The City of
OKLAHOMA CITY

Law Enforcement Policy Task Force

AGENDA

--Special Meeting--

March 11, 2021 – 1:30 p.m.

During the COVID19 pandemic, no physical location will be provided for this meeting. The meeting will instead be live streamed from remote locations as allowed by SB 1031, 25 O.S. Supp. 2020 §307.1(C). Instructions on how to join the meeting can be found on the second page of this agenda.

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All members will be attending via Video Conference

Oklahoma City Law Enforcement Policy Task Force
Participant Instructions

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SPECIAL MEETING AGENDA

THE CITY OF OKLAHOMA CITY
LAW ENFORCEMENT TASK FORCE

March 11, 2021
1:30 PM

I. **Welcome** - MT Berry

II. **Community Presentation: Indigenous Community & Restorative Justice** - Sarah Adams-Cornell and Kendra Wilson-Clements

III. **Process updates** – 21CP Solutions

IV. **Discussion of De-escalation: National Best Practices and Initial Thoughts on OKCPD Current Policy**

V. **Q & A with Task Force**

VI. **Other Business**

VII. **Adjournment**

Next Meeting Date: April 8, 2021 – 1:30 p.m.

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CRIMINOLOGY
& Public Policy

ORIGINAL ARTICLE

Did de-escalation successfully reduce serious use of force in Camden County, New Jersey? A synthetic control analysis of force outcomes

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Research Summary: Despite the widespread interest that de-escalation training has attracted in law enforcement contexts over the past few years, we know little about its effectiveness in reducing use of force incidents. This study seeks to ascertain the effect of de-escalation training on serious use of force events in Camden, a high-crime and high-poverty city in New Jersey. An analysis of individual officers suggested de-escalation training had no significant effects on serious force, whereas a synthetic control analysis of the entire department suggested that de-escalation training led to a 40% reduction in serious force events. It is suggested that spillover effects between trained and untrained officers may account for the discrepancy.

Policy Implications: This study offers evidence that de-escalation training may be more effective at reducing police force than other measures that have been proposed in recent years, such as consent decrees, less lethal weapons, and body-worn cameras. However, the unique environment in which the program was introduced—a high-crime, high-use of force jurisdiction that had previously dissolved and rebuilt its police force—suggests these encouraging results should be tempered with a good dose of caution.

KEYWORDS
policing, police reform, police use of force, training

1 | INTRODUCTION

The 2014 shooting of black teenager Michael Brown in Ferguson, Missouri, is often credited with the beginning of a new era in policing. The incident sparked what Sherman (2018) terms a "Second Great Awakening" of public awareness and concern over police violence towards citizens. In addition to the injury and even loss of life entailed, police use of force has further repercussions. Awareness of such incidents generate negative community sentiment, which potentially delegitimizes and reduces civilian cooperation with the police, thereby reducing the efficacy of policing in disadvantaged, majority–minority communities that need it the most. In 2015 and 2016, the *Washington Post* and *The Guardian* (Zimring, 2017) reported that just under 1,000 people were fatally shot by United States police in each year, over twice the number counted by voluntary federal data. This number does not include the people who were injured by, but survived, contact with the police.

The Police Executive Research Forum's (PERF) suggested that "American policing is at a critical juncture," and that there was a need to challenge the conventional thinking behind policing as it was currently practiced in the country and to rethink "some of the fundamentals, of policies, training, tactics, and equipment regarding use of force" (Police Executive Research Forum 2016b). What followed were 30 proposed guidelines on use of force, amongst them that de-escalation should be adopted as formal agency policy. In addition, PERF stated that police departments must respect the sanctity of human life, develop best policies that went beyond *Graham v. Connor*'s the Supreme Court case which established an objective reasonableness standard for when an officer can legally use force minimum requirements, and meet the test of proportionality in applying use of force.

De-escalation training can be seen as an incarnation of several police training efforts to reduce use of force, including conflict resolution techniques such as verbal judo (Meyer, Paul, & Grant, 2009) and less lethal weapons (Alpert et al., 2011; MacDonald, Kaminski, & Smith, 2009). De-escalation training has been applied in diverse contexts, using different frames and vocabularies, over the last few decades. Despite such widespread implementation, Engel, McManus, and Herold (2020) concluded in their systematic review of 64 de-escalation training evaluations conducted in the past 40 years that almost all the research designs of included studies scored poorly a Level 1 or 2 on the 5-point Maryland Scientific Methods Scale, demonstrating extremely weak internal validity. Moreover, many of these studies were conducted in the fields of nursing and psychiatry, and outcomes comprising force in law enforcement contexts were rare.

This research complements recent and forthcoming efforts to evaluate de-escalation training programs—in addition to a recently published randomized controlled trials (RCTs) of de-escalation training for police officers in the Louisville Metro Police Department (Engel, Corsaro, Isaza, & McManus, 2020) and social interaction training for police officers (McLean, Wolfe, Rojek, Alpert, & Smith, 2020), there are ongoing proposals (Alpert, Rojek, Wolfe, & Smith, 2016; White & Pooley, 2016). While these ongoing studies are randomized control trials conducted within police departments, this study represents a valuable addition in using a relatively novel method synthetic control analysis to compare outcomes in a department where de-escalation training was implemented, with other large departments that did not receive such training. Moreover, it evaluates a high-profile de-escalation program that was credited with reducing rates of force in Camden, New Jersey (Fiedler, 2016).

Analysis is conducted on two different levels. In the first, a Poisson regression analysis is applied to a panel dataset of individual officers and their use of force, comparing levels of serious force for officers before and after undergoing de-escalation training, relative to their peers. In the second, a

synthetic control analysis, in which Camden is compared to a weighted group of other large police departments in New Jersey which show similar trends in use of force, is deployed. While the first approach did not provide statistically significant results where individual officers' use of force levels was concerned, the synthetic control approach comparing force levels in the department with that of other departments showed large decreases in force following the intervention.

The rest of the paper is organized as follows. Section 2 reviews the extant literature on use of force and de-escalation training, while Section 3 provides background information on crime and policing in Camden, as well as the introduction of de-escalation training in its police department. Section 4 discusses the officer-level empirical analysis deployed, including data and method. Section 5 covers the department-level analysis, again including the data and method used. Section 6 presents the results from both analyses. Section 7 conducts robustness checks, and Section 8 discusses and concludes.

2 | LITERATURE REVIEW

2.1 | De-escalation as successful authority maintenance

Insofar as there exists a theoretical basis for the concept, the term de-escalation suggests a conception of potential force encounters as fluid and dynamic situations, in which social interactions have the potential to spiral out of control. There is a rich vein of theoretical work on police social interactions and use of force that may explain some of the factors that determine outcomes in each of these situations. Sykes and Clark's (1975) theory of deference exchange was based on Goffman (1956, 1961)'s theory of interaction rituals, which suggested that individuals in social exchange with one another are governed by order-creating rituals, and Bittner (1967)'s ethnographic work on policing skid row. Deference exchange theory suggested that police–citizen encounters are governed by an asymmetrical status norm in which police officers expect deference from citizens but do not expect to reciprocate the same level of respect. Arrest and force result from recalcitrant citizens' lack of deference and attempts to resist the status definition imposed upon them by officers.

Binder and Scharf (1980) contributed to deference exchange theory by emphasizing that the decision to use force was merely an endpoint to a contingent sequence of decisions over four phases: anticipation, entry, information exchange, and the final decision. Alpert and Dunham (2004)'s authority maintenance theory returned to Sykes and Clark (1975)'s conceptual framework in re-emphasizing the centrality of officers' authority, in which both officers and citizens enter encounters with expectations that may range from maintaining authority and control on the part of officers to being treated fairly or avoiding arrest on the part of citizens. Alpert and Dunham (2004)'s theoretical contribution rests in considering that citizens, in addition to police, are likely to become more aggressive when their goals are blocked, thus redefining use of force by either party as the end-result of "an escalating exchange of coercion and resistance" (Wolfe, McLean Rojek, & Alpert, 2020). In addition, Alpert, Dunham, and MacDonald (2004) suggest that police interactions with civilians are more likely to involve greater use of force by the police relative to the suspect when a suspect appears to have less authority relative to the police officer. These theoretical developments may suggest that officers who are trained to de-escalate encounters with civilians feel that they are still in control of the situation and able to maintain their authority, thereby avoiding that escalation of aggression that becomes more likely when officer goal blockage occurs.

De-escalation training may therefore reduce force incidents by making officers feel that they are successfully maintaining their authority, while communicating nonaggressively. Officers' nonaggressive communication, in turn, is less likely to result in goal blockage on the part of citizens, thus preventing them from spiraling out of control. While de-escalation tactics have not been the focus of theoretical explorations in recent years, researchers have continued to describe the dynamic process underlying police–citizen encounters. Hine, Porter, Westera, Alpert, and Allen (2018) emphasized the need to use a naturalistic decision-making approach to understand use of force decisions over shoot–do not shoot scenarios, while Wolfe et al. (2020) argued that any research that disregards the fluidity of such encounters are inherently limited, and training that focuses solely on de-escalation will fail to capture the complex nature of police citizen–encounters and therefore to effectively reduce the number of incidents that result in force.

2.2 | Empirical evaluations of de-escalation training

De-escalation training has been applied in diverse contexts, using different frames and vocabularies, over the last few decades. One of the challenges to studying de-escalation is that there is no uniformly accepted definition of de-escalation in the field (Engel et al., 2020; Oliva, Morgan, & Compton, 2010; Todak 2017). As such, any definition provided is necessarily elastic: the National Consensus Policy and Discussion Paper on Use of Force defines de-escalation as "taking action or communicating verbally or nonverbally during a potential force encounter in an attempt to stabilize the situation and reduce the immediacy of the threat so that more time, options, and resources can be called upon to resolve the situation without the use of force or with a reduction in the force necessary" (International Association of Chiefs of Police 2017). Todak (2017) conducted interviews and focus groups with officers identified by peers as skilled de-escalators, suggesting key elements of de-escalation: first, bringing a situation or citizen in crisis back to an objective or calm state while secondly, gaining a citizen's willing cooperation with officer's instructions, and last, achieving both by using the least amount of force possible. Similarly, Oliva et al. (2010)'s practical overview of the tactic also identified de-escalation as reducing tension while moving down the National Institute of Justice (2009)'s use of force continuum, which proceeds, in order of least to most severe, from officer presence, to the verbalization of commands, empty-hand control, use of hard techniques such as hitting and kicking, to less-than-lethal methods such as the use of blunt impact, chemical methods and conducted energy devices, to finally the use of lethal force. The Police Executive Research Forum (2016b), on the other hand, cautioned against a "mechanical" application of the "outdated" concept. Its concerns were that officers too easily moved up the force continuum in response to confrontational or aggressive behavior by civilians, instead advocating that officers be trained to evaluate the "entire situation they are facing."

Despite such widespread implementation, Engel et al. (2020) concluded in their systematic review of 64 de-escalation training evaluations conducted in the past 40 years that almost all the research designs of included studies had weak internal validity. Many of the studies used either pre/post designs or comparison groups without demonstrated comparability to the treatment groups or did not use controls within statistical analyses. In addition, while the studies generally reported positive changes, most reported survey-based outcomes such as knowledge, confidence, general attitudes, and perceptions of behavior rather than behavioral measures. Lastly, given that many of the studies were conducted within the fields of nursing or psychiatry, few evaluated the effect of de-escalation on outcomes in law enforcement contexts. Outside of the studies evaluated in Engel, McLean et al. (2020) systematic review, two recently released RCTs suggest promising

effects. First, Engel et al. (2020) find that the randomly assigned timing of de-escalation training in Louisville was associated with a statistically significant decline in use of force, citizen injuries, and officer injuries. Second, McLean et al. (2020) found that social interaction training for police officers had a significant treatment effect on officers' procedural justice priorities as surveyed, but a nonstatistically significant decrease in use of force.

Given that de-escalation is an important component of the wider Crisis Intervention Training (CIT) program, the evidence for CIT should also be briefly discussed. CIT is a mental healthcare model which was developed in Memphis specifically as a strategy for law enforcement officers to deal with mentally ill individuals in crisis situations (Dupont & Cochran, 2000). The CIT model is based on partnerships between law enforcement agencies, advocacy groups, family members, and individuals with a mental illness. Typically, specialist officers would undergo a 40-h training consisting of lectures to transmit specialized knowledge relating to mental illness, and role-playing interventions (DuPont, Cochran, & Pillsbury, 2007; Oliva et al., 2010). In other words, the CIT model was developed for a particularly vulnerable subset of the population and envisions de-escalation as a specialist tool to be used by CIT-trained officers. This contrasts with the kind of de-escalation training endorsed by the report of the President's Task Force on 21st Century Policing (2015) and PERF, which recommends that all law enforcement officers be trained in de-escalation, so that it can be used to gain any citizen's willing cooperation. Compton, Bahora, Watson, and Oliva (2008) review 20 studies of CIT, 19 of which were found in the mental health literature. Six studies reported on officer-level outcomes, with five studies using survey designs and one using a focus group methodology. Overall, CIT-trained officers were likely to report greater knowledge of mental health issues, improved attitudes and decreased social distance towards subjects with mental illnesses. By and large, patients brought in by CIT officers were more likely to experience better outcomes, such as diversion from jails. However, many of the studies were subject to methodological issues, such as a lack of comparison or control groups. Similarly, Peterson and Densley (2018)'s review of 25 empirical studies on the effect of CIT training on law enforcement agents identified an overreliance on self-report officer data and a lack of comparison groups and longitudinal studies. Taheri (2016)'s ((2016)) systematic review and meta-analysis of studies considering CIT's effect on law enforcement outcomes required that studies were quasi-experimental or experimental in nature. Only eight studies met the criteria for inclusion, with six studies measuring the effect of CITs on arrests of individuals with mental illnesses, suggesting that on average CIT-trained officers were less likely to arrest individuals with mental illnesses. However, this finding was not unequivocal, with some studies (Acker, 2010; Watson, 2010) showing nonsignificant effects. Ultimately, the author concluded that limited conclusions could be drawn from the meta-analysis, given that there have been no randomized experiments of CIT and that the type of quasi-experimental setup was found to significantly affect findings.

In conclusion, there is little evidence either for or against de-escalation training, although recent interventions have produced results that are both robust and promising. This can be attributed to the lack of training evaluations with high-quality research designs, the lack of behavioral as opposed to attitudinal outcomes measured in such evaluations, and the fact that many of the studies were conducted within the fields of nursing or psychiatry as opposed to criminal justice. The state of research on de-escalation as a component of the wider mental healthcare model found in the CIT program was found to be equally lacking, given the limited number of studies available, studies' reliance on self-reported outcomes, and lack of comparison groups. The limited state of research bears out Engel et al. (2020)'s articulation of the "urgent need" for researchers to generate and disseminate knowledge on de-escalation.

3 | BACKGROUND

Camden, a city in southern New Jersey, is separated from the city of Philadelphia by the Delaware River. In 2019, it had a population of 73,000. One of the poorest American cities, Camden's record-high murder rate in 2012 "rivaled national rates of the most dangerous countries" (Maciag, 2014) and was spurred in part by its thriving drug trade, which in turn resulted in its high rates of opioid-related mortality (Healey, Hamlyn, Pellicane, Sedky, & Pumariega, 2018).

In 2013, Camden experienced a decisive shift in its policing when the Camden Police Department was dissolved for several reasons, amongst them a lack of funding, an overpermissive union contract, and endemic corruption within the force (Cornish, 2014; Zernike 2012). Camden County Police Department took over policing duties, rehiring many of the same officers with a new contract and a new union. Widely viewed as a "reset button," the new department incorporated changes in their style of policing, such as greater use of foot patrol (Cornish, 2014), better data collection, de-escalation training and faster response to use of force incidents.[1] Since the county takeover of policing in Camden, the city has seen a falling crime rate and, in 2018, a 30-year low homicide count of 22, down from 67 in 2012. However, this still gives it the highest homicide rate in New Jersey.

Over a period of nearly 2 years, CCPD began providing de-escalation training to its officers. The first training occurred in May 2015 and was provided by a vendor on four dates in the same year until the company ceased operations and the task of providing de-escalation training was taken over by the (PERF, which had developed the Integrating Communications, Assessments, and Tactics (ICAT) curriculum. Beginning in the last quarter of 2016 and running throughout 2017, the de-escalation training of existing officers in the force consisted of initial curriculum training but was also deployed as part of a wider program of response to use of force, that is, reinforcement training was provided to officers who had engaged in force encounters.

ICAT sought to impart the tactical skills that are needed in dynamic situations. The training comprised a number of modules, including an introduction to the critical decision-making model (CDM), crisis recognition and response, tactical communications, and operational safety tactics, before culminating in several sessions of practice, conducted via either video case studies or scenario-based exercises. The CDM, which formed the basis of ICAT training, is a training and operational tool that was adapted from the United Kingdom's national decision model. It sought to provide officers with a logical thought process for analyzing and responding to a range of incidents in directing officers to (1) collect information, (2) assess the situation, threats, and risks, (3) consider police powers and agency policy, (4) identify options and determine the best course of action, before finally (5) acting, reviewing, and reassessing the situation. In developing this model, PERF noted that similar critical thinking and decision-making processes had been employed by specialized tactical law enforcement squads to guide their dangerous and difficult work, and that patrol officers would benefit from a similar model built around an ethical core encompassing the elements of police ethics, agency values, proportionality, and the sanctity of human life (Police Executive Research Forum 2016b).

The ICAT curriculum introduced a number of new concepts and orientations to officers that differentiated it from standard supervision and training. First, the CDM sought to provide officers with a logical thought process for analyzing and responding to incidents so that they had guidance on the key questions to ask themselves in highly charged situations where split-second reactions could be required. Instead of responding in the heat of the moment and then saying that they did not have time to think, the CDM sought to provide officers with guidance on what questions to

think about. Drawing on concepts developed from cognitive behavioral therapy (CBT), the ICAT training guide suggested that over time, drawing on the CDM would become learned behavior for officers, comparable to the automaticity of experienced drivers who did not have to actively think about their driving (Police Executive Research Forum 2016a).

Second, ICAT explicitly rejected concepts such as "drawing a line in the sand" or never backing away from a threat as outdated and unhelpful. Rather, officers were instructed that by slowing situations down, keeping a safe distance from a threat and using cover, officers could de-escalate situations peacefully rather than reaching a point at which lethal force had to be used. This emphasis on nonaggressive communication echoes earlier discussions of successful police–citizen encounters as meeting officers' expectations of authority maintenance on the part of officers and citizens' expectations of being treated with respect. Moreover, the ICAT curriculum explicitly urged agencies to establish clear expectations that officers take as much time as they needed to handle calls.

Given that ICAT training rejected much of the conventional wisdom in policing, there was also a need to create as much "buy-in" among officers as possible. Hence, training was rolled out innovatively, compared to the regular training academy structure. Instead of having the program delivered by regular training personnel, the department identified and recruited 20 informal leaders within the agency, who regardless of rank, assignment, or experience, were well known and widely respected by fellow officers (Hoban & Gourlie, 2019; Police Executive Research Forum 2016a). The department provided those personnel with train-the-trainer instruction on the philosophy and program. These officers then delivered the training to the entire department.

In terms of similarities to earlier interventions and practices, the de-escalation training provided by ICAT was probably the most similar to CIT. However, there are some notable differences. While departments implementing CIT tended to train only some specialist officers, ICAT training aimed to transform all officers' approach to dealing with individuals in crisis. Moreover, where CIT focused on communications, ICAT identified a gap between communications and tactical skills. It provided training in the latter so that in the case where a crisis situation turned dynamic, officers did not resort to the basic defensive tactics in which they were trained (Police Executive Research Forum 2016a).

While the first de-escalation training was carried out in May 2015, the first months of de-escalation training were carried out by the aforementioned first vendor. In total, 71 officers were trained by the first vendor while 432 officers received the ICAT training (a subset of officers received both first-vendor and ICAT training). Panel D of Table 1 provides a more detailed breakdown of the number of officers trained by date. The 71 officers trained by the first vendor were trained on four separate dates, while the PERF training was provided in 14 sessions over the 15 months between September 2016 and December 2017. By the end of 2017, all officers in Camden County Police Department had been trained.

4 | OFFICER-LEVEL ANALYSIS

4.1 | Data

Using administrative data obtained from CCPD, a monthly panel dataset of 432 officers was constructed. The dataset contained monthly data beginning January 2014 and ending in May 2019 (65 months). Training began in May 2015, with the last officers in the dataset receiving training in December 2017. As officers were hired at different times and some of them had left prior to the last month included, the panel dataset was unbalanced.

TABLE 1 Summary statistics of Camden officer-month panel dataset

(a) Panel A: Descriptive characteristics				
Variable	**Mean**	**SD**	**Min.**	**Max.**
UOF incidents	0.092	0.334	0	4
Serious UOF incidents	0.041	0.215	0	4
Incidents involving a firearm	0.0004	0.019	0	1
De-escalation training	0.157	0.364	0	1
PERF-ICAT training	0.517	0.500	0	1
(b) Panel B: Descriptive characteristics in pre- and post-de-escalation training periods				
Variable	**Trained group mean**	**Pretraining mean**	**Posttraining mean**	**Untrained group mean**
UOF incidents	0.100	0.158	0.071	0.090
Serious UOF incidents	0.049	0.080	0.033	0.038
Incidents involving a firearm	0.0009	0.0020	0.0003	0.0002
(c) Panel C: Descriptive characteristics in pre- and post-ICAT periods				
Variable	**Pre-ICAT treated**	**Post-ICAT treated**	**Pre-ICAT comparison**	**Post-ICAT comparison**
UOF incidents	0.127	0.063	0.127	0.094
Serious UOF incidents	0.054	0.029	0.056	0.47
Incidents involving a firearm	0.0005	0.0003	0.0006	0

4.1.1 | Dependent variable

The dependent variable consists of serious use of force incidents. Within the data, use of force incidents were categorized accordingly, from least serious to most: (1) compliance hold, (2) takedown, (3) use of hands/fists, (4) use of feet/kicking, (5) use of pepper spray, (6) use of baton, (7) use of canine, (8) use of conducted energy device, and (9) firearm discharge. Serious use of force incidents were defined as force incidents in which any force more serious than that of a takedown was employed.

Serious use of force incidents is defined as such and deployed as the variable of interest for a number of reasons. First, serious force is arguably a more important outcome than all force incidents: while use of force should be avoided where possible, incidents in which serious use of force is employed by definition carry a heavier risk of injury and loss of human life. Second, as a measure it is also arguably more sensitive to changes in police training regimens: while an officer might still find it necessary to physically restrain a civilian during the course of their duties, de-escalation training if effective would influence them to use less severe forms of force than previously. Third, this study uses a relatively broad definition of serious force. A more stringent definition would restrict serious force incidents to only incidents which involved firearm discharge, or the use of firearms and conducted energy devices (CEDs). As an example, a well-known incident in which de-escalation successfully took place in Camden ended shortly after one of the officers involved fired his Taser (Leahy, 2016). Although that outcome would still be considered serious force by this measure, it was viewed as a successful outcome and a "validation" of de-escalation techniques (Fiedler, 2016). The reason that a more stringent definition of serious force could not be employed was that serious force incidents were relatively rare, and incidents in which firearms are used, the most harmful and

life-threatening form of force, were extremely rare. While the dataset counted 1,766 use-of-force incidents of any level and 775 serious use-of-force incidents, there were just seven incidents involving a firearm. Therefore, firearm incidents were not considered a suitable outcome measure.

4.1.2 | Independent variable

Each officer's training status was expressed in two dummy variables indicating whether the officer in question had previously undergone either de-escalation training or PERF-ICAT training. There were 18 unique dates in which officers underwent either de-escalation or PERF-ICAT trainings. While only 71 officers underwent de-escalation training, all 432 officers included in the dataset underwent PERF-ICAT training.

4.2 | Empirical strategy

To evaluate the effect of de-escalation training on serious use of force, we consider whether individual officers engage in fewer serious force incidents after receiving de-escalation training. This is analyzed at the individual officer by month level using the following equation:

$$\log(Y_{it}) = \beta_0 + \beta_1 \text{PostDeEscalation}_{it} + \beta_2 \text{PostPERFICAT}_{it} + \text{Officer}_i + \text{YearMonth}_t$$

The dependent variable Y_{it} refers to the number of serious use of force incidents that officer i was involved in during the month t. $\text{PostDeescalation}_{it}$ is a dummy variable indicating whether the officer i had received first-vendor de-escalation training during that month t or any previous month, and PostPERFICAT_{it} indicates whether the officer i had received PERF-ICAT training during month t or any previous month.

This analysis is conditioned on two sets of fixed effects. First, officer fixed effects, Officer_i, account for unobserved heterogeneity that is constant over time, but which varies by officer. This ensures that serious use of force incidents are not being compared between different officers, but serious force among the months prior to and after de-escalation training is implemented for a particular officer. Second, the analysis is conditioned on month fixed effects, YearMonth_t. As the crime rate in Camden dropped, it might be that officers engaged in less force because they were working in an environment that became safer over time. Month fixed effects accounts for this possibility, as well as other external factors.

Officer-level data on the number of arrests or crimes responded to, which would otherwise have served as valuable controls, were not available. Given that officers exposed to more encounters with citizens are more likely to use force, the lack of information on such measures impose limitations on the study's ability to understand if officers who underwent de-escalation training were also engaging in depolicing.

Serious force incidents are rare. An individual officer engages in an average of 0.041 incidents every month, which makes the Poisson regression the most suitable method of analysis for data (MacDonald & Lattimore, 2010; Wooldridge, 2010). Further, standard errors are clustered by officer to account for serial correlation (Bertrand, Duflo, & Mullainathan, 2004).

5 | DEPARTMENT-LEVEL ANALYSIS

5.1 | Data

Data for the department-level analysis consisted of administrative data from the police departments of the 36 largest municipalities in New Jersey. These data were obtained from *The Force Report*, a centralized database published by NJ Advance Media, which acquired the data via public records requests to all municipal and state police departments in New Jersey. The data were input and cleaned by a third-party company, then audited and standardized by NJ Advance Media staff. The incident-level database contains information on the dates, times, type of force used in each incident, the race and age of each subject, and the name of each officer (NJ Advance Media, 2019). It should be noted that New Jersey has a statewide policy which mandates the reporting of all use of force incidents, using either a state-provided report form or the format required by the law enforcement agency in question (New Jersey Attorney General, 2000). However, at the time of NJ Advance Media's reporting, there was no centralized database of use of force reports by the state, which NJ Advance Media sought to remedy via The Force Report. Since its publication, the state of New Jersey has announced plans to launch a statewide database of use of force (Napoliello & Sullivan, 2020).

This data was compiled into a department-by-quarter dataset. The synthetic control analysis employs quarterly use of force data from departments with jurisdiction over 35 out of 36 of the largest municipalities in New Jersey.[2] All included municipalities had a population of at least 50,000 people at the beginning of the study period, with Camden's population ranking as the 12th largest in New Jersey making it close to the median in terms of population, albeit at the top with regards to crime. Beginning the first quarter of 2012 and ending the last quarter of 2016, the balanced panel dataset consists of 35 departments $\times$ 20 quarters $=$ 700 rows.

5.1.1 | Dependent variable

The dependent variable was the rate of serious use of force incidents per 1,000 arrests each quarter. As with the officer-level analysis, serious force incidents were any events in which any force more serious than that of a takedown was employed.

5.1.2 | Independent variable

Despite the presence of multiple training dates, the date of intervention is taken as the date on which the first officer was trained (May 2, 2015). As only 17 officers were trained on the date, this provides us with a somewhat conservative estimate.

Following the county takeover of policing in Camden and prior to the implementation of de-escalation training, CCPD had already incorporated changes such as improved collection of data, particularly pertaining to use of force. This would also make the estimated effect more conservative, given that we expect more serious force incidents to be recorded after the dissolution of Camden Police Department (CPD) in Q5 compared with the number of incidents recorded during the CPD regime of Q1–4, including during the postintervention period of Q14–20.

5.2 | Empirical strategy

The synthetic control method, pioneered by Abadie, Diamond, and Hainmueller (2010), is a method of counterfactual estimation which constructs a synthetic control unit similar to the treatment unit on observable preintervention outcomes. Synthetic controls work best where only one unit is exposed to the intervention of interest, unlike difference-in-differences studies where multiple units may receive the intervention at different times. The method has been used to consider the effect of California's tobacco control program on tobacco consumption (Abadie et al., 2010) and the effect of catastrophic natural disasters on economic growth (Cavallo, Galiani, Noy, & Pantano, 2013); in the area of criminal justice, synthetic controls have been deployed to evaluate the crime effects of raising the age of majority (Loeffler & Chalfin, 2017), place-based crime interventions (Saunders, Lundberg, Braga, Ridgeway, & Miles, 2015) and right-to-carry laws (Donohue, Aneja, & Weber, 2017).

In the context of a department-level intervention, a synthetic Camden, composed of a weighted average of other municipal New Jersey departments that have not implemented such training, is created for comparison purposes. Each department is assigned an analytic weight, so that the difference in the preintervention outcome between the treated department (CCPD) and its synthetic control is minimized. The method therefore meets the assumption of parallel trends prior to the intervention.

The synthetic control provides a supplementary means of exploring the effect of CCPD's de-escalation training on serious use of force. Where the first approach took individual officers as the unit of analysis, the synthetic control as deployed in this study considers the department's force levels in the postintervention period, with the outcome that would have been observed had the department not undergone de-escalation training.

This is a critical component of the empirical analysis. An analysis that explores the effect of de-escalation training on individuals, comparing officers who received the treatment earlier with officers who were treated later, as conducted in the DiD, potentially neglects the behavioral peer effects of de-escalation training on the latter. Officers that received de-escalation training may affect the behavior of officers who had not yet been trained, reducing the latter's force rates. A comparable case is provided in Miguel and Kremer (2004) study of school-based mass deworming treatment in rural Kenya, in which it was found that deworming reduced worm burdens not only in schools which received the treatment, but also had similar effects among children in neighboring primary schools. Within the policing context, spillovers have been detected in body-worn camera RCTs. Repeated exposure changed officers' behavior even when they are not assigned to the treatment condition (Ariel et al., 2017; Ariel, Sutherland, & Sherman, 2019), leading Ariel et al. (2017) to dub the phenomenon "contagious accountability."

As discussed earlier, Camden has much higher levels of serious use of force than other municipalities in New Jersey. This study employs Doudchenko and Imbens (2016)'s (henceforth referred to as DI) adaptation of Abadie et al. (2010) (ADH)'s synthetic control procedure. The ADH synthetic control procedure involves a number of restrictions that DI proceed to relax, namely that there can be no intercept and that weights must sum to one. Further details can be found in the Appendix.

6 | RESULTS

6.1 | Descriptive characteristics for officer-level analysis

Table 1 provides the descriptive characteristics of the Camden officer-month panel dataset. Panel A of that table provides overall statistics. Use of force incidents were relatively rare, with 0.092 incidents occurring per officer and month. Serious use of force incidents were even rarer, with an average of 0.042 incidents. Incidents involving firearms were rarest of all, at 0.00004 incidents per officer and month. 15.7% of officer-by-month rows were given de-escalation training by the first vendor, while 51.7% of officer-by-month rows were provided with PERF's ICAT training.

Panels B and C disaggregate officers by whether, and when, they received de-escalation training from the first vendor and PERF respectively. The first column of Panel B provides the mean on key measures of force (all use of force incidents, serious use of force incidents, and incidents involving firearm use) for the group that underwent training by the first vendor, while the second and third columns disaggregate those figures into the pretraining mean and the posttraining mean. Compared to the untrained group, the group that was trained engaged in more use of force, more serious use of force, and more force incidents involving firearms, throughout the study period. Following the implementation of de-escalation training, use of force amongst the group of trained officers seemed to decrease: use of force incidents fell from a mean of 0.158–0.071, serious use of force incidents fell from 0.080 to 0.033, and the mean of incidents involving a firearm fell from 0.002 to 0.0003.

All officers in the dataset underwent ICAT training. However, a comparison group was iteratively constructed based on officers who had not been trained during each training date (e.g., if an officer received ICAT training in 2017, during the month of September 2016, when ICAT trainings were first rolled out, they would be considered a member of the untrained group). Panel C of Table 1 compares pre-ICAT means of force with post-ICAT means of force amongst the treated and comparison groups. Similarl to the first vendor's de-escalation training, following ICAT training force seemed to decrease for the treated group: from 0.126 to 0.063 for use of force incidents, from 0.054 to 0.029 for serious force incidents, and from 0.0005 to 0.0003 for incidents involving a firearm. However, the comparison group saw posttraining decreases in force as well, albeit ones that were smaller. The only exception was the firearm incident variable, where the comparison group saw a decrease from 0.0006 in the pretreatment period to 0 in the post. However, given how rare the outcome was, that difference should be treated as negligible.

Figure 1 presents the rollout of training, with the cumulative number of officers trained during each month. These exact training dates are presented in Table A1, which is in the appendix.

Figure 2 presents the mean number of use of force incidents each officer engaged in each month within a 24-month period: 12 months prior to training, and 12 months after training. Strictly speaking, there is no "control" group as all officers in the dataset were trained by the end of the study period. However, the graph presents as a control group the 109 officers who were trained from March 2017 onwards and takes the 24-month period prior to training as the appropriate observation window. The incidence of use of force does not seem sufficiently dense to present meaningful trends as the serious force variable was even sparser, it was not presented in the figure. However, Figure 2 does suggest that trends in use of force between the two groups of officers were not wildly divergent prior to the implementation of training.

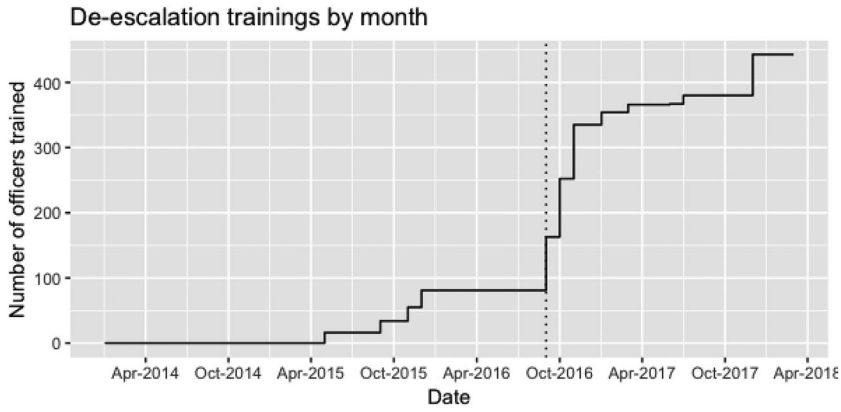

FIGURE 1 De-escalation training rollout in Camden County, New Jersey

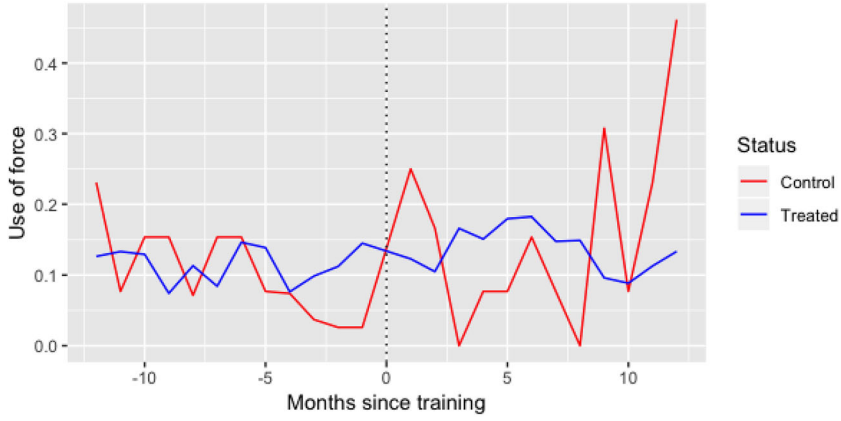

FIGURE 2 Use of force before and after training [Color figure can be viewed at wileyonlinelibrary.com]

6.2 | Main results for officer-level analysis

The results of the Poisson analysis are presented in Table 2. The result of PERF's ICAT training is presented in the column on the left, which shows an Incident Rate Ratio (IRR) of 1.294. While this would suggest that ICAT training actually resulted in an increase of serious force levels by 29.4%, the standard error and *p*-value of .291 and .251 respectively are too large for the result to be considered significant. Similarly, the IRR for the other de-escalation training program is 1.05 but is

TABLE 2 Results from officer-level analysis

	PERF-ICAT training	De-escalation training
$\exp(\widehat{b})$	1.294	1.050
$se(\widehat{b})$	0.291	0.211
p	0.251	0.808
[CI]	[0.833, 2.011]	[0.701, 1.557]
Observations = 19,134		

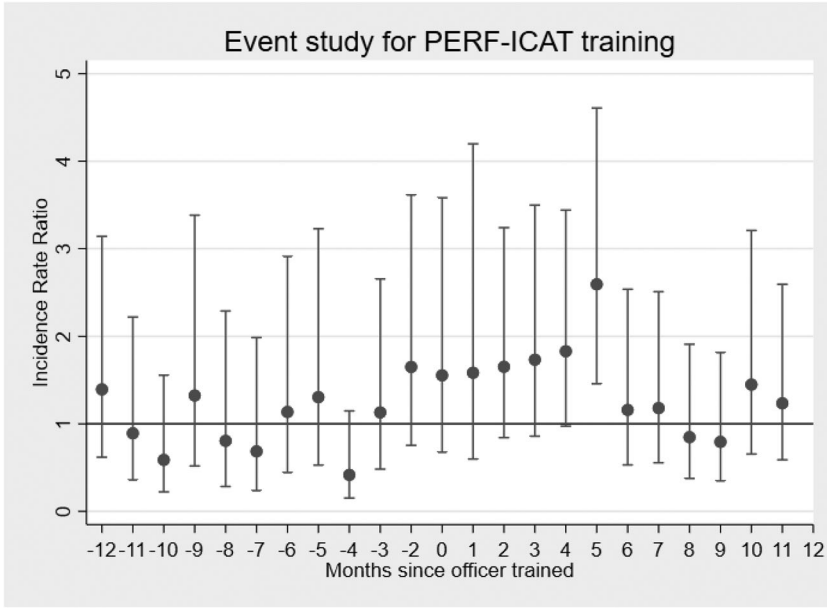

FIGURE 3 Event study for PERF-ICAT training

insignificant. On an individual officer level, it seems that neither type of training show significant changes in serious use of force levels.

6.3 | Event study for officer-level analysis

The event study exploits the fact that de-escalation training was rolled out over a period of time. Essentially, officers which underwent training X months ago are treated as equivalent to each other, even if they were trained on different dates that is, an officer trained in the month of September 2016 is, in December 2016, the same position as an officer trained in December 2016 is in March 2016.

$$\log(Y_{it}) = \alpha + \sum_{s=-12}^{12} \beta^s I\left[D_{it}^s = 1\right] + \gamma_i + \omega_t$$

D^s represents the event dummies, which are equal to one when officer i was trained in de-escalation s months ago as of year t. The analysis is performed using serious force incidents within 12 months (before and after) of training for each officer, with standard errors being clustered at officer level. As with the main analysis, officer and month fixed effects are employed. By conducting an event study, one can evaluate both whether there are force trends prior to training, and how levels of force change, on a monthly basis, after the intervention. Note: s = −1 or the month prior to implementation is the reference year, and as such was excluded from the regression.

Figure 3 plots the coefficients and their confidence intervals following the Poisson regression of serious use of force incidents on event dummies. The horizontal axis represents the dummy variables for the number of years prior to and after Department of Justice (DOJ) intervention. The vertical axis represents the IRR for the dummy variables, with IRR = 1 indicating no change.

The dot marks the point estimates and the error bars represent the 95% confidence intervals. With the single exception of T = 5, the bars suggest that there are no marked pre- and posttreatment trends, given that the error bars on each of the dummy variables range across IRR = 1. $T = 5$ suggests an increase in serious force 5 months after each officer is trained. Together, the event study suggests no marked pre- or posttreatment trends.

6.4 | Descriptive characteristics for department-level analysis

In Table 3, the summary statistics for the New Jersey department-quarter panel dataset used in the synthetic control analysis are presented. Out of the 35 law enforcement agencies in New Jersey included in the dataset, a mean of 22.85 use of force incidents occurred every month. Fewer than half (10.09) were serious force incidents, while incidents involving a firearm were extremely rare 0.229 per department per month. The statistics are also standardized by arrest since arrest can be a proxy for the amount of contact between officers and civilians, which can vary by jurisdiction and affect the likelihood of a force encounter.

Panel B disaggregates these figures into departments which received the de-escalation intervention, and departments that did not. Since Camden was the only department to implement de-escalation training during the study period, its force statistics are provided in Column 1. Columns 2 and 3 disaggregate the figures presented in Column 1 to the preintervention period (Q1–13, prior to the date of first training in Q14) and the postintervention period (Q14 onwards). Columns 4–6 present use of force figures for departments other than Camden.

Overall, Camden officers engaged in more use of force than officers in other New Jersey Departments. For all use of force incidents, the mean was 90.95, compared with 20.26 in other departments. For serious force incidents, this was 37.5 compared with the mean of 9.02 of other departments. For incidents involving a firearm, on average Camden officers engaged in 0.9 incidents per quarter compared with 0.20 for officers from other departments.

There was a clear drop in use of force after the intervention took place. For the quarters preceding the implementation of de-escalation training, an average of 99.6 use of force incidents occurred every quarter. After the intervention, the average fell to 74.9. There was an even greater reduction in serious force incidents, from 47.8 to 18.3. The difference was marked even when these numbers were standardized by arrest, suggesting that use of force did not fall simply because officers made fewer arrests or initiated fewer encounters. Other New Jersey departments marked no such reductions.

Figure 4 presents the number of serious force incidents per 1,000 arrests in a quarterly graph. The line in red represents serious force incidents for Camden throughout the study period, whereas the line in blue represents an unweighted average of the other New Jersey departments included in the dataset. There is an intercept at Q5 to reflect the date at which Camden Police Department was dissolved and Camden County Police Department took over law enforcement duties in Camden (first quarter of 2013), and an intercept at Q13 to show the last period prior to intervention (first quarter of 2015). The figure shows that Camden had a much higher rate of serious force than the rest of New Jersey until the intervention began, when it fell beneath the New Jersey average.

Figure 5 shows the rate of serious force per 1,000 arrests respectively for Camden and the five largest municipalities in New Jersey: Newark, Jersey City, Paterson, Elizabeth, and Edison. Camden's status as a high-crime, high-force city makes it comparable to these more populous

TABLE 3 Summary statistics of New Jersey department-quarter panel dataset

Panel A: Descriptive characteristics				
Variable	**Mean**	**SD**	**Min.**	**Max.**
UOF incidents	22.85	21.52	0	150
Serious UOF incidents	10.09	11.89	0	72
Incidents involving a firearm	0.229	0.643	0	6
UOF per 1,000 arrests	145	91.2	0	727
Serious UOF per 1,000 arrests	58	47.7	0	364
Firearm incidents per 1,000 arrests	1.25	4.17	0	45

Panel B: Descriptive characteristics of Camden vs. other departments						
Variable	**Camden**	**Preintervention Camden**	**Postintervention Camden**	**Other departments**	**Other departments preintervention**	**Other departments postintervention**
UOF incidents	90.95	99.62	74.9	20.26	20.20	20.37
Serious UOF incidents	37.5	47.84	18.3	9.02	9.46	8.20
Incidents involving a firearm	0.9	1.15	0.43	0.20	0.22	0.18
UOF per 1,000 arrests	208	245	142	139	135	149
Serious UOF per 1,000 arrests	92.1	123	34	56.19	58.5	51.9
Firearm incidents per 1,000 arrests	2.25	2.94	0.97	1.18	1.10	1.34

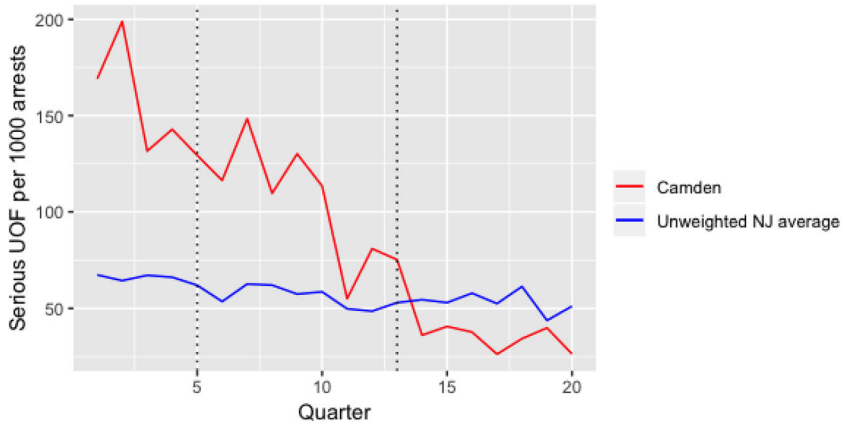

FIGURE 4 Use of force incidents per 1,000 arrests [Color figure can be viewed at wileyonlinelibrary.com]

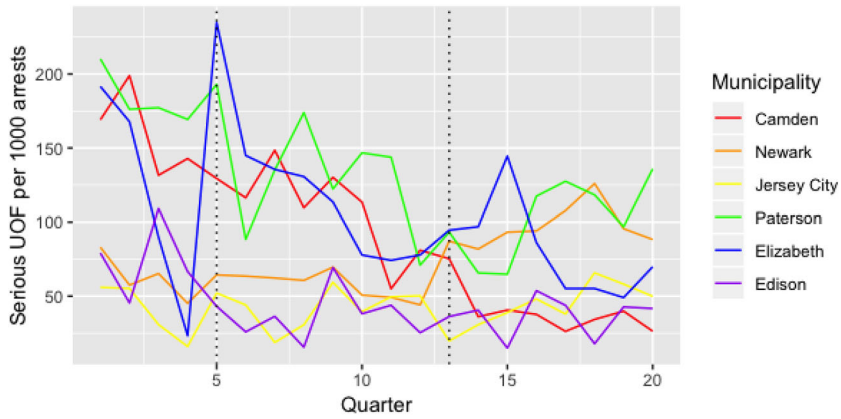

FIGURE 5 Trends in serious use of force: Camden vs. five largest New Jersey cities [Color figure can be viewed at wileyonlinelibrary.com]

cities. There, the incidence and rates of force are more comparable to that of Camden's, although the trends seem markedly different.

Figure 6 shows a graph of Camden's force incidents broken down by force level. As with Figures 3 and 4, there is an intercept at Q5 to reflect the county's takeover of policing duties and an intercept at Q13 to show the last period prior to intervention (first quarter of 2015). The figure shows that compliance holds, the least severe form of force, were also the most commonly used. Additionally, they accounted for much of the postintervention decline in total force. The use of hands (for punching), or the least severe form of force still considered "serious force," were the most commonly used form of serious force. Out of the forms of force considered serious, hands and legs accounted for most of the post-Q13 decline in total serious force, while other forms of serious force such as pepper spray, use of batons, and other weapons (comprising canines, stun weapons, and guns), were too rare to account for much of this decline.

