9-1-1, What's Your Risk? Minimizing the Risk of Police Violence Through Computer-Assisted Dispatch

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I. INTRODUCTION

Psychiatrist and human rights activist Ralph Crawshaw once said that "the exercise of power by a police official is one significant manifestation of an interaction between the world of the powerful and the powerless."[1] Despite Crawshaw's skepticism, one scholar suggested that "[t]he obligation of the police leadership to protect Human Rights will be fulfilled when it is realized that power for the police is not an end in itself but is a means to serve the people."[2] Yet in the last decade, those in densely populated inner cities are plagued by the following paradox: How can those specifically designated to keep us safe end up being those who many fear the most?

The nature of a police force itself promotes the idea of protection and security. In the United States, when you call 9-1-1 you feel confident the police department will know how to locate you and send help.[3] Typically, the dispatcher will ask the caller a series of questions to determine the nature and priority of the emergency using the computer-based telephone system.[4] This information is then entered into a Computer-Aided Dispatch (CAD) system.[5] The dispatcher then relays the request to a police officer, who is typically located through the use of a GPS-based vehicle locating system, which tracks the location of officers throughout the city.[6] The dispatcher then makes a subjective assessment to determine which officers to send to the location of the emergency based on the officer's distance from the emergency location and estimated time of arrival.[7] When the officer arrives, the rational constituent anticipates that the officer will address the situation by only using as much force as necessary to protect his own safety and the well-being of the surrounding community.[8] However, over the last decade in many U.S. cities, this assumption that police officers will respond by using an appropriate level of force has become rather dubious, causing increased police-related fatalities and a demise in the public trust of law enforcement.[9]

This Note will discuss some implications of current police dispatch technology and suggest an algorithm-based solution that will minimize the violent triggers brought out by Post-Traumatic Stress Disorder while

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1. S. B. M. Prasanna, *Role of Police in Protection of Human Rights: A Review*, 2 INDIAN SOC. SCI. J. 52, 52 (2013), https://www.questia.com/library/journal/1P3-3358585851/role-of-police-in-protection-of-human-rights-a-review [https://perma.cc/R8NU-ES8U].
2. *Id.*
3. *See* Carol Fleischer, *The History of Police Communications*, CITY OF IRVINE, https://legacy.cityofirvine.org/ipd/divisions/communications/history_of_police_communications.asp [https://perma.cc/FYR3-VP67] (last visited Mar. 12, 2017).
4. *See id.*
5. *See id.*
6. *See id.*
7. *See id.*
8. *See* Jeffrey M. Jones, *In U.S., Confidence in Police Lowest in 22 Years*, GALLUP (June 19, 2015), http://www.gallup.com/poll/183704/confidence-police-lowest-years.aspx?g_source=police&g_medium=search&g_campaign=tiles [https://perma.cc/2V75-BA24].
9. *See id*.

decreasing the chance for the use of excessive force. Section I will introduce the issue of police use of excessive force and its implications. Section II will provide background on the development of police dispatch technology, including the first police communication systems, the road to 9-1-1, and the current regime: computer aided dispatch systems. Section II will also detail the rise in police use of excessive force, and the psychology behind excessive force. Section III will describe problems with the current state of CAD, including the lack of digital prevention mechanisms, the fact that post-traumatic incident policy guidelines vary widely by city, and the failure to leverage full technological capabilities. Section IV will suggest a risk-based approach to CAD, including how to revamp CAD using a coding system to leverage current technologies and how the risk-based CAD system could be applied through a national mandate. Section IV will also assess the cities where risk-based CAD would have the greatest impact, the anticipated costs of compliance with a risk-based CAD system, and the source of funding for risk-based CAD.

II. BACKGROUND

A. The Development of Police Dispatch Technology

1. The First Police Communication Systems

Although CAD and other forms of police technology provide for a quick and efficient response by emergency personnel, these are relatively new technologies aiding police communication.[10] The first documented police communications date back to Old England, where "constables[11] carried a hand bell or rattle, referred to as a ratchet."[12] The constables would sound the rattle when necessary to alert others in the surrounding area of their need for assistance.[13] These rattles were used by "police forces, fire brigades, and military units across the British Empire up through [World War I]."[14]

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10. *See* Kenneth E. Morgan, *Computer Aided Dispatch Technology: A Study of the Evolution and Expectations of CAD and a Comparative Survey of CAD in the U.S. Fire Service and the Clark County Fire Department*, UNLV U. LIBR., https://digitalscholarship.unlv.edu/cgi/viewcontent.cgi?article=1575&context=thesesdissertations [https://perma.cc/D87Y-AX9N] (last visited Aug. 27, 2018).

11. A constable is a British word for police officer, particularly one of the lowest rank. *Constable*. OXFORD DICTIONARIES, https://en.oxforddictionaries.com/definition/constable [https://perma.cc/23RM-XFJ3] (last visited Mar. 29, 2017).

12. Gail Koger, *In the Beginning*, 9-1-1 MAG., http://www.9-1-1magazine.com/In-The-Beginning/ [https://perma.cc/D8DJ-QVXQ] (last visited Mar. 12, 2017).

13. *See id.*

14. Edward J. Steenberg, *Police Rattles & Whistles*, SAINT PAUL POLICE HIST. SOC'Y, http://www.spphs.com/history/whistles/index.php [https://perma.cc/HNS8-MLQ3] (last visited Mar. 12, 2017).

Another form of police communication was developed in the late 1800s.[15] Police communicated with one another on the streets by placing a red signal light near major intersections where officers were needed.[16] By 1870, the Chicago Police Department updated its signal lights with "call booths," accessible only by an officer or "reputable citizen" who was issued a key.[17] Inside each call booth was a "telegraph that was set up with a device that looked like a clock with a bell on top."[18] For police officers to communicate with police headquarters regarding their status, "an officer would move the pointer on the telegraph to one of eleven specific choices[19]…and pull a handle."[20] Just a decade later, the Chicago Police Department updated the call booths by adding telephones that linked the officer directly to the police department.[21]

Detroit was the first city to utilize an "on the air" voice communication for police dispatch.[22] In 1928, the Detroit Police Department began utilizing a one-way radio to facilitate arrests.[23] However, the application of the one-way radio was limited in the sense that only the police department could talk to the officer, and the officer could not directly respond; police officers had to communicate back to headquarters through telephone or call booths.[24] A marked advancement in police technology came five years later with the advent of the two-way radio, which was first used in Bayonne, New Jersey.[25] The two-way radio connected the Bayonne Police Department to nine of their patrol vehicles.[26]

With popular manufacturers such as General Electric, RCA, and Motorola mass-producing police radios, by 1940 the first statewide radio system was implemented by the Connecticut State Police.[27] Still, when an officer left his vehicle, he was unable to communicate directly with headquarters, creating a major need for a hand-held mode of communication.[28] Hand-held radios were first developed in 1960 using technologies utilized during World War II.[29] While hand-held radios were an advancement, they also had drawbacks.[30] The first hand-held radios were the

15. *See* Fleischer, *supra* note 3.
16. *See* Koger, *supra* note 12.
17. *See* Fleischer, *supra* note 3.
18. *Id.*
19. The choices "were arson, thieves, forgers, riot, drunkard, murder, accident, violation of city ordinances, fighting, testline, and fire." *Id.*
20. *Id.*
21. *See id.*
22. *See id.*
23. *See id.*
24. *See id.*
25. *See* Koger, *supra* note 12.
26. *See id.*
27. *See* Fleischer, *supra* note 3.
28. *See id.*
29. *See id.*
30. *See id.*

"size of a brick and weighed about five pounds."[31] Naturally, an officer could not carry such a heavy and cumbersome object or wear it in his or her belt without it hindering his or her actions.[32]

Still, even with these vast improvements in radio technology, a new deficit was identified.[33] Because many people did not know the seven-digit phone number for their local police department, telephone operators became "unofficial public safety dispatchers."[34] This placed telephone companies in the precarious position of determining the best point of contact for a particular emergency, often in the absence of the caller's exact location.[35] It became clear that an "easily remembered means" was necessary to "connect callers to the appropriate agency and identify their location."[36]

2. The Creation of 9-1-1

The National Association of Fire Chiefs was the organization to first call for a nationwide emergency telephone number.[37] In 1957, the Association recommended use of a single number for reporting fires.[38] A decade later, the President's Commission on Law Enforcement and Administration of Justice recommended that a single number be established nationwide for reporting emergency situations.[39] Additionally, "[t]he use of different telephone numbers for each type of emergency was determined to be contrary to the purpose of a single, universal number."[40] As a result, the President's Commission sought help from the Federal Communications Commission (FCC) to develop a single-number solution.[41]

