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MEASURING POLICE BODY CAMERA INFRASTRUCTURE

Ronald J. Coleman*

Police body cameras have been in ascendancy since at least the 2014 deaths of Eric Garner and Michael Brown, and body cameras are poised to play an increasing role in law enforcement following the more recent deaths of George Floyd, Daunte Wright, and others. Indeed, President Biden, himself, has repeatedly called for the passage of the George Floyd Justice in Policing Act of 2021, which would require federal law enforcement officers to wear a body camera. Notwithstanding their ascendancy, important empirical questions on body cameras persist. For instance, do local law enforcement agencies have adequate infrastructure to support body camera programs? If not, what areas should policy-makers target in order to increase the adequacy of local agency infrastructure? And, are certain groups of agencies doing better with body camera infrastructure than others? Answering these and related questions requires accurate measurement of phenomena that are extremely challenging to measure. This Article presents what appears to be a first-of-its-kind multidimensional measure of local U.S. law enforcement body camera infrastructure: the Police Body Camera Infrastructure Index (“BCII”). Analysis of the BCII offers three primary contributions. First, it provides a broad summary of over 1,100 local agencies’ inadequacy in body camera infrastructure based on a large-N dataset. Second, it isolates the specific factors which drive agency inadequacy. Third, since countrywide averages have the potential to mask important differences across agencies, it reveals the position of certain agency subgroups based on size and location. It is hoped that this Article will inform policy-makers and local stakeholders in improving body camera programs, highlight the value of measurement in formulating such policy decisions, and spur continued research into body camera programs.

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I. INTRODUCTION

A twenty-year-old African American man is out on a Sunday afternoon with his girlfriend.¹ He is driving to his brother's house when police allegedly pull him over for an expired tag.² Officers apparently learn that the man has an outstanding warrant.³ Released body camera footage appears to reflect the man—outside his car and with arms behind his back—with an officer behind him attempting to handcuff him.⁴ An officer tells the man, “don’t,” before the man twists away and re-enters his vehicle.⁵ Footage appears to reflect an officer warning the man she will use her Taser, then repeatedly shouting, “Taser! Taser! Taser!”⁶ Then the officer screams: “Holy [expletive]! I just shot him.”⁷ The vehicle's door closes, and the man drives away.⁸ The vehicle apparently

1. Amir Vera et al., *Protests and police clash in third night of protests after death of Daunte Wright*, CNN (Apr. 14, 2021, 1:40 AM), <https://www.cnn.com/2021/04/13/us/daunte-wright-minnesota-shooting-tuesday/index.html>; *What to Know About the Death of Daunte Wright*, N.Y. TIMES (Dec. 24, 2021), <https://www.nytimes.com/article/daunte-wright-death-minnesota.html> [hereinafter *Death of Daunte Wright*].

2. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

3. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

4. Vera et al., *supra* note 1.

5. *Id.*

6. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

7. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

8. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

crashes some blocks away, and the man passes away.⁹ The man was Daunte Wright, and his death and accompanying body camera footage led to multiple nights of protests.¹⁰

The Wright protests in April 2021—which recalled those sparked by George Floyd’s death in May 2020—took place only around ten miles away from where Officer Derek Chauvin was on trial for Floyd’s death.¹¹ The world had also been able to watch via video footage as Floyd had been pinned to the ground, with a knee on his neck, and uttered his final words: “I can’t breathe.”¹² After Chauvin was found guilty of Floyd’s murder in April 2021, President Biden said of Floyd’s final words: “We cannot let them die with him. We have to keep hearing them. . . . We have a chance to begin to change the trajectory in this country.”¹³ The events surrounding the deaths of George Floyd, Daunte Wright, and others have kept police reform at the fore, and camera footage has played a key role in several such incidents.¹⁴ Indeed, President Biden, himself,

9. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

10. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

11. Vera et al., *supra* note 1; *Death of Daunte Wright*, *supra* note 1.

12. See, e.g., Evan Hill et al., *How George Floyd Was Killed in Police Custody*, N.Y. TIMES (May 31, 2020), <https://www.nytimes.com/2020/05/31/us/george-floyd-investigation.html>; Eric Levenson, *Here’s what happened to George Floyd from every perspective and angle*, CNN (Apr. 5, 2021, 9:28 AM), <https://www.cnn.com/2021/04/05/us/george-floyd-video-angle/index.html>; *George Floyd: What happened in the final moments of his life*, BBC NEWS (July 16, 2020), <https://www.bbc.com/news/world-us-canada-52861726>; Meredith Deliso, *Timeline: The impact of George Floyd’s death in Minneapolis and beyond*, ABC NEWS (Apr. 21, 2021, 12:35 PM), <https://abcnews.go.com/US/timeline-impact-george-floyds-death-minneapolis/story?id=70999322>.

13. See *Remarks by President Biden on the Verdict in the Derek Chauvin Trial for the Death of George Floyd*, WHITE HOUSE (Apr. 20, 2021, 7:11 PM), <https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/04/20/remarks-by-president-biden-on-the-verdict-in-the-derek-chauvin-trial-for-the-death-of-george-floyd/>; *‘Justice’ but still ‘a long way to go’: Reaction to Chauvin conviction*, REUTERS (Apr. 20, 2021, 3:31 PM), <https://www.reuters.com/article/us-usa-race-georgefloyd-voices-quotes/justice-but-still-a-long-way-to-go-reaction-to-chauvin-conviction-idUSKBN2C7334>; Katie Rogers, *‘It was a murder in full light of day,’ President Biden says of George Floyd’s death*, N.Y. TIMES (Apr. 20, 2021), <https://www.nytimes.com/2021/04/20/us/president-biden-comments-derek-chauvin-verdict.html> (noting President Biden’s statement of George Floyd’s death: “[i]t was a murder in full light of day, and it ripped the blinders off for the whole world to see.”).

14. See, e.g., Tim Arango, *New body camera footage shows George Floyd handcuffed on the street*, N.Y. TIMES (Apr. 13, 2021), <https://www.nytimes.com/2021/04/13/us/george-floyd-bodycam-footage.html> (George Floyd); *Death of Daunte Wright*, *supra* note 1 (Daunte Wright); Josh Marcus, *‘She was scared’: New bodycam video raises questions in Breonna Taylor case*, INDEPENDENT (Oct. 8, 2020, 12:18 AM), <https://www.independent.co.uk/news/world/americas/new-body-camera-footage-police-breonna-taylor-b870319.html> (Breonna Taylor); Brandon Tensley, *Ahmaud Arbery and the resilience of black protest*, CNN (May 12, 2020, 8:54 PM), <https://www.cnn.com/2020/05/12/politics/ahmaud-arbery-black-protest-pandemic/index.html> (Ahmaud Arbery); Peter Nickeas et al., *Chicago police say bodycam footage shows less than a second passes from*

has repeatedly called for the passage of the George Floyd Justice in Policing Act of 2021, which would require, among other things, federal law enforcement officers to wear a body camera.¹⁵

Police body-worn camera (“BWC”) use has been in ascendency since the protests following the highly-publicized deaths of Michael Brown and Eric Garner in 2014, and the recent wave of renewed protests for George Floyd and others seems set to continue or accelerate this rise.¹⁶ BWC advocates have argued that BWCs have myriad benefits, such as increasing accountability, improving behavior, and reducing citizen complaints.¹⁷ Critics have raised concerns that the cameras are costly and could lead to unfairness or erosion of privacy.¹⁸ The ongoing normative debates on BWCs have also been accompanied by empirical study, as researchers and stakeholders have sought to understand the actual efficacy and impact of BWCs.¹⁹ Missing from this empirical

when 13-year-old is seen holding a handgun and is shot by officer, CNN (Apr. 16, 2021, 8:08 AM), <https://www.cnn.com/2021/04/15/us/adam-toledo-police-shooting-body-camera/index.html> (Adam Toledo); Will Wright, *California Man Dies After Officers Pin Him to Ground for 5 Minutes*, N.Y. TIMES (Apr. 27, 2021), <https://www.nytimes.com/2021/04/27/us/mario-gonzalez-alameda-police.html> (Mario Gonzalez).

15. See George Floyd Justice in Policing Act of 2021, H.R. 1280, 117th Cong. §§ 371-372 (2021) (noting relevant part of bill “may be cited as the ‘Federal Police Camera and Accountability Act’ ”); Rogers, *supra* note 13 (noting that the bill was co-authored by Vice President Kamala Harris). A day after the Chauvin verdict, Attorney General Merrick Garland also announced an investigation of the Minneapolis police. See Katie Benner, *Attorney General Merrick Garland announces an investigation into the Minneapolis Police Department*, N.Y. TIMES (Apr. 21, 2021), <https://www.nytimes.com/2021/04/21/us/justice-department-investigation-minneapolis-police.html> (“Such investigations are often the precursors to court-approved deals between the Justice Department and local governments that create and enforce a road map for training and operational changes.”). This was not the only such investigation. See Jessica Schneider et al., *Garland announces Justice Department investigation into the Louisville Police Department*, CNN (Apr. 27, 2021, 10:01 AM), <https://www.cnn.com/2021/04/26/politics/justice-department-investigation-louisville-police-department/index.html> (“The impending probe will come a little over a year after officers with the department shot and killed Breonna Taylor, a 26-year-old aspiring nurse, in her own home during a botched raid.”); Pete Williams & Adam Edelman, *Justice Department launches investigation into Louisville policing practices*, NBC NEWS (Apr. 26, 2021, 10:23 AM), <https://www.nbcnews.com/politics/justice-department/justice-department-launch-investigation-louisville-pd-s-policing-practices-n1265400>. The New York Times has referred to “the use of body cameras among law enforcement in the United States” as the “rule rather than the exception.” Richard Fausset & Giulia McDonnell Nieto del Rio, *As Body Cameras Become Commonplace, a Debate Over When to Release the Footage*, N.Y. TIMES (May 2, 2021), <https://www.nytimes.com/2021/05/02/us/police-body-cameras-andrew-brown-north-carolina.html>.

16. See *infra* Part II.A; Ronald J. Coleman, *Police Body Cameras: Go Big or Go Home?*, 68 BUFF. L. REV. 1353, 1355 (2020).

17. See *infra* Part II.B.

18. *Id.*

19. See *infra* Part II.A; Coleman, *supra* note 16, at 1355.

study is sufficient *measurement* of law enforcement body camera infrastructure, and this Article helps to fill that gap.

This Article presents what appears to be a first-of-its-kind multidimensional measure of local U.S. law enforcement body camera infrastructure: the Police Body Camera Infrastructure Index (“BCII”).²⁰ Analysis of the BCII offers three primary contributions. First, it provides a broad summary of over 1,100 local agencies’ inadequacy in body camera infrastructure based on a large-N dataset. Second, it isolates the specific factors which drive agency inadequacy. Third, since countrywide averages have the potential to mask important differences across agencies, it reveals the position of certain agency subgroups based on size and location. It is hoped that this Article will inform policy-makers and local stakeholders in improving body camera programs, highlight the value of measurement in formulating such policy decisions, and spur continued research into body camera programs.

The remainder of this Article proceeds as follows. Part II will provide background on body cameras, including a discussion of their rise, as well as perceived benefits and concerns associated with their use. Part III will set out the Article’s methodology. Part IV will present the Article’s empirical findings. Finally, Part V will conclude and note areas for further research.

II. BODY CAMERA BACKGROUND

BWCs are small cameras placed on an officer’s person, which may capture what the officer sees or does.²¹ They may be positioned in

20. The BCII methodology is adapted from Sabina Alkire and James Foster’s Adjusted Headcount Ratio. *See generally* Ronald J. Coleman & Ana Vaz, *Law and Multidimensional Measurement*, 44 S. ILL. U. L.J. 253 (2020) (discussing Adjusted Headcount Ratio and Alkire-Foster method); *infra* Part III.