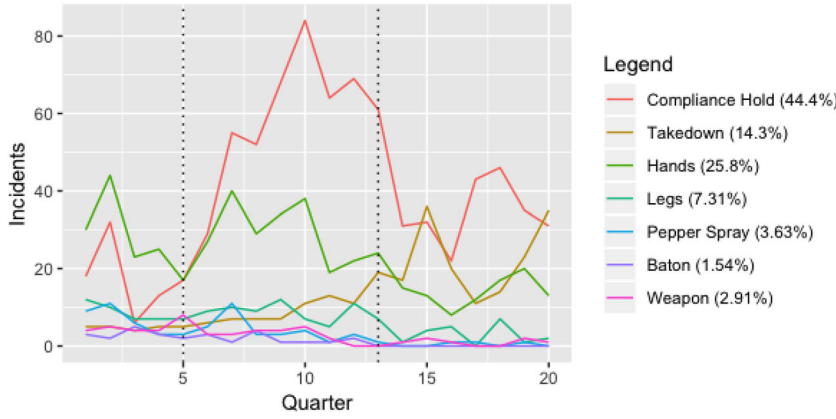

FIGURE 6 Trends in Camden use of force: breakdown by force level [Color figure can be viewed at wileyonlinelibrary.com]

6.5 | Main results for department-level analysis

The individual-level analysis suggested that de-escalation training failed to have any significant effects on serious force. However, there are several challenges to that approach. First, the implementation of de-escalation training was not randomized training was first rolled out to officers who were well respected within in the department, in order to convince personnel who may otherwise have been skeptical about the training that it was valuable (Police Executive Research Forum 2016a). Despite the use of officer fixed effects to address differences in force levels, training receptivity, and general behavior between officers, an analysis of individual force rates may be insufficient, given that individual officers' behavior is subject to peer influence. Recent studies (Ouellet, Hashimi, Gravel, & Papachristos, 2019; Quispe-Torreblanca & Stewart, 2019) have found that officer involvement in excessive use of force complaints or misconduct can be explained by exposure to peers accused of similar; it stands to reason that positive peer influence may also reduce such behaviors. In this case, nontrained officers may be influenced by others who had undergone the training, thus adapting their behavior to mimic trained officers and thereby reducing force levels. The synthetic control analysis is thus deployed to address potential spillover effects in the individual officer analysis.

Table 4 displays the weights of each control municipality in the synthetic Camden. The weights reported indicate that serious use of force trends in Camden, New Jersey prior to the introduction of de-escalation training is best reproduced by a combination of ten municipalities (Edison, Middletown, Old Bridge, Bayonne, Union Township, Piscataway, Irvington, Howell, Hoboken, and West New York). All other municipalities in the donor pool are assigned zero weights. As discussed in the Methods section, the DI synthetic control method used in this study rejects the ADH restriction that weights must be less than one or sum to one, since it is implausible if the outcome for the treatment unit is systematically larger than that in the control units.

Figure 7 displays serious use of force rates for Camden and its synthetic counterpart during the period 2012–2016. It is to be noted that, in contrast to the unweighted New Jersey average shown in Figure 4, serious force levels in synthetic Camden closely track those in "real" Camden throughout the entire preintervention period. Following the introduction of de-escalation training, however, outcomes diverge with synthetic Camden's outcomes. The real Camden experienced a marked

TABLE 4 Municipality weights in the synthetic Camden

Municipality	Weight	Municipality	Weight
Newark	0	Gloucester township	0
Jersey City	0	East Orange	0
Paterson	0	Bayonne	0.094
Elizabeth	0	Franklin	0
Edison	0.134	North Bergen	0
Woodbridge	0	Vineland	0
Lakewood	0	Union Township	0.465
Tom's River	0	Piscataway	1.249
Hamilton	0	New Brunswick	0
Trenton	0	Jackson	0
Clifton	0	Wayne	0
Brick	0	Irvington	0.079
Cherry Hill	0	Howell	0.071
Passaic	0	Perth Amboy	0
Middletown	0.306	Hoboken	0.114
Union City	0	Plainfield	0
Old Bridge	0.426	West New York	0.150

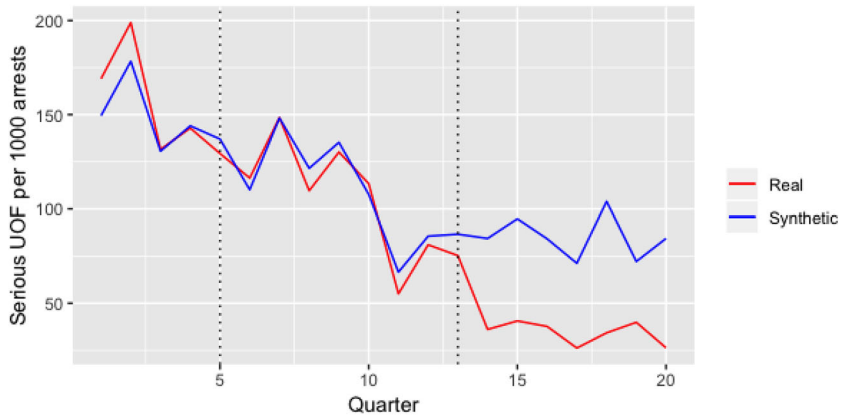

FIGURE 7 Trends in serious UOF incidents: Camden versus synthetic Camden [Color figure can be viewed at wileyonlinelibrary.com]

decline compared to serious force rates exhibited by its synthetic counterpart. The discrepancy between those two lines suggest that de-escalation training had a large negative effect on serious uses of force.

Figure 8 plots the quarterly estimates of the impacts of de-escalation, that is, gaps in serious use of force incidents, between synthetic Camden and the real city. The figure suggests that de-escalation had a large and sustained effect on serious force. Across the postintervention period, the number of serious force incidents dropped by an average of 50 incidents per 1,000 arrests each quarter, a decline of approximately 40%.

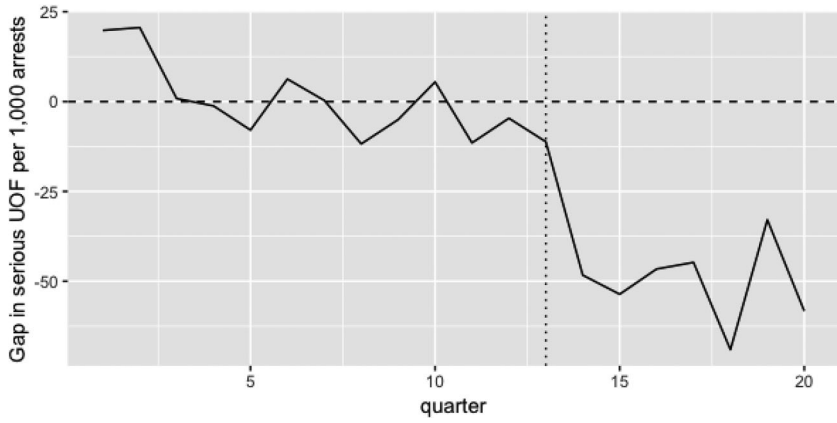

FIGURE 8 Serious UOF rate gap between Camden and synthetic Camden

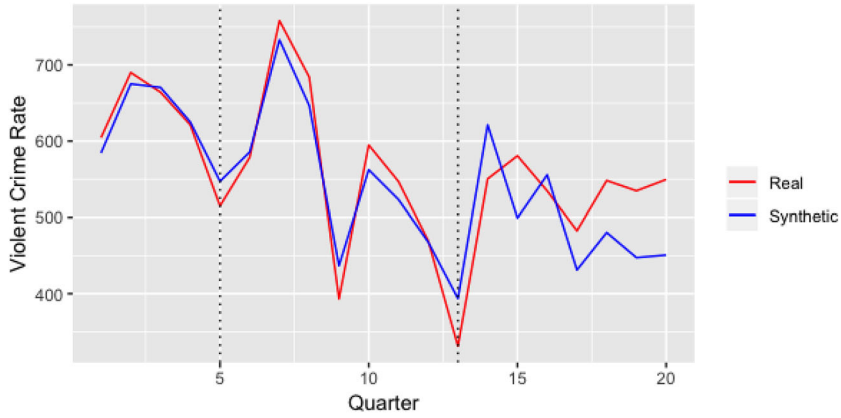

FIGURE 9 Trends in violent crime: Camden vs. synthetic Camden [Color figure can be viewed at wileyonlinelibrary.com]

6.6 | Crime as a dependent variable

While most would agree that reducing serious use of force is a desirable goal, concerns have been raised that training police officers to de-escalate situations rather than engaging in force will increase crime rates if it causes the environment that police officers operate in to become more dangerous, thereby causing police officers to withdraw from proactively enforcing the law. Similar discussions have been raised with respect to a purported Ferguson effect, in which increased scrutiny of the police ostensibly causes depolicing due to fear of negative attention over racial profiling or use of force. The evidence for such an effect is mixed (Pyrooz, Decker, Wolfe, & Shjarback, 2016; Rosenfeld, 2015; Shjarback, Pyrooz, Wolfe, & Decker, 2017). However, if increased crime is a consequence of de-escalation training, this is necessarily a trade-off that policymakers should weigh in considering whether to implement de-escalation training more widely.

To ascertain this relationship, the synthetic control analysis was rerun, this time using the violent crime rate as the outcome of interest. The results are presented in Figure 9. The violent crime rate that occurred in postintervention Camden did not diverge significantly from that presented by

its synthetic counterpart. Moreover, the figure shows that a drop in violent crime in Camden did occur from Q7 onwards, suggesting that a fall in the crime rate could have contributed to declining force levels prior to the implementation of de-escalation training. Weights are presented in Table A2, which is in the Appendix.[3]

7 | ROBUSTNESS CHECKS

7.1 | Officer-level analysis: Counts of force weighted by seriousness

As an alternative to using serious force incidents as the dependent variable, all use of force incidents were weighted by seriousness and added up to produce an aggregate measure. The least severe form of force, compliance holds, were assigned one point, while the next least severe form of force, takedowns, were assigned two points, etc., with the most severe form of force (firearm use) being assigned nine points. Despite the inclusion of all forms of force in the measure, a positive value for the weighted measure continued to be a rare occurrence. Therefore, a Poisson regression was applied, as in the main analysis.

Results for the analysis are presented in Table A3, which can be found in the Appendix. The results are in the main similar to that of the main analysis, in that both trainings are found to have an insignificant effect on individual officers' force levels.

7.2 | Department-level analysis: Poisson regression

A Poisson analysis was applied to the department-quarter panel dataset that was originally used in the synthetic control analysis. This is analogous to a synthetic control analysis in which the control municipalities are all equally weighted (Doudchenko & Imbens, 2016). However, demographic control variables are also included. The equation and results can be found in the Appendix. The analysis suggested that de-escalation training had a negative and significant effect on serious use of force, reducing it by over half (IRR 0.426), which was even larger than the effect suggested by the synthetic control analysis.

7.3 | Department-level analysis: Testing for anticipation effects

It is plausible that individual officers began changing their behavior prior to the implementation of de-escalation training, in response to expectations that they would be undergo it in the future. Anticipation effects usually cause treatment effects to be underestimated, because the before–after comparison attributes anticipatory treatment effects to the before period, and thereby "not only ignores, but deducts, anticipatory treatment effects from the overall treatment effect" (Malani & Reif, 2015).

Despite the fact that anticipation effects, if any exist, would provide conservative estimates, this check reran synthetic controls counting Q13 as the quarter the treatment began to subsume any anticipation, one quarter earlier than the timing of the actual treatment. Weights for this analysis and its results are presented in the appendix. Trends for Camden's synthetic counterpart largely resemble that of the main analysis, with the exception that outcomes for real and synthetic Camden are seen to diverge earlier. A possible explanation is that the decline in use of force should

be attributed not to the implementation of de-escalation training, but to the county's takeover of policing, which began much earlier in Q5.

7.4 | Department-level analysis: All force incident outcomes

As noted earlier, only serious force incidents were deployed as the outcome in the main analysis. The reason for this is that de-escalation training by definition aims to influence officers to use less severe forms of force than previously, whereas avoiding any force whatsoever, even takedowns or compliance holds, may not be possible during the course of officers' duties. Despite the fact that deploying serious use of force as an outcome arguably possesses more external validity than considering all force incidents, including low-level ones, it might be that officers in Camden County continued to routinely deploy low-level uses of force against civilians even as de-escalation training resulted in a decrease in the most serious and rare forms of use of force. Further, the measure of all force incidents is certainly denser, making it easier for the synthetic control to track outcome trends measured in Camden. Therefore, this check consisted of running a synthetic control analysis in which the outcome measure was all force incidents.

Weights and the results of the analysis are presented are in the Appendix. Force incidents (standardized by arrest) fell by 63.5% following the implementation of de-escalation training.

7.5 | Department-level analysis: More serious force incident outcomes

Despite the restriction of the outcome to serious force events only in the main analysis, a relatively loose definition of "serious" force was employed, consisting of any incident in which force more serious than a takedown was employed. As one proceeds up the force spectrum, incidents involving more serious forms of force become increasingly rare, which makes it difficult to estimate overall trends using weighted averages of the control units. This robustness check uses a more stringent definition of serious force, including any form of force in which firearm and non-firearm weapons are used, specifically batons, canines, conducted energy devices, and firearms. It excludes force incidents in which officers used their hands or fists, or legs or feet, as were included in the original analysis.

Weights and the results of the analysis are presented in the Appendix. presents the results of this analysis. Outcomes in real Camden decreased by approximately 68% compared with its synthetic counterpart.

7.6 | Department-level analysis: Placebo tests for randomization inference

There is a possibility that the results showing Camden's dramatic decrease in serious force incidents following the implementation of de-escalation training could be driven entirely by chance. In order to test this hypothesis, a placebo test is employed by applying the synthetic control method to every control unit in the dataset, as with Abadie and Gardeazabal (2003; Abadie et al., 2010; Bertrand et al., 2004). In effect, each New Jersey municipality in the dataset that did not train its officers in de-escalation during the study period is treated as if it had implemented the training beginning Q14. In each iteration, the study assigns "treatment" to one of the 34 control

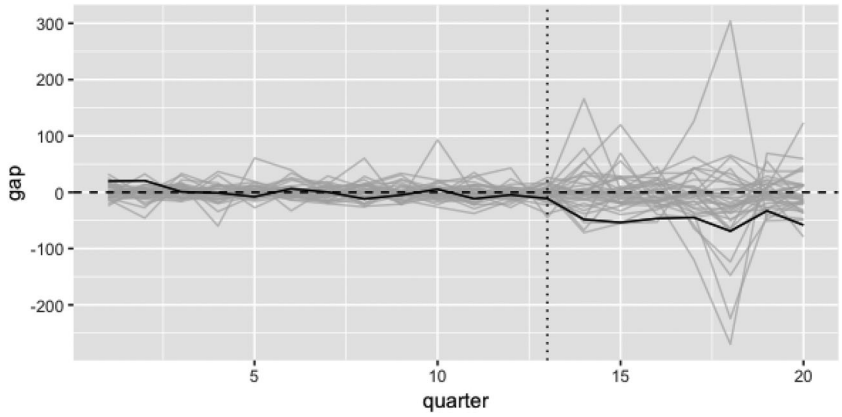

FIGURE 10 Gap in rate of serious force in Camden and placebo gaps in all 34 control municipalities

municipalities, shifting Camden to the donor pool. The estimated effect associated with each placebo run is then computed.

If the placebo studies create gaps for the difference in real and synthetic outcomes, of magnitude similar to that shown in the main results, then the analysis would suggest there is no significant evidence that de-escalation training reduced serious force in Camden. However, if the placebo studies show that the gap estimated for Camden is unusually large relative to the gaps for the municipalities that did not implement de-escalation training, then the analysis would provide significant evidence of a negative effect of de-escalation training on serious force.

Figure 10 displays the results for the placebo test. The grey lines represent the gap associated with each of the 34 iterations of the test, or the difference in serious use of force between each municipality in the donor pool and its respective synthetic counterpart. The superimposed black line denotes the gap estimated for Camden. The estimated postintervention gap for Camden during the 2012–2016 period is not large compared to that for some of the placebo effects. However, some of the large postintervention gaps may be from iterations of the placebo test which also produced large preintervention gaps, indicating a poor fit overall.

To calculate the extent to which the synthetic control analysis tracks with actual force outcomes, the root mean squared prediction error (RMSPE) is a useful measure. The mean squared prediction error takes the difference between the number of serious force incidents predicted by the synthetic control and the number of serious force incidents that actually occurred in each quarter, squares the figure to eradicate differences in sign, and then takes the mean. The square root of this number is then calculated to indicate how far off, on average, the synthetic control analysis was, from the actual reported outcome. A small RSMPE in the pre-period would indicate that the synthetic control is a good fit, whereas a large RSMPE in the pre-period would indicate a poor fit. In the main analysis, the pre-period RSMPE in the Camden synthetic control analysis was 10.35 and the postperiod RSMPE was 136.46. This indicates that in the preperiod, the synthetic Camden tracked its real counterpart fairly closely, and was "off" by an average of 10.35 serious force incidents per 1,000 arrests each quarter. In the postperiod, outcomes for Camden and its synthetic counterpart diverged by an average of 136.46 serious force incidents per 1,000 arrests each quarter.

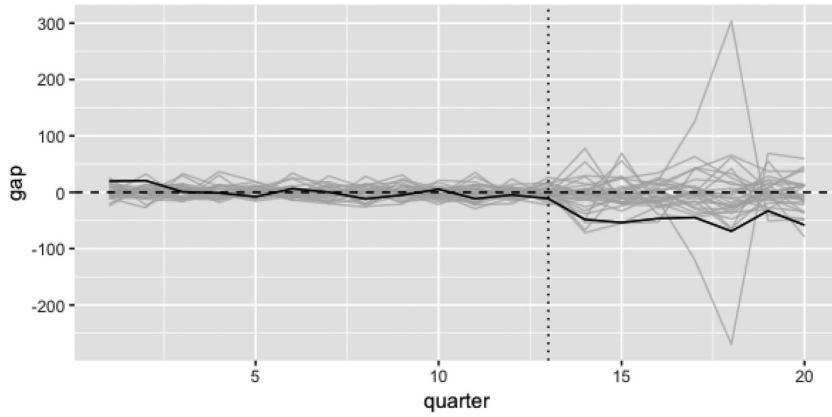

FIGURE 11 Gap in rate of serious force Camden and placebo gaps in all 29 control municipalities, excluding tests with a pre-intervention RMSPE of over 20

Compared with other municipalities included in the dataset, the RMSPE for the Camden synthetic control in the pre-period was about average the pre-period RMSPE for all municipalities had a mean of 13.2, and the largest RMSPE reported was 31.4 (Elizabeth).

Municipalities which show a high RMSPE during the pre-period do not provide useful information about the relative rarity of estimating a large postperiod gap for a municipality that was well-fitted prior to the intervention. Therefore, placebo tests that resulted in a preintervention RMSPE of over 20, nearly twice that of Camden's, were removed from the pool. This comprised the placebos for five municipalities: Elizabeth, Hoboken, Jackson, Passaic, and Perth Amboy. The analysis is then presented in Figure 11. Camden now has one of the largest postintervention gaps out of 30 municipalities, but still not the largest. Ultimately, given that the pool is limited to 30 municipalities, the placebo test is underpowered. However, the findings suggest it has the third-largest postintervention gap.

8 | LIMITATIONS

There are a number of limitations to this study, which will be discussed here. Although findings from the synthetic control analysis suggests de-escalation training reduced serious force in Camden by some 40%, these findings should be interpreted with extreme caution. First, the trend data for use of force in Camden was decreasing prior to intervention. Despite the creation of a synthetic control to account for this, the reform-oriented environment created by the dissolution of Camden Police Department and the county takeover of policing services means we cannot exclude the possibility of other changes having more effect on serious force than de-escalation itself. After 2013, Camden County Police Department implemented several changes, such as the collection of detailed force data, that related to how policing was carried out in Camden. It is highly plausible that the general reorganization of policing in Camden County that began in 2013, were still in progress in 2015 when de-escalation training was introduced.

Second, the de-escalation training was not implemented on a treatment–control group basis. The officer-level analysis yielded no significant results, suggesting either the ineffectiveness of de-escalation training or peer influence of nontrained officers by officers who had undergone the

training. In order to test for this, a synthetic control analysis was used to compare CCPD's serious force levels as a whole with other municipal law enforcement agencies in New Jersey.

This brings us to the third limitation of the study. Given that Camden is an outlier in crime levels, demographic factors, and serious force levels, it was hard to find a synthetic control unit that provided a good match for the city. In order to address this, Doudchenko and Imbens (2016)'s adaptation of the original Abadie et al. (2010) or ADH synthetic control method was used to relax some of the restrictions that resulted in a poor fit. However, this choice meant that only pre-period trends of the outcome measure were used as the basis of matching, rather than taking into account potential control factors such as crime levels and demographics, as ADH do. Checks on the robustness of these results were somewhat mixed. While a placebo test suggested that the postintervention gap between Camden and its synthetic counterpart was large, other municipalities that did not implement de-escalation training for their police force showed comparably large postintervention gaps as well. On the other hand, a regression analysis of the department-by-quarter panel dataset used in the synthetic control analysis corroborated the initial finding that de-escalation training resulted in a large decrease in serious force incidents.

9 | CONCLUSION AND POLICY IMPLICATIONS

In the wake of the 2020 deaths of George Floyd, Breonna Taylor, Tony McDade, and other Black Americans at the hands of the police, policing reform in Camden County, New Jersey, has become a flashpoint of national debate amidst protests against police brutality and emerging calls to defund the police (Fussell 2020; Landergan, 2020). As a key component of Camden's new policing regime, its de-escalation program has come under particular scrutiny. Yet, empirical verification of it and similar programs remain forthcoming despite their widespread implementation in law enforcement contexts throughout the United States.

The present study examined, using both an individual-level and a department-level analysis, whether de-escalation training resulted in fewer serious use of force incidents. While the former analysis revealed no significant effects of de-escalation training, the latter suggested that serious force incidents fell by 40% following the intervention, even accounting for the secular downward trend in the department's force levels. This is a large decrease, particularly compared to other measures that have been evaluated for their ability to reduce use of force, such as consent decrees (Goh, 2020), less lethal weapons (MacDonald et al., 2009), and body-worn cameras (Lum, Stoltz, Koper, & Amber Scherer, 2019). The analysis was found to be robust to a number of checks conducted on the main analysis.

A possible reason for the discrepancy between the analysis of individual officers and the department as a whole is the presence of huge spillover effects within CCPD, which are not available between law enforcement agencies in different New Jersey municipalities. A similar effect has been detected in body-worn camera RCTs (Ariel et al., 2017; Ariel et al., 2019), in which repeated exposure to the technology changed officers' behavior even when they were not assigned to the treatment condition. This effect has implications for how future experiments should be designed to account for precisely such a phenomenon. In the case of body-worn cameras, Ariel et al. (2019) argue for the randomization of treatment by shift. Where de-escalation training is concerned, a cluster randomized trial by precinct or district may be most appropriate.

In addition to the large decrease in serious use of force, the study also found that there were no significant increases in the violent crime rate following the intervention. This may be reassuring to policymakers weighing potential trade-offs between decreased use of force and an increased crime

rate. Future research should assess the effect of de-escalation trainings on adjacent outcomes, such as officer injury, excessive force complaints, and arrests.

These findings are cause for optimism—but such optimism should be tempered with a heavy dose of caution on the part of law enforcement executives and policymakers. As discussed, the secular downward trend in serious force incidents prior to the introduction of de-escalation training suggests that while the training may have contributed to the decline in force, there is a strong possibility that the new policing regime introduced after the county takeover of policing, in which not only officers from the old city department were rehired (Doubek, 2020), might have had a greater effect on serious force. If anything, the unique policing context of Camden as a high-crime, high use-of-force jurisdiction that recently experienced a major policing reorganization may well pose an external validity challenge, in that it may be difficult to replicate the environment in which the training took place.

CONFLICT OF INTEREST STATEMENT

The authors confirm that they have no conflict of interest to declare.

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ENDNOTES

[1] Personal communication with Lieutenant Kevin Lutz, Camden County Police Department, April 4 2019.

[2] As there were too many zero values reported by Parsippany, it had to be removed from the dataset.

[3] The weights in this analysis, as well as those for the analyses run to perform checks on the robustness of results, were different from the weights used to create the synthetic control in the main analysis, as the estimator was optimizing for a match in a different outcome.

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APPENDIX

Synthetic Control Details

This section discusses DI's synthetic control procedure, beginning with a brief overview of notation used and the basic synthetic control method. This is followed by the motivation behind ADH's restrictions, as well as DI's relaxation of those restrictions. Finally, we discuss the regularization methods DI employ to deal with a potentially large number of possible control units.

The synthetic control method creates a counterpart unit that closely matches outcomes which comprises a weighted average of control units; if conventional regression equally weights all control units, the synthetic control seeks weights that cause the control to most closely simulate

the treatment unit. Notation-wise, we consider that there are $N + 1$ cross-sectional units, in this case departments. Units $i = 1, \ldots, N$ are control units which do not receive the treatment in any time period. Unit $N + 1$ receives the control treatment in periods $1, \ldots T_0$ and the active treatment in time periods $t = T_0 + 1, \ldots, T_0 + T_1$, where $T = T_0 + T_1$. We are interested in the treatment effect for the unit that receives the treatment during the postintervention time period, or $Y_i t(1) - -Y_i t(0)$.

The equation in full is:

$$Y_{0,T}(0) = \mu + \sum_{i=1}^{N} \omega_i \cdot Y_{i,T}^{obs}$$

The imputed control outcome for the treated unit is a linear combination of the control units, with an intercept of μ and weights ω_i for the control unit i. In order to address Camden's status as an outlier, the study employs DI's adaptation of the ADH synthetic control procedure, which includes an intercept and relaxes the requirement that weights must sum to one. These changes accommodate a situation in which the treatment unit produces outcomes that are systematically larger than that of the control units, as is the case here. DI additionally introduce a third change in which weights can be negative, to allow for negative correlation between treatment and control units. However, this is not applied here. Due to the relative discreteness of law enforcement agencies, any negative correlation between outcomes (Camden's force levels decreasing while, for example, Newark's increases) is likely to be spurious.

Given the relaxation of ADH restrictions, the recurrent problem is then that there are a large number of potential combinations of weights, leading to a lack of precision in the estimator. DI regularize this through an elastic-net type penalty (Hastie, Tibshirani, and Wainwright (2009, 2015) that combines ridge regression and the lasso penalty. DI additionally propose a particular cross-validation procedure in which each control unit is treated as the pseudo-treated unit, to determine the optimal value for the tuning parameters alpha and lambda.

DI suggest that an obvious way to estimate the parameters μ and ω is to use least squares. However, they caution that this may not be feasible if the number of control units is larger than the number of treatment periods, as is the case in this study (35 control units, six treatment periods), as the large number of potential combinations of weights will result in the estimator suffering from a lack of precision.

In order to address this issue, ADH impose three substantive restrictions, all of which reduce the number of potential solutions: first, that there is no intercept ($\mu = 0$), second, that the weights sum to one, and third, that the weights must be nonnegative. The first restriction rules out the possibility that the outcome for the treated unit is systematically larger than other units, by a constant. DI note that this is implausible if the unit of interest is an outlier relative to the other units. This is the case with respect to Camden, where use of force is higher than in any other municipality in New Jersey.

The second restriction, that weights must sum to one, DI also reject. This is despite its commonness in matching strategies, as it is also implausible if the outcome for the treatment unit is systematically larger than that of the control units. The third restriction, that of nonnegativity, helps both regularize the estimation of weights in cases with relatively many control units by ensuring there is a unique solution, and by limiting the sum of the squared weights which enters into the variance. DI relax it to allow for negative correlation between treatment and control units, which they suggest may improve the out-of-sample prediction. In this study, the restriction is not

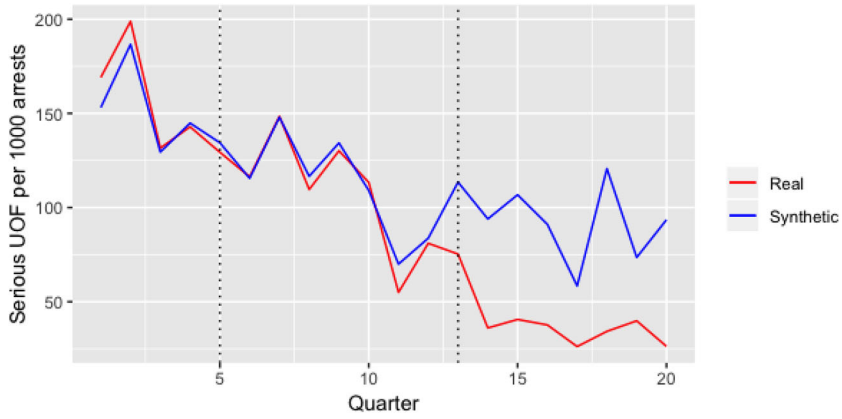

FIGURE A1 Subsuming anticipation effects: Treatment occurs one quarter earlier [Color figure can be viewed at wileyonlinelibrary.com]

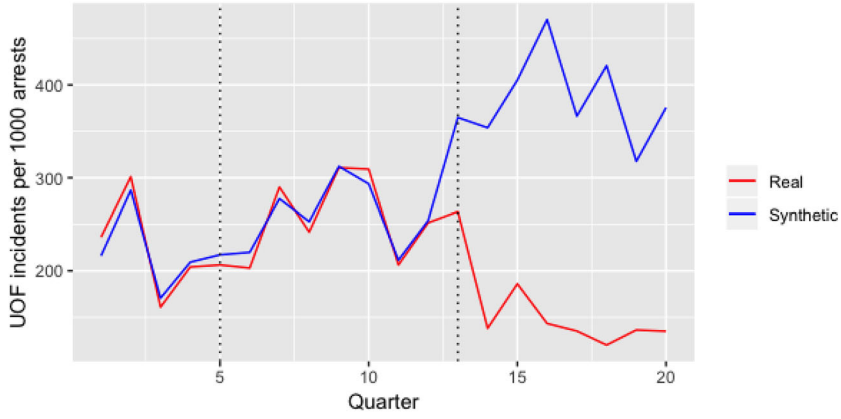

FIGURE A2 Using all force incidents as outcome [Color figure can be viewed at wileyonlinelibrary.com]

relaxed. Due to the relative discreteness of law enforcement agencies, any negative correlation between outcomes (Camden's force levels decreasing while, for example, Newark's increases) is likely to be spurious.

Given the relaxation of ADH restrictions, the recurrent problem is then that there are a large number of potential combinations of weights, leading to a lack of precision in the estimator. DI regularize this through an elastic-net type penalty (Hastie et al. (2009, 2015) that combines ridge regression and the lasso penalty. DI additionally propose a particular cross-validation procedure in which each control unit is treated as the pseudo-treated unit, to determine the optimal value for the tuning parameters alpha and lambda.(A1, A2, A3, A4, A5, A6, A7, A1, A2, A3)

Dates of training

Robustness checks: Poisson regression analysis of NJ department-quarter panel dataset

TABLE A1 Dates of training

Training type	Training date	Officers trained
De-escalation	2015-05-02	15
	2015-09-09	16
	2015-11-20	18
	2015-12-16	22
PERF-ICAT	2016-09-13	2
	2016-09-21	47
	2016-09-28	47
	2016-10-06	41
	2016-10-07	20
	2016-10-12	27
	2016-10-16	18
	2016-11-09	44
	2016-11-23	55
	2017-01-27	22
	2017-03-23	12
	2017-06-15	1
	2017-07-13	33
	2017-12-21	63

TABLE A2 Municipality weights in the synthetic Camden (outcome is violent crime rate)

Municipality	Weight	Municipality	Weight
Newark	0	Gloucester township	1.43
Jersey City	0.006	East Orange	0
Paterson	0	Bayonne	0
Elizabeth	0	Franklin	2.69
Edison	0	North Bergen	0
Woodbridge	0.727	Vineland	0
Lakewood	0	Union Township	1.20
Tom's River	0.390	Piscataway	0
Hamilton	2.49	New Brunswick	0
Trenton	0	Jackson	1.98
Clifton	0	Wayne	0
Brick	0	Irvington	0
Cherry Hill	2.75	Howell	0
Passaic	0	Perth Amboy	0.718
Middletown	0	Hoboken	0
Union City	0	Plainfield	0
Old Bridge	0	West New York	0

TABLE A3 Officer-level analysis using weighted measure

	PERF-ICAT training	De-escalation training
exp($\widehat{\beta}$)	0.915	1.056
se($\widehat{\text{beta}}$)	0.165	0.141
P	.608	.530
[CI]	[0.906, 1.307]	[0.794, 1.088]
Observations = 19134		

TABLE A4 Poisson regression of NJ department-quarter panel dataset

	exp($\widehat{\beta}$)	se($\widehat{\beta}$)	*p*	[CI]
Training	0.426***	0.118	0	[0.347, 0.523]
Violent crime rate	1.000	0.000	.285	[0.999, 1.000]
% of population Black	1.049***	0.0149	.001	[1.029, 1.071]
% of population foreign-born	1.006	0.021	.788	[0.978, 1.034]
% of population on SNAP benefits	0.991	0.021	.669	[0.962, 1.021]
Observations = 700				

The equation used in the analysis is as follows:

$$\log(Y_{it}) = \beta_0 + \beta_1 \text{Training}_{it} + \beta_2 \text{ViolentCrime}_{it} + \beta_3 \text{PercentBlack}_{it} + \beta_4 \text{ForeignBorn}_{it} + \beta_5 \text{PercentSNAP}_{it} + \text{Agency}_i + \text{Quarter}_t$$

TABLE A5 Municipality weights in the synthetic Camden (treatment occurs one quarter earlier)

Municipality	Weight	Municipality	Weight
Newark	0	Gloucester Township	0
Jersey City	0	East Orange	0
Paterson	0	Bayonne	0
Elizabeth	0.147	Franklin	3.06
Edison	0	North Bergen	0
Woodbridge	0	Vineland	0
Lakewood	0	Union Township	0.166
Tom's River	0	Piscataway	1.57
Hamilton	0	New Brunswick	0
Trenton	0	Jackson	0
Clifton	0	Wayne	0.090
Brick	0.685	Irvington	0
Cherry Hill	0	Howell	0
Passaic	0	Perth Amboy	0
Middletown	4.60	Hoboken	1.44
Union City	1.04	Plainfield	0
Old Bridge	3.43	West New York	0

TABLE A6 Municipality weights in the synthetic Camden (outcome is all use of force incidents)

Municipality	Weight	Municipality	Weight
Newark	0	Gloucester Township	0
Jersey City	0	East Orange	0.678
Paterson	0	Bayonne	0.213
Elizabeth	0.054	Franklin	0.136
Edison	0	North Bergen	0
Woodbridge	0	Vineland	0
Lakewood	0	Union Township	0.274
Tom's River	0	Piscataway	0
Hamilton	0.076	New Brunswick	0
Trenton	0	Jackson	0
Clifton	0	Wayne	0.634
Brick	0	Irvington	0
Cherry Hill	0.055	Howell	0
Passaic	0	Perth Amboy	0
Middletown	0	Hoboken	0
Union City	0.664	Plainfield	0
Old Bridge	0	West New York	0

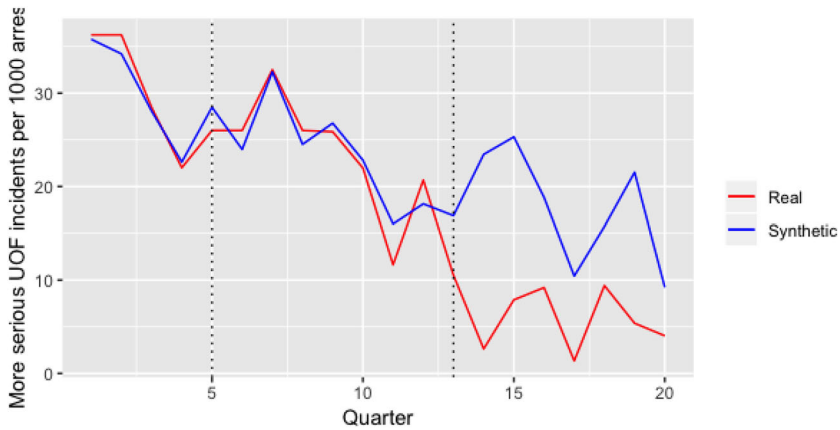

FIGURE A3 Using incidents involving firearm and nonfirearm weapons as outcome [Color figure can be viewed at wileyonlinelibrary.com]

Where $\log(Y_{it})$ refers to the force outcome, Treatment_{it} is a binary variable where Camden County was assigned a value of 1 from Q14 onwards. Camden prior to Q14 and all other departments in all time periods, not having received the de-escalation treatment, were assigned a 0. ViolentCrime_{it} is a control variable for the lagged violent crime rate (the rate from the prior quarter), PercentBlack_{it} controls for racial demographics in denoting the percentage of the population that is Black, ForeignBorn_{it} is another control variable reflecting the percentage of the population that was not born in the United States, and PercentSNAP_{it} is a measure of poverty in denoting the percentage of the population on SNAP benefits. Agency_i and Quarter_t are agency and quarter fixed

TABLE A7 Municipality weights in the synthetic Camden (outcome is more serious use of force incidents)

Municipality	Weight	Municipality	Weight
Newark	0	Gloucester Township	0
Jersey City	0	East Orange	0
Paterson	0	Bayonne	0.311
Elizabeth	0.696	Franklin	0
Edison	0	North Bergen	0
Woodbridge	0	Vineland	0.327
Lakewood	0	Union Township	0.229
Tom's River	0	Piscataway	0
Hamilton	0.216	New Brunswick	0
Trenton	0.087	Jackson	0
Clifton	0	Wayne	0
Brick	0	Irvington	0
Cherry Hill	0	Howell	0
Passaic	0	Perth Amboy	0.200
Middletown	0	Hoboken	0
Union City	0.843	Plainfield	0
Old Bridge	0	West New York	0

effects respectively. As with the individual-level difference-in-differences analysis, serious force incidents are rare even at the department-quarter dataset, leading to small counts. This made a Poisson model the most suitable to apply here (MacDonald & Lattimore, 2010; Wooldridge, 2010), with standard errors clustered by agency to account for serial correlation (Bertrand et al., 2004).

Table A4 presents the results of the difference-in-differences analysis. De-escalation training had a negative and significant effect on serious use of force, with an IRR of 0.426 suggesting that serious force was more than halved that is, the effect was even larger than that suggested by the synthetic control analysis, which indicated a 40% reduction. The results also indicated that the proportion of a population that was Black had a positive and significant effect on the number of serious use of force incidents that community was likely to experience: an IRR of 1.049 suggested that for every percentage point increase in the percentage of the population that was Black, a 4.9% increase in serious force incidents would result. None of the other control variables were significant.

Examining the Impact of *Integrating Communications, Assessment, and Tactics* (ICAT) De-escalation Training for the Louisville Metro Police Department: Initial Findings

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Updated: October 30, 2020

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NOTE FROM THE AUTHORS

As researchers, we strive to produce meaningful evidence to reduce harm in communities and make police-citizen encounters safer for all. As we issue this report, we recognize the challenging circumstances facing residents and police officers in the City of Louisville. When we implemented this study with the LMPD in the fall of 2018, we could not have imagined the circumstances facing our country when our research was completed two years later. Although our work examining LMPD's use of force is anonymized and conducted at the aggregate level, we recognize the value of every life that is included in the numbers we analyze and report. For a variety of complicated reasons, situations involving crime, violence, and police use of force disproportionally impact communities of color, and our collective work is specifically designed to better understand and address these problems. While heartbreaking, encounters that result in injuries and fatalities of citizens and officers motivate those of us who work in partnership with police agencies to work even harder, generating evidence designed to make policing practices safer, and more effective and equitable for all communities.

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EXECUTIVE SUMMARY

In recent months, law enforcement officers have been faced with an unprecedented set of circumstances, navigating major social unrest in communities amid a pandemic and economic crisis. Acknowledging the dangers to both the community and officers, efforts have intensified to identify "solutions" to reduce the frequency and severity of violent encounters between police and the public. Calls for the adoption of "de-escalation" policies and training – widely endorsed by policy makers, policing experts, and the public – have been especially strong, and recent statistics on law enforcement practices suggest the field has responded (Engel et al., 2020b). For example, in a 2019 national survey of 155 large police departments in the United States, nearly all responding agencies indicated they offered some form of de-escalation training to officers in their agency (CBS, 2019).

Although the implementation of de-escalation training is often encouraged, the effects of this training on police officers and their interactions with the public has not been systematically evaluated (Engel et al., 2020a). For this reason, the impact of de-escalation training on the frequency and severity of officers' use of force and the subsequent injuries to citizens and officers is not well understood. It was within this context that the Louisville (KY) Metro Police Department (LMPD) stepped forward to both deliver and participate in the evaluation of a de-escalation training. Specifically, the LMPD introduced the Police Executive Research Forum's (PERF) *Integrating Communications, Assessment, and Tactics* (ICAT) training program to instruct officers in de-escalation tactics and critical thinking skills for the management of potentially volatile police-citizen encounters. Seeking to understand the effectiveness of this training, the LMPD partnered with the *International Association of Chiefs of Police/University of Cincinnati Center for Police Research and Policy* (IACP/UC Center) to conduct an independent, external evaluation of the effects of the ICAT training on their agency.

This report documents the methodology and findings of the evaluation of ICAT training implemented within the LMPD. This study represents one of the first large-scale, methodologically rigorous evaluations of a well-known de-escalation training for police. Specifically, this study uses a multi-method approach, relying upon two distinct survey designs (i.e., repeated measure survey design, cross-sectional survey design) to assess the impact of training on the perceptions and self-reported experiences of officers and first-line supervisors, and a stepped-wedge randomized control trial design to examine training effects on officers' behaviors and changes in the outcomes of police-citizen encounters. This seminal study is the first randomized control trial to demonstrate a significant reduction in officer use of force following de-escalation training implementation.

A. LMPD's Implementation of the ICAT Training

The *Integrating Communications, Assessment, and Tactics* (ICAT) training instructs police officers in de-escalation tactics and critical thinking skills for the management of potentially volatile police-citizen encounters, encouraging the integration of crisis recognition and intervention, communication skills, and operational tactics in police responses. This training is designed for patrol officers responding to circumstances involving persons in crisis – that is, individuals that may be behaving erratically due to mental health concerns, substance use,

situational stress, and/or intellectual/developmental disabilities. ICAT training is meant to apply to situations where individuals are either unarmed or armed with anything less than a firearm (PERF, 2016). A full summary of the ICAT training can be accessed here: https://www.policeforum.org/icat-training-guide.

The ICAT curriculum is comprised of six modules. These modules include content related to: (1) Introduction; (2) Critical Decision-Making Model; (3) Crisis Recognition and Response; (4) Tactical Communications; (5) Operational Safety Tactics; and (6) Integration and Practice (PERF, 2016b). However, PERF emphasizes that ICAT training is flexible and adaptable, encouraging that agencies be creative in how they incorporate the training modules into new or existing programs on de-escalation, tactical communication, or crisis intervention. Notably, the LMPD followed this advice, tailoring the ICAT curriculum to fit within the local context and experiences of LMPD officers.

Brought to the department by then-Assistant Chief Robert Schroeder, the implementation of ICAT training in the LMPD was led by the LMPD Training Division officers and staff. Two LMPD instructors, Sergeant Justin Witt and Sergeant Christopher Keith, initially participated in a train-the-trainer course provided by PERF staff and have subsequently become PERF national instructors. These two instructors provided train-the-trainer instruction for three additional officers – Travis Hayden, Anthony Stallard, and Rich Wilson – within the LMPD Training Division. The LMPD asked PERF to observe and provide feedback on its ICAT training, and PERF Director of Applied Research and Management, Tom Wilson, went to Louisville to observe the initial sessions and offer guidance. Thereafter, these five LMPD instructors provided the ICAT training to the remaining LMPD sworn personnel. The ICAT training program was delivered during two consecutive eight-hour training days (Wednesday and Thursday) within a 40-hour week in-service training block required for all sworn officers. Approximately 40 to 50 officers were present in each training session. From February 2019 through November 2019, LMPD trained 1,049 officers of all ranks and assignments following a randomized training scheduled developed by the research team. The officers who attended ICAT training were largely male (83.6%), White (80.2%) and served as patrol officers (57.7%). Officers were fairly evenly distributed in terms of age, law enforcement tenure, and LMPD tenure. A majority (53%) had a Bachelor's degree or higher, and slightly less than one-third had military experience (30.9%).

B. Methodology

The evaluation was designed to assess the effects of the training across the following outcomes:

(1) Officers' knowledge of and attitudes toward persons in crisis
(2) Officers' confidence in handling critical incidents
(3) First-line supervisors' perceptions and self-reported activities related to their use and supervision of de-escalation skills
(4) The frequency of officer use of force and the types/severity of force used during encounters with resistant suspects
(5) The frequency of injuries to citizens and officers during use of force encounters
(6) Changes in training impact over time

Three research designs were used to examine these outcomes, including: (1) a repeated measure survey design to assess officers' knowledge and attitudes; (2) a cross-sectional survey design to identify first-line supervisors' perceptions and self-reported activities; and (3) a stepped-wedge randomized control trial to coordinate the LMPD's training schedule and assess behavioral outcomes.

Repeated Measures Survey Design

To examine the impact of de-escalation training on LMPD officers' knowledge and attitudes, three training surveys (pre-training, post-training, and follow-up) designed by the research team were administered by the LMPD Training Division staff to officers immediately before, immediately after, and approximately four to six months following officers' participation in the training. These surveys allow for comparisons of officers' knowledge and attitudes over time. Specifically, statistical comparisons of pre-training to post-training survey responses assess changes in responses following officers' participation in the ICAT training program. Additionally, comparisons of the post-training and follow-up survey responses provide insight on training effects over time. Finally, comparisons of the pre-training and follow-up survey responses consider the overall impact of the ICAT training program on LMPD officers' knowledge and attitudes.

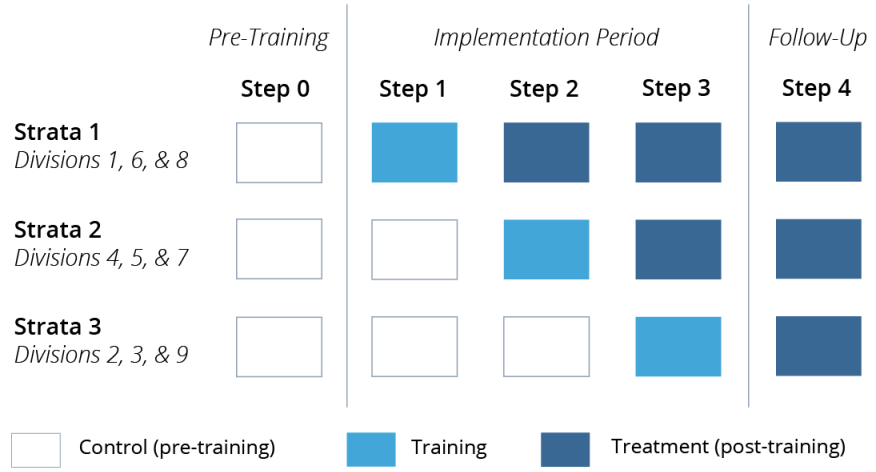
Cross-Sectional Survey Design

To supplement the evaluation of the training program, LMPD supervising officers (i.e., sergeants and lieutenants) were administered a survey in March of 2020, designed by the research team to assess their general perceptions of the role of supervisors, and more specifically, their views regarding how and when they supervise and/or reinforce the ICAT training. This cross-sectional design collected information from supervisors at a single point in time after the implementation of the ICAT training. Descriptive analyses are conducted to provide an examination of the role of supervision in ICAT training.

