What Police Chiefs and Sheriffs Need to Know About Collecting and Analyzing Use-of-Force Data

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PERF wishes to thank the Charles Koch Institute for funding this project, our expert panel for guidance on the research literature, and PERF's Research Advisory Board for their valuable feedback on the draft.

The points of view expressed herein are the authors, and do not necessarily reflect the views of project funders, partners or all Police Executive Research Forum members.

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Graphic design by Dave Williams.

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From PERF's Executive Director

WITH ALL THE OTHER CHALLENGES THEY FACED IN 2020, USE OF FORCE REMAINS A TOP CONCERN of America's police leaders. The high-profile deaths of George Floyd, Breonna Taylor, Elijah McClain, and others refocused police and community attention on the issue and the need to continue making improvements.

Over the years, there has been a great deal of research done on use of force, including on what factors, or precursors, are commonly associated with force. But that research has not alwyas been widely disseminated to police executives or acted upon by their agencies.

To help address this gap in the profession's knowledge, I tasked the research team at PERF, led by Senior Research Criminologist Dr. Sean Goodison and aided by our Research Advisory Board, to assemble what the research literature tells us about use of force. The result is this report, which identifies the leading research studies on use of force and summarizes their key findings. The analysis pays particular attention to the precursors to force. These are the officer, subject, situational, and environmental factors that seem to influence – or, in some cases, not influence – the use of force by officers.

Knowing what the research says is only a first step, however. Police leaders also need to know what use-of-force data *their agencies* should be collecting and how that data should be analyzed and used. Rigorous data collection and analysis are critical to understanding the issue and to driving improvements in policy, training, and use-of-force outcomes.

This report is intended to help agencies self-analyze what use-of-force data they are already collecting and what additional data they should collect. The report presents a comprehensive data framework that serves as a template for use-of-force data collection. In addition, the report offers guidance to agencies on how to effectively analyze the use-of-force data they collect, including by forming partnerships with outside researchers to help analyze and interpret results.

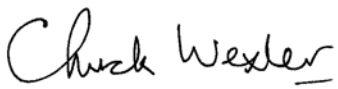
The report has a great deal of technical information that police chiefs and sheriffs should share with their operational and analytical staffs. And to augment this written document, PERF's research team will be hosting webinars that will present our findings and walk agencies through the process of improving their data collection and analysis. So please look for these upcoming events.

I want to thank the Charles Koch Institute (CKI) for its support of this project. CKI continues to show its commitment to strengthening communities, improving outcomes for those impacted by the criminal justice system, and making people safer. This project certainly supports all those goals.

I also want to thank PERF's research team for its outstanding work in pulling this report together: Deputy Director and Senior Research Criminologist Dr. Sean Goodison, who served as Principal Investigator on the project; Senior Research Associate Jeremy Barnum,

who was Project Manager; and Senior Research Assistant Siara Sitar, under the guidance of Director Tom Wilson. Thanks also to PERF's Research Advisory Board, which is chaired by Arizona State University Professor Ed Maguire. Ed and other Advisory Board members took the time to review drafts of this report and offer insightful comments that improved the final product. Kevin Morison and Craig Fischer of the PERF staff reviewed and edited the report, and Dave Williams laid out the document.

I believe this report will assist police chiefs and sheriffs in several important ways. It will help them better understand the use-of-force issue and what leading researchers have found about when and why force occurs. And it will enable them to turn that research into action, by collecting and analyzing data to help them better manage use of force and reduce its occurrence in their agencies. Everyone – communities and police – will be safer as a result.



Chuck Wexler
Executive Director
Police Executive Research Forum
Washington, D.C.

Introduction

CONTROVERSIAL POLICE USES OF FORCE HAVE SPARKED SOCIAL UNREST ACROSS THE COUNTRY, damaged police-community relationships, raised fundamental questions about the use of government authority to enforce laws, and spurred efforts by local, state and federal governments to improve police-civilian encounters. More recently, nationwide protests following the May 2020 death of George Floyd in Minneapolis underscore broader concerns among the general public about how and when police use force. All of these factors have demonstrated the need for further knowledge about these important issues.

The national conversation on police use of force has highlighted the need for improved data collection. It was not until recently that data were systematically gathered on the numbers of fatal shootings by police officers nationwide. News organizations in 2015 began to compile unofficial statistics on officer-involved shootings,[1, 2, 3] and the U.S. Department of Justice has begun efforts to collect official data in this area.[4] However, most publicly available data on police use of force is extremely limited, and meaningful analysis is not possible without valid, reliable and comprehensive data. Detailed data are critical to understanding the circumstances in which police use force, as well as what types of interventions might prevent unnecessary uses of force.

What This Report Contains

This report details what we know about use of force from the research literature. We pay particular attention to what the research says about the precursors to use-of-force incidents – the officer, subject, situational, and environmental factors that seem to influence, or not influence, the use of force.

In addition, the report provides guidance to agencies on how to collect, analyze, and use use-of-force data. Evidence-based policing provides the guiding principles to understand how and why science is valuable to law enforcement executives.

Using evidence-based policing as a foundation, PERF has developed a comprehensive Use-of-Force Data Framework for agencies to collect use-of-force information. (See Appendix D.) The Framework can be used as a self-assessment for what data an agency

1. https://www.washingtonpost.com/graphics/investigations/police-shootings-database/

2. https://www.theguardian.com/us-news/ng-interactive/2015/jun/01/the-counted-police-killings-us-database

3. See also https://mappingpoliceviolence.org/ and https://fatalencounters.org/ for detailed collections of data, both of which provide greater detail than mainstream media or governmental sources.

4. https://www.fbi.gov/news/pressrel/press-releases/fbi-announces-the-official-launch-of-the-national-use-of-force-data-collection

currently collects. The Framework also serves as a guide and model for future collection and analysis.

The report also outlines what police executives need to know about analyzing use-of-force data. Developing good analysis can be challenging at times, especially for agencies with limited resources. We highlight what is needed to understand use-of-force scientifically, so that agencies know what adjustments may be needed in their policies, training, and operations. Police leaders should use this guide to hold data analysis to a higher standard and facilitate evidence-based decisions around officers' use of force.

Finally, the report stresses the importance of partnerships in collecting and analyzing use-of-force data. There are many resources, some at low or no cost, available to agencies who seek partners to help them with collection and analysis.

The results of collecting and analyzing data can provide critical information on force incidents, identify risk factors, and make evidence-based decisions to minimize preventable and unnecessary incidents of force.

Key Takeaways

Here are some of the key findings from PERF's review of the research literature on use of force and data collection and analysis:

- ***The research literature shows that many factors influence the use of force and that, collectively, these factors provide important context for understanding the dynamics of use-of-force incidents.*** The key factors influencing use of force include officer, subject, situational, and environmental/neighborhood characteristics. These factors have been found to be important predictors across a vast collection of research literature on use of force (see Appendix A). Important insights can be gleaned from this robust body of evidence that can inform potential solutions to prevent or reduce violent encounters (see Terrill, 2020, 82).

- ***Based on our comprehensive review of the research literature, there is a great deal that we know about different factors and their effect on use-of-force.*** (See Table 1 on p. 13 for additional information; see pp. 9-11 for citations of key studies on each of these factors.)

  - Officer factors such as level of education, experience, and age tend to decrease the chance that officers will use force. Previous uses of force by an officer and fewer training hours tend to increase the likelihood of force. And factors such as the officer's unit assignment, gender, or race tend to not influence the chance of force.

  - Subjects who are male, provide active resistance, or have a weapon will increase the likelihood of force. But the research is less clear on how factors such as race or whether the subject disrespects an officer affect the chance of force, with several studies finding no effect.

- Situations where there was a foot or vehicle pursuit tend to increase the chance of force. Studies looking at the call type or whether dispatch alerted officers to potential danger seem to show neither factor influences the likelihood of force.
- Areas with high levels of neighborhood disadvantage (i.e., combination of poverty, residential instability, and disorder) and high crime rates tend to experience an increased chance of force.

  It is important to recognize existing research can vary in terms of the specific factors that are measured, how they are measured, and how data are analyzed. There is more we do not know about, or are unsure about, precursors to force. This is, in part, due to limited data on use of force in policing.

- ***Agencies must use evidence-based policing as a guiding principle for any use-of-force data collection and analysis.*** This means using science to inform decision-making.
  - Examples of evidence-based policing practices include referencing findings from the research literature when developing policy, having a systemic data collection plan, and conducting rigorous analyses.
  - Relying on evidence-based policing can require a culture change that starts at the top by expecting better data and analysis. Science does not mean simply "following the numbers." Evidence-based approaches should be a systemic part of executive decisions, along with experience, human intelligence, community concerns, and legal authority.
- ***Agencies cannot manage what they do not measure.*** Collecting high-quality data on use of force is a necessity. Readily available data are important for internal tracking. More detailed, high-quality data also contribute to legitimacy when information is shared externally with the public and media. **And without data, there is no way to evaluate policies.**
  - We are providing the **PERF Use-of-Force Data Framework** (Appendix D) as a guide to help agencies self-assess what data they already collect, how the data are compiled, and what still needs to be gathered. (The Data Framework is also available electronically as an Excel file on the PERF website: https://www.policeforum.org/assets/PERFUOFDataFramework.xlsx.)
  - The Framework is a "wish list" since most agencies will not start with comprehensive data on all the measures. But executives should lead agencies towards collecting as many of these measures as possible to better track and understand use-of-force incidents.

- ***Agencies should keep data in a searchable, digital format. When you have electronic data, you need a way to seamlessly combine different sources. A digital format allows for quick answers to questions and analysis of patterns.***
  - We have found too much valuable use-of-force data are captured only in narratives, paper records or inaccessible electronic systems. It is critical to systematically collect this information, which many agencies are already compiling informally, in a digital format.
  - **Measures need to include officer, subject, situational, and environmental/ neighborhood characteristics for each use-of-force incident.**
  - Additionally, there should be clear measures on the *types of force* used, including if there were attempts at de-escalation or communication prior to an incident.
- ***Once you have data, thorough analysis is critical.*** Police executives need to hold analysis to a higher standard and go beyond a simple tally of incidents. The best analysis uses comparison groups to study what factors led to force incidents and examine alternate explanations for why an incident occurred. (These best practices are discussed later in this report, in the section "What to Know about Analysis.")
  - **Sophisticated analysis can help establish priorities, justify changes, and determine what works.**
  - This allows executives to see which measures and precursors are most important to understanding force decisions in their agencies.
- ***Collecting and analyzing data can be challenging and take time. Partnerships can make these tasks easier.*** There are researchers with experience working with law enforcement agencies. Federal initiatives such as the NIJ LEADS Scholars Program help develop practitioner-researcher relationships.[5] And organizations like PERF have dedicated research units who can help directly or provide connections to resources.
- ***Training on use of force matters.*** The research literature shows that training can impact use of force. Officers who receive more training hours have a decreased likelihood of using force. The *type of training* officers receive can also make a difference. While outside the scope of the literature review on use-of-force precursors, there are recent studies on how training can impact officer attitudes and, in some cases, officer behavior in use-of-force situations. A summary of three recent studies on use-of-force training can be found in Appendix C: "What the Research Says about the Impact of De-Escalation Training."

5. https://nij.ojp.gov/funding/national-institute-justices-law-enforcement-advancing-data-and-science-leads-programs

Research Literature Studying Precursors to Use of Force

PERF RESEARCHERS COMPLETED A THOROUGH REVIEW OF THE POLICE USE-OF-FORCE LITERATURE.[6] Our goal was to find consensus among studies examining multiple factors influencing uses of force.

The research team identified more than 350 scholarly articles examining use of force up through September 2020. The focus, goals, and methods of the studies vary considerably.

The current review summarizes studies which:

- Examined individual use-of-force incidents;
- Included at least one comparison group;
- Used research methods measuring multiple possible explanations; and
- Collected detailed data on officer, subject, situational, and/or environmental variables for each use-of-force incident.

The purpose was to identify studies measuring the complex reality of a police encounter. Strong research can show how different factors impact the nature and extent of force.

We identified 30 studies meeting these criteria. A list of these studies is provided in Appendix A.

All 30 studies used large datasets to examine individual incidents of force. These studies looked at different combinations of officer, subject, situational, and environmental factors to try and explain *why* a use of force occurred.

How Training Impacts Use of Force

The research literature shows that officers who receive more training hours have a decreased likelihood of using force. In addition, police leaders should be interested in the impact that de-escalation training in particular has on officer behavior and performance. Three recent studies using rigorous research methods examined the effects of training on use of force, and all three found some promising results. Summaries of these studies and their implications for police agencies can be found in Appendix C of this report.

6. PERF wishes to thank the current and former members of the Research team involved in the reading of case files, data collection, analysis, and drafting process to include (alphabetically): Rachael Arietti; Jeremy Barnum; Elizabeth Berger; Dr. Sean Goodison; Adam Kass; Adam Kemerer; Tatiana Lloyd-Dotta; and Siara Sitar.

The studies vary greatly across specific factors examined, locations, and time. Because of this, the individual studies themselves are not as valuable as the patterns seen across the studies. These patterns represent what the research collectively shows as the important precursors to use-of-force incidents. **The common findings across multiple studies are summarized in Table 1.**

We excluded studies not meeting these criteria. For example, we did not consider studies reviewing trends in use of force over time or comparing the rates of force among different cities.

We also did not include studies examining the impact of a single variable on use of force. For example, evaluations of a technology (e.g., body-worn cameras) or training program are not included. (For readers interested in how training impacts use of force, Appendix C contains a summary on "What the Research Says About the Impact of De-Escalation Training.")

What We Know about Use-of-Force Precursors

Use-of-force incidents are complex events with many potential explanations. In other words, using force can be affected by many different factors at one time. Many of these factors may be highly correlated to force.

But when research can analyze many factors at the same time, often correlations are not as strong. Analysis can identify more precisely the specific factors which help explain uses of force.

Research can determine the strongest precursors of when officers use force. As such, research provides police leaders with more information they can use when setting policy and program priorities designed to reduce force incidents.

Overall, the literature shows context matters when understanding use-of-force decisions.

Below we describe consensus findings from the research literature on use-of-force precursors. Factors are grouped into four categories reflecting the fundamental components of an encounter: officer, subject, situation, and environment.

For each broad finding, we reference specific research studies from our literature review. These citations are intended to provide additional details and context for the broad, overall findings on use-of-force precursors.

Agencies can use the information in Table 1 right now to help develop policies and set priorities. Take the information provided and see what your agency can do to address these factors. If you are able to address these factors, you may reduce your agency's uses of force.