In November 1967, the FCC met with the American Telephone and Telegraph Company (AT&T) in hopes of creating what would become a universal emergency number that could be utilized throughout the country.[42] At the time, AT&T operated a vast majority of telephone traffic in the United States.[43] In 1968, "AT&T announced that it would establish the digits 9-1-

31. *Id.*
32. *See id.*
33. *See* Fleischer, *supra* note 3.
34. *Id.*
35. *See id.*
36. *Id.*
37. *See 9-1-1 Origin & History*, NAT'L EMERGENCY NUMBER ASS'N, https://www.nena.org/?page=911overviewfacts [https://perma.cc/VH2U-7DVP] (last visited Mar. 12, 2017).
38. *See id.*
39. *See id.*
40. *Id.*
41. *See id.*
42. *See id.*
43. *See* Carolyn Abate, *History of 911: America's Emergency Service, Before and After Kitty Genovese*, PBS (Jan. 19, 2017), http://www.pbs.org/independentlens/blog/history-of-911-americas-emergency-service-before-and-after-kitty-genovese/ [https://perma.cc/T9HQ-QVJS].

1… as the emergency code throughout the United States."[44] The code 9-1-1 was chosen for two reasons:

> First, and most important, it met public requirements because it is brief, easily remembered, and can be dialed quickly. Second, because it is a unique number, never having been authorized as an office code, area code, or service code, it best met the long-range numbering plans and switching configurations of the telephone industry.[45]

Congress supported AT&T's plan and ultimately passed legislation requiring the telephone providers to absorb the cost of central office modifications and local law enforcement agencies to pay network trunking[46] costs according to tariffed rates.[47] The Executive Branch confirmed the establishment of 9-1-1 in March 1973 by issuing a "national policy statement which recognized the benefits of 9-1-1, encouraged the nationwide adoption of 9-1-1, and provided for the establishment of a Federal Information Center to assist units of government in planning and implementation" from the White House's Office of Telecommunications.[48]

9-1-1 was serving about 17% of the population of the United States by the end of 1976.[49] By 1979, 9-1-1 had extended to "approximately 26% of the population of the United States… and nine states had enacted 9-1-1 legislation," while "9-1-1 implementation was growing at the rate of 70 new systems per year."[50] By the end of the 20th century "nearly 93% of the population of the United States was covered by some type of 9-1-1 service."[51] In response to the widespread use of a single emergency number, advances in police dispatch technology soon followed.[52]

3. The Current Regime: Computer Aided Dispatch Systems

Computer Aided Dispatch (CAD) systems were developed by vendors in the 1960s to accommodate the newly created 9-1-1 systems.[53] CAD

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44. *See 9-1-1 Origin & History*, *supra* note 37.
45. *Id.*
46. A "trunk" connects a private telephone network to the public telephone network. Trunks contain channels that facilitate incoming and outgoing telephone calls. *See, e.g.*, *Pricing*, SIP.US, http://www.sip.us/pricing/ [https://perma.cc/PJP2-2YG2] (last visited Mar. 29, 2017).
47. *See 9-1-1 Origin & History*, *supra* note 37.
48. *Id.*
49. *See id.*
50. *Id.*
51. Coverage is approximately 96% today. *Id.*
52. *See* TOM MCEWEN ET AL., COMPUTER AIDED DISPATCH IN SUPPORT OF COMMUNITY POLICING, NAT'L INST. OF JUST. (2002), https://www.ncjrs.gov/pdffiles1/nij/grants/204025.pdf [https://perma.cc/4UVS-Z3FR].
53. *See id.*

systems support two key objectives of the professional policing model: "(1) satisfying citizens with rapid responses to all calls for service and (2) effecting arrests to reduce crime."[54] The implementation of CAD technology both decreased the response time to send officers to calls for assistance and allowed for more efficient emergency resource allocation.[55]

There are two features of CAD systems that are particularly important for the purposes of this Note. First, CAD systems "provide a rich source of data because of the detailed information they contain on what patrol officers do," such as resource management, call taking, location verification, dispatching, unit status management, and call disposition.[56] Second, "less than 20 percent of the citizen calls in a CAD system are for serious crime incidents. The rest are for incidents that affect the callers' quality of life to such an extent that they believe police intervention is necessary," such as a noise complaint or reporting an abandoned vehicle.[57] Despite nationwide advances in police dispatch technology, the police have still struggled to maintain public trust.[58]

B. The Rise in Police Use of Excessive Force

Despite advances in police dispatch technology, public distrust of the police is at an all-time low. [59] The public's skepticism likely stems from numerous officer shootings involving unarmed civilians, which attracted significant media attention.[60] While the National Institute of Justice states that there is no single, agreed upon definition of "force," it notes that the "International Association of Chiefs of Police has described use of force as the 'amount of effort required by police to compel compliance by an unwilling subject.'"[61] The Legal Information Institute has further defined the term "excessive force" as "force in excess of what a police officer reasonably believes is necessary." [62] The National Institute of Justice uses five categorizations within a "Use of Force Continuum" to describe various levels of police contact.[63] The least violent method of resolution is called "Officer Presence," which categorizes incidents where no force is used.[64] The second

54. *Id.*
55. *See id.*
56. *Id.*
57. *Id.*
58. *See* Jones, *supra* note 8.
59. *See id.*
60. *See id.*
61. *Police Use of Force*, NAT'L INST. OF JUST., https://www.nij.gov/topics/law-enforcement/officer-safety/use-of-force/pages/welcome.aspx [https://perma.cc/3VM6-WZ2V] (last modified Nov. 29, 2016).
62. *Excessive Force*, LEGAL INFO. INST., https://www.law.cornell.edu/wex/excessive_force [https://perma.cc/95U9-5NC5] (last visited Mar. 12, 2017).
63. *The Use-of-Force Continuum*, NAT'L INST. OF JUST. (Aug. 3, 2009), https://www.nij.gov/topics/law-enforcement/officer-safety/use-of-force/Pages/continuum.aspx [https://perma.cc/MG2J-ECAA].
64. *See id.*

category is "Verbalization," in which the force is not physical and the police issue calm, non-threatening demands.[65] The third category is "Empty-Hand Control," in which police officers "use bodily force to gain control of a situation."[66] The fourth category is "Less-Lethal Methods," in which less-lethal technologies are used to gain control of a situation.[67] Lastly, "Lethal Force" is defined as the use of deadly weapons used to gain control of a situation.[68] The Institute points out that this type of force "should only be used if a suspect poses a serious threat to the officer or another individual."[69] The appropriate use of force is context-specific; there is no single level that is in and of itself "excessive."[70]

Recent police shootings in Ferguson, Missouri,[71] Staten Island, New York,[72] and Charleston, South Carolina,[73] to list a small portion of many, have increased citizens' level of concern over police use of excessive force.[74] Fatal shootings across the country have ignited a public uproar and grave concern about police violence.[75] A Gallup poll in 2015 indicated that only 52% of American adults had "a great deal" or "quite a lot" of confidence in the police; this marked the lowest percent of confidence in police in 22 years.[76] 18% of Americans said they had "very little" or "no" confidence in

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65. *See id.*

66. There are two types of "Empty-Hand Control": soft techniques and hard techniques. When using soft techniques, police officers use "grabs, holds, and joint locks to restrain an individual," as opposed to hard techniques, in which police officers use "punches and kicks to restrain an individual." *Id*.

67. There are three types of "Less-Lethal Methods": blunt impact, chemical, and Conducted Energy Devices (CEDs). Blunt impact allows an officer to "immobilize a combative person" by using a "baton or projectile." Chemical force restrains an individual by using "chemical sprays or projectiles embedded with chemicals," such as pepper spray. CEDs "immobilize" an individual by discharging a "high-voltage, low-amperage jolt of electricity at a distance." *See id*.

68. *See id*.

69. *Id.*

70. The Supreme Court has rejected a generalized excessive force standard for civil rights deprivation cases brought under 42 U.S.C. § 1983. *See* Graham v. Connor, 490 U.S. 386, 393–94 (1989).

71. *See* Larry Buchanan et al., *What Happened in Ferguson?*, N.Y. TIMES (Aug. 10, 2015), https://www.nytimes.com/interactive/2014/08/13/us/ferguson-missouri-town-under-siege-after-police-shooting.html [https://perma.cc/6UXN-TJNS].