Stepped-Wedge Randomized Control Trial Design

To examine the impact of ICAT training on LMPD officers' behavior, the research team developed a stepped-wedge randomized control trial (RCT) design that was implemented by the LMPD Training Division. The stepped-wedge cluster RCT is a crossover design in which clusters of subjects begin as no-intervention controls, crossing over permanently from the control group to the intervention group in sequence at randomized, pre-specified points in time (Hussey & Hughes, 2007). In the present study, a stepped-wedge cluster RCT crossover design allowed for clusters of LMPD officers to begin as non-intervention controls (i.e., untrained in ICAT). Individual clusters of officers were then randomly selected in a sequence at pre-planned time points to cross over from the control group to the intervention group (i.e., trained in ICAT). At the end of the experiment, all officer clusters had crossed over to the intervention group. To implement the stepped-wedge RCT design, the nine LMPD Patrol Divisions, including eight geographic-based divisions and one mobile unit operating across the city of Louisville, were grouped into three strata, which were then randomly selected for training. This implementation of the stepped-wedge RCT design is displayed in Figure 1.

Figure 1: The Stepped-Wedge Design



Note: Step 0 = January 2019 to February 10, 2019; Steps 1 to 3 = February 11, 2019 to November 30, 2019; Step 4 = December 1, 2019 to February 2020

The research team's examination of the LMPD training regimen was consistent with the randomly arranged stepped-wedge training plan, suggesting high fidelity between the treatment as delivered and treatment as intended. Additionally, sensitivity testing examining the potential movement of LMPD officers from one Patrol Division to another during the research period – creating a potential contamination effect of the treatment condition – demonstrated little concern for possible contamination during the evaluation period.

Data Sources

Using the research designs described above, the research team gathered quantitative data from three sources: (1) officer surveys, (2) field supervisor surveys, and (3) official reports of officer behavior.[1] All data collection and related research activities were reviewed and approved by the University of Cincinnati's Institutional Review Board (IRB) in February 2019 (IRB# 2019-0118). The research questions for this study were assessed using a variety of analytic techniques to provide descriptive statistics, two-wave survey comparisons, and three-wave survey comparisons to assess officer attitudes and perceptions. Changes in frequency and severity of LMPD uses of force, citizen injuries, and officer injuries are assessed using a series of univariate statistics, including monthly and annual changes in uses of force over time, followed by a series

[1] The original research plan included a qualitative component that was not implemented. Four focus groups were scheduled with approximately 40-45 LMPD officers to be convened on March 20 and 27, 2020, but were canceled due to Ohio and Kentucky travel restrictions associated with COVID-19. Unfortunately, these focus groups were unable to be rescheduled during the study period due to the continued restrictions of group meetings. The intent of these focus groups was to gather additional context regarding the strengths and limitations of implementing de-escalation tactics in the field, comments regarding the ICAT training, and reactions to the study results specifically. If deemed appropriate and still of value, these sessions may be rescheduled sometime in 2021.

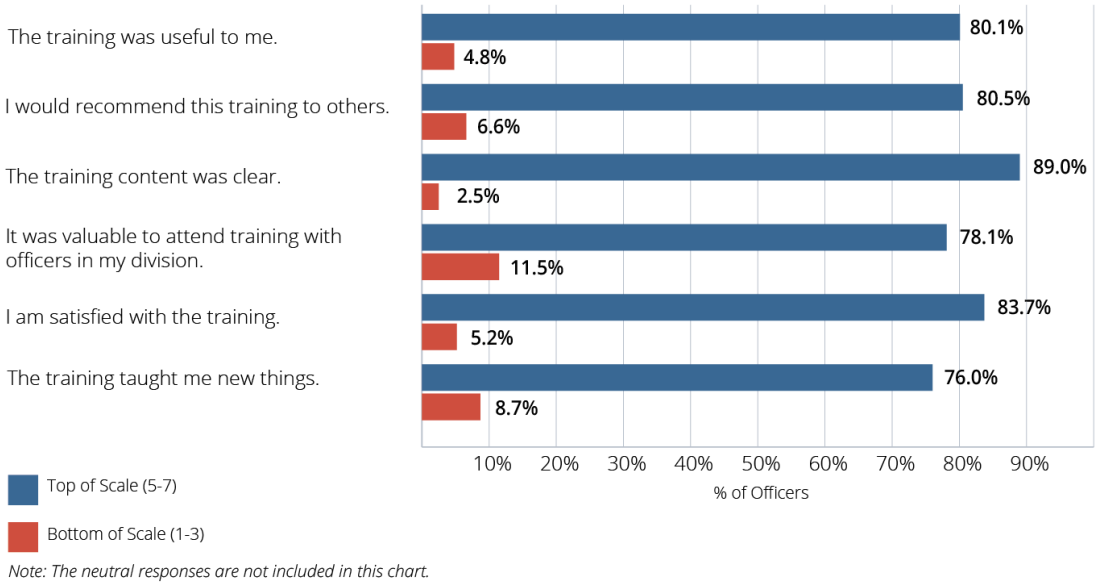
of panel regression analyses that corresponded to the stepped-wedge RCT design to assess the changes in uses of force that corresponded with the randomized timing of the training.

C. Officer Surveys

Officer training surveys (pre-training, post-training, and follow-up) were administered to LMPD officers immediately before, immediately after, and approximately four to six months following their participation in the ICAT training, all with high response rates (87, 100, and 74 percent, respectively). Prior to the training, LMPD officers reported high levels of agreement that their roles involved activities consistent with community-oriented policing principles, however slightly more than half of the officers viewed law enforcement as their most important responsibility. Also of interest in the baseline measures, a majority (75%) of officers agreed or strongly agreed that the jurisidiction they work in is dangerous, and 85% agreed or strongly agreed that there is a good chance they would be assaulted while on the job, which presents a potential challenge for trainers when encouraging officers to think differently about use of force and the promotion of de-esclation tactics. In addition, only slightly over a quarter of officers agreed/strongly agreed that overall the LMPD is a good agency to work for, suggesting potential issues with officer morale that may impact receptivity to training.

Despite these possible challenges, as reported in Figure 2, the ICAT training was well received, with over three-quarters of the officers reporting positive reactions immediately following the training. A vast majority of surveyed LMPD officers found the training useful and would recommend to others, both immediately following training, as well as four to six months later.

Figure 2: LMPD Officer Post-Training Perceptions of ICAT Training



Note: The neutral responses are not included in this chart.

However, these positive impressions of the training appear to be stronger immediately after training, declining somewhat in the months after their initial training. When asked during the follow-up period four to six months after the initial training, 63% of officers reported that the

training strategies were useful, and 57% reported they would recommend ICAT training to other officers. This highlights the need for continual reinforcement of ICAT training for officers, whether this is through roll call or other forms of refresher trainings. Over 40% of officers agreed they would benefit from a refresher course.

Officers were also asked a series of questions designed to measure their attitudes regarding *Views on Interactions with the Public*, *Attitudes towards Persons in Crisis*, and *Attitudes Toward Use of Force*. Examination of these various items and scales demonstrated statistically significant changes in officer attitudes the expected direction following the training. For example, after the training, officers were more likely to strongly support the notion that force should be used as a last resort compared to scores before the training.

The summed *Attitudes Toward Use of Force Scale* also demonstrated a statistically significant change in the pre-training to post-training scores, and in the pre-training to follow-up scores, in line with the expected changes from the training. This indicates that officers may have sustained attitudinal changes regarding the use of force after participation in the ICAT training that do not appear to decay over time. In contrast, officers reported *Attitudes towards Persons in Crisis*, demonstrated immediate positive changes that were consistent with the tenants of ICAT training, however, these positive attitudinal changes decayed significantly over time.

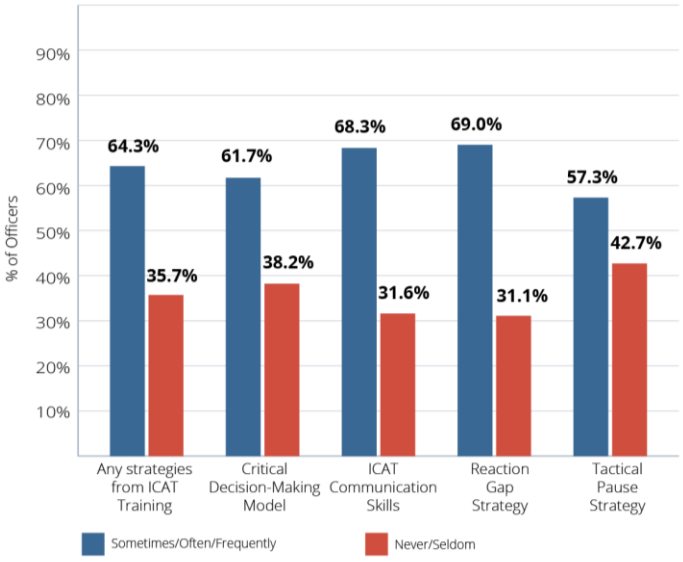
The officer survey findings illuminated some avenues for improvement on training curricula. The findings indicate there remains a small minority of respondents who are not convinced that ICAT training is useful nor beneficial to their police work. Additionally, the large percentages of "neutral" respondents also present an opportunity for trainers to enhance the perceived utility of ICAT training. Reinforcement of the benefits of the training may be an important step for LMPD ICAT trainers for these groups of officers.

One aspect of ICAT training in particular, the Critical Decision-Making Model (CDM), was not perceived as positively by officers. The CDM represents an important aspect of the ICAT training program, therefore officers' reactions to this thinking framework are especially relevant to the training evaluation. Analyses of post-training scores compared to follow-up scores revealed that ten of the eleven items demonstrate statistically significant changes in the *opposite direction* than would be expected, indicating that officers reported finding the CDM less useful over time. This is an area for reconsideration regarding how the training curricula is created and delivered by the LMPD Training Division.

Finally, officers were asked to self-report their confidence in handling interactions with persons in crisis. The findings demonstrate that officers' confidence did not significantly improve immediate after or in the months following the ICAT training. This lack of reported change is likely because officers started with high levels of reported confidence in handling these types of situations pre-training.

Nevertheless, when considering self-reported use of ICAT skills in the field, the majority of surveyed officers (over 60%) self-reported using ICAT skills during their previous 60 days of work. Use of the *Reaction Gap Strategy* was reported most frequently of all four skills assessed (CDM, ICAT Communication Skills, Reaction Gap Strategy, and the Tactical Pause Strategy), demonstrated in Figure 3.

Figure 3: LMPD Officer Self-Reported Use of Trained Skills, Follow-Up Survey



D. Supervisor Surveys

Recognizing the key position of first-line supervisors in the reinforcement of de-escalation training, the research team sought to examine the activities of sergeants and lieutenants within the LMPD as they relate to their own use of ICAT de-escalation skills and the supervision and support of those de-escalation skills among their subordinates. To assess these outcomes, LMPD supervising officers (N = 157) were administered a single survey in March 2020 by LMPD Training Division staff. Of these, 131 surveys were completed (83.4% response rate). Descriptive analyses are used to present the average responses of LMPD supervisors across five key areas, including their (1) use of ICAT de-escalation skills, (2) ability to supervise officers' use of ICAT de-escalation skills, (3) observations of officers' use of ICAT de-escalation skills, (4) frequency of participation in supervisory activities related to ICAT de-escalation skills, and (5) frequency of participation in general supervisory activities.

The survey analyses revealed several important findings. The LMPD supervisors appear to hold positive attitudes regarding their own use of the ICAT de-escalation skills. On average, supervisors expressed confidence in their ability to use the skills during both interactions with the public and their subordinate officers. Additionally, supervisors indicated they can effectively supervise and coach subordinate officers in the use of these de-escalation skills, with nearly 90% indicating they did not require additional training or support from leadership to complete these tasks.

Importantly, however, while most survey respondents (57%) suggest it is not difficult to supervise the use of ICAT de-escalation skills by their subordinate officers, the average frequency of participation in supervisory activities that may serve to support or reinforce officers' use of de-escalation were fairly low. The average responses of supervisors suggest they seldom (i.e., once per month) or only sometimes (i.e., two to three times per month) communicate with their subordinate officers about the use of ICAT de-escalation skills in a

general or incident-specific manner. Additionally, survey responses suggest the documentation of officers' use of de-escalation skills – by means of use of force reports, letters of commendation, or other formal recognition – is uncommon. In turn, supervisors reported limited observations of the use of de-escalation by officers in the field or through video review.

These low self-reports of supervisory activities associated with reinforcing de-escalation training content were echoed in the findings from the officer surveys. When officers were asked how frequently immediate supervisors reinforce ICAT training, over 40% indicated this happened seldom (once per month) or never. Collectively, the rarity of these types of supervisor-officer interactions suggests LMPD first-line supervisors may be missing important opportunities to support and reinforce the skills learned in the de-escalation training sessions among their subordinate officers.

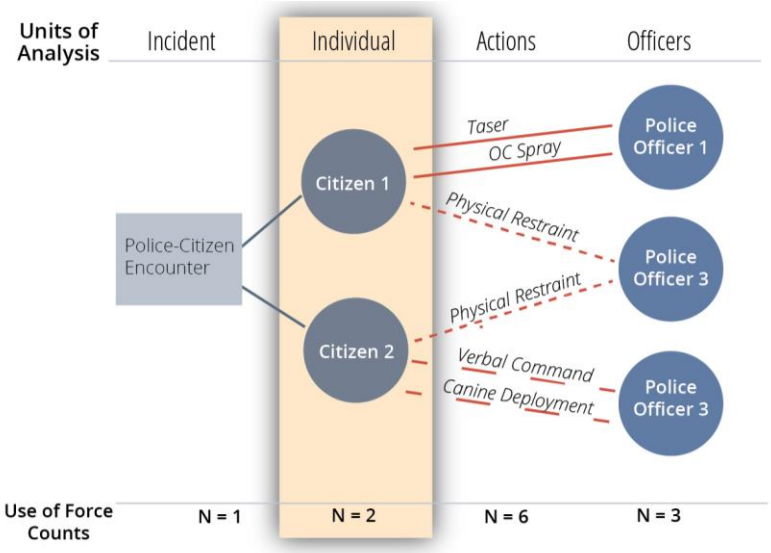
E. Impact of ICAT Training on Officer Behavior

The most important consideration for this evaluation is the impact of ICAT de-escalation training on changes in officer behavior during interactions with the public. Use of force is governed by LMPD Standard Operating Procedure (SOP) 9.1 (Use of Force Policy), which delineates when and how force can be used by LMPD officers. This evaluation of the ICAT de-escalation training relies on LMPD's official use of force data. The LMPD's reportable uses of force include *all use of force incidents resulting in any injury, or the complaint of any injury, to either the officer or subject, or when physical force other than a control hold (a technique with a low probability of injury to the officer or subject, utilized to maintain physical control of a subject) is used.*

For all of the analyses that follow, ***we measure the use of force as the number of individuals that had force used against them during a single encounter*** (see Figure 4, "individual" unit of analysis). If an individual had force used against him/her in more than one encounter with police during the study time period, those multiple uses of force are included in the data analyses. Measured in this way, our individual use of force count (# of individuals having force used against them) includes multiple police actions, given the escalating nature of force (i.e., an officer may initiate with a low level of force and increase in severity if resistance increases), and multiple officers that could use force against a single individual. In addition, ***we measure injuries as those reported by individuals or officers, regardless of whether medical attention was received.***[2]

[2] Measuring the count of injuries in the manner will necessarily include injuries that, while reported by officers and citizens, were likely minor in severity. Of the 758 citizen injuries reported during the study time period (Jan 1, 2018 – April 30, 2020), over half (50.5%) did not require medical attention. Likewise, of the 681 officer injuries reported, 59.7% did not required medical attention.

Figure 4: Hypothetical Example of Use of Force Measures, by Unit of Analysis



Note: The individual level is the unit of analysis used in this study.

The research team first considered the historical context of use of force incidents in Louisville between 2010 and 2020. Using time series analyses, three changes in the pattern of use of force counts over time were identified. Specifically, as shown in Figure 5, the univariate moving average graph demonstrates consistent trends in the data, indicated by patterns of long-term stability in event counts and clear structural breaks in the time series. First, from January 2010 through December 2014, the average number of uses of force was roughly 51 per month for this stage in the time series. Second, from January 2015 through December 2018, the average number of uses of force was roughly 40 per month. Finally, during the period of the randomized experiment (beginning in February 2020) through April 2020, the average number of uses of force was roughly 30 per month. Thus, the use of force events in Louisville were consistently stable for a six-year period (2010-2015) as well as three-year period (2016-2018) prior to the implementation of the ICAT training.

Figure 5: Time Series Analysis January 2010 to April 2020

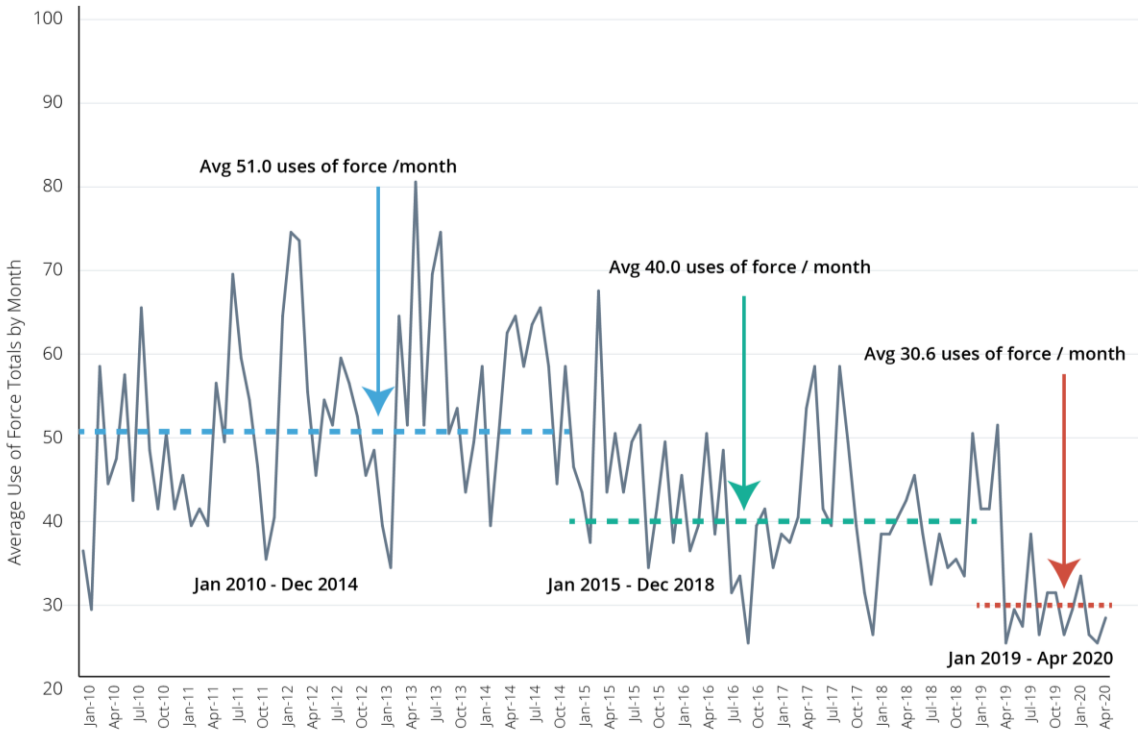
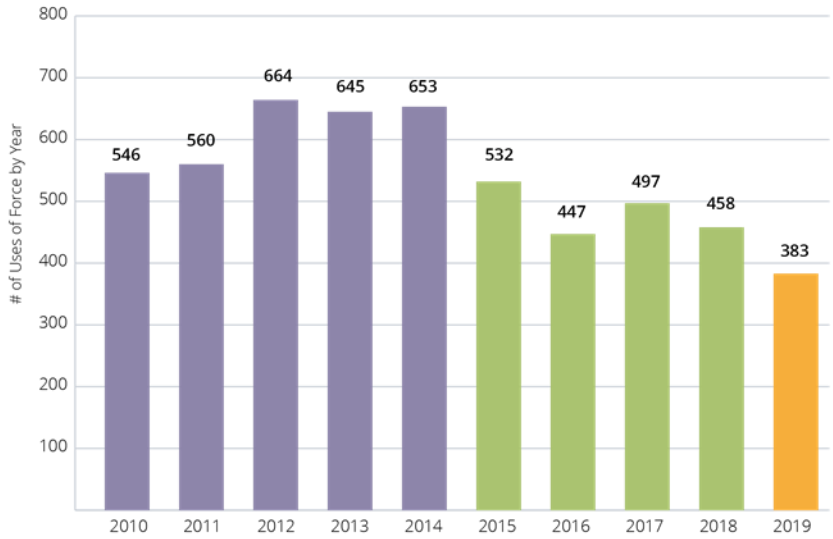


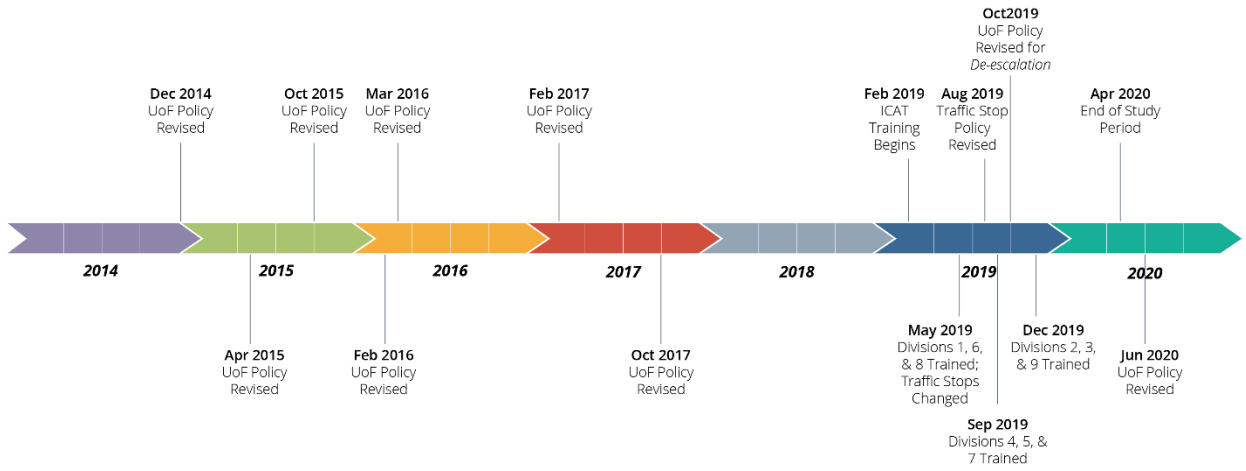
Figure 6 reports the number of reported uses of force each year, across the ten-year period. The three identified breaks in the data from the interrupted time series analyses are represented by different colors.

Figure 6: Use of Force Totals by Year (2010 – 2019)



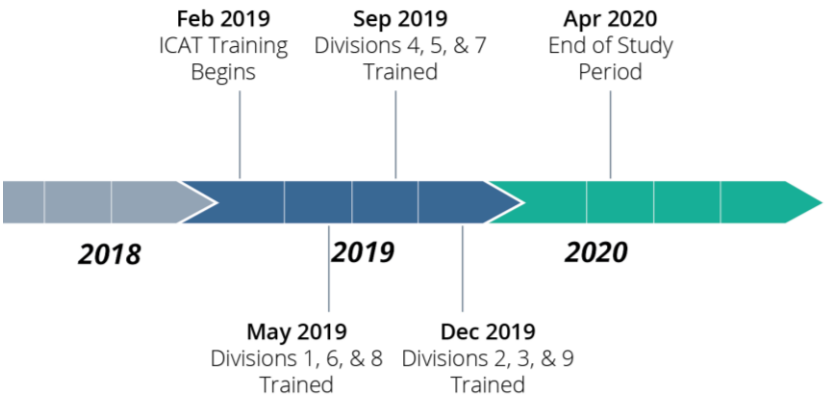
These changes in the pattern of use of force counts are roughly correlated with LMPD policy changes. For a five-year period (from 2010 – 2014), use of force counts were consistently stable. After a series of changes to the LMPD Use of Force Policy (SOP 9.1) in 2015 and early 2016, the following four years (2015 – 2018) demonstrated a stable reduction compared to the previous time period (see Figure 7). This established stable four-year time period (2015 – 2018) serves as the baseline prior to the implementation of the training and additional policy changes. From January 2019 – April 2020 (the current study time period, inclusive of the ICAT training implementation), the monthly average number of uses of force again significantly declined.

Figure 7: LMPD Use of Force Policy Changes 2014-2020



To study the impact of ICAT training specifically using the stepped-wedge RCT design, uses of force were examined for a 28-month period, from January 1, 2018 – April 30, 2020. As shown in Figure 8, these analyses include a pre-training period (January 2018 – February 2019), training intervention period (February 2019 – November 2019), and follow-up period (December 2019 – April 2020).

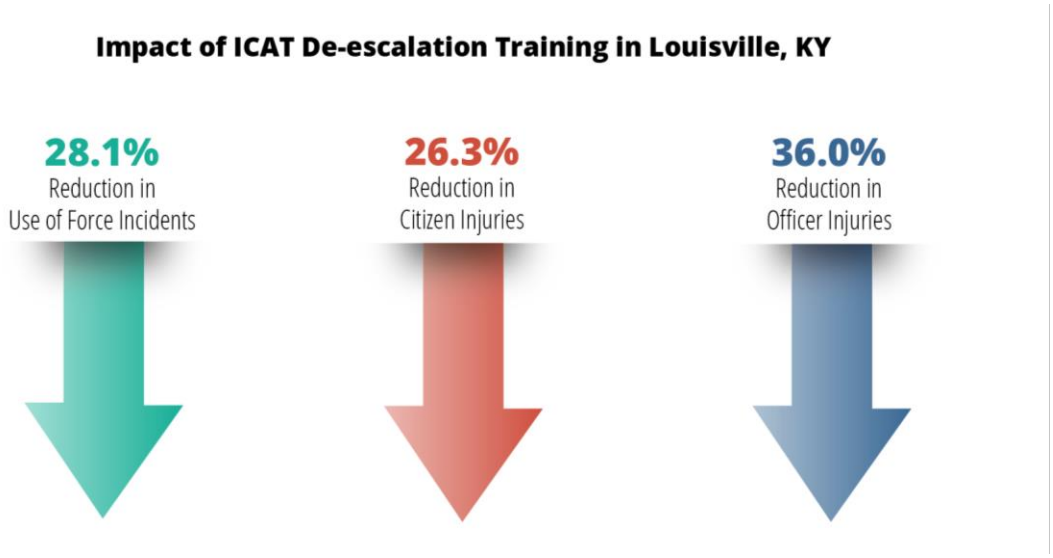
Figure 8: LMPD ICAT Training Implementation Timeline 2019-2020



Analyses of patrol officers' behaviors (i.e., frequency of use of force, and likelihood of officer/ citizen injuries) relied on fixed effects panel regression models. The count regression results indicate that the ICAT training may lead to changes in officer behaviors associated with use of force and related issues surrounding use of force (i.e., injuries). Between January 2018 and April 2020, *the monthly average use of force counts declined in six of the eight patrol divisions*, ranging from a decrease of -16% to -52% among the vast majority of divisions that experienced sizable and notable declines in use of force.

The difference-in-difference estimates via the stepped-wedge panel regression models show three primary, consistent, and robust findings, net of controls and net of prior trends in the data. Of the utmost importance, *the randomly assigned timing of de-escalation training in Louisville was associated with a statistically significant decline in use of force* (-28%), *citizen injuries* (-26%), and *officer injuries* (-36%), shown in Figure 9.

Figure 9. Summary Impact of ICAT Training on LMPD Officer Behavior in Stepped-Wedge RCT



Notably, these results were beyond chance. Further, these significant reductions in force and injuries occurred above and beyond observed changes in arrest patterns. The research team is confident that the changes in uses of force – and the subsequent reductions in citizen and officer injuries – corresponded with the timing of the training across the various police divisions.

F. Recommendations

While we continue to conduct more detailed analyses of these data, the initial findings are clear: ICAT de-escalation training delivered within the LMPD had its intended effect, improving officers' attitudes and reducing the frequency of use of force and resulting injuries to both officers and members of the public. The results also demonstrate the importance of developing a coordinated and comprehensive effort, where changes in de-escalation training are reinforced in policies, emphasized through direct field supervision, and supported through an established

managerial accountability system for using these tactics – and all of these approaches should be tested to determine effectiveness. As a result of this work, we provide the following recommendations to the LMPD (further detailed in Section VIII):

1. Continue, Refine, and Expand ICAT De-escalation Training within the LMPD

   Based on the compelling benefits of LMPD's ICAT de-escalation training that were revealed in this evaluation, we strongly urge LMPD officials to continue and further expand training in this area. The modifications made by LMPD trainers to the original ICAT training for application in Louisville are associated with successful outcomes. There is always room for improvement in any training curriculum, however, and some changes have already been identified by the LMPD Training staff. This work needs to be supported and expanded.

2. Include Louisville Residents in ICAT Training

   In addition to educating officers regarding the importance and use of de-escalation tactics to handle potentially problematic encounters, it is important to educate local policy makers and community leaders. There is substantial misunderstanding around police use of force in general, and the relationship between police and the public in the City of Louisville is fractured, as exemplified by months of protests associated with police use of force. Inclusion of the Louisville community with the LMPD must be both purposeful and meaningful. It is recommended that the LMPD Training Division develop a specialized ICAT training session for community and political leaders. It will be helpful for these and other local residents to see and better understand the purpose and use of de-escalation training, and also for LMPD to hear and incorporate their feedback. LMPD instructors may even consider the inclusion of community members within the ICAT training itself, in the form of actors for role-play scenarios, or speakers to provide additional context and perspectives for officers. Developing meaningful ways to incorporate the community into LMPD training will be an important first step toward rebuilding partnerships.

3. Continue Use of Force Policy Changes and Updates

   Although it appears that routine reviews of use of force policies is already occurring within the LMPD, it is important that these policies receive continual review to reduce the risk of officer and citizen injury, and reduce the likelihood of racial/ethnic disparities in the application of force. Additionally, the department should continue to analyze and review its use of force activities, policies, and training to identify patterns and trends that suggest needed changes or revisions. When needed, the LMPD should engage with outside research partners or consultants to assist in this review and make necessary adjustments and updates to both its policy and training.

4. Examine the Availability and Use of Less Lethal Equipment by the LMPD

   The survey findings revealed some discrepancies regarding the perceived need and use of additional less-lethal tools for officers. Although the specific context around these issues within the LMPD is unknown to the research team, it is recommended that LMPD

officials consider these findings in combination with recent local and national concerns regarding the use of less-lethal tools, particularly when used as a response to protests.

5. Revisit the Role of Supervisors to Reinforce ICAT Training

   LMPD officials should develop a plan to support supervisors in their reinforcement of the ICAT de-escalation training – encouraging sergeants and lieutenants to speak more openly and directly to their subordinate officers regarding the value and application of the de-escalation skills in their day-to-day work. Specifically, the LMPD should identify opportunities when these messages can be communicated (e.g., roll call, post-incident reviews), discussing both successful use of de-escalation skills, as well as areas for improvement. In particular, incorporating the documentation of the use of de-escalation in use of force reports, letters of commendation, and other formal ways of positive recognition within the agency can further integrate the principles and application of ICAT de-escalation training into the agency.

6. Implement Changes to LMPD Use of Force Data Collection

   The LMPD should begin systematically documenting the frequency, type, and circumstances surrounding the use of de-escalation tactics. This information will be critical to identify patterns and trends in the use of de-escalation skills that reduce uses of force. Regarding current practices in data collection on use of force incidents, we recommend that when narrative-based incident details are collected, it is done in a manner that will make data culling and analyses more readily available to LMPD officials. Further, the LMPD may consider a change in the reporting system to accommodate all uses of force into a single database that may be more easily analyzed. Specific recommendation regarding these changes are presented in Section VIII.

7. Examine the Impact of Changes to the LMPD Traffic Stop Policy

   Revisions to the Traffic Stop Policy (SOP 7.12) were made by LMPD on August 1, 2019 based, in part, on public concerns regarding the frequent use of (and police conduct during) traffic stops. Policy revisions included additional restrictions for conducting traffic stops, new guidelines for handcuffing people who are not under arrest, and emphasis that stops are to be conducted free of bias. It is recommended that the City of Louisville commission an independent assessment to determine the impact of these changes to the LMPD Traffic Stop Policy on the frequency, patterns, and racial/ethnic disparities associated with traffic stops.

8. Continue and Expand External Review of Reported Use of Force Incidents and Training

   Mandating the collection and reporting of police use of force data is insufficient to significantly change police practice; these data, once collected, must be properly analyzed. It is recommended that the LMPD continue to prioritize its willingness to have independent assessments conducted, to use the findings from these assessments to change

policy, practice, and training, and to widely disseminate findings to other law enforcement agencies in an effort to continually to build the evidence base.

Finally, note that this report is the first of two reports that will be issued to the LMPD based on our research. The findings documented throughout this first report demonstrate patterns of change in various survey constructs that corresponded with de-escalation training and the CDM model of officer decision-making. Our second report (scheduled for delivery in January 2021) will unpack these patterns of attitudinal and behavioral changes in a more precise and detailed manner, and provide a more robust examination of individual officer and citizen characteristics that lead to use of force incidents. For example, we plan to identify the types of officers and supervisors – including consideration of demographics, experience, attitudes, and ICAT training – who are more likely to report using de-escalation skills and supervise these skills in the field. These analyses will be designed to help the LMPD Training Division modify and refine their training curricula for optimal impact. We will further examine all arrest situations and statistically model the types of police-citizen encounters that are more likely to result in use of force, and provide additional clarity around the racial/ethnic disparities in police response.

Moving forward, it is essential to better understand and systematically assess the impact of changes in police policies and trainings, and in particular, use of force de-escalation training – including assessments of which de-escalation skills are most often used in the field, during what types of encounters, by what types of officers, and their resulting impact on officer/citizen injury. We must continue to generate evidence to identify and support what works in policing. The safety of our police officers, and the community they serve, hinges on this collective work to advance the evidence base in the policing profession. This work is especially imperative for the City of Louisville, where trust between the police and the communities they serve has been fractured. The challenging work that lies before the Louisville community – to repair frayed police-community relations – will not be easy. It must start with a foundation of transparency regarding LMPD's policies and practices, and an understanding of the role and impact of de-escalation training designed to make police-citizen encounters safer for everyone.

I. INTRODUCTION

In recent months, law enforcement agencies in the United States have been faced with an unprecedented set of circumstances requiring the navigation of major social unrest in communities amid a pandemic and economic crisis. Acknowledging the dangers to both the community and officers embedded within this crisis of police-community relations, efforts have intensified to identify "solutions" to reduce the frequency and severity of violent encounters between police and the public. Calls for the adoption of use of force "de-escalation" policies and training have been especially strong – widely endorsed by policymakers, policing experts, and the public – and the law enforcement field has responded (Engel et al., 2020b). In a U.S. national survey of 155 large police departments conducted in 2019, nearly all responding agencies indicated they offered some form of de-escalation training to at least some officers in their agency (CBS, 2019).

Although the implementation of use of force de-escalation training has been emphasized across the field of law enforcement, the effects of de-escalation training have not been systematically evaluated (Engel et al., 2020a). As such, the law enforcement agencies implementing de-escalation training, as well as the field more generally, do not fully understand the impact of this type of training on the frequency and severity of officers' use of force or on subsequent injuries to citizens and officers. To address this gap in knowledge, researchers at the *IACP/UC Center for Police Research and Policy* partnered with the Louisville Metro Police Department (LMPD) in 2019 to conduct a randomized control trial evaluation of de-escalation training for police. Specifically, from February through November 2019, the LMPD delivered in-service de-escalation training to approximately 85% of its sworn personnel, including all officers assigned to the Patrol Division. This training – *Integrating Communications, Assessment, and Tactics* (ICAT) – was developed by the Police Executive Research Forum (PERF) to instruct officers in de-escalation tactics and critical thinking skills for the management of potentially volatile police-citizen encounters.

Louisville Metro Police Department

Louisville is the largest city in Kentucky, with roughly 620,000 residents, representing over 15% of the state population. Based on 2010 Census figures, the City of Louisville's residential population is 69.9% White; 23.5% Black; 2.7% Asian; 5.4% Hispanic; and 3.0% other. The percentage of women is 51.6%, foreign-born citizens is 7.4%, and the median age is 37.2 years (U.S. Census, 2020). In January of 2003, the Jefferson County Police Department and the Louisville Division of Police merged to form the Louisville Metro Police Department (LMPD), which has been led by Interim Chief Robert Schroeder since June 1, 2020. Based on personnel records from January 2019, the LMPD is comprised of 1,245 sworn officers and 325 civilian personnel. The agency is organized into three bureaus (administration, support, and patrol), which encompass the LMPD's eight patrol divisions, along with other specialized, and support

units.[3] There are approximately 800 officers assigned to patrol and the LMPD is responsible for roughly 400 square miles of territory.

In the winter of 2018, LMPD executives expressed interest in partnering with the IACP/UC Center's research team to evaluate the ICAT training scheduled for delivery to all sworn officers within the LMPD. After receiving and agreeing to an evaluation proposal developed by the research team, a Memorandum of Understanding was signed by the LMPD and the University of Cincinnati (UC) research team that described the work and commitments from both parties. In addition, a Data Use Agreement was signed by both parties to guide the exchange, storage, and use of official LMPD use of force, officer, and supervisor survey data. The LMPD agreed to: (1) participate in the proposed research design, including altering their training schedule for randomization, (2) provide access to LMPD personnel and data as required for the study, (3) allow the research team to observe ICAT training sessions, and (4) allow the findings of the study to be publicly disseminated. This independent evaluation was completed using existing resources within the *IACP/UC Center for Police Research and Policy*, primarily supported by Arnold Ventures (previously the Laura and John Arnold Foundation). No costs associated with this evaluation were assigned to the LMPD or the City of Louisville.

The evaluation was designed to address the impact of ICAT training across several outcomes, including: (1) officers' knowledge of and attitudes toward persons in crisis; (2) officers' confidence in handling critical incidents; (3) supervisors' perceptions and self-reported activities related to de-escalation; (4) the frequency of officer use of force and the types of force used during encounters with resistant suspects, (5) the frequency of injuries to citizens and officers during use of force encounters; and (6) changes in training impact over time, including training decay. A stepped-wedge randomized control trial (RCT) design was employed for the training schedule, along with three officer surveys (pre-training, immediately post-training, and four to six-months follow-up), and one supervisor survey (during the follow-up period).

This report documents the methodology and findings of the evaluation of ICAT training implemented within the LMPD. Building upon a pilot-test conducted with the University of Cincinnati Police Division (UCPD) that facilitated the development and assessment of officer training survey instruments (see Isaza et al., 2020),[4] the LMPD study represents one of the first large-scale, methodologically rigorous evaluations of a well-known de-escalation training for police. This seminal study is the first randomized control trial to demonstrate a significant reduction in officer use of force following training implementation.

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[3] In addition to eight Patrol Divisions, the Patrol Bureau also includes the 9th Mobile Division, which provides additional patrol services throughout LMPD's jurisdiction.

[4] Similar to the LMPD, UCPD instructors also attended a train-the-trainer session with PERF staff, and then internally delivered ICAT training over a two-day period. A total of 62 UCPD officers were trained over a five-month period, and these officers were the subjects of the pilot evaluation study. This evaluation focused on the impact of de-escalation training on officers' attitudes, but was unable to consider the impacts on officer behavior due to the infrequency in the use of force.

Report Outline

This report begins in **Section II** with a review of available research examining the implementation and impact of de-escalation training for police. **Section III** describes the delivery of the ICAT training to 1,049 LMPD sworn officers over an approximate 10-month period (February 2019 – November 2019). **Section IV** outlines the methodology used in this study, including a description of the research questions, design, and data sources. **Section V** presents the findings from three waves of officer surveys (i.e., pre-training, post-training, follow-up), that were designed to assess changes in officers' perceptions of the role of police and the ICAT training, as well as changes in officers' attitudes regarding use of force and their reported confidence in using de-escalation tactics based on the ICAT training program. **Section VI** reports the findings from a single supervisory survey, administered to assess the perceptions of sergeants and lieutenants regarding their roles and activities in reinforcing ICAT training in the field. **Section VII** reviews the LMPD use of force data and the frequency and severity of force over a 10-year period. The report concludes with **Section VIII**, where the study findings are summarized, and a series of conclusions and recommendations for policy, research, and practice are presented. A description of future analyses to be conducted by the *IACP/UC Center for Police Research and Policy* using these data to further build our understanding of the impact of ICAT training is also provided.

II. LITERATURE REVIEW

Decades of research examining the function of law enforcement in society have highlighted the ability of officers to use force as a defining role of the police (e.g., Bittner, 1974; Fyfe, 1988). This role has been subject to serious scrutiny and debate as researchers, policymakers, practitioners, and the public examine *why* and *how* police use force in their encounters with the public. In recent years, a series of highly publicized incidents involving the killing of unarmed individuals by American police has sparked protests, civil unrest, and demands for police reform to reduce the frequency and severity of use of force encounters between police and the public they serve. Facing this National Police Crisis (Walker, 2018), police executives have been encouraged to make significant changes regarding policies, procedures, training, and equipment related to officer use of force (e.g., see National Consensus Policy on Use of Force, 2017; Police Executive Research Forum, 2016a; President's Task Force on 21st Century Policing, 2015).

Police use of force is generally defined as an action taken by police that threatens, attempts, or employs physical force to compel compliance from an unwilling subject (Garner et el., 1995; Henriquez, 1999). Most studies find that police use of force is a rare occurrence, with approximately 1-5% of all police-citizen encounters resulting in force (Davis et al., 2018; Garner et al., 2018). Studies have also found that when force does occur, it is often at lower levels of severity (Garner et al., 2018; Stroshine & Brandl, 2019; Torres, 2018). The prevalence of police force, however, depends upon how it is measured. Many use of force studies do not clearly define the concept of force, and they also vary in how it is measured. In addition, police agencies themselves vary in how use of force data is collected and counted, making it challenging to compare across agencies (Garner et al. 2002, 2018; Hickman et al., 2008; Terrill et al., 2018).[5] Although some police actions are nearly always conceptualized and documented as force (e.g., weaponless physical force involving injuries, physical restraints, chemical spray, nonlethal tactics and weapons, firearm threat or use), the inclusion of other minor actions as uses of force (e.g., verbal commands, handcuffing, and minor physical force without injuries) varies widely across agencies (Fridell, 2017; Klahm et al., 2014; Klinger, 1995; Terrill, 2003).

While the calls continue for a national database tracking officer use of force (see Jackman, 2020), advocates for police reform have also focused heavily on the need to change police use of force policy and training. De-escalation training, specifically, has been widely implemented by U.S. police agencies in the wake of adverse public reaction to recent controversial police use of force incidents. Despite vast promotion from politicians, academics, expert panels, and the public, however, we know little about the effects of de-escalation training on officers and police–citizen interactions (Engel et al., 2020a, 2020b). Although de-escalation training has become widely accepted as a common-sense approach to reduce unnecessary use of force by the police and to enhance the safety of both officers and the public during their encounters, the empirical

[5] For a comprehensive review summarizing how police use of force has been conceptualized and measured, as well as the methodological limitations of previous research, see Hollis, 2018. For a review of the strengths and weaknesses of various use of force data sources, see Garner et al., 2002.

evidence to support these claims is nearly non-existent. Although important initial investments have been made in the evaluation of de-escalation training on policing outcomes, the widespread implementation of, and substantial variation in de-escalation training curricula currently precludes strong conclusions regarding its effects on the attitudes and behaviors of police officers and the public (CBS News, 2019; Engel et al., 2020a).

Even the term "de-escalation" lacks an evidence-based definition in the policing field (Engel et al., 2020a; Todak & James, 2018). Broadly speaking, nursing and psychiatry fields refer to de-escalation as a process used to prevent, reduce, or manage aggressive behavior during an interaction between two or more persons (Engel et al., 2020a). The *National Consensus Policy and Discussion Paper on Use of Force*, released in October 2017, was one of the first documents to define de-escalation as it relates to policing. They proposed the following definition:

> Taking action or communicating verbally or non-verbally during a potential force encounter in an attempt to stabilize the situation and reduce the immediacy of the threat so that more time, options, and resources can be called upon to resolve the situation without the use of force or with a reduction in the force necessary. De-escalation may include the use of such techniques as command presence, advisements, warnings, verbal persuasion, and tactical repositioning (p. 2).

Rather than a description of the tactics or process, others have recommended a more succinct definition. For example, based on feedback gathered during focus groups with police officers, Todak and White (2019, p. 842) define de-escalation as "bringing a situation or citizen in crisis back to a calm state, using the least amount of force possible."

Proponents of de-escalation training within law enforcement agencies argue that this type of training provides officers with enhanced skills to resolve conflicts in highly confrontational situations without the use of force (Oliva et al., 2010). In turn, an officer's ability to defuse these encounters is viewed to enhance both officer and civilian safety in police-citizen interactions. Critics of de-escalation training, however, suggest these tactics contradict traditional policing operational responses, increasing officers' risk for injury by encouraging slow responses to potentially volatile situations (Blake, 2017; Jackman, 2016). Unfortunately, available research on the impacts of de-escalation training provides limited insight on arguments pertaining to the efficacy of this training. Like most trainings implemented within law enforcement, de-escalation training has not been the subject of substantial empirical evaluation (Lum et el., 2016; National Research Council, 2004). As a result, little is known regarding the development, delivery, and impact of this type of training.

Illustrating this gap in research, a recent multidisciplinary systematic review of de-escalation training evaluations showed that while a limited number of de-escalation trainings were evaluated across professions (N = 64), most studies appeared in the fields of nursing and psychiatry. *No evaluations* published within the policing or the criminal justice fields were identified (Engel et al., 2020a). Still, the findings produced from studies conducted in other professional fields provide some insight regarding the possible attitudinal (i.e., self-reported) and behavioral impact of de-escalation training. Specifically, studies examining self-reported outcomes suggest that de-escalation training has led to favorable effects on the attitudes, perceptions, and self-reported experiences and behaviors of trained individuals. In contrast, the

understanding of the impact of de-escalation training on behavioral outcomes is less clear. Although the majority of studies report favorable effects associated with de-escalation training (e.g., reduction in number and severity of violent incidents, increased application in use of de-escalation techniques), there are also findings suggesting de-escalation training has no, or in some cases, unfavorable effects on behavioral outcomes (Engel et al., 2020a).

Notably, confidence in the validity and generalizability of this available research is threatened by several considerations, including: (1) the variation across de-escalation training programs under examination; (2) the reliance on non-experimental research designs lacking a comparable control group; (3) the failure to assess behavioral outcomes; (4) the prioritization of short-term outcomes; and (5) the lack of examination of police officers specifically (Engel et al., 2020a). As a result, recommendations for de-escalation training, as well as larger conversations on the safety and well-being of police officers and the individuals they encounter, continue to rely heavily on anecdotal evidence and untested (or unsupported) propositions about best practice.

In the year since this systematic review was conducted, results from one study examining the impact of de-escalation training for police were published (see Mclean et al., 2020). Using a randomized control trial (RCT) design to assess the impact of the Tact, Tactics, and Trust (T3) training program offered by Polis Solutions in two police departments (Fayetteville, NC and Tucson, AZ), McLean and his colleagues (2020) reported that, although officers' attitudes improved, there were no discernable changes in actual officer behavior in the field. Similarly, researchers are currently in the process of evaluating a de-escalation training program in partnership with the Tempe (AZ) Police Department (White & Pooley, 2018). Using a randomized control trial, this research team plans to measure changes in behavioral outcomes including officers' use of force and de-escalation, and citizen complaints, as well as attitudinal outcomes such as changes in citizen and officer perceptions of police encounters over time. However, the results of this study are not yet available.