Officer Factors Influencing the Chance of Force Being Used

Officers with more education[7], experience[8], or who are older[9], tend to use less force. These findings are found repeatedly in the literature (e.g., see Terrill, 2020, 80).

Past uses of force[10] and training hours[11] are also linked to likelihood of force. Force is more likely to be used by officers who have past force incidents or officers with fewer training hours. A recent evaluation of PERF's ICAT training suggests overall use-of-force rates can decline through training as well (see Appendix C).

Other officer factors such as unit assignment[12], gender[13], and race[14] tend to have limited or no effect on force use.

Subject Factors Influencing the Chance of Force Being Used

Many factors about the subject increase the likelihood of force by officers, according to the research literature. The most common significant findings are drug or alcohol impairment[15], active resistance[16], prior arrest history[17], being a male subject[18], and presence of a weapon[19]. Those factors are associated with more force used.

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7. See Terrill & Mastrofski, 2002; Paoline & Terrill, 2004; Paoline & Terrill, 2007; Rydberg & Terrill, 2010; Lee, Vaughn, & Lim, 2014.

8. See Terrill & Mastrofski, 2002; Kaminski, DiGiovanni, & Downs, 2004; Paoline & Terrill, 2007; Sun, Payne, & Wu, 2008; Rydberg & Terrill, 2010

9. See Garner, Maxwell, & Heraux, 2002; Lee et al., 2010

10. See McCluskey & Terrill, 2005; Lawton, 2007

11. See sidebar on "What Research Says About the Impact of De-escalation Training," though note some research has found no significant effects due to training (see Terrill & Mastrofski, 2002; Terrill & Reisig, 2003).

12. See Garner, Maxwell, & Heraux, 2002; Sun & Payne, 2004; Sun, Payne, & Wu, 2008

13. See Crawford & Burns, 1998; Terrill & Mastrofski, 2002; Sun & Payne, 2004; Paoline & Terrill, 2007; Lawton, 2007; Lee et al., 2010; Rydberg & Terrill, 2010; Klahm, Frank, & Brown, 2011; Lee, Vaughn, & Lim, 2014; Rossler & Terrill, 2017.

14. *Ibid.*

15. See Engel, Sobol, & Worden, 2000; Terrill & Mastrofski, 2002; Garner, Maxwell, Heraux, 2002; Terrill, Paoline, & Manning, 2003; Kaminski, DiGiovanni, & Downs, 2004; Paoline & Terrill, 2004; McCluskey & Terrill, 2005; McCluskey, Terrill, & Paoline, 2005; Paoline & Terrill, 2007; Terrill, Leinfelt, & Kwak, 2008; Rydberg & Terrill, 2010

16. See Engel, Sobol, & Worden, 2000; Terrill & Mastrofski, 2002; Garner, Maxwell, Heraux, 2002; Terrill, Paoline, & Manning, 2003; Schuck, 2004; Paoline & Terrill, 2004; McCluskey & Terrill, 2005; McCluskey, Terrill, & Paoline, 2005; Paoline & Terrill, 2007; Terrill, Leinfelt, & Kwak, 2008; Lee et al., 2010; Rydberg & Terrill, 2010; Lee, Vaughn, & Lim, 2014; Mulvey & White, 2014; Kaminski, DiGiovanni, & Downs, 2004; Leinfelt, 2005; Johnson, 2011; Rossler & Terrill, 2017.

17. See Terrill & Mastrofski, 2002; Terrill, Paoline, & Manning, 2003; Paoline & Terrill, 2004; McCluskey & Terrill, 2005; McCluskey, Terrill, & Paoline, 2005; Paoline & Terrill, 2007; Rydberg & Terrill, 2010.

18. See Terrill & Mastrofski, 2002; Garner, Maxwell, Heraux, 2002; Terrill, Paoline, & Manning, 2003; Terrill & Reisig, 2003; Kaminski, DiGiovanni, & Downs, 2004; Sun & Payne, 2004; Engel & Calnon, 2004; Leinfelt, 2005; McCluskey & Terrill, 2005; McCluskey, Terrill, & Paoline, 2005; Paoline & Terrill, 2007; Sun, Payne, & Wu, 2008; Lee, Jang, Yun, Lim, & Tushaus, 2010; Rydberg & Terrill, 2010; Klahm, Frank, & Brown, 2011; Lee, Vaughn, & Lim, 2014; Rossler & Terrill, 2017

19. See Terrill & Mastrofski, 2002; Terrill, Paoline, & Manning, 2003; Kaminski, DiGiovanni, & Downs, 2004; Sun & Payne, 2004; McCluskey, Terrill, & Paoline, 2005; Paoline & Terrill, 2007; Sun, Payne, & Wu, 2008; Rydberg & Terrill, 2010; Klahm, Frank, & Brown, 2011; Rossler & Terrill, 2017.

Other subject factors have little or no impact on use of force. Subject demeanor and impairment due to mental illness[20], subject race[21], age[22], disrespect towards officers[23], number of subjects involved[24], and warrant status[25] have been studied often, yet often do not appear to influence force decisions or produce mixed results across studies. While the overall research to date has not shown that subject race is significantly related to police use of force, it is clear that from the community's perspective, race remains an important issue in use-of-force encounters. More research is needed to better understand the impact of subject race on use of force.

Situational Factors Influencing the Chance of Force Being Used

Situational factors refer to the characteristics of an encounter. For example, encounters that involve a warrant check[26], officer calling for backup[27], hostile bystander demeanor[28], or subject pursuit[29] may be more likely to result in a use of force.

Incidents that occur in a public location[30], with more officers on scene[31], and involving more serious offenses that initiated the encounter[32] may increase force likelihood, but the evidence is not as strong.

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20. See Terrill & Mastrofski, 2002; McCluskey, Terrill, & Paoline, 2005; Johnson, 2011; Klahm, Frank, & Brown, 2011 for no mental health effects, though some studies have suggested a link to increased force (see Kaminski, DiGiovanni, & Downs, 2004; Lawton, 2007; Rossler & Terrill, 2017).

21. See Crawford & Burns, 1998; Engel, Sobol, & Worden, 2000; Terrill & Reisig, 2003; Sun & Payne, 2004; McCluskey & Terrill, 2005; McCluskey, Terrill, & Paoline, 2005; Lawton, 2007; Lee, Jang, Yun, Lim, & Tushaus, 2010; Lee, Vaughn, & Lim, 2014; Mulvey & White, 2014; Rossler & Terrill, 2017.

While there is research suggesting subject race may have an effect on force outcomes (see Terrill & Mastrofski, 2002; Garner, Maxwell, Heraux, 2002; Terrill, Paoline, & Manning, 2003; Kaminski, DiGiovanni, & Downs, 2004; Shuck, 2004; Engel & Calnon, 2004; Leinfelt, 2005; Paoline & Terrill, 2007; Sun, Payne, & Wu, 2008; Rydberg & Terrill, 2010), such studies are often older with less refined measures and controls.

22. See Engel, Sobol, & Worden, 2000; Garner, Maxwell, Heraux, 2002; Sun & Payne, 2004; Leinfelt, 2005; Terrill, Leinfelt, & Kwak, 2008; Crawford & Burns, 2008; Johnson, 2011; Klahm, Frank, & Brown, 2011; Mulvey & White, 2014; Lee et al., 2010.

23. See Terrill & Mastrofski, 2002; McCluskey & Terrill, 2005; McCluskey, Terrill, & Paoline, 2005.

24. See Garner, Maxwell, & Heraux, 2002; Leinfelt, 2005.

25. See Engel, Sobol, & Worden, 2000; Klahm, Frank, & Brown, 2011

26. See Klahm, Frank, & Brown, 2011.

27. See Garner, Maxwell, & Heraux, 2002.

28. See Friedrich 1980.

29. See Kaminski, DiGiovanni, & Downs, 2004; Crawford & Burns, 2008

30. See McCluskey, Terrill, & Paoline, 2005; Lee, 2016.

31. See Terrill & Mastrofski, 2002; Garner, Maxwell, & Heraux, 2002; Terrill, Paoline, & Manning, 2003; Paoline & Terrill, 2007, though some studies show no effects (see Engel, Sobol, & Worden, 2000; McCluskey, Terrill, & Paoline, 2005; Rydberg & Terrill, 2010; Johnson, 2011), and some show decreases (see Lawton, 2007).

32. See Engel, Sobol, & Worden, 2000; Garner, Maxwell, & Heraux, 2002; Lawton, 2007.

The number of civilians witnessing the interaction[33], the call/offense type[34], and dispatch anticipating danger when calling for an officer[35] tend to show no effect on the likelihood of force being used.

Environmental Factors Influencing the Chance of Force Being Used

Environmental factors include characteristics of the broader locations where an encounter occurs. For example, neighborhood disadvantage (e.g., poverty, unemployment, residential instability)[36] and crime rate[37] may increase uses of force. Findings on neighborhood demographics[38] and the likelihood of force have been mixed in the research literature.

Understudied Factors within the Research Literature

Obviously, uses of force are more complicated than the factors noted in Table 1. Each incident has far more potential data points and questions. Appendix A shows the range of factors examined within precursor studies. While there is some overlap in the studies, most are unique combinations of locations, factors, and analysis techniques. What we know about precursors is less than what we do not know.

Many factors are understudied in the research literature. Notably, there is a research gap on assignment practices, in general, and their impacts on use of force. For example, additional work is needed on how assignment of officers to high-crime areas and deployment of one- versus two-officer units may affect use of force. If determined to be important in the use-of-force context, altering assignment practices may be a relatively easy and cost-effective way of reducing violent encounters.

Other factors simply have too few studies using them and mixed results from a small sample of research. For example, some studies show that force is more severe when more officers (including supervisors) are on scene (e.g., Garner, Maxwell, and Heraux; Terrill & Mastrofski, 2002), whereas other studies have found no effect (e.g., Engel, Sobol, & Worden, 2000; McCluskey Terrill & Paoline, 2005). In this case, there is not enough evidence to make a consensus conclusion.

But police executives need more answers than seen in Table 1. The research literature shows that there is much to still be investigated.

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33. See Terrill, Paoline, & Manning, 2003; Paoline & Terrill, 2004; McCluskey, Terrill, & Paoline, 2005; Paoline & Terrill, 2007; Terrill, Leinfelt, & Kwak, 2008: Rydberg & Terrill, 2010

34. See Terrill, Paoline, & Manning, 2003; Paoline & Terrill, 2004; Leinfelt, 2005; Paoline & Terrill, 2007.

35. See Terrill & Mastrofski, 2002; Terrill, Paoline, & Manning, 2003; Klahm, Frank, & Brown, 2011.

36. See Terrill & Reisig 2003; McCluskey, Terrill, & Paoline 2005; Sun, Payne, & Wu 2008; Lee, Jang, Yun, Lim, & Tushaus 2010.

37. See Terrill & Reisig 2003; Lee, Jang, Yun, Lim, & Tushaus 2010; Lee, Vaughn, & Lim 2014.

38. See Sun & Payne 2004; Sun, Payne, & Wu 2008; Lee, Jang, Yun, Lim, & Tushaus 2010; Lee 2016.

How do we get these answers? It is a three-step process.

1. Agencies must base their decision-making on evidence-based practices that have been scientifically tested. This is critical both for getting agency buy-in for rigorous data collection and analysis and for informing agency policy and actions on use of force.

2. Becuase you cannot manage what you cannot measure, collecting data is the next step. Agencies must commit to collecting comprehensive data on uses of force.

3. Finally, agencies need to dig into the data with rigorous analyses. And to do this right and get answers your agency needs, you might need help. There are many partnership opportunities that can support your data analysis.

The remainder of this report walks through the details of this three-step process. First, we discuss the foundation of evidence-based policing and science. Then, we present the PERF Use-of-Force Data Framework to guide agencies toward collecting comprehensive data. Finally, we walk through what needs to be known about analysis and partnerships.

Table 1. What We Know about Precursors to Force

Precursor Category	Factor	Influence on Likelihood of Force
Officer Factor	Officer level of education	Decreased
Officer Factor	Officer experience	Decreased
Officer Factor	Officer training hours	Decreased
Officer Factor	Prior force incidents	Increased
Subject Factor	Drug or alcohol impairment	Increased
Subject Factor	Active resistance	Increased
Subject Factor	Prior arrest history	Increased
Subject Factor	Male subject	Increased
Subject Factor	Presence of a weapon	Increased
Situational Factor	Conducting a warrant check	Increased
Situational Factor	Calling for backup	Increased
Situational Factor	Aggressive bystander demeanor	Increased
Situational Factor	Foot and vehicle pursuit	Increased
Environmental Factor	Disadvantaged neighborhood	Increased
Environmental Factor	Neighborhood crime rate	Increased
Subject Factor	Subject demeanor	Unclear/Mixed
Subject Factor	Impairment due to mental illness	Unclear/Mixed
Situational Factor	Incidents in a public location	Unclear/Mixed
Situational Factor	Number of officers on scene	Unclear/Mixed
Situational Factor	Offense seriousness	Unclear/Mixed
Environmental Factor	Neighborhood demographics	Unclear/Mixed
Officer Factor	Unit assignment	Little/no effect
Officer Factor	Gender	Little/no effect
Officer Factor	Race	Little/no effect
Subject Factor	Race	Little/no effect
Subject Factor	Age	Little/no effect
Subject Factor	Disrespect toward officer	Little/no effect
Subject Factor	Number of suspects	Little/no effect
Subject Factor	Warrant status	Little/no effect
Situational Factor	Number of civilians witnessing the interaction	Little/no effect
Situational Factor	Call/offense type	Little/no effect
Situational Factor	Dispatch anticipating danger	Little/no effect

Guiding Principles for Understanding Use of Force

Evidence-Based Policing and a Culture of Science

Some agencies have sophisticated data analysis units that already have the ability to collect and analyze data on officers' uses of force. Other agencies may not have those resources. This report is designed to help both types of agencies better understand use of force through improved data collection and analysis.

For all agencies, evidence-based policing must be a guiding principle for their data collection and analysis. This means using science to inform police decision-making. Using science allows agencies to provide the best possible public service by incorporating and considering all available information. This philosophy is important to establishing an agency culture to collect, analyze, and use data effectively.

The goal of evidence-based policing is to give scientific research a seat at the table, but not the only seat. Other important considerations for decision-making include experience, human intelligence, community concerns, and legal authority. **Sometimes a decision will be consistent with current research, sometimes it will not, and other times research may have less to contribute at the time. But the systematic incorporation of science into decision-making allows for police to provide the best possible public service, using all available sources of information when making choices.**

What Evidence-Based Policing Means for Understanding Use of Force

There are two primary ways to use science within an agency. **First,** science can involve using the research literature for ideas of what has worked previously. This is taking the experience of others, as documented in rigorous research, and applying it to an agency. **Second,** science can involve collecting high-quality data and conducting strong analyses. This involves answering internal agency questions by using measurement and rigorous analysis. The goal should be to address agency concerns while also sharing results that can contribute to the research literature.