72. *See* Deborah E. Bloom & Jareen Imam, *New York Man Dies After Chokehold by Police*, CNN (Dec. 8, 2014, 5:31PM), http://www.cnn.com/2014/07/20/justice/ny-chokehold-death/ [https://perma.cc/W8EU-M3KX].

73. *See* Alan Blinder, *Mistrial for South Carolina Officer Who Shot Walter Scott*, N.Y. TIMES (Dec. 5, 2016), https://www.nytimes.com/2016/12/05/us/walter-scott-michael-slager-north-charleston.html [https://perma.cc/42K4-HLRL].

74. *See* Martin Kaste, *After Stephon Clark Shooting, Questions Remain About Police Use Of Force*, NPR (Apr. 4, 2018, 6:02 PM), https://www.npr.org/2018/04/04/599525838/after-stephon-clark-shooting-questions-remain-about-police-use-of-force [https://perma.cc/9U8T-SZFZ].

75. *See, e.g.*, Salazar-Limon v. Houston, 826 F.3d 272 (5th Cir.), *cert. denied*, 137 S.Ct. 1277, n.2 (2017) (Sotomayor, J., dissenting) ("Some commentators have observed the increasing frequency of incidents in which unarmed men allegedly reach for empty waistbands when facing armed officers.").

76. *See* Jones, *supra* note 8.

the police, also the highest percentage in over 22 years.[77] 2016 showed a slight uptick to 56% of American adults having "a great deal" or "quite a lot" of confidence in the police; however, 14% of Americans still said they had "very little" or "no" confidence in the police.[78] Over the course of the 22-year study, Americans have only reported such minimal confidence since 2012.[79]

Although the Violent Crime Control and Law Enforcement Act of 1994 required the government to keep "data about the use of excessive force by law enforcement officers,"[80] such a database never came to fruition.[81] Even though the Bureau of Justice Statistics and the National Institute of Justice began jointly publishing an annual report in 1996 on "Police Use of Force," the Institute itself has admitted that "the mechanisms for systematically acquiring data are not yet in place."[82] Still 20 years later, there is no single streamlined source for excessive force data. The data that is currently reported on "excessive force" comes from a host of various surveys, none of which directly relate to whether the amount of police force used is justified under the circumstances.[83] While at first glance the FBI's Uniform Crime Reporting Program (UCR) appears to show more promise by posting the annual statistics regarding the number of "justifiable homicides" by law enforcement, [84] other organizations have noted problems with these

77. *See id.*

78. *See* Frank Newport, *U.S. Confidence in Police Recovers From Last Year's Low*, GALLUP (June 14, 2016), http://www.gallup.com/poll/192701/confidence-police-recovers-last-year-low.aspx?g_source=police&g_medium=search&g_campaign=tiles [https://perma.cc/D9N7-BQRG].

79. From 1993 to 2011, the combined minimal and no confidence ratings ranged from 8-13%. Only since 2012 have these same percentages consistently ranged between 13-18%. *See* Jones, *supra* note 8.

80. The Act requires that the Attorney General publish an annual summary of data acquired on police use of force. *See* 34 U.S.C. § 12602 (2017).

81. There is no national database of officer-involved shootings or incidents in which police use excessive force. *See Police Use of Force*, *supra* note 63.

82. TOM MCEWEN ET AL., *supra* note 54.

83. The following surveys collect data on various aspects of law enforcement use of force, although none are specifically devoted to unjustified use of police force: Police-Public Contact Survey (PPCS), Arrest-Related Deaths (ARD) program, Law Enforcement Management and Administrative Statistics (LEMAS), Survey of Inmates in Local Jails (SILJ), Census of Law Enforcement Training Academies (CLETA), FBI's Supplementary Homicide Reports (SHR), and FBI's Law Enforcement Officers Killed and Assaulted (LEOKA). *See Use of Force*, BUREAU OF JUST. STAT., https://www.bjs.gov/index.cfm?ty=tp&tid=84 [https://perma.cc/G3FM-A863] (last revised Mar. 10, 2017).

84. *See Expanded Homicide*, FBI: UCR, https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/offenses-known-to-law-enforcement/expanded-homicide [https://perma.cc/DH43-58H4] (last visited Mar. 12, 2017).

statistics.[85] For example, UCR reports do not include any information on victims or offenders, which are provided on a separate form called the Supplementary Homicide Report (SHR).[86] David Klinger, an associate professor of criminology and criminal justice at the University of Missouri and a specialist in policing and the use of deadly force, has noted that "[n]obody that knows anything about the SHR puts credence in the numbers that they call 'justifiable homicides.'"[87] So, while we know the use excessive force may be rising, there is a gap in concrete data to show just how many of these deaths were "justifiable," as opposed to "unjustifiable."[88]

In the absence of transparent and easily accessible government data, the media has taken a significant interest in pursuing this epidemic.[89] The Washington Post now has a live database for fatal police shootings, which is searchable by state, gender, race, age, mental illness, and weapon.[90] Other criteria include whether the police officer was wearing a body camera, whether the suspect tried to flee the scene, and whether the officer responsible has been identified.[91] While these efforts meant to increase law enforcement accountability should be applauded, there is no category for "use of excessive force."[92]

The government's most recent inquiries are just beginning to uncover the deep-rooted issue of police violence. For example, the 2014 fatal Chicago police shooting of 17-year-old Laquan McDonald spurred the Department of

85. *See* Reuben Fischer-Baum, *Nobody Knows How Many Americans the Police Kill Each Year*, FIVETHIRTYEIGHT (Aug. 19, 2014, 11:36 AM), https://fivethirtyeight.com/features/how-many-americans-the-police-kill-each-year/ [https://perma.cc/N6WT-4CB3] (citing John Wihbey & Leighton Walter Kille, *Excessive or reasonable force by police? Research on law enforcement and racial conflict*, JOURNALIST'S RESOURCE, https://journalistsresource.org/studies/government/criminal-justice/police-reasonable-force-brutality-race-research-review-statistics [https://perma.cc/6NK8-HSWE] (last updated July 28, 2016)).

86. *See id.*

87. *Id.*

88. *See id.*

89. *See* Matt Apuzzo & Sarah Cohen, *Data on Use of Force by Police Across U.S. Proves Almost Useless*, N.Y. TIMES (Aug. 11, 2015), https://www.nytimes.com/2015/08/12/us/data-on-use-of-force-by-police-across-us-proves-almost-useless.html [https://perma.cc/JG72-RHGV].

90. *See Fatal Force*, WASH. POST, https://www.washingtonpost.com/graphics/national/police-shootings-2016/ [https://perma.cc/6Y7R-U7QL] (last visited Mar. 12, 2017); *see alsoHow The Washington Post Is Examining Police Shootings in the United States*, WASH. POST (July 7, 2016), https://www.washingtonpost.com/national/how-the-washington-post-is-examining-police-shootings-in-the-united-states/2016/07/07/d9c52238-43ad-11e6-8856-f26de2537a9d_story.html [https://perma.cc/53B8-VQZT].

91. *See id.*

92. *Id.*

Justice to examine the Chicago Police Department's practices.[93] The report, released January 2017, concluded that the Chicago police engaged in numerous instances of unjustified force, including "shooting at vehicles without justification, using Tasers on people who posed no threat, and using force to retaliate against and punish people."[94] The recent spotlight and unsettling discoveries on widespread police use of excessive force suggests a need to study, determine, and remedy the root cause of the issue.

C. The Psychology Behind Excessive Force

The use of excessive force has deep roots in psychology. It has long been recognized that "[e]xcessive force needs to be considered a result not only of individual personality traits but also of organizational influences."[95] While individual factors such as aggressive or abusive personalities and triggers from former job experience may make officers more prone to the use of excessive force,[96] organizational factors are perhaps more influential and more often overlooked.

Post-Traumatic Stress Disorder (PTSD) and its less severe forms are a part of everyday life for many law enforcement officers.[97] According to the Anxiety and Depression Association of America, PTSD is "a serious potentially debilitating condition that can occur in people who have experienced or witnessed a natural disaster, serious accident, terrorist incident, sudden death of a loved one, war, violent personal assault such as rape, or other life-threatening events."[98] While PTSD is generally treatable, people suffering from PTSD "continue to be severely depressed and anxious for months or even years following the event."[99]

For police officers, PTSD can be triggered in two ways: through a single traumatic event or from ongoing stress.[100] A single traumatic event

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93. *See* Jason Hanna & Madison Park, *Chicago Police Use Excessive Force, DOJ Finds*, CNN (Jan. 13, 2017, 4:56 PM), http://www.cnn.com/2017/01/13/us/chicago-police-federal-investigation/ [https://perma.cc/6FN5-PUC6] (citing INVESTIGATION OF THE CHICAGO POLICE DEP'T, U.S. DEP'T OF JUST. C.R. DIVISION AND U.S. ATT'YS OFF. NORTHERN DISTRICT OF ILL. (Jan. 13, 2017), http://i2.cdn.turner.com/cnn/2017/images/01/13/cpd.findings.pdf [https://perma.cc/Z7R8-ZCRD]).