21. Mary D. Fan, *Privacy, Public Disclosure, Police Body Cameras: Policy Splits*, 68 ALA. L. REV. 395, 398 (2016) (“Body cameras . . . are capable of going everywhere police can go to record what the officer sees and does.”) [hereinafter Fan, *Public Disclosure*]; Mindy Lawrence, *Lights, Camera, Action: The Age of Body Cameras in Law Enforcement and the Effects of Implementing Body Camera Programs in Rural Communities*, 91 N.D. L. REV. 611, 615 (2015) (“Body cameras are small recording devices . . . which record the officer’s actions and conversations with members of the public.”); Connie Felix Chen, *Freeze, You’re on Camera: Can Body Cameras Improve American Policing on the Streets and at the Borders?*, 48 U. MIAMI INTER-AM. L. REV. 141, 156 (2017) (“[T]he cameras capture both video and audio recordings of interactions from the officer’s perspective. The majority of systems also come with a cloud-based data storage service”); Dru S. Letourneau, *Police Body Cameras: Implementation with Caution, Forethought, and Policy*, 50 U. RICH. L. REV. 439, 442 (2015) (“Police body cameras are compact devices that can create both audio and visual records of police officer actions, observations, and interactions with the public.”); Mitch Zamoff, *Assessing the Impact of Police Body Camera Evidence on the Litigation of Excessive Force Cases*, 54 GA. L. REV. 1, 8 (2019) (“Bodycams are unique because of their placement, which provides a real-time, first-person perspective on officer-civilian interactions.”).

different areas on the officer, such as on an officer's uniform or headgear.²² BWCs might be used to, for instance, capture the interaction of civilians and the police, with the camera footage helping to provide “clarity on what exactly occurred during such an interaction.”²³

These cameras vary in configuration and price—with many now offering cloud storage—and the technology continues to evolve.²⁴ For instance, Axon Enterprise, Inc. (previously TASER International, Inc.) is a leading provider of BWCs in the United States.²⁵ In late 2020, Axon unveiled “new features intended to help law enforcement supervisors better monitor officers and curb problematic behavior.”²⁶ A “centerpiece” of these features was the “‘Priority-Ranked Video Audit’ software,” which Axon said helped “supervisors sift through the thousands of hours of body cam footage” many received on a “weekly basis to zero in on potential abuses of power.”²⁷

22. Jeffrey Bellin & Shevarma Pemberton, *Policing the Admissibility of Body Camera Evidence*, 87 FORDHAM L. REV. 1425, 1429-30 (2019) (noting the cameras are sufficiently versatile and small such that they may be “worn almost anywhere” on an officer’s person); Lawrence, *supra* note 21, at 615 (“Body cameras . . . are positioned either on the front of an officer’s uniform or headgear . . .”); Fan, *Public Disclosure*, *supra* note 21, at 398 (“Body cameras [may be worn] at an officer’s eye level, head level, or chest . . .”); Danielle Evans, *Police Body Cameras: Mending Fences and How Pittsburgh is a Leading Example*, 16 U. PITT. J. TECH. L. & POL’Y 76, 76 (2015) (mentioning body cameras may even be affixed to specially designed sunglasses).

23. Evans, *supra* note 22, at 76.

24. Chen, *supra* note 21, at 156 (noting variation in pricing and that “majority of systems” come with “a cloud-based data storage service”); Letourneau, *supra* note 21, at 442-43 (referencing “differences among available devices”); Zamoff, *supra* note 21, at 9 (“The technology is continuing to evolve in an effort to improve, among other features, the camera’s overall field of vision, night vision capabilities, and picture stability.”).

25. See *Product Catalog*, AXON, <https://www.axon.com/products/cameras> (last visited July 7, 2021) (showing cameras); Chen, *supra* note 21, at 173 (noting offer of free body cameras from Axon in 2017); Bellin & Pemberton, *supra* note 22, at 1431 (same); Zamoff, *supra* note 21, at 9 (listing “COBAN, Motorola, Panasonic, Pinnacle, Utility, PRO-VISION, and Axon” as manufacturers and noting Axon “is the largest supplier of body cams in America today”); Chauncey Alcorn, *Police body cam maker unveils new features it hopes will curb officer misconduct*, CNN (Oct. 28, 2020, 9:14 AM), <https://www.cnn.com/2020/10/28/tech/axon-body-cam-new-features/index.html> (referring to Axon as “[t]he nation’s leading provider of police body cameras”); see also MICHAEL D. WHITE, POLICE OFFICER BODY-WORN CAMERAS: ASSESSING THE EVIDENCE 12 n.2 (2014) (“[T]he manufacturers most commonly cited in the identified literature and media sources were, by far, VIEVU and TASER International.”).

26. Alcorn, *supra* note 25; Press Release, Axon, Axon’s Sprint for Justice Initiative Delivers New Product Features Focused on Transparency, Truth and Officer Development (Oct. 28, 2020), <https://investor.axon.com/2020-10-28-Axons-Sprint-for-Justice-Initiative-Delivers-New-Product-Features-Focused-on-Transparency,-Truth-and-Officer-Development>.

27. Alcorn, *supra* note 25.

A. Body Camera Ascendancy

Commenters have pointed to several developments which may have encouraged body camera adoption.²⁸ Several of the more important developments are treated here.

In August 2013, the U.S. District Court for the Southern District of New York issued its *Floyd v. City of New York* opinion, which concerned the use of “stop and frisk” by the N.Y. Police Department.²⁹ The court noted that more than 80% of “stops between January 2004 and June 2012 . . . were of blacks or Hispanics,” and found certain Constitutional violations.³⁰ Importantly, Judge Shira A. Scheindlin ordered several remedies, including a trial program for body cameras in New York City boroughs.³¹

The deaths of Eric Garner and Michael Brown in the summer of 2014 may have heightened calls for body camera use. According to news sources, video depicted an officer grabbing Eric Garner in a chokehold and Garner repeating “I can’t breathe” before passing away.³² Michael Brown was an eighteen-year-old male fatally shot by an officer in Ferguson, Missouri.³³ Some have argued that the public outcry in the

28. See, e.g., *infra* Part II.A. Much of the body camera background discussed in this Part II was also recounted in Coleman, *supra* note 16, at 1358-63.

29. *Floyd v. City of New York*, 959 F. Supp. 2d 540, 556 (S.D.N.Y. 2013).

30. *Id.* at 556-63 (discussing violations of the Fourth and Fourteenth Amendments).

31. *Id.* at 563 (ordering, among other things “a trial program requiring the use of body-worn cameras in one precinct per [New York City] borough. . . .”); see also Kyle J. Maury, *Police Body-Worn Camera Policy: Balancing the Tension Between Privacy and Public Access in State Law*, 92 NOTRE DAME L. REV. 479, 485 (2015) (“In 2013, the United States District Court for the Southern District of New York ordered ‘a trial program requiring the use of body-worn cameras in one precinct per borough’ when it ruled in a § 1983 class action claim alleging New York City’s stop-and-frisk policy violated the Fourth and Fourteenth Amendments. The court recognized the reasons why body camera recordings can play a vital role in resolving the constitutionality of criminal procedures”) (footnotes omitted); Seth W. Stoughton, *Police Body-Worn Cameras*, 96 N.C. L. REV. 1363, 1364 (2018) (“Having video footage of officers’ interactions with civilians, Judge Scheindlin wrote, ‘will serve a variety of useful functions.’”); Laurent Sacharoff & Sarah Lustbader, *Who Should Own Police Body Camera Videos?*, 95 WASH. U. L. REV. 267, 282 (2017). Earlier in her opinion, Judge Scheindlin also stated “[b]ecause there is no contemporaneous recording of the stop (such as could be achieved through the use of a body-worn camera), I am relegated to finding facts based on the often conflicting testimony of eyewitnesses.” *Floyd*, 959 F. Supp. 2d at 562.

32. Associated Press, *From Eric Garner’s death to firing of NYPD officer: A timeline of key events*, USA TODAY (Aug. 20, 2019, 10:32 AM), <https://www.usatoday.com/story/news/2019/08/20/eric-garner-timelinechokehold-death-daniel-pantaleo-fired/2059708001/> (noting the confrontation was caught on “amateur video”); Deborah Bloom & Jareen Imam, *New York man dies after chokehold by police*, CNN (Dec. 8, 2014, 5:31 PM), <https://www.cnn.com/2014/07/20/justice/ny-chokehold-death/index.html> (noting Garner’s “cries [were] muffled into the pavement.”).

33. Alberto R. Gonzales & Donald Q. Cochran, *Police-Worn Body Cameras: An Antidote to the “Ferguson Effect”?*, 82 MO. L. REV. 299, 300 (2017) (noting officer Darren

wake of these and other high-profile incidents—as well as the “Black Lives Matter” protests and movement—encouraged further use of body cameras.³⁴

Wilson killed Brown); *Michael Brown: Ferguson officer won't be charged for 2014 killing*, BBC NEWS (July 31, 2020), <https://www.bbc.com/news/world-us-canada-53603923> (“Brown . . . suffer[ed] at least seven gunshot wounds . . .”); *Timeline of events in shooting of Michael Brown in Ferguson*, AP NEWS (Aug. 8, 2019), <https://apnews.com/article/9aa32033692547699a3b61da8fd1fc62> (“After words were exchanged, the white officer confronted the 18-year-old Brown, who was black. . . . The officer shot and killed Brown, who was unarmed.”); Iesha S. Nunes, *Hands Up, Don't Shoot: Police Misconduct and the Need for Body Cameras*, 67 FLA. L. REV. 1811, 1814 (2016) (“The event that occurred in Ferguson is only one of many that law enforcement’s use of body cameras could have prevented, or, at the very least, easily cleared up.”).

34. Maury, *supra* note 31, at 480 (noting “implementation of police body-worn cameras” was at the “forefront”); Stoughton, *supra* note 31, at 1364-65 (discussing video footage and the Brown shooting, stating it was “among the first in a series of violent incidents that attracted public scrutiny and widespread criticism of the police.”); Lawrence, *supra* note 21, at 614-15 (noting law enforcement and civilians began to discuss the need for body cameras after the deaths of Garner and Brown, and stating, “[i]n both instances, police discretion on the use of force was critiqued . . . ?”); David K. Bakardjiev, *Officer Body-Worn Cameras—Capturing Objective Evidence with Quality Technology and Focused Policies*, 56 JURIMETRICS J. 79, 79 (2015) (“The high-profile deaths of Eric Garner and Michael Brown by police officers have provoked a national outcry for greater measures in police accountability.”); Chris Pagliarella, *Police Body-Worn Camera Footage: A Question of Access*, 34 YALE L. & POL’Y REV. 533, 533 (2016) (noting even Brown’s parents campaigned “vigorously” for body cameras on every officer); Letourneau, *supra* note 21, at 441 (“Had Officer Wilson been wearing a body camera during his interaction with Mr. Brown, there would have been a digital record of the event.”); Evans, *supra* note 22, at 76 (mentioning Brown, Garner, and Freddie Gray in connection with calls for greater accountability through body cameras); Karson Kampf, *Police-Worn Body Cameras: Balancing Privacy and Accountability Through State and Police Department Action*, 76 OHIO ST. L.J. 1153, 1154-55 (2015) (“Michael Brown—an unarmed, black eighteen-year-old male—was shot and killed by a white police officer in Ferguson, Missouri. . . . Situations calling police conduct into question have gained increased media attention in the United States, especially when minority victims are involved. Notoriously inaccurate eyewitness testimony—as well as inherently self-serving officer testimony—are both unreliable methods of obtaining a true picture of events as they unfolded. To shield themselves from unwarranted accusations and build trust with their communities, police departments throughout the country have rapidly begun to adopt the use of police-worn body cameras [] to create an objective audio and video record of officer interactions with the public.”) (footnotes omitted); Bellin & Pemberton, *supra* note 22, at 1430-31 (“The Police Executive Research Forum, in conjunction with COPS, conducted a survey in July 2013 that revealed that fewer than 25% of responding law enforcement agencies used body cameras. That changed dramatically following the August 2014 shooting of Michael Brown in Ferguson, Missouri.”) (footnote omitted); Katie Farden, *Recording a New Frontier in Evidence-Gathering: Police Body-Worn Cameras and Privacy Doctrines in Washington State*, 40 SEATTLE U. L. REV. 271, 273 (2016) (“A grand jury’s decision not to indict Wilson for Brown’s death ignited civilian clashes with police in Brown’s home city of Ferguson, Missouri, so severe that windows shattered, buildings blazed, tear gas sprayed, and rubber bullets flew.”); Ethan Thomas, *The Privacy Case for Body Cameras: The Need for a Privacy-Centric Approach to Body Camera Policymaking*, 50 COLUM. J.L. & SOC. PROBS. 191, 192 (2017) (discussing “unrest and controversy over police tactics in Ferguson, Missouri. . . .”); Roseanna Sommers, *Will Putting Cameras on Police Reduce Polarization?*, 125 YALE L.J. 1304, 1307-09 (2016) (discussing Brown, Garner, and the Black Lives Matter movement, and stating, “advocates for reform have enthusiastically embraced the idea of putting cameras on

In 2014, President Barack Obama “proposed a \$263 million spending package to increase the use of body cameras,” and this “included a \$75 million package to aid local governments with implementation costs.”³⁵ In 2015, the Justice Department announced the “\$20 million Body-Worn Camera Pilot Partnership Program as part of a \$75 million investment in law enforcement agencies.”³⁶ Attorney General Loretta Lynch described body cameras as holding “tremendous

police officers”); Matthew A. De Stasio, Comment, *A Municipal Speech Claim Against Body Camera Video Restrictions*, 166 U. PA. L. REV. 961, 962 (2018) (“Ever since the rapid expansion of body camera programs following highly publicized police shootings (particularly the shooting of Michael Brown in Ferguson, Missouri, in the summer of 2014), state legislatures across the country have rushed to decide who should have access to the collected video and how to limit its public release.”); V. Noah Gimbel, Note, *Body Cameras and Criminal Discovery*, 104 GEO. L.J. 1581, 1582-83 (2016) (“The Black Lives Matter movement, largely formed and fueled in response to mounting African-American deaths at police hands, has drawn global attention to issues of racial justice unseen since the Civil Rights Movement. And calls for reform have reverberated all the way to the White House. Among the policy vehicles for enhancing police accountability, the use of body-worn cameras (BWCs) by police officers has been one of the most widely advocated, garnering the support of nearly 90% of Americans.”) (footnotes omitted); Morgan A. Birck, *Do You See What I See? Problems with Juror Bias in Viewing Body-Camera Video Evidence*, 24 MICH. J. RACE & L. 153, 154 (2018) (“A revolution occurred in policing after the shooting of Michael Brown in Ferguson, Missouri. . . . Most significantly, Brown’s death ignited a deeper conversation in the United States about police violence and particularly the racial disparities in use-of-force.”) (footnote omitted); *Considering Police Body Cameras*, 128 HARV. L. REV. 1794, 1795 (2015) [hereinafter *Considering Cameras*] (“The hope was that video recordings of police-civilian interactions would deter officer misconduct and eliminate the ambiguity present in cases like Michael Brown’s, making it easier to punish officers’ use of excessive force.”); Zamoff, *supra* note 21, at 10 (“In the wake of the Michael Brown shooting, prominent civil rights groups called for police departments to equip their officers with bodycams.”).