In summary, the available research provides a limited understanding of the impact of de-escalation training on police behavior and police-citizen encounters. As a result, police may be implementing trainings that are ineffective, perhaps even with unintended consequences to the safety of officers and the public. However, if de-escalation trainings can be implemented effectively, there is great opportunity to reduce the likelihood of injury for both citizens and officers. Therefore, it is critical to better understand the effects of de-escalation training on law enforcement. The study results documented within this initial report provide several important contributions to the knowledge base regarding the impact of de-escalation training on police attitudes and behaviors, as well as on police-citizen encounters. *Most critical, this current study represents the first large-scale, rigorous empirical evaluation of police de-escalation training that has demonstrated a significant reduction in police use of force.*

III. LMPD IMPLEMENTATION OF ICAT TRAINING

The *Integrating Communications, Assessment, and Tactics* (ICAT) training for law enforcement officers was implemented within the LMPD over a 10-month period (February 11, 2019 to November 21, 2019). During this time, a total of 1,049 LMPD officers – approximately 85% of 1,245 officers identified by personnel records in January 2019 – participated in the ICAT training.[6]

The ICAT training was originally developed in April 2016 by staff and consultants affiliated with the Police Executive Research Forum (PERF). Designed to enhance both officer safety and the safety of the individuals they encounter, this training relies on tactics and skills to de-escalate potentially volatile officer-citizen interactions. Specifically, this training is designed for police officers responding to circumstances where a person is behaving erratically and is either unarmed, or armed with anything less than a firearm (PERF, 2016b). It is these types of encounters, PERF contends, that have received the most criticism on police training and use of force. Further, the potential lethality of these types of situations is of great concern. This notion is supported by research demonstrating that in over 40% of fatal encounters with police, the suspect was unarmed, or using a weapon other than a firearm (Sherman, 2018; Zimring, 2017). By training officers in a wider array of options to handle and "slow down" these situations, officers may be better equipped to use alternative actions to the use of force.

Integrating Communications, Assessment, and Tactics (ICAT)

The ICAT curriculum is an integration of critical thinking, crisis recognition and intervention, communication skills, and operational tactics. While Crisis Intervention Team (CIT) training has become a model in dealing with persons in crisis, PERF aptly notes that CIT training is largely focused on communication, yet when situations are evolving, officers may forget or downplay their CIT training and instead resort to defensive tactics such as the use of force. In contrast, ICAT is designed primarily to help officers handling *persons in crisis* – including individuals who may be behaving erratically due to mental health concerns, substance use, situational stress, and/or intellectual/developmental disabilities. An important component of the ICAT curriculum is providing officers with the skills to recognize these types of individuals and behaviors and identify tactics to approach these encounters in a safe, effective manner.

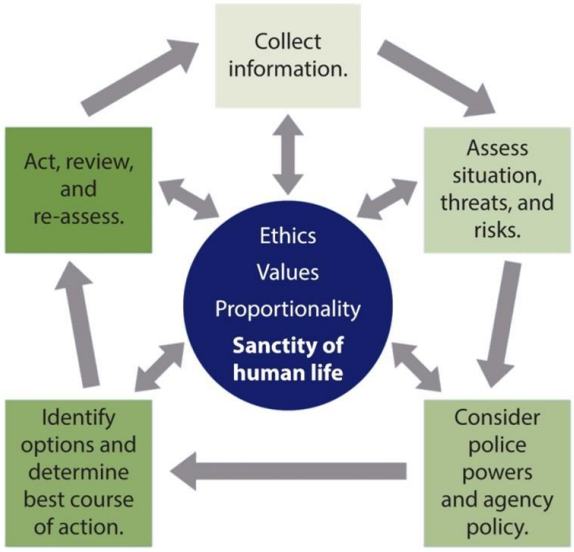
The ICAT curriculum is comprised of six modules. These modules include content related to: (1) Introduction; (2) Critical Decision-Making Model; (3) Crisis Recognition and Response; (4) Tactical Communications; (5) Operational Safety Tactics; and (6) Integration and Practice

[6] Although LMPD Training Division's official roster included 1,042 officers trained, seven more post-training surveys were received compared to the roster, possibly because officers may have been added late to training sessions and did not appear on the training roster. Based on a review of the officer code numbers reported on the surveys, it was determined that these additional seven surveys were not duplicates, and therefore are included in the analyses as trainees.

(PERF, 2016b). However, PERF emphasizes that ICAT training is flexible and adaptable, encouraging that agencies be creative in how they incorporate the training modules into new or existing programs on de-escalation, tactical communication or crisis intervention.[7] ICAT uses both lecture/discussion-based training and practical instruction and emphasizes the importance of scenario-based training for police. A full summary of the ICAT training can be accessed here: https://www.policeforum.org/icat-training-guide.

An integral component of the ICAT training program is the use of Critical Decision-Making Model (CDM). Developed in the United Kingdom and historically used by SWAT teams in the United States, the CDM focuses on a different style of thinking than the traditionally taught use-of-force continuum. Specifically, the CDM is based on a circular thought process designed to help officers develop and think through their options in a situation (see Figure 1). This five-step critical thinking process is centered on an agency's core values, ethics, and sanctity of human life. Every action that an officer takes should reflect a consideration of these central themes and should not go against those ideals. While the CDM is particularly useful in critical situations, its application is meant to be much broader, and can be used in everyday situations as well.

Figure 1: The Critical Decision-Making Model (PERF, 2016b)



The ICAT training program is being implemented in numerous police agencies across the United States (for a list, see https://www.policeforum.org/icat-agencies). PERF staff indicate that to date, over 600 individual agencies have participated in some form of ICAT training, including training

[7] PERF continues to develop the ICAT training. In 2019, PERF added a module that provides guidance to officers about how to recognize and respond effectively to "Suicide by Cop" incidents, in which a person attempts to die at the hands of a police officer. "Suicide by Cop: Protocol and Training Guide." https://www.policeforum.org/suicidebycop

officers by PERF staff, or train-the-trainer sessions (A. Kass, personal communication, January 6, 2020).

LMPD Implementation

Brought to the department by then-Assistant Chief Robert Schroeder, the implementation of ICAT training in the LMPD was led by the LMPD Training Division officers and staff. Two LMPD instructors, Sergeant Justin Witt and Sergeant Christopher Keith, initially participated in a train-the-trainer course provided by PERF staff and have subsequently become PERF national instructors. These two instructors provided train-the-trainer instruction for three additional officers –Travis Hayden, Anthony Stallard, and Rich Wilson – within the LMPD Training Division. The LMPD asked PERF to observe and provide feedback on its ICAT training, and PERF Director of Applied Research and Management, Tom Wilson, went to Louisville to observe the initial sessions and offer guidance. Thereafter, these five instructors provided the ICAT training to the remaining LMPD sworn personnel.

Prior to training delivery, the LMPD instructors and Training Division Major Paul Humphrey, made several minor adaptations to the curriculum to tailor the training program to local contexts. For example, LMPD instructors specifically modified the training to be more interactive and emphasized the importance of sound decision-making. To do this, they added additional practical components and exercises around communication and the CDM. Additionally, the LMPD modified the training to stress the importance of safety priorities (which was also added to LMPD's Use of Force Policy, SOP 9.1) along with the differences in goals and priorities during these types of situations.

To provide context to the training evaluation, the research team completed a comprehensive review of the ICAT training curricula. Additionally, research team members observed the delivery of the ICAT training within the LMPD across two distinct sessions. Observing training delivery in this manner provided the opportunity for a qualitative assessment of the LMPD instructors' fidelity to the curricula. In the assessment of the research team, both observed sessions demonstrated that the LMPD trainers were adhering to the training curricula, successfully illustrating model fidelity. A general overview of the timeline and delivery of the ICAT training and specific descriptions of training activities can be found below.

The ICAT training program was delivered during two consecutive eight-hour training days (Wednesday and Thursday) within a 40-hour week in-service training block required for all sworn officers. From February 2019 through November 2019, LMPD trained 1,049 officers of all ranks and assignments following a randomized training scheduled developed by the research team (for details, see Section IV). Approximately 40 to 50 officers were present in each training session. Officers had assigned seating at group tables with their respective Division officers, often with a Division supervisor. The group seating arrangements were specifically designed to reinforce collaboration among officers who often work in the field with one another.

The structure of the first training day centered on the use of videos (both pop culture and real-life use of force incidents), the use of team building activities, and the use of PowerPoint slides and discussion on ICAT training content. The content covered during the first day of training included the first four modules of ICAT training: (1) Introduction to ICAT, (2) The Critical

Decision-Making Model (CDM), (3) Communication skills, and (4) Crisis recognition. Officers engaged in candid group discussions, guided by the instructors, during each module. The instructors also directed the officers in activities to reinforce the tenets of the curriculum. For example, officers split into two groups in different rooms to engage in an exercise using building blocks and a telephone to reinforce the importance of communication skills amongst officers.

The second day of training covered the final two modules of ICAT: (1) Operational tactics and (2) Integration and practice. The remainder of the curriculum is covered through PowerPoint slides, the review of use of force videos, and group discussion. The ICAT curriculum is also practiced through two live-action scenarios, where training staff act as subjects going through crisis. The first incident included officers responding to a person in a wheelchair and the second scenario involved officers called to an apartment building for reports of a man with a knife. While scenarios began the same, the training staff took different actions based on the officers' decision-making. Therefore, the live scenarios could play out in many ways, ending successfully or unsuccessfully. The officers also engaged in practice with firearm simulators, receiving feedback from the LMPD instructors, which may also end successfully or unsuccessfully.

IV. METHODOLOGY

This study relies on multiple data sources and analytic techniques embedded within an adaptation of a randomized control trial (RCT) design. The various components of the research methodology are described below, including the research questions, study design, data sources, and analytic techniques employed to complete this research.

A. Research Questions

This evaluation aims to examine changes in officers' knowledge, attitudes, and behavior following their participation in a two-day de-escalation training program. Additionally, this research seeks to understand supervisors' perceptions and self-reported behaviors as they relate to the reinforcement of the ICAT training. These outcomes are examined using officer training surveys and the combined analysis of officer-level data provided by the LMPD. A series of convergent analytical approaches are used to answer the following research questions:

1. What is the impact of ICAT training on officers' reported knowledge about and attitudes toward persons in crisis?

2. What is the impact of ICAT training on officers' reported confidence in handling critical incidents?

3. How do first-line supervisors reinforce and/or supervise subordinates' use of ICAT de-escalation skills?

4. What is the impact of ICAT training on the frequency of officer use of force and the types of force used during encounters with resistant suspects?

5. What is the impact of ICAT training on the frequency of injuries to citizens and officers during use of force encounters?

6. Do the observed impacts of the ICAT training change over time?

B. Research Design

To assess the impact of ICAT training on (1) the knowledge and attitudes of officers, (2) the attitudes and self-reported behaviors of supervisors, (3) the behaviors of officers, the research team employed three distinct research designs. Specifically, the evaluation of training effects included (1) a repeated measure survey design, (2) a cross-sectional survey design, and (3) a stepped-wedge randomized control trial design. All data collection and related research activities were reviewed and approved by the University of Cincinnati's Institutional Review Board (IRB) in February 2019 (IRB# 2019-0118). Each of these designs are discussed in greater detail below.

1. Repeated Measure Survey Design

To examine the impact of ICAT training on LMPD officers' knowledge and attitudes, three training surveys (pre-training, post-training, and follow-up) were administered by the Training Division staff to officers immediately before, immediately after, and approximately four to six

months following officers' participation in the ICAT training. These surveys allow for comparisons of officers' knowledge and attitudes over time. Specifically, statistical comparisons of pre-training to post-training survey responses assess changes in responses following officers' participation in the ICAT training program. Additionally, comparisons of the post-training and follow-up survey responses provide insight on training effects over time. Finally, comparisons of the pre-training and follow-up survey responses consider the overall impact of the ICAT training program on LMPD officers' knowledge and attitudes. Details related to the survey measures, study sample, and analytic strategy are described more fully in Section V of this report.

2. Cross-Sectional Survey Design

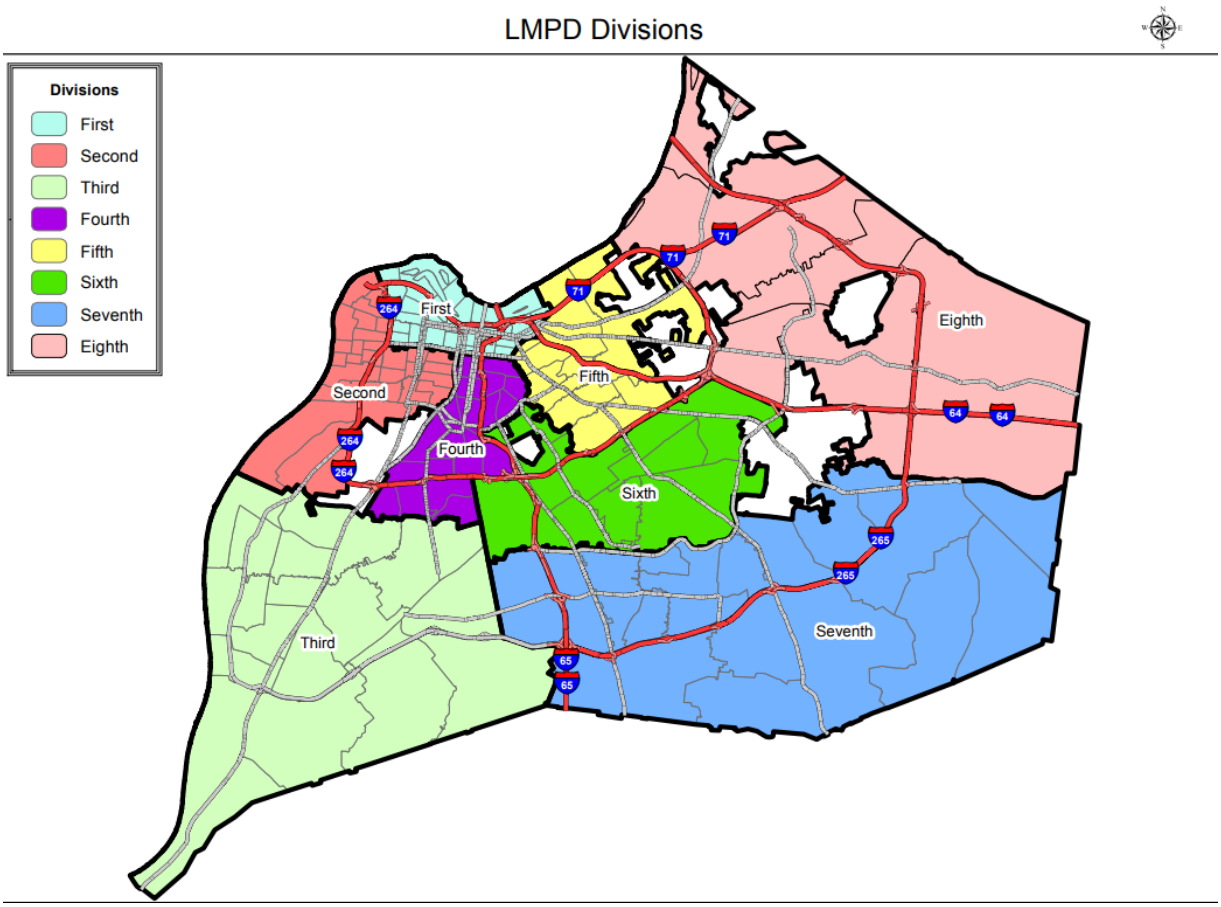
To supplement the evaluation of the ICAT training program, LMPD supervising officers (i.e., sergeants, lieutenants) were administered a survey in March 2020, designed to assess their general perceptions of the role of supervisors, and more specifically, their views regarding how and when they supervise and/or reinforce the ICAT training. This cross-sectional design collected information from supervisors at a single point in time after the implementation of the ICAT training. Descriptive analyses are conducted to provide an examination of the role of supervision in ICAT training. Details related to the survey measures, study sample, and analytic strategy are described more fully in Section VI of this report.

3. Stepped-Wedge Randomized Control Trial Design

To examine the impact of ICAT training on LMPD officers' behavior, the research team developed a stepped-wedge randomized control trial (RCT) design that was implemented by the LMPD Training Division. The stepped-wedge cluster RCT is a crossover design in which clusters of subjects begin as no-intervention controls, crossing over permanently from the control group to the intervention group in sequence at randomized, pre-specified points in time (Hussey & Hughes, 2007). This design allows for an experimental comparison between participants in clusters receiving the intervention and clusters receiving "conditions as usual" awaiting crossover to the intervention group. There are practical benefits to this approach such as minimizing ethical concerns that control participants in traditional RCTs do not receive a treatment or intervention that may prove to be beneficial.

In the present study, a stepped-wedge cluster RCT crossover design allowed for clusters of LMPD officers to begin as non-intervention controls (i.e., untrained in ICAT). Individual clusters of officers were then randomly selected in a sequence at pre-planned time points to cross over from the control group to the intervention group (i.e., trained in ICAT). At the end of the experiment, all officer clusters had crossed over to the intervention group. To implement the stepped-wedge RCT design, the nine LMPD Patrol Divisions, including eight geographic-based divisions and one mobile unit operating across the city of Louisville (see Figure 2), were grouped into three strata, which were then randomly selected for training.

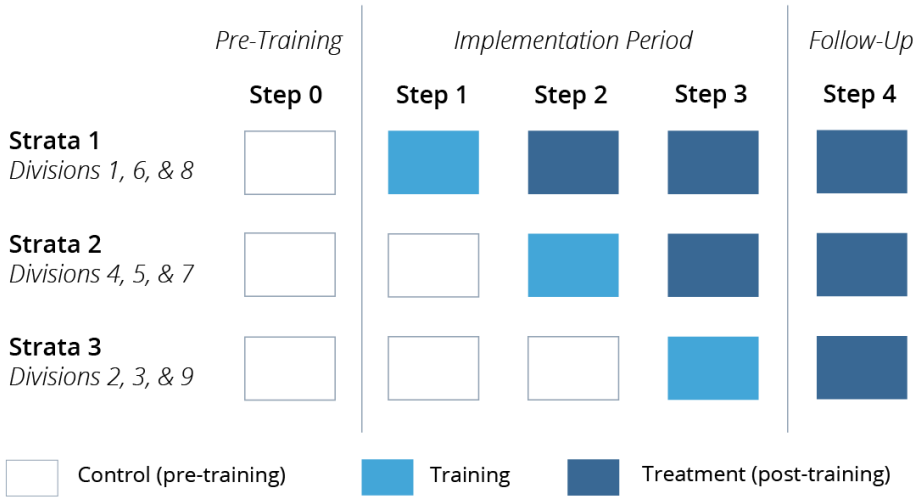
Figure 2: LMPD Patrol Division Map of Louisville/Jefferson County



The Divisions were selected into strata while ensuring relative equivalency of patrol officer counts, as well as comparable pre-intervention crime and arrest rates across the pooled clusters.[8] The next step was to randomly select each strata for the various discrete time points of training. Strata 1 (Divisions 1, 6, and 8) were randomly selected to attend training first from February 11 to May 17, 2019. Thereafter, officers from Strata 2 (Divisions 4, 5, and 7) were trained from May 20 to August 23, 2019, and officers from Strata 3 (Divisions 2, 3, and 9) completed their training from September 9, 2019 to November 21, 2019. By the end of the current experimental trial, all clusters moved to the intervention group, which meant that all Patrol Divisions (1-8), as well as the Mobile 9th Division, had received ICAT training. This process is shown in Figure 3.

[8] For example, when comparing monthly event counts of use of force by strata, the mean differences for the entire year of 2018 (the year preceding the experiment) yielded no significant mean difference across any of the strata over the monthly counts ($F = 1.775$, $p = .175$).

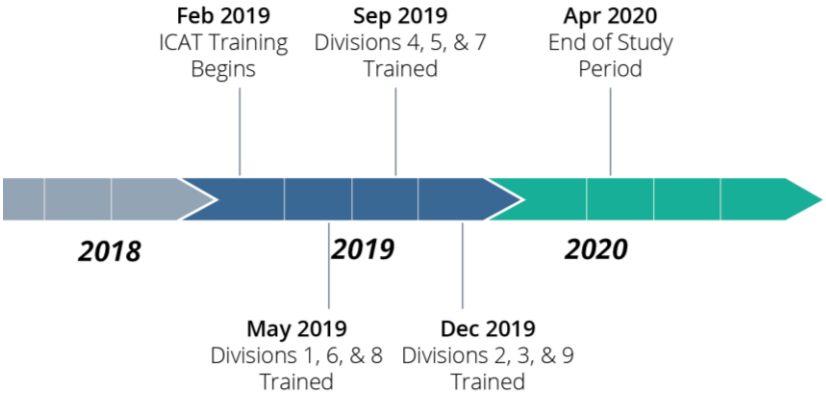
Figure 3: The Stepped-Wedge Design



Note: Step 0 = January 2019 to February 10, 2019; Steps 1 to 3 = February 11, 2019 to November 30, 2019; Step 4 = December 1, 2019 to February 2020

An examination of the LMPD training regimen was consistent with the randomly arranged stepped-wedge training plan, suggesting high fidelity between the treatment as delivered and treatment as intended. Specifically, 92.0% of officers (N = 192) in Divisions 1, 6, and 8 were trained by the end of Step 1; 92.4% of officers (N = 180) in Divisions 4, 5, and 7 were trained by the end of Step 2; and 95.0% of officers (N = 88) from Divisions 2, 3, and 9 were trained by the end of Step 3. In total, 98.0% of patrol officers (N = 528) were trained by the end of their Division's planned training period, demonstrating LMPD's adherence to the research design and fidelity to the pre-determined randomization conditions. The timeline for LMPD's implementation of the stepped-wedge research design is displayed in Figure 4.

Figure 4: LMPD ICAT Training Implementation Timeline 2019-2020



C. Officer Mobility (Sensitivity Testing)

One complication for the stepped-wedge RCT design is the potential movement of officers from one patrol division to another between Steps 1 and 4 of the training delivery period. For example, an officer may be trained with a division assigned to Strata 1, and subsequently be transferred to a division within a different training strata. To examine the frequency of this possible contamination effect of the treatment condition, we randomly sampled 40 officers – noting the division where they were trained as part of the experiment (17 were selected from Strata 1, 15 from Strata 2, and 8 from Strata 3). Of the 40 randomly selected officers, 38 (95%) had observable activity (e.g., tickets and arrests) during the follow-up period within the same division where they were initially trained at the end of the training period.[9] When generalized to the agency, it is likely that majority of patrol officers remained within the division in which they were trained for the follow-up time period, substantially reducing concerns of possible contamination effect.[10]

D. Data Sources

Using the research designs described above, the research team gathered quantitative data from three sources: (1) officer surveys, (2) field supervisor surveys, and (3) official reports of officer behavior.[11] All data collection and related research activities were reviewed and approved by the University of Cincinnati's Institutional Review Board (IRB) in February 2019 (IRB# 2019-0118). The research questions for this study were assessed using a variety of analytic techniques to provide descriptive statistics, two-wave survey comparisons, and three-wave survey comparisons to assess officer attitudes and perceptions. Advanced statistical modeling was used to assess any LMPD Division-level changes in police-citizen encounters as measured by arrests, use of force, and officer/citizen injury. These three data sources, associated statistical analyses, and study findings are documented within Sections V through VII to follow.

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[9] Note that one of the two officers who transferred to a different Division still remained in the same strata (moving from Division 4 to Division 5, both within Strata 2).

[10] Research contamination occurs when the members of one group (the "control" group) in a trial receive the treatment or are exposed to the treatment that is meant for the treatment group. This would bias the contrast between the control group and the treatment group, reducing the confidence that experimental effects are actually due to the treatment (in this study, ICAT training).

[11] The original research plan included a qualitative component that was not implemented. Four focus groups were scheduled with approximately 40-45 LMPD officers to be convened on March 20 and 27, 2020, but were canceled due to Ohio and Kentucky travel restrictions associated with COVID-19. Unfortunately, these focus groups were unable to be rescheduled during the study period due to the continued restrictions of group meetings. The intent of these focus groups was to gather additional context regarding the strengths and limitations of implementing de-escalation tactics in the field, comments regarding the ICAT training, and reactions to the study results specifically. If deemed appropriate and still of value, these sessions may be rescheduled sometime in 2021.

V. IMPACT OF TRAINING ON OFFICERS' ATTITUDES

To assess the impact of the ICAT training on officers' knowledge and attitudes, the research team used a repeated measures survey design. Three training surveys were administered to officers by the LMPD Training Division staff immediately before, immediately after, and approximately four to six months following officers' participation in the ICAT training. Both the pre- and post-training surveys were administered in a paper format to all training participants and placed into a collection box that was retrieved by the research team approximately every two to three weeks.[12] The online follow-up survey – provided to patrol officers only – was administered using LMPD software (i.e., PowerDMS).[13] The inclusion of a unique identifier for each officer allowed survey responses to be linked across waves of measurement (i.e., pre, post-, and follow-up), as well as linked to observations of officer behavior (e.g., uses of force, arrests, injuries).

The survey instruments were created by the research team in consultation with LMPD officials. Where possible, the survey items were informed by previous research measuring police officers' self-reported attitudes related to the role of police, interactions with the public, use of force, training, and police agencies. Additionally, the surveys contain survey items designed specifically for the evaluation of the ICAT training, including measures regarding officers' perceptions of persons in crisis and the Critical Decision-Making Model (CDM). The majority of the items presented in the LMPD officer training surveys were pilot tested in the evaluation of ICAT training with the University of Cincinnati Police Division (see Isaza et al., 2020). Aligning with previous survey research, many of these items are measured using variations of a Likert scale, allowing the research team to capture both the nature – for example, agreement or disagreement – and the intensity of officers' attitudes across the outcomes of interest.

The LMPD officer training surveys included questions grouped within 10 different conceptual areas. Although many of these items were designed to measure officer attitudes that might be affected by their participation in a use of force training program, other items serve as "control" measures and, as such, are not expected to change over time. The survey items presented to officers differed across the waves of the training survey. The inclusion of specific items across periods of measurement was determined by the need to collect specific information across multiple points in time, as well as by the desire to shorten the follow-up survey to increase response rates. The 10 sections of the officer training surveys include:

(1) Views on Interactions with the Public – Included in pre- and post-training surveys, officers' general views on citizen interactions – including issues of officer safety and de-escalation – were measured using seven survey items. Officers were asked to indicate

[12] ICAT training was delivered on Wednesdays and Thursdays of the 40-hour in-service training week; the pre-training survey was administered on Wednesday mornings before ICAT training began and post-training survey was administered on Thursdays after the curriculum was complete, over the course of 24-weeks of training.

[13] PowerDMS, a police management software used for policy and procedure management, was used for administration of the follow-up survey. Officers signed into their individual accounts to fill out the surveys, which were later exported to Excel files by LMPD staff and provided to the research team. The research team entered all excel file responses into an SPSS database for analysis.

their level of agreement to each of the seven survey items on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). After the appropriate reverse coding, higher scores indicate a greater agreement to the tenets taught during ICAT training.

(2) *Attitudes Towards Persons in Crisis* – Included in pre-, post-, and follow-up training surveys, 14 survey items were used to measure officers' attitudes toward interactions with persons in crisis. Based on the ICAT curriculum, a person in crisis refers to an individual that may be behaving erratically due to factors such as mental health concerns, substance use, situational stress, and/or intellectual/developmental disabilities. For each survey item, officers were asked to indicate their level of agreement on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Higher scores indicate a greater agreement to the tenets taught during the ICAT training.

(3) *Views on Policing* – Included in pre- and post-training surveys, 15 survey items were used to assess officers' view of the role of police – including the importance of various job duties – and officers' perspectives regarding their peers and agency. Respondents were asked to indicate their level of agreement to each survey item on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree).

(4) *Attitudes Toward Use of Force* – Included in pre-, post-, and follow-up training surveys, 11 items were asked to garner officers' attitudes toward using force, including their preference for using force and communication skills. Respondents were asked to indicate their level of agreement to each item on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Higher scores indicate a greater agreement to the tenets taught during the ICAT course.

(5) *Officer Confidence in Interactions with Persons in Crisis* – Included in pre-, post-, and follow-up training surveys, officers were asked to indicate their level of confidence on a four-point scale (1 = Not Confident at All; 4 = Very Confident) to a series of actions when responding to a hypothetical person in crisis. Thirteen survey items measured respondents' confidence, in managing the described situation. Item values are expected to increase as a result of the ICAT training.

(6) *Utility of the Critical Decision-Making Model (CDM)* – Included in post- and follow-up training surveys, 11 survey items were measured to determine the perceived utility of the Critical Decision-Making Model (CDM). Respondents were asked to indicate their level of agreement on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Higher scores indicate officers' greater agreement regarding the utility of the CDM.

(7) *Receptivity to Training* – Included in pre-training survey, survey respondents were asked to indicate their level of agreement with seven statements related to training in law enforcement using a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). These items were adapted from a study on employees' openness toward change conducted by Miller, Johnson and Grau (1994). These items serve as control measures for the evaluation and were only asked on the pre-training survey.

(8) *Perceptions of the ICAT Training Program* – Included in the post-training survey, officers' perceptions of the ICAT training program – including the content, delivery, and perceived outcomes – were assessed using eight items where respondents indicated how

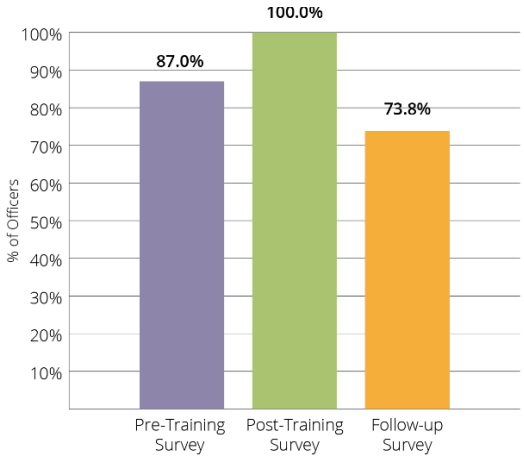
applicable they felt each statement was to them (1 = Not At All Applicable to Me to 7 = Very Applicable to Me).

(9) Use of ICAT Skills – Included in the follow-up survey, 10 survey items assessed respondents' perceptions of ICAT training, based on their level of agreement on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Items also determined how often ICAT specific de-escalation skills were used by officers in the last 60 days, including their difficulty and effectiveness of use. An additional 20 questions were posed to respondents in a variety of formats to gather feedback on the use of ICAT de-escalation skills in the field.

(10) Demographics – Included in pre-, post-, and follow-up training surveys, 14 survey items measured respondents' demographics, previous experiences with persons in crisis, and participation in specific trainings during the last three years.

Officer training surveys received high response rates at all three waves of measurement. Specifically, 907 of the 1,049 officers trained completed the pre-training survey (87%), while all officers (100%) completed the post-training surveys.[14] Finally, of the 809 trained officers assigned to patrol, 597 (73.8%) completed the follow-up survey. These response rates are presented in Figure 5.

Figure 5. LMPD Training Survey Response Rates



A. Data Analyses

The officer training survey data were primarily analyzed using SPSS, a social science statistical software program. The statistical approach to assess these data include: (1) descriptive analyses of survey items presented in a single wave of measurement (e.g., reactions to ICAT training measured in the post-training survey only), (2) independent t-test comparisons of survey items

[14] The lower pre-training response rate was likely due to some officers arriving late to the 8:00 am training, after the pre-training survey had been administered.

presented across two waves of measurement,[15] and (3) repeated measures analysis-of-variance (ANOVA) models for comparisons of those survey items measured at all three waves of the officer training survey.[16] In short, findings from analyses of the officer training survey data are produced from both descriptive analyses and statistical comparisons of officers' average responses on survey items across the pre-training, post-training, and follow-up training surveys. Specifically, statistical comparisons of pre-training to post-training survey responses are intended to examine changes in officers' attitudes affected by the ICAT training program. In turn, comparisons of post-training and follow-up survey responses are intended to assess training impacts on officers' attitudes over time. Finally, comparisons of the pre-training responses to follow-up responses considers the overall impactful change in officers' attitudes produced by the ICAT training program. Tests for statistically meaningful differences in officers' average responses are conducted across these comparisons. In this report, the research team considers tests with p-values lower than the convention 0.05 level to be statistically meaningful, indicating 95% confidence that there is a difference in that item across the two waves that could be attributed to ICAT training. These differences are denoted in all tables with an asterisk (*).

B. Section Outline

The remainder of this sections is organized into five areas. First, the demographic characteristics and baseline attitudinal measures of officers are presented. Second, officers' reactions to the ICAT curriculum both immediately after and several months following the training are considered. Next, officers' self-reported use of the ICAT de-escalation skills four to six months following their participation in training are reported. Then, changes in officer attitudes over time are presented. Finally, a summary of the findings across these analyses is provided. Appendices A through C contain the descriptive statistics for the three training surveys, including the percentages representing how many respondents selected each response option across the survey items.

C. Officer Demographics and Baseline Measures

This section contains descriptive statistics regarding the demographic characteristics of the officer sample, as well as baseline measures of officers' views of policing prior to their participation in the ICAT training.

Table 1 describes the characteristics of the LMPD officers that completed a post-training survey (N = 1,049; response rate = 100%). As shown, the officers who attended ICAT training were

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[15] Independent t-test comparisons determine whether the mean (average) difference of two sets of observations is zero. If the resulting t-test statistic rejects the null hypotheses of zero mean difference, then there is a statistically meaningful difference between the two observations.

[16] Repeated measures ANOVA derives from the one-way ANOVA statistical family – but for related (rather than independent) groups (Keselman et al., 2001). In short, repeated measures ANOVA allows for the analysis of repeated measures for at least three or more points in time for the same individuals in a panel design. The analysis describes the levels and the change in these measures over time. Additionally, the Bonferroni post-hoc tests allow for multiple comparisons (i.e., pre-training with post-training, post-training with follow-up, and pre-training with follow-up) to demonstrate which comparisons are statistically significant.

largely male (83.6%), White (80.2%) and served as patrol officers (57.7%). Officers were fairly evenly distributed in terms of age, law enforcement tenure, and LMPD tenure. A majority (53%) had a Bachelor's degree or higher, and slightly less than one-third had prior military experience (30.9%).

Table 1. Post-Training Sample Demographics (N = 1,049)

	% (n)		% (n)
Gender		**LE Tenure**	
Male	83.6 (877)	Less than 1 year	3.6 (38)
Female	14.7 (154)	1 – 4 years	21.5 (226)
Other	1.0 (10)	5 – 9 years	22.3 (234)
Unknown	0.8 (8)	10 – 14 years	19.7 (207)
Age		15 – 19 years	18.2 (191)
18 - 20 years old	0.2 (2)	20 or more years	14.0 (147)
21 - 24 years old	5.1 (54)	Unknown	0.6 (6)
25 - 29 years old	16.7 (175)	**LMPD Tenure**	
30 - 34 years old	20.6 (216)	Less than 1 year	4.2 (44)
35 - 39 years old	17.5 (184)	1 – 4 years	24.3 (255)
40 - 44 years old	16.9 (177)	5 – 9 years	21.7 (228)
45 - 49 years old	13.4 (141)	10 – 14 years	20.4 (214)
50 + years old	9.0 (94)	15 – 19 years	18.0 (189)
Unknown	0.6 (6)	20 or more years	10.7 (112)
Race		Unknown	0.7 (7)
Caucasian/White	80.2 (841)	**Education**	
African American/Black	11.8 (124)	High School	7.4 (78)
Latino/Hispanic	2.8 (29)	> 2 years college	21.5 (226)
Asian/Pacific Islander	1.9 (20)	Associate's Degree	16.4 (172)
Other	2.5 (26)	Professional Degree	0.8 (8)
Unknown	0.9 (9)	Bachelor's Degree	47.0 (493)
Rank		Graduate Degree	6.2 (65)
Patrol Officer	57.7 (605)	Unknown	0.7 (7)
Detective	20.9 (219)	**Military Experience**	
Sergeant	14.2 (149)	Yes	30.9 (324)
Lieutenant	4.8 (50)	No	68.7 (721)
Major and Above	0.8 (8)	Unknown	0.4 (4)
Other	1.4 (15)		
Unknown	0.3 (3)		

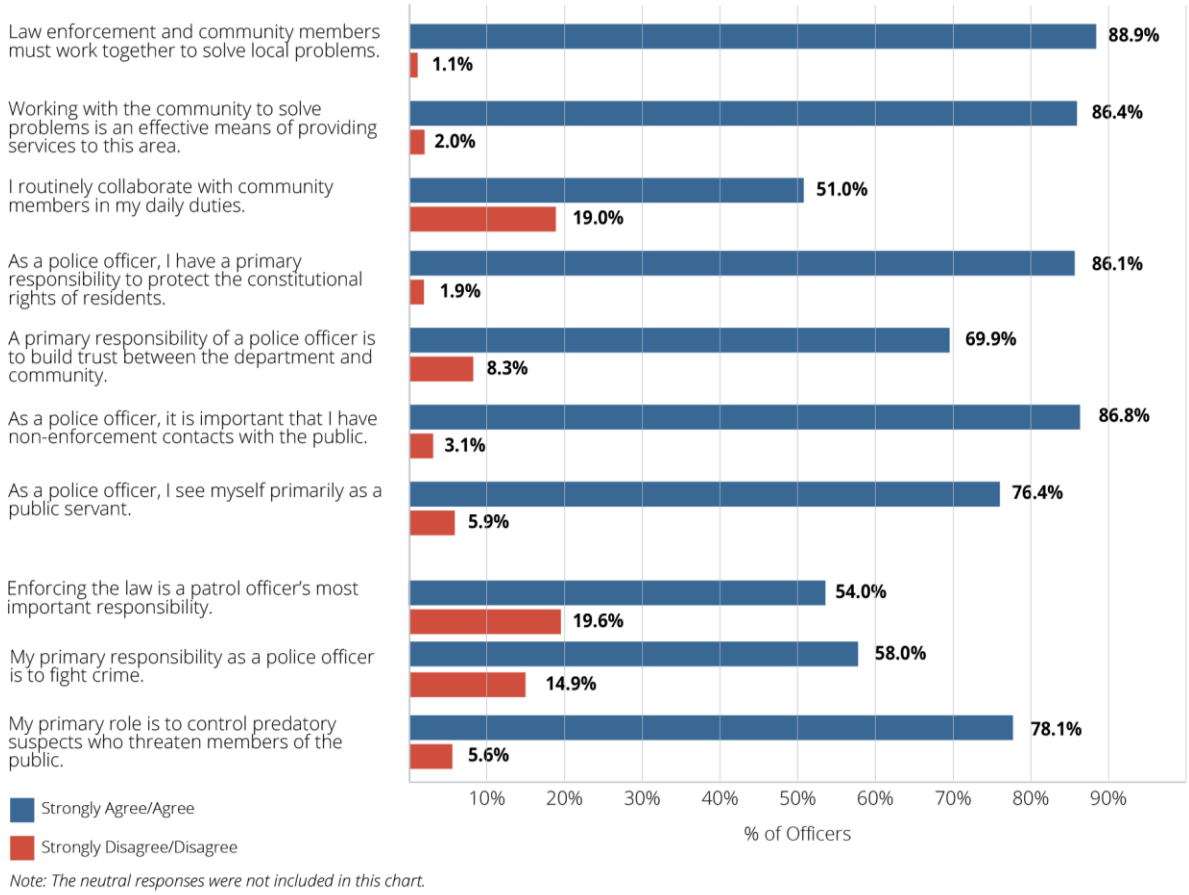
Table 2 presents the baseline assessment of officers' views on policing. Specifically, officers' perceptions were prompted regarding the role of police, as were their perceptions of working as a police officer in Louisville / Jefferson County. Respondents were asked to indicate their level of agreement on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree) to 15 survey items. Table 2 reports the average response ($\bar{X}$), standard deviation (SD), and number of officers responding to each question (N).

Table 2: LMPD Officer Views on Policing, Pre-Training

Survey Statements	$\bar{X}$	SD	N
1. Enforcing the law is a patrol officer's most important responsibility.	3.47	0.98	901
2. Law enforcement and community members must work together to solve local problems.	4.15	0.65	901
3. Working with the community to solve problems is an effective means of providing services to this area.	4.07	0.68	899
4. I routinely collaborate with community members in my daily duties.	3.44	1.94	900
5. My primary responsibility as a police officer is to fight crime.	3.54	0.90	901
6. As a police officer, I have a primary responsibility to protect the constitutional rights of residents.	4.09	0.66	900
7. A primary responsibility of a police officer is to build trust between the department and community.	3.76	0.83	901
8. As a police officer, it is important that I have non-enforcement contacts with the public.	4.08	0.71	899
9. As a police officer, I see myself primarily as a public servant.	3.87	0.79	900
10. My primary role is to control predatory suspects who threaten members of the public.	3.92	0.77	900
11. The jurisdiction that I work in is dangerous.	3.96	0.89	900
12. As a police officer, there is a good chance you will be assaulted while on the job.	4.17	0.77	901
13. Overall, I am satisfied with my job.	3.68	0.95	901
14. I enjoy working with my colleagues.	4.27	0.71	901
15. Overall, this is a good agency to work for.	2.71	1.14	900

Presented differently, the percentage of officers who indicated that they agree (shown in blue) or disagree (shown in red) with each of these statements is graphically displayed in Figure 6 and Figure 7. Figure 6 demonstrates that prior to the training, LMPD officers reported high levels of agreement that their roles involved activities consistent with community-oriented policing principles, however slightly more than half of the officers viewed law enforcement as their most important responsibility. Also, of interest in the baseline measures, a majority (75%) of officers agreed or strongly agreed that the jurisidiction they work in is dangerous, and 85% agreed that there is a good chance they would be assaulted while on the job, which presents a potential challenge for trainers when encouraging officers to think differently about use of force and the promotion of de-esclation tactics. In addition, only slightly over a quarter of officers agreed / strongly agreed that overall the LMPD is a good agency to work for, suggesting potential issues with officer morale that may impact receptivity to training.

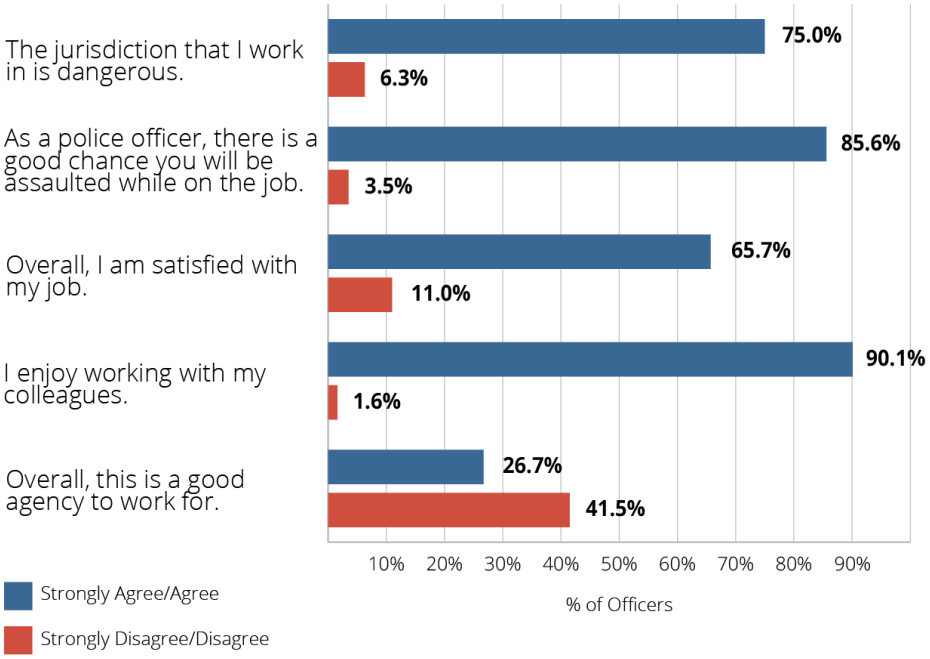
Figure 6. LMPD Officer Views on Policing, Pre-Training



Note: The neutral responses were not included in this chart.

Figure 7 displays officer agreement (shown in blue) or disagreement (shown in red) to several statements related to policing in the Louisville Metro area. A low percentage (26.7%) of LMPD officers agreed that the LMPD was a good agency to work for, with almost 42% disagreeing to this statement. A majority (75%) of surveyed officers agree or strongly agree that the jurisidiction they work in is dangerous. Additionally, most officers suggested that police officers are likely to be assaulted on the job (85.6%). Importantly, this perception of danger could present a potential challenge for LMPD trainers when encouraging officers to think differently about their use of force and de-escalation.

Figure 7: LMPD Officer Perceptions of Policing in Louisville



Note: The neutral responses were not included in this chart.

D. Officers' Reactions to the ICAT Training

Guided by observations of the importance of documenting officers' assessment of the quality and utility of training (see Kirkpatrick, 1998), this portion of the report details officer reactions to and perceptions of the ICAT curriculum, including: (1) officers' post-training perceptions of the ICAT curriculum, (2) officers' perceptions of the Critical Decision-Making Model (CDM) at the post-training and follow-up periods of measurement, and (3) officers' impressions of the impact of ICAT on their work four to six months after their participation in the training.

1. Post-Training Perceptions of the ICAT Training Program

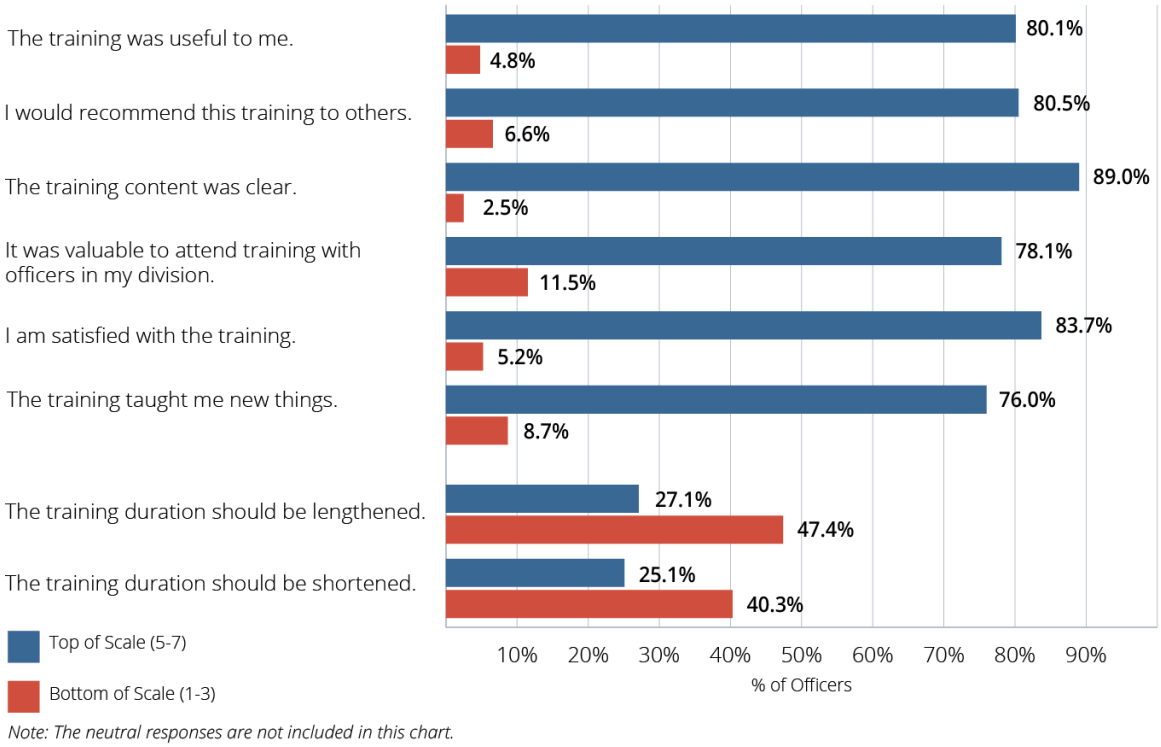
In the post-training survey, eight survey items were designed to assess the delivery and perceived value of the ICAT training curriculum. Officers were asked to provide their perceptions of the ICAT training using a seven-point scale (where 1 = not at all applicable to me, 4 = somewhat applicable to me, and 7 = very applicable to me). The average responses across these survey items are presented in Table 3. As seen in Table 3, officers' perceptions of the training were consistently positive on items 1 through 5, with an average response of 5.5 or higher. When asked specifically about the duration of the training, officers were generally split on their responses of whether it should be longer or shorter, with the majority indicating a neutral opinion.