94. *See id.*

95. *See* ELLEN M. SCRIVNER, CONTROLLING POLICE USE OF EXCESSIVE FORCE: THE ROLE OF THE POLICE PSYCHOLOGIST, NAT'L INST. OF JUST. (1994), https://www.ncjrs.gov/pdffiles1/Digitization/150063NCJRS.pdf [https://perma.cc/8Z25-LXUQ].

96. *See id.*

97. *See* Constance Scharff, *Police Brutality and PTSD: Is There a Connection?*, HUFFINGTON POST: BLOG (Sept. 8, 2015, 9:51 AM), http://www.huffingtonpost.com/constance-scharff-phd/police-brutality-and-ptsd_b_8094396.html [https://perma.cc/YJ28-TUBD].

98. *Understand the Facts: Posttraumatic Stress Disorder (PTSD)*, ANXIETY AND DEPRESSION ASS'N OF AM., https://www.adaa.org/understanding-anxiety/posttraumatic-stress-disorder-ptsd [https://perma.cc/EZ39-44EN] (last visited Apr. 11, 2017).

99. *Id.*

100. *See* Scharff, *supra* note 99.

could be responding to a life-threatening domestic violence incident or participating in the fatal shooting of a suspect.[101] Ongoing stress includes "being witness to difficult situations that one is powerless to change," such as "responding day after day to cases of domestic violence, child abuse, desperate people stealing to put food on the table, or to help individuals who are suicidal or so high they are a threat to themselves or others."[102] Both single traumatic events and ongoing stress can significantly impact an officer's ability to do his or her job effectively, including using the appropriate amount of force.[103]

There are many similarities between the experiences of military veterans and police officers who develop PTSD.[104] Both veterans and police officers "have a culture of denying the psychological wounds their jobs can create and are sometimes inhibited by that culture and personal beliefs when it comes to seeking treatment."[105] While some focus primarily on the "[f]ailure to treat PTSD, which is estimated to affect nearly one in three officers at some point in their careers," another nexus point should center on preventing the dispatch of law enforcement officers to back-to-back violent incidents, potentially avoiding the PTSD trigger altogether.[106] It is well known that those untreated officers "are more likely than their counterparts without PTSD to overreact and make poor decisions in difficult situations."[107] Thus, a potential solution could be putting officers who are especially at risk in less risky situations.

III. PROBLEMS WITH THE CURRENT STATE OF CAD

CAD data can be particularly beneficial in identifying problems and in measuring the impact of problem solving efforts. However, CAD applications have been criticized as inadequate.[108] There are several weaknesses in CAD that stem from call classification processes.[109] For

101. *See id.*
102. *Id.*
103. *See* John Violanti, *PTSD among Police Officers: Impact on Critical Decision Making*, COMMUNITY OF POLICING DISPATCH (May 2018), https://cops.usdoj.gov/html/dispatch/05-2018/PTSD.html [https://perma.cc/XAX2-DELH].
104. *See id.*
105. *Id.* (citing Tom McGhee, *Police officers struggle with PTSD, but treatment can bring stigma*, THE DENV. POST (June 18, 2014 3:12PM), http://www.denverpost.com/2014/06/18/police-officers-struggle-with-ptsd-but-treatment-can-bring-stigma/ [https://perma.cc/WNU4-SJCE] (last updated Apr. 27, 2016 5:48AM); Hal Brown, *The Effects of Post Traumatic Stress Disorder (PTSD) on the Officer and the Family*, AM. ACAD. OF EXPERTS IN TRAUMATIC STRESS, http://www.aaets.org/article132.htm [https://perma.cc/7PZX-8QU4] (last visited Apr. 11, 2017); *What's Stopping You? Overcome Barriers to Care*, U.S. DEP'T OF VETERANS AFF., http://www.ptsd.va.gov/public/treatment/therapy-med/Stigma_Barriers_to_Care.asp [https://perma.cc/RB79-N89C] (last updated Aug. 14, 2015)).
106. Scharff, *supra* note 99.
107. *Id.*
108. MCEWEN ET AL., *supra* note 54, at 1.
109. *Id.* at 1-2.

example, "the type of call" inputted into CAD is typically based on information conveyed by the caller, who may not be able to correctly identify two related, but distinctly different crimes, such as the difference between "a burglary and a robbery or between vandalism and graffiti."[110] In addition, many call centers may fail to adequately identify each type of call, creating an over-utilized but misrepresentative "other type of call" category.[111] Other problems relate to determining the incident address, which can be problematic when "the telephone number and address from [9-1-1] systems may not be the location of the incident."[112] A final problem is the need for a new vocabulary to describe CAD information. In some cities, every record gets counted as a call for service, including "multiple calls on the same incident, assist units at the same incident, and administrative and self-initiated activities," which make it difficult to ascertain the availability of different officers on-call.[113]

In addition to the problems that have been previously posited, as discussed below, the CAD system is far from perfect. The current CAD dispatch system, accompanied by manually implemented, city-specific police department policies, creates additional flaws that can inadvertently lead to the use of excessive police force.[114] These weaknesses include a (1) a lack of digital prevention mechanisms in the CAD system, (2) a wide variance in city-specific post-traumatic incident policy guidelines, and (3) a failure to leverage CAD's full technological capabilities.[115]

A. Lack of Digital Prevention Mechanisms

Police officers use CAD to "facilitate incident response and communication in the field."[116] "Calls for service" (CFS) initiate the CAD process, in which citizens or other agencies requesting services provide "notification of events or activities of concern."[117] A CFS may originate in a variety of ways, including "alarm systems, E911 systems, direct calls…, walk-ins, CAD-to-CAD interfaces or Web-based systems."[118] Call taking entails "receiving the call, obtaining sufficient and accurate information from the caller, determining whether this is a duplicate of a call in progress, and recording or updating the CFS in the CAD system."[119] The call taker may also "verify, analyze, classify, and prioritize the call prior to routing the CFS

110. *See id.* at 2.
111. *See id.* at 2.
112. *Id.* at 2.
113. *Id.* at 2.
114. *See*, *e.g.*, STANDARD FUNCTIONAL SPECIFICATIONS FOR LAW ENFORCEMENT COMPUTER AIDED DISPATCH (CAD) SYSTEMS, U.S. DEP'T OF JUST. 1, http://www.theiacp.org/portals/0/pdfs/LawEnforcementCADSystems.pdf [https://perma.cc/QA7A-DZRN] (last visited Apr. 11, 2017).
115. *See id.*
116. *Id.*
117. *Id.*
118. *Id.*
119. *Id.*

to the dispatcher."[120] A police officer in the field may also generate a CFS by contacting the "dispatcher or the call taker, or [s/]he may actually create the call electronically using the optional MDT [mobile data terminal] interface."[121]

First, the call taker will assign the emergency a "nature code, which may include general classification and subtypes of the call."[122] Then, the CAD system will prioritize the call based on type "to determine the appropriate dispatch and response needs."[123] Following prioritization, the system "automatically evaluates the CFS location to determine…whether a call is a duplicate."[124] Then, the call taker either confirms or eliminates this possibility by evaluating the information already in the system with that obtained from the caller.[125] At this point the call taker requests the caller's basic information, including the "type of call (nature of the complaint), the priority, and the location"[126] of the emergency.[127] Once the basic information is entered into the CAD system, the fifth step is to route the call to the appropriate dispatcher.[128] The last step for the call taker is to cross-check the caller's location against address listings already in the CAD system, which can be a street address, intersection, or common place.[129]

At this point in the CAD process, the dispatcher takes over. "The dispatcher is presented with the recommended resources…based upon preset criteria for the type and priority of CFS."[130] Other information the dispatcher uses to determine the necessary resources include the "history of the location, suspect, and the possibility that hazardous materials may be involved."[131] Officers available for dispatch are designated as unassigned.[132] The CAD determines officer "proximity based on a closeness calculation, which can be distance or driving time."[133] The officer is then selected and dispatched accordingly.[134] Once the officer has left the scene, the CFS is closed.[135]

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120. *Id.*
121. *Id.*
122. *Id.* at 4.
123. *Id.*
124. *See id.*
125. "Calls for service may be received by many sources for the same CFS, such as a traffic accident witnessed by two or more motorists or a fire alarm reported from an electronic monitoring system or a witness reporting smoke coming from a business. The call may be determined to be unique, but if it is not it will be linked to another existing call." *Id.*
126. "In many instances, the call taker has access to the call origination location" but if not, the emergency "location must be elicited from the caller." It is important to note that "the caller's location may not be the location of the call for service." *Id.*
127. *Id.*
128. *See id.*
129. *See id.*
130. *Id*. at 6.
131. *Id.* (Some CAD systems have the capability to allow the dispatcher to override the recommended resources "based on the additional information or requests by officers on the scene.").
132. *See id.* at 7.
133. *Id.*
134. *See id.*
135. *See id.* at 15.