35. Bellin & Pemberton, *supra* note 22, at 1431; Sacharoff & Lustbader, *supra* note 31, at 280; Sommers, *supra* note 34, at 1307 (“In December 2014, President Obama announced the Body Worn Camera Partnership Program, a new initiative to purchase fifty thousand body cameras for use by police officers across the country.”); Jocelyn Simonson, *Beyond Body Cameras: Defending a Robust Right to Record the Police*, 104 GEO. L.J. 1559, 1565 (2016) (“Since mid-2014, at least thirty-six states have proposed some form of legislation involving police-worn cameras, and President Obama has announced a three-year, \$263 million investment in body cameras.”); Kami Chavis Simmons, *Body-Mounted Police Cameras: A Primer on Police Accountability vs. Privacy*, 58 HOW. L.J. 881, 883 (2015) (“President Obama announced that \$75 million of federal money would be made available for local law enforcement to purchase and train officers to use body cameras.”); Birck, *supra* note 34, at 154-55; Zamoff, *supra* note 21, at 11. President Obama also established a new task force relating to policing. Simmons, *supra*, at 882 (“In the wake of these deaths [Michael Brown and Eric Gardner] and others, President Obama signed an order establishing the President’s Task Force on 21st Century Policing, a body of scholars, practitioners, and policymakers that would examine ways to improve distrust between communities and police.”).

36. Bellin & Pemberton, *supra* note 22, at 1431; Sacharoff & Lustbader, *supra* note 31, at 280-81.

promise.”³⁷ The American Civil Liberties Union and certain other groups also appeared at least somewhat supportive of body cameras.³⁸

This growing support for body cameras may also have been encouraged by findings from early empirical studies.³⁹ In particular, a frequently referenced Rialto, California study suggested officers wearing cameras were the objects of substantially fewer complaints and greatly reduced their use of force.⁴⁰ Other early studies also appeared to have offered at least certain encouraging results.⁴¹

37. Sacharoff & Lustbader, *supra* note 31, at 280; *see also* Gimbel, *supra* note 34, at 1584.

38. Sacharoff & Lustbader, *supra* note 31, at 280-82 (“The ACLU has characterized body cameras as ‘a win for all,’ as long as privacy safeguards are implemented.”); Sommers, *supra* note 34, at 1310 (discussing ACLU); Simmons, *supra* note 35, at 883 (discussing NAACP, ACLU, and Lawyers’ Committee for Civil Rights Under Law); Birck, *supra* note 34, at 155 (discussing, among others, police unions and ACLU).

39. *See, e.g.*, Pagliarella, *supra* note 34, at 535-36 (“Initial studies on the impact of BWCs are tentatively encouraging.”).

40. *Considering Cameras*, *supra* note 34, at 1800 (“In [the Rialto] study, which ran from February 2012 through July 2013, half of Rialto, California’s fifty-four patrol officers were ‘randomly assigned to wear the TASER AXON body-camera system.’ The results of the study appeared conclusive: ‘[s]hifts without cameras experienced twice as many incidents of use of force as shifts with cameras,’ and ‘the rate of use of force incidents per 1,000 contacts was reduced by 2.5 times’ overall as compared to the previous twelve-month period.”) (footnote omitted); Howard M. Wasserman, *Recording of and by Police: The Good, the Bad, and the Ugly*, 20 J. GENDER RACE & JUST. 543, 548 (2017) [hereinafter Wasserman, *Recording of and by Police*] (“This study found that, when wearing cameras, officers were less likely to use weapons and less likely to initiate physical contact with suspects, doing so only when physically threatened. When not wearing cameras, officers were more likely to initiate physical contact and more likely to use force, even when not physically threatened.”) (footnote omitted); Mark Tunick, *Regulating Public Access to Body Camera Footage: Response to Ilesha S. Nunes, “Hands Up, Don’t Shoot”*, 67 FLA. L. REV. F. 143, 143-44, 144 n.10 (2016) (“The authors found that there were fewer citizen complaints during the year (three, as opposed to twenty-four in a prior year—although two of the three were lodged against officers wearing cameras) and fewer use of force incidents (twenty-five versus fifty-four in a prior year, seventeen of which involved ‘no-camera’ officers and eight of which involved ‘body camera’ officers.”); Sommers, *supra* note 34, at 1311 (“Indeed, promising results from a pilot program in Rialto, California found that body cameras were associated with a decrease in use of force.”); Mary D. Fan, *Democratizing Proof: Pooling Public and Police Body-Camera Videos*, 96 N.C. L. REV. 1639, 1656 (2018) [hereinafter Fan, *Pooling Public and Police Body-Camera Videos*] (“The results indicated that officers not wearing body cameras used force twice as often as officers wearing body cameras. However, the investigators were unable to detect a statistically significant between-groups effect due to the low number of complaints against either group.”) (footnote omitted); Chen, *supra* note 21, at 161 (noting Rialto study results, including finding of “88% reduction in ‘citizen complaints’ ”); Pagliarella, *supra* note 34, at 535-36 (discussing Rialto study results, including finding that officers who were wearing cameras “cut their total use of force by 50%” and “were the objects of 88% fewer complaints”).

41. Pagliarella, *supra* note 34, at 536 (“Subsequent studies in the United States and the United Kingdom have also shown a drop in complaints and in use of force when BWCs are in use.”); Wasserman, *Recording of and by Police*, *supra* note 40, at 548-50 (stating “[e]arly studies of, and experiences with, cameras are hopeful” and discussing Rialto study, as well as results in Mesa and Phoenix, Arizona and San Diego, California); Chen, *supra* note 21, at 161

Whatever the specific causes, BWCs have quickly risen to prominence.⁴² One commenter noted, “BWC technology has exploded onto the law enforcement scene at an unbelievable pace.”⁴³ Another commenter has argued “a police body camera revolution is fast unfolding.”⁴⁴ Notwithstanding the increased interest in body cameras, some have raised concerns about using such cameras, so discussing the perceived concerns and benefits of body cameras may also be helpful.⁴⁵

B. Body Camera Benefits and Concerns

Several benefits and concerns have been raised with the use of body cameras. A few of the more common benefits and concerns that have been advanced are treated here.⁴⁶

1. Perceived Benefits of Body Cameras

The perceived benefits of body cameras include: (i) improving behavior and decreasing misconduct; (ii) reducing or better resolving citizen complaints; (iii) increasing accountability, legitimacy, and transparency; (iv) collecting evidence; and (v) use in training. Each of these will be discussed in turn.

First, improving behavior and decreasing misconduct have been suggested as benefits of body cameras. In theory, when someone knows they “‘are being recorded and that the recording *may be used as*

(“The Mesa Police Department in Arizona found 75% fewer use of force complaints and 40% fewer total complaints against officers wearing body cameras compared to those without.”). Not all study findings could be considered encouraging, however. *See, e.g., Fan, Pooling Public and Police Body-Camera Videos, supra* note 40, at 1657 (noting certain findings have been “mixed” and “concerning”); Fausset & McDonnell Nieto del Rio, *supra* note 15 (“Research on the effects of body cameras so far have come to varied conclusions.”).

42. *See, e.g., Gimbel, supra* note 34, at 1583-84; Zamoff, *supra* note 21, at 5 (“[T]here is growing consensus that outfitting police officers with body-worn cameras [] is one of the reform measures most likely to have a positive impact on the situation.”); Sacharoff & Lustbader, *supra* note 31, at 273, 281; Stoughton, *supra* note 31, at 1366 (“Body-worn cameras are here, and more are coming.”); Fausset & McDonnell Nieto del Rio, *supra* note 15 (suggesting body cameras “have become more commonplace”).

43. Gimbel, *supra* note 34, at 1583 (“Among the policy vehicles for enhancing police accountability, the use of [BWCs] by police officers has been one of the most widely advocated, garnering the support of nearly 90% of Americans.”); *see also* Maury, *supra* note 31, at 486 (“Body camera implementation is a tidal wave that cannot be stopped.”).

44. *See* Mary D. Fan, *Justice Visualized: Courts and the Body Camera Revolution*, 50 U.C. DAVIS L. REV. 897, 901 (2017) [hereinafter Fan, *Justice Visualized*]; *see also* Stoughton, *supra* note 31, at 1367 (“The popular belief in the inherent superiority of video footage has led to what Mary Fan calls the ‘camera cultural revolution.’ The result, she predicts, is that ‘the future will be recorded.’”) (footnote omitted).

45. *See infra*, Part II.B.

46. This Article does not attempt to itemize all such perceived benefits or concerns, nor does it seek to evaluate the strength of them or weigh perceived concerns against perceived benefits.

evidence' it will 'deter misconduct and prompt police and the public to behave better.'"⁴⁷ The presence of BWCs may have a "civilizing" effect on citizen-law enforcement interactions.⁴⁸ On the officer side, this might mean, for instance, a reduction in use of force.⁴⁹ On the citizen side, civilians may be, for instance, more likely to comply with laws, act respectfully, or obey officer directives.⁵⁰

Second, reducing or better responding to citizen complaints has been suggested as a benefit of body cameras.⁵¹ Having footage of events

47. Maury, *supra* note 31, at 488; *see also* Evans, *supra* note 22, at 77-81 ("[T]he Rialto study suggests that when officers are being filmed and are aware that they will be held accountable for their actions, they are more inclined to resist using force until absolutely necessary."); Letourneau, *supra* note 21, at 446; Simmons, *supra* note 35, at 885-86; Howard M. Wasserman, *Moral Panics and Body Cameras*, 92 WASH. U. L. REV. 831, 837 (2015) [hereinafter Wasserman, *Moral Panics*] (noting supporters offer benefits, including deterring misconduct and prompting police to behave better).

48. Maury, *supra* note 31, at 488; *see also* *Considering Cameras*, *supra* note 34, at 1800; WHITE, *supra* note 25, at 20 ("Advocates of body-worn cameras have argued the technology will change police officer behavior during encounters with citizens."); Evans, *supra* note 22, at 82 ("While the Rialto study suggests that body cameras can be used to deter officer misconduct, the decrease in use-of-force incidents may also be explained by an improvement in civilian behavior when they are aware that they are being filmed."); Stoughton, *supra* note 31, at 1383 ("With regard to decreasing incivility, it is hoped that officers and civilians who are being recorded will be more polite to each other, improving the character of police encounters.").

49. *See* Evans, *supra* note 22, at 77-78 ("Body cameras can potentially reduce the amount of force an officer uses when engaging with a civilian in tense situations."); Stoughton, *supra* note 31, at 1383 ("[W]ith regard to reducing violence, the objective is to discourage resistance by civilians and gratuitously severe or frequent uses of force by officers, especially in the context of deadly force."); Kampfe, *supra* note 34, at 1162 ("[I]nstances of police use-of-force have been shown to decrease by as much as 58% by employing [police worn body cameras]."); Mary Anne Franks, *Democratic Surveillance*, 30 HARV. J.L. & TECH. 425, 475 (2017) ("Some studies have suggested that the use of body cameras greatly reduces the use of force in police encounters . . .").

50. *See* Stoughton, *supra* note 31, at 1384 ("There is some reason to believe that body-worn cameras do influence civilian and officer behavior, although the results of empirical studies are not consistent."); Kampfe, *supra* note 34, at 1164 ("Furthermore, as the public's opinion of police becomes more positive, citizens become more compliant and crime rates decrease."); Letourneau, *supra* note 21, at 448 ("Proponents suggest that officers wearing body cameras will improve the behavior of the citizens with whom they interact . . ."); Evans, *supra* note 22, at 82 ("In addition to more desirable officer behavior, studies also found that body cameras improved citizen behavior."); Maury, *supra* note 31, at 488-89; Gonzales & Cochran, *supra* note 33, at 309-10; Simmons, *supra* note 35, at 886; Wasserman, *Moral Panics*, *supra* note 47, at 837; WHITE, *supra* note 25, at 22-23 ("Proponents of body-worn cameras have also argued that the technology will improve citizen behavior during encounters with police, suggesting that they will be more respectful and compliant.").