Table 3: LMPD Officer Post-Training Perceptions of the ICAT Training

Survey Statements	$\bar{X}$	SD	N
1. This training was useful to me	5.53	1.26	1043
2. I would recommend this training to others	5.55	1.30	1042
3. The training content was clear	5.89	1.08	1041
4. It was valuable to attend training with officers in my division	5.54	1.70	1039
5. I am satisfied with the training	5.68	1.26	1042
6. The training taught me new things	5.38	1.42	1042
7. The training duration should be lengthened	3.56	1.79	1038
8. The training duration should be shortened	3.65	1.66	1037

To further illustrate these findings, officers' responses across the seven-point Likert scale are collapsed and displayed in Figure 8. Specifically, scores ranging from 1 to 3 represent the bottom of the response scale (see bars in red), with officers providing these responses suggesting that the statements about the ICAT training *do not align* with their perceptions. Scores ranging from 5 to 7 represent the top of the scale (see bars in blue), with officers providing these responses suggesting the statements about the ICAT training align with their perceptions. A score of 4 is interpreted as a neutral response and is not presented. As shown in Figure 8, 80.1% of officers reported the training was useful to them (reporting a score of 5 or higher). Further 83.7% of officers expressed satisfaction with the training, with 78.1% suggesting it was valuable to attend the training with officers in their division. Frequencies across the remaining survey items demonstrate that the majority of officers viewed the ICAT training program positively.

Figure 8: LMPD Officer Post-Training Perceptions of ICAT Training



Note: The neutral responses are not included in this chart.

2. Perceptions of the Critical Decision-Making Model

As stated previously, an integral component of the ICAT training program is the use of Critical Decision-Making Model (CDM). Recognizing the importance of officers' reactions to the CDM, the research team presented survey respondents with 11 survey items designed to assess their views on the utility of the CDM. The questions were first asked on the post-training survey (after the concepts were introduced to officers), and then again during the four to six-month follow-up survey.

Table 4: LMPD Officer Views on Critical Decision-Making Model (CDM) Utility

	Post-Training			Follow-up			
The CDM Model…	$\bar{X}$	SD	N	$\bar{X}$	SD	N	**T-Value**
1. …increases my decision-making skills during everyday situations.	3.92	0.70	1049	3.65	0.81	544	-7.07**
2. …often takes too much time to use in encounters with a person in crisis.	2.60	0.80	1049	2.77	0.79	545	4.15**
3. …may make officers hesitate to take action when needed.	2.92	0.88	1049	2.97	0.82	544	1.09
4. …helps me to assess the risks in a situation.	3.95	0.61	1048	3.57	0.73	542	-10.83**
5. …helps me identify my options for action in a situation.	3.97	0.61	1049	3.58	0.75	543	-11.02**
6. …helps me select an option to resolve a situation.	3.92	0.64	1049	3.56	0.73	544	-10.11**
7. …reminds me to continuously gather information during a situation.	4.01	0.65	1049	3.65	0.77	543	-9.89**
8. …is too complicated.	2.35	0.81	1049	2.73	0.81	543	8.84**
9. …helps me review the action I took during a situation.	3.86	0.64	1049	3.52	0.72	543	-9.43**
10. …helps me to explain my decision-making after I act in a situation.	3.92	0.65	1049	3.54	0.73	542	-10.49**
11. I am confident using the CDM during an encounter with a person in crisis.	3.88	0.70	1049	3.51	0.79	540	-9.66**
CDM Utility Scale[17]	31.42	4.44	1038	28.55	5.28	531	11.35**

**p < 0.01; *p < 0.05

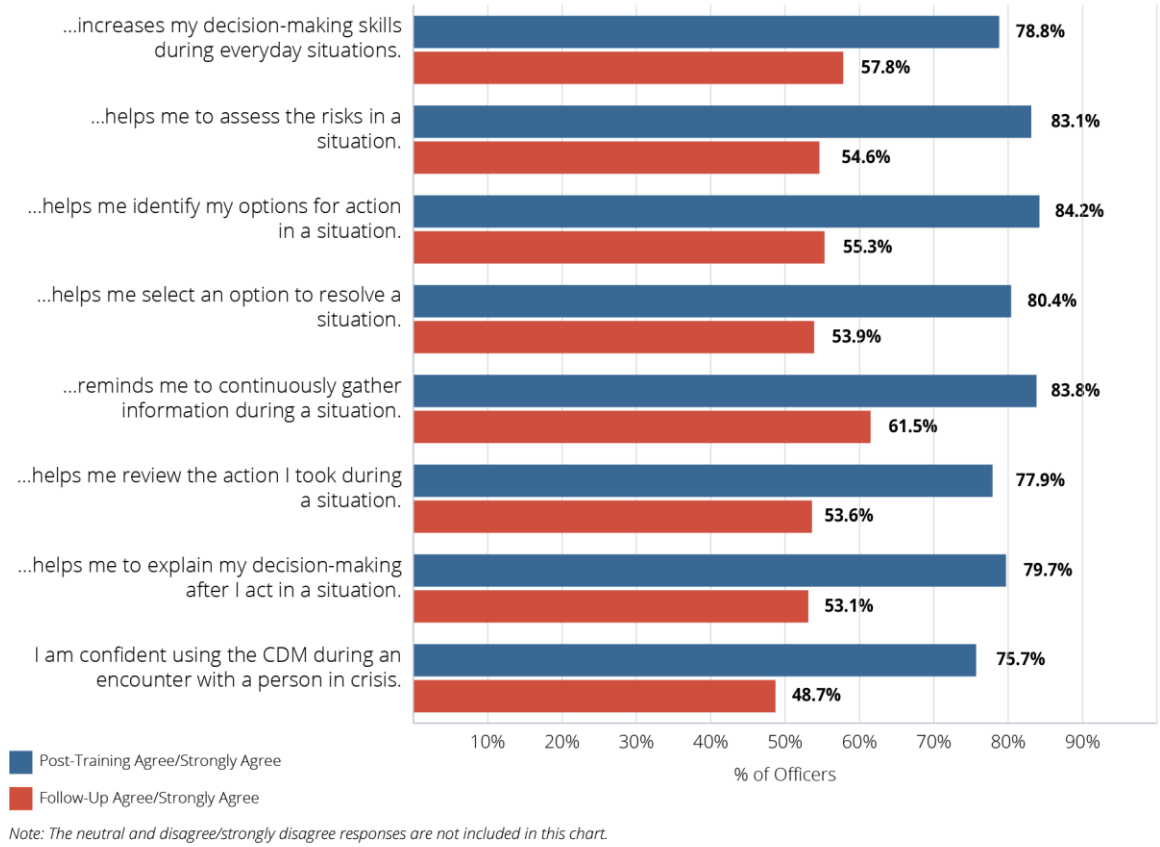
Officers were asked to indicate their level of agreement on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree) to 11 items concerning the CDM (see Table 4). Higher scores indicate officers' greater agreement regarding the utility of the CDM (with the exception of items 2, 3, and 8 which are expected to decrease).[18] The t-test results indicate that 10 of the 11 items demonstrate statistically significant changes in the mean score from post-training to follow-up periods of measurement. Notably, however, all changes in officers' perceptions are in the *opposite direction* than would be expected. The additive *CDM Utility Scale*, presented at the bottom of Table 4, which should increase in the follow-up period if the CDM is found to be useful with practice, demonstrates a significant reduction in the score. In other words, these findings indicate that when surveyed four to six months after training, officers reported less utility of the CDM in their work.

[17] Based on an additive scale composed of item 1, items 3-7, and items 9-11. The Cronbach's Alpha score for Post-Training is 0.947 and 0.954 for Follow-up.

[18] These 11 items were summed to create an additive *CDM Utility Scale* for each wave of data; the Cronbach's Alpha score for Post-Training is 0.75 and 0.77 for Follow-up.

Presented differently, Figures 9 and 10 display the frequencies of officer responses to each of the survey items assessing CDM utility. Figure 9 contains those survey items that are worded positively. It was expected that the frequencies for officers' follow-up responses (shown in red) would be greater than the frequencies for officers' post-training responses (shown in blue) – suggesting that officers perceived greater utility of the CDM over time. However, as shown in Figure 9, we find the opposite to be true.

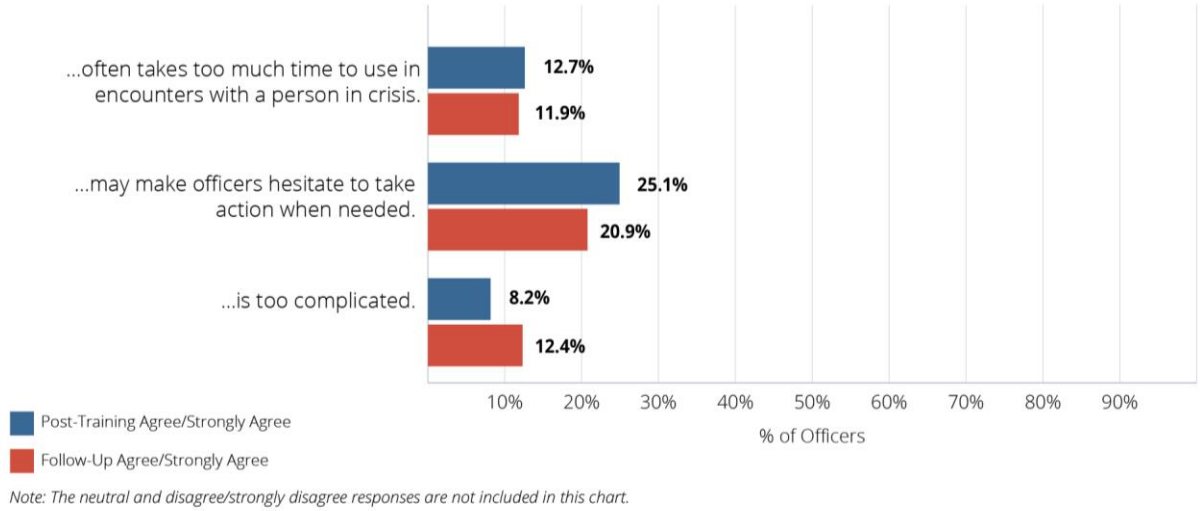
Figure 9: LMPD Officer Views on Critical Decision-Making Model Utility, Positive Items



Note: The neutral and disagree/strongly disagree responses are not included in this chart.

In turn, Figure 10 contains survey items related to the CDM that were negatively worded. It was expected that the frequencies for officers' follow-up responses (shown in red) would be smaller than the frequencies for officers' post-training responses (shown in blue) – suggesting that officers perceived fewer challenges to the CDM over time. Although the difference in officers' responses from post-training to follow-up are less pronounced across these items, the findings do not suggest improvements in officers' perceptions of the CDM utility over time. Given that these changes are inconsistent with the objectives of the ICAT training, the LMPD Training Division should reconsider how material is presented for this area of the curriculum.

Figure 10: LMPD Officer Views on Critical Decision-Making Model Utility, Negative Items



Note: The neutral and disagree/strongly disagree responses are not included in this chart.

3. Follow-Up Reactions to the ICAT Training

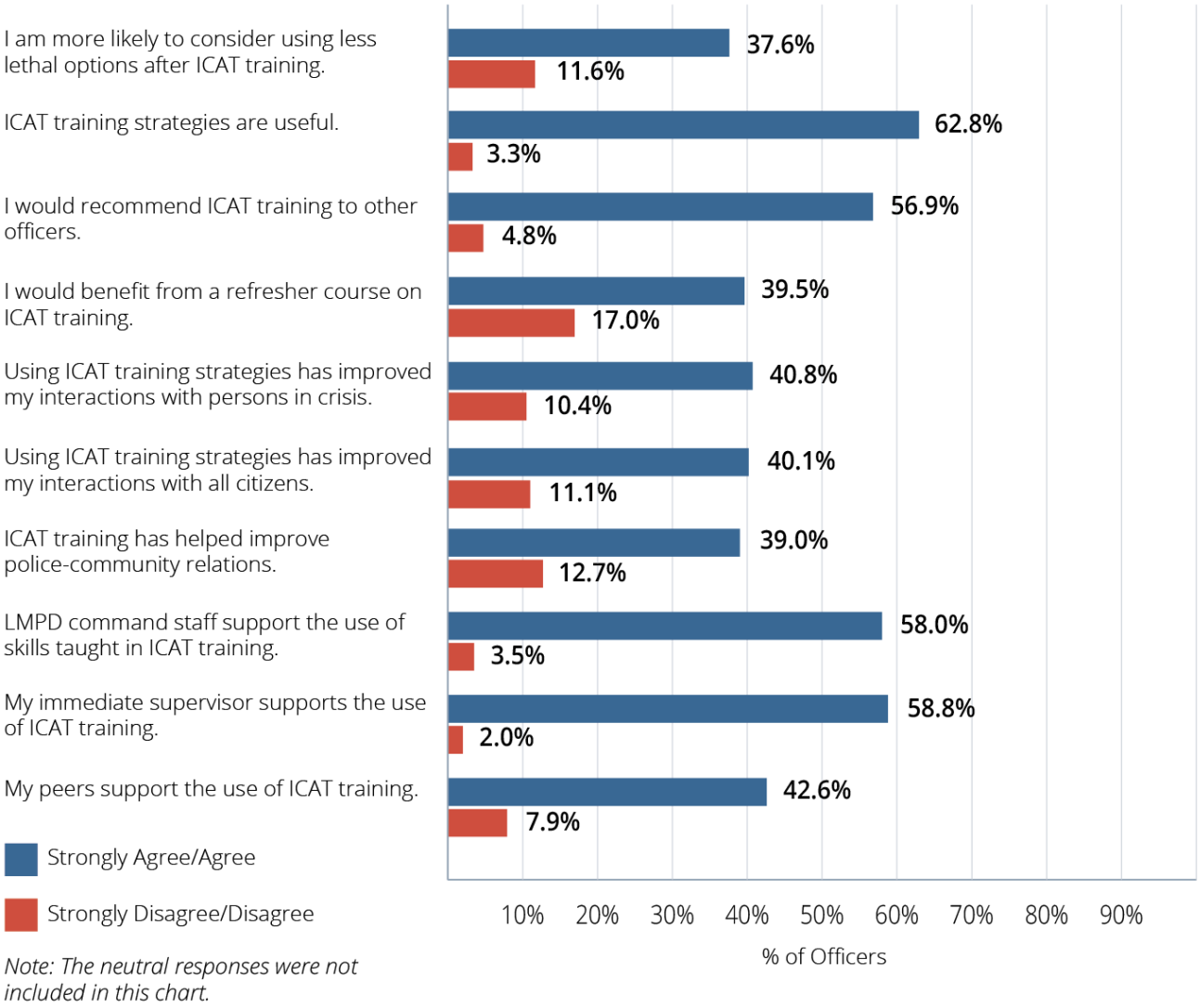
Officers were also asked about their impressions of the impact of ICAT training on their work during the follow-up survey. Table 5 displays the frequencies of responses to the 10 survey items assessing officers' perceptions of the training program. For each item, respondents were asked to indicate their level of agreement on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). As shown in Table 5, a majority of officers (62.8%) agreed or strongly agreed that the ICAT training strategies were useful. A majority of officers (56.9%) also agreed or strongly agreed that they would recommend the ICAT training to others. Importantly, 39.5% of respondents indicated they would benefit from an ICAT refresher training. When asked if ICAT training has helped to improve interactions with the public, persons in crisis, and with police-community relations, the majority of surveyed LMPD officers were neutral. Finally, the majority of surveyed LMPD officers agreed or strongly agreed that they felt the support of ICAT skills from command staff (58.0%) and from their immediate supervisor (58.8%), but the majority reported feeling neutral about support from their peers (49.5%).

Table 5: LMPD Officer Follow-up Reactions to ICAT Training

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I am more likely to consider using less lethal options after ICAT training. (n = 543)	2.6%	9.0%	50.8%	30.8%	6.8%
2. ICAT training strategies are useful. (n = 542)	1.8%	1.5%	33.9%	55.2%	7.6%
3. I would recommend ICAT training to other officers. (n = 543)	1.7%	3.1%	38.3%	46.6%	10.3%
4. I would benefit from a refresher course on ICAT training. (n = 542)	5.0%	12.0%	43.5%	33.0%	6.5%
5. Using ICAT training strategies has improved my interactions with persons in crisis. (n = 539)	2.4%	8.0%	48.8%	34.5%	6.3%
6. Using ICAT training strategies has improved my interactions with all citizens. (n = 542)	2.6%	8.5%	48.9%	33.8%	6.3%
7. ICAT training has helped improve police-community relations. (n = 543)	3.5%	9.2%	48.3%	33.7%	5.3%
8. LMPD command staff support the use of skills taught in ICAT training. (n = 540)	1.5%	2.0%	38.5%	45.0%	13.0%
9. My immediate supervisor supports the use of ICAT training. (n = 543)	0.9%	1.1%	39.2%	45.7%	13.1%
10. My peers support the use of ICAT training. 9. (n = 543)	2.0%	5.9%	49.5%	36.3%	6.3%

Figure 11 displays the grouped (agree or disagree) responses to the survey items presented in Table 5. Those who responded "neutral" were excluded from the graphic. This figure illustrates the variation in responses, and also highlights that the greatest agreement was seen for item 2, (ICAT strategies are useful), and the greatest disagreement was seen for item 4 (I would benefit from a refresher course on ICAT training). It is evident that the majority of LMPD officers perceive ICAT training in a positive light, but there is a vocal minority of respondents who are not convinced that ICAT training is useful nor beneficial to their police work. Importantly, however, the large percentages of "neutral" respondents across these survey items (see Table 4) present an opportunity for the Training Division to persuade LMPD officers of the utility of ICAT training. Reinforcement of the benefits of the training may be an important avenue for LMPD ICAT trainers.

Figure 11: LMPD Officer Follow-Up Reactions to ICAT Training



Note: The neutral responses were not included in this chart.

In summary, these findings demonstrate that the ICAT training was generally received positively by LMPD officers. However, these positive impressions of the training appear to be stronger immediately after training, declining somewhat in the months after. This highlights the need for continual reinforcement of ICAT training for officers, whether this is through roll call or other forms to "refresh" the content in the minds of the officers.

E. Officers' Self-Reported Use of ICAT Skills

This section of the report contains summary and descriptive statistics surrounding LMPD officers' self-reported use of ICAT training skills in the field. These findings rely on survey items contained in the follow-up survey, administered to officers four to six months after ICAT training. The average or mean response for each survey item is presented (denoted by "$\bar{X}$"). The standard deviation ("SD") from this average is also noted. Finally, the number of officers that answered each survey item may vary and is noted within each table ("N") to provide insight on

the number of responses used to calculate each average score. The frequencies of officer responses are also reported when useful/appropriate.

LMPD officers were asked a series of items related to the reinforcement and application of ICAT training strategies during the previous 60 days. When asked about how frequently immediate supervisors reinforce ICAT training, over 40% indicated this happened seldom (once per month) or never. Officers were asked about the ways that immediate supervisors may reinforce ICAT training (in direct conversations, during roll call, during monthly review, during post-incident reviews, and "other"). These results are shown in Table 6. Of those who indicated their supervisor reinforced ICAT training, the most common response to when it was reinforced was roll call (46.4% of respondents), followed by post-incident reviews (36.5%). Only 29% of responding officers indicated that ICAT was reinforced through direct conversations with immediate supervisors, while 15% reported reinforcement through monthly reviews and 23% reported reinforcement through other ways. Note that officers could select multiple responses for this survey item.

Table 6: ICAT Training Supervisor Reinforcement

	ICAT training is reinforced by my immediate supervisor...	% (n)
1.	...in conversations with me (n = 405)	29.6 (120)
2.	...during roll call (n = 405)	46.4 (188)
3.	...during my monthly review (n = 404)	15.3 (62)
4.	...during post-incident reviews (n = 405)	36.5 (148)
5.	Other (n = 403)	22.8 (92)

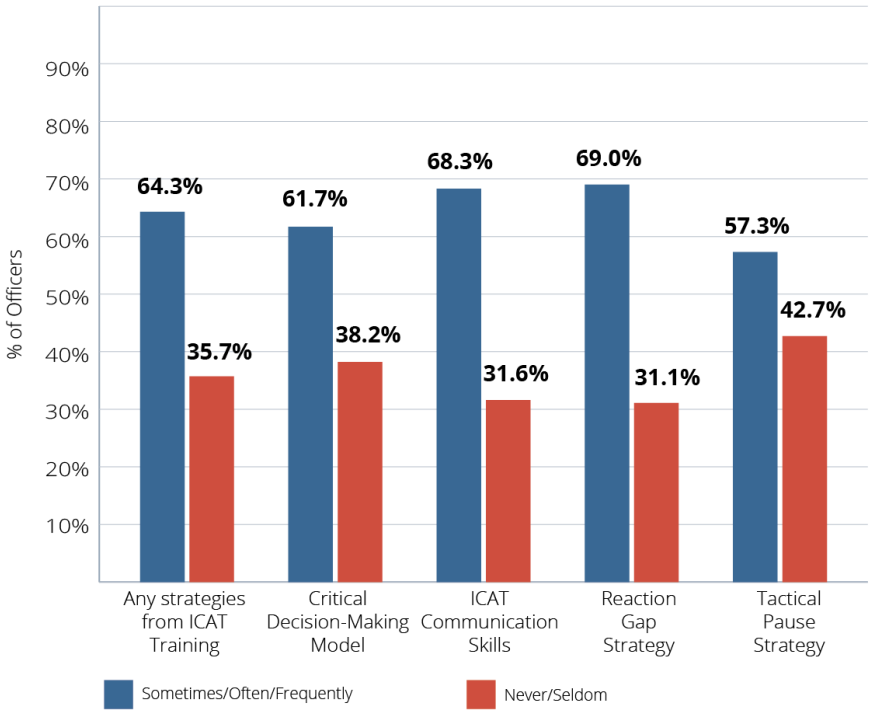
Table 7 documents officers' self-reported use of specific types of ICAT skills in the previous 60 days. The frequency of these activities was measured on a five-point scale, represented by, 1 = Never (0 times), 2 = Seldom (1 per month), 3 = Sometimes (2-3 times per month), 4 = Often (1 per week), and 5 = Frequently (more than 2-3 times per week). Officers reported using the "Reaction Gap" strategy most frequently of all skills, but a substantial portion (between 17% and 26%) reported never using any ICAT skills in the previous 60 days. Notably, however, non-use could be related to officers' specific job assignments within the Patrol Division.

Table 7: LMPD Officer Self-Reported Use of ICAT Skills

In the last 60 days, did you apply...	Never (%)	Seldom (%)	Sometimes (%)	Often (%)	Frequently (%)
1. ...any strategies from ICAT training? (n = 527)	19.4	16.3	33.2	20.7	10.4
2. ...the Critical Decision-Making Model (n = 538)	23.0	15.2	31.6	18.8	11.3
3. ...ICAT Communication Skills (n = 534)	17.7	13.9	28.8	18.6	20.9
4. ...the Reaction Gap Strategy (n = 532)	17.9	13.2	20.3	20.1	28.6
5. ...the Tactical Pause Strategy (n = 532)	25.8	16.9	25.2	18.8	13.3

Figure 12 displays the grouped frequencies of survey responses contained in Table 7. Those who report that they sometimes, often, or frequently use skills are shown in blue whereas those who report that they never or seldom use skills are shown in red. Figure 12 illustrates that at least 57% of respondents indicate they had used one of the skills during the previous 60 days.

Figure 12: LMPD Officer Self-Reported Use of Trained Skills



In contrast, a small percentage of officers that indicate they did not use one of the ICAT skills in the previous 60 days. For example, only a minority of respondents indicated they did not use each of the skills—less than 15% of all respondents per skill type.

To provide additional context around officers' use of the ICAT skills in the previous 60 days, officers were asked to self-report the perceived difficulty in using specific ICAT skills. Table 8 presents perceptions related to the degree of difficulty in the use of each ICAT skill among the officers who self-reported using the skill in the previous 60 days. In general, very few surveyed officers found any of the four skills difficult to use; rather, nearly 63.3% agreed that the reaction gap strategy was not at all difficult, 51.6% agreed that the tactical pause strategy was not at all difficult, 48.3% agreed that ICAT communication skills were not difficult, and 32.2% found the CDM not difficult at all.

Table 8: LMPD Officer Self-Reported Difficulty in Using ICAT Skills

How difficult is it to use...	**Very Difficult (%)**	**Difficult (%)**	**Neutral (%)**	**Somewhat Difficult (%)**	**Not at all Difficult (%)**
the Critical Decision-Making Model (n = 503)	3.0	2.6	53.3	8.9	32.2
ICAT Communication Skills (n = 503)	1.4	0.8	42.3	7.2	48.3
the Reaction Gap Strategy (n = 498)	1.0	0.6	27.3	7.8	63.3
the Tactical Pause Strategy (n = 461)	3.7	1.5	35.1	8.0	51.6

In the instances where officers suggested that they were unable to use ICAT skills in the previous 60 days, they were prompted to identify the obstacle(s) they faced in using those skills. Figures 13 and 14 present officers' responses to these questions. Specifically, Figure 13, which examines the perceived obstacles for officers in their use of the CDM, demonstrates that 24.8% of responding officers indicated they faced an obstacle to implementing the CDM. Of those officers, 28% indicated it was for an "other" reason, followed by 26.5% indicating they could not remember the model. Note that officers were able to select multiple perceived obstacles to CDM use.

Figure 13: Officer Perceived Obstacles to Using the CDM Model

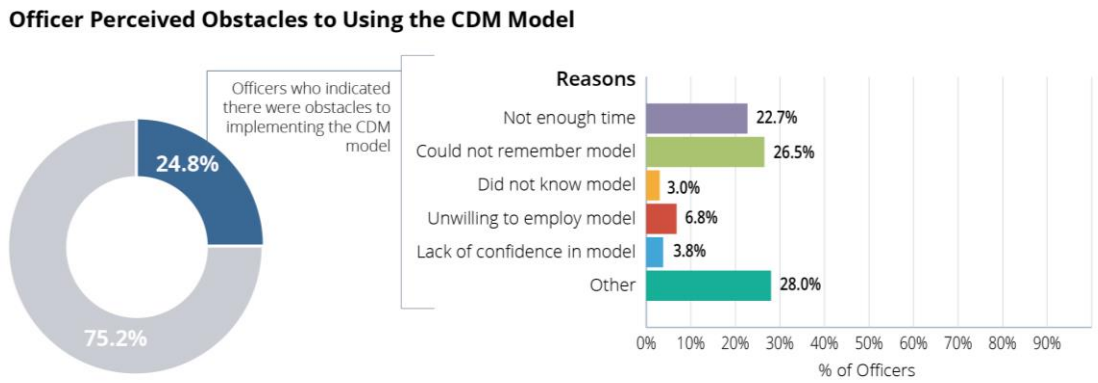
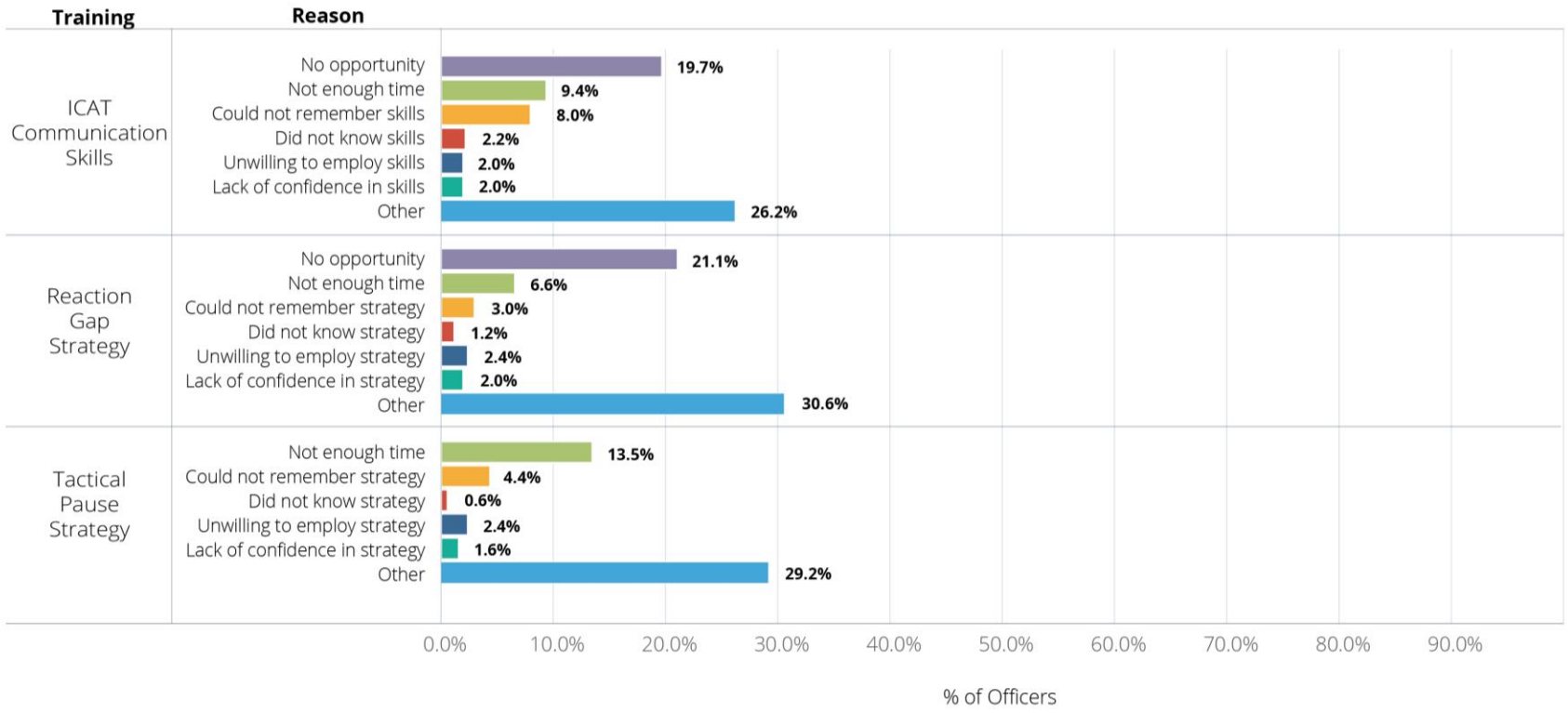


Figure 14 displays officers' perceived barriers for the other three skill types: ICAT Communication Skills, Reaction Gap Strategy, and the Tactical Pause Strategy. For all three types, officers most commonly selected "other" for their perceived barrier to skill use. Note that multiple reasons could be selected by officers.

Figure 14: LMPD Officer Perceived Obstacles to Using Trained Skills



Finally, officers were asked to report whether they had responded to an incident involving a person in crisis since they were trained in ICAT. A majority, 71.6 % (n = 381), of LMPD officers indicated that they *had responded* to this type of incident, while 28.4% (n = 151) of surveyed officers indicated that they *had not responded* to this type of incident. Nearly 79% (n = 370) of these individuals indicated that these ICAT strategies were not applicable during their most recent encounter. However, Table 9 displays the results from officers who reported that they had used a particular skill during a recent encounter. As shown in Table 9, when ICAT skills were used they were generally perceived as effective.

Table 9: LMPD Officer Self-Reported Use of ICAT Skills During Most Recent Encounter with a Person in Crisis

Skill Type and Perceived Effectiveness	Effective % (n)	Partially Effective % (n)	Not Effective % (n)
Critical Decision-Making Model (CDM) (n = 184)	79.3 (146)	18.5 (34)	2.2 (4)
ICAT Communication Skills (n = 254)	84.3 (214)	14.2 (36)	1.6 (4)
Reaction Gap (n = 229)	86.5 (198)	13.5 (31)	0 (0)
Tactical Pause (n = 164)	84.8 (139)	13.4 (22)	1.8 (3)
Less Lethal Tool (n = 26)	76.9 (20)	11.5 (3)	11.5 (3)

In summary, a majority of surveyed LMPD officers found the ICAT training program useful and would recommend this training to others, both in the times immediately after training as well was four to six months later. ICAT training was reportedly reinforced by immediate supervisors only sometimes (2-3 times per month), although nearly a quarter of respondents indicated their immediate supervisor has never reinforced ICAT training. Approximately 80% of surveyed LMPD officers had used some form of ICAT skills during the previous 60 days, with the *Tactical Pause Strategy* applied most frequently. It appeared that most surveyed officers did attempt to apply ICAT skills successfully, but when there were obstacles to their use it was most often due to a lack of opportunity to apply the skill or running out of time. Additionally, when ICAT skills were used they were generally perceived to be effective by the LMPD officer when considering their most recent encounter with a person in crisis.

F. Changes in Officers' Attitudes

This section of the report details the changes in measured officer attitudes as a result of ICAT training. Two analytic approaches are used. First, immediate training impacts are considered by comparing pre-training to post-training scores. This change is measured using T-test comparisons that assess statistical differences in the mean scores of survey items asked across two waves of data are presented below, examining officer changes in *Views on Interactions with the Public*, and *Views on Policing*. For each survey item, the tables below display the average or mean score ("$\bar{X}$"), the standard deviation ("SD"), the number of respondents ("N"), and the T-statistic value, with an asterisk (*) demonstrating values with a p-value below 0.05 or 0.01. An asterisk indicates a statistically significant change in officers' responses from Time 1 (pre-training) to Time 2 (post-training).

Second, changes in attitudes across all three survey waves (pre-training, post-training, and follow-up) are assessed for two areas: *Interactions with Persons in Crisis and* (2) *Attitudes Toward Use of Force.* These tables also display mean scores ("$\bar{X}$"), standard deviation scores ("SD"), and number of respondents ("N") for each particular survey item. These changes are measured using repeated measures ANOVA analyses, which describe the levels and change in repeated survey responses over time. For inclusion in the ANOVA analyses reported below, officers had to respond to each of the three survey waves, reducing the number of respondents to approximately 430 officers or less.

For each survey item that demonstrates a statistically meaningful difference, an asterisk (*) is shown in the far-left column to demonstrate a Wilks Lambda F Statistic with a p-value below 0.05. In addition, the Partial Eta Square statistic is shown, which demonstrates the magnitude of the differences between average scores, also known as an effect size. Some suggested norms for the effect size interpretation based on partial eta square include estimations of small (around 0.01) to medium (around 0.06) and large (around 0.14). The final column of each table contains the Bonferroni Post Hoc Significant Differences across the three waves, identifying which comparisons are statistically different. There can be one of three meaningful differences: between pre-training and post training scores ("$\bar{X}1$ & $\bar{X}2$"); between post-training and follow-up scores ("$\bar{X}2$ & $\bar{X}3$"); and finally, between pre-training and follow-up scores ("$\bar{X}1$ & $\bar{X}3$").

1. Views on Interactions with the Public

Table 10 displays the first set of survey items assessing officers' views on interactions with the public. This table compares pre-training to post-training scores. Seven survey items related to officers' general views of encounters with the public – including issues of officer safety and de-escalation – were measured using a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree) to assess officers' level of agreement with each statement. If the ICAT training is effective, it is expected that some items will show an increase in the level of agreement (e.g., I have considerable ability to control the nature of citizen interactions to create positive outcomes), while other items will show a decrease in the level of agreement (e.g., In tense citizen encounters, the most important thing is that I get home safely).

Four of the seven survey items achieved statistically significant differences, and all changes are in the direction expected based on the training curricula. For example, officers reported statistically significant increases in their agreement that they have considerable ability to control the nature of citizen interactions to create positive outcomes, that officers can be trained to increase the likelihood of positive encounters with citizens, and that officers can be trained to improve their ability to de-escalate citizen encounters. They also reported significantly less agreement that during tense citizen encounters, the most important thing is for them to get home safely.

These individual seven items were also included in an additive scale (with reverse coded questions where appropriate). The *Views on Interactions with the Public Scale* demonstrates a

statistically significant difference in officers' reported attitudes pre-training compared to post-training, in the expected direction based on the ICAT training curricula.[19]

Table 10: Changes in LMPD Officer Views on Interactions with the Public

	Pre-Training			Post-Training			
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	**T-Value**
1. I have considerable ability to control the nature of citizen interactions to create positive outcomes.	3.90	0.73	901	4.05	0.68	1048	-4.80**
2. I am good at identifying officer safety risks in citizen encounters.	4.34	0.58	902	4.32	0.58	1049	0.90
3. I am good at de-escalating encounters with citizens.	4.19	0.71	902	4.17	0.58	1047	0.67
4. In tense citizen encounters, the most important thing is that I get home safely.	4.58	.71	900	4.20	0.84	1049	10.52**
5. Officers can be trained to increase the likelihood of positive encounters with citizens.	3.99	0.74	902	4.22	0.65	1045	-7.15**
6. Officers can be trained to improve their ability to identify officer safety risks in citizen encounters.	4.30	0.61	902	4.29	0.61	1046	0.10
7. Officers can be trained to improve their ability to de-escalate citizen encounters.	4.12	0.66	902	4.23	0.64	1048	-4.06**
Views on Interactions with the Public Scale[20]	26.26	2.76	899	27.08	2.95	1040	-6.27**

**p < 0.01; *p < 0.05

2. Views on the Role of Police

As noted previously, officers were also asked about their perceptions regarding the role of police (see Table 2). It is possible that participation in ICAT will impact officers' more global perceptions about their roles. To test for this possibility, officers were asked again to report their perceptions of their roles immediately following the ICAT training in the post-training survey by indicating their level of agreement with each item based on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Table 11 reports the mean, standard deviation, and number of officers responding to each question, along with the T-value comparison and significance of the p-value. As shown, officers reported significant differences in their

[19] The Cronbach's Alpha score for Pre-Training is 0.69 and 0.76 for Post-Training.
[20] Based on an additive scale composed of all survey items, where item 4 is reverse coded. The Cronbach's Alpha score for Pre-Training is 0.694 and 0.761 for Post-Training.

perceptions of the role of police after the ICAT training. Specifically, officers were significantly more likely to agree that: working with the community to solve problems is an effective means of providing service; they routinely collaborate with community members in daily duties; a primary responsibility is to build trust between the department and community; it is important to have non-enforcement contacts with the public, and they see themselves primarily as public servants.

Table 11: Changes in LMPD Officer Views on Policing

	Pre-Training			Post-Training			
	Mean	SD	N	Mean	SD	N	**T-Value**
1. Enforcing the law is a patrol officer's most important responsibility.	3.47	0.98	901	3.40	0.92	1046	1.70
2. Law enforcement and community members must work together to solve local problems.	4.15	0.65	901	4.17	0.60	1045	-0.61
3. Working with the community to solve problems is an effective means of providing services to this area.	4.07	0.68	899	4.13	0.63	1045	-2.06*
4. I routinely collaborate with community members in my daily duties.	3.44	1.94	900	3.62	0.87	1045	-2.70**
5. My primary responsibility as a police officer is to fight crime.	3.54	0.90	901	3.55	1.53	1042	-0.023
6. As a police officer, I have a primary responsibility to protect the constitutional rights of residents.	4.09	0.66	900	4.10	0.66	1045	-0.039
7. A primary responsibility of a police officer is to build trust between the department and community.	3.76	0.83	901	3.94	0.73	1044	-4.95**
8. As a police officer, it is important that I have non-enforcement contacts with the public.	4.08	0.71	899	4.17	0.66	1044	-2.70**
9. As a police officer, I see myself primarily as a public servant.	3.87	0.79	900	3.99	0.71	1045	-3.50**
10. My primary role is to control predatory suspects who threaten members of the public.	3.92	0.77	900	3.91	0.78	1046	0.48

**p < 0.01; *p < 0.05

3. Attitudes Towards Persons in Crisis

Results for the ANOVA, or three-way mean score comparisons, for the LMPD officer *Attitudes Towards Persons in Crisis* survey items are shown in Table 13, however Table 12 summarizes these changes and their direction. A person in crisis refers to an individual that may be behaving erratically due to factors such as mental health concerns, substance use, situational stress, and/or intellectual/developmental disabilities. The ICAT training program should teach officers to view

persons in crisis in a more understanding manner in an effort to make encounters with these individuals safer. Therefore, these items measuring attitudes should change in the post-training and follow-up scores. As seen in Table 12, a total of 11 of the 14 survey items have significant differences between the pre-training and post-training scores. Changes that are in the expected direction, or positive, are shown with a plus (+) sign, whereas changes that are opposite to the expected direction, or negative, are shown with negative (-) sign. Most of these changes are in the expected direction, as agreement with the statements should increase post-training (with the exception of items 2, 3, 13 and 14 which should decrease).

When comparing pre-training to follow-up scores, seven of the 14 items demonstrate sustained significant differences. Four of the changes are in the expected direction whereas three changes are in the unexpected direction. Finally, six of the 14 items have meaningful changes from the post-training survey to follow-up survey. Some large changes are seen, such as for item 6 (In crisis situations, it is beneficial to keep a subject talking) and item 10 (The majority of time spent communicating with a subject should be spent listening), which both increase in the expected direction when comparing post-training scores to pre-training scores.

Examining the summed *Attitudes Towards Persons in Crisis Scale*, this change demonstrates a statistically significant increase from the pre-training to post-training score aligned with the expected changes from the training.[21] Note, however, that this overall score then decreases in the follow-up results, also a statistically significant change. This indicates that there is a possibility of training decay demonstrated in attitudinal changes a few months after the training has been conducted. Interestingly, this follow-up score is slightly lower than the initial pre-training score, demonstrating a possible substantial decay in the training impact.

[21] In addition to the individual items, an additive scale based on survey items 1, and items 3 through 13 was created. The Cronbach's alpha scores are 0.70, 0.69, and 0.80 for the Pre-, Post-, and Follow-up Training Surveys, respectively.

Table 12: ANOVA Summary for LMPD Officer Attitudes Towards Persons in Crisis

Survey Item	Pre-Training & Post-Training	Post-Training & Follow-Up	Pre-Training & Follow-Up
1. Recognizing the signs that a person is in crisis can improve the outcome of an interaction with that individual.	+	-	-
2. There is no explaining why a person in crisis acts the way they do.	-	+	
3. Noncompliance should be viewed as a threat.	+		+
4. Unnecessary risks should be avoided in encounters.			
5. The most important role of an officer responding to a crisis is to stabilize the situation.	+	-	-
6. In crisis situations, it is beneficial to keep a subject talking.	+	-	
7. In many cases, the use of force against a person in crisis can be avoided.	+	-	+
8. As a person's emotions rise, their rational thinking declines.	+	-	
9. When responding as a team, it's important to designate roles in the crisis intervention.	+	-	
10. The majority of time spent communicating with a subject should be spent listening.	+	-	+
11. An officer's nonverbal communication, such as body language, influences how a subject reacts.	+	-	
12. I know how to slow down an encounter with a person in crisis.	+	-	
13. Situational stress is no excuse for a person to act irrational.		+	+
14. Responding to persons in crisis should not be a role of the police.		-	-
Attitudes Towards Persons in Crisis Scale	+	-	-

Table 13: ANOVA Results for LMPD Officer Attitudes Towards Persons in Crisis

	N	$\bar{X}1$ (SD1)	$\bar{X}2$ (SD2)	$\bar{X}3$ (SD3)	Partial Eta Squared	Bonferroni Post Hoc Significant Differences
1. Recognizing the signs that a person is in crisis can improve the outcome of an interaction with that individual.*	422	4.18 (0.68)	4.32 (0.66)	3.95 (1.16)	0.093	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
2. There is no explaining why a person in crisis acts the way they do.*	419	2.61 (0.92)	2.79 (0.99)	2.56 (0.88)	0.052	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
3. Noncompliance should be viewed as a threat.*	415	3.40 (0.88)	3.00 (0.89)	3.00 (0.87)	0.217	$\bar{X}1$ & $\bar{X}2$; $\bar{X}1$ & $\bar{X}3$
4. Unnecessary risks should be avoided in encounters.*	416	4.11 (0.75)	4.19 (0.65)	4.09 (0.86)	0.015	--
5. The most important role of an officer responding to a crisis is to stabilize the situation.*	413	4.06 (0.72)	4.20 (0.63)	3.92 (0.87)	0.086	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
6. In crisis situations, it is beneficial to keep a subject talking.*	414	3.84 (0.72)	4.22 (0.62)	3.88 (0.76)	0.267	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
7. In many cases, the use of force against a person in crisis can be avoided.*	414	3.28 (0.78)	3.60 (0.74)	3.45 (0.81)	0.144	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
8. As a person's emotions rise, their rational thinking declines.*	415	4.22 (0.66)	4.39 (0.60)	4.13 (0.77)	0.111	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
9. When responding as a team, it's important to designate roles in the crisis intervention.*	414	4.10 (0.68)	4.36 (0.58)	4.09 (0.73)	0.167	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
10. The majority of time spent communicating with a subject should be spent listening.*	416	3.75 (0.66)	4.12 (0.65)	3.86 (0.70)	0.227	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
11. An officer's nonverbal communication, such as body language, influences how a subject reacts.*	414	3.96 (0.65)	4.20 (0.57)	4.00 (0.70)	0.149	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
12. I know how to slow down an encounter with a person in crisis.*	416	3.96 (0.56)	4.13 (0.57)	3.94 (0.69)	0.098	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
13. Situational stress is no excuse for a person to act irrational.*	413	2.85 (0.89)	2.83 (0.91)	2.64 (0.78)	0.048	$\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
14. Responding to persons in crisis should not be a role of the police.*	413	2.38 (0.94)	2.36 (0.92)	2.49 (0.91)	0.020	$\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
Attitudes Towards Persons in Crisis Scale[22]*	398	45.72 (3.99)	47.64 (4.33)	44.97 (5.68)	0.297	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$

*Wilks Lambda F Statistic p-value < 0.05

[22] Additive scale based on survey items 1, and 3 through 13. The Cronbach's Alpha score for Pre-Training is 0.704 and 0.690 for Post-Training.

4. Attitudes Toward Use of Force

Officers' attitudes and perceptions regarding the use of force was the second area of the training survey measured across all three waves, as these attitudes are expected to change as a result of the ICAT training program. Results for the ANOVA, or three-way mean score comparisons, for these eleven survey items are shown in Table 15. The ICAT training is expected to teach officers that use of force should be a last resort, and therefore most of these items (with the exception of items 8, 9 and 10) should *decrease* after ICAT training. Seven of the 11 survey items demonstrate a significant difference between the pre-training and post-training scores, and these are all in the expected direction. Displayed in Table 14, changes that are in the expected direction, or positive, are shown with a plus (+) sign, whereas changes that are opposite to the expected direction, or negative, are shown with negative (-) sign.