While the current CAD system accounts for concerns for those *at* the scene, it fails to account for concerns for those *arriving* to the scene.[136] The only criteria within the current CAD system used to determine which officers are dispatched are (1) location and (2) availability.[137] No process of the system correlates the violence of the incidents with the police officers being dispatched; they are treated as wholly separate. This is a mistake given that the two concepts are deeply intertwined. For example, an officer who just finished responding to a suicide, "Officer #1," would show as "unassigned" in the dispatch system right alongside someone who just finished conducting house surveillance for eight hours, "Officer #2." The current CAD system does not differentiate between the two and thus will treat them interchangeably. If a call came in to respond to an armed robbery, Officer #1 and Officer #2 have a statistically equal chance of being deployed to the scene.

From a risk-management standpoint, this makes little sense. While Officer #1 and Officer #2 have an equal chance of being deployed, the "risk" associated with their deployment is far from equal. It is much riskier to send Officer #1 to the scene, who might overreact to the robbery and use lethal weapons as a response to the violent trigger of guns and potential hostages. Officer #2 would be a far less risky choice, as he has not experienced any incidents on duty that day that would give him a predisposition to violence. As a practical matter, it is counterintuitive to fail to take the risks of each police officer and his or her current experiences into account in CAD.

B. Post-Traumatic Incident Policy Guidelines Vary Widely by City

Although there is no formal mechanism in place to prevent police officers from responding to back-to-back violent incidents, it is nonetheless important to recognize that some police departments may attempt to manually address these concerns through their standard operating procedures. Although there is no nationwide stance on this issue, the International Association of Chiefs of Police (IACP) recommends that officers not be required to return to work immediately following a post-shooting or other critical incident intervention session.[138] Still, individual cities vary widely on their prevention mechanisms following police officer involvement in traumatic incidents. For example, the Cincinnati Police Department requires contact with police psychologists and administrative leave following an incident resulting in death or serious injury.[139] The Boise Police Department, on the other hand, notes that their recommendation of a minimum of three

136. *See id.* at 7.

137. *See id.*

138. *See* OFFICER-INVOLVED SHOOTING GUIDELINES, INT'L ASS'N OF CHIEFS OF POLICE 9 (2013), http://www.theiacp.org/portals/0/documents/pdfs/psych-officerinvolvedshooting.pdf [https://perma.cc/8WQC-3CM7].

139. *See Post Critical Incident Trauma*, CITY OF CIN., 1-2, http://cincinnati-oh.gov/police/assets/File/Procedures/19106.pdf [https://perma.cc/57XA-FDH6] (last updated Mar. 14, 2013).

days' administrative leave and initial consultation with a psychologist or psychiatrist within 72 hours of the traumatic incident are mere guidelines, not requirements.[140]

There are several problems with this policy-based approach. First, each city may determine what a "critical" or "qualifying" incident is differently, which presupposes that the traumatic effect in responding to the same types of incidents is dependent on the officer's geographical location. Second, some cities require that officers take administrative leave, while others only recommend it and may only issue it upon officer request, making the time to process a situation and address any mental health concerns dependent on the locale the officer serves.[141] Lastly, some cities may choose to see the guideline as a mere recommendation and ignore it, possibly due to a failure to recognize the risks or short staffing. Thus, the current individual city policy-based approach to risk-management is ineffective when implemented on a national scale.

C. Failure to Leverage Full Technological Capabilities

From the description of the CAD process, it is clear that the system is capable of handling multiple inputs. The CAD system is already used to intake the caller's location, nature of the emergency, and contact information.[142] This system is fully capable of adding additional inputs to account for the level of violence anticipated at the incident, based on the nature of the incident described.[143] A main part of the CAD revolution was to be able to communicate electronically with those dispatched or unassigned in various locations. Thus, the CAD system would also be capable of taking in additional information from officers when they close out each CFS.

IV. A RISK-BASED APPROACH TO CAD

While some appear to have posited a risk-based approach to CAD[144], no city has yet to implement this type of approach on a large scale with the goal of minimizing police violence. There are several benefits to utilizing a risk-based approach. Federal law enforcement agencies have noted that risk-

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140. *See Policy Manual*, BOISE POLICE DEP'T, 22, https://police.cityofboise.org/media/8830/BPD%20Policy%20Manual%20-%20Sept%202015%2020150901_Redacted.pdf [https://perma.cc/W2L4-FQXD] (last updated Sept. 1, 2015).

141. *See Post Critical Incident Trauma*, *supra* note 141; *see also Policy Manual*, *supra* note 142.

142. *See* STANDARD FUNCTIONAL SPECIFICATIONS FOR LAW ENFORCEMENT COMPUTER AIDED DISPATCH (CAD) SYSTEMS, *supra* note 116.

143. The author confirmed this assumption with a prominent CAD Developer. Telephone Interview with Eric Sargent, Crimestar Corporation (Mar. 2, 2017).

144. A recent patent of a CAD system posits the idea that the importance of calls be ranked through a risk-assessment of the situation pertaining to the caller. *See* Protocol builder for a call handling system, U.S. Patent No. 7,646,858, at [2] (filed Apr. 11, 2007), http://www.freepatentsonline.com/7646858.pdf [https://perma.cc/WBZ2-G4FL].

based management can "enhance national interests, conserve resources, and assist in avoiding or mitigating the effects of emerging or unknown risks."[145] This created the general idea of "risk-based resource allocation," which is used in a variety of Government sectors with limited resources.[146]

A. How to Re-vamp CAD: Use of Coding to Leverage Current Technologies

The revised CAD system would require two new input components. One new component would be inputted during the 9-1-1 call by the dispatcher and another by the police officer following the incident. These components would be comprised of a risk-rating system, on a 1-5 scale. For dispatchers, the 1-5 scale would represent the severity and potential violence of the offense. For example, if the dispatcher receives a call that someone is locked out of his or her car, this would be a very low-risk incident, with a minimal chance of violence. Such an incident would receive a "1" from the dispatcher on the risk-rating scale. However, if the dispatcher receives a call from a bystander who heard shots fired across the street, this would be a very high-risk incident, with a much more likely chance of violent activity. This type of incident would receive a "5" from the dispatcher on the risk-rating scale. These numbers represent the projected level of violence necessary to gain control of a situation.

Following the incident, the police officer would input the actual level of violence used. For example, if the police officer was called to the scene of a fender bender, this would be likely a heated but nonviolent incident. This would receive a "1" or at most a "2" from the police officer on the risk-rating scale. Yet if the police officer was called to a home to break up a domestic violence dispute, this would be a more physical and intense experience, deserving of at least a "5" on the scale.

Based on these two numbers, the CAD system would change the way that police officers are dispatched to reduce the use of excessive force. Rather than solely dispatching based on location, the CAD system would use a combined algorithm of the location *and* the officer's most recent risk-rating. A potential algorithm could look something like this:

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145. RISK MANAGEMENT FUNDAMENTALS, U.S. DEP'T OF HOMELAND SECURITY 8 (Apr. 2011), https://www.dhs.gov/xlibrary/assets/rma-risk-management-fundamentals.pdf, [https://perma.cc/ZD99-YKWG].

146. *See generally* Diana Farrell et al., *Risk-based resource allocation*, MCKINSEY & CO. (Feb. 2013), https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/Risk/Working%20papers/42_Risk-based_resource_allocation.ashx, [https://perma.cc/9CFS-2YZL].