51. *Considering Cameras*, *supra* note 34, at 1801-02; Evans, *supra* note 22, at 79-80 (referencing studies in Phoenix, Arizona and Plymouth, England); Gonzales & Cochran, *supra* note 33, at 308-10; Kampfe, *supra* note 34, at 1165 ("Departments that have adopted the use of PWBCs [police-worn body cameras] have seen a significant drop in the number of complaints filed and sustained against officers."); Simmons, *supra* note 35, at 886; Franks, *supra* note 49, at 475 ("Some studies have suggested that the use of body cameras greatly reduces . . . the number of complaints lodged against police."); Wasserman, *Moral Panics*,

may, in theory, lower the overall number of actual complaints and discourage the filing of untruthful complaints.⁵² Similarly, advocates contend that BWCs “can produce records of events that could expedite the resolution of complaints and lawsuits against officers.”⁵³

Third, it has been suggested that BWCs could increase accountability, legitimacy, and transparency.⁵⁴ It may be that, in “the event of officer misconduct, body cameras can be used to hold officers accountable for their inappropriate actions.”⁵⁵ The capability to “accurately and more frequently place responsibility on an officer when it is due should [also] directly translate into increased departmental transparency.”⁵⁶ Further, it may be that BWCs help restore faith in the police and promote a sense of procedural fairness and perceived legitimacy in officer-citizen encounters.⁵⁷

supra note 47, at 837 (noting supporters insist that “there will be fewer citizen complaints. . . .”); WHITE, *supra* note 25, at 23-24.

52. WHITE, *supra* note 25, at 23-24; *Considering Cameras*, *supra* note 34, at 1801-02; Kampfe, *supra* note 34, at 1165; Maury, *supra* note 31, at 488 (“The results, advocates claim, are a reduction in both use-of-force by police, and complaints filed against officers.”).

53. See Letourneau, *supra* note 21, at 449-50; see also WHITE, *supra* note 25, at 23-24.

54. *Considering Cameras*, *supra* note 34, at 1803; Lawrence, *supra* note 21, at 616; Evans, *supra* note 22, at 81-82; Letourneau, *supra* note 21, at 445-46; Gonzales & Cochran, *supra* note 33, at 310-11; Maury, *supra* note 31, at 491-93; Stoughton, *supra* note 31, at 1381-82 (discussing accountability, transparency, and public trust); Kampfe, *supra* note 34, at 1163 (“As the demand for PWBCs [police-worn body cameras] increases in response to public distrust of police officers, the most important benefit of PWBCs to the public is the accountability and transparency they can provide.”); Simmons, *supra* note 35, at 887 (discussing accountability and transparency); Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1664 (“While the primary reasons for adopting police-worn body cameras differ depending on perspective, a widespread rationale, particularly embraced by civil rights and community groups, is rebuilding public trust through improved transparency.”); WHITE, *supra* note 25, at 19-20.

55. See Evans, *supra* note 22, at 81-82 (“[B]ody cameras create a platform to monitor job performance and ultimately hold officers accountable for inappropriate behavior.”); see also Maury, *supra* note 31, at 492-93 (“When the public is able to access and observe police misconduct, it possesses the power to use legal institutions to hold such misconduct accountable (and in a more efficient manner too).”); Lawrence, *supra* note 21, at 616 (mentioning officer “accountability” as a “driving factor[.]”); Stoughton, *supra* note 31, at 1394 (“[A]dditional video could potentially help recalibrate the current flawed approach to officer accountability by providing much-needed information.”).

56. See Letourneau, *supra* note 21, at 450; see also WHITE, *supra* note 25, at 19-20 (“Transparency, or willingness by a police department to open itself up to outside scrutiny, is an important perceived benefit of officer body-worn cameras.”); Maury, *supra* note 31, at 491-93 (discussing transparency); Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1664-65 (same).

57. Gonzales & Cochran, *supra* note 33, at 310-11 (discussing legitimacy); Kampfe, *supra* note 34, at 1164 (same); Maury, *supra* note 31, at 491-93 (noting restoring confidence and faith in law enforcement as potentially the “greatest benefit” of BWCs).

Fourth, proponents have suggested that body cameras can be helpful in evidence collection.⁵⁸ In theory, having a video record of encounters between police and citizens could assist in factual determinations during trial and resolution of disputes prior to trial.⁵⁹ For instance, BWC footage could be used to verify written statements or reports.⁶⁰ It could also help defense attorneys and prosecutors by providing “objective evidence” concerning “whether a confession was voluntary” or a search “consented to or justified.”⁶¹

Fifth, and finally, the usefulness of body cameras in training police officers has been cited as a benefit.⁶² Modern police training purportedly “involves a substantial number of videos.”⁶³ Videos may “offer[] a rare window into which would-be officers can see what the world is really like.”⁶⁴ The footage could also be used to train police officers for

58. *Considering Cameras*, *supra* note 34, at 1803; Maury, *supra* note 31, at 490; Stoughton, *supra* note 31, at 1393 (discussing potential to produce objective and accurate evidence); Kampfe, *supra* note 34, at 1182-83 (noting role of footage in trial); Johnathan M. Nixon, Comment, *Eye Spy Injustice: Delving into the Implications Police Body Cameras Will Have on Police Officers and Citizens*, 60 HOW. L.J. 719, 738-39 (2017); Wasserman, *Moral Panics*, *supra* note 47, at 837; WHITE, *supra* note 25, at 24-25 (noting potential to facilitate arrest and prosecution).

59. Maury, *supra* note 31, at 489-90 (noting record of events could lead to guilty pleas instead of trial).

60. *See Considering Cameras*, *supra* note 34, at 1803; *see also* Stoughton, *supra* note 31, at 1394 (discussing use in supporting investigations or prosecutions).

61. *Considering Cameras*, *supra* note 34, at 1803; Letourneau, *supra* note 21, at 456-57 (“Many proponents of police body cameras suggest that video evidence from these devices ‘will facilitate the arrest and prosecution of offenders.’ . . . Recorded evidence also has the potential to positively assist defendants in court.”) (footnote omitted).

62. Stoughton, *supra* note 31, at 1397-98, 1421 (noting BWCs promise to “facilitate officer training”); Chen, *supra* note 21, at 163 (noting value in developing better training programs); *Considering Cameras*, *supra* note 34, at 1802; Lawrence, *supra* note 21, at 618 (“Using one officer’s experience to educate others allows for second-hand learning.”); Simmons, *supra* note 35, at 887 (“Even if officers display behaviors that are not actionable or subject to disciplinary proceedings, supervisors can use the footage to determine which officers may be in need of additional training, or whether the entire department might benefit from particular training.”); WHITE, *supra* note 25, at 25-26. In particular, “review of body-camera footage may be [] useful in monitoring new officers.” *Considering Cameras*, *supra* note 34, at 1802; Nixon, *supra* note 58, at 739 (“Police officers can use footage captured by body cameras to educate and train young and newly-admitted officers.”).

63. *See* Stoughton, *supra* note 31, at 1397-98; *see also* Nixon, *supra* note 58, at 739 (“These videos can be used as scenario-based training tools, determining areas where officers perform strongly and areas where they may need more work before being placed in the field.”). Privacy may be recognized as valuable for a number of reasons. *See, e.g.*, Daniel J. Solove, *The Myth of the Privacy Paradox*, 89 GEO. WASH. L. REV. 1, 37-41 (2021) (discussing why privacy is valuable and noting, for example, its value in maintaining appropriate social boundaries, limiting power of companies and the government, and reputation management).

64. Stoughton, *supra* note 31, at 1397 (“One common theme can be found in ‘officer survival’ videos, which attempt to remind officers of the dangers of complacency by showing officers being brutally attacked, disarmed, or killed. Indeed, it is the rare officer who has not

high-risk situations (including armed encounters or active shooters) and to debrief police officers after critical incidents.⁶⁵ In this way, officers “can learn from the experiences and mistakes of the other officers” rather than having “to make costly mistakes themselves.”⁶⁶

Although these benefits have been discussed in connection with body cameras, certain concerns have also been raised. This Article next considers such concerns.

2. Perceived Concerns with Body Cameras

The perceived concerns with body cameras include: (i) privacy; (ii) fairness; and (iii) costs. Each of these concerns will be discussed in turn.

First, privacy concerns have been raised with body cameras.⁶⁷ Placing body cameras on all officers in the United States may be seen as a “serious threat” to privacy.⁶⁸ Important privacy questions have been raised in areas such as “the consent of the civilians being recorded, who can access the footage, how the footage will be stored, and how the footage will be used.”⁶⁹ For instance, the footage could be released for

seen the video-recorded line-of-duty deaths of Laurens County, Georgia Deputy Kyle Dinkheller or South Carolina Trooper Mark Coates.”) (footnotes omitted).

65. See *id.* at 1397-98; see also *Considering Cameras*, *supra* note 34, at 1802 (noting potential use in “remedial training”); WHITE, *supra* note 25, at 25-26 (noting potential use for “critical incidents,” including use of force).

66. Lawrence, *supra* note 21, at 618.

67. Simmons, *supra* note 35, at 889 (“The privacy concerns present complicated issues.”); *Considering Cameras*, *supra* note 34, at 1808 (“Privacy is a counterpoint to access: increasing transparency necessarily means more people will view body-camera footage, which will frequently feature civilians who may not want the recordings of themselves shared.”); Franks, *supra* note 49, at 476 (“[T]here is yet another reason to hesitate, which has to do with the privacy and surveillance implications of mandatory police body cameras.”); Letourneau, *supra* note 21, at 453 (“[B]ody cameras coupled with other technology, such as facial recognition software, have the possibility to deepen the mire of privacy issues.”); Evans, *supra* note 22, at 83; Maury, *supra* note 31, at 492-93; Gonzales & Cochran, *supra* note 33, at 314, 326; Kampfe, *supra* note 34, at 1169-75; Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1665 (“Privacy protection also looms as a major challenge.”); Nixon, *supra* note 58, at 732-33; WHITE, *supra* note 25, at 27-28. At the same time, it has also been suggested that BWCs may actually offer some privacy-related benefits. See Thomas, *supra* note 34, at 199-201 (listing certain perceived privacy benefits of police body cameras, such as their potential to “help reduce illegal searches” or reduce “the prevalence of privacy-infringing crime, such as burglary and stalking.”).

68. Woodrow Hartzog, *Body Cameras and the Path to Redeem Privacy Law*, 96 N.C. L. REV. 1257, 1258 (2018); Simmons, *supra* note 35, at 889 (noting “fiercest opposition” has come from groups which are concerned about privacy implications).

69. See Franks, *supra* note 49, at 477; see also Thomas, *supra* note 34, at 197 (“Body camera usage affects the privacy interests of many more people than the direct subjects of investigation, however. Bystanders or passersby, whether involved with the subject of an encounter or not, will inevitably be captured on a large number of recordings in both public and private settings, perhaps unaware that the police are filming.”) (footnote omitted); Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1665; Nixon, *supra* note 58, at 733 (“The accidental and incidental filming of individuals could raise concerns that,

no reason aside from embarrassing an individual, such as the release of video depicting “celebrity DUI stops or other similar situations.”⁷⁰ Similarly, the long-term storage of “intimate interactions”—such as domestic disputes—may raise privacy concerns.⁷¹ The Fourth Amendment implications of recording may be a particular concern for citizens,⁷² and police officers may also be concerned about their own privacy at work.⁷³ More broadly, critics may view BWCs as a means of enhanced government surveillance.⁷⁴

Second, critics have raised fairness concerns with body cameras.⁷⁵ There is a worry that juries will be overly reliant on BWC video or will reach improper conclusions based on it.⁷⁶ Overreliance on BWC video could be especially concerning since it has been suggested that camera video can potentially mislead, or biases may impact viewers.⁷⁷ For

although [a] body camera[] provide[s] an account of an officer’s actions, it vicariously surveys those individuals who happen to fall within the range of the camera’s view.”).

70. Evans, *supra* note 22, at 83. It may be that the more access which is afforded the media, the subjects of the video, and the public, the greater the opportunity for privacy intrusions. See Maury, *supra* note 31, at 493.

71. See *Considering Cameras*, *supra* note 34, at 1808; see also Evans, *supra* note 22, at 83.

72. Nixon, *supra* note 58, at 732; Erik Nielsen, Comment, *Fourth Amendment Implications of Police-Worn Body Cameras*, 48 ST. MARY’S L.J. 115, 120 (noting concerns with individual right “to be free from unreasonable searches”); Chen, *supra* note 21, at 164.