When comparing pre-training to follow-up scores, nine of the 11 survey demonstrate sustained significant differences in the expected direction. Finally, six of the 11 items have meaningful changes from post-training to follow-up scores. Some large effect sizes are noted, such as for item 2 (It is sometimes necessary to use more force than is technically allowable) and for item 4 (Refraining from using force when you are legally able to puts yourself and other officers at risk) both significantly change in the expected (negative) direction when comparing pre-training to post-training scores, as well as when comparing pre-training to follow-up scores.

Considering the summed *Attitudes Toward Use of Force Scale*, there is a statistically significant reduction from the pre-training to post-training score (in line with the expected changes from the training).[23] Additionally, the follow-up score is also significantly lower than the pre-training score, indicating that is sustained changes in officers' attitudes toward use of force that do not appear to decay over time.

[23] In addition to the individual items, an additive scale based on survey items 1 through 7 and item 11 was created. The Cronbach's alpha score for Pre-Training is 0.70, Post-Training is 0.73 and 0.71 for Follow-up.

Table 14: Summary of ANOVA Changes for LMPD Officer Attitudes Towards Use of Force

Survey Question	Pre-Training & Post-Training	Post-Training & Follow-Up	Pre-Training & Follow-Up
1. Officers are NOT allowed to use as much force as is necessary to make suspects comply.	+	+	+
2. It is sometimes necessary to use more force than is technically allowable.	+	+	+
3. Verbally disrespectful suspects sometimes deserve physical force.		+	+
4. Refraining from using force when you are legally able to puts yourself and other officers at risk.	+		+
5. It is important to have a reputation that you are an officer willing to use force.		+	+
6. Not using force when you could have makes suspects more likely to resist in future interactions.	+		+
7. It is important that my fellow officers trust me to handle myself in a fight.	+		+
8. Trying to talk my way out of a situation is always safer than using force.	+	-	
9. It is important that my fellow officers trust my communication skills.			-
10. I respect officers' ability to talk suspects down rather than using force to make them comply.		-	
11. Generally speaking, if force has to be used, it is better to do so earlier in an interaction with a suspect, as opposed to later.	+		+
Attitudes Toward Use of Force Scale	+	+	+

Table 15: ANOVA Results for LMPD Officer Attitudes Towards Use of Force

	N	$\bar{X}1$ (SD1)	$\bar{X}2$ (SD2)	$\bar{X}3$ (SD3)	Partial Eta Squared	Bonferroni Post Hoc Significant Differences
1. Officers are NOT allowed to use as much force as is necessary to make suspects comply.*	411	2.80 (1.14)	2.65 (.98)	2.38 (.98)	.099	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
2. It is sometimes necessary to use more force than is technically allowable.*	408	3.17 (1.01)	2.87 (1.01)	2.64 (.97)	.192	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
3. Verbally disrespectful suspects sometimes deserve physical force.*	409	2.30 (.89)	2.25 (.85)	2.14 (.83)	.031	$\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
4. Refraining from using force when you are legally able to puts yourself and other officers at risk.*	409	3.41 (.99)	2.99 (.89)	3.03 (.85)	.158	$\bar{X}1$ & $\bar{X}2$; $\bar{X}1$ & $\bar{X}3$
5. It is important to have a reputation that you are an officer willing to use force.*	406	2.79 (.94)	2.70 (.94)	2.59 (.88)	.041	$\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$
6. Not using force when you could have makes suspects more likely to resist in future interactions.*	406	3.06 (1.03)	2.80 (.89)	2.72 (.91)	.108	$\bar{X}1$ & $\bar{X}2$; $\bar{X}1$ & $\bar{X}3$
7. It is important that my fellow officers trust me to handle myself in a fight.*	407	4.30 (.68)	4.16 (.69)	4.10 (.82)	.060	$\bar{X}1$ & $\bar{X}2$; $\bar{X}1$ & $\bar{X}3$
8. Trying to talk my way out of a situation is always safer than using force.*	408	3.61 (1.01)	3.91 (.91)	3.70 (.97)	.086	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$
9. It is important that my fellow officers trust my communication skills.*	407	4.38 (.53)	4.35 (.55)	4.27 (.75)	.018	$\bar{X}1$ & $\bar{X}3$
10. I respect officers' ability to talk suspects down rather than using force to make them comply.*	407	4.18 (.65)	4.26 (.65)	4.15 (.78)	.019	$\bar{X}2$ & $\bar{X}3$
11. Generally speaking, if force has to be used, it is better to do so earlier in an interaction with a suspect, as opposed to later.*	406	3.21 (.90)	2.85 (.91)	2.94 (.86)	.125	$\bar{X}1$ & $\bar{X}2$; $\bar{X}1$ & $\bar{X}3$
Attitudes Toward Use of Force Scale[24]*	396	24.95 (4.28)	23.20 (4.40)	22.46 (4.09)	.317	$\bar{X}1$ & $\bar{X}2$; $\bar{X}2$ & $\bar{X}3$; $\bar{X}1$ & $\bar{X}3$

[24] Additive scale based on survey items 1 through 7, and item 11. The Cronbach's alpha score for Pre-Training is 0.70 and 0.73 for Post-Training.

5. Officer Confidence in Interacting with Persons in Crisis

In addition to reported changes in officers' attitudes, the research team measured officers' reported confidence in interacting with persons in crisis. This section of the survey contained 13 items related to a respondent's self-efficacy, or confidence, in handing the described actions. Confidence in handling each of the listed items is expected to increase as a result of ICAT training. Interestingly, only one of the 13 items demonstrated a statistically significant difference in reported confidence in handling any of the situations described, demonstrated in Table 16. Moreover, the summed *Officer Confidence Scale* did not demonstrate any significant changes from the pre-training to the post-training, or follow-up scores.[25] Although 12 of the 13 scores did slightly increase from pre-training to post-training, as well as with the summed *Officer Confidence Scale* comparison, these changes were not statistically significant. Additionally, six of the 13 scores slightly increased from post-training to follow-up, as well as with the summed *Officer Confidence Scale* comparison, again, however not statistically significant changes. Finally, a comparison of pre-training scores to follow-up scores indicates that eight of the 13 scores slightly increased, which was also demonstrated with the *Officer Confidence Scale* comparison, none reaching statistical significance. In summary, it appears that the ICAT training did not significantly impact officers' reported confidence during interactions with persons in crisis.

[25] These 13 items were summed to create an additive *Officer Confidence Scale* for each wave of data, with a Cronbach's Alpha score of 0.95 for Pre-Training, 0.96 for Post-Training, and 0.95 for Follow-up.

Table 16: ANOVA Results for LMPD Officer Confidence in Interacting with Persons in Crisis

	N	$\bar{X}1$ (SD1)	$\bar{X}2$ (SD2)	$\bar{X}3$ (SD3)	Partial Eta Squared	Bonferroni Post Hoc Significant Differences
…interacting with a person in crisis?	398	3.62 (0.50)	3.63 (0.52)	3.66 (0.51)	0.005	--
…in your ability to effectively communicate with someone in crisis?	396	3.56 (0.52)	3.60 (0.53)	3.62 (0.55)	0.011	--
…taking someone in crisis to a social service agency?	399	3.52 (0.61)	3.55 (0.60)	3.52 (0.66)	0.005	--
…asking someone in crisis open-ended questions to gather information about what is going on?	398	3.60 (0.52)	3.65 (0.53)	3.67 (0.53)	0.013	--
…interacting with family members of a person in crisis?	398	3.66 (0.49)	3.66 (0.50)	3.64 (0.54)	0.001	--
…in your ability to summarize/paraphrase statements made by a person in crisis in your own words?	399	3.58 (0.52)	3.59 (0.54)	3.62 (0.56)	0.006	--
…calming down someone in crisis?	397	3.49 (0.53)	3.52 (0.54)	3.55 (0.56)	0.013	--
…helping someone in crisis call a social services agency?	397	3.49 (0.61)	3.50 (0.63)	3.48 (0.65)	0.001	--
…de-escalating a situation involving a person in crisis?	398	3.54 (0.54)	3.56 (0.55)	3.58 (0.56)	0.005	--
…talking to a person in crisis about his/her medications?	396	3.38 (0.68)	3.43 (0.62)	3.38 (0.69)	0.011	--
…expressing understanding towards a person in crisis?	399	3.53 (0.57)	3.59 (0.52)	3.57 (0.57)	0.010	--
…getting someone in crisis to talk to you rather than acting out?*	398	3.48 (0.54)	3.55 (0.52)	3.48 (0.59)	0.017	$\bar{X}1$ & $\bar{X}2$
…talking to someone in crisis about whether or not he/she uses alcohol or drugs?	398	3.56 (0.55)	3.61 (0.53)	3.62 (0.55)	0.014	--
Officer Confidence Scale[26]	378	46.02 (5.73)	46.38 (5.93)	46.47 (5.91)	0.009	--

*Wilks Lambda F Statistic p-value < 0.05

[26] Based on an additive scale composed of all thirteen survey items, the Cronbach's Alpha score for Pre-Training is 0.949 and 0.960 for Post-Training.

G. Summary

The various findings in the areas described above demonstrate some important potential impacts from the ICAT training. First, baseline measures of officer attitudes prior to training indicate a majority (75%) of surveyed officers agree or strongly agree that the jurisidiction they work in is dangerous, which presents a potential challenge for trainers when encouraging officers to think differently about use of force and the promotion of de-esclation tactics.

Considering officer reactions to the training, it appears that the ICAT training was generally received positively by LMPD officers with 80.1% of officers reporting that the training was useful to them. Further, 80.5% of officers reported that they would recommend this training to others. However, these positive impressions of the training appear to be stronger immediately after training, declining somewhat in the months after their initial training. This highlights the need for continual reinforcement of the ICAT training for officers, whether this is through roll call or other forms of refresher trainings.

Importantly, there is a small, but vocal, minority of respondents who are not convinced that ICAT training is useful nor beneficial to their police work. The large percentages of "neutral" respondents, however, represent a sample of officers primed to be convinced of the utility of ICAT training. Reinforcement of the benefits of the training may be an important avenue for LMPD ICAT trainers for these groups of officers.

One aspect of ICAT training, the Critical Decision-Making Model (CDM), was not perceived as positively by officers. The CDM represents an important aspect of the ICAT training program, therefore officers' reactions to this thinking framework are especially relevant to the training evaluation. Analyses of post-training scores compared to follow-up scores revealed that ten of the eleven items demonstrate statistically significant changes in the mean score in the *opposite direction* than would be expected. Importantly, these changes demonstrate the officers find the CDM to be generally less useful with practice. Given that these changes are inconsistent with the objectives of the ICAT training, the LMPD Training Division should reconsider how material is presented for this area of the curriculum.

During the follow-up survey, administered four to six months after training, officers were asked about their use of four ICAT skills: CDM, ICAT Communication Skills, Reaction Gap Strategy, and the Tactical Pause Strategy. For officers who responded to the follow-up survey, at least 57% of respondents indicated they had used at least one ICAT skill during the previous 60 days. Officers reported using the Reaction Gap Strategy most frequently of all skills, but a substantial portion (between 17% and 26%) reported never using any ICAT skills within the previous sixty days. However, non-use may be related to officers' specific job assignment within the Patrol Division. In general, very few surveyed officers found any of the four skills difficult to use. When officers reported using skills, these skills were largely found to be effective.

Examining the additive *CDM Utility Scale*, which should increase in the follow-up period if the CDM is found to be useful with practice, demonstrates a significant reduction in the score. In other words, these findings indicate that when surveyed four to six months later, officers are *less* likely to indicate the utility of the CDM in their work. Given that these changes are inconsistent

with the objectives of the ICAT training, the LMPD Training Division should reconsider how material is presented for this area of the curriculum.

Considering officer attitudinal changes, several positive and significant changes appear to be associated with ICAT training. First, immediate and positive training impacts were found for changes in officer views on interactions with the public, measured with seven survey items. Second, immediate and positive training impacts were demonstrated for officers' more global perceptions about policing. For example, officers were significantly more likely to agree that working with the community to solve problems is an effective means of providing service and that a primary responsibility is to build trust between the department and community.

Third, officer measures surrounding *Attitudes Toward Persons in Crisis* demonstrated significant changes, most in the expected direction. However, some significant changes were seen in the opposite direction. Examining the summed *Attitudes Towards Persons in Crisis Scale*, a statistically significant change between the pre-training post-training scores was achieved, aligned with the expected changes from the training. Note, however, that this overall score then decreases in the follow-up results, also a statistically significant change. This indicates that there is a possibility of training decay demonstrated in attitudinal changes a few months after the training has been conducted. Interestingly, this follow-up score is slightly lower than the initial pre-training score, demonstrating a possible substantial decay in the training impact.

Importantly, the majority of *Attitudes Toward Use of Force* survey items demonstrated a significant change between the pre-training and post-training scores, all in the expected direction. Furthermore, the summed *Attitudes Toward Use of Force Scale* demonstrated a statistically significant reduction from the pre-training to post-training scores, and in the pre-training to follow-up scores, in line with the expected changes from the training. This indicates that here may be sustained attitudinal changes in the measured use of force items that do not appear to decay over time. Finally, it appears that the ICAT training did not significantly impact officers' reported confidence in interactions with persons in crisis. The implications and recommendations based on these findings will be explored in the concluding section of the report.

VI. SUPERVISOR SURVEY

Many have noted the importance of field supervisors in the reinforcement and promotion of training objectives among their subordinates. For example, the PERF (2018) suggests actions of first-line supervisors are critical in reinforcing the tenets taught during any training and in communicating the expectations for changes in practices, such as use of force (see also Van Craen & Skogan, 2017). Although other organizational support is needed to promote the use of de-escalation tactics (e.g., policies, procedures), immediate supervisors play a critical role in encouraging officers' application of de-escalation in their day-to-day work. Recognizing the key position of supervisors in the reinforcement of de-escalation, the research team sought to examine the activities of sergeants and lieutenants within the LMPD as they relate to their own use of ICAT de-escalation skills and the supervision and reinforcement of those de-escalation skills among their subordinates.

To assess these outcomes, LMPD supervising officers were administered a survey in March 2020 designed to assess their general perceptions of the role of supervisors and, more specifically, their views regarding how and when they supervise and/or reinforce the ICAT training. Broadly speaking, the purpose of this survey – which was developed by the research team in consultation with LMPD administrators and Training Division staff – was to examine the role of first-line supervisors as part of the ICAT training program. To administer the survey, LMPD officials took advantage of supervisors' mandatory attendance for an unrelated inspection (i.e., annual gas mask fit testing). During the inspection check-in, 157 LMPD supervisors were provided a paper survey by LMPD Training Division staff; 131 surveys were completed, resulting in an 83.4% response rate. Completed surveys were placed by respondents in a sealed box that was mailed to the research team.[27] These survey responses were entered into an electronic database and analyzed by the research team.

The ICAT supervisor survey included eight sections examining the following topics:

(1) *Perceptions Related to Using ICAT De-escalation Skills.* Using nine survey items related to first-line supervisors' direct use of ICAT de-escalation skills, various concepts were examined, including confidence, agency support, and the perceptions of the utility and frequency of ICAT training. Respondents were asked to indicate their level of agreement to each item on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). Higher scores indicate a more positive impression of supervisors' use of ICAT de-escalation skills.

(2) *Perceptions Related to Supervising ICAT De-escalation Skills.* Seven items were included to assess supervisors' perceptions of their effectiveness in coaching, available resources for supervising, and the difficulties in directly supervising subordinate officers' use of de-escalation skills. Respondents were asked to indicate their level of agreement to each item on a five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). A

[27] Surveys could not be collected in person by the research team because of COVID-19 travel restrictions from the States of Ohio and Kentucky during the time of survey collection.

higher or lower score will indicate a more positive attitude regarding the ability to supervise subordinates' use of de-escalation skills depending on the way each item is worded.

(3) *Field Observations of Subordinates' ICAT De-escalation Skills.* Seven survey items assessed the frequency with which first-line supervisors engage in specific activities related to observing subordinate officers' use of de-escalation skills in the field. Supervisors are asked about general observations, as well as the observations of ICAT skills. Respondents were asked to indicate how frequently they observed particular activities according to the following parameters: Never (0 times), Seldom (1 per month), Sometimes (2-3 times per month), Often (1 per week), and Frequently (more than 2-3 times per week). Higher scores indicate respondents engaged in the activity more frequently.

(4) *Video Observations of Subordinates' ICAT De-Escalation Skills.* Using seven items, the frequency with which first-line supervisors engage in specific activities related to observing subordinate officers' use of de-escalation skills through video recordings (e.g., review of body-worn camera footage) were assessed. Supervisors were asked about general observations as well as the observations of specific ICAT skills. Respondents were asked to indicate how frequently they observed particular activities according to the following parameters: Never (0 times), Seldom (1 per month), Sometimes (2-3 times per month), Often (1 per week), and Frequently (more than 2-3 times per week). Higher scores indicate respondents engaged in the activity more frequently.

(5) *Supervision Activities Related to ICAT De-escalation Skills.* Six survey questions regarding the frequency with which first-line supervisors engage in specific activities related to supervising subordinate officers' use of de-escalation skills were asked. For example, questions assessed the frequency that supervisors document the use of ICAT de-escalation skills, counsel subordinates for not using ICAT de-escalation skills, or generally talk about the use of ICAT de-escalation skills. Respondents were asked to indicate how frequently they engaged in the specified activities according to the following parameters: Never (0 times), Seldom (1 per month), Sometimes (2-3 times per month), Often (1 per week), and Frequently (more than 2-3 times per week). Higher scores indicate respondents engaged in the activity more frequently. In addition to the multiple-choice survey items, two open response questions were posed to gather further information on how supervisors document the use of ICAT de-escalation skills and how they mentor or coach subordinates to improve the use of these skills.

(6) *Self-Reported Supervisor Activities.* Six questions were used to assess the frequency that supervisors engage in general supervision activities, such as arriving to incidents being handled by subordinates, conducting video reviews, and talking about subordinate performance. Respondents were asked to indicate how frequently they engaged in the specified activities according to the following parameters: Never (0 times), Seldom (1 per month), Sometimes (2-3 times per month), Often (1 per week), and Frequently (more than 2-3 times per week). Higher scores indicate respondents engaged in the activity more frequently.

(7) *Perceptions of Supervisor Functions.* Fourteen supervisor functions were listed, and supervisors were asked to assess the importance of each. For instance, supervisors were

asked how important it is to disseminate departmental directors, ensure reports are properly completed, ensure appropriate use of force, and to ensure fair and equal treatment of citizens. Respondents were asked to indicate the level of importance of each function on a five-point Likert scale (1 = Very Important to 5 = Very Important).

(8) *Demographics.* Eight items gathered the demographic characteristics of respondents, including age, sex, race/ethnicity, highest level of education, years of experience in law enforcement, tenure as a supervisor, and their unique LMPD-assigned code number.

A. Data Analyses

LMPD supervisors' survey responses are examined using descriptive statistics. Specifically, for each section of measures (outlined above), the average or mean response for each survey item is presented (denoted by "$\bar{X}$"). The standard deviation ("SD") from this average is also noted. Finally, the number of supervisors that answered each survey item may vary and is noted within each table ("N") to provide insight on the number of responses used to calculate each average score. The frequencies of supervisor responses are also reported when useful/appropriate. Additional information related to the supervisor survey is provided in Appendix D, where the frequencies of responses across response categories for each survey item is presented as percentages. These data were analyzed using SPSS, a social science statistical software program.

B. Characteristics of LMPD Supervisors

To begin, analyses of the demographic characteristics of the supervisor sample (N = 131) are displayed in Table 17. As shown in this table, the majority of surveyed LMPD supervisors are male (80.6%), White (84.7%), and have a bachelor's degree or Graduate Degree (68.7%). The median age category for supervisors is 40-44 years old, and the vast majority had worked in law enforcement – and specifically the LMPD – for 10 years or more (90.9%). Finally, nearly half of the respondents (47%) had four or fewer years of supervisory experience.

Table 17: Demographic Characteristics of LMPD Supervisors (N = 131)

	% (n)		% (n)
Gender		**LE Tenure**	
Male	80.9 (106)	> 1 year	0 (0)
Female	16.8 (22)	1 – 4 years	0 (0)
Unknown	2.3 (3)	5 – 9 years	8.4 (11)
Age		10 – 14 years	29.0 (38)
> 29 years old	0 (0)	15 – 19 years	32.1 (42)
30 - 34 years old	10.7 (14)	20+ years	29.8 (39)
35 - 39 years old	20.6 (27)	Unknown	0.8 (1)
40 - 44 years old	27.5 (36)	**LMPD Tenure**	
45 - 49 years old	28.2 (37)	> 1 year	0 (0)
50 + years old	12.2 (16)	1 – 4 years	0 (0)
Unknown	0.8 (1)	5 – 9 years	8.4 (11)
Race		10 – 14 years	34.4 (45)
Caucasian/White	84.7 (111)	15 – 19 years	36.6 (48)
African American/Black	8.4 (11)	20+ years	19.8 (26)
Latino/Hispanic	1.5 (2)	Unknown	0.8 (1)
Asian/Pacific Islander	3.1 (4)	**Education**	
Other	1.5 (2)	High School	4.6 (6)
Unknown	0 (0)	> 2 years college	13.7 (18)
Years Supervising		Associate's Degree	12.2 (16)
> 1 year	10.7 (14)	Professional Degree	0 (0)
1 – 4 years	37.4 (49)	Bachelor's Degree	55.7 (73)
5 – 9 years	26.7 (35)	Graduate Degree	13.0 (17)
10 – 14 years	19.8 (26)	Unknown	0.8 (1)
15 – 19 years	3.1 (4)		
20 or more years	0.8 (1)		
Unknown	0.8 (1)		

C. Participation in Supervisory Activities

To gain a better understanding of LMPD supervisors' interactions with their subordinate officers, supervisors were asked to self-report the frequency in which they engaged in a list of *general* supervisory activities. Specifically, using a five-point scale, where 1 = Never (0 times), 2 = Seldom (1 per month), 3 = Sometimes (2-3 times per month), 4 = Often (1 per week), and 5 = Frequently (more than 2-3 times per week), supervisors were asked to indicate how often they go to, participate in, and review the incidents managed by their subordinate officers.

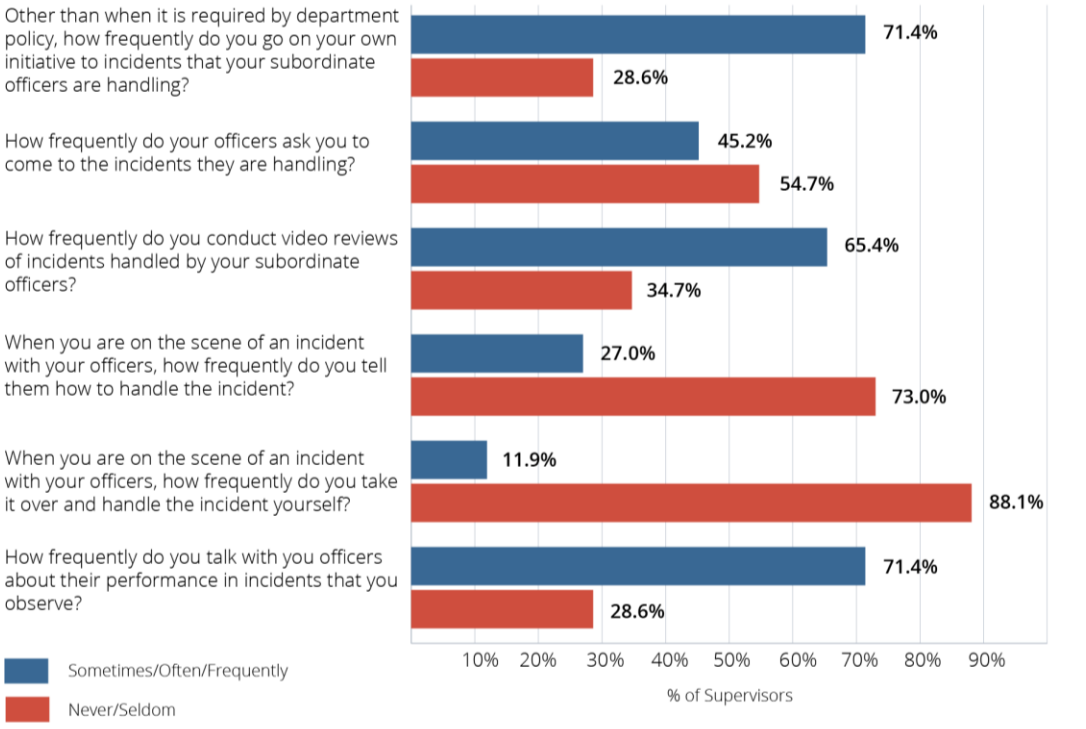
As shown in Table 18, although the majority of supervisors reported that they sometimes (2-3 times per month) go on their own initiative to incidents being handled by subordinates ($\bar{X}$ = 3.32), they never or seldom take over the incident and handle it themselves ($\bar{X}$ = 1.68). Generally, LMPD supervisors reported they sometimes (2-3 times per month) talk to their officers about their performance in observed incidents ($\bar{X}$ = 3.04).

Table 18: LMPD Supervisor Self-Reported Supervision Activities

		$\bar{X}$	SD	N
1.	Other than when it is required by department policy, how frequently do you go on your own initiative to incidents that your subordinate officers are handling?	3.32	1.37	126
2.	How frequently do your officers ask you to come to the incidents they are handling?	2.37	.98	126
3.	How frequently do you conduct video reviews of incidents handled by your subordinate officers?	2.92	1.30	124
4.	When you are on the scene of an incident with your officers, how frequently do you tell them how to handle the incident?	2.12	.855	126
5.	When you are on the scene of an incident with your officers, how frequently do you take it over and handle the incident yourself?	1.68	.80	126
6.	How frequently do you talk with you officers about their performance in incidents that you observe?	3.04	1.09	126

The frequency of conducting these supervisory functions is further examined in Figure 15. Of interest here is the percentage of supervisors who indicate they *never or seldom* conduct specific tasks. For example, approximately 30-35% of supervisors indicate that they never or seldom go on their own to incidents to observe subordinates, review video incidents of their subordinates, or talk to subordinates about the incidents they observe.

Figure 15: LMPD Supervisor Self-Reported Supervision Activities



D. Perceptions of the Implementation and Utility of De-escalation Training

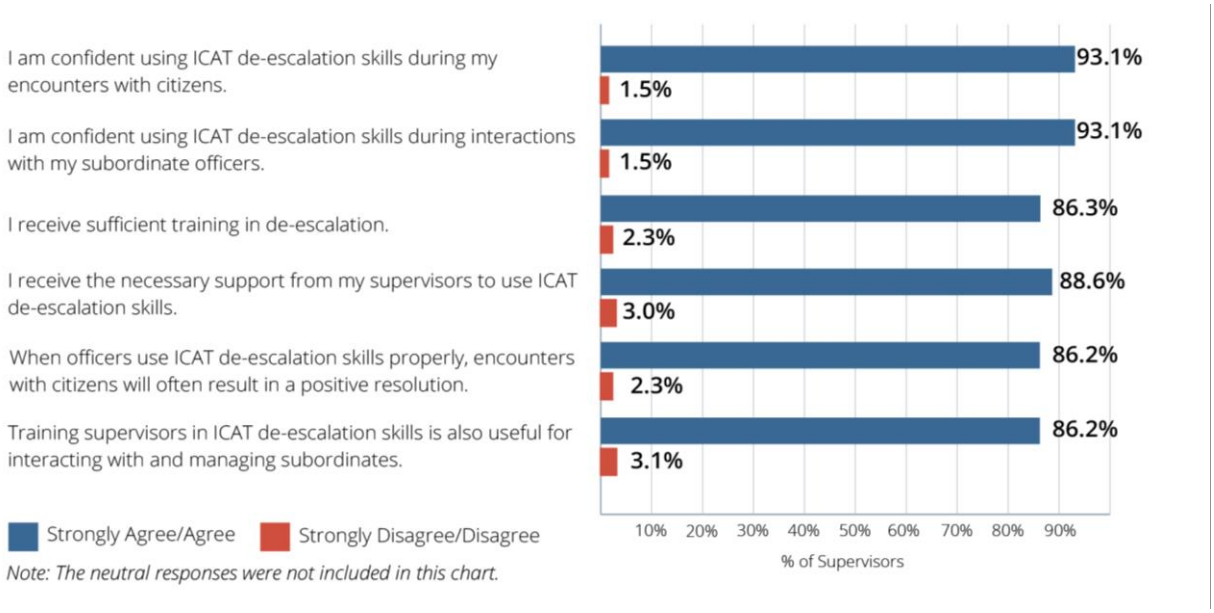
Seeking to understand the views of LMPD supervisors related to the implementation and applicability of the ICAT training in their work, supervisors were asked about their perceptions and experiences regarding *their own use* of ICAT de-escalation skills. As shown in Table 19, supervisors were asked to indicate their level of agreement to seven survey items assessing their perceptions, using a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree). On average, supervisors reported feeling confident using de-escalation skills with both citizens and with subordinate officers, suggesting they have received sufficient training in de-escalation, and believe that when skills are used properly, encounters with citizens will likely end with a positive resolution. Importantly, supervisors generally did *not* agree that their subordinates needed more training in de-escalation than is currently provided within the LMPD.

Table 19: LMPD Supervisor Perceptions Related to Using ICAT De-escalation Skills

		$\bar{X}$	SD	N
1.	I am confident using ICAT de-escalation skills during my encounters with citizens.	4.34	0.72	131
2.	I am confident using ICAT de-escalation skills during interactions with my subordinate officers.	4.34	0.72	131
3.	I receive the necessary equipment from my department to de-escalate situations.	3.99	0.94	131
4.	I receive sufficient training in de-escalation.	4.22	0.80	131
5.	I receive the necessary support from my supervisors to use ICAT de-escalation skills.	4.28	0.81	131
6.	When officers use ICAT de-escalation skills properly, encounters with citizens will often result in a positive resolution.	4.15	0.80	131
7.	Some encounters with citizens require additional less-lethal equipment than is currently available.	3.90	1.10	131
8.	My subordinates need more training in de-escalation than is currently provided.	2.79	0.92	131
9.	Training supervisors in ICAT de-escalation skills is also useful for interacting with and managing subordinates.	4.09	0.79	131

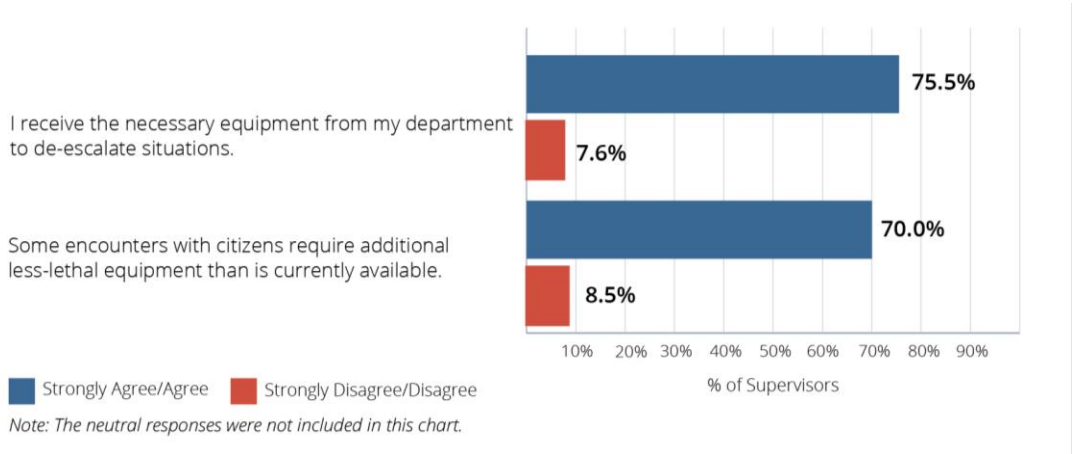
Figures 16-18 below further explore supervisors' responses by collapsing the Strongly Agree/Agree categories compared to the Strongly Disagree/Disagree categories across these survey items (while excluding the neutral category from display). For example, we see in Figure 16 that the overwhelming majority of respondents agree or strongly agree that they are confident using ICAT de-escalation skills with citizens and subordinates, that they have received sufficient training and support from superiors to used de-escalation skills, and that when these skills are properly used, encounters with citizens will often result in a positive resolution.

Figure 16: LMPD Supervisor Perceptions Related to Using ICAT De-escalation Skills



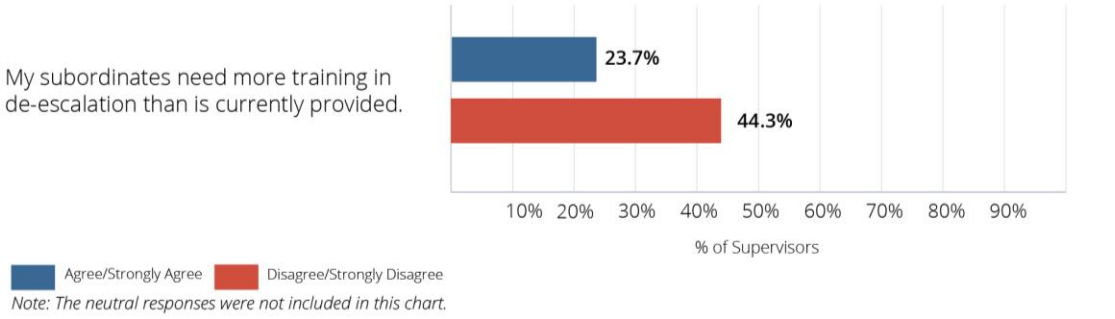
Interestingly, however, there appears to be some inconsistency in supervisors' responses to questions regarding the availability of equipment to facilitate de-escalation in encounters. As shown in Figure 17, over 75% of supervisors agreed or strongly agreed that they receive the necessary equipment to de-escalate situations. Yet, 70% of supervisors also agreed or strongly agreed that some encounters with citizens require additional less-lethal equipment than is currently available. It is unclear to the research team the possible reasons for these discrepancies.

Figure 17: LMPD Supervisor Perceptions Regarding Equipment for De-escalation



There was also a lack of consensus among supervisors when asked if their *subordinates needed more training in de-escalation techniques* than is currently provided. Specifically, although nearly a quarter of supervisors agreed or strongly agreed that more training was needed for subordinates (23.7%), 44.3% of supervisors disagreed or strongly disagreed with this statement.

Figure 18: LMPD Supervisor Perceptions Regarding Additional De-escalation Training



Perceptions of Supervising De-escalation Skills

Supervisors were also questioned regarding their perceptions of their ability to effectively supervise their subordinates' use of de-escalation and the support (via equipment, training, leadership) they receive from the department in fulfilling these duties.

As demonstrated in the average scores Table 20, supervisors generally suggest they can effectively supervise and coach the use of ICAT de-escalation tactics among their subordinates. Further, they generally disagreed that it was difficult to supervise subordinates' use of de-escalation skills, or that they required more support from their superiors to accomplish this task.

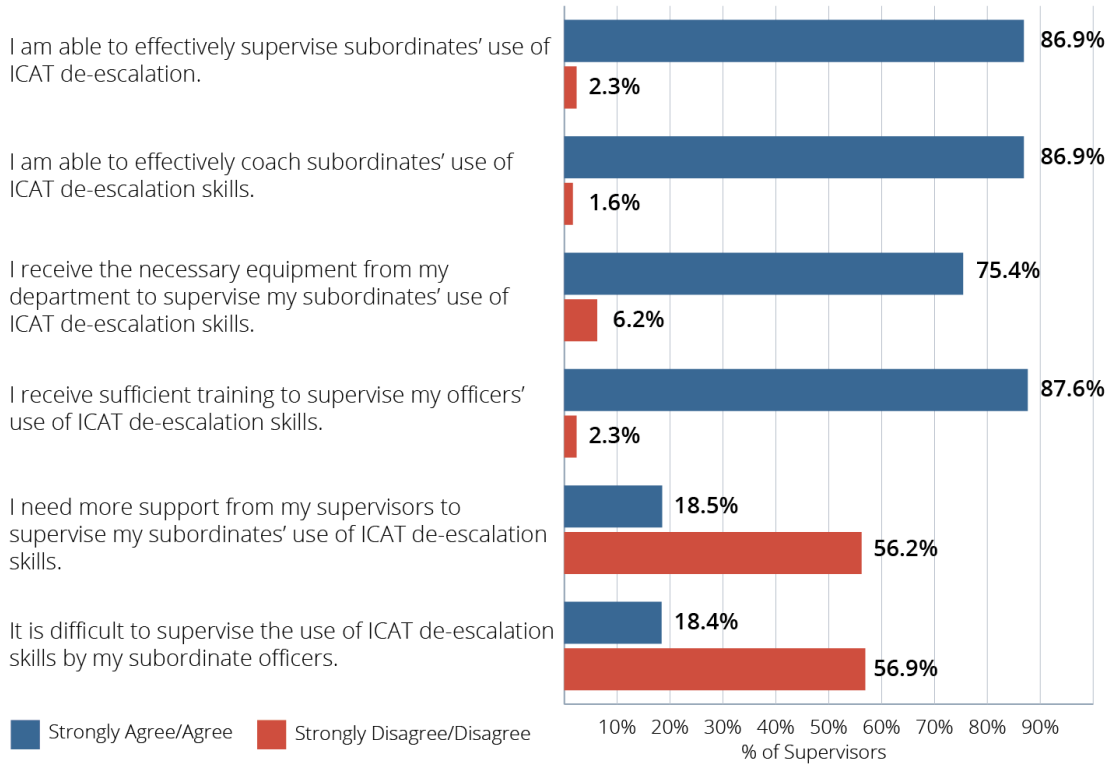
Table 20: LMPD Supervisor Perceptions Related to Supervising ICAT De-escalation Skills

		$\bar{X}$	SD	N
1.	I am able to effectively supervise subordinates' use of ICAT de-escalation.	4.08	.69	130
2.	I am able to effectively coach subordinates' use of ICAT de-escalation skills.	4.09	.67	130
3.	I receive the necessary equipment from my department to supervise my subordinates' use of ICAT de-escalation skills.	3.93	.85	130
4.	I receive sufficient training to supervise my officers' use of ICAT de-escalation skills.	4.08	.68	130
5.	I need more support from my supervisors to supervise my subordinates' use of ICAT de-escalation skills.	2.58	.91	130
6.	It is difficult to supervise the use of ICAT de-escalation skills by my subordinate officers.	2.53	.94	130

The consensus in supervisors' responses across these survey items are demonstrated more thoroughly in Figure 19. Specifically, 87% of supervisors agreed or strongly agreed they were able to both effectively supervise and coach subordinates' use of ICAT de-escalation skills. Supervisors' responses also indicated feelings of support in completing these tasks, with the majority agreeing they have the necessary equipment (75.4%) and sufficient training (87.6%) to supervise their subordinates' use of ICAT de-escalation skills. Finally, although a slight majority

of supervisors suggested it was not difficult to supervise the use of de-escalation skills (56.9%), a relevant minority (approximately 20%) identified challenges in this role.

Figure 19: LMPD Supervisor Perceptions Related to Supervising ICAT De-escalation Skills



Note: The neutral responses were not included in this chart.

Observations of Subordinates' Use of De-escalation Skills

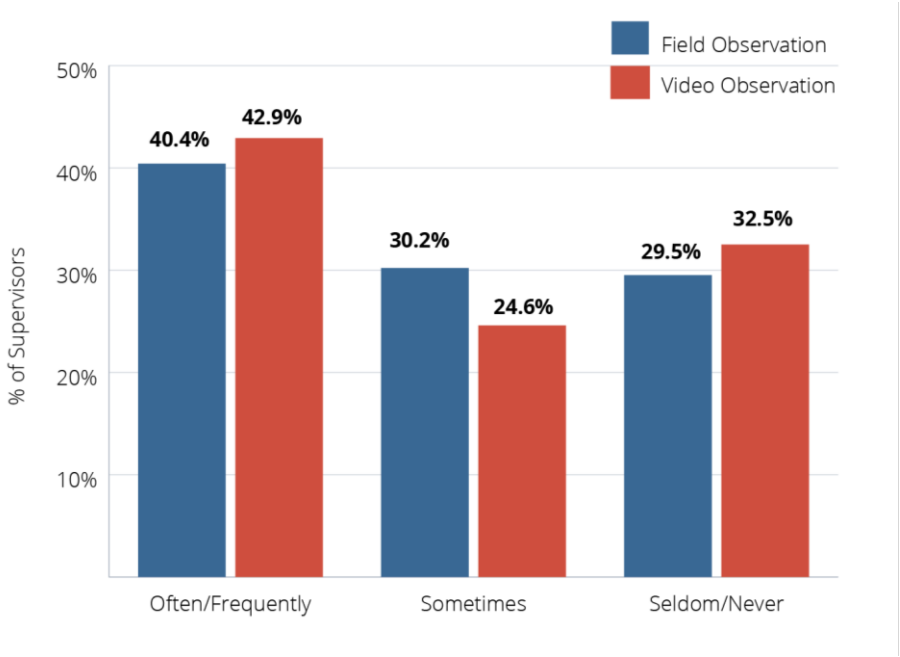
Finally, LMPD supervisors were asked to indicate how frequently they observe their subordinate officers use de-escalation in their day-to-day interactions with citizens. Specifically, survey respondents suggested the frequency by which they observe – either in the field or by video review – their officers use specific ICAT skills, using a five-point response scale: 1 = Never (0 times), 2 = Seldom (1 per month), 3 = Sometimes (2-3 times per month), 4 = Often (1 per week), and 5 = Frequently (more than 2-3 times per week). As shown in Table 21, on average, supervisors report "sometimes" observing subordinate officers using ICAT de-escalation skills in the field, reporting similar frequencies for video observations.

Table 21: LMPD Supervisor Observations of Subordinates' Use of ICAT De-escalation Skills

	In the Field			Video Review		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N
1. How frequently do you observe your subordinate officers using ICAT de-escalation skills?	3.18	1.22	129	3.07	1.40	126
2. When observing subordinate officers, how frequently do they use ***ICAT Communication Skills*** (such as actively gathering information from a subject, communicating to other officers, using active listening, or maintaining communication with a subject)?	3.82	1.16	129	3.40	1.45	126
3. When observing subordinate officers, how frequently do they use the ***Reaction Gap Strategy*** (actively re-positioning to keep a favorable position between the officer and the subject)?	3.88	1.16	129	3.35	1.42	126
4. When observing subordinate officers, how frequently do they use the ***Tactical Pause Strategy*** (sharing information and developing a strategy with other responding officers during a citizen encounter)?	3.63	1.14	129	3.17	1.35	126
5. When observing subordinate officers, how frequently do they attempt to use less lethal tools?	2.68	1.21	129	2.54	1.21	125
6. How often have you observed incidents handled by your subordinates where ICAT de-escalation skills were properly used, but were unsuccessful in achieving a positive resolution to an incident?	2.29	.94	129	2.19	.98	126
7. How often have you used ICAT de-escalation skills but were unsuccessful in achieving a positive resolution to an incident?	2.02	.74	129	--	--	--

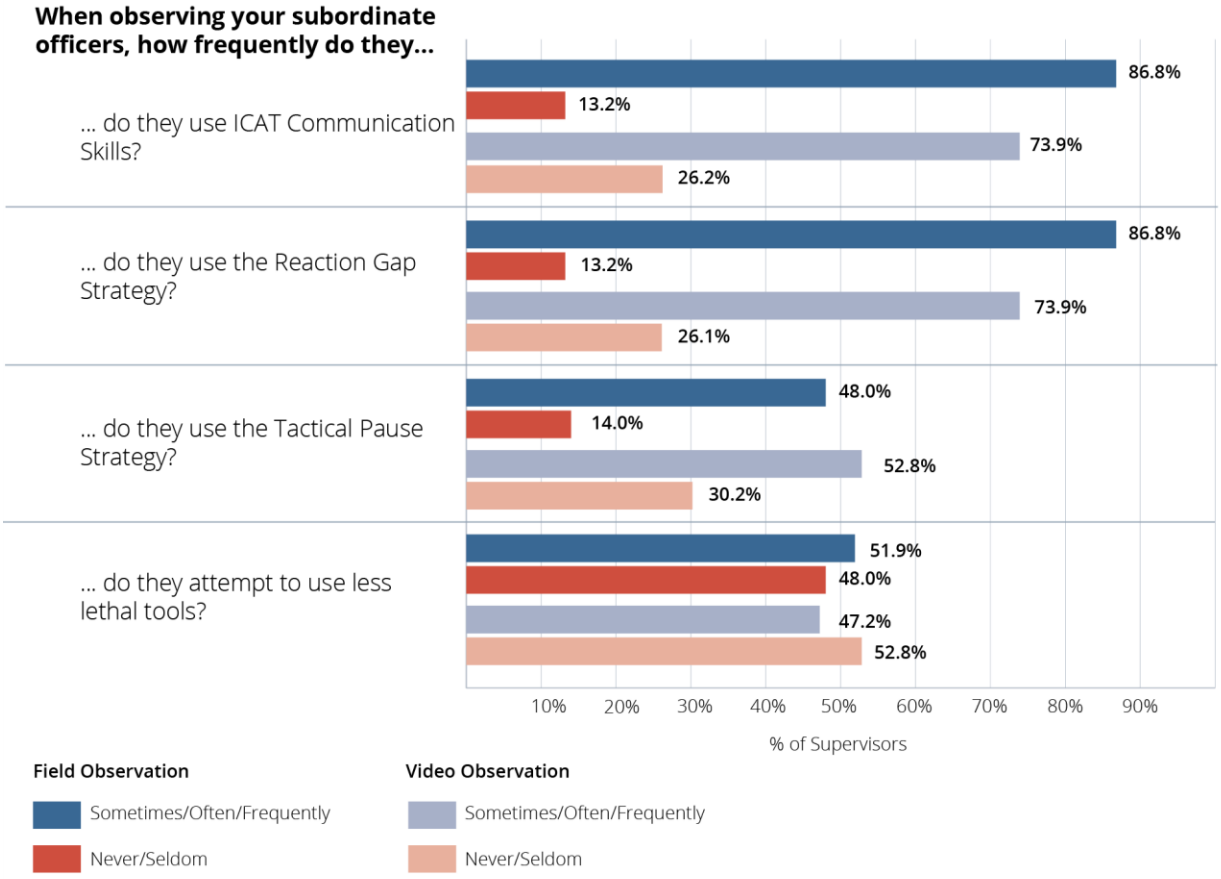
As shown in Figure 20, the frequency of supervisors' observations of subordinates' use of de-escalation skills did not vary significantly between the field observations and review of videos. That is, the method of observation did not vary substantially from one another. However, the frequency with which supervisors reported observing subordinates' de-escalation skills (either in the field or on video) did vary significantly across supervisors. For example, while approximate 40% of supervisors reported often or frequent observations of their officers, approximately 30% reported seldom or never conducting these types of observations or reviews.

