstrapped standard errors with 100 replications are provided

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$

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