For example, the first part of this report provided a summary of research on use-of-force precursors. Agencies can use that summary to help identify high-risk situations and develop training or policy accordingly. For example, research shows more officer education and training hours will decrease the likelihood of force. Increasing education requirements and increasing training time can likely reduce uses of force within an agency.

But in this example, science is not the only consideration. Other factors are part of the decision making, such as current staffing levels, budget constraints, or prior challenges

recruiting good hires. Scientific evidence does not dictate what must be done. Rather, it provides guidance as to what is possible.

The research literature can also help prioritize decisions. Using the summary on use-of-force precursors, the evidence suggests that some policies geared to reducing force may not work in the aggregate. For example, policies changing the types of calls officers go on or having dispatch communicate potential danger show no evidence on the likelihood of force.

Does that mean agencies should not make such changes? The research findings suggest that other areas, such as increasing education and training, are more likely to positively impact force decisions by officers. If you have limited resources, maybe the science helps determine which ones are the best bets.

Agencies can use the information in Table 1 right now to help develop policies and set priorities. Take the information provided and see what your agency can do to address these factors.

Integrating Evidence-Based Practices into Agency Operations

It is relatively easy to start incorporating strategies and tactics seen in the literature. The main challenges are being able to translate research jargon into practical guidance and knowing what is considered "good" research.

There are two great resources for finding the research evidence for specific programs. Both sources are designed for police professionals. They take complex research, assess the quality, and provide guidance based on the best studies available. Both sources are updated regularly and are available free of charge.

First is through the U.S. Department of Justice, Office of Justice Programs and the National Institute of Justice. It is called **CrimeSolutions.gov** (see https://crimesolutions.ojp.gov/). Leading researchers take studies, analyze them, and develop practical guidance for agencies. This site examines research from throughout the criminal justice system and is organized primarily by topic. One section on the main topic page is dedicated solely to law enforcement research. Users can also enter key search terms such as "use of force" to retrieve studies on specific topics. Programs are ranked based on the total literature studying each program. Rankings range from effective to promising to no effect/harmful.

Second is the **UK College of Policing toolkit** (see https://whatworks.college.police.uk/toolkit/Pages/Welcome.aspx). While this source is international, much of the research included comes from studies within the United States. This site also focuses exclusively on policing research. Programs are ranked based on the total literature, as with CrimeSolutions. But this toolkit provides some other metrics, such as explaining why the program works and even how much it can cost to implement.

There is another resource that can help police executives develop a culture of science within their agencies. The National Institute of Justice primer on evidence-based policing is written specifically for police executives. The author is Dr. Gary Cordner, who currently serves as the Academic Director of the Education and Training section for the Baltimore Police Department. PERF staff contributed to the review of Dr. Cordner's report prior to publication. It is an excellent resource covering 45 topics, most in less than a single page,

with extensive resources. It can be found here: https://nij.ojp.gov/library/publications/evidence-based-policing-45-small-bytes

Accepting evidence-based policing is important to demonstrate the value and role of science within an agency. It is difficult to collect meaningful data and develop useful analyses unless there is a culture that looks towards science as part of the decision-making process.

You Can Only Manage What You Measure

All agencies want to manage use-of-force incidents. To do that effectively, agencies need to measure those incidents. Effective management requires data and analysis. And the most effective management is necessary to provide the best public service.

No media or federal government data collection effort will be able to match the level of detail an agency can capture from its own use-of-force case investigations. Departments are a rich source of data but often lack the framework necessary to properly collect and analyze this information.

In addition to guiding internal policies and procedures, data on use-of-force incidents help agencies answer questions from the public, the news media, and policymakers. The better the data, the better the answers. Policing needs to be transparent about use-of-force incidents. This includes providing data and thoughtful, accurate analysis to members of the community.

This report and the Data Framework that is included provide a resource for agencies to comprehensively track use-of-force incidents. These products will allow agencies to meaningfully collect and analyze data regarding their use of force. Better quality data and analysis help departments evaluate policies and tailor solutions for reducing uses of force.

Using the Framework to collect and analyze data is the next step for agencies. While the literature gives some guidance, there is still much which is *not known* about precursors to force. By collecting and analyzing your own data, you can produce listings of factors to complete your agency's version of Table 1, but with your data. And then you can determine the most promising policies and programs for your agency based on an analysis of your own data.

What to Know about Collecting Use-of-Force Data

PERF's Use-of-Force Data Framework

To get agencies started with data collection, PERF developed a list of factors potentially influencing force and guidance on how to measure them. This is the PERF Use-of-Force Data Framework. (See Appendix D. The Data Framework is also available electronically as an Excel file on the PERF website: https://www.policeforum.org/assets/PERFUOFDataFramework.xlsx.) The Framework is based on the research literature, expert recommendations, the FBI's National Use-of-Force Database, and PERF's experience collecting data across agencies. The purpose is to help agencies identify the range of important factors and how they should be collected to facilitate evidence-based decision-making.

In total, the Framework includes more than 150 officer, subject, situational, and environmental/neighborhood factors. (These are the four main groupings of factors that were identified in the research literature.) Each variable is its own field in the database. We provide suggestions for how to record values in a useable format and where this data may typically be housed in many agencies.

We understand having this many measurements can be overwhelming, especially if your agency is just starting to collect data. One way to help address this is to work with partners who have experience collecting and analyzing data (see the section on "What to Know about Partnerships"). But agencies on their own can prioritize what data they collect. We suggest prioritizing the following data for collection:

- Collect measures taken from the FBI National Use-of-Force Database as a minimum standard. These measures will account for a significant amount of context. Also, collecting these factors in the stated way will make submission to the FBI Database much easier.[39]
- Use Table 1 as a guide to additional factors beyond what's in the FBI National Database. Focus in particular on those factors for which the research literature has found an unclear or mixed impact on force (e.g., subject demeanor, number of officers on the scene, neighborhood demographics).
- Assess which factors are most important to *your* agency and community. For example, if you have a new wellness program in place, the factors associated with officer health may be important not just to force outcomes but to a program evaluation.

39. For more information on the FBI's National Use-of-Force Data Collection program, see https://www.fbi.gov/services/cjis/ucr/use-of-force.

These officer, subject, situational, and environmental/neighborhood factors represent what executives should know about each use-of-force incident. The Framework is a "wish list" since most agencies do not have comprehensive data on all 150 measures. But executives should lead agencies towards collecting as many of these measures as possible to better track and understand use-of-force incidents.

Using the Framework as Self-Assessment

The Framework can serve initially as a self-assessment. How many of these factors does your agency collect regularly? How many factors are stored electronically elsewhere? How many do you not track? Then, the Framework can guide future collection depending on what is feasible and relevant for your agency.

We understand this process can be complex. But we encourage police executives to examine the list of factors and ask their agencies what is already being collected. The Framework list could be distributed to your staff for them to check off what is collected, where, and how. **This self-assessment or check-up allows you to know where your agency stands and how far it may need to go to get high-quality data.** Additionally, we discuss how outside research partners can be useful for assessing where your data are now and how they can be improved.

Use of this Data Framework also would allow an agency to seamlessly collect the necessary data for participation in the FBI's National Use-of-Force Data Collection. Most FBI variables are also used in the Framework, thus preventing repeated data collection and entry. **PERF recommends that all police departments and sheriffs' offices submit data on applicable force incidents to the FBI as part of their national collection.**

Data Collection Best Practices

Agencies need to take charge of their data by improving the number of metrics, how those are measured, and what can be done with the information. Without good data, there cannot be good analysis or data-driven decision-making.

Here are some best practices agencies should follow:

- Any use-of-force data should be digital and electronic. In our analysis of use-of-force data in multiple agencies we have found too much important case information stays in paper files. Executives and other decision-makers need the information at their fingertips. The answer to basic questions on use-of-force patterns cannot be, "we have to re-read those files." Relying on paper files is inefficient and can hurt transparency.

- Narratives have great information, but the format is not efficient for analysis. Reading large blocks of text slows down efforts to obtain information and prevents meaningful analysis. Too often, executives must wait for the most basic use-of-force patterns because officers must "read the narratives" for information. Great data are often in report narratives, but the information is buried for quick assessment. Our Framework helps agencies collect *specific* information from narratives in a meaningful, practical way to allow for analysis.

- If your agency already collects data on some factors electronically, those databases need to speak to each other. Some data are in your RMS (e.g., date, location, officers involved) or CAD system (e.g., calls for service, call history). Other data may be available through your Human Resources unit (e.g., sick leave usage) or personnel records (e.g., officer training history, experience). To be useful, data from different systems need to be linked together. The easiest way to link data is to ensure there are common fields with the same format. For example, any data with case information should have a case number in each dataset, and the case number should be recorded in the same format throughout. Also, any data with officer information should include a badge or identification number. Having these common fields and consistent format allows data to be merged for quicker and better analysis.

What to Know about Analysis

THE PERF USE-OF-FORCE DATA FRAMEWORK (SEE APPENDIX D) OUTLINES A COMPREHENSIVE SET OF data points that agencies should strive to collect about all use-of-force incidents. But data collection is only the first step in the process.

Data analysis is the necessary next step to transform information into practical action. Many agencies limit their analysis to basic information and counts of factors, such as "how many shootings were there this year?" Some agencies may ask how many of those shootings took place in a specific location or involved subjects of specific demographic traits, like race or gender.

Analysis needs to go further than basic counts. While those initial examinations of data are a first step, they cannot be the last step if the goal is to assess and shape policy. The best analysis will incorporate two key features: a comparison of force to no force or lesser force, and a method to address multiple explanations at once.

The Need to Compare Force Incidents Against Non-Force or Lesser Force

To understand why use-of-force incidents happen, you need to develop an appropriate comparison group. In other words, you need to compare cases where force did happen with cases where it *could have* happened but didn't, to understand if certain factors truly influence use of force.

For example, without any context, knowing that use-of-force incidents decreased by 20% in a police district may seem to be cause for celebration. However, suppose that finding is compared to other districts in the agency where application of force dropped by over 50% during the same time. Now the potential celebration may be a cause for concern.

The 30 use-of-force precursor studies we reviewed provide suggestions for comparison groups. Some examples require a lot of data, such as matching by calls for service or examining the sequence of force within an incident. Other examples, such as comparing tool-assisted to hands-on force, do not require as much data. Each method has strengths and weaknesses. A choice of comparison group also depends on the question being asked. For example, do you want to know why force happens sometimes, or are you interested in knowing why certain types of force occur in cases when force is used? Those questions could each require a different comparison group.

Below are some examples of comparison groups used in prior research.

- Comparison of officers using force to other officers at the same scene who did not use force
- Comparison sample of arrests in which force was not used

- Matched comparison of calls for service that resulted in force versus calls for service that had similar characteristics and did not result in force
- Comparison of cases where force escalated to the highest level, versus cases where force escalated and then de-escalated (or where there was no escalation; or where escalation was abrupt, i.e., skipping many levels)
- Comparison of cases with high levels of anticipated violence versus cases with low levels of anticipated violence
- Comparison of cases resulting in a tool-assisted use of force (e.g., use of a firearm or an electronic control weapon) versus cases resulting in a hands-on use of force (e.g., take-downs)

How to Analyze Data

Once you have identified a comparison group, you can start analyzing the similarities and differences between groups.

Rigorous analysis will require individuals with training or education. Unfortunately, good analysis is not possible without some background in research methods. Not just anyone can do it well.

Some agencies already have trained people on staff, either informally or as part of an analysis unit. If you do not have anyone, you may need to look towards partnerships outside of your agency. We cover partnerships later in this report under "What to Know about Partnerships."

This report will not train someone to conduct specific analyses. Our goal is to provide best practices and examples that police executives should be looking for from any analysis they encounter. Provide this analysis section to whoever is assigned and have them account for these best practices.

There are two broad categories of analysis – descriptive and causal inference. We describe each category and provide best practices (i.e., what police executives should know to ask).

Descriptive Analysis Addresses "What" Patterns Exist

Most internal agency analysis uses a limited range of descriptive techniques and no tests of statistical significance.

Types of Descriptive Analyses

Descriptive techniques focus on the number of cases and are often presented with frequency tables (e.g., how many of each gender there are in a sample, with a list and count of each variable category), cross-tabulations (e.g., how many of each gender, across type of force used), or averages (i.e., mean, median, mode). Examples of these three types of frequency tables are in the Technical Appendix B.

Importance of Significance for Finding Patterns

All metrics can vary at different points in time. But how do you know if a difference or change may indicate a pattern to explore further? That is where statistical significance can assist. Simply put, statistical significance means a mathematical difference not likely due to chance.

Without such tests, you may either overstate or entirely miss an important pattern. For example, a drop in incidents that result in use of force by 50% may seem statistically significant. And if the drop is from 100 to 50 incidents, it may be. But if the drop is from 2 to 1, it might not be – this low count can just be normal change due to chance. It is easy to see the difference with this over-simplified example, but it gets more complicated when the change is less dramatic or you are dealing with a lot of metrics at once, like in a cross-tabulation.

Statistical significance helps you to prioritize which changes to look at in more detail. Statistically insignificant changes may be due to chance, so it could be a waste of time to dig in further. But it is important to remember that *statistical* significance is about numbers and not necessarily practical importance. For example, a small drop in fatal uses of force may not be statistically significant, but it will certainly be practically significant. This is a case where data should play a role in decision-making, but other sources of information should play a role as well. Quantitative data should be used to focus conversations about patterns, which can produce additional qualitative information or better community understanding of issues.