Figure 20: LMPD Supervisor Observations of ICAT Skills in the Field & in Video



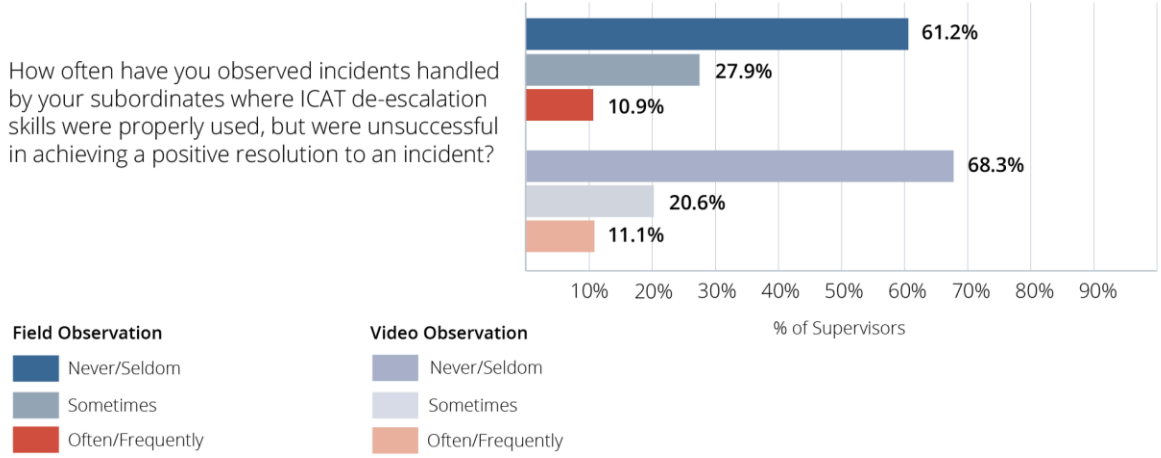
Of those supervisors who report observing subordinates' use of de-escalation tactics in the field or on video, differences emerge regarding the frequency that the four types of tactics – communication skills, reaction gap strategy, tactical pause strategy, and use of less lethal tools – are observed (see Figure 21). Of these specific de-escalation tactics, supervisors report observing subordinates' using communication skills and the reaction gap strategy significantly more frequently than the tactical pause strategy or the use of less lethal tools. Importantly, about half of the supervisors indicated that the seldom or never observe officers in the field or on video using less lethal tools to de-escalate situations. The lack of use of these tools may be related to supervisors' previously reported perception that access to additional less lethal equipment is needed.

Figure 21: Supervisor Observation of Subordinate ICAT Skills in the Field and in Video



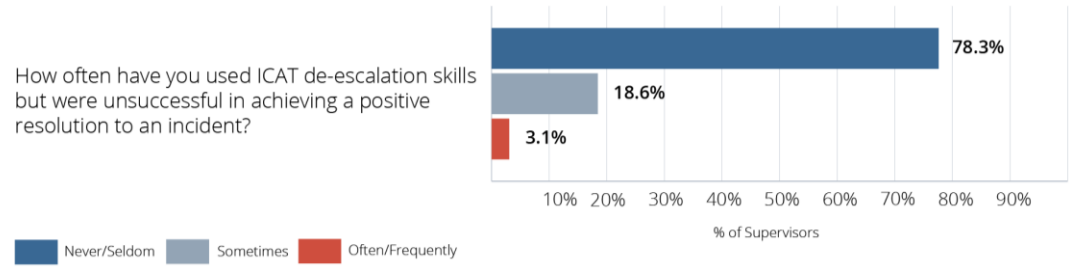
Supervisors were also asked to report how often the incidents they observed their subordinates handling where de-escalation skills were used were unsuccessful in achieving a positive resolution to the encounter. In short, how often, in their perception did their subordinates' encounters using de-escalation tactics fail to result in a positive outcome. As shown in Figure 22, over 60% of supervisors indicated that they never or seldom observed incidents where de-escalation skills were used but were unsuccessful in achieving a positive resolution. Only 10% of supervisors indicated often or frequently observing the use of these skills resulting in an unsuccessful outcome.

Figure 22: Supervisor Observation of Subordinate ICAT Skills in the Field and in Video



Likewise, Figure 23 shows over 78% of supervisors reported that they never or seldom used de-escalation skills themselves without reaching a positive resolution. Only 3% of supervisors reported that they often or frequently used de-escalation skills that resulted in an unsuccessful outcome.

Figure 23: Supervisor Field Observation of Subordinate ICAT Skills



Supervisors' Reinforcement of ICAT Training

As stated above, a primary objective of the LMPD supervisor survey was to gain insights regarding the frequency of supervisor activities that directly support or reinforce their subordinate officers' use of the de-escalation skills presented within the ICAT training. Using a five-point scale – where 1 = Never (0 times), 2 = Seldom (1 per month), 3 = Sometimes (2-3 times per month), 4 = Often (1 per week), and 5 = Frequently (more than 2-3 times per week) – LMPD sergeants and lieutenants were asked to indicate how often they participate in six specific supervisory activities, including talking with officers about the use of de-escalation skills both generally and in specific incidents, and documenting officers' use of de-escalation skills in different ways. The descriptive statistics produced from these survey items are presented in Table 22.

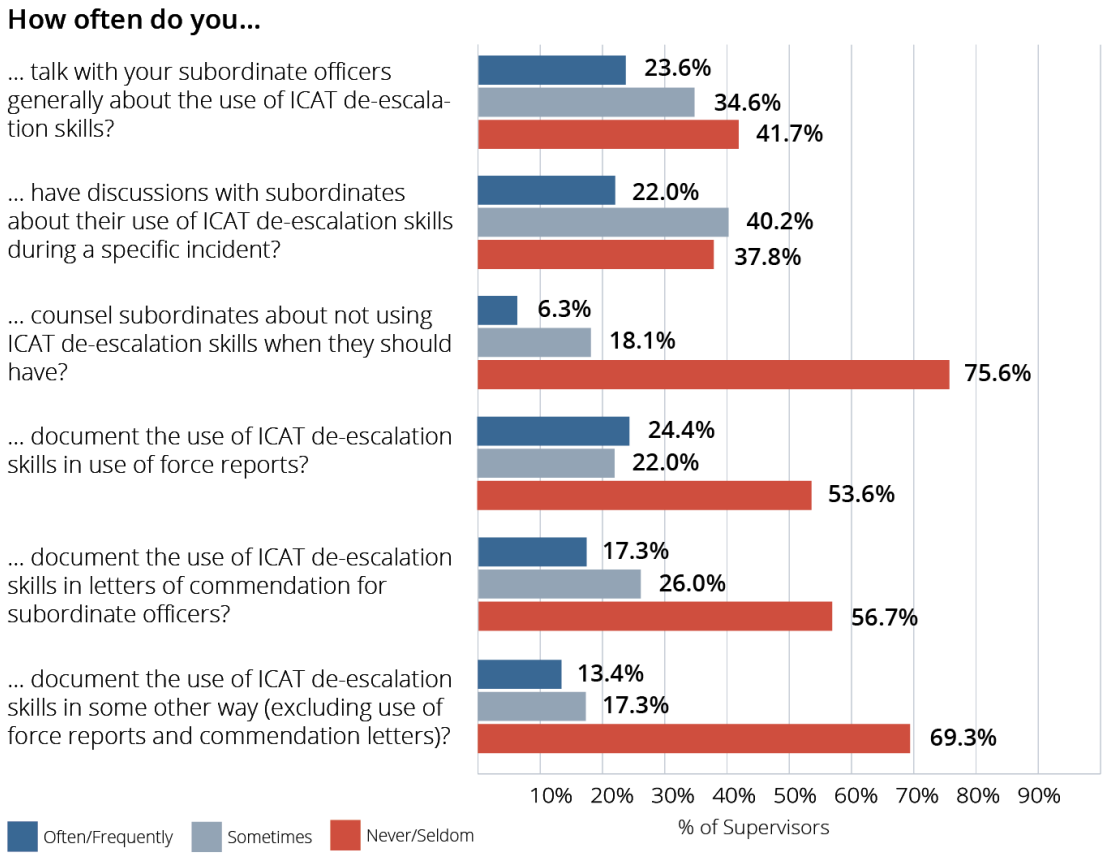
As seen in Table 22, the average frequency of LMPD supervisors' participation in the six activities were fairly low, typically ranging from seldom (i.e., once per month) to sometimes (i.e., two to three times per month). Specifically, supervisors report talking with their officers about the use of de-escalation skills (generally or based on a specific incident) only once per month ($\bar{X}$ = 2.72 and $\bar{X}$ = 2.79, respectively). Further, supervisors report that they seldom (once per month) document the use of ICAT de-escalation skills through a variety of methods (i.e., use of force reports, letters of commendations, or other ways).

Table 22: Supervision Activities Related to ICAT De-escalation Skills

		$\bar{X}$	SD	N
1.	How frequently do you talk with your subordinate officers generally about the use of ICAT de-escalation skills?	2.72	1.03	127
2.	How often do you have discussions with subordinates about their use of ICAT de-escalation skills during a specific incident?	2.79	1.05	127
3.	How frequently do you counsel subordinates about not using ICAT de-escalation skills when they should have?	2.01	.86	127
4.	How frequently do you document the use of ICAT de-escalation skills in use of force reports?	2.60	1.22	127
5.	How frequently do you document the use of ICAT de-escalation skills in letters of commendation for subordinate officers?	2.41	1.11	127
6.	How frequently do you document the use of ICAT de-escalation skills in some other way (excluding use of force reports and commendation letters)?	2.16	1.04	127

Figure 24 provides additional insights on LMPD supervisors' activities related to the support and reinforcement of subordinates' use of ICAT de-escalation skills. Specifically, across the survey items, respondents most often reported seldom or never conducting supervisory activities related to officers' use of de-escalation. This was the case for talking with subordinate officers generally about the use of ICAT de-escalation skills, counseling officers on using de-escalation when they did not, and documenting the use of ICAT de-escalation skills in use of force reports, letters of commendation, and other ways. Notably, however, a slightly larger percentage of supervisors suggested they "sometimes" (i.e., two to three times a month) have discussions with subordinate officers about their use of ICAT de-escalation skills during a specific incident (40.2%).

Figure 24: Supervision Activities Related to ICAT De-escalation Skills



E. Summary

In summary, a survey was administered to sergeants and lieutenants (N = 131) in March 2020 to assess LMPD first-line supervisors' perceptions and self-reported experiences as they relate to their use of ICAT de-escalation skills and the supervision and reinforcement of those skills among their subordinates. Descriptive analyses of these survey responses reveal several important findings. First, LMPD supervisors appear to hold positive attitudes regarding their own use of the ICAT de-escalation skills. On average, supervisors expressed confidence in their ability to use the skills during their interactions with both the public and their subordinate officers. Additionally, supervisors indicated they can effectively supervise and coach subordinate officers in the use of these de-escalation skills, suggesting they did not require additional training or support from leadership to complete these tasks. Assuming supervisors' positive perceptions related to their self-efficacy in the use/supervision of de-escalation translates to behavior, this study presents encouraging findings for the application of ICAT de-escalation skills among LMPD supervisors and effective supervision of de-escalation by officers.

Importantly, however, while most survey respondents (57%) suggest it is not difficult to supervise the use of ICAT de-escalation skills by their subordinate officers, the average frequency of participation in supervisory activities that may serve to support or reinforce officers' use of de-escalation were fairly low. Indeed, average responses by supervisors suggest

they seldom (i.e., once per month) or only sometimes (i.e., two to three times per month) communicate with their subordinate officers about the use of ICAT de-escalation skills in a general or incident-specific manner. Additionally, survey responses suggest the documentation of officers' use of de-escalation skills – by means of use of force reports, letters of commendation, or other formal recognition – is uncommon. In turn, supervisors suggest limited observations of the use of de-escalation by officers out in the field or by video review. Collectively, the rarity of these types of supervisor-officer interactions suggests LMPD first-line supervisors may be missing important opportunities to support and reinforce the skills learned in the de-escalation training sessions among their subordinate officers.

VII. ICAT TRAINING IMPACT ON OFFICER BEHAVIOR

In this section, we assess multiple parameters regarding potential changes in use of force that corresponded with ICAT training. We first describe our operationalized use of force, citizen injuries, and officer injuries, including defining our measurement that focuses on the units of analysis for use of force available in the current study. We next provide a series of univariate statistics, including monthly and annual changes in uses of force over time (as well describe many of the time-specific LMPD changes in uses of force policies). We then present an analysis of use of force severity using a rigorous index for force severity. Finally, we present a series of panel regression results that corresponded to the stepped-wedge RCT design to assess the changes in uses of force that corresponded with the randomized timing of the training.

A. Measuring LMPD Use of Force – Policies and Data

Use of force is governed by LMPD Standard Operating Procedure (SOP) 9.1 (Use of Force Policy), which delineates when and how force can be used by LMPD officers. Commanding officers are required to complete a report (*Administrative Incident Report* or *AIR*) for all use of force incidents resulting in any injury, or complaint of injury, to either the officer or subject, or when physical force other than a control hold is used. Upon using force, or conducting an arrest where the resulting charge is resisting arrest or assault on an officer, the involved officers must immediately notify commanding officers.

All LMPD policy changes are made through PowerDMS, a software used by LMPD that notifies officers to updated policy documents, requiring that they read, understand, and acknowledge all new information. Between 2015 and July 2020, SOP 9.1 (Use of Force Policy) has been revised nine times (see Figure 25). De-escalation tactics were first introduced into policy in October 2015. This revision also defined passive and active resistance, noting their difference. The Use of Force Policy underwent extensive revisions again in October 2019, adding more specific language regarding de-escalation procedures, positional asphyxia (restraint positions that interfere with breathing), shooting at, or from, a moving vehicle, and clarified the use of conducted electrical weapons. Most recently, the use of force policy was modified in June 2020, after the study period concluded. The revisions include an added definition of safety priorities, restrictions associated with using officers' weight on subjects' back, head, and neck, and expanded upon the duty for officers to intervene when unlawful or excessive force is used.

In addition to changes to the Use of Force Policy, the LMPD Traffic Stops and Enforcement Policy (SOP 7.12) was also significantly revised during the study period. Changes officially took effect August 1 2019, although officers were encouraged to make changes in May of 2019. Policy revisions included additional restrictions for conducting traffic stops, new guidelines for handcuffing people who are not under arrest, and emphasis that stops are to be conducted free of bias.

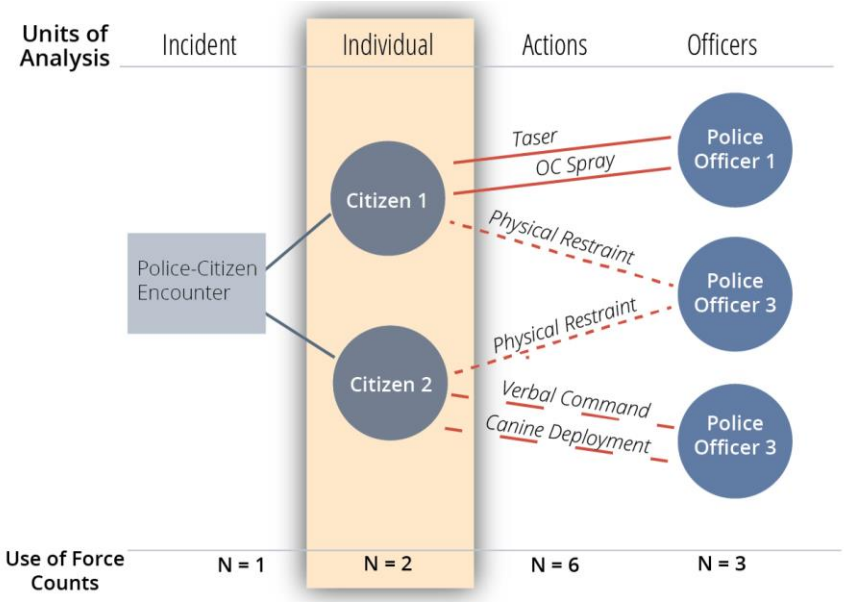
Our evaluation of the ICAT de-escalation training relies on LMPD's official use of force data. Commanding officers at a use of force scene are required to complete an AIR through Blue Team (LMPD's software program) and forward through the appropriate chain of command. LMPD's reportable uses of force include *all use of force incidents resulting in any injury, or the complaint of any injury, to either the officer or subject, or when physical force other than a*

control hold (a technique with a low probability of injury to the officer or subject, utilized to maintain physical control of a subject) is used.

It is important to note that use of force counts can vary dramatically based on the unit of analysis at which they are measured. For example, as depicted in Figure 25, a single police-citizen *incident* or *encounter* may involve one of more *individuals* receiving one or more police *actions* by one or more *officers*. And because a single use of force incident may include multiple types of force, used against multiple individuals, by multiple officers, there are a variety of ways force could be counted, for example as (1) the number of incidents involving any use of force, (2) the number of individuals who had force used against them in a single encounter, (3) the number of different types of force (or officer *actions*) used, or (4) the number of officers using force. Each of these measures would result in different use of force counts.

For all of the analyses that follow, ***we measure the use of force as the number of individuals that had force used against them during a single encounter***. If an individual had force used against him/her during more than one encounter with police during the study time period, multiple uses of force are included in the data analyses. Measured in this way, our individual use of force count (# of individuals having force used against them) include multiple police actions given the escalating nature of force (i.e., an officer may initiate with a low level of force and increase in severity if resistance increases), and multiple officers that could use force against a single individual.[28]

Figure 25: Hypothetical Example of Use of Force Measures, by Unit of Analysis



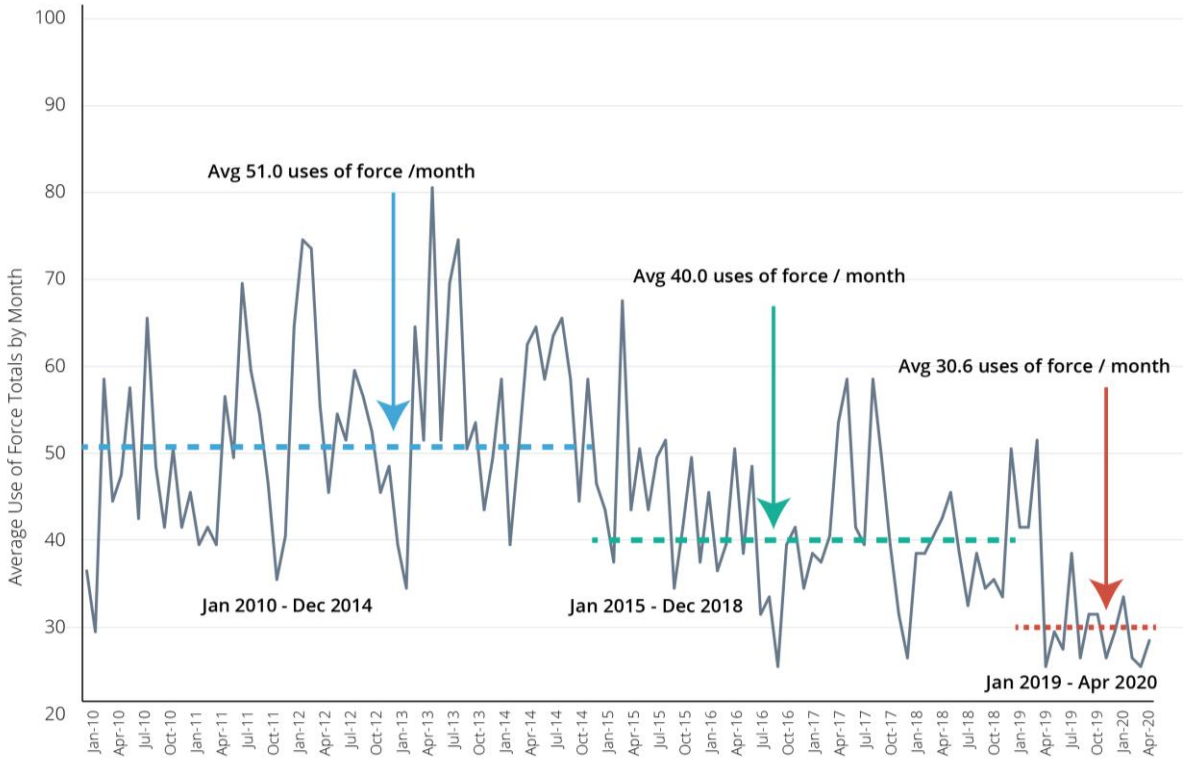
Note: The individual level is the unit of analysis used in this study.

[28] For example, for LMPD in 2018, there were roughly 21 officer-actions on average per each measured use of force incident across the various officers involved.

In order to provide a long-term historical context of use of force incidents in Louisville (where force incident counts represent a use of force against a civilian), we graph the use of force counts from January 2010 through April 2020.

An Augmented Dickey Fuller Unit Root test indicates that there is statistically significant mean instability in the time series ($p < 0.01$). As graphically displayed in Figure 26, the univariate moving average graphs show a consistent pattern in the data indicated by patterns of long-term stability in event counts and clear structural breaks in the time series. First, from January 2010 through December 2014, the average number of uses of force was roughly 51 per month for this stage in the time series. Second, from January 2015 through December 2018 the average number of uses of force was roughly 40 per month. Finally, during the period of the randomized experiment (beginning in February 2020) through April 2020, the average number of uses of force was roughly 30 per month. Thus, the use of force events in Louisville were consistently stable for a five-year period (2010-2014) as well as four-year period (2015-2018) prior to the implementation of the ICAT training and subsequent policy changes in Louisville after the training was completed.

Figure 26: Time Series Analysis January 2010 to April 2020



This time series analysis is accompanied by Figure 27, which provides a long-term historical context of changes to LMPD's Use of Force Policy. These three changes in the pattern of use of force counts are roughly correlated with LMPD Use of Force Policy changes. For a five-year period (from 2010 – 2014), use of force counts were consistently stable. The following four years (2015 – 2018) demonstrated a stable reduction compared to the previous time period. This

stable four-year time period (2015 – 2018) serves as the baseline prior to the implementation of the ICAT training and additional policy changes.

Figure 27: Use of Force Policy Changes 2014-2020

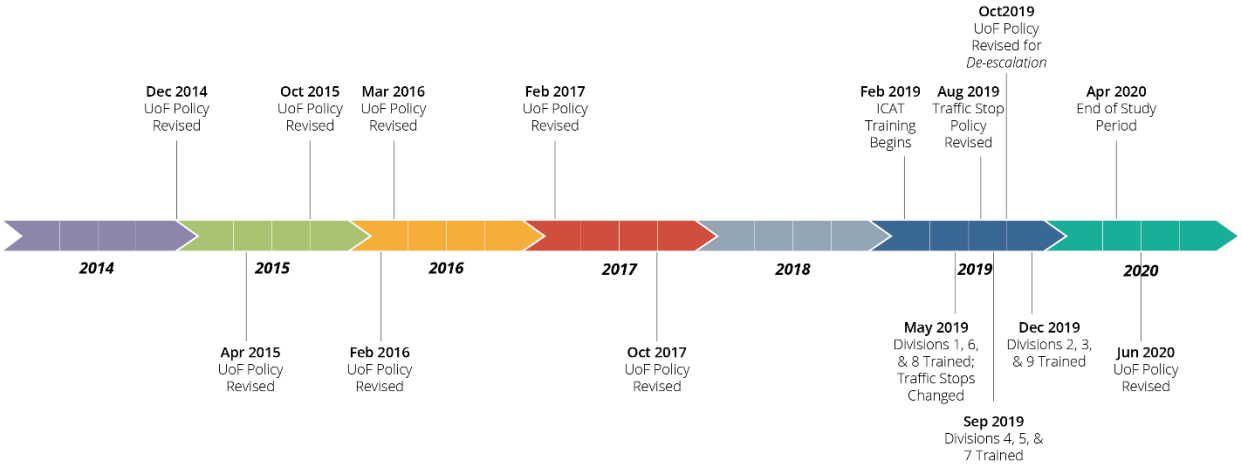
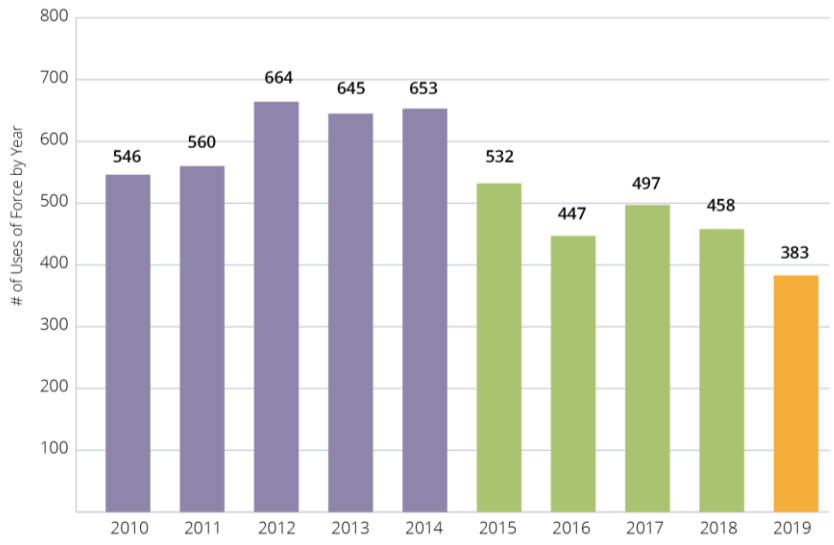


Figure 28 graphically displays the number of individuals annually who had force used against them by LMPD Officers. As previously described, for the analyses that follow, we examine the number of individuals who had force used against them during a single encounter. The color changes across years represent the breaks identified using interrupted time series analyses.

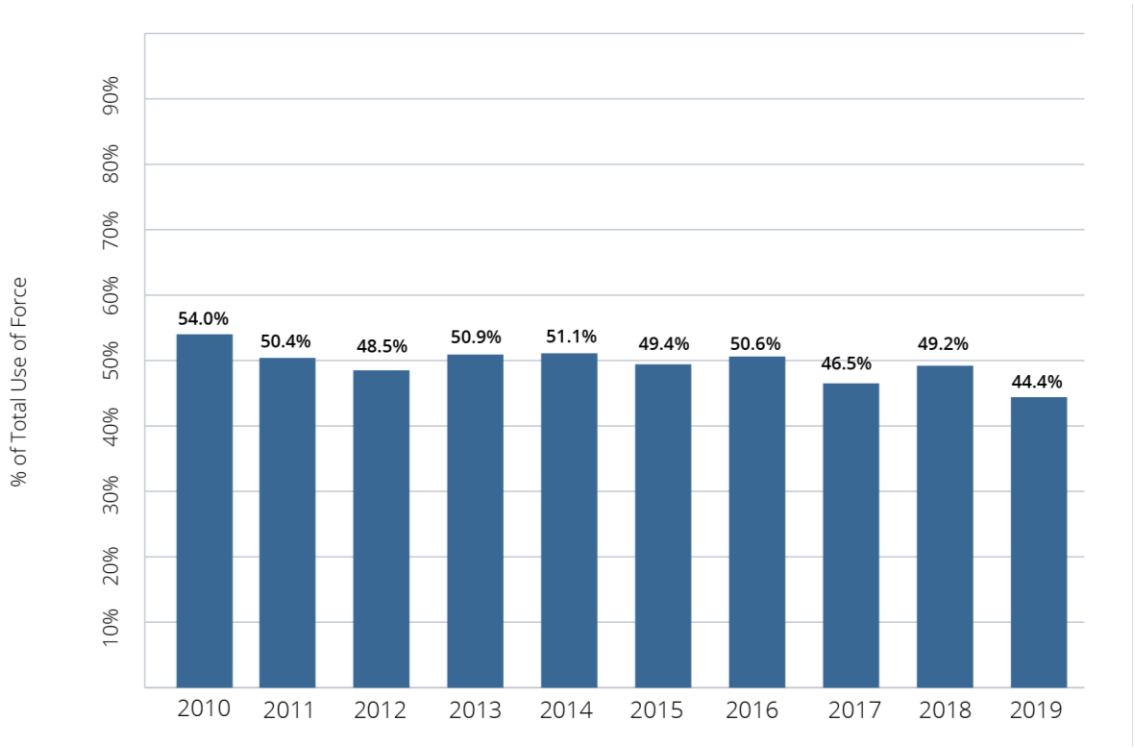
Figure 28: Use of Force Totals by Year (2010 – 2019)



As shown in Figure 29, the percent of uses of force that involve Black citizens has hovered around 50% for the majority of the ten-year period, although the lowest percentage (44.4%) was

recently observed in 2019. If this trend continues, it may represent a reduction in racial/ethnic disparities in uses of force as a result of ICAT de-escalation training.[29]

Figure 29: Percentage of African-American Use of Force by Year (2010 - 2019)

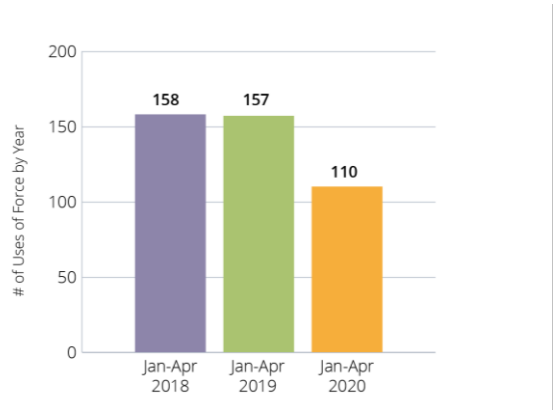


Given that the ICAT rollout began in February 2019 and continued through November 2019, we also use 2018 as the foundational baseline to provide context of the potential impact of ICAT de-escalation training.[30] As part of the follow-up period for the experimental study we also examined use of force incidents from January 1 – April 30, 2020. To provide context for these additional four months of data, Figure 30 displays uses of force reported from Jan 1- April 30 for each of the three years of data (2018, 2019, and 2020). As shown, 158 and 157 uses of force were reported for this four-month period in 2018 and 2019 respectively, compared to 110 uses of force for the same time period in 2020. This equates to a 30% seasonal decline in the first four months of 2020, relative to the first four months in 2018 and 2019.

[29] Additional analyses examining the impact of training at the individual level, including analyses that consider individuals' demographic characteristics on the likelihood of force during arrest situations, will be included in subsequent reports.

[30] Also recall that the time series analyses previously reported shows that use of force counts in 2018 are relatively consistent with counts from the two previous years (2016 and 2017).

Figure 30: Use of Force Seasonal Changes (January through April) 2018, 2019, 2020



Additional descriptive analyses presented below examine the frequency of use of force based on the severity or level of force. For these analyses, the severity is determined based on the research team's developed hierarchy of use of force tactics (presented in Figure 31). These levels of force roughly match LMPD's Use of Force policy.

Figure 29: Use of Force Severity Index with Force Types[31]

Severity Index	Type of Force
Level 1	Verbal Directions
Level 2	Energy Conducted Weapon (ECW) Arc Display Hobble
Level 3	Come-along Empty Hand Control
Level 4	OC Spray Pepper Ball
Level 5	ECW Cartridge Deployed ECW Stun Feature
Level 6	Empty Hand Strikes Kick Kick Strike Knee Strike Take Down
Level 7	Impact Weapon K-9 Bite Special Impact Munitions
Level 8	Firearm Deployed

[31] The "Other Narrative" use of force is linked in the incident reports and thus is not included in the use of force severity index. The highest level of force column excludes the other category – and thus the highest level of force per incident is the category prior to any officer filling out the 'other' category in the use of force report.

When considering the frequency of use of force severity, we document in Table 23 the overall percentage of incidents that involve each specific type of force, and also the percentage of incidents where that type of force used was the highest, or most severe.

As documented, the number of verbal directions declined from 412 in 2018 to 342 in 2019 (-16.9%). Empty hand controls were reduced from 361 in 2018 to 312 in 2019 (-13.5%). Take downs declined from 293 in 2018 to 227 in 2019 (-22.5%). Finally, the Level 6 severity index (includes empty hand strikes, kicks, knee strikes, and take downs) was consistently the highest level of use of force in both 2018 and 2019. The number of uses of force that met this index severity threshold, however, declined 21.2% (from 335 in 2018 to 264 in 2019). Thus, the most sweeping measurable change in use of force severity in 2019 relative to 2018 was the reduced number of physical take-downs, knee strikes, kicks and hand strikes. The most severe form of force (officer involved shootings, severity index = Level 8), remained relatively stable between 2018 and 2019, which is unsurprising given that officer involved shootings comprised less than 2% of use of force incidents each year.

Table 23: Use of Force by Force Type and Severity, 2018-2019

Severity Index	Type of Force	# of Use of Force+ 2018	# of Use of Force+ 2019	Percentage Change (2018-2019)
1	Verbal Directions	412	342	-17%
2	Energy Conducted Weapon (ECW) Arc Display	5	0	--
	Hobble	68	36	-47%
3	Come-along	18	28	56%
	Empty Hand Control	361	312	-14%
4	OC Spray	17	11	-35%
	Pepper ball	0	5	--
5	ECW Cartridge Deployed	65	44	-32%
	ECW Stun Feature	40	19	-53%
6	Empty Hand Strikes	154	121	-21%
	Kick	1	3	--
	Knee Strike	35	32	-9%
	Take Down	293	227	-23%
7	Impact Weapon	10	8	--
	K-9 Bite	14	20	43%
	Special Impact Munitions	3	3	--
8	Firearm Deployed	9	10	--
--	Other (Narrative)*	35	29	-17%

* The specific uses of force included in the "Other" use of force category are only captured in narrative form and were unavailable to the research team and are therefore not included in the severity index. Every use of force incident classified as other, however, also had at least one additional category selected that is used to determine the severity level.

+Categories are progressive in nature and thus are not mutually exclusive in this column.

In additional to annual comparisons, we also compare January – April 2020 use of force counts with the same monthly periods in 2018 and 2019 given that the randomized control experiment

regarding ICAT training was launched in February 2019. In short, the 2018 and 2019 periods can be viewed primarily as a baseline, while the full 2020 period occurred after full delivery of the randomized ICAT training program. Similar to earlier univariate results, there were fewer verbal directions in early 2020 (N = 87) when compared to 2018 (N = 144) and 2019 (N = 138). Similarly, empty hand controls were less common in early 2020 (N = 89) when compared to 2018 (N = 120) and 2019 (N = 117). Finally, take downs were considerably reduced (N = 65) in early 2020 when compared to 2018 (N = 109) and 2019 (N = 94).

Table 24: Use of Force by Force Type and Severity, January-April 2018-2020

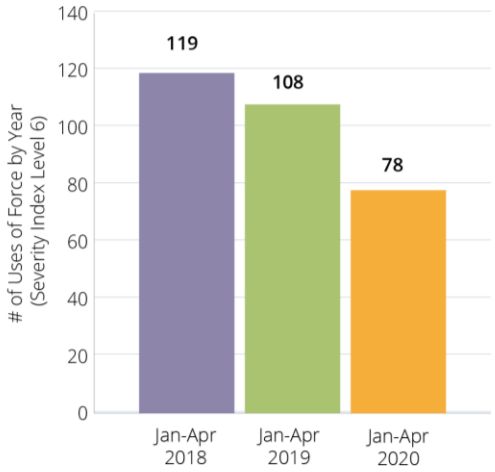
		Jan-April 2018	**Jan-April 2019**	**Jan-April 2020**	**3-Year Percentage Change[32]**
Severity Index	**Type of Force**	# of Use of Force[+]	# of Use of Force [+]	# of Use of Force [+]	
1	Verbal Directions	144	138	87	-65.5%
2	Energy Conducted Weapon (ECW) Arc Display	3	0	0	--
	Hobble	29	15	10	-190.0%
3	Come-along	5	15	6	--
	Empty Hand Control	120	117	89	-34.8%
4	OC Spray	16	4	16	--
	Pepper ball	0	5	0	--
5	ECW Cartridge Deployed	18	13	13	-38.5%
	ECW Stun Feature	12	10	5	-140.0%
6	Empty Hand Strikes	55	53	27	-103.7%
	Kick	1	0	1	--
	Knee Strike	11	13	11	0.0%
	Take Down	109	94	65	-67.7%
7	Impact Weapon	4	3	0	--
	K-9 Bite	7	7	2	--
	Special Impact Munitions	1	2	0	--
8	Firearm Deployed	5	4	5	--

[+]Categories are progressive in nature and thus are not mutually exclusive in this column.

A comparison of the most frequent and more severe type of force used during incidents for the four-month period (Jan 1- April 30) are graphically displayed for 2018- 2020 in Figure 32Figure 30. As shown, the use of knee strikes, empty hand strikes, take downs and kicks were considerably less in 2020 (n = 78) compared to 2018 (n=119) and 2019 (n=108).

[32] For cases with fewer than 10 uses of force no percentage change is calculated

Figure 30: Use of Force January – April, 2018 – 2020 (Severity Index Level 6, Knee Strikes, Empty Hand Strikes, Take Downs and Kicks)



B. Injuries

In addition to uses of force, the research team also examined the frequency of officer and citizen injuries reported as a result of use of force incidents. The LMPD collects injury information for every individual and police officer involved in a use of force encounter regardless of the need for some type of medical attention. The data provided to the research team did not include specific information regarding the type or severity of these injuries, only whether or not an injury was reported by the officer or citizen, and if it required medical attention. For the analyses that follow, *counts of injuries include those reported by individuals or officers, regardless of whether medical attention was received.*[33] Recall that use of force incidents can involve more than one officer or suspect, and therefore, it is possible that a single incident includes multiple injuries.

As noted previously, 458 individuals had force used against them in police encounters in 2018. This same year, 1,007 officers were involved in these incidents—although note this figure includes the same officers involved in multiple incidents during the year.[34] Likewise, 386 individuals had force was used against them in 2019. During the same year, 899 officers were involved in these encounters (again noting that this represents only 406 different police officers during the 12-month period).

[33] Measuring the count of injuries in the manner will necessarily include injuries that, while reported by officers and citizens, were likely minor in severity. Of the 758 citizen injuries reported during the study time period (Jan 1, 2018 – April 30, 2020), over half (50.5%) did not require medical attention. Likewise, of the 681 officer injuries reported, 59.7% did not required medical attention.

[34] As with individuals, officers may be involved in multiple uses of force throughout the study period. For example, in 2018, 478 individual officers accounted for the 1,007 officers engaged in use of force incidents (most officers were involved in multiple use of force encounters over the course of a year).

Combined, this year-over-year change from 2018 to 2019 equates to a 15.7% decline in uses of force against individuals, and 10.7% decline in officer injuries. Finally, the civilian self-reported injury total for the use of force encounters was 355 (of 458) for 2018, and 319 (of 386) in 2019, which equates to a 10.1% decline between 2018 and 2019.

For the first four months of the year (January – April), 158 individuals had force used against them in 2018, 157 in 2019, and 110 in 2020 – or an average decline of 30.1% in 2020 relative to 2018/2019. For each year respectively, 296, 397, and 184 officers were involved in these incidents, or an average decline of 47% in 2020 relative to 2018/2019. The number of injuries reported for citizens for 2018 = 124, 2019 = 135, and 2020 = 84, or an average decline of 35% in 2020 relative to 2018/2019. Finally, the number of injuries reported for officers for 2018 = 80, 2019 = 115, and 2020 = 78, or an average decline of 20% in 2020 relative to 2018/2019

C. Univariate Summary

The combined univariate findings demonstrate the following patterns regarding the frequency and severity of use of force reported by the LMPD for the time period under study (January 1, 2018 – April 30, 2020). First, the greatest reductions in use of force incident counts were seen in the 2019 total (N = 386) relative to the 2018 total (N = 458). Second, the first four months of 2020 had considerably fewer use of force incidents (N = 110) relative to the first four months of 2018 (N = 158) and 2019 (N = 157). Third, use of force encounters in the first four months of 2020 were less likely (in terms of overall percentages) to involve more severe uses of force (Levels 6-7, including striking, kneeing, take downs, K-9 bites, and impact weapons). Thus, the types of uses of force that put the public and officers at risk for injury declined in the post-training period relative to the pre-training period. Below the impact of ICAT training based on the stepped-wedge RCT design in examined in more detail.

D. Stepped-Wedge RCT Results

The primary purpose of ICAT is to train officers in de-escalation skills and tactics designed to minimize the frequency and severity of police use of force, when and where possible. In order to assess the impact on police behaviors in the field, we conduct a series of bivariate and multivariate analyses on officers' enforcement activities (i.e., uses of force) as well as injury data (citizen and officer injury reports), while also examining changes in patterns of arrests (since use of force incidents are highly calibrated with and frequently drawn from arrest incidents).

Table 25 shows that the monthly average use of force counts declined in six of the eight patrol divisions, ranging from a decrease of -16% to -52% among the vast majority of divisions that experienced sizable and notable declines in use of force. The post-training periods were unique to each division depending on where they were allocated within the stepped-wedge training, implementation, and evaluation design – with each division having between 8 to 12 months of post-training follow-up.

Table 25: Monthly Use of Force Counts, Per Division, Between January 1, 2018 to April 30, 2020 (Site Specific Pre- and Post-Training Dates) [35]

Division	Pre-Training Average	Post-Training Average	Percentage Change
1	9.30	5.77	-40%
2	5.50	4.60	-16%
3	5.06	5.40	6%
4	7.31	5.17	-30%
5	2.81	1.33	-52%
6	2.80	1.92	-31%
7	1.50	1.93	27%
8	0.93	0.46	-50%

January 1, 2018 to April 30, 2020 was the time frame used to examine changes in counts of enforcement actions. This equated to between 14 and 20 months of observational data prior to the onset of training, and eight to twelve months in the post-training period for each division. The first step of training onset occurred April 2019 for Treatment Block A, July 2019 for Treatment Block B, and October 2019 for Treatment Block C. The analyses of event counts relied upon the immediate and short-term association with ICAT training on officer use of force events across LMPD divisions.

Each behavioral outcome (i.e., use of force counts, citizen injury counts, officer injury counts, and arrest counts) was estimated by relying upon the following regression equation:

$$Y^{J}_{it} = \beta 0 + \beta 1 T_{it} + \theta_i + \rho_t + \varepsilon_{it}$$

In each equation, Y^{J} it represents the number of behavioral outcomes of type J generated by police in divisions in each cluster i in time period t. For Equations 1, T_{it} represents the contemporaneous timing of the permanent movement into the treatment group (i.e., ICAT training) for divisions assigned to cluster i in time period , and where θi and ρt represent individual and time period (i.e., monthly and annual) fixed effects, respectively, that account for time- and individual-invariant unobserved heterogeneity, and ε is based on Huber-White Robust sandwich estimators to ensure the coefficient variances were robust to violations of homoscedastic error distributions.

Use of Force (Count Outcomes)

The Poisson regression models that rely upon Maximum Likelihood estimation indicates that use of force counts experienced statistically significant reductions in the post-training period, relative to the pre-training counts, and relative to other police divisions which had not crossed into treatment (prior to their eventual crossover). Model 1 examines the total use of force counts (where each incident count is reflective of the use of force against an individual/suspect, even if

[35] The ninth experimental unit, the Mobile Ninth division, operated across the city of Louisville in each of the divisions as well as in different sectors within the city. Any incident (use of force, arrest, injury) involving the small number of mobile ninth incident were coded at the location where the incident took place – and thus for consistency were culled to the broader divisions for the event count analyses.

there were multiple types of force used or multiple officers were involved in the use of force). The total number of use of force counts declined in the post-training period for treatment sites by roughly -28.1% (b = -0.329, s.e., = 0.126, p < 0.05, IRR = 0.719).

Model 2 provides the estimated changes in officer injury counts. The results showed that officer injuries experienced a statistically significant decline by -36.0% (b = -0.447, s.e., = 0.235, p < 0.05, IRR = 0.639). Finally, civilian injuries were also significantly lower in the post-training period among police divisions that experienced training by roughly -26.3% (b = -0.305, s.e., = 0.141, p < 0.05, IRR = 0.737).

Table 26: Poisson Regressions for Use of Force, Officer Injury, and Civilian Injury counts (January 1, 2018 to April 30, 2020)

	Model 1 Use of Force		**Model 2 Officer Injuries**		**Model 3 Civilian Injuries**	
Parameter	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error
Post-Training	-0.329**	0.126	-0.447*	0.235	-0.305*	0.141
Intercept	2.25**	0.111	0.265	0.332	2.07**	0.139
Model Statistics						
Log-Likelihood	-391.1		-248.0		-371.26	
Pseudo R-Square	0.3184		0.194		0.286	

There are two possible pathways by which changes in arrest counts could impact the ICAT training evaluation on use of force (the primary outcome of interest). First, use of force incidents are almost uniformly calibrated with arrests (i.e., officers tend to only use force when making an arrest, or if force is used an arrest will follow suit as a resistance charge against a suspect); thus, if arrests were to decline unrelated to ICAT or de-escalation training, a reduction in use of force incidents would simply follow the same unrelated trend, or pattern, as the change in arrests. In this case, assessing a change in use of force without examining the change in arrests might overstate the change in use of force or injuries. Second, the training itself might lead to a reduction in less serious forms of arrests (given that prior research has shown that offense severity and those with warrants against suspects provide limited discretion among arresting officers – see Engel et al., 2019). Table 27 provides a more robust assessment of both potential pathways regarding changes in arrests that corresponds with the randomized training regimen.

Model 4 indicates that the total number of arrests experienced a statistically significant decline by roughly -11.5% (b = -0.122, s.e. = 0.034, p < 0.01, IRR = 0.885). Thus, there was a reduction in all arrests that corresponded with the timing of the training that was beyond chance alone, given the significant association with the timing of the training across the various divisions. Model 5 shows that warrantless arrests (i.e., arrests that were not based on warrants that limit officer discretion) also experienced a statistically significant decline by roughly -10.0% (b = -0.106, s.e. = 0.035, p < 0.01, IRR 0.899) suggesting a significant proactive 10% arrest rate decline that corresponded with the training. Finally, we examined arrest patterns for Part I violent crimes given that these arrest types would be unlikely to change unless there were a significant change in offense reports of violent crime – and the results indicate that Part I violent

arrests did not change in any statistically significant or measurable manner that corresponded with the timing of the ICAT training.

Table 27: Poisson Regressions for Use of Force, Officer Injury, and Civilian Injury counts (January 1, 2018 to April 30, 2020)

	Model 4 All Arrests		**Model 5 Warrantless Arrests**		**Model 6 Part I Violent Arrests**	
Parameter	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error
Post-Training	-0.122**	0.034	-0.106**	0.035	.110	0.075
Intercept	7.07**	0.045	6.71**	0.052	3.42**	0.079
Model Statistics						
Log-Likelihood	-1632.05		-1478.07		-602.47	
Pseudo R-Square	0.906		0.871		0.500	

The combined findings suggest that the observed change in use of force counts was unrelated (or at least not heavily dependent upon) to a change in warrantless arrests changes in serious Part I violent arrests (i.e., those arrests with the lowest discretion among responding patrol officers). It is possible, then, that use of force patterns declined independent of external factors within this randomized control trial setting. However, it is also important to examine whether the decline in use of force was 'above and beyond' the decline in total arrests and warrantless arrests. In order to measure this 'difference-in-difference' estimate, or more specifically to examine whether the coefficients that describe a relationship (in this case the randomized impact of ICAT training) empirically different from one-another, we conduct a standard approach to regression comparison estimation – the Clogg z-difference estimation (Clogg, Petkova, and Haritou, 1995). The hypothesis in this case is that if ICAT training has its intended impact on use of force, that impact should be observed above and beyond (i.e., significantly differently) than the change in arrests (and in particular warrantless arrests since warrantless arrests are more discretionary (relative to arrests that include warrant-based arrests)).

The results in Table 28 show that the reduction in use of force and officer injuries were marginally significantly different ($p < 0.10$) than were the reductions in all arrests among the post-training coefficients. This suggests that the decline in use of force and officer injuries were unique and distinct relative to the reduction in total arrests. The same pattern is even more pronounced and significant when comparing use of force, officer injuries, and civilian injuries with the changes in warrantless arrests ($p < 0.10$), particularly when comparing use of force count changes with the changes in warrantless arrests ($p < 0.05$).[36]

In summary, under the assumption that changes in arrests were independent of the ICAT training, these results indicate that the reduction in use of force, officer injuries, and citizen

[36] The original report included an analysis of changes in total arrest charges. The updated table here reflects changes in total in-custody arrests. The results from both operationalizations of arrest counts yield virtually no substantive differences in outcome changes.

injuries were distinct and in greater magnitude than the changes in arrests during the same period of comparison.