Dispatch = (0.5)Distance * (0.5)Risk Rating[147]

This would result in officers who are close to the scene but who also have not just responded to violent incidents being dispatched. This would reduce the chance of a police officer operating on autopilot and overexerting him or herself. While at first glance it might appear dangerous to dispatch officers who may be farther from the scene, this concern could be alleviated by first implementing a risk-rated system in some of the country's largest cities. In large cities, are most incidents in a smaller geographic area and less likely to be spread out, and these also are more likely to have police forces populous enough to minimize the risk of any significant delay in deployment.

B. Application of Risk-Based CAD Through a National Mandate

The revised CAD system should be implemented by a national mandate issued by Congress. Such a bill would typically have to pass both houses of Congress and receive a signature from the President. There would be three main components of the mandate: (1) geographical requirements, (2) anticipated costs of compliance, and (3) funding.

1. Cities Where Risk-Based CAD Would Have the Greatest Impact

A major concern, given the cost, is how many metropolitan police forces should be required to implement this mandate. The answer was again developed using an algorithm, this time based on the rate of each city's violent crimes and its overall population. The cities were determined using the following algorithm:

Greatest Need = (0.5)Population*(0.5)Rate of Violent Crime[148]

This targets cities that both (1) have the resources to allow for a risk-rated CAD system and (2) are prone to violent crime and thus pose a greater

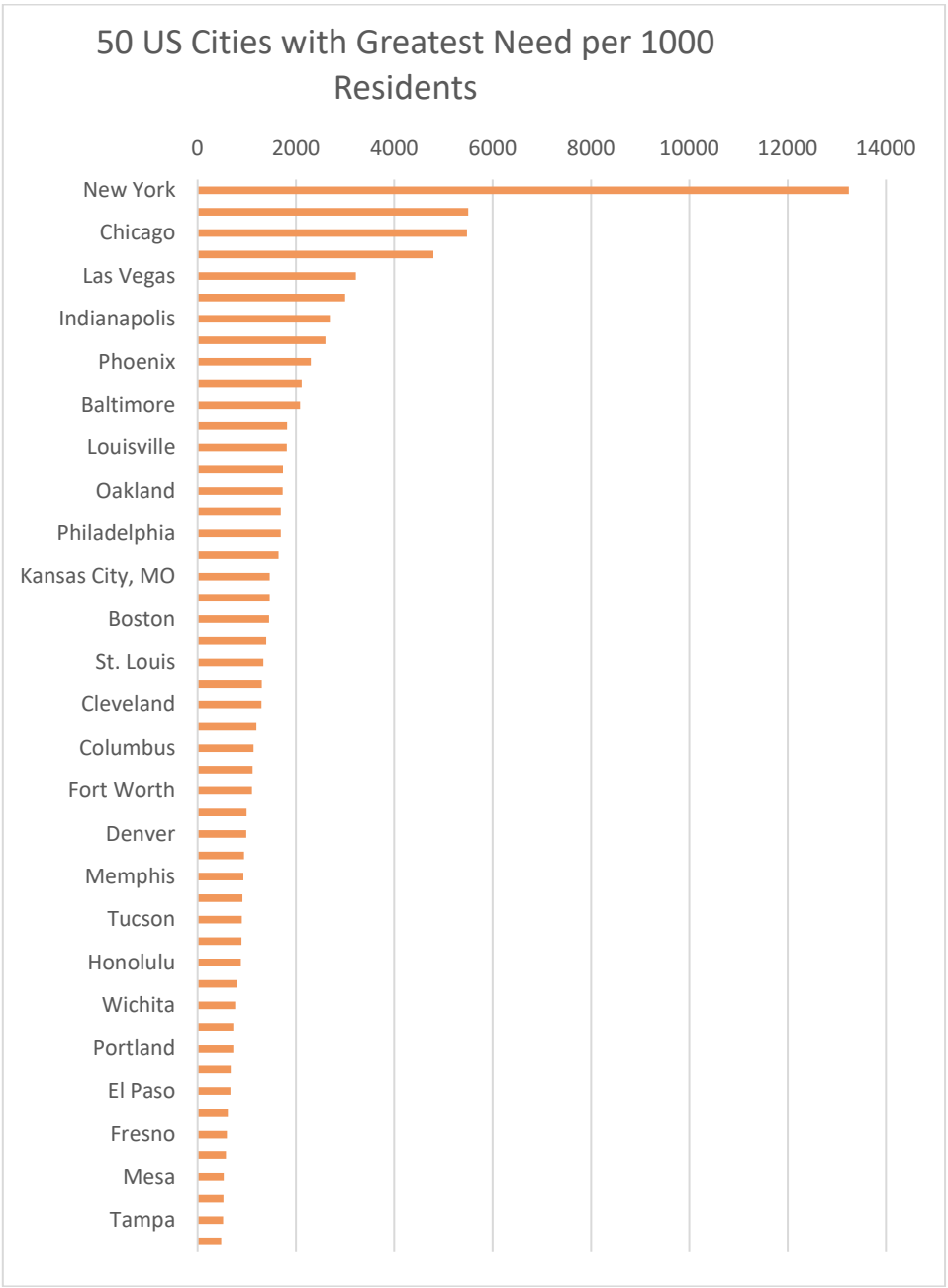
147. The algorithm would be incorporated into the dispatch system to automatically dispatch officers based on their proximity to the incident and their most recent "force" level. 0.5 was chosen as the initial factor to use for both components of the algorithm to equally consider the distance of the police officer from the scene and the potential level of violence required. Of course, the algorithm would need to be studied over time and tested for efficiency using various factors to achieve the best results. For example, it would be important to compare the current suggested factors with (0.4) Distance * (0.6) Risk Rating, and vice versa. The most effective factors would be determined both by how many times police officers were required to respond to back-to-back violent incidents using those numbers and which numbers produced the least number of excessive force interactions between civilians and the police.

148. The cities chosen to implement the algorithm would be based on their population and their most recent rate of violent crime. 0.5 was chosen as the initial factor to use for both components of the algorithm to equally consider the fact that the algorithm requires a larger police force for successful implementation and that areas ridden with violent crime will be best served by excessive force reduction efforts.

risk of requiring police officers to respond to back-to-back violent incidents.[149] The population data leveraged was from the 2014 population projections by the US Census Bureau and the rate of violent crime was leveraged from the 2014 FBI Uniform Crime Report.[150] Figure 1 below reflects the cities in most need of risk-based CAD, according to the algorithm.

149. Because E-911 funds are collected as a standard surcharge on every telephone, and telephone use (mobile or otherwise) is widespread nationwide, cities with greater populations will inherently coincide with cities that have greater public safety funding. *See generally Understanding Your Telephone Bill*, FCC, https://www.fcc.gov/consumers/guides/understanding-your-telephone-bill, https://perma.cc/86LR-C4KP (last updated Jan. 24, 2017).

150. *See 2015 Police Violence Report*, MAPPING POLICE VIOLENCE, https://mappingpoliceviolence.org/2015/, https://perma.cc/A8SU-SE63 (last visited Apr. 11, 2017) (citing *2014 National Population Projections*, U.S. CENSUS BUREAU, https://www.census.gov/population/projections/data/national/2014.html, https://perma.cc/P58M-ARKL (last visited Apr. 11, 2017); *Crime in the U.S. 2014*, FBI: UCR, https://ucr.fbi.gov/crime-in-the-u.s/2014/crime-in-the-u.s.-2014, https://perma.cc/3KXY-43ZV (last visited Apr. 11, 2017)).



As evidenced above, some of the nation's largest metropolitan cities such as New York, Houston, Chicago, and Los Angeles top the list. However, the data revealed that some smaller cities, such as Milwaukee, Oakland, and Colorado Springs also have a need.[151]

151. *See id.* (mapping killings by America's largest city police departments in 2014 and 2015 where Oakland, Milwaukee, and Colorado Springs are listed).