Descriptive Analysis Best Practices

- Use frequency tables, cross-tabulations, and averages to summarize your data as the first step in any analysis. We provide some examples below.
  - **Descriptive analyses answers questions of "what" happened or "what" do the data show.**
  - **However, descriptive analyses alone cannot answer "why" the observed patterns exist.**
- Example of a frequency table

Type of Force Used by [Agency Name] in 2020

Force Type	Count	%
OC Spray (i.e., "pepper spray")	22	18.3
ASP/Baton	22	18.3
ECW (i.e., stun gun or Taser)	72	60.0
Firearm	4	3.4
TOTAL	**120**	**100.0**

- Example of a cross-tabulation

Officer Use of Weapon During a Use-of-Force Incident, by Officer Gender, in [Agency Name] during 2020

	Weapon Used		No Weapon	
	Count	%	Count	%
Officer Gender				
Female	7	5.8	5	4.4
Male	113	94.2	108	95.6
TOTAL	**120**	**100.0**	**113**	**100.0**

- Example of an averages table

Average Officer Experience (in years) among [Agency Name] Officers Involved in Use-of-Force Incidents during 2020

Officer Experience	Years
Mean	7.18
Median	6.72
Mode	7

  - **Mean** is the numeric average and can be skewed by outlier values. Do not use it alone to measure "average," but with the other two measures.
  - **Median** is the 50th percentile where half of the cases are larger and half are smaller than the median value. The median is better to use when/if you have outliers. A large difference between mean and median is evidence of outliers in the data.
  - **Mode** is most common response or value. It provides an idea of what you would most likely hear if you asked a real person or see if you examined a real case at random.
  - In this example, all three measures of average are similar. That means the outliers will not likely skew your analysis and you can summarize by reporting the average officer experience is about 7 years.

- Label these analyses clearly so anyone can understand what was measured. The factors and results should be as self-explanatory as possible.
  - Titles for charts or graphs should be detailed enough that if the figure were removed from the analysis to stand alone, a reader would still know what information was presented.
  - Do not assume a reader will know what specific terms mean, as readers may not have law enforcement experience. For example, all readers may not know what "OC Spray" or "hands-on" refers to without some guidance.

- Use statistical significance tests with your descriptive analyses to help prioritize what changes or differences require a deeper dive.[40] Statistically significant results most likely occur beyond luck or normal variation.[41]
  - Using and interpreting statistical significance will **require** individuals with specific training or education. Basic descriptive tables *can* be completed by most staff, but significance and all subsequent analysis *cannot* be done by most staff. You may have trained staff in your agency, or you may need to look towards outside partnerships.
  - Statistically significant results likely have a "why" behind them, as there is a reason for the difference rather than chance. These tests flag the changes to look at, but you need additional analysis to explore the reason "why" or "why not."
- Agencies should not base decision-making on descriptive analysis alone. There are many limits to descriptive analysis, as the practices cannot indicate why changes take place in a systematic way.
  - Using statistical significance tests with descriptive analysis is better for decision-making than just descriptive techniques alone. But that can only tell you what to prioritize, not what to do to address the cause.
  - **Analysis needs to be held to a higher standard for decision-making.** More advanced analysis will use techniques we call causal inference analysis.

Causal Inference Analysis Addresses "Why" Patterns Exist

Causal inference approaches guide answers as to "why" the results exist, going beyond the "what" addressed in descriptive analysis. The techniques try to answer questions of cause and effect by accounting for multiple potential patterns simultaneously using statistics or a particularly rigorous research design.

Researchers have more confidence in results if a relationship still exists after accounting for other patterns, as opposed to an observed relationship seen in descriptive techniques alone. Causal inferential analysis is designed for studies attempting to explain a phenomenon or evaluate a program.[42]

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40. More specifically, "changes" are longitudinal events and happen across time, either continuously or through systematic repeated measurement. In contrast, "differences" are cross-sectional and compare distinct points in time. Many of the descriptive analyses in this report are best suited to look at differences.

41. This report notes the importance of not automatically treating statistical significance as practical significance. However, there are also statistical reasons to not automatically put full faith into significance testing. Mathematically, significance speaks to whether a genuine relationship exists between factors. It is also important to note the strength or magnitude of the relationship. Critiques of relying on statistical significance are not new (see Carter, 1978), but a common theme is the need for careful interpretation of statistical tests requiring significant attention to detail among those trained in such testing (see Greenland, et. al., 2016).

42. See the Technical Appendix B for details on why causal inference techniques are well-suited for explanation or evaluation.

Techniques include analysis of variance tests, regression analysis, and structural equation modeling. These can be complicated processes you may not be familiar with and often need specific training and statistical software to do properly. **If your agency does not have staff with these skills or the necessary tools, we suggest making partnerships outside of your agency. We discuss partnerships in the final section of this report, "What to Know about Partnerships."**

And all these techniques have statistical significance tests built into them, so the results will provide values and significance. That is different from descriptive analyses where you can have values without significance testing.

But using these methods is necessary to hold analysis to a higher standard. These techniques are also critical for providing actionable priorities and determining if policy changes work.

Examples of Causal Inference Analysis in Use of Force

There is no single "best" causal inference technique. That's because the analysis method needs to be tailored to the question being asked and the outcome of interest. For example, trying to understand what factors are precursors to a yes-or-no decision (such as whether force was used or not) will require a slightly different statistical analysis than looking at factors as precursors to different types of force (e.g., hands-on vs. ECW vs. firearm).

Precursor Studies are Examples of Causal Inference Results

All 30 studies from our literature review used causal inference analyses. We provide a listing of the 30 studies on use-of-force precursors that have causal inference techniques in Appendix A. You can see how each study looked at dozens of factors at the same time. This is by design, because using **causal inference analysis allows for an extremely efficient process to study numerous factors all at once**.

Another benefit of these analyses is the built-in **ability to highlight the significant factors**. If you have dozens of potential factors which all *sound possible,* the causal inference analysis allows for rapid identification of the factors truly influencing the outcome. The significant factors are the most accurate precursors of force within the study's data.

In the table of 30 studies in Appendix A, we provide all the factors each study examined and bolded the key significant findings. All 30 studies examined the outcome "whether force or type of force was used" as compared to instances when there was no or lower-level force (see our previous discussion of Comparison Groups).

For a police executive managing limited resources and a desire to reduce force, you want to focus on the significant causal findings. Those precursors will likely provide the best return on investment to help change how force is used in your agency. **You can use the table in the appendix for your agency to summarize what data you have, what factors were used in an analysis, and which precursors were significant.**

In the case of these 30 studies, the individual study takeaways are not as important as the overall trends. We summarize those trends in Table 1 of this report. Using these overall findings to manage use of force is the one way to incorporate evidence-based policing.

An Example of What is Gained from Conducting Causal Inference Analyses within an Agency

Police executives need data and analysis from their agency to tailor potential policy or training changes. The research literature can provide overall suggestions and guidance, but the real goal is to understand how *your agency* works and where to dedicate *your resources*.

As a simplified example, say your agency uses the PERF Use-of-Force Data Framework to collect information on officer education, officer experience, call type, and impairment by mental illness for all use-of-force cases in a year. These factors are all significant in the literature to influence the chance of force.

But you need to know if these factors are significant to your agency. For example, you want to know what precursors increase the likelihood of force versus no force during arrest. So you compare arrests where force was used versus arrests without use of force. The descriptive analyses reveal initial patterns that less educated or experienced officers use force more, subjects in disadvantaged neighborhoods are subjected to more force, domestic calls often lead to force, and more uses of force occur when there is a mental health crisis.

These descriptive results tell you the "what" but not the "why." It's likely these factors interact. For example, rookie officers may be assigned more often to disadvantaged neighborhoods or to shifts when domestic calls are more prevalent. These raw findings by themselves do not help inform policy or operational decisions since the various factors being analyzed all seem to play a part in uses of force.

A more rigorous, causal inference analysis is needed to reveal more specific findings that account for all the interrelated factors. After considering all factors simultaneously, a causal analysis may show that only officer education and mental illness impairment truly influence whether an arrest leads to a use of force or not.

Those two factors are what the data and analysis suggest are the ones to prioritize for your agency. The causal analysis suggests that increasing officer education requirements and improving training for mental health crises would be the most efficient and effective use of resources to reduce uses of force.

Causal Inference Analysis Best Practices

- **Have the right people doing these analyses. Causal inference tests will require someone trained to conduct them.** These are scientific tests with lots of details to make them work. You would not have just anyone do ballistics comparisons or run DNA testing. Your agency may have people with some training for these analyses, or even a unit dedicated to research that can handle this.
    - But it is possible you do not, and that is when you may want to think of partnerships. We discuss partnerships in the next section.
- Know what to ask. These analyses are highly specialized scientific tests like ballistics or DNA. Even if you or your staff may not be able to conduct the tests, you want to know what to look for in the results.

- Ask about the methodology beforehand and ask for the strengths and weaknesses. Even if you or your staff are not trained in analysis, hearing the positives and negatives can help you make choices which are best for the questions you want answered.
    - If you are told an analysis technique or method has no weaknesses, do not allow that person to conduct the analysis. No method is perfect, and there are always trade-offs. But there are people who either do not know or are just trying to peddle the latest technique. You should carefully weigh such claims by asking the research partner specifically about weaknesses or asking for a second opinion from a different researcher or organization.
- Be clear about what data were used in any causal inference analysis. Some analysis may not use all the data provided. So ask what was actually considered in the analysis, which factors were considered, what time frame, etc.
- Ask for the causes and effects. What is the analysis trying to explain? What explanations are being considered?

- You want an analysis that tries to explain why a specific outcome happened. The outcome should be clear and practical. For example, research on use-of-force precursors all use "the decision to use force" as an outcome.
- Analysis should consider many potential explanations for the change in outcome when possible. Causal inference techniques excel at considering the effect of multiple possible factors. A test which only looks at one or two possible factors may miss out on some unexpected or previously unknown explanation. There is no fixed number of factors to use, but there should be a measure for any possible explanation you can think of for the outcome.
    - Always include demographics when possible, for both the officer and subject. In these cases, finding *insignificant* results can be more favorable. When that happens in a causal inference analysis, that means something like race or call type did *not* likely play a factor in a force outcome. That's powerful information which can be shared – "our analysis suggests race or call type does not influence our force decisions, after accounting for many other potential explanations."
- Obtain a narrative of the results which include:
    - Tables of the raw analyses. Even if you do not understand them, you can pass them off to someone who does as a double-check of findings.
    - A clear statement as to the statistical significance and size of the effect for each variable. For example, "Domestic calls led to a 2% increase in force, but that was not statistically significant."
    - Recommended policy changes based on the analysis. You want this to help inform any agency decisions. Science should have a seat at the table and given weight, even if you do not follow analysis-based recommendations in the end.

- Any caveats or areas identified for future research. You need to know the potential weaknesses and areas where your agency may need to look in the future to build from the current analyses. Knowing these things will aid in making decisions.

As a general best practice, we recommend using both descriptive and causal inference analyses when possible. First, explore the data as to "what" the cases looked like (descriptive) and then address "why" differences still exist when holding other factors constant (causal inference). **Partnerships can be key to help conduct analyses, as researchers have the technical skills and availability to do such work.**

What to Know about Partnerships

COLLECTING AND ANALYZING DATA CAN BE CHALLENGING AND TAKE TIME. EVEN WITH GUIDES OF BEST practices and established frameworks in place, conducting original research can be a strain on any department. **Not everyone has the skills or resources to collect data or conduct good analysis. But there are many available options for agencies lacking the staff, time, tools, or expertise to still reap the benefits of research.**

Over the years, partnerships have proven valuable for agencies in many areas of policing. Regional sharing of resources, federal tasks forces, and jurisdiction-wide cooperation on major issues like the opioid epidemic all highlight the potential benefits of partnerships.

The same is true for research. Bringing together additional resources can be a force multiplier. This is especially important for agencies without any research units, but also can be helpful where crime analysis is already established.

Partners exist who have experience bringing evidence-based policing practices to departments. Many partners also have an expertise in use-of-force issues. For collecting and analyzing use-of-force data, both broader evidence-based expertise and a focus on force will together provide the most valuable partnerships.

University departments, professors, and research organizations are an excellent source for research guidance. For example, PERF's Research Advisory Board[43] has nationally known policing researchers as members. Yet, there are many more practitioner-focused researchers across the world. And those well-known researchers often have many eager students with similar interests.

Additionally, federal initiatives exist to bring science into policing. One example is the National Institute of Justice's LEADS (Law Enforcement Advancing Data and Science) Program. This initiative is designed to "advance evidence-based policing by supporting the development of research-minded law enforcement personnel." Established in 2014, LEADS has paired dozens of law enforcement practitioners to work closely with federal partners, their own agencies, and the wider research community. While most participants have been sworn members, LEADS also has a group of academics and civilians as part of the program.[44] The LEADS Program can be both an opportunity for a research-minded staff member in your agency

43. For current membership of PERF's Research Advisory Board, see https://www.policeforum.org/research-advisory-board

44. For listing of LEADS Program biographies, see https://nij.ojp.gov/funding/leads-scholar-biographies

(applications are considered annually) and a resource by tapping into the perspectives of past or current participants. You can find more on the NIJ LEADS Program, of which PERF is a partner in managing the initiative, here: https://nij.ojp.gov/funding/national-institute-justices-law-enforcement-advancing-data-and-science-leads-programs

Finally, other organizations often aid departments to incorporate and conduct research. PERF has done extensive work on the broad evidence-based policing perspective and specifically within use of force. PERF's research team uses many different methods, from surveys to interviews to experiments, to provide practical guidance and recommendations to police leaders. **PERF will be hosting webinars to share more details on the topics explored in this report. Look for more information on the PERF website (www.policeforum.org).**

Additionally, PERF has experience working with *other partners* such as university professors and federal organizations. For example, a recent evaluation of PERF's ICAT training was done in partnership between Louisville (KY) Metropolitan Police Department and an academic team led by Dr. Robin Engel. Using an experimental design, the collaborative effort found evidence that ICAT training may reduce overall force rates (see Appendix C for more information).

Partnership Best Practices

If you seek a partner to help with research, you want to keep a few considerations in mind.

- Reputation is important. You want to find partners with experience working with law enforcement. Ask for prior references or publications. Other departments you work with have likely had research partners, so ask those agencies about the experience. PERF and our Research Advisory Board can help by quickly reviewing researcher proposals and giving police executives guidance to what to look for. Like in all walks of life, there are good partners and bad partners, so do your homework before agreeing to a partnership.

- Establish expectations early by telling partners the questions you want answered, timelines, and what data will be available. Also, clearly state that any findings need to have timely, actionable, practical interpretations. Anything less will not help a police executive with decision-making. Note you will want regular updates on any findings, especially if partners notice major potential problems which could be harming public safety.

- Put together a data sharing agreement with any partners. This establishes the data being collected and used, analysis done, and conditions to prevent disclosure of data or findings without the agency's review. An agreement should be formalized and signed for any project where a partner receives sensitive data for analysis. In the case of research based on the use-of-force data elements we advocate in our Framework, this will always be the case. Agreements will also serve to assign clear points of contact, both within the agency and among the partners.