73. Nixon, *supra* note 58, at 733; WHITE, *supra* note 25, at 28-29.

74. Hartzog, *supra* note 68, at 1312 (“If lawmakers keep applying the same privacy frameworks to the rules for body cameras, they will get what they’ve always gotten: an inconsistent set of rules that do not seem to match people’s actual expectations of privacy and actually seem to facilitate the slow creep toward more surveillance.”); *Considering Cameras*, *supra* note 34, at 1810 (discussing “government surveillance”); Franks, *supra* note 49, at 476 (describing BWCs as a “powerful form of surveillance”).

75. See, e.g., Sacharoff & Lustbader, *supra* note 31, at 276; Letourneau, *supra* note 21, at 460-63; Maury, *supra* note 31, at 491; Gonzales & Cochran, *supra* note 33, at 319; Daniel Bernard Trimble, *Body-Worn Cameras: The Implementation of Both the Police Department’s Rollout of Cameras and the State’s Attorney’s Office’s Processing of Data for Discovery*, 47 U. BALT. L. REV. 379, 381-82 (2018); Franks, *supra* note 49, at 475.

76. Letourneau, *supra* note 21, at 460-63; Maury, *supra* note 31, at 491 (“[O]verreliance is worrisome.”).

77. See *Considering Cameras*, *supra* note 34, at 1812-14 (discussing implicit bias in perceiving the story depicted and “unconscious incorporation of implicit biases when determining whether an officer’s actions were ‘reasonable’ under the circumstances”); Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1662 (“A camera’s position and angle, the perspective from which recordings are made, and the time-framing of what is recorded all may powerfully shape a story and potentially mislead.”); Lawrence, *supra* note 21, at 624-25; Stoughton, *supra* note 31, at 1413 (“These biases may be even more troubling given our propensity to be highly confident in our own conclusions, a tendency that may be artificially bolstered even further when our conclusions are based on our review of video evidence.”); Birck, *supra* note 34, at 173 (“Body-camera footage, while helpful evidence, will be informed by and viewed through a lens of implicit bias.”); Nixon, *supra* note 58, at 732 (“Body cameras, as their name infers, are worn on the body of a police officer. As a result, a legitimate concern has been raised about whether these cameras display an accurate

instance, a camera “may not be at the right angle to catch the flash of a suspect’s weapon or the stomps of officers beating a suspect” while a viewer’s “prior ideological commitments [could] influence their interpretation of a recording.”⁷⁸ That it is law enforcement that retains control of video could raise concerns that body cameras may “exacerbate[] the unfairness already deeply entrenched in the criminal justice system.”⁷⁹

Third, and finally, the cost of body camera use has been cited as a concern.⁸⁰ Relevant costs may include initial program implementation

record of an encounter.”); Wasserman, *Moral Panics*, *supra* note 47, at 840 (“More problematic is the insistence that body cameras will provide video evidence that is always an objective, neutral, certain, and unambiguous representation of what happened in an encounter, leaving no doubts and no he-said/he-said disputes.”); Zamoff, *supra* note 21, at 18-19 (“Another concern is that bodycam evidence will be so emotionally compelling that it will render ‘factfinders vulnerable to a host of biases, including naïve realism, or the belief that what one sees is the uncontroverted truth; the inability to recognize the role of subjectivity; the fragmentation of perspective; and identification bias.’”).

78. Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1662-63.

79. Sacharoff & Lustbader, *supra* note 31, at 274. Officers might, for instance, seek to manipulate, or restrict access to, body camera video. *See, e.g.*, Sacharoff & Lustbader, *supra* note 31, at 274-76; *Considering Cameras*, *supra* note 34, at 1806; Franks, *supra* note 49, at 475; Fan, *Pooling Public and Police Body-Camera Videos*, *supra* note 40, at 1665 (“Nondisclosure or delayed disclosure of body-camera footage has led to anger and outrage among some community groups.”); Nixon, *supra* note 58, at 734-35 (“In step with the concern that body cameras may violate individuals’ privacy rights is the concern of that police department or authoritative figures who may have something to lose, will use their influence or access to body cameras to edit, or simply not record, body camera footage for their own personal agenda. . . . [N]ot all law enforcement officers or police departments are forthright with their reports or camera footage.”) (footnote omitted).

80. Letourneau, *supra* note 21, at 451-52 (“Implementing police body cameras is an expensive proposition, even at the department level—these devices can reach up to \$1000 per camera unit. Allocations for replacement hardware also must be considered. Further, the largest cost of camera implementation and use does not lie in the equipment itself but in the storage, management, and retention of data.”) (footnotes omitted); Lawrence, *supra* note 21, at 618; Gonzales & Cochran, *supra* note 33, at 318; Nixon, *supra* note 58, at 730-31 (“There are more than 1,000,000 law enforcement personnel in the United States today, and to equip each one of these individuals—or even a majority of them—with a body camera could become extremely expensive especially considering the cost of purchasing the equipment and training officers to effectively use said cameras.”); Zamoff, *supra* note 21, at 12 (“In fact, there are substantial barriers to entry that have prevented several major urban police departments from equipping all their officers with bodycams and that have kept many other police forces from adopting any bodycam program at all. These barriers include not only the cost of the equipment but the cost of storing vast quantities of bodycam data”); WHITE, *supra* note 25, at 32-34. Of course, it has also been suggested that BWCs may save money, such as by decreasing the number of civil suits against officers or reducing administrative time investigating officer shootings. *See* Gonzales & Cochran, *supra* note 33, at 319 (“Although such savings may be difficult to quantify, supporters counter they are nevertheless real and should not be ignored.”); *Considering Cameras*, *supra* note 34, at 1809 (noting certain “costs may be offset by savings on litigation, if cameras do in fact lead to fewer complaints and more efficient resolution of police misconduct cases”); Lawrence, *supra* note 21, at 620; Letourneau, *supra* note 21, at 456; Evans, *supra* note 22, at 80-81 (“While body cameras are expensive, the Rialto study projected that the police department saved \$4 in litigation costs

costs and continuing costs, such as for data manipulation, data storage, and preparation of footage for use.⁸¹ The full costs can be substantial, and some departments have opted to discontinue their body camera programs in the wake of such costs.⁸²

Before moving on from the perceived concerns (and benefits) of body cameras, it is worth noting the importance some commenters have placed upon substantive body camera policies and procedures. As one commenter stated: “[i]t is not enough to demand body cameras and video; we must decide and establish rules governing all aspects of how cameras and the resulting video will be used.”⁸³ As another commenter stated:

There are . . . a massive range of policy considerations that are best addressed through consultation with stakeholders, including officers

for every \$1 spent on the cameras.”); Nixon, *supra* note 58, at 738 (“For complaints that were found to have merit, police departments may have to conduct lengthy and costly investigations to determine whether the officer was within the scope of his employment or whether a punishment should be handed down. Potentially, this could all be avoided by the implementation of body cameras.”) (footnote omitted); Zamoff, *supra* note 21, at 17.

81. Letourneau, *supra* note 21, at 451-52 (“But the initial cost of the physical devices is not the source of the largest budget constraints the cameras will ultimately cause. The long-term usage of police body cameras will require substantial continued expenditure—especially in data storage, data manipulation, and the production of a courtroom-ready product.”); Evans, *supra* note 22, at 90-91; *Considering Cameras*, *supra* note 34, at 1809 (“While the start-up cost of outfitting a force with body cameras is not trivial for cash-strapped departments, the costs of storing and transmitting this data can be particularly staggering: some departments have already spent hundreds of thousands or even millions of dollars managing their data.”); Lawrence, *supra* note 21, at 618-19; Gonzales & Cochran, *supra* note 33, at 318-19 (discussing costs beyond cameras themselves, including training, other equipment, storage, management, and legal costs); Kampfe, *supra* note 34, at 1179 (“The cost of reviewing footage for the purposes of redaction and classification also poses a tremendous burden on police departments.”); Zamoff, *supra* note 21, at 14 (discussing data storage costs); WHITE, *supra* note 25, at 32-34 (discussing data storage and management).

82. Letourneau, *supra* note 21, at 451-52; Kimberly Kindy, *Some U.S. police departments dump body-camera programs amid high costs*, WASH. POST (Jan. 21, 2019), https://www.washingtonpost.com/national/some-us-police-departments-dump-body-camera-programs-amid-high-costs/2019/01/21/991f0e66-03ad-11e9-b6a9-0aa5c2fcc9e4_story.html (“[A]lthough the cameras were widely adopted, many departments—especially in smaller jurisdictions—are now dropping or delaying their programs, finding it too expensive to store and manage the thousands of hours of footage.”).

83. Wasserman, *Recording of and by Police*, *supra* note 40, at 555 (“The 2015 DOJ/PERF study offered thirty-three recommendations, with the key being that every department establish clear, specific, and detailed guidelines for all elements of camera and video usage.”); *see also* Simmons, *supra* note 35, at 883 (“Even many of the agencies that are using the cameras are racing to develop sound policies for their use.”); Mary D. Fan, *Missing Police Body Camera Videos: Remedies, Evidentiary Fairness, and Automatic Activation*, 52 GA. L. REV. 57, 62 (2017) (analyzing “available major-city body camera policies” and finding “widespread enforcement gaps in body camera policies.”); Mary D. Fan, *Body Cameras, Big Data, and Police Accountability*, 43 LAW & SOC. INQUIRY 1236, 1244 (2018) (analyzing police department body camera policies to draw conclusions); Maury, *supra* note 31, at 487.

themselves, interest groups such as the prosecution and defense bar, and individual community members. Policies relating to officer and civilian privacy, notification that an officer is recording and that civilians have (or do not have) the right to request the officer to not record in different situations, the transmission and storage of digital video, retention periods, automated analysis, provision of video to private technology companies for machine-learning purposes, et cetera, can all affect the ultimate results of an agency's BWC program.⁸⁴

Adoption of body camera policies and procedures may, thus, be seen as one means of seeking to mitigate certain concerns regarding body cameras while increasing the likelihood of realizing the benefits of such cameras.⁸⁵ The next Part will set out the methodology utilized in this Article.

III. METHODOLOGY

This Article creates the Police Body Camera Infrastructure Index ("BCII"), which seeks to measure inadequacy in body camera infrastructure among local law enforcement agencies in the United States. This Part sets out the data and methodology used in creating and calculating the BCII.

A. Data

The BCII draws upon the results of the 2016 Law Enforcement Management and Administrative Statistics Body-Worn Camera Supplement study ("LEMAS Study"), which the Bureau of Justice Statistics in the U.S. Department of Justice authored and the

84. Stoughton, *supra* note 31, at 1414; *see also* Fan, *Public Disclosure*, *supra* note 21, at 401-02 ("These policies are often enacted with some community input, whether through community meetings, online surveys, or both. The balances struck in body camera policies are important to investigate because they are governing how body cameras are being deployed on the ground. Legislatures and the courts often trail behind technology, leaving law enforcement to establish the baseline rules that courts and legislatures codify, approve, or amend in some respects. To understand the future balance between public disclosure and privacy, it is important to look beyond the few formal laws on the books to the many more departmental policies guiding practices on the ground.") (footnotes omitted).

85. *See, e.g.*, Thomas, *supra* note 34, at 194 ("Privacy and accountability are the primary interests implicated with body camera use, and policies must adequately protect both interests for implementation to actually benefit the public."); Maury, *supra* note 31, at 487 ("[T]he most important question is, how should body camera policies be designed to achieve positive results?"); Fan, *Public Disclosure*, *supra* note 21, at 401-02 ("As debates continue, balances between transparency and privacy protection are already being struck on the ground in body camera policies issued by police departments deploying body cameras."). Of course, the actual policy choices are important. *See, e.g.*, Stoughton, *supra* note 31, at 1414; Maury, *supra* note 31, at 487; Kampfe, *supra* note 34, at 1187-1200 (including sample policy).

Inter-university Consortium for Political and Social Research produced.⁸⁶ The LEMAS Study sample was derived from a law enforcement database containing 15,810 general purpose agencies, which included 12,695 county and local police departments, 49 primary state police departments, and 3,066 sheriffs' offices.⁸⁷ The final size of the sample was 4,976 agencies.⁸⁸ Data collection was largely conducted via the web or a mail-in survey, with additional data captured via telephone interviews.⁸⁹ Ultimately, 3,928 total agencies completed the study's survey, for a 79% response rate.⁹⁰ Of those, 1,915 agencies reported having acquired body cameras by the survey date.⁹¹ Since the positions of the three different types of agencies—county/local, state, and sheriffs' offices—may be distinct and since this Article is most interested in the position of the more local agencies, this Article focuses solely on data from the 1,460 county and local police departments who

86. See U.S. DEP'T OF JUSTICE, OFFICE OF JUSTICE PROGRAMS, BUREAU OF JUSTICE STATISTICS, LAW ENFORCEMENT MANAGEMENT AND ADMINISTRATIVE STATISTICS BODY-WORN CAMERA SUPPLEMENT (LEMAS-BWCS) 2016, at 1, 4-5 (2016) [hereinafter LEMAS STUDY]. See Coleman, *supra* note 16, at 1375-76 (using same data source and noting "[i]n the summary data description, the time period is reflected as 2015-2016"). It should be noted that, although this Article cites to pages in the LEMAS Study's codebook, the data is largely drawn from the LEMAS Study's Stata dataset. See Coleman, *supra* note 16, at 1375 n.76.