2. Anticipated Costs of Compliance with a Risk-Based CAD System

There are four major costs associated with implementation of a risk-based CAD system: (1) dispatch and police officer training, (2) police department policy and procedure update, (3) additional dispatcher CAD input time, and (4) CAD software update to incorporate the algorithm.[152]

a. Dispatcher and Police Officer Training

Both 9-1-1 dispatchers and police officers would need to be trained in how to use the new risk-rating system. As of the 2015 Bureau of Labor Statistics, police officers made about $29.46 per hour on average.[153] Police dispatchers made about $18.27 on average.[154] It is much more difficult to ascertain the "average" size of a police force, as such numbers vary widely based on a host of factors including the size of the city, rate of crime, etc. However, to be conservative, NYPD's force of 34,500 was used.[155] Estimates indicated that NYPD employed roughly 1,091 dispatchers in in 2009.[156] The actual presentation of the training should take no more than one hour[157] to relay the new procedure to current officers, instruct them on how to use the numbers on the risk-rated scale, and allow time for officers to ask questions. The training materials, namely a chart on how to rate specific types of incidents, would be incorporated into the policy and procedures as discussed below. Training on the new risk-rating system would be incorporated into new officer's training efforts at little to no cost, as it would become part of the normal dispatch and report-writing training. This would result in a very conservative estimate of $1,016,370[158] per department to train police officers

152. *See generally* MCEWEN ET AL., *supra* note 54. Each cost estimate is exemplary only. More study would be required to determine the precise costs required to create, obtain, and implement the proposed algorithm.

153. *See May 2015 National Occupational Employment and Wage Estimates*, BUREAU OF LAB. STAT., https://www.bls.gov/oes/current/oes_nat.htm#33-0000 [https://perma.cc/46LW-5AHE] (last modified Mar. 30, 2016).

154. *See Police, Fire, and Ambulance Dispatchers*, BUREAU OF LAB. STAT. (Dec. 17, 2015), https://www.bls.gov/ooh/office-and-administrative-support/police-fire-and-ambulance-dispatchers.htm [https://perma.cc/5WZT-ZSD6].

155. *See Frequently Asked Questions: Police Administration*, NYPD, http://www.nyc.gov/html/nypd/html/faq/faq_police.shtml#, [https://perma.cc/7QGY-EDSA] (last visited Apr. 11, 2017).

156. *See New '911' Operators Join NYPD Force of Emergency Dispatchers*, NYPD (Feb. 3, 2009), http://www.nyc.gov/html/nypd/html/pr/pr_2009_ph02.shtml [https://perma.cc/MT59-6NQK].

157. This is merely an assumption, the actually training time may be shorter or longer.

158. While at first glance this may seem significant, it is important to note that New York is over twice as large as the next biggest United States city, Los Angeles. Thus, for most cities, this number would likely be cut at least in half. *See 2015 Police Violence Report*, *supra* note 152.

and $19,165 per department to train 9-1-1 dispatchers.[159] As more is learned about the algorithm, a monthly update may be necessary for the first year of implementation to tweak the numbers preceding each variable to ensure maximum effectiveness.[160]

b. Police Department Policy and Procedure Update

To implement the new CAD system, the policies and procedures would need to be updated in each metropolitan city that initiates the change. This would require police staff to (1) describe the new processes for call intake and post-incident reporting, and (2) provide numerous examples of what differentiates each risk-rating level for both dispatchers and police officers. The updates should take no more than two hours[161] for a single police force. Per the 2015 Bureau of Labor Statistics, administrative staff made an estimated $17.55 per hour on average.[162] For the new CAD system, police department administrative staff would need to update the department's policies and procedures, at a cost of approximately $29.46 per hour on average as of 2015.[163] Thus, the policy and procedure update should result in only a minimal expense of about $94 per department. The cost to re-print the selected portion of the updated policies and procedures would also need to be factored in. As of 2017, a typical letter-size pack of paper cost about $7.99 for 500 sheets.[164] Assuming that the new policy and procedure takes no more than five pages to relay, a conservative estimate of the cost of the policy and procedure would be approximately $2,757.

c. Additional Dispatcher CAD Input Time

The additional time a dispatcher or police officer needs to input the risk-ratings into the

system and the associated costs are largely dependent on proper and thorough training. If the dispatchers and police officers have the five categorizes memorized, the input will be almost instantaneous upon hearing the complaint or departing the scene. However, if law enforcement officials spend considerable time looking up the ratings, the new CAD approach will begin to become costly. This can be avoided by providing numerous concrete examples and an interactive practice session during the initial training

159. This is a very conservative estimate given that the NYPD serves the largest city in the nation and thus has a respectively sizable police force.

160. *Supra* note 149.

161. This is merely an assumption, the actually training time may be shorter or longer.

162. *See Secretaries and Administrative Assistants*, BUREAU OF LAB. STAT. (Dec. 17, 2015), https://www.bls.gov/ooh/office-and-administrative-support/secretaries-and-administrative-assistants.htm [https://perma.cc/VGD5-BXNR].

163. *See May 2015 National Occupational Employment and Wage Estimates*, *supra* note 155.

164. *See Staples Multipurpose Paper, 8 1/2" x 11", 500/Ream (513099-WH)*, STAPLES, http://www.staples.com/Staples-Multipurpose-Paper-8-1-2-inch-x-11-inch-Ream/product_513099 [https://perma.cc/Z7GY-8LJR] (last visited Apr. 11, 2017).

exercise as well as specific examples in the policy manual. Providing officials with a concrete and visual sense of risk-rating will make any additional CAD input time negligible following a brief initial learning curve.

d. CAD Software Update to Incorporate Algorithm

In addition, there may be potential costs associated with updating the CAD technology itself. Some major developers of CAD technology, including Crimestar and TriTech, are already capable of one of the two inputs required for the algorithm to work.[165] These CAD systems currently have the capability to operate on an algorithm that prioritizes certain types of calls over others, and effectually ensures that officers respond to more dangerous emergencies more quickly than less imperative concerns.[166] For example, many dispatchers already use a 1-10 numbering system to prioritize the police response,[167] with one being the most imminent (i.e., fight in progress with a knife involved) and ten being the least imminent (i.e., barking dog).[168] Because CAD technology has the capacity for unlimited "inputs" of information relating to each call, it is unlikely that a software update would be required to indicate the level of force used after the incident as well.[169] However, to fully incorporate the risk-rated algorithm into the system, lines of code would likely need to be developed to update current CAD software.[170] The cost of the new software would likely be determined by how long it takes the programmers to develop it.[171] It is important to note, however, that because CAD technology already uses a similar response prioritization algorithm for the order of call responses, creating the code for this particular risk-rated algorithm would not prove cumbersome. After the programmers have updated the software, police departments would then need to purchase the CAD software updates individually.

3. Funding for Risk-Based CAD

a. E-911 Surcharge Increase on Phone Bills

The Federal Communications Commission (FCC) has previously authorized a surcharge on telephone bills[172] called a "911 Emergency Service

165. Telephone Interview with Eric Sargent, *supra* note 143.

166. *Id.*

167. Dispatchers must make an educated guess on the type of call based on the information provided by the caller. Due to the increased potential for initial inaccuracy, CAD technology has the capability to escalate or de-escalate calls by switching the prioritization level as more information about the incident is acquired. *Id.*

168. *Id.*

169. *Id.*

170. *Id.*

171. *Id.*

172. *See Understanding Your Telephone Bill*, *supra* note 151.

Fee."[173] Fee amounts vary by state and are usually charged as a fixed amount, but sometimes come from a percentage of the bill total.[174] The FCC has stated that the intent of the tax is to provide financial assistance to local governments' emergency services.[175] This surcharge was precisely intended to serve as financing for 9-1-1 developments and enhanced technologies to protect local communities.[176]

Although states with large cities and police forces may argue that the entire surcharge is already being utilized by other aspects of emergency services such as paying dispatchers, obtaining current city maps, and squad cars, this seems highly unlikely due to the increasing number of states, including New York, that divert the revenue from E-911 fees to non-public safety uses.[177] In New York, for example, as of January 2017, the 9-1-1 surcharge is between $0.35-$1.00 for landlines and $1.20-$1.50 for wireless telephones.[178] A recent study showed that 96% of people who live in New York City have cell phones,[179] and thus would be subjected to this tax. Therefore, a conservative estimate using $1.20 as the wireless surcharge of how much New York City obtains from the tax each year is approximately $9,781,723. Assuming these funds are being fully utilized, a negligible increase in the monthly surcharge per consumer, such as $0.20[180] could have a significant impact on the City's ability to fund the training necessary for the change. A $0.20 increase on the wireless telephone surcharge in New York City could bring in an estimated additional $1,630,287. This is over $500,000 of the estimated cost, signifying that the increase could potentially be even lower. While an increase in the 9-1-1 surcharge would surely have some impact on New York City residents, in a city whose median household income

173. *See Billing Glossary: Glossary of Terms*, VERIZON, https://www.verizon.com/support/consumer/account-and-billing/taxes-and-surcharges [https://perma.cc/X49D-SXQP] (last visited Apr. 11, 2017).