- Clarify the limits of data use and publication. Note if the data need to be returned or destroyed at the end of the project, especially with sensitive information. You should also address if the data can be used for conference presentations or in publications beyond the agency, such as in academic journals or research briefs, or if researchers should observe certain guidelines about using data in these outlets (e.g., not naming the agency directly). Many researchers will work with an agency at minimal cost to the department if they are allowed to publish findings. Good research never begins with a preconceived expectation of what the data will reveal, so police executives need to demonstrate courage to allow such an analysis. But to limit potential miscommunication and the risk of being blindsided by findings, require agency review and feedback before publication as part of any agreement.
- Importantly, these agreements also address the issue of data security. While there are internet and cloud-based methods to secure data, a basic recommendation is to not transmit sensitive raw data electronically. Instead, use encrypted devices to store and transfer sensitive data where only the agency and the partner point of contact know the key or password.

Conclusion

USE-OF-FORCE INCIDENTS ARE AMONG THE MOST SERIOUS CRITICAL EVENTS A POLICE EXECUTIVE will need to manage. These incidents can cost lives and jobs. But you cannot manage what you do not measure. And for years, there has been an outcry for better data to measure use of force.

The time is long overdue for agencies to get ahead of this data challenge. The FBI has rolled out a national platform for use-of-force data, but that is not enough for individual agencies. The federal government cannot solve the problems of poor data within police departments and sheriffs' offices.

Poor data leads to poor analysis. Poor analysis leads to missing trends or patterns and early warnings, as well as policies which may not work. With poor data and poor analysis, your agency may have problems waiting to happen. You need good data and analysis to inform decision-making about use-of-force issues.

Lessons from research and science can help agencies develop good data and analysis. We understand agencies may only have the time or resources to manage force incidents case-by-case. Using research may not be what you trained for when joining law enforcement. But science, data, and analysis need to be a part of every decision your agency makes, and there are resources to help familiarize you with this transition.

The research literature has insight on some of the key precursors to force. These include factors related the officer, the subject, the situation, and the environment in which the incident takes place. In the report, we have also provided a Use-of-Force Data Framework for agencies to use internally. Police executives can use this list of factors to see what their agency currently collects, how it is stored, and what else needs to be done. Following the Framework as a self-assessment can lead to better, more robust data about use of force within an agency.

Then we've provided guidance on what your agency needs to do in analyzing the data you do collect. There are some simple steps, like using comparisons for context, and some more complicated ones, like conducting statistical significance tests, when doing a deep dive with the data. But even for that deep dive, there is help through partnerships.

Agencies need to incorporate science into their decision-making. This report has provided guidance and examples to help agencies do just that. Using this work, we believe chiefs and sheriffs can take use-of-force data and analysis to the next level, thereby promoting better policies, improving transparency, and assessing changes as departments look to reduce incidents of force.

Appendix A: List of 30 Studies Included in PERF's Precursor Use-of-Force Review

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
Friedrich	1980	Boston, Chicago, Washington DC	Experience, Attitude towards Job, Race of Patrol Team, Attitude towards Blacks	Gender, Age, Race, Class	Offense Seriousness, Suspect Behavior, Manner towards Police, General State, Sobriety, Place Type, Number Bystanders, Initiation, Number Officers in Unit, Number Additional Police	
Crawford Burns	1998	Phoenix, AZ	**Experience**, Gender, Young, Race	Gender, **Young**, Ethnicity, Race, **Angry/ Aggressive**, **Weapon**, **Flees**, **Alcohol**, **Drugs**, Taller than Officer	Domestic, **Witnesses**, **Location Hazardous**, **Night**	
Engel Sobol Worden	2000	Rochester, NY; St. Louis, MO; St. Petersburg, FL		Race, Gender, Age, **Alcohol/ Drug**, **Demeanor**, Victim knows Suspect, Victim Suspect Strangers, Victim Requests Arrest	Entry, Location, **Number Bystanders**, Number Officers, **Seriousness**, Suspect Fight Other Citizen, **Suspect Fight Officer**, Arrest Warrant, Drug/ Gun Offense, Race/Demeanor Interactions	

Note: Factors in BOLD represent significant findings in the research study

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
Terrill Mastrofski	2002	Indianapolis, IN; St. Petersburg, FL	Gender, Race, **Experience**, **Education**, Training, Crimefighter Orientation, Distrust, Legal Restraints	**Gender**, **Race**, **Age**, **Wealth**, **Drug/Alcohol**, Mental Illness, Fear/Anger, Disrespect, **Resistance**, **Conflict**, **Weapon**, **Evidence**, **Arrest**	**Number Officers**, Number Bystanders, Violence Anticipated, **Proactive,** Potentially Violent, **Site**	
Garner Maxwell Heraux	2002	Charlotte, NC; Colorado Springs, CO; Dallas, TX; St. Petersburg, FL; San Diego, CA	Patrol, **Duty Status**, **Gender**, **Race**, Height, Weight, Demeanor, **Prior Medical Attention**, **Age**	**Race**, **Gender**, Believed to be Suspect, Believed to be Assaultive, **Believed to Carry Weapons**, Believed has Criminal Record, **Gang or Criminal Group**, **Intoxicated**, Relationship to Victim, **Relationship to Bystanders**, **Resistance**, Age	**Location Known for Crime**, Location Hazardous, Arrest Inside, Violent Offense, **Weekend**, **Bystanders Demeanor**, Number Bystanders, Number Suspects, **Custody**, Reason for Contact, **Police Initiated**, **Priority Call**, **Lights and Sirens**, **Unknown**, **Called for Backup**, **Number Officers**, **Jurisdiction**	
Terrill Paoline Manning	2003	Indianapolis, IN; St. Petersburg, FL	**Culture-Pro**, **Culture-Mid**	**Gender**, **Race**, **Age**, **Wealth**, Demeanor, **Drug/Alcohol**	**Resistance**, **Safety**, **Conflict**, **Arrest**, **Evidence**, **Number Officers**, Number Bystanders, Violence Anticipated, Problem Type, **Proactive**, **Site**	
Terrill Reisig	2003	Indianapolis, IN; St. Petersburg, FL	Gender, Race, Experience, Education, Training, Crimefighter Orientation, Distrust, Legal Restraints	**Gender**, Race, **Age**, **Wealth**, Intoxicated, Mental Illness, Emotional, Disrespect, Resistance, Conflict, Weapon, Evidence, Arrest	Number Officers, Number Bystanders, Violence Anticipated, Proactive, Potentially Violent	**Disadvantage**, **Homicide Rate**

Note: Factors in BOLD represent significant findings in the research study

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
Kaminski DiGiovanni Downs	2004	Southeastern Municipal PD (Large)	Gender, **Experience**	**Gender**, Age, Height, Weight, Race, Impaired, **Weapon**, **Threatening**	**Pursuit**	
Schuck	2004	Phoenix, AZ		**Race**, **Ethnicity**, **Gender**, **Custody**, **Resistance**, Impaired, Criminal Record	Number Subjects, Domestic, Violent Not Domestic, Bystanders, Bystanders Antagonistic, Location, Location Hazardous, Car Chase, Race Interations	
Paoline Terrill	2004	Indianapolis, IN; St. Petersburg, FL	Race, **Experience**, **Education**	**Resistance**, **Conflict**, **Weapon**, **Evidence**, **Arrest**, **Gender**, **Race**, **Age**, **Wealth**, **Drug/ Alcohol**, Demeanor	**Number Officers**, Number Bystanders, **Proactive**, Problem Type, **Site**	
Sun Payne	2004	Indianapolis, IN; St. Petersburg, FL	Race, Gender, Experience, Education, Community Policing, Shift	**Race**, Gender, Age, Wealth, **Role**, **Demeanor**, **Emotional**, **Weapon**, **Evidence**	Race Interactions	**Predominantly White**, Heterogeneity, Disadvantage
Engel Calnon	2004	USA	Race, Number Stops	**Gender**, **Age**, **Race**, Ethnicity, Employed, **Income**	**Number People in Vehicle**, **Evidence**, DUI, **Nonspeeding Traffic Offense**, **Vehicle Defect**, License/ Registration Check, **Driver Suspect**, **Other Reason**	
Leinfelt	2005	PD (Mid)		**Age**, **Gender**, **Race**, Intoxicated, **Resistance-Armed**, Resistance-Unarmed	Arrest, **Officer Initiated**, Domestic, Public Order, DWI, Other Traffic, Warrants, Number Subjects	

Note: Factors in BOLD represent significant findings in the research study

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
McCluskey Terrill	2005	St. Petersburg, FL	Gender, Race, Experience, Complaint Rate-Force, **Complaint Rate-Verbal**, **Complaint Rate-Combined**, Complaint Rate-Global	**Resistance**, **Evidence**, **Conflict**, Weapon, **Arrest**, **Gender**, Race, **Lower Class**, **Age**, **Intoxicated**, Disrespect, **Proactive**		
McCluskey Terrill Paoline	2005	St. Petersburg, FL	Peer Group Aggressiveness, Aggressiveness, Gender, Race, Experience	**Age**, **Race**, Gender, Lower Class, **Resistance**, **Weapon**, **Conflict**, Disrespect, **Arrest**, **Evidence**, **Problem Type**, **Alcohol/Drug**, **Emotion**, Mental Illness	**Public Location**, **Proactive**, Number Officers, Number Bystanders	**Disadvantage-Middle**, Disadvantage-High
Paoline Terrill	2007	Indianapolis, IN; St. Petersburg, FL	**Some College**, **College**, **Experience**, Gender, Race	**Resistance**, **Conflict**, **Weapon**, **Evidence**, **Arrest**, **Race**, **Age**, **Wealth**, **Drugs/Alcohol**, Demeanor	**Number Officers**, Number Bystanders, **Proactive**, Problem Type, **Site**	
Lawton	2007	Philadelphia, PA	**Previous Force**, Experience, Gender, Race	Gender, Race, Intoxicated, **Drugs**, **Mental Illness**, Resistance, Resistence with Weapon	**Multiple Officers**, **Part I Offense**, Race Interaction	Violent Crime Rate, Heterogeneity
Crawford Burns	2008	Charlotte-Mecklenburg, NC; Colorado Springs, CO; Dallas, TX; St. Petersburg, FL; San Diego, CA;	Gender, Young, Race, **Male**	**Gender**, Young, Ethnicity, **Race**, **Antagonisitc**, **Weapon**, **Drugs**, **Flees**	**Witnesses**, **Lights/Sirens**, Weekend, Hazardous Location, Night, **Street**, **Suspects House**, **Location Time Interaction**	
Terrill Leinfelt Kwak	2008	Midwest PD (Small)	Gender, Experience	**Race**, **Intoxication**, Age, **Resistance**	Number Bystanders, **Proactive**	

Note: Factors in BOLD represent significant findings in the research study

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
Sun Payne Wu	2008	Indianapolis, IN; St. Petersburg, FL	**Experience**, **Gender**, Race, Education, Community Policing, **Shift**	**Age**, **Gender**, **Race**, **Wealth**, Demeanor, **Emotional**, **Weapon**, **Evidence**		**Perecent Senior**, **Concentrated Disadvantage**
Klahm	2009	Cincinnati,OH; Indianapolis, IN; St. Petersburg,FL	**Gender**, Race, Some College, College Graduate, **Experience**	Race, **Gender**, Young, **Weapon**, **Intoxicated**, **Mental Illness**, **Lower Class**, **Resistance**, **Disrespectful**, **Fear/Anger**	**Felony**, **Warrant Check**, Conflict, **Criminal Act**, **Number Officers**, **Number Bystanders**, **Violence**, **Proactive**	
Rydberg Terrill	2010	Indianapolis, IN; St. Petersburg, FL	**Some College**, **College**, **Experience**, Gender, Race	**Age**, **Gender**, **Race**, **SES**, **Resistance**, **Conflict**, **Weapon**, Demeanor, **Drug/Alcohol**, **Evidence**, **Evidence** Prior Arrest, Citizen Request Arrest, Arrest	Number Officers, Number Bystanders, **Proactive**, **Observation Site**, Serious Problem	
Lee Jang Yun et al	2010	Charlotte-Mecklenburg, NC; Colorado Springs, CO; Dallas, TX; St. Petersburg, FL; San Diego, CA; Phoenix, AZ; Metro-Dade, FL	Age, Race, Gender	**Age**, Race, **Gender**, **Resistance**	Race Interaction	Heterogeneity, **Violent Crime Rate**, Unemployment Rate
Johnson	2011	Eugene, OR; Springfield, OR	**Gender**, **Experience**	Mentall Illness, **Gender**, Age, Drugs/Alcohol, **Demeanor**, **Weapon**, **Resistance-Grapple**, **Resistance-Struck**	**Proactive**, Number Officers, Public Location	

Note: Factors in BOLD represent significant findings in the research study

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
Klahm Frank Brown	2011	Cincinnati, OH	Gender, Race, Some College, College, Experience	**Race**, **Gender**, Age, **Weapon**, **Intoxicated**, Mental Illness, **Lower Class**, Resistance, **Demeanor**, **Fear/Anger**, **Warrant**	Felony, Warrant Check, Conflict, Criminal Act, **Number Officers**, **Number Bystanders**, Violence, Proactive	
Lee Vaughn Lim	2014	Austin, TX	**Age**, Gender, Race, **Education**	Age, **Gender**, Race	Race Interaction, **Resistance**, **Number Bystanders**, **Number Officers**, **Violent Crime**, **Drug Crime**, **Officer Initiated**, **Arrest**	**Violent Crime Rate**
Mulvey White	2014	Maricopa County, AZ		**Resistance**, **Mental Illness**, Gender, Race, Age, Education, **Employment**, **Alcohol**, **Drug**, **Felony**, **Violent**, **Prior Arrest**, Homeless		
Lee	2016	New York City, NY		Race, Age, Resistance	Location Type, Night, Perceived Danger, Part I Offense	Percent White, Perecent Black, Percent Hispanic, Violence Rate
Paoline Gau Terrill	2016	Columbus, OH; Charlotte-Mecklenburg, NC; Portland, OR; Albuquerque, NM; Colorado Springs, CO; St. Petersburg, FL; Knoxville, TN; Fort Wayne, IN	**Experience**	**Race**, **age**, **resistance**, **drugs/alcohol**, **weapon**, **mental impairment**		

Note: Factors in BOLD represent significant findings in the research study

Author(s) Last Names	Publication Year	Data From…	Officer Factors Studied	Suspect Factors Studied	Situational Factors Studied	Environment Factors Studied
Rossler Terrill	2017	Colorado Springs, CO; Portland, OR; St. Petersburg, FL	Gender, Race, **Experience**	**Mentall Illness**, **Resistance-None**, **Resistance-Fail to Comply**, **Resistance-Physical**, **Resistance-Deadly**, **Gender**, Race, **Age**, Alcohol/Drug, **Weapon**		

Note: Factors in BOLD represent significant findings in the research study

Appendix B: Technical Appendix

Statistical significance is the probability that a difference between values (typically a sample versus a population) exceeds luck or chance. Significance tests require the researcher to set a threshold of error. Often, this threshold is 5%, meaning there is 95% likelihood the result is not due to chance but still a 5% likelihood it could be due to chance. With a statistically significant result, researchers reject the "null" hypothesis that there is no real difference between values. There are two important considerations for statistical significance: first, results do not "prove" a fact but rather "support" a finding; second, statistical significance does not necessarily indicate practical significance, as when a difference is still very small in size yet consistent.