87. LEMAS STUDY, *supra* note 86, at 5 ("Local police departments and sheriffs' offices were chosen for the [LEMAS Study] using a stratified sample design based on number of full- and part-time sworn officers (part-time officers were counted as 0.5 full-time equivalents) and agency type. The sample was designed to be representative of all general purpose state and local law enforcement agencies in the United States, with separate samples drawn of local police departments and sheriffs' offices. All 49 primary state law enforcement agencies (state police and highway patrol) and all local departments and sheriffs' offices with 100 or more full-time sworn officers were included. Agencies serving special jurisdictions (such as schools, airports, or parks), or with special enforcement responsibilities (such as conservation laws or alcohol laws), were considered out of scope for the [LEMAS Study].")

88. *Id.*

89. *Id.* ("Among the responding agencies, 86% completed via web, 12% via mail, and 2% by combination of web and phone.")

90. See *id.* at 6 ("Since the overall response rate was less than 80%, a non-response bias analysis was conducted."); see also Coleman, *supra* note 16, at 1375-76 n.78 ("The base weights are set out in the [LEMAS STUDY] codebook."). Base weights and information on sampling error estimates are reflected in the codebook. See LEMAS STUDY, *supra* note 86, at 6 ("Variance and standard error estimates . . . were generated . . . [and] [t]he Taylor linearization method for a 'stratified without replacement' design was used for these calculations."); For more information on the LEMAS Study sample, limitations, and design, see generally LEMAS STUDY, *supra* note 86.

91. Data from question 10a in the LEMAS Study was used to derive this number. See LEMAS STUDY, *supra* note 86, at 16; see also Coleman, *supra* note 16, at 1376 n.81.

reported body camera acquisition.⁹² The county and local police departments studied will be referred to as the “Local Agencies.”⁹³

B. Alkire-Foster Adjusted Headcount Ratio

The BCII adopts the functional form of Sabina Alkire and James Foster’s Adjusted Headcount Ratio (M_0), a discrete multidimensional measure within a larger family of measures initially developed to study poverty.⁹⁴ The M_0 allows for the identification of inadequate units through the analysis of unit insufficiency across a number of selected indicators.⁹⁵ It has been called a “high-resolution lens” and is particularly suited to informing policy because it produces an overall measure, may be decomposed for targeting particular subgroups, permits identification of inadequacy drivers, and is suited to both ordinal and cardinal data.⁹⁶ The M_0 may be preferable to dashboards and composite indices—other multidimensional measurement techniques, which have more commonly been featured in legal scholarship—since these other techniques “focus on each factor individually, and so fail to reveal how different factors are interdependent.”⁹⁷ The M_0 , for instance, permits the

92. LEMAS STUDY, *supra* note 86, at 16; Coleman & Vaz, *supra* note 20, at 262 (“We suspect that, given the different nature of the three types of agencies, their capacities should be evaluated with reference to different criteria. Thus, for purposes of our measure, we focused exclusively on the local police departments . . .”).

93. Missing values and observations which are not helpful for the BCII’s focus—such as “Don’t know” or “Unsure/don’t know”—are generally excluded in constructing the BCII and reporting its findings. *See generally* LEMAS STUDY, *supra* note 86. Accordingly, the actual number of observations for the BCII—and number of agencies studied—is 1,115 rather than 1,460.

94. *See generally* Sabina Alkire & James Foster, *Counting and Multidimensional Poverty Measurement*, 95 J. PUB. ECON. 476 (2011); SABINA ALKIRE ET AL., MULTIDIMENSIONAL POVERTY MEASUREMENT AND ANALYSIS (2015); Sabina Alkire, José Manuel Roche & Ana Vaz, *Changes over Time in Multidimensional Poverty: Methodology and Results for 34 Countries*, 94 WORLD DEV. 232 (2017); *see also* Coleman & Vaz, *supra* note 20, at 255-56 (noting Alkire and Foster’s multidimensional measurement “framework helps reveal the extent to which units under study fall below an established standard, i.e., the extent to which units (perhaps individuals or institutions) are inadequate according to some selected criteria.”). This Article will utilize the terminology “insufficient” and “inadequate”—rather than “deprived” and “poor” (e.g., the terminology that would normally be utilized in the poverty literature)—because this Article focuses on application of the measure in the law enforcement, rather than in the poverty, context. *See* Coleman & Vaz, *supra* note 20, at 255 n.17 (noting use of such terminology when discussing “measurement’s capacity outside the poverty context”).

95. *See* Alkire, Roche & Vaz *supra* note 94, at 233; Coleman & Vaz, *supra* note 20, at 255-56. A unit is considered “insufficient” when it does not meet the sufficiency threshold established by the researcher for a given indicator and “inadequate” when the unit does not meet the overall threshold set by the researcher for adequacy.

96. ALKIRE ET AL., *supra* note 94, at 21; Coleman & Vaz, *supra* note 20, at 254-56.

97. ALKIRE ET AL., *supra* note 94, at 72-75 (discussing dashboards and composite indices); Coleman & Vaz, *supra* note 20, at 253-54 (noting these other techniques are still

identification of units that experience insufficiency in a larger share of indicators simultaneously.

Construction of an M_0 measure may be seen as a series of five steps.⁹⁸ First, the measure's purpose must be defined.⁹⁹ Second, the unit of identification must be established.¹⁰⁰ The unit of identification will be the entity under study, which the measure will identify as either adequate or inadequate.¹⁰¹ Third, statistical indicators must be selected and assigned weights.¹⁰² Indicators may be based on specific variables in a dataset, and weights are assigned to such indicators based on their comparative importance to the measure.¹⁰³ For convenience, similar indicators may be grouped into dimensions.¹⁰⁴ Fourth, insufficiency cutoffs must be established for specific indicators, along with an overall inadequacy cutoff for individual units.¹⁰⁵ The selected cutoffs should reflect the *minimum* attainment necessary to not be considered insufficient in an indicator or inadequate overall.¹⁰⁶ Fifth, and finally,

"extremely useful"). Dashboards measure each factor independently without aggregation, and, although composite indices do offer aggregation, they aggregate independent factors into a single number. See Coleman & Vaz, *supra* note 20, at 253-54. The M_0 approach may also be preferable to other approaches such as statistical approaches and Venn diagrams, since the M_0 produces a summary measure (unlike a Venn diagram) and it also allows "easier comparison across metrics based on different data sets" (unlike statistical approaches). Coleman & Vaz, *supra* note 20, at 254 n.4; see also ALKIRE ET AL., *supra* note 94, at 70-122.

98. Coleman & Vaz, *supra* note 20, at 256 (noting "there are not necessarily defined 'steps' for creating a measure," but presenting creation of measure as consisting of steps for convenience).

99. *Id.* at 256. This requires determining "why the measure is being created." *Id.* at 259.

100. *Id.* at 256.

101. *Id.* at 256-57 (noting that "the measure's purpose" should "guide the choice of appropriate unit of identification").

102. *Id.* at 257 ("An indicator may be defined as 'a data element that represents statistical data for a specified time, place, and other characteristics.'").

103. *Id.* Put another way, "the weight assigned to an indicator reflects the value that an insufficiency in such indicator has for inadequacy, relative to insufficiencies in other indicators." ALKIRE ET AL., *supra* note 94, at 197.

104. Coleman & Vaz, *supra* note 20, at 257 ("Dimensions may be defined as 'conceptual categories into which indicators may be arranged (and possibly weighted) for intuition and ease of communication.' Grouping related indicators into dimensions may aid communication of the measure's results, since there would normally be fewer dimensions than there are indicators, and the thematic dimensions may be more accessible to those less connected to the research.") (citation omitted); ALKIRE ET AL., *supra* note 94, at 197, 202.

105. Coleman & Vaz, *supra* note 20, at 257 (noting it may be helpful to select an inadequacy cutoff such that the measure "identif[ies] as inadequate only those units with enough insufficiencies as might compromise a unit's performance").

106. *Id.* ("The insufficiency cutoff for an indicator reflects the minimum attainment required so as not to be insufficient in such indicator. The inadequacy cutoff reflects what minimum share of weighted insufficiencies would be necessary to identify a unit as inadequate.") (footnote omitted); ALKIRE ET AL., *supra* note 94, at 197. There are several approaches for selecting cutoffs. See Coleman & Vaz, *supra* note 20, at 257-58 n.33 ("For instance, one could deem a unit inadequate if such unit were insufficient in at least one indicator (called the union approach). This approach would generally identify a large group

the M_0 must be calculated.¹⁰⁷ This fifth step requires identification of inadequate units,¹⁰⁸ and then calculation of: (1) the incidence of inadequacy (proportion of inadequate units, also called the headcount ratio);¹⁰⁹ (2) intensity of inadequacy (average share of insufficiencies among the inadequate units, also called breath of inadequacy);¹¹⁰ and (3) Adjusted Headcount Ratio or M_0 (a measure of overall inadequacy—considering “incidence” and “intensity”).¹¹¹ The Adjusted Headcount Ratio corresponds to the insufficiencies that are “experienced by inadequate units expressed as a proportion of all possible insufficiencies (if all units were insufficient in all indicators).”¹¹² In being sensitive to both the intensity and incidence of inadequacy, the

of units as inadequate, potentially including some which are only insufficient in a single indicator and whose performance may not be impaired by such insufficiency. An alternative option might be to deem a unit inadequate only if it were insufficient in all indicators (called the intersection approach). This approach generally identifies as inadequate a very small group of units, perhaps leaving out units with many insufficiencies whose performance might be hindered even though they are not insufficient in all indicators. Where appropriate, it is helpful to select an inadequacy cutoff between these two extremes, potentially permitting one to identify as inadequate only those units with enough insufficiencies as might compromise a unit’s performance.” (citations omitted).

107. Coleman & Vaz, *supra* note 20, at 258. The Adjusted Headcount Ratio (M_0) may also be called the multidimensional index. *See id.*

108. *Id.* (“Suppose you have a population of n units and information on their attainments in d indicators. Let x_{ij} represent the attainment of unit i on indicator j . Assume w_j stands for the relative weight of indicator j , and the weights of the d indicators sum to one: $\sum_{j=1}^d w_j = 1$. Then, let z_j reflect the insufficiency cutoff for indicator j , and k denote the overall inadequacy cutoff. Unit i is identified as insufficient in indicator j if its attainment on that indicator is below the respective insufficiency cutoff: $g_{ij} = 1$ if $x_{ij} < z_j$ and $g_{ij} = 0$ if $x_{ij} \geq z_j$. The inadequacy score of unit i , denoted c_i , is the weighted sum of its insufficiencies: $c_i = \sum_{j=1}^d w_j g_{ij}$. Unit i is identified as inadequate if its inadequacy score is equal to or greater than the inadequacy cutoff: $c_i \geq k$.”) (footnote omitted); Alkire & Foster, *supra* note 94, at 477-80.

109. Coleman & Vaz, *supra* note 20, at 258 (“The incidence of inadequacy . . . , denoted by H , is the proportion of inadequate units: $H = \frac{q}{n}$, where q is the number of inadequate units.”); Alkire & Foster, *supra* note 94, at 477-80; *see also* Coleman & Vaz, *supra* note 20, at 255-59 (“By ‘incidence of inadequacy,’ we mean the percentage of analyzed units that are inadequate.”); OXFORD POVERTY & HUMAN DEV. INITIATIVE, CONSTRUCTING A MULTIDIMENSIONAL POVERTY MEASURE (2015), <http://www.ophi.org.uk/wp-content/uploads/Constructing-a-multidimensional-poverty-index-WEB-Jan-2015.pdf>.

110. Coleman & Vaz, *supra* note 20, at 258 (“The intensity . . . is the average inadequacy score among the inadequate units: $A = \frac{1}{q} \sum_{i=1}^n c_i I(c_i \geq k)$ where $I(\cdot)$ is an identification function that assumes the value one if the condition between parentheses is true for unit i , and zero otherwise.”); Alkire & Foster, *supra* note 94, at 477-80; *see also* Coleman & Vaz, *supra* note 20, at 255-59 (“By ‘intensity of inadequacy,’ we mean the average proportion of insufficiencies faced by inadequate units simultaneously.”); OXFORD POVERTY & HUMAN DEV. INITIATIVE, *supra* note 109.

111. *See* Coleman & Vaz, *supra* note 20, at 258 (“The . . . adjusted headcount ratio[]], denoted M_0 , reflects the incidence of inadequacy adjusted for the intensity: $M_0 = HA$ or $M_0 = \frac{1}{n} \sum_{i=1}^n c_i I(c_i \geq k)$.”); Alkire, Roche & Vaz, *supra* note 94, at 233.