174. *See 9-1-1 Surcharge - User Fees by State*, NAT'L EMERGENCY NUMBER ASS'N (Jan. 2017), https://www.nena.org/?page=911RateByState [https://perma.cc/9QA8-28UE].

175. *See Understanding Your Telephone Bill*, *supra* note 151.

176. *See id.*

177. *See* Michael O'Rielly, *States Must Stop Raiding 9-1-1 Fees*, FCC BLOG (Mar. 1, 2017 4:52PM), https://www.fcc.gov/news-events/blog/2017/03/01/states-must-stop-raiding-9-1-1-fees [https://perma.cc/P2ZQ-ADY3].

178. *See 9-1-1 Surcharge - User Fees by State*, *supra* note 176.

179. *See* NEW YORK CITY MOBILE SERVICES STUDY: RESEARCH BRIEF, N.Y.C. DEP'T OF CONSUMER AFF. (Nov. 2015) http://www1.nyc.gov/assets/dca/MobileServicesStudy/Research-Brief.pdf [https://perma.cc/2NL4-7LPP].

180. For example, Verizon calculates the amount of monthly flat fee charges for a cell phone at the NYPD Police Headquarters (1 Police Plaza, New York, NY 10007) as $2.94 ($1.50 of that being the local 9-1-1 surcharge). Thus, a $0.20 increase in the 9-1-1 surcharge would represent approximately a 13% increase in the 9-1-1 surcharge itself and an overall flat fee increase of approximately seven percent. *See Taxes and Surcharges Estimator*, VERIZON WIRELESS, https://www.verizonwireless.com/support/taxes-and-surcharge-estimator/ [https://perma.cc/J7MK-SA9V] (last visited Apr. 11, 2017).

from 2011-2015 was $53,373,[181] this increase is unlikely to pose an undue burden when applied at the local level.

b. Achievement of Objectives Through NG9-1-1

The proposed national mandate for risk-based CAD is also supported by a national movement to re-vamp emergency services called Next Generation 9-1-1 ("NG9-1-1").[182] NG9-1-1 replaces the "existing narrowband, circuit switched 9-1-1 networks which carry only voice and very limited data" to support for additional information to be streamed to 9-1-1.[183] Some of the posited changes include the capability to receive 9-1-1 messages via text message and the ability to receive image and video transmissions as well.[184] Other changes to the network would include "access to . . . telematics data, building plans and medical information over a common data network."[185] NG9-1-1 highlights the need for a more flexible system with increased ability to share and transfer information between local and state entities as well as third parties involved in emergency services.[186] Certain vendors of CAD are already referring to their products as "aimed at, enabling, or being wholly NG9-1-1 compliant."[187]

As early as 2011, the FCC's Public Safety and Homeland Security Bureau noted that the transition from 9-1-1 to NG9-1-1 is a priority.[188] Since then, the FCC has stated that NG9-1-1 will provide "new location accuracy benchmarks for indoor as well as outdoor wireless calls" and encourage "development of 'dispatchable location[s]' as alternative[s] to coordinate-based location[s]," and that "carrier compliance with [NG9-1-1] standards will be measured based on live 911 call data starting in April 2017."[189] As of December 2015, the FCC had reported that 36 states, the District of Colombia, and Puerto Rico reported spending 9-1-1/E-911 funds on NG9-1-1

181. *See QuickFacts: New York City, New York*, U.S. CENSUS BUREAU (2015), http://www.census.gov/quickfacts/table/PST045215/3651000 [https://perma.cc/V7AA-Y54T].

182. *What is NG9-1-1?*, NAT'L EMERGENCY NUMBER ASS'N (Sept. 2008), https://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/whatisng911.pdf [https://perma.cc/YNB2-VL6Q].

183. *Id.*

184. *See id.* For example, such image and video streaming could provide additional support for those with disabilities, such as those hard of hearing and whom utilize American sign language as their primary form of communication.

185. *Id.*

186. *See id.*

187. *Id.*

188. *See generally* Facilitating the Deployment of Text-to-911 and Other Next Generation 911 Applications; Framework for Next Generation 911 Deployment, *Notice of Proposed Rulemaking*, FCC 11-134 (2011), https://apps.fcc.gov/edocs_public/attachmatch/FCC-11-134A1_Rcd.pdf [https://perma.cc/3ZC8-DACS].

189. David L. Furth, *FCC NG911 Update*, FCC PUB. SAFETY AND HOMELAND SECURITY BUREAU 3 (July 25, 2016), http://pubs.naruc.org/pub/35A09669-CACC-0D05-C039-19BB5F30EE11 [https://perma.cc/T4L9-ZQX8].

programs.[190] On a national level, approximately $165 million, roughly six percent of the total amount of 9-1-1/E-911 fees collected, are being spent on the transition to NG9-1-1.[191]

The objectives of NG9-1-1 are directly congruous with a risk-based CAD system. Both NG9-1-1 and a risk-based CAD system are directed towards improving the accuracy and reliability of 9-1-1 communications, as well as the ultimate safety of both citizens and police officers.[192] While NG9-1-1 focuses on ensuring that police officers arrive to the right locations, a risk-based CAD system ensures that the least risky police officers are being sent there.[193] Thus, a risk-based CAD system is directly aligned with the intent and purpose of NG9-1-1 and could be essential to its ultimate success. However, there is still another way to secure funding for the national mandate that does not involve increasing or diverting E-911 funds that are already used for public safety purposes.[194]

c. Full Utilization of 9-1-1 Funding

There is currently no federal mechanism to ensure that states use 9-1-1 funds for public safety purposes.[195] As a result, some states have not hesitated to take advantage of this loophole.[196] The New and Emerging Technologies 911 Improvement Act of 2008 (NET 911 Act) requires the FCC to submit an annual report to Congress on the collection and distribution of 9-1-1 and E-911 fees and charges by the states, the District of Columbia, U.S. territories, and Tribal Nations.[197] The most report issued in December 2016 noted that eight states and one territory diverted their 9-1-1 fees.[198] "Iowa, New Hampshire, New Jersey, Washington, and West Virginia used a portion of their 9-1-1/E-911 funds to support non-9-1-1 related public safety programs", while "Illinois, New Hampshire, New York, Rhode Island, and Puerto Rico used a portion of their 9-1-1/E-911 funds for either non-public safety or unspecified uses."[199] Non-public safety programs receiving 9-1-1 fees included "General Funds" and "Work Promotion and Economic Activity Funds."[200] This amounts to a total of approximately $220 million in diverted

190. *See On State Collection and Distribution of 911 and Enhanced 911 Fees and Charges*, FCC, 3 (Dec. 30, 2016), https://apps.fcc.gov/edocs_public/attachmatch/DA-17-61A2.pdf [https://perma.cc/DVW8-UKB4].

191. *See id.*

192. *See* Furth, *supra* note 191.

193. *See id.*

194. *See* O'Rielly, *supra* note 179.

195. *See id.*

196. *See id.*

197. New and Emerging Technologies 911 Improvement Act of 2008 § 6(f), 47 U.S.C. § 615a-1(f) (2016).

198. *See On State Collection and Distribution of 911 and Enhanced 911 Fees and Charges*, *supra* note 192.

199. *Id.*

200. *Id.*

fees, which is approximately eight percent of total 9-1-1/E-911 fees collected.[201]

To force states to use their 9-1-1 funds solely for public safety purposes, there must be some consequences for diversion. Then-FCC Commissioner O'Rielly suggested in [year] three actions the FCC could take to remedy this problem: (1) bar diverting states from imposing 9-1-1 fees on interstate calls, (2) prevent states from collecting of funds above what will be spent directly on 9-1-1 services, and (3) exclude diverting states from Commission Advisory Committees.[202] The Commissioner also noted that Congress is fully capable of "diverting states practices either by directly applying existing law or by exerting necessary leverage via its extensive grants and funding regimes."[203] Thus, developing a remedy to ensure that 9-1-1 surcharge funds are actually spent on the maintenance and development of 9-1-1 services could be an essential factor in securing funding for a risk-based CAD system.

V. CONCLUSION

Computer-Aided Dispatch Systems could have a significant effect on reducing police use of excessive force in metropolitan communities. By employing a risk-rating mechanism to classify the types of 9-1-1 calls and the level of police violence required to gain control of an incident, police officers are less likely to respond with more violence in situations that require less violence. Re-vamping the thought process behind CAD will help police officers' mental health and workplace behavior, while also making our largest cities safer places to live and restoring confidence in local law enforcement.

201. *See id.*
202. *See* O'Rielly, *supra* note 179.
203. *Id.*