There are three necessary components for causation: the cause happening before the effect, correlation, and elimination of spurious relationships or alternative explanations. None of the three components are sufficient in of themselves to establish causation. Typically, the time order of variables is the easiest to demonstrate, followed by a formal correlation measure, with properly eliminating other explanations being considered the most difficult component to satisfy.

The use of causal inference statistics is often done to compensate for methodological decisions. The goal for such research is to improve internal validity when the gold standard for such validity, the experimental model also known as a randomized controlled trial, is not available. Measurement error will be a significant challenge in any methodology other than a high-fidelity randomized controlled trial with a treatment and control (e.g., comparison group), as is often seen in medical science. When an experimental design with control group is unavailable, statistical techniques allow researchers to create a mathematically-based control group to allow for a comparison within data. As a result, causal inference statistics are often used to estimate the effects when using secondary data collections, surveys, or official government data. In contrast, studies with an experimental design can assess the effect of treatment using less complex techniques, including some descriptive analyses with significance testing. Experimental designs, when properly executed, already account for the potential of spurious or alternative explanations by having an equivalent comparison group built in, and thus are not required to explain or evaluate using purely statistical means.

Appendix C: What Research Says About the Impact of De-Escalation Training

While outside the current scope of the literature review on use-of-force precursors, three recent studies have used rigorous methods to examine the effect of de-escalation training.

Many "best practices" in policing have not been evaluated. De-escalation training is one of the highest profile topics without much vetting in research. Many challenges face de-escalation research, including lack of clear definitions for de-escalation itself, limited standardized options for training, and a perception by officers that they already engage in de-escalation tactics.

However, given recent events in policing across the nation, de-escalation is too important a topic to ignore. Below we highlight three recent research studies that attempt to not just understand what de-escalation is, but how it can be effectively trained and applied among law enforcement officers, impacting both their attitudes and behaviors.

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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Nicholas Corsaro, Ph.D., University of Cincinnati
Gabrielle Isaza, M.S., University of Cincinnati
Hannah McManus, M.S., University of Cincinnati

What is this study about? This study examined the implementation of the Integrating Communications, Assessment, and Tactics (ICAT) training program, developed by the Police Executive Research Forum.[45] The ICAT program is designed to equip officers with crisis recognition, critical thinking, and communication skills, as well as de-escalation tactics to resolve dynamic and potentially dangerous encounters safely and effectively. A key element of the program is the critical decision-making model (CDM), which emphasizes a circular (not linear) thought process that helps officers organize their thinking, make effective choices in response to constantly evolving circumstances, and better explain how decisions were made. ICAT emphasizes the sanctity of life, putting a premium on officer and community safety.

45. https://www.policeforum.org/icat-training-guide

How was this study conducted? This study used a "clustered" randomized controlled trial to evaluate the ICAT training program as implemented in the Louisville, Kentucky, Metro Police Department (LMPD). Using this approach, groups of officers begin the study as non-intervention control subjects (no ICAT training) and then cross over into the intervention group (ICAT trained). Researchers assessed changes in reported uses of force and injuries to officers and members of the public between these two conditions. In addition, pre- and post-training surveys were conducted with officers to assess impacts of ICAT training on knowledge and attitudes towards persons in crisis and perceived ability to handle critical incidents.

What did this study find? Results from the randomized controlled trial showed that ICAT training led to statistically significant changes in officers' attitudes, behavior, and use-of-force outcomes. This includes a 28% reduction in use of force, a 26% decline in civilian injuries, and a 36% reduction in officer injuries. These changes occurred beyond chance and held when controlling for changes in arrest patterns. *The researchers reported that this is the first known study to demonstrate significant changes in officer behavior as a direct result of de-escalation training.* In addition, survey data showed that officers received ICAT training favorably, with about 8 in 10 agreeing with statements such as "The training was useful to me," "I would recommend this training to others," and "The training taught me new things." At follow up, more than half of officers reported using at least one ICAT skill in the past 60 days, and those that reported using skills largely found them to be effective. Surveys also revealed positive changes in officers' attitudes towards persons in crisis and towards use of force more generally (e.g., force should only be used as a last resort).

What are the key takeaways of this study? The study results showed that officers are receptive to de-escalation training and, when implemented, de-escalation training can reduce uses of force, leading to fewer injuries to both officers and the public. A key lesson for law enforcement leaders is that implementation of de-escalation training requires a comprehensive effort that involves going beyond training to include reinforcement through organizational policies and procedures, emphasis by front-line supervisors in the field, and integration with managerial accountability systems.

Full text available here: https://www.theiacp.org/sites/default/files/Research%20Center/LMPD_ICAT%20Evaluation%20Initial%20Findings%20Report_FINAL%2009212020.pdf

Social Interaction Training to Reduce Police Use of Force

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Jeff Rojek, Ph.D., Michigan State University
Kyle McLean, Ph.D., Florida State University
Geoffrey Alpert, Ph.D., University of South Carolina

What is this study about? This study examined the implementation of the Tact, Tactics, and Trust (T3) training program.[46] The T3 program seeks to enhance officers' social interaction skills and produce more favorable outcomes during law enforcement encounters with the public. The training program incorporates concepts of de-escalation, but also procedurally just communications and self-control. A key element of the T3 program is "deliberate repetitive practice," an adult learning concept that emphasizes a process of learning, feedback, and repetition to develop expertise.

How was this study conducted? This study used a randomized controlled trial to evaluate the T3 training program in the Fayetteville, North Carolina, Police Department (FPD) and Tucson, Arizona, Police Department (TPD). Officers in each agency were assigned to one of two experimental conditions, either high-dose (6-month) or low-dose (3-month) training, or a control condition of no training. Researchers assessed officers' knowledge and attitudes about social interactions after receiving (or not receiving) training, as well as training dosage effects on outcomes, using anonymous post-training surveys.

What did this study find? Most officers (about 2 in 3) who participated in T3 reported that the training program was of high or moderate value, but fewer officers (about 1 in 4) believed the training program improved their own skills. At the same time, more than 1 in 3 officers thought other officers would greatly benefit from the training program. In terms of training delivery, the vast majority of officers (about 8 in 10) believed their department trainers effectively delivered the training program, and the same number found value in the refresher training (nearly 8 in 10). Finally, many officers (about 4 in 10) found video training components to be helpful, but generally most officers thought they should not replace scenario-based training.

What are the key takeaways of this study? This study showed that many officers may see the value in social interaction training, especially for their colleagues. However, the challenge for law enforcement leaders will be generating buy-in among officers who may believe they already use the skills the training seeks to teach. Another challenge includes the operational and cultural realities that make deliberate repetitive training difficult to implement. Law enforcement leaders will need to consider flexible and efficient scheduling practices. Finally, choosing the right trainers is critical to bolster the legitimacy of the training program and maximize officer engagement.

Full text available here: https://journals.sagepub.com/doi/full/10.1177/0002716219887366

46. https://www.polis-solutions.net/t3

Tempe (AZ) Officer Perceptions of De-Escalation

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Victor Mora, M.S., Arizona State University

What is this study about? This study examined the implementation of a one-day violence de-escalation training program for law enforcement officers. The novel training program was developed using a peer nomination process whereby officers identified colleagues who are highly skilled at de-escalating violent encounters. The research team then employed a sentinel event process with "expert" de-escalators, reviewing body-worn camera footage to identity salient principles of de-escalation that informed the development of the training program.

How was this study conducted? This study used a randomized controlled trial to evaluate the violence de-escalation training program in the Tempe, Arizona, Police Department. Officers were assigned to the intervention group (received training) or control group (no training). Researchers surveyed officers to assess their perceptions of de-escalation tactics before and after training, controlling for officer demographics, length of service, and baseline attitudes. Officers ranked the importance of 18 de-escalation methods on a scale of 0 to 3 from least to most important, as well as the frequency with which they used each tactic on a scale of 0 to 4 from least used to most used

What did this study find? Both trained and not trained officers reported most of the 18 de-escalation tactics asked about on the survey as being important. However, trained officers reported a statistically significant greater importance on "compromise" tactics. Compromise tactics may involve different things, like reducing charges, when possible, or responding to a subject's request, such as for a cigarette (e.g., see Todak and James, 2018; Todak and White, 2019). Regarding frequency of use, trained officers were significantly more likely to use three tactics, including compromise, maintaining officer safety, and knowing when to walk away. However, frequent use of most tactics was reported by both trained and not trained officers.

What the key takeaways of this study? This study showed that officers value and frequently use de-escalation tactics, and thus de-escalation training programs may encounter challenges in achieving meaningful changes in offices' knowledge, attitudes, of behaviors about use of force. At the same time, violence de-escalation training did lead to greater use of three tactics (compromise, maintaining officer safety, and knowing when to walk away). Trained officers report more frequent usage of compromise and knowing when to walk away, two de-escalation tactics that diverge with traditional law enforcement mindsets that emphasize asserting control over a situation and avoiding retreat. Further, the study found that trained officers are more likely to engage in tactics that emphasize officer safety. This runs counter to common conceptions that de-escalation training will increase injuries to officers. Future work is needed that provides clear definitions of the de-escalation methods identified by officers to better understand and train on specific actions officers can take to resolve encounters without the use-of-force.

Full text available here: https://www.strategiesforpolicinginnovation.com/spi-sites/tempe-arizona-2017

Appendix D: PERF Use-of-Force Data Framework

The Data Framework is also available electronically as an Excel file on the PERF website: https://www.policeforum.org/assets/PERFUOFDataFramework.xlsx.

Variable	Example Data Values/Format	Variable Definition	Potential Source
Administrative Information			
Case Number	xx-xxx-xxxx	Case number or other administration identifier(s) associated with use of force incident. If multiple identifiers exist, such as use of force number, arrest number, incident number CAD number, etc. exist, they should also be included.	Use of Force Report, Field
Date	MM/DD/YYYY	Date of use of force incident.	Use of Force Report, Field
Location Address	1234 N. Main St NE	Address of use of force incident.	Use of Force Report, Field
City	Washington	City of use of force incident.	Use of Force Report, Field
State	DC	State of use of force incident.	Use of Force Report, Field
Zip	12345	Zip code of use of force incident.	Use of Force Report, Field
X Coordinate/ Longitude	xx.xxxxxx	Longitude of use of force incident.	CAD Report, Field
Y Coorindate/ Latitude	xx.xxxxxx	Latitude of use of force incident.	CAD Report, Field
Force Type	0=Police Presence (announcing police on the scene to subject) 1=Verbal coercion (police requests for specific action from subject) 2=Hands on 3=OC Spray 4=ASP 5=ECW 6=Firearm - Pointing 7=Firearm - Shooting 8=Canine 9=Other (Specify)	Defining level of force used during the incident. Often this is thought of as “highest” level or most severe, but that is not always clear to rank. Since the next variable caputures all the force types used, this measure can capture simply “what type of force was this case” if you were labeling it with one item. Odds are, departments already are making this classification in any tracking of UOF. There is value to a single snapshot of the incident so we suggest keeping it, but then using subsequent variables to provide more detail in digital format.	Use of Force Report, Field

Variable	Example Data Values/Format	Variable Definition	Potential Source
Force Sequence	Same as Force Type, but separated by commas (see Variable Definition)	Using data values from 'Force Type,' a sequence of values indicating the types of force used during a use of force incident, listed in order of use. Separate each Force Type with a comma. Example: 0, 1, 5, 1, 6 for presence, verbal coersion, followed by ECW, additional verbal coersion, then pointing a firearm.	Use of Force Report, Narrative
Where Subject Hit	1=Abdomen 2=Air 3=Arm 4=Back 5=Chest 6=Face 7=Legs 8=Waist 9=Other (Specify)	Area on subject where use of force was used. If multiple target areas recorded, separate each area with a comma (example: 1, 3, 7 for Abdomen, Arm, and Legs)	Use of Force Report, Field
Strikes/Bursts	xx	The number of times the highest level of force was deployed.	Use of Force Report, Field
Verbal Warning of Force	1=Yes 0=No	Officer gave verbal warning annoucung the force to be used immediately prior to deploying force. Example: "If you do not comply, I will physically restrain you."	Use of Force Report, Field
Time to Comply	1=Yes 0=No	Officer gave time to comply prior to deploying force.	Use of Force Report, Field;
Distance	Less than 1 foot 1 to 4 feet 5 to 7 feet 8 to 10 feet 10 or more feet	Distance (in feet) between officer and subject when force was deployed.	Use of Force Report, Field
Duration	xx	Duration (in seconds) of use of force.	Use of Force Report, Field
Time Dispatched	HH:MM	Time officer dispatched to incident.	CAD Report, Field
Time Arrived	HH:MM	Time officer arrived at incident.	CAD Report, Field
Time of Force	HH:MM	Time officer used force during incident.	CAD Report, Field; Use of Force Report, Field
Time Completed	HH:MM	Time officer cleared incident.	CAD Report, Field
Total Time of Incident	HH:MM	Total duration of incident.	CAD Report, Field