112. Coleman & Vaz, *supra* note 20, at 258; *see* Alkire & Foster, *supra* note 94, at 477-80.

Adjusted Headcount Ratio may capture the impact of policies reducing the quantum of inadequate units or improving the position of such units.¹¹³ The Adjusted Headcount Ratio is the inadequacy index of interest.

Once the Adjusted Headcount Ratio (or inadequacy index of interest) is calculated, several additional analyses may be made.¹¹⁴ First, estimating the “censored” and “uncensored” headcount ratios reveals the pattern of insufficiencies in the population.¹¹⁵ Uncensored headcount ratios “summarize the prevalence of the different insufficiencies among the population.”¹¹⁶ Censored headcount ratios may also be interesting, however, “in that they summarize the prevalence of insufficiencies experienced by *only* the inadequate units.”¹¹⁷ Second, the percentage contribution may be calculated.¹¹⁸ This entails breaking down the measure by contribution of each dimension and indicator, which reveals the drivers of inadequacy.¹¹⁹ An indicator or dimension that has a large relative contribution could become a policy priority.¹²⁰ Third, and finally, decomposed results may be analyzed.¹²¹ The M_0 may be decomposed by subgroups, such as by unit size or location of units.¹²²

113. Coleman & Vaz, *supra* note 20, at 258-59 (“For example, suppose a policy was successful at reducing the number of insufficiencies experienced by a set of highly inadequate units, but such policy failed to make any inadequate unit adequate. A measure focused only on incidence would fail to reveal the value of such policy, but the [Adjusted Headcount Ratio] would capture it.”).

114. Possible calculations not relevant for the current Article are not here discussed.

115. See ALKIRE ET AL., *supra* note 94, at 165-67; Coleman & Vaz, *supra* note 20, at 259, 261.

116. Coleman & Vaz, *supra* note 20, at 259 (“The uncensored headcount ratio of indicator j , denoted h_j , is the proportion of units that are insufficient in that indicator: $h_j = \frac{1}{n} \sum_{i=1}^n g_{ij}$.”).

117. *Id.* (emphasis added) (“The censored headcount ratio of indicator j , denoted $h_j(k) = \frac{1}{n} \sum_{i=1}^n g_{ij} I(c_i \geq k)$.”).

118. See ALKIRE ET AL., *supra* note 94, at 166, 186-87; Coleman & Vaz, *supra* note 20, at 259-61.

119. See ALKIRE ET AL., *supra* note 94, at 166, 186-87; Coleman & Vaz, *supra* note 20, at 259-60. Since the Adjusted Headcount Ratio “can be written as the weighted sum of the censored headcount ratios ($M_0 = \sum_{j=1}^d w_j h_j(k)$), the relative contribution of an indicator is obtained by multiplying the indicator’s censored headcount ratio by the indicator’s weight and dividing by the [Adjusted Headcount Ratio].” Coleman & Vaz, *supra* note 20, at 260.

120. Coleman & Vaz, *supra* note 20, at 260.

121. See Alkire & Foster, *supra* note 94, at 480; see ALKIRE ET AL., *supra* note 94, at 186-87; Coleman & Vaz, *supra* note 20, at 260-61.

122. See ALKIRE ET AL., *supra* note 94, at 184; Coleman & Vaz, *supra* note 20, at 260 (“Suppose the population can be divided into m exhaustive and mutually exclusive subgroups, M_0^l is the [Adjusted Headcount Ratio] for subgroup l and v^l denotes the population share of such group. Then, the [Adjusted Headcount Ratio] can be expressed as the weighted sum of the subgroups’ [Adjusted Headcount Ratios]: $M_0 = \sum_{l=1}^m v^l M_0^l$.”). Note, if the unit of identification were individuals rather than entities, other types of subgroup decomposition might be possible, such as by race or gender. Coleman & Vaz, *supra* note 20, at 260.

Having subgroup-level results may permit targeting resources to those groups most in need.¹²³

C. Construction of the Police Body Camera Infrastructure Index

Construction of the BCII followed the steps set out in Part III.B. These steps were: (i) determining the measure's purpose; (ii) adopting a unit of identification; (iii) setting indicators, dimensions, and weights; (iv) establishing insufficiency and inadequacy cutoffs; and (v) calculating the measure.¹²⁴ The first and second steps were accomplished by determining that the BCII's purpose would be to measure inadequacy in BWC infrastructure among local law enforcement agencies in the United States and by setting the Local Agencies as the unit of identification.

Moving into the third and fourth steps, seven indicators based on LEMAS Study questions were selected for inclusion in the measure. Such indicators were identified by drawing upon the body camera benefits and concerns literature referenced in Part II.B and comparing guidance from such literature to functional data available in the LEMAS Study. Each of the seven indicators was assigned an insufficiency cutoff and equal weight, and such indicators were sorted into three dimensions of BWC infrastructure: "Deployment," "Policies and Procedures," and "Features and Usefulness." Table 1 summarizes these parameters.

The Deployment dimension consisted of two indicators. First, the "Degree of Deployment" indicator identified as insufficient any agencies not describing their current state of BWC deployment as at least "[c]omplete deployment for some assignments/partial deployment in others."¹²⁵ For instance, those agencies offering "[f]ull deployment to all intended personnel" would be considered sufficient, but those merely engaged in "[e]xploratory/pilot deployment" or "[p]artial deployment" would be considered insufficient.¹²⁶ Second, the "Cameras Per Sworn Officers" indicator deemed insufficient agencies with less than one BWC per every three "full-time sworn officers with general arrest

123. Coleman & Vaz, *supra* note 20, at 260 ("Combining the subgroup decomposition with the breakdown by indicators permits display of the composition of inadequacy by each subgroup.").

124. The fifth step (calculation of the measure) is treated in Part IV (on empirical results of the measure) rather than here.

125. Based on question 13 ("How would you describe the current state of body-worn camera deployment in your agency?") in the LEMAS Study. LEMAS STUDY, *supra* note 86, at 25-26.

126. *See id.*

powers.”¹²⁷ This dimension was included on the assumption that a sufficient degree of camera deployment is important to support an adequate BWC program.

The Policies and Procedures dimension was made up of two indicators. First, the “Formal Policy” indicator considered insufficient agencies lacking a formal policy on BWCs or footage recorded by such cameras.¹²⁸ Second, the “Internal Access Procedure” indicator deemed insufficient agencies who fail to track internal access to video files.¹²⁹ This dimension was included on the assumption that sufficient policies and procedures are important to support an adequate BWC program.

The Features and Usefulness dimension was made up of three indicators. First, the “Features” indicator considered insufficient agencies who identify their BWCs as having less than four of the ten features inquired into by the LEMAS Study: “Time / date stamp,” “Variable camera placement (e.g., eyewear, lapel, other part of uniform),” “Pre-event video buffer (e.g., the device continuously records video which is saved when the device is activated),” “Capable of recording in low light conditions,” “Playback screen,” “Minimum battery life,” “Global Positioning System (GPS) information,” “Safeguards against inadvertent video file corruption, loss, or tampering,” “Officer down alerts,” and “Officer event tagging.”¹³⁰

127. Based on questions 8 (“[A]pproximate number of full-time sworn officers with general arrest powers . . . ?”) and 12 (“About how many body-worn cameras are currently in service?”) in the LEMAS Study. LEMAS STUDY, *supra* note 86, at 14-15, 23-25 (suggesting responses may be based on approximations).

128. Based on question 19 (“Does your agency have a formal policy on the use of body-worn cameras or the video footage recorded by those cameras?”) in the LEMAS Study. LEMAS STUDY, *supra* note 86, at 47. This does not include those agencies who reported having a policy that was under development or in draft form. *Id.* Since the Formal Policy indicator merely tracks whether Local Agencies have a formal policy, it was initially considered to include a separate indicator seeking to track the quality of such policies. This other indicator would have been based on questions 20 (“Were any published guidelines from independent sources (such as the NIJ, BJA, PERF, IACP, CALEA, etc.) used in the formulation of policies and procedures regarding body-worn camera deployment, use, or video storage?”), 21 (“Does your agency’s body-worn camera (or related) policy cover what events to record?”), and 23 (“Does your agency’s body-worn camera (or related) policy cover transfer, storage, or disposal of video?”) in the LEMAS Study. *Id.* at 47-56 (underlining omitted). The considered “policy quality” indicator was ultimately excluded, since nearly all Local Agencies satisfying the Formal Policy indicator would have also satisfied the policy quality indicator. Accordingly, had such indicator been included, it would have effectively double-weighted the policy indicator to the detriment of other important indicators in the measure.

129. Based on question 53 (“Does your agency keep a log of or otherwise track internal (i.e., law enforcement agency staff) access to video files?”) in the LEMAS Study. *Id.* at 92.

130. Based on question 51 in the LEMAS Study. *Id.* at 80-87. Please note, the “Other (please specify)” answer choice was ignored for purposes of the Features indicator, since it was selected very few times and responses would have been difficult to standardize.

Second, the “Perceived Usefulness” indicator identified as insufficient agencies who report that they “[s]trongly disagree” with any of a series of BWC satisfaction questions in the LEMAS Study: BWCs “provide reliable evidence of officer-citizen interactions,” “have been useful in protecting officers from unwarranted complaints,” “have been a useful tool for supervising officers,” “have improved professionalism of officers,” “have helped identify instances of officer misconduct that might not have been identified without them,” and “have improved relationships between the agency and the community.”¹³¹ Third, the “Use in Training” indicator identified as insufficient those agencies not using BWC footage to develop and/or inform in-service training.¹³² This dimension was included on the assumption that BWCs should have sufficient features and be sufficiently useful in order to support an adequate BWC program.

Table 1 – BCII: Dimensions, Indicators, Cutoffs, and Weights¹³³

Dimension	Indicator	Cutoff (Insufficient if ²)	Weight (%)
Deployment	Degree of Deployment	Has not deployed to at least “[c]omplete deployment for some assignments/partial deployment in others” level	14.29
	Cameras Per Sworn Officers	Has less than one BWC per every three “full-time sworn officers with general arrest powers”	14.29
Policies and Procedures	Formal Policy	Lacks formal policy on BWCs or footage recorded by BWCs	14.29
	Internal Access Procedure	Fails to track internal access to video files	14.29

131. Based on question 52 in the LEMAS Study. *Id.* at 88-92. Respondent agencies are presented answer choices including: “Strongly agree,” “Agree,” “Disagree,” and “Strongly disagree.” *Id.* These four answer choices are “analogous to a four-point Likert-type scale,” and the additional two answer choices—“Too soon to know” and “Don’t know”—are ignored for purposes of the measure. *Id.*; Coleman, *supra* note 16, at 1376 n.84; Natalie Todak & Janne E. Gaub, *Predictors of Police Body-Worn Camera Acceptance: Digging Deeper into Officers’ Perceptions*, 43 POLICING 299, 303 (2019); Scott W. Phillips et al., *The Impact of General Police Officer Outlooks on Their Attitudes Toward Body-Worn Cameras*, 43 POLICING 451, 456 (2020).

132. Based on question 18 (“Does your agency use body-worn camera footage to inform and/or develop in-service training?”) in the LEMAS Study. LEMAS STUDY, *supra* note 86, at 46-47.

133. Quotations in the text are derived from survey questions in the LEMAS Study. See *supra* Part III.C.

Features and Usefulness	Features	Has less than four of ten features inquired into by LEMAS Study	14.29
	Perceived Usefulness	“Strongly disagree[s]” as to satisfaction on any of series of BWC satisfaction questions in LEMAS Study	14.29
	Use in Training	Does not use BWC footage to develop and/or inform in-service training	14.29

IV. EMPIRICAL RESULTS

This Part reports findings from the BCII analysis. Study limitations and robustness are also treated.

A. Findings

Analysis of the BCII reveals both an overall inadequacy picture and a granular view of the factors constituting the inadequacy.¹³⁴ To begin, the incidence, intensity, and BCII—i.e., the Adjusted Headcount Ratio or M_0 —are estimated. These values and their 95% confidence intervals are presented in Table 2. The incidence reflects that 32.7% of the Local Agencies are inadequate. The intensity shows that inadequate Local Agencies are insufficient, on average, in 53.5% of indicators, corresponding to nearly four of the seven indicators. The BCII is 0.175, meaning the total insufficiencies which are experienced by inadequate Local Agencies corresponds to roughly 17.5% of all possible insufficiencies (if all Local Agencies were insufficient in all indicators). These aggregate figures may provide an overall view of the Local Agencies’ inadequacy in BWC infrastructure. They may be used, for instance, to inform federal policy-makers as to status across the country.