Table 28: Clogg-Z Difference Coefficient Tests (Z-Table)

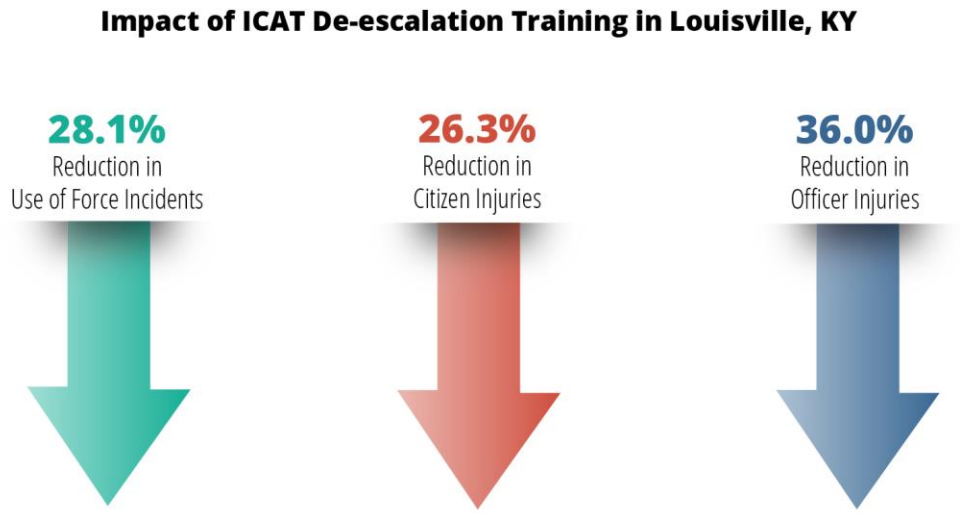
Post-Training Comparison Between:	B1-B2	S.E.	Z-score
Arrests			
Use of Force and All Arrests	-0.187	0.130	-1.43^{+}
Use of Force and Warrantless Arrests	-0.232	0.129	-1.78*
Officer Injuries			
Officer Injuries and All Arrests	-0.305	0.237	-1.28^{+}
Officer Injuries and Warrantless Arrests	-0.349	0.237	-1.48^{+}
Citizen Injuries			
Citizen Injuries and All Arrests	-0.162	0.145	-1.12
Citizen Injuries and Warrantless Arrests	-0.207	0.144	-1.44^{+}

$^{+}p < 0.10$, * $p < 0.05$
One-tailed given that both estimates were negative in the original regression models.
S.E. Relies upon Paternoster et al. (1998) Correction Parameter

E. Stepped-Wedge Regression Results Summary

The difference-in-difference estimates via the stepped-wedge panel regression models show three primary, consistent, and robust findings, net of controls and net of prior trends in the data. As shown in Figure 33, after ICAT de-escalation training, overall uses of force by the LMPD declined by 28.1%, citizen injuries during encounters with LMPD officers declined by 26.3%, and LMPD officer injuries during encounters with citizens declined by 36.0%.

Figure 313: Summary Impact of ICAT Training on Officer Behavior in Stepped-Wedge RCT



These reductions were beyond chance and held even when accounting for changes in overall arrests. The research team is confident that the changes in uses of force and the subsequent reductions in injuries that accompany uses of force that impact citizens and officers alike corresponded with the timing of the training across the various police divisions.

VIII. RECOMMENDATIONS

Based on the promising findings regarding the impact of ICAT de-escalation training conducted by the LMPD documented throughout this report, the following eight recommendations are provided by the *IACP/UC Center for Police Research and Policy* research team for consideration by LMPD Commanders.

1. Continue, Refine, and Expand ICAT De-escalation Training within the LMPD

Based on the compelling benefits of LMPD's ICAT de-escalation training that were revealed in this evaluation, we strongly urge LMPD officials to continue and further expand training in this area. The modifications made by LMPD trainers to the original ICAT training for application in Louisville are associated with successful outcomes. There is always room for improvement in any training curriculum, however, and some changes have already been identified by the LMPD Training Division. This work needs to be supported and expanded. For example, 17% of officers agreed they would benefit from a refresher course, and 44% of supervisors believe that additional training in de-escalation is needed by their subordinates, and we agree. Although training decay did not appear to be a principal concern from our findings, it will be important to consider the optimal "training dosage" needed to ensure de-escalation tactics are routinely being used by officers in the field.

One aspect of ICAT training in particular, the Critical Decision-Making Model (CDM), was not perceived as positively by officers. The CDM represents an important aspect of the ICAT training program, therefore officers' reactions to this thinking framework are especially relevant to the training evaluation. Analyses of post-training scores compared to follow-up scores revealed that ten of the eleven items demonstrate statistically significant changes in the *opposite direction* than would be expected, indicating that officers reported finding the CDM less useful over time. This is an additional area for reconsideration of the training curricula and delivery for the LMPD Training Division.

The survey findings also revealed a small percentage of LMPD officers with concerns and reluctance regarding de-escalations tactics. A few do not believe the training was effective, and some reported not using de-escalation tactics in the field. We recommend that in addition to continual training on these concepts, LMPD officers should be made aware of the main findings in this report – in particular the association of ICAT training with a 36% reduction in reported officer injuries. Often when studies are conducted within police agencies, first-line officers are never made aware of the findings. It is recommended that a brief (1-2 page) fact sheet describing the results from this study be produced by the LMPD Training Division and disseminated through PowerDMS to every officer, or some alternative method for distributing study findings.

2. Include Louisville Residents in ICAT Training

In addition to educating officers regarding the importance and use of de-escalation tactics to handle potentially problematic encounters, it is likewise important to educate local policy makers and community leaders. There is substantial misunderstanding around police use of force in general, and the relationship between police and the public within the City of Louisville is fractured, as exemplified by months of protests associated with police use of force. Inclusion of

the Louisville community with the LMPD must be both purposeful and meaningful. It is therefore recommended that the LMPD Training Division develop a specialized ICAT training session for community and political leaders. It will be helpful for these and other local residents to see and better understand the purpose and use of de-escalation training. LMPD instructors may even consider the inclusion of community members within the ICAT training itself, in the form of actors for role-play scenarios, or speakers to provide additional context and perspectives for officers. Developing meaningful ways to incorporate community members into LMPD training will be an important first step toward rebuilding partnerships.

3. Continue Use of Force Policy Changes and Updates

One finding from our moving-average time series analysis of the frequency of use of force incidents over the last ten years demonstrated significant reductions associated with major changes in use of force policies and training. From 2010 – 2015, approximately 50 individuals per month had force used against them. This average dropped to 40 per month from 2016 – 2018, after a change to use of force policy, and significantly declined again to an average of 30 individuals per month after additional policy and training changes. Given the number of policy changes in the last five years, it appears that a routine review of policy is already occurring within the LMPD. It is important that use of force policies receive continual review to reduce the risk of officer and citizen injury, and reduce the likelihood of racial/ethnic disparities in the application of force. It is clear from our analyses that policy changes do have impact.

The department should continue to analyze and review its use of force activities, policies, and training to identify patterns and trends that suggest needed changes or revisions. When needed, the LMPD should engage with outside research partners or consultants to assist in this review, and make necessary adjustments and updates to both its policy and training. For example, a study of the impact of use of force policies has found that police agencies with policies that require officers to file a use of force report when they point their guns at people but do not fire, is associated with significantly lower rates of gun deaths (Jennings and Rubado, 2017). As evidence is accumulated, appropriate changes should be made to LMPD use of force policies.

4. Examine the Availability and Use of Less Lethal Equipment by the LMPD

The survey findings revealed some discrepancies regarding the perceived need and use of additional less-lethal tools for officers. Our survey assessed first-line supervisors' perceptions of the need for less lethal tools during citizen encounters, and 70% of supervisors agreed that additional equipment was needed. However, survey findings of self-reported use of less lethal tools during the previous 60 days was quite low, used in 7% of the officers' most recent encounter with a person in crisis. However, this discrepancy may be due to the need for tools that were unavailable during the officers' most recent encounter with a person in crisis

While the specific context around these issues within the LMPD is unknown to the research team, it is recommended that LMPD officials consider these findings in combination with recent local and national concerns regarding the use of less lethal tools, particularly when used as a response to protests. For example, the International Association of Chiefs of Police (IACP) recently announced its plans to "review its recommended policies on pepper spray and less-lethal 'impact projectiles' as well as other aspects of crowd control" (McCoy et al., 2020). A similar

review should be conducted within the LMPD, to include a discussion of survey findings regarding officer and supervisors reported concerns of needing additional less lethal tools to effectively de-escalate situations.

5. ***Revisit Role of Supervisors to Reinforce ICAT Training***

The supervisor survey results demonstrated an area for improvement within the LMPD. It is challenging to change officer behavior based solely on training. Rather, it is clear that actual changes in policing must be based on coordinated and comprehensive efforts that include changes in training that are reinforced in policies, emphasized through direct field supervision, with an established managerial accountability system for using these tactics. Supervisors' low self-reported participation in activities that may serve to support the tenets of the ICAT de-escalation training among their subordinate officers (e.g., communication about use of de-escalation skills, documentation of use of de-escalation skills) suggest there may be more opportunities to reinforce the lessons and tactics provided within the training.

These low self-reports of supervisory activities associated with reinforcing de-escalation training content were echoed in the findings from the officer surveys. When officers were asked how frequently immediate supervisors reinforce ICAT training, over 40% indicated this happened seldom (once per month) or never. Collectively, the rarity of these types of supervisor-officer interactions suggests LMPD first-line supervisors may be missing important opportunities to support and reinforce the skills learned in the de-escalation training sessions among their subordinate officers.

LMPD officials should develop a plan to support supervisors in their reinforcement of the ICAT de-escalation training – encouraging sergeants and lieutenants to speak more openly and directly to their subordinate officers regarding the value and application of the de-escalation skills in their day-to-day work. LMPD should identify opportunities when these messages can be communicated (e.g., roll call, post-incident reviews), discussing both successful use of de-escalation skills, as well as areas for improvement. In particular, incorporating the documentation of the use of de-escalation in use of force reports, letters of commendation, and other formal ways of positive recognition within the agency can further integrate the principles and application of ICAT de-escalation training into the agency.

6. ***Implement Changes to LMPD Use of Force Data Collection***

The LMPD should begin systematically documenting the frequency, type, and circumstances surrounding the use of de-escalation tactics. This information will be critical to identify patterns and trends in the use of de-escalation skills that reduce uses of force. Currently, the LMPD only collects whether or not de-escalation is conducted on their use of force reports. This information is too limited to be meaningfully analyzed. It remains unknown: 1) the number and types of situations where de-escalation skills are successfully used and when no use of force was needed (and therefore no use of force report was generated), and 2) during use of force situations, the specific types of de-escalation skills that are used and the result of their use. There are several methods to systematically collect this information that would not be overly burdensome to officers, and would provide valuable information for LMPD Commanders to continually monitor and enhance the use of de-escalation skills in the field.

The LMPD should also begin systematically documenting other information relevant for understanding use of force situations, including suspected alcohol/drug use, mental health status, resistance, and the demeanor of all arrested subjects. These factors are well-documented correlates of force and resistance, but do not appear to be systematically captured on arrest and use of force reports. Adding these fields would improve use of force analysis and may suggest avenues for improved training and intervention by the LMPD among substance-involved populations or those exhibiting signs of mental illness and/or intellectual disabilities.

During our analyses of LMPD's use of force data, the research team also uncovered a few anomalies in the data collection process that could be addressed for easier access and analyses of these data. These changes have the potential to assist LMPD (and other police agencies) in their data collection and analysis of uses of force. LMPD collects detailed information in their use of force reporting database. However, two broader issues became apparent in our analyses. First, for roughly 7% of all use of force cases (where each unique suspect represents a unique case), officers filled out an 'other' category regarding the type of force that was used. Additional analysis of these 'other' narrative-based reports was not immediately possible because they are currently housed in a different reporting system. As is often the case, merging files across different data structures makes managing files particularly challenging for police agencies. We therefore recommend that when narrative-based incident details are collected, it is done in a manner that will make data culling and analyses more readily available to LMPD officials. It may also be the case that the current use of force applied control actions are insufficient, and additional categories based on commonly reported "other" types of force should be added.

Second, while shooting incidents were much less common at LMPD (typically fewer than 10 per year), they are inconsistently included in the use of force database. In some cases, these shooting incidents were not captured in the same use of force database as non-shooting use of force incidents, but they were in other cases. This made the counting the annual number of uses of force slightly challenging, and opened the possibility that the most serious use of force cases would be inadvertently underreported. A detailed review of shooting incidents was necessary to determine the true use of force counts by year during the experimental period. A change in the reporting system to accommodate all uses of force into a single database may be more easily analyzed.

7. Examine the Impact of Changes to the LMPD Traffic Stop Policy

This report documents changes in police practice based, in part, on changes to the LMPD Use of Force policy. Given some controversy surround the high frequency use and conduct of officers during traffic stops, revisions to the Traffic Stop Policy (SOP 7.12) were made by LMPD on August 1, 2019. Policy revisions included additional restrictions for conducting traffic stops, new guidelines for handcuffing people who are not under arrest, and emphasis that stops are to be conducted free of bias. It would be beneficial to determine whether the frequency and patterns of traffic stops in Louisville were altered as a result of these policy changes. Therefore, it is recommended that the City of Louisville commission an independent assessment to determine the impact of changes to the LMPD Traffic Stop Policy on the frequency, patterns, and racial/ethnic disparities associated with traffic stops.

8. Continue and Expand External Review of Reported Use of Force Incidents and Training

Mandating the collection and reporting of police use of force data is insufficient to significantly change police practice; these data, once collected, must be properly analyzed. Simply stated, the current aggregate level comparisons of use of force data to residential Census population figures by racial/ethnic group do not consider the complexity of police-citizen interactions and should not be relied upon. Rather, rigorous and methodologically sound studies of use of force provide a stronger mechanism to examine and statistically control for context at the police-civilian encounter level. If the goal is to reduce racial/ethnic disparities in police practices, the factors that cause these disparities must be understood to better inform the selection and investment in reforms efforts that have a realistic opportunity to reduce these disparities.

In order to better unravel the micro-level interactions between officers and civilians, a number of researchers are now exploring content-rich data sources like observations, report narratives, body worn camera footage, and interviews with officers and civilians to examine the "force factor" (i.e., the level of civilian resistance subtracted from the officer level of force) and other measures like time to force and duration of force. These types of research studies can also further identify shifts in LMPD use of force as the agency continues to focus on de-escalation training, and changes in use of force policies designed to reduce not only the frequency but the *severity* of force used.

It is therefore recommended that the LMPD continue to prioritize its willingness to have independent assessments conducted, to use the findings from these assessments to change policy, practice, and training, and to widely disseminate findings to other law enforcement agencies in an effort to continually to build the evidence base.

Additional Forthcoming Report

This report is the first of two reports that will be issued to the LMPD based on our research. Our findings documented throughout this first report demonstrate patterns of changes in various survey constructs that corresponded with de-escalation training and the CDM model of officer decision-making. Our second report (scheduled for delivery in January 2021) will unpack these patterns of attitudinal and behavioral changes in a more precise and detailed manner, and provide a more robust examination of individual officer and citizen characteristics that lead to use of force incidents. Examining all arrest situations, our analyses will predict the types of police-citizen encounters that are more likely to result in use of force.

This second report will also further examine the types of officers and supervisors– including consideration of demographics, experience, attitudes, and ICAT training – who are more likely to report using de-escalation skills in the field. We will also concentrate on identifying any changes in patterns and trends that may be related to the ICAT training. The second report will also further examine the types of supervisors who are more likely to reinforce the tenants of ICAT training with their subordinates. The findings from this second report will be designed to help the LMPD Training Division to modify and refine their training curricula for optimal impact.

Moving forward, it is imperative to better understand and systematically assess the impact of changes in police policies and trainings, and in particular, use of force de-escalation training. It is further critical to determine which de-escalation skills are most often used in the field, during what types of encounters, by what types of officers, and their resulting impact on officer/citizen injury. This work must be prioritized and supported. We look forward to continuing our partnership with the LMPD and City of Louisville to conduct this important work.

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X. APPENDICES

A. Appendix A. Pre-Training Frequency Tables

Table 29: LMPD Officer Views on Interactions with the Public, Pre-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. I have considerable ability to control the nature of citizen interactions to create positive outcomes. (n=901)	0.8	3.8	15.9	63.9	15.6
2. I am good at identifying officer safety risks in citizen encounters. (n=902)	0.4	0.1	2.7	58.6	38.1
3. I am good at de-escalating encounters with citizens. (n=902)	0.4	0.2	6.8	64.9	27.7
4. In tense citizen encounters, the most important thing is that I get home safely. (n=900)	0.7	0.9	6.2	24.4	67.8
5. Officers can be trained to increase the likelihood of positive encounters with citizens. (n=902)	0.7	2.1	17.3	57.4	22.5
6. Officers can be trained to improve their ability to identify officer safety risks in citizen encounters. (n=902)	0.4	0.2	5.0	57.9	36.5
7. Officers can be trained to improve their ability to de-escalate citizen encounters. (n=902)	0.6	1.0	10.4	62.4	25.6

Table 30: LMPD Officer Attitudes on Interactions with Persons in Crisis, Pre-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Recognizing the signs that a person is in crisis can improve the outcome of an interaction with that individual. (n=899)	0.4	2.0	9.0	58.6	29.9
2. There is no explaining why a person in crisis acts the way they do. (n=900)	6.4	43.9	31.6	14.6	3.6
3. Noncompliance should be viewed as a threat. (n=901)	1.0	12.4	39.0	38.3	9.3
4. Unnecessary risks should be avoided in encounters. (n=900)	0.7	2.4	14	56.4	26.4
5. The most important role of an officer responding to a crisis is to stabilize the situation. (n=896)	0.7	2.9	10.2	63.6	22.7
6. In crisis situations, it is beneficial to keep a subject talking. (n=902)	0.2	3.3	26.8	56.9	12.7
7. In many cases, the use of force against a person in crisis can be avoided. (n=899)	2.0	12.3	45.5	36.7	3.4
8. As a person's emotions rise, their rational thinking declines. (n=901)	0.6	1.8	9.1	59.3	29.3
9. When responding as a team, it's important to designate roles in the crisis intervention. (n=901)	0.2	2.4	11.2	61.4	24.8
10. The majority of time spent communicating with a subject should be spent listening. (n=902)	0.2	2.5	30.3	56.9	10.1
11. An officer's nonverbal communication, such as body language, influences how a subject reacts. (n=902)	0.7	1.7	16.1	64.6	17.0
12. I know how to slow down an encounter with a person in crisis. (n=901)	0.2	0.9	18.1	68.3	12.5
13. Situational stress is no excuse for a person to act irrational. (n=901)	3.8	33.9	38.7	21.1	2.6
14. Responding to persons in crisis should not be a role of the police. (n=901)	13.2	47.9	26.6	9.1	3.1

Table 31: LMPD Officer Views on Policing, Pre-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Enforcing the law is a patrol officer's most important responsibility. (n=901)	1.2	18.4	26.4	40.1	13.9
2. Law enforcement and community members must work together to solve local problems. (n=901)	0.3	0.8	10.0	61.0	27.9
3. Working with the community to solve problems is an effective means of providing services to this area. (n=899)	0.7	1.3	11.6	63.3	23.1
4. I routinely collaborate with community members in my daily duties. (n=900)	2.9	16.1	30.0	42.0	9.0
5. My primary responsibility as a police officer is to fight crime. (n=901)	0.9	14.0	27.1	46.5	11.5
6. As a police officer, I have a primary responsibility to protect the constitutional rights of residents. (n=900)	0.1	1.8	12.0	61.4	24.7
7. A primary responsibility of a police officer is to build trust between the department and community. (n=901)	0.9	7.4	21.8	54.4	15.5
8. As a police officer, it is important that I have non-enforcement contacts with the public. (n=899)	0.7	2.4	10.1	61.4	25.4
9. As a police officer, I see myself primarily as a public servant. (n=900)	1.1	4.8	17.8	58.7	17.7
10. My primary role is to control predatory suspects who threaten members of the public. (n=900)	0.2	5.4	16.2	58.1	20.0
11. The jurisdiction that I work in is dangerous. (n=900)	1.4	4.9	18.7	46.7	28.3
12. As a police officer, there is a good chance you will be assaulted while on the job. (n=901)	0.4	3.1	10.8	49.9	35.7
13. Overall, I am satisfied with my job. (n=901)	3.3	7.7	23.3	49.3	16.4
14. I enjoy working with my colleagues. (n=901)	0.8	0.8	8.3	51.4	38.7
15. Overall, this is a good agency to work for. (n=900)	18.9	22.6	31.8	22.3	4.4

Table 32: LMPD Officer Attitudes Toward Use of Force, Pre-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Officers are *NOT* allowed to use as much force as is necessary to make suspects comply. (n=900)	12.6	28.8	26.7	25.3	6.7
2. It is sometimes necessary to use more force than is technically allowable. (n=896)	5.4	23.9	29.5	34.4	6.9
3. Verbally disrespectful suspects sometimes deserve physical force. (n=899)	15.1	47.5	26.3	10.1	1.0
4. Refraining from using force when you are legally able to puts yourself and other officers at risk. (n=897)	1.6	16.6	38.4	29.5	13.9
5. It is important to have a reputation that you are an officer willing to use force. (n=897)	7.8	32.7	38.1	17.6	3.8
6. Not using force when you could have makes suspects more likely to resist in future interactions. (n=898)	3.7	28.7	34.0	25.7	7.9
7. It is important that my fellow officers trust me to handle myself in a fight. (n=900)	0.6	1.6	7.8	52.2	37.9
8. Trying to talk my way out of a situation is always safer than using force. (n=900)	3.0	11.2	28.3	39.8	17.7
9. It is important that my fellow officers trust my communication skills. (n=900)	0.1	0.3	4.2	57.1	38.2
10. I respect officers' ability to talk suspects down rather than using force to make them comply. (n=900)	0.1	0.9	11.7	59.0	28.3
11. Generally speaking, if force has to be used, it is better to do so earlier in an interaction with a suspect, as opposed to later. (n=900)	1.0	18.9	48.6	23.9	7.7

Table 33: LMPD Officer Confidence in Handling Critical Incidents, Pre-Training Survey

	Not at All Confident (%)	Not Very Confident (%)	Somewhat Confident (%)	Very Confident (%)
1. …interacting with a person in crisis? (n=900)	0.0	0.7	38.9	60.4
2. …in your ability to effectively communicate with someone in crisis? (n=900)	0.1	1.0	42.7	56.2
3. …taking someone in crisis to a social service agency? (n=900)	0.8	5.0	42.7	51.6
4. …asking someone in crisis open-ended questions to gather information about what is going on? (n=900)	0.0	1.3	40.0	58.7
5. …interacting with family members of a person in crisis? (n=900)	0.0	0.9	36.8	62.3
6. …in your ability to summarize/paraphrase statements made by a person in crisis in your own words? (n=900)	0.1	1.3	43.0	55.6
7. …calming down someone in crisis? (n=900)	0.0	1.2	51.3	47.4
8. …helping someone in crisis call a social services agency? (n=898)	0.6	5.9	43.8	49.8
9. …de-escalating a situation involving a person in crisis? (n=900)	0.0	1.7	44.8	53.6
10. …talking to a person in crisis about his/her medications? (n=898)	0.7	8.0	45.3	46.0
11. …expressing understanding towards a person in crisis? (n=900)	0.2	2.0	45.1	52.7
12. …getting someone in crisis to talk to you rather than acting out? (n=900)	0.1	1.7	51.4	46.8
13. …talking to someone in crisis about whether or not he/she uses alcohol or drugs? (n=900)	0.2	1.3	43.6	54.9

B. Appendix B. Post-Training Survey Frequency Tables

Table 34: LMPD Officer Views on Interactions with the Public, Post-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. I have considerable ability to control the nature of citizen interactions to create positive outcomes. (n=1048)	0.6	1.8	11.5	64.0	22.0
2. I am good at identifying officer safety risks in citizen encounters. (n=1049)	0.4	0.2	2.9	60.6	35.9
3. I am good at de-escalating encounters with citizens. (n=1047)	0.5	0.4	5.6	68.3	25.2
4. In tense citizen encounters, the most important thing is that I get home safely. (n=1049)	0.8	3.2	12.5	41.8	41.8
5. Officers can be trained to increase the likelihood of positive encounters with citizens. (n=1045)	0.7	0.3	8.0	58.9	32.2
6. Officers can be trained to improve their ability to identify officer safety risks in citizen encounters. (n=1046)	0.6	0.0	5.0	58.3	36.1
7. Officers can be trained to improve their ability to de-escalate citizen encounters. (n=1048)	0.6	0.3	7.0	59.4	32.7

Table 35: LMPD Officer Attitudes on Interactions with Persons in Crisis, Post-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Recognizing the signs that a person is in crisis can improve the outcome of an interaction with that individual. (n=1043)	0.7	1.0	5.2	56.5	36.7
2. There is no explaining why a person in crisis acts the way they do. (n=1046)	4.3	40.8	29.7	20.5	4.7
3. Noncompliance should be viewed as a threat. (n=1046)	2.1	27.9	40.5	24.4	5.1
4. Unnecessary risks should be avoided in encounters. (n=1046)	0.3	2.1	11.7	58.3	27.5
5. The most important role of an officer responding to a crisis is to stabilize the situation. (n=1048)	0.1	2.0	8.7	62.7	26.5
6. In crisis situations, it is beneficial to keep a subject talking. (n=1046)	0.2	1.1	9.8	62.0	27.1
7. In many cases, the use of force against a person in crisis can be avoided. (n=1047)	0.7	4.9	39.4	45.9	9.1
8. As a person's emotions rise, their rational thinking declines. (n=1048)	0.6	0.4	4.6	54.5	40.0
9. When responding as a team, it's important to designate roles in the crisis intervention. (n=1046)	0.1	0.0	4.1	56.5	39.3
10. The majority of time spent communicating with a subject should be spent listening. (n=1048)	0.1	0.3	14.6	59.8	25.2
11. An officer's nonverbal communication, such as body language, influences how a subject reacts. (n=1048)	0.1	0.3	8.4	64.7	26.5
12. I know how to slow down an encounter with a person in crisis. (n=1048)	0.1	0.7	9.6	69.8	19.9
13. Situational stress is no excuse for a person to act irrational. (n=1048)	3.5	38.1	33.5	21.0	3.9
14. Responding to persons in crisis should not be a role of the police. (n=1048)	13.9	50.6	23.1	9.3	3.1

Table 36: LMPD Officer Views on Policing, Post-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Enforcing the law is a patrol officer's most important responsibility. (n=1046)	1.3	17.5	30.5	41.6	9.1
2. Law enforcement and community members must work together to solve local problems. (n=1045)	0.1	0.5	8.8	63.5	27.1
3. Working with the community to solve problems is an effective means of providing services to this area. (n=1045)	0.2	0.8	10.9	62.1	26.0
4. I routinely collaborate with community members in my daily duties. (n=1045)	1.1	10.1	27.5	48.5	12.7
5. My primary responsibility as a police officer is to fight crime. (n=1042)	0.7	14.0	28.3	47.3	9.7
6. As a police officer, I have a primary responsibility to protect the constitutional rights of residents. (n=1045)	0.0	1.3	13.1	59.8	25.7
7. A primary responsibility of a police officer is to build trust between the department and community. (n=1044)	0.5	2.8	18.6	58.8	19.3
8. As a police officer, it is important that I have non-enforcement contacts with the public. (n=1044)	0.4	1.1	9.2	59.9	29.4
9. As a police officer, I see myself primarily as a public servant. (n=1045)	0.5	2.0	16.8	59.4	21.2
10. My primary role is to control predatory suspects who threaten members of the public. (n=1046)	0.3	5.4	17.5	57.3	19.6
11. The jurisdiction that I work in is dangerous. (n=1045)	0.8	3.9	18.9	49.0	27.4
12. As a police officer, there is a good chance you will be assaulted while on the job. (n=1046)	0.3	1.9	9.7	55.1	33.1
13. Overall, I am satisfied with my job. (n=1046)	2.5	7.7	20.3	53.0	16.5
14. I enjoy working with my colleagues. (n=1045)	0.5	1.2	7.5	53.8	37.0
15. Overall, this is a good agency to work for. (n=1045)	17.6	20.5	29.3	27.2	5.5

Table 37: LMPD Officer Attitudes Toward Use of Force, Post-Training Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Officers are *NOT* allowed to use as much force as is necessary to make suspects comply. (n=1043)	9.6	39.4	29.2	19.1	2.7
2. It is sometimes necessary to use more force than is technically allowable. (n=1043)	6.3	30.0	32.9	27.9	2.9
3. Verbally disrespectful suspects sometimes deserve physical force. (n=1043)	16.3	51.9	23.8	7.5	0.6
4. Refraining from using force when you are legally able to puts yourself and other officers at risk. (n=1042)	2.6	27.6	44.1	21.2	4.4
5. It is important to have a reputation that you are an officer willing to use force. (n=1042)	7.7	34.8	35.5	20.2	1.8
6. Not using force when you could have makes suspects more likely to resist in future interactions. (n=1040)	3.9	35.8	39.0	18.1	3.2
7. It is important that my fellow officers trust me to handle myself in a fight. (n=1043)	0.3	2.8	9.4	58.6	29.0
8. Trying to talk my way out of a situation is always safer than using force. (n=1043)	1.2	6.1	21.7	45.9	25.1
9. It is important that my fellow officers trust my communication skills. (n=1043)	0.0	0.1	4.5	59.2	36.2
10. I respect officers' ability to talk suspects down rather than using force to make them comply. (n=1043)	0.2	1.0	8.6	57.4	32.8
11. Generally speaking, if force has to be used, it is better to do so earlier in an interaction with a suspect, as opposed to later. (n=1043)	4.2	29.4	45.0	16.5	4.9

Table 38: LMPD Officer Confidence in Handling Critical Incidents, Post-Training Survey

	Not at All Confident (%)	Not Very Confident (%)	Somewhat Confident (%)	Very Confident (%)
1. …interacting with a person in crisis? (n=1011)	0.2	0.6	39.3	59.9
2. …in your ability to effectively communicate with someone in crisis? (n=1009)	0.2	1.0	40.5	58.3
3. …taking someone in crisis to a social service agency? (n=1011)	0.4	4.6	40.5	54.5
4. …asking someone in crisis open-ended questions to gather information about what is going on? (n=1010)	0.2	0.9	37.5	61.4
5. …interacting with family members of a person in crisis? (n=1010)	0.1	0.7	37.3	61.9
6. …in your ability to summarize/paraphrase statements made by a person in crisis in your own words? (n=1010)	0.2	1.0	41.0	57.8
7. …calming down someone in crisis? (n=1010)	0.1	1.3	47.1	51.5
8. …helping someone in crisis call a social services agency? (n=1010)	0.6	6.1	42.6	50.7
9. …de-escalating a situation involving a person in crisis? (n=1011)	0.2	1.2	45.0	53.6
10. …talking to a person in crisis about his/her medications? (n=1010)	0.3	6.3	44.4	49.0
11. …expressing understanding towards a person in crisis? (n=1009)	0.2	0.9	42.2	56.7
12. …getting someone in crisis to talk to you rather than acting out? (n=1011)	0.1	1.5	47.0	51.4
13. …talking to someone in crisis about whether or not he/she uses alcohol or drugs? (n=1011)	0.2	0.9	40.8	58.2

Table 39: LMPD Officer Views on Critical Decision-Making Model (CDM) Utility, Post-Training Survey

The CDM Model…	**Strongly Disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
1. …increases my decision-making skills during everyday situations. (n=1042)	0.5	2.4	18.3	62.0	16.8
2. …often takes too much time to use in encounters with a person in crisis. (n=1041)	4.0	46.6	36.6	11.0	1.7
3. …may make officers hesitate to take action when needed. (n=1040)	1.9	33.5	39.4	21.3	3.8
4. …helps me to assess the risks in a situation. (n=1041)	0.5	1.2	15.1	69.6	13.5
5. …helps me identify my options for action in a situation. (n=1041)	0.5	1.1	14.2	69.5	14.7
6. …helps me select an option to resolve a situation. (n=1042)	0.5	1.5	17.6	66.8	13.6
7. …reminds me to continuously gather information during a situation. (n=1041)	0.4	1.1	14.8	64.4	19.4
8. …is too complicated. (n=1040)	10.0	54.5	27.2	6.6	1.6
9. …helps me review the action I took during a situation. (n=1041)	0.5	2.0	19.6	67.1	10.8
10. …helps me to explain my decision-making after I act in a situation. (n=1042)	0.5	1.4	18.3	65.5	14.2
11. I am confident using the CDM during an encounter with a person in crisis. (n=1042)	0.6	1.9	21.8	60.2	15.5

C. Appendix C. Follow-Up Survey Frequency Tables

Table 40: LMPD Officer Attitudes on Interactions with Persons in Crisis, Follow-Up Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Recognizing the signs that a person is in crisis can improve the outcome of an interaction with that individual. (n=567)	8.1	0.4	12.3	41.6	37.6
2. There is no explaining why a person in crisis acts the way they do. (n=563)	8.0	45.3	33.6	10.3	2.8
3. Noncompliance should be viewed as a threat. (n=560)	3.8	20.5	46.1	26.8	2.9
4. Unnecessary risks should be avoided in encounters. (n=560)	1.8	1.6	13.6	48.4	34.6
5. The most important role of an officer responding to a crisis is to stabilize the situation. (n=558)	2.7	2.9	15.9	54.5	24.0
6. In crisis situations, it is beneficial to keep a subject talking. (n=556)	0.9	1.3	24.3	54.1	19.4
7. In many cases, the use of force against a person in crisis can be avoided. (n=558)	1.6	5.4	43.5	41.0	8.4
8. As a person's emotions rise, their rational thinking declines. (n=559)	1.1	0.7	11.4	54.7	32.0
9. When responding as a team, it's important to designate roles in the crisis intervention. (n=558)	0.9	0.5	13.8	55.9	28.9
10. The majority of time spent communicating with a subject should be spent listening. (n=559)	0.9	0.5	23.3	60.5	14.8
11. An officer's nonverbal communication, such as body language, influences how a subject reacts. (n=557)	0.9	0.9	16.0	60.5	21.7
12. I know how to slow down an encounter with a person in crisis. (n=557)	1.3	0.0	18.3	63.7	16.7
13. Situational stress is no excuse for a person to act irrational. (n=555)	4.0	40.0	41.1	13.9	1.1
14. Responding to persons in crisis should not be a role of the police. (n=555)	10.6	45.2	34.1	7.2	2.9

Table 41: LMPD Officer Attitudes Toward Use of Force, Follow-Up Survey

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. Officers are NOT allowed to use as much force as is necessary to make suspects comply. (n=553)	18.6	39.2	28.2	11.6	2.4
2. It is sometimes necessary to use more force than is technically allowable. (n=553)	13.0	31.1	36.0	17.7	2.2
3. Verbally disrespectful suspects sometimes deserve physical force. (n=552)	23.0	48.2	24.3	4.0	0.5
4. Refraining from using force when you are legally able to puts yourself and other officers at risk. (n=552)	2.2	21.6	49.6	21.6	5.1
5. It is important to have a reputation that you are an officer willing to use force. (n=550)	11.5	35.3	40.7	11.1	1.5
6. Not using force when you could have makes suspects more likely to resist in future interactions. (n=548)	6.6	35.9	40.0	15.0	2.6
7. It is important that my fellow officers trust me to handle myself in a fight. (n=549)	1.5	1.3	16.0	47.0	34.2
8. Trying to talk my way out of a situation is always safer than using force. (n=551)	1.1	9.3	28.5	37.4	23.8
9. It is important that my fellow officers trust my communication skills. (n=549)	0.9	0.0	9.7	47.9	41.5
10. I respect officers' ability to talk suspects down rather than using force to make them comply. (n=550)	0.7	0.7	14.4	49.1	35.1
11. Generally speaking, if force has to be used, it is better to do so earlier in an interaction with a suspect, as opposed to later. (n=549)	3.3	25.1	49.9	17.7	4.0

Table 42: LMPD Officer Confidence in Handling Critical Incidents, Follow-Up Survey

		Not at All Confident (%)	Not Very Confident (%)	Somewhat Confident (%)	Very Confident (%)
1.	…interacting with a person in crisis? (n=546)	0.5	0.9	31.1	67.4
2.	…in your ability to effectively communicate with someone in crisis? (n=546)	0.7	0.9	33.5	64.8
3.	…taking someone in crisis to a social service agency? (n=547)	1.6	4.6	34.7	59.0
4.	…asking someone in crisis open-ended questions to gather information about what is going on? (n=545)	0.6	0.9	30.3	68.3
5.	…interacting with family members of a person in crisis? (n=545)	0.7	0.9	31.6	66.8
6.	…in your ability to summarize/paraphrase statements made by a person in crisis in your own words? (n=544)	0.7	0.7	34.7	63.8
7.	…calming down someone in crisis? (n=544)	0.6	1.3	41.5	56.6
8.	…helping someone in crisis call a social services agency? (n=542)	1.3	4.2	38.4	56.1
9.	…de-escalating a situation involving a person in crisis? (n=544)	0.9	1.1	37.1	60.8
10.	…talking to a person in crisis about his/her medications? (n=542)	0.9	7.4	44.3	47.4
11.	…expressing understanding towards a person in crisis? (n=545)	0.6	1.7	38.7	59.1
12.	…getting someone in crisis to talk to you rather than acting out? (n=543)	0.9	1.3	47.1	50.6
13.	…talking to someone in crisis about whether or not he/she uses alcohol or drugs? (n=544)	0.6	1.3	34.7	63.4

Table 43: LMPD Officer Views on Critical Decision-Making Model (CDM) Utility, Follow-Up Survey

The CDM Model…	**Strongly Disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
1. …increases my decision-making skills during everyday situations. (n=544)	2.0	2.0	38.2	44.7	13.1
14. …often takes too much time to use in encounters with a person in crisis. (n=545)	4.2	29.4	54.5	8.6	3.3
15. …may make officers hesitate to take action when needed. (n=544)	2.8	22.8	53.5	16.9	4.0
16. …helps me to assess the risks in a situation. (n=542)	1.3	3.0	41.1	46.9	7.7
17. …helps me identify my options for action in a situation. (n=543)	1.5	2.6	40.7	46.6	8.7
18. …helps me select an option to resolve a situation. (n=544)	1.5	2.4	42.3	46.7	7.2
19. …reminds me to continuously gather information during a situation. (n=543)	1.8	2.9	33.7	51.4	10.1
20. …is too complicated. (n=543)	4.8	32.2	50.6	9.6	2.8
21. …helps me review the action I took during a situation. (n=543)	1.7	3.3	41.4	48.3	5.3
22. …helps me to explain my decision-making after I act in a situation. (n=542)	1.5	2.8	42.6	46.5	6.6
23. I am confident using the CDM during an encounter with a person in crisis. (n=540)	1.9	3.7	45.7	39.3	9.4

D. Appendix D. Supervisor Survey Frequency Tables

Table 44: LMPD Supervisor Perceptions Related to Supervising ICAT De-escalation Skills

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. I am able to effectively supervise subordinates' use of ICAT de-escalation.	0.8	1.5	10.8	63.1	23.8
2. I am able to effectively coach subordinates' use of ICAT de-escalation skills.	0.8	0.8	11.5	62.3	24.6
3. I receive the necessary equipment from my department to supervise my subordinates' use of ICAT de-escalation skills.	0.8	5.4	18.5	50.8	24.6
4. I receive sufficient training to supervise my officers' use of ICAT de-escalation skills.	0.8	1.5	10.0	63.8	23.8
5. I need more support from my supervisors to supervise my subordinates' use of ICAT de-escalation skills.	6.2	50.0	25.4	16.2	2.3
6. It is difficult to supervise the use of ICAT de-escalation skills by my subordinate officers.	10.0	46.9	24.6	16.9	1.5

Table 45: LMPD Supervisor Field Observation of Subordinates' ICAT Skills

	Never (%)	Seldom (%)	Sometimes (%)	Often (%)	Frequently (%)
1. How frequently do you observe your subordinate officers using ICAT de-escalation skills? (n=129)	10.1	19.4	30.2	23.3	17.1
2. When observing subordinate officers, how frequently do they use ***ICAT Communication Skills*** (such as actively gathering information from a subject, communicating to other officers, using active listening, or maintaining communication with a subject)? (n=129)	5.4	7.8	20.9	31.0	34.9
3. When observing subordinate officers, how frequently do they use the ***Reaction Gap Strategy*** (actively re-positioning to keep a favorable position between the officer and the subject)? (n=129)	6.2	7.0	15.5	34.9	36.4
4. When observing subordinate officers, how frequently do they use the ***Tactical Pause Strategy*** (sharing information and developing a strategy with other responding officers during a citizen encounter)? (n=129)	7.0	7.0	27.1	34.1	24.8
5. When observing subordinate officers, how frequently do they attempt to use less lethal tools? (n=129)	17.8	30.2	27.1	15.5	9.3
6. How often have you observed incidents handled by your subordinates where ICAT de-escalation skills were properly used, but were unsuccessful in achieving a positive resolution to an incident? (n=129)	20.9	40.3	27.9	10.1	0.8
7. How often have you used ICAT de-escalation skills but were unsuccessful in achieving a positive resolution to an incident? (n=129)	23.3	55.0	18.6	3.1	0

Table 46:LMPD Supervisor Video Observation of Subordinates' ICAT Skills

	Never (%)	Seldom (%)	Sometimes (%)	Often (%)	Frequently (%)
1. How frequently do you observe your subordinate officers using ICAT de-escalation skills? (n=126)	21.4	11.1	24.6	24.6	18.3
2. When observing subordinate officers, how frequently do they use ***ICAT Communication Skills*** (such as actively gathering information from a subject, communicating to other officers, using active listening, or maintaining communication with a subject)? (n=126)	18.3	7.9	18.3	26.2	29.4
3. When observing subordinate officers, how frequently do they use the ***Reaction Gap Strategy*** (actively re-positioning to keep a favorable position between the officer and the subject)? (n=126)	19.0	7.1	18.3	31.0	24.6
4. When observing subordinate officers, how frequently do they use the ***Tactical Pause Strategy*** (sharing information and developing a strategy with other responding officers during a citizen encounter)? (n=126)	18.3	11.9	21.4	31.7	16.7
5. When observing subordinate officers, how frequently do they attempt to use less lethal tools? (n=125)	23.2	29.6	23.2	17.6	6.4
6. How often have you observed incidents handled by your subordinates where ICAT de-escalation skills were properly used, but were unsuccessful in achieving a positive resolution to an incident? (n=126)	25.4	42.9	20.6	9.5	1.6

Table 47: LMPD Supervision Activities Related to ICAT De-escalation Skills

	Never (%)	Seldom (%)	Sometimes (%)	Often (%)	Frequently (%)
1. How frequently do you talk with your subordinate officers generally about the use of ICAT de-escalation skills? (n=127)	12.6	29.1	34.6	20.5	3.1
2. How often do you have discussions with subordinates about their use of ICAT de-escalation skills during a specific incident? (n=127)	11.8	26.0	40.2	15.7	6.3
3. How frequently do you counsel subordinates about not using ICAT de-escalation skills when they should have? (n=127)	29.9	45.7	18.1	6.3	0
4. How frequently do you document the use of ICAT de-escalation skills in use of force reports? (n=127)	19.7	33.9	22.0	15.7	8.7
5. How frequently do you document the use of ICAT de-escalation skills in letters of commendation for subordinate officers? (n=127)	23.6	33.1	26.0	13.4	3.9
6. How frequently do you document the use of ICAT de-escalation skills in some other way (excluding use of force reports and commendation letters)? (n=127)	29.9	39.4	17.3	11.8	1.6

Table 48: LMPD Supervisor Self-Reported Supervision Activities

	Never (%)	Seldom (%)	Sometimes (%)	Often (%)	Frequently (%)
1. Other than when it is required by department policy, how frequently do you go on your own initiative to incidents that your subordinate officers are handling? (n=126)	13.5	15.1	24.6	19.8	27.0
2. How frequently do your officers ask you to come to the incidents they are handling? (n=126)	21.4	33.3	32.5	11.9	0.8
3. How frequently do you conduct video reviews of incidents handled by your subordinate officers? (n=124)	20.2	14.5	31.5	21.0	12.9
4. When you are on the scene of an incident with your officers, how frequently do you tell them how to handle the incident? (n=126)	22.2	50.8	20.6	5.6	0.8
5. When you are on the scene of an incident with your officers, how frequently do you take it over and handle the incident yourself? (n=126)	47.6	40.5	8.7	2.4	0.8
6. How frequently do you talk with you officers about their performance in incidents that you observe? (n=126)	10.3	18.3	36.5	27.0	7.9

Table 49: LMPD Supervisor Perceptions of Supervisor Functions

	Very Unimportant (%)	Unimportant (%)	Neutral (%)	Important (%)	Very Important (%)
1. Disseminating information about departmental directives (n=131)	3.1	0.8	3.1	34.4	58.8
2. Helping officers develop sound judgement (n=131)	3.1	0	1.5	23.7	71.8
3. Protecting officers from unfair criticism or punishment (n=130)	3.1	0.8	6.9	30.8	58.5
4. Ensuring appropriate use of force by officers (n=131)	3.1	0	1.5	19.8	75.6
5. Giving officers feedback on their performance (n=131)	3.1	0.8	1.5	26.0	68.7
6. Distributing the workload fairly (n=131)	3.1	0.8	9.2	40.5	46.6
7. Making superior officers aware of problems on the street (n=131)	3.1	0.8	6.9	42.0	47.3
8. Making sure that reports are properly completed (n=131)	3.1	0.8	4.6	51.1	40.5
9. Enforcing department rules and regulations (n=131)	3.1	0	6.9	50.4	42.7
10. Providing input on department policy (n=131)	3.1	3.8	7.6	51.1	37.4
11. Ensuring fair and equal treatment of citizens (n=131)	3.1	0	1.5	21.4	74.0
12. Listening or discussing concerns officers may have on the job or in their personal life (n=131)	3.1	0	1.5	27.5	67.9
13. Motivating officers to perform organizational goals (n=131)	3.1	0	3.8	37.4	55.7
14. Providing a personal example for officers to emulate (n=51)	0	0	2.0	17.6	80.4

Table 50: LMPD Supervisor Perceptions Related to Using ICAT De-escalation Skills

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. I am confident using ICAT de-escalation skills during my encounters with citizens. (n=131)	1.5	0	5.3	49.6	43.5
2. I am confident using ICAT de-escalation skills during interactions with my subordinate officers. (n=131)	1.5	0	5.3	49.6	43.5
3. I receive the necessary equipment from my department to de-escalate situations. (n=131)	1.5	6.1	16.8	42.7	32.8
4. I receive sufficient training in de-escalation. (n=131)	1.5	0.8	11.5	46.6	39.7
5. I receive the necessary support from my supervisors to use ICAT de-escalation skills. (n=131)	1.5	1.5	8.4	44.3	44.3
6. When officers use ICAT de-escalation skills properly, encounters with citizens will often result in a positive resolution.(n=131)	2.3	0	11.5	53.4	32.8
7. Some encounters with citizens require additional less-lethal equipment than is currently available. (n=130)	3.1	5.4	21.5	38.5	31.5
8. My subordinates need more training in de-escalation than is currently provided.(n=131)	3.8	40.5	32.1	20.6	3.1
9. Training supervisors in ICAT de-escalation skills is also useful for interacting with and managing subordinates. (n=131)	2.3	0.8	10.7	58.0	28.2