Variable	Example Data Values/Format	Variable Definition	Potential Source
Officer Factors			
Number Officers Using Force	xx	Total number of officers that used force.	Use of Force Report, Field
Number Officer Witnesses	xx	Total number of officers that witnessed use of force (i.e., at scene during use of force), but did not use force.	Use of Force Report, Field
Officer Witnesses First Time	1=Yes 0=No	Have the witnessing officer(s) previously witnessed uses of force by O1?	RMS
Collect information on below officer variables for each officer who used force during an incident. O1 represents primary officer on scene. If needed, repeat all "O1" measures for O2, O3, etc.			
O1 Force Type	0=Police Presence 1=Verbal coercion 2=Hands On 3=OC Spray 4=ASP 5=ECW 6=Firearm - Pointing 7=Firearm - Shooting 8=Canine 9=Other (Specify)	Defining level of force used by the primary officer (O1) during incident. See notes for Force Type. Define Force Type with as much detail as possible adding categories as necessary. For example, "hands on" may be separated into distinct categories for strikes, kicks, or takedowns.	Use of Force Report, Field
O1 Race	0=White 1=Black 2=Asian 3=American Indian or Alaskan Native 4=Native Hawaiian or Other Pacific Islander 5=Unknown	Race of O1.	Use of Force Report, Field
O1 Ethnicity	0=Not Hispanic 1=Hispanic 2=Unknown	Ethnicity of O1.	Use of Force Report, Field
O1 Gender	0=Male 1=Female	Gender of O1.	Use of Force Report, Field
O1 Gender Identity	0=Cisgender 1=Transgender 2=Gender Non-Binary 3=Other (Specify)	Gender identity of O1.	Personnel files
O1 Age	xx	Age (in years) of O1.	Personnel files
O1 Age Recruited	xx	Age (in years) of O1 at recruitment.	Personnel files
O1 Height	xx	Height (in inches) of O1.	Personnel files
O1 Weight	xxx	Weight (in pounds) of O1.	Personnel files
O1 Education	0=High School 1=Some College, but no Bachelor's Degree 2=Bachelor's Degree or Higher	Highest level of education obtained by O1.	Personnel files

Variable	Example Data Values/Format	Variable Definition	Potential Source
O1 Date of Appointment	MM/DD/YYYY	Date O1 was appointed as sworn member of the agency.	Personnel files
O1 Experience	xx	Total experience (in years) of O1.	Personnel files
O1 Rank	0=Police Officer 1=Police Officer First Class 2=Corporal 3=Sergeant 4=Detective 5=Lieutenant 6=Captain or Higher	Rank of O1. Use ranks which are consistent with your agency's structure in the Data Values. Order rank from most junior to start to most senior.	Use of Force Report, Field
O1 Years at Current Rank	xx	Years at current rank of O1.	Personnel files
O1 Undercover	0=In Uniform 1=Undercover	O1 undercover at time of incident?	Use of Force Report, Narrative
O1 Unit Assignment	0=Patrol 1=Traffic 2=Investigations 3=SWAT 4=Community Policing 5=Crisis Intervention 6=School Resource	Unit assignment of O1. Use units which are consistent with your agency's structure in the Data Values. The order of variables does not matter. It is important to include all your agency's units in the Date Values.	Use of Force Report, Field
O1 Other Duties	1=Yes 0=No	Officer has other duties outside of current unit assignment.	Personnel files
O1 Full-time	0=Full-time 1=Part-time 2=Volunteer	Shift status of O1.	Tour of Duty assignment
O1 Duty Status	0=Normally scheduled work hours (not on leave) 1=Normally scheduled work hours (on leave) 2=Hours outside normally scheduled work hours (not working) 3=Hours outside normally scheduled work hours (secondary employment) 4=Hours outside normally scheduled work hours (overtime)	Duty status of primary officer on scene.	Use of Force Report, Field
O1 Shift Time	0=Morning 1=Afternoon 2=Evening 3=Night	Shift time of O1.	Tour of Duty assignment
O1 Shift Date of Appointemnt	MM/DD/YYYY	Date O1 was assigned to shift.	Personnel files
O1 Shift Rotation	0=No rotation 1=Forward rotation 2=Backward rotation	Shift rotation of O1.	Tour of Duty assignment
O1 Shift Length	xx	Shift length of O1 at time of incident.	Tour of Duty assignment

Variable	Example Data Values/Format	Variable Definition	Potential Source
O1 District	1 2 3 4 5	District assignment of O1. Use values consistent with your agency in the Data Labels. "District" means the largest division for assignment within the jurisdiction. If your agency uses names (e.g., North, South, etc), simply assign a numerical value to each (e.g., 1=North, 2=South, etc.).	Use of Force Report, Field
O1 Precinct	1 2 3 4 5 6 7	Precinct assignment of O1. Use values consistent with your agency in the Data Labels. "Precinct" means the next largest division for assignment within the jurisdiction. If your agency uses names (e.g., North, South, etc), simply assign a numerical value to each (e.g., 1=North, 2=South, etc.). If your agency does not use further divisions for officer assignment, then disregard this measure.	Use of Force Report, Field
O1 Beat	1 2 3 4 5 6 7	Beat assignment of O1. Use values consistent with your agency in the Data Labels. "Beat" means the largest division for assignment within the jurisdiction. If your agency uses names (e.g., North, South, etc), simply assign a numerical value to each (e.g., 1=North, 2=South, etc.).If your agency does not use further divisions for officer assignment, then disregard this measure.	Use of Force Report, Field
O1 Squad	xxx	Squad assignment of O1.	Use of Force Report, Field
O1 Squad Date of Appointment	MM/DD/YYYY	Date O1 was assigned to squad.	Personnel files
O1 Number Consecutive Shifts	x	Number of consecutive shifts of O1 at time of incident.	Tour of Duty assignment
O1 Injured	00=N/A 09=Not related to use of force 10=Not injured 11=Bruise/abrasion 12=Sprain/soreness 13=Laceration 14=Bite 15=Broken nose 16=Broken bone (non-nose) 17=Internal injury 18=Gun shot 19=Other	Injury type to O1. If multiple injuries during the incident, include them in order of severity and separated by a comma (e.g., 11, 14, 16 for a bruise, bite, and broken bone)	Use of Force Report, Field
O1 Treatment	00=N/A 20=None 21=Refused 22=First aid 23=Hospital 24=Personal physician 25=Decontamination	Treatment provided to O1 at time of incident. If multiple treatments, such as first aid and decontamination, list all separated by a comma.	Use of Force Report, Field

Variable	Example Data Values/Format	Variable Definition	Potential Source
O1 Existing Injury	0=No 1=Yes	O1 existing injury before incident.	Personnel files
O1 Injury History	xx	O1 past number of job-related injuries.	Personnel files
O1 Specialized Training A _Type	Example using “de-escalation training”: 0=No specialized training 1=De-escalation training	O1 has received [Specialized Training A]. Repeat the Specialized Training questions (Type, Last, Hours) for each training you want to measure, with 0 meaning not trained and 1 meaning trained in each Specialized Training. Specialized training can include things like de-escalation, crisis intervention, or procedural justice. Include variables for each training type, last date of training, and total number of hours relevant to agency.	Training
O1 Specialized Training A _ Last	MM/DD/YYYY	Date of last [Specialized Training A] for O1.	Training
O1 Specialized Training A _ Hours	xxx	Total number of hours of [Specialized Training A] for O1.	Training
O1 Time Since Last Meal	HH:MM	Time since O1 last meal.	Officer
O1 EWS Score	xx	O1 early warning system score	Internal affairs
O1 Past Number Use of Force Incidents	xx	O1 past number of use of force incidents. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed	RMS; Personnel files
O1 Past Number Lethal Use of Force Incidents	xx	O1 past number of lethal use of force incidents. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed	RMS; Personnel files
O1 Past Number Less Lethal Use of Force Incidents	xx	O1 past number of less lethal use of force incidents. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed	RMS; Personnel files
O1 Past Number Disciplinary Incidents	xx	O1 past number of disciplinary incidents. Create separate variables for different types of disciplinary incidents, as needed. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files

Variable	Example Data Values/Format	Variable Definition	Potential Source
O1 Past Number Stops	xx	O1 past number of stops. Create separate variables for different stop types, as needed Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed	RMS; Personnel files
O1 Past Number Citations	xx	O1 past number of citations written. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number Arrests	xx	O1 past number of arrests. Create separate variables for different types of arrests, as needed. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number Felony Arrests	xx	O1 past number of felony arrests. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number Misdemeanor Arrests	xx	O1 past number of misdemeanor arrests. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number Subjects Arrested with Firearm	xx	O1 past number of subjects arrested with a firearm. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number Complaints	xx	Number of past complaints against O1. Create separate variables for different complaint types, as needed. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number Sustained Complaints	xx	Number of past sustained complaints against O1. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files

Variable	Example Data Values/Format	Variable Definition	Potential Source
O1 Past Number Use of Force Complaints	xx	Number of past use of force complaints against O1. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	RMS; Personnel files
O1 Past Number of Commendations	xx	O1 past number of commendations. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	Personnel files
O1 Past Performance Review Score	xx	O1 past performance reivew score.	Personnel files
O1 Firearm Qualification Score	xx	O1 past firearms qualification score.	Training
O1 Other Recruiting Standards Score	xx	O1 other recruitment scores. Create separate variables for different recruitment scores, as needed.	Personnel files
O1 Past Days of Sick Leave	xx	O1 past number of days of sick leave. Record as count and/or rate. Include total, past year, and/or other specified timeframe. Create separate variables, as needed.	Human resources
O1 Military Experience	0=No 1=Yes	O1 has previous military experience.	Personnel files
Subject Factors *Collect information on variables below for each subject who experienced force during an incident. S1 is the primary subject. If needed, include variables for subjects S2, S3, etc..*			
Number of Subjects	xx	Number of subjects on whom police used force.	Use of Force Report, Field
S1 Animal	0=No 1=Yes	Primary subject is an animal (e.g., dog, deer). This variable can be used to track animal shootings. If any animal, most S1 variables can be skipped.	Use of Force Report, Field/Narrative
S1 Race	0=White 1=Black 2=Asian 3=American Indian or Alaskan Native 4=Native Hawaiian or Other Pacific Islander 5=Unknown	Race of primary subject (S1) on scene.	Use of Force Report, Field
S1 Ethnicity	0=Not Hispanic 1=Hispanic 2=Unknown	Ethnicity of S1.	Use of Force Report, Field

Variable	Example Data Values/Format	Variable Definition	Potential Source
S1 Gender	0=Male 1=Female	Gender of S1.	Use of Force Report, Field
S1 Age	xx	Age (in years) of S1.	Use of Force Report, Field
S1 Sexual Orientation	0=Heterosexual 1=Homosexual 2=Bisexual 3=Other (Specify)	Sexual orientation of S1.	Use of Force Report, Narrative
S1 Gender Identity	0=Cisgender 1=Transgender 2=Gender Non-Binary 3=Other (Specify)	Gender identity of S1.	Use of Force Report, Narrative
S1 Height	xx	Heigh (in inches) of S1.	Use of Force Report, Field
S1 Weight	xxx	Weight (in pounds) S1.	Use of Force Report, Field
S1 Perceived SES	1=Chronic Poverty 2=Low 3=Middle 4=Above Middle	Perceived socioeconomic status of S1.	Use of Force Report, Narrative
S1 Sobriety	0=Sober 1=Alcohol 2=Marijuana 3=Cocaine 4=PCP 5=Methamphetamine 6=Opioids 7=Other (Specify) 8=Unknown	Sobriety of S1.	Use of Force Report, Field
S1 Impairment – Drugs	0=No 1=Yes	S1 displayed signs of drug impairment.	Use of Force Report, Narrative; CAD report
S1 Impairment – Alcohol	0=No 1=Yes	S1 displayed signs of alcohol impairment.	Use of Force Report, Narrative; CAD report
S1 Crisis - Mental Illness	0=No 1=Yes	S1 displayed signs of mental health crisis.	Use of Force Report, Narrative; CAD report
S1 Visible Physical Disability	0=No 1=Yes	S1 displayed signs of a visible physical disability.	Use of Force Report, Narrative; CAD report
S1 Drug possession	0=No 1=Yes (Specify)	S1 in possession of illegal drugs.	Use of Force Report, Narrative; CAD report

Variable	Example Data Values/Format	Variable Definition	Potential Source
S1 Observed Behavior	0=Calm 1=Visibly Upset 2=Erratic 3=Highly agitated 4=Combative	Observed behavior of S1. Using data values from 'S1 Observed Behavior,' a sequence of values indicating the types of behavior displayed during a use of force incident listed in order of occurrence. Example: 1, 2, 1, 0 for a subject initially upset, then erratic, but then de-escalated to upset and finally calm. A visibly upset individual will appear emotional but still in command of faculties. Erratic indicates some diminishing of reasoning due to emotion. Highly agistated includes outward behaviors like yelling or threats towards others. Combatitive is preparing for or looking toengage in physical conflict.	Use of Force Report, Field/Narrative
S1 Disrespectful	0=No 1=Yes	S1 displayed disrspectful behavior towards officer. "Disrespect included a variety of verbal statements: calling the officer names, making derogatory statements about the officer or his family, making disparaging or belitting rmearks, and slurs (racial, sexual, lifestyle). Ignoring the officer's commands or questions did not consitute disrespect, but was classified as passive resistance. In addition, certain gestures and actions were coded as disrespect, such as "flipping the bird," obscene gestures, and spitting in the presence of an officer (even if not in the officer's direction)" (Terrill and Mastrofski, 2002).	Use of Force Report, Narrative; CAD report
S1 Conflict	1=None 2=Calm Verbal 3=Agitated Verbal 4=Threatened Assault 5=Assault	S1 in conflict with another citizen when officer arrived on scene. "Suspect in conflict with another citizen on scene" (Terrill and Mastrofski, 2002).	Use of Force Report, Narrative; CAD report
S1 Evidence of crime by subject	Summative index, 0-8 (see Variable Definition)	"A summative index (0-8) of the evidence of the target's or requester's violation of the law was used. Points were assigned for each factor present and summed: officer observed suspect perform an illegal act (3), suspect gave officer full confession (2), suspect gave officer a partial confession (1), officer observed physical evidence implicating suspect (1), and officer heard testimony from other citizens implicating the suspect (1)" (Terrill, Paoline, and Manning, 2003). Does not include attempting to flee/evade law enforcement and does not include situations where officers are serving arrest warrants.	Use of Force Report, Narrative; Incident Report, Narrative

Variable	Example Data Values/Format	Variable Definition	Potential Source
S1 Arrest	0=No 1=Yes	S1 arrested and taken into police custody to be charged for a crime and admitted into the criminal justice system. Excludes temporary detainments.	Use of Force Report, Narrative; Incident Report, Narrative
S1 Resistance Type	0=Cooperative 1=Needs Verbal Direction 2=Psychological Intimidation 3=Verbal Non-Compliance 4=Passive Resistance 5=Defensive Resistance 6=Active Aggression 7=Aggravated Active Aggression	Level of resistence offered by S1.	Use of Force Report, Field/Narrative
S1 Resistance Type FBI	10=Barricade 11=Chemical 12=Edge_Weapon 13=Electronic 14=Escape/Flee 15=Firearm 16=Physical 17=Display Weapon 18=Body Fluids 19=Throwing 20=Noncompliance 21=None 22=Passive Resistance 23=Pending 24=Resisted 25=Unknown 26=Verbal 27=Vehicle	Level of resistence offered by S1. Alternative values derived from Nationl Use of Force Data Collection.	Use of Force Report, Field/Narrative
S1 Threatened Officer	0=No 1=Yes	S1 threatened officer(s), verbally or physically.	Use of Force Report, Field/Narrative; CAD report
S1 Threatened Others	0=No 1=Yes	S1 threatened other(s), verbally or physically.	Use of Force Report, Field/Narrative; CAD report
S1 Type of Threat	1=Verbal 2=Physical 3=Both	Type of threat(s) made by S1.	Use of Force Report, Field/Narrative; CAD report
S1 Weapon Type	00=N/A 69=None 70=Open Hand/Arm 71=Fist 72=Feet/Legs 73=Blunt Instrument 74=Sharp Instrument 75=Rock/Bottle 76=Explosive 77=Vehicle 78=Firearm 79=Other	Type of weapon possessed by S1.	Use of Force Report, Field

Variable	Example Data Values/Format	Variable Definition	Potential Source
S1 How Weapon Used	00=N/A 110=Threaten 111=Stab 112=Throw 113=Grab/Hold 114=Push/Pull 115=Strike/Hit 116=Bite 117=Slash 118=Firearm Discharge 119=Restraint 120=Other	How weapon used by S1.	Use of Force Report, Field
S1 Injury Type	00=N/A 09=Not related to use of force 10=Not injured 11=Bruise/abrasion 12=Sprain/soreness 13=Laceration 14=Bite 15=Broken nose 16=Broken bone 17=Internal injury 18=Gun shot 19=Other	Injury type to S1.	Use of Force Report, Field
S1 Treatment	00=N/A 20=None 21=Refused 22=First aid 23=Hospital 24=Personal physician 25=Decontamination	Treatment provided to S1 at time of incident.	Use of Force Report, Field
S1 Known to Officer	1=Yes 0=No U=Unknown	S1 known to officer prior to incident.	Use of Force Report, Narrative; CAD report
S1 Prior Incidents with O1	0=None 1=Encounter/Field Contact 2=Medical Emergency 3=Citation 4=Arrest 5=Use of Force	S1 has had prior contact with O1, and type of contact made.	RMS
S1 Warrant Status	1=Yes 0=No U=Unknown	S1 has active warrant.	Use of Force Report, Narrative; CAD report
S1 Prior Arrests	1=Yes 0=No U=Unknown	S1 has prior arrests. If possible, an additional variable can also be created to capture S1 Prior Convictions.	Use of Force Report, Narrative; CAD report
S1 Prior Uses of Force	1=Yes 0=No U=Unknown	S1 has previously been involved in a use of force incident.	RMS

Variable	Example Data Values/Format	Variable Definition	Potential Source
Officer Knew S1 Criminal History	1=Yes 0=No U=Unknown	S1's criminal history was known to officer before the use of force.	Use of Force Report, Narrative; CAD report
S1 Gang Affiliation	1=Yes 0=No U=Unknown	S1 affiliated with a gang.	Use of Force Report, Narrative; CAD report
S1 Tattoos	1=Yes 0=No U=Unknown	S1 has visible tattoos.	Use of Force Report
S1 Victimization History	1=Yes 0=No U=Unknown	Primary subject has victimization history.	Use of Force Report, Narrative; CAD report
Officer Knew S1 Victimization History	1=Yes 0=No U=Unknown	S1's victimization history known to officer before the use of force.	Use of Force Report, Narrative; CAD report
S1 Homeless	1=Yes 0=No U=Unknown	S1 is currently experiencing homeless.	Use of Force Report, Narrative
S1 Residence Status	1=Non-resident 0=Resident U=Unknown	S1 is a resident of agency's jurisdiction.	Use of Force Report, Narrative
S1 Citizenship Status	1=Yes 0=No U=Unknown	Primary subject a U.S. citizen.	Use of Force Report, Narrative
Situational and Environmental/Neighborhood factors. *These should be constant through the incident and not require additional measures, even if more than 1 officer/subject present.*			
Weather	01=Clear 02=Partially Overcast 03=Overcast 04=Fog 05=Rain 06=Snow 90=Other 99=Unknown	Exterior atmospheric conditions at the time of the use of force incident.	Weather reports
Location Type	01 = Air/Bus/Train Terminal 02 = Bank/Savings and Loan 03 = Bar/Nightclub 04 = Church/Synagogue/Temple/ Mosque 05 = Commercial/Office Building 06 = Construction Site 07 = Convenience Store 08 = Department/Discount Store 09 = Drug Store/Doctor's Office/ Hospital 10 = Field/Woods 11 = Government/Public Building 12 = Grocery/Supermarket 13 = Highway/Road/Alley/Street/ Sidewalk	Type of location or premises where use of force incident occurred.	Use of Force Report, Narrative; CAD report

Variable	Example Data Values/Format	Variable Definition	Potential Source
Location Type (cont.)	14 = Hotel/Motel/Etc. 15 = Jail/Prison/Penitentiary/ Corrections Facility 16 = Lake/Waterway/Beach 17 = Liquor Store 18 = Parking/Drop Lot/Garage 19 = Rental Storage Facility 20 = Residence/Home 21 = Restaurant 23 = Service/Gas Station 24 = Specialty Store OTHER = Other 37 = Abandoned/Condemned Structure 38 = Amusement Park 39 = Arena/Stadium/Fairgrounds/ Coliseum 40 = ATM (Automated Teller Machine) Separate from Bank 41 = Auto Dealership New/Used 42 = Camp/Campground 44 = Daycare Facility 45 = Dock/Wharf/Freight/Modal Terminal 46 = Farm Facility 47 = Gambling Facility/Casino/Race Track 48 = Industrial Site 49 = Military Installation 50 = Park/Playground 51 = Rest Area 52 = School–College/University 53 = School–Elementary/Secondary 54 = Shelter–Mission/Homeless 55 = Shopping Mall 56 = Tribal Lands 57 = Community Center PENDING = Pending further investigation UNKNOWN = Unknown and is unlikely to ever be known		
Location Dangerous	0=No 1=Yes	Location described as or believed to be dangerous by dispatch, primary officer, or other responding officers.	Use of Force Report, Narrative; CAD report
Indoor Area	0=No 1=Yes	Use of force incident occurred indoors.	Use of Force Report, Narrative; CAD report
Other Agencies Involved	0=No 1=Yes	Officers from other law enforcement agencies involved in use of force incident. To the extent possible, collect requisite information about officers involved from other agency (see “Officer Factors” section above).	Use of Force Report, Field/Narrative

Variable	Example Data Values/Format	Variable Definition	Potential Source
Witnesses Present	0=No 1=Yes	Civilians on scene who witnessed the focal use of force event. Excludes civilians who were present, but did not witness the use of force event.	Use of Force Report, Field/Narrative
Number of Witnesses	xx	Number of civilians on scene who witnessed the focal use of force event. Excludes civilians who were present, but did not witness the use of force event.	Use of Force Report, Field/Narrative
Witnesses Demeanor	1=Uncooperative 0=Cooperative	Civilians on scene were cooperative with officers.	Use of Force Report, Narrative
Additional Bystanders	0=No 1=Yes	Other bystanders nearby incident who may or may not have witnessed the use of force event (e.g., officer notes citizens observing encounter from their window).	Use of Force Report, Narrative
Vulnerable Person(s) Present	0=No 1=Yes	Vulnerable civilians present, such as minors or pregnant women.	Use of Force Report, Narrative
Reason for Initial Contact	80=Warrant 81=Court Order 82=Criminal/Suspicious Activity 83=Demonstration 84=Follow Up Investigation 85=Medical, Mental Health, Or Welfare Assistance 86=Other 87=Pending = Pending Further Investigation 88=Routine Patrol 89=Traffic Stop 90=Unknown	Reason behind initial encounter between officer(s) and subject(s). Create additional categories, as neeeded.	Use of Force Report, Narrative; CAD report
Lights and Sirens	0=No 1=Yes	Officer arrived on scene with lights and sirens engaged.	Use of Force Report, Narrative; CAD report
Officer Approached Subject(s) (Proactive)	0=No 1=Yes	Encounter initiated by officer.	Use of Force Report, Narrative; CAD report
Officer Ambushed by Subject(s)	0=No 1=Yes	Officer ambushed by subject	Use of Force Report, Narrative; CAD report
Warrant Check	0=No 1=Yes	Officer conducted warrant check on subject prior to use of force.	Use of Force Report, Narrative; CAD report
Called for Backup	0=No 1=Yes	Officer called for backup prior to use of force.	Use of Force Report, Narrative; CAD report

Variable	Example Data Values/Format	Variable Definition	Potential Source
Suicide by Cop	0=No 1=Yes	Subject attempting suicide via lethal force.	Use of Force Report, Narrative; CAD report
Offense Type	00 = No offense occurred 09A = Homicide Offenses - Murder & Nonnegligent Manslaughter 09B = Homicide Offenses - Negligent Manslaughter 09C = Homicide Offenses - Justifiable Homicide 100 = Kidnapping/Abduction 11A = Sex Offenses - Rape 11B = Sex Offenses - Sodomy 11C = Sex Offenses - Sexual Assault With An Object 11D = Sex Offenses - Fondling 120 = Robbery 13A = Assault Offenses - Aggravated Assault 13B = Assault Offenses - Simple Assault 13C = Assault Offenses - Intimidation 200 = Arson 210 = Extortion/Blackmail 220 = Burglary/Breaking & Entering 23A = Larceny/Theft Offenses - Pocket-picking 23B = Larceny/Theft Offenses - Purse-snatching 23C = Larceny/Theft Offenses - Shoplifting 23D = Larceny/Theft Offenses - Theft From Building 23E = Larceny/Theft Offenses - Theft From Coin-Operated Machine or Device 23F = Larceny/Theft Offenses - Theft From Motor Vehicle 23G = Larceny/Theft Offenses - Theft of Motor Vehicle Parts or Accessories 23H = Larceny/Theft Offenses - All Other Larceny 240 = Motor Vehicle Theft 250 = Counterfeiting/Forgery 26A = Fraud Offenses - False Pretenses/Swindle/Confidence Game 26B = Fraud Offenses - Credit Card/ Automated Teller Machine Fraud 26C = Fraud Offenses - Impersonation 26D = Fraud Offenses - Welfare Fraud 26E = Fraud Offenses - Wire Fraud 26F = Fraud Offenses - Identity Theft 26G = Fraud Offenses - Hacking/ Computer Invasion	The most serious offense committed by the subject prior to the use of force.	Use of Force Report, Narrative; Incident report; CAD report

Variable	Example Data Values/Format	Variable Definition	Potential Source
Offense Type (cont.)	270 = Embezzlement 280 = Stolen Property Offenses 290 = Destruction/Damage/ Vandalism of Property 35A = Drug/Narcotic Violations 35B = Drug Equipment Violations 36A = Sex Offenses - Incest 36B = Sex Offenses - Statutory Rape 370 = Pornography/Obscene Material 39A = Gambling Offenses - Betting/ Wagering 39B = Gambling Offenses - Operating/Promoting/Assisting Gambling 39C = Gambling Offenses - Gambling Equipment Violation 39D = Gambling Offenses - Sports Tampering 40A = Prostitution Offenses - Prostitution 40B = Prostitution Offenses - Assisting or Promoting Prostitution 40C = Prostitution Offenses - Purchasing Prostitution 510 = Bribery 520 = Weapon Law Violations 64A = Human Trafficking, Commercial Sex Acts 64B = Human Trafficking, Involuntary Servitude 720 = Animal Cruelty 90A = Bad Checks 90B = Curfew/Loitering/Vagrancy Violations 90C = Disorderly Conduct 90D = Driving Under the Influence 90E = Drunkenness 90F = Family Offenses, Nonviolent 90G = Liquor Law Violations 90H = Peeping Tom 90I = Runaway 90J = Trespass of Real Property 90Z = All Other Offenses		
Senior Officer Present When Force Threatened	0=No 1=Yes	Senior officer present when force threatened on subject. Does not indicate a specific rank, but indicates an officer of superior rank to primary officer who used force.	Use of Force Report, Narrative; CAD report
Senior Officer Present When Force Used	0=No 1=Yes	Senior officer present when force used on subject. Does not indicate a specific rank, but indicates an officer of superior rank to primary officer who used force.	Use of Force Report, Narrative; CAD report
Senior Officer in Contact	0=No 1=Yes	Senior officer in contact (e.g., via radio) when force threatened on subject. Does not indicate a specific rank, but indicates an officer of superior rank to primary officer who used force.	Use of Force Report, Narrative; CAD report

Variable	Example Data Values/Format	Variable Definition	Potential Source
Subject Engaged in Felony	0=No 1=Yes	Subject engaged in a felony.	Use of Force Report, Narrative; CAD report
Subject Engaged in Misdemeanor	0=No 1=Yes	Subject engaged in a misdemeanor.	Use of Force Report, Narrative; CAD report
Verbal Communication Attempt	0=No 1=Yes	Officer engaged subject verbally prior to use of force.	Use of Force Report, Narrative; CAD report
Video of Incident (Dash, BWC, CCTC, Bystander)	0=None 1=Dashcam 2=BWC 3=Bystander 4=CCTV	Use of force event captured on video. Multiple videos recorded, separated with ‘,’.	Use of Force Report, Field/Narrative
Weapon Recovered	0=No 1=Yes	Officer recovered subject’s weapon after use of force.	Use of Force Report, Field/Narrative
Attempt to Flee	0=No 1=Yes	Subject attempted to flee the scene, regardless of whether a pursuit ensued.	Use of Force Report, Narrative; CAD report
Pursuit (Vehicle, Foot)	0=None 1=Foot 2=Vehicle	Officer pursured subject prior to use of force.	Use of Force Report, Narrative; CAD report
Anticipate Danger (from Dispatch)	0=No 1=Yes	Dispatch advised officer of a potentially dangerous encounter.	Use of Force Report, Narrative; CAD report
Anticipate Mental Health Crisis	0=No 1=Yes	Dispatch advised officer of a potential mental health crisis.	Use of Force Report, Narrative; CAD report
Anticipate Substance Abuse Crises	0=No 1=Yes	Dispatch advised officer of a potential substance use crisis.	Use of Force Report, Narrative; CAD report
Anticipate Weapon	0=No 1=Yes	Dispatch advised officer to anticipate a weapon.	Use of Force Report, Narrative; CAD report
K9 Present	0=No 1=Yes	K9 officer present on scene.	Use of Force Report, Narrative; CAD report
SWAT Present	0=No 1=Yes	SWAT team present on scene.	Use of Force Report, Narrative; CAD report