Table 2 – Incidence, Intensity, and BCII

Cutoff (k) = 42%	Value	Confidence Interval (95%)	
Incidence (H, %)	32.7	29.8	35.7
Intensity (A, %)	53.5	52.0	54.9
BCII (M_0)	0.175	0.158	0.191

It is then possible to estimate insufficiencies that are driving inadequacy in the Local Agencies. To begin, the indicators’ censored

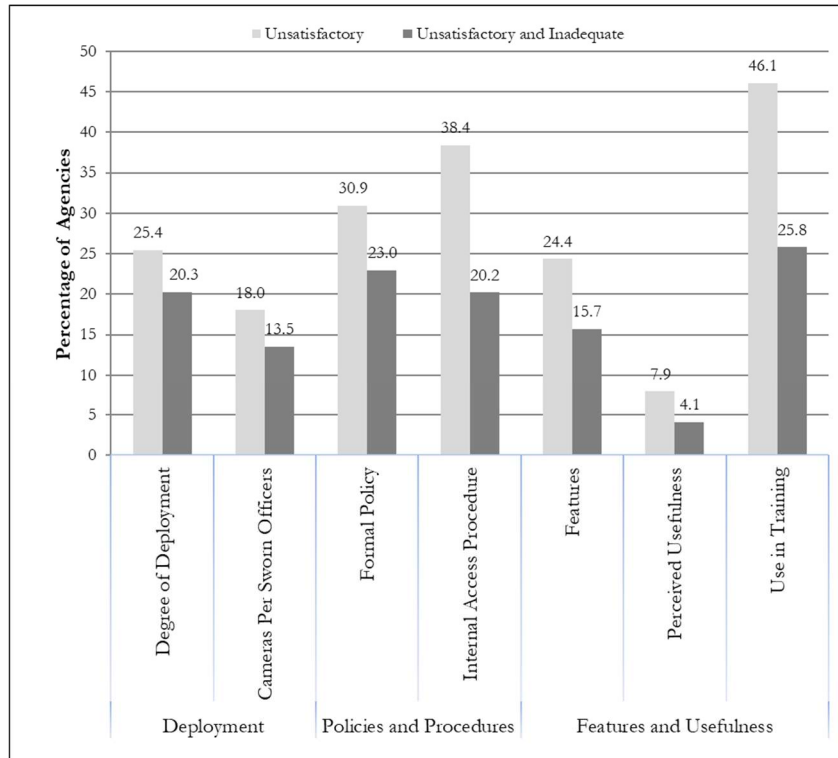
134. Presentation of the findings here largely follows the format of Coleman & Vaz, *supra* note 20.

headcount ratios are examined.¹³⁵ These censored headcount ratios are depicted in Figure 1 and appear in the darker color. Such censored headcount ratios are interesting because they “focus only on the insufficiencies experienced by *inadequate* agencies, rather than the insufficiencies among *all* agencies.”¹³⁶ The uncensored headcount ratios, or insufficiencies among all agencies, are also depicted in Figure 1 and appear in the lighter color.¹³⁷ From the uncensored headcount ratios, it is clear that, for instance, less than 8% of the Local Agencies are insufficient in the Perceived Usefulness indicator, but close to half of such agencies (46.1%) are insufficient in the Use in Training indicator. If a policy-maker were looking for a way to improve the BWC infrastructure of Local Agencies, such policy-maker might want to target resources toward encouraging the use of BWCs in in-service training and divert resources away from improving perceptions of BWC usefulness. However, if that same policy-maker were most interested in improving the situation of agencies that are inadequate in BWC infrastructure overall, the censored headcount ratios might show that, for instance, targeting resources toward encouraging the use of BWCs in in-service training would not help that much more than targeting those same resources toward encouraging adoption of a formal BWC policy.

135. See *supra* Part III.B.

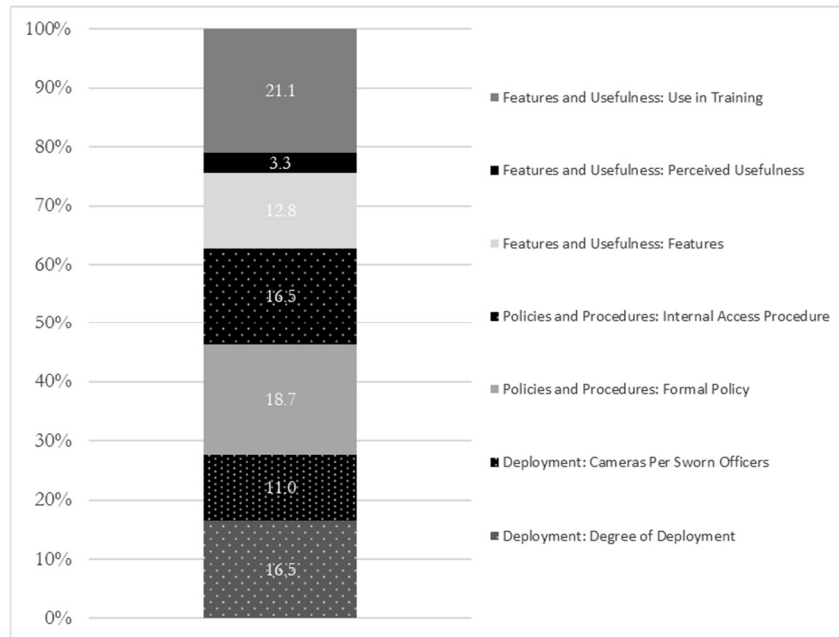
136. Coleman & Vaz, *supra* note 20, at 266.

137. *Id.* at 266-67.

Figure 1 – Censored and Uncensored Headcount Ratios

Another means of seeking to isolate the drivers of inadequacy among the Local Agencies is quantifying the relative contribution of individual indicators to the BCII.¹³⁸ This is summarized in Figure 2. Similar to the findings above, the indicators with the highest contribution to the BCII are Use in Training (21.1%) and Formal Policy (18.7%), while Perceived Usefulness has the lowest contribution (3.3%). Again, these percentages may inform policy-makers as to where best to deploy resources.

138. See *id.* at 267; *supra* Part III.B.

Figure 2 – Percentage Contribution of Each Indicator to BCII

In addition to analyses of all Local Agencies studied, it is also possible to examine the positions of particular subgroups of Local Agencies. For instance, Figures 3 and 4 depict the BCII and incidence of inadequacy, respectively, by agency size, along with relevant 95% confidence intervals. It appears that, on average, Local Agencies with less than ten officers have higher inadequacy than those agencies with twenty-five or more officers. While it may be understandable that larger agencies might tend to have more BWC infrastructure—due to, for instance, economies of scale—it is still helpful for a policy-maker to know that smaller agencies might generally need more support than larger agencies.

Figure 3 – BCII by Agency Size

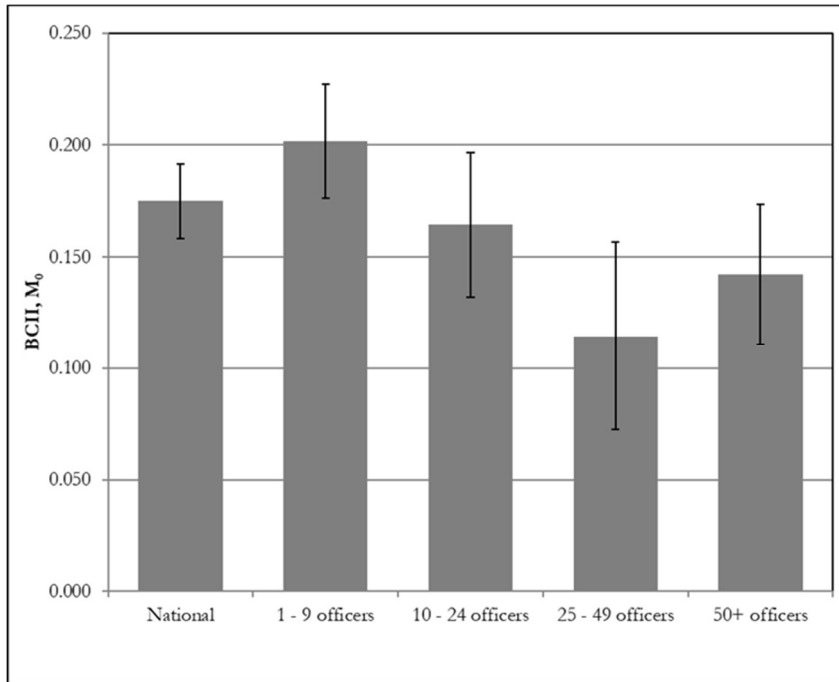
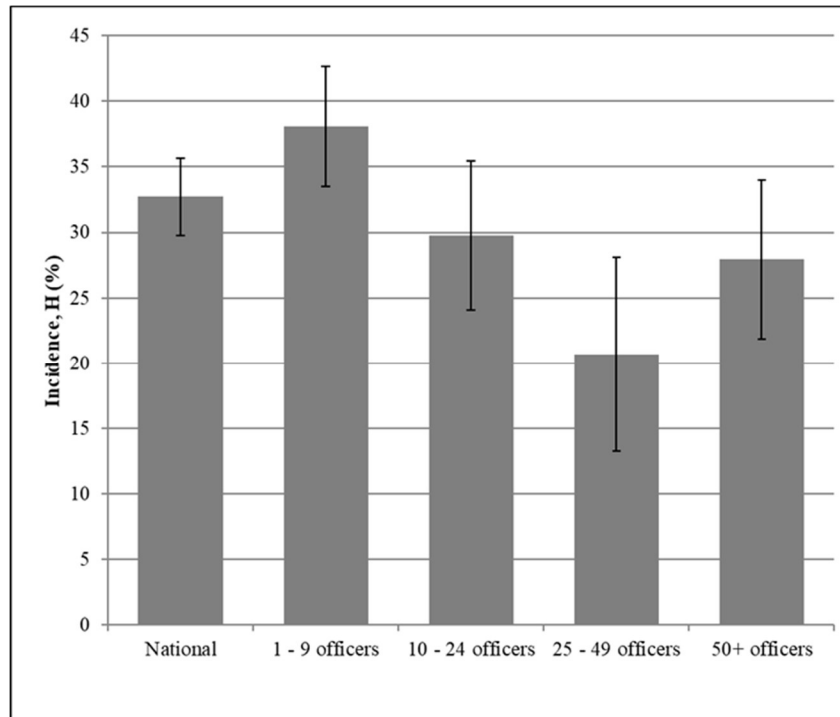


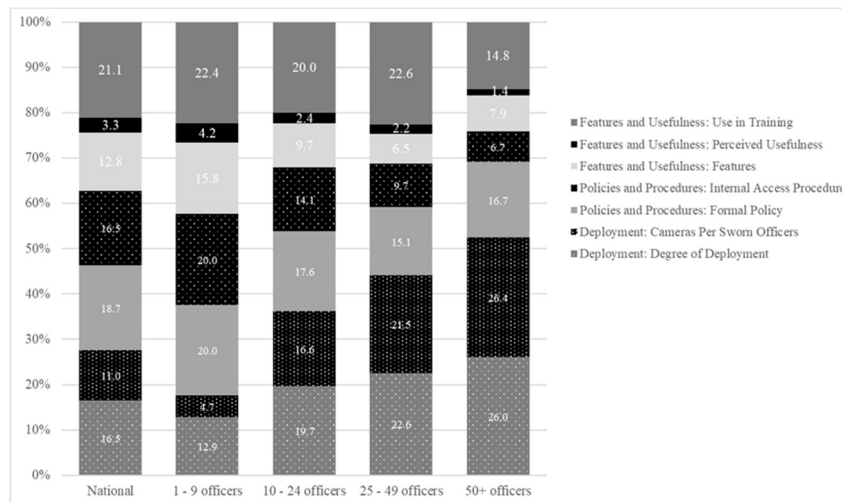
Figure 4 – Incidence of Inadequacy by Agency Size

It is also possible to analyze the percentage contribution of each indicator to the BCII by agency size, as depicted in Figure 5. As Figure 5 reflects, there is a large variation in percentage contribution across different agency sizes. For example, the percentage contribution of the indicator Cameras Per Sworn Officers varies between 26.4% for agencies with fifty or more officers and 4.7% for agencies with less than ten officers. The percentage contribution of Degree of Deployment and Cameras Per Sworn Officers generally appears to increase as agency size increases. In contrast, the percentage contribution of Internal Access Procedures and Perceived Usefulness generally appears to decrease as the size of the agency increases.¹³⁹ It may be that larger agencies generally need more cameras and greater investment in deployment than smaller agencies, while smaller agencies are less likely than larger agencies to need formal policies and procedures. Since the profile of insufficiencies varies across different agency sizes, a local government seeking to improve the BWC infrastructure of agencies in its area might

139. These observations are simply descriptive, and it is unclear whether they are statistically significant.

decide to take a different approach depending on the size of such agencies. For instance, if an agency had over fifty officers, making an investment in the number of cameras per sworn officers and/or degree of deployment of such cameras might improve the agency's position. In contrast, if an agency had less than ten officers, it might be better to invest in using the camera footage in in-service training, adopting a formal BWC policy, and/or tracking internal access to the video.

Figure 5 – Percentage Contribution of Each Indicator to BCII by Agency Size



In addition to agency differences based on size, there may also be important differences based on agency location. Figures 6, 7, and 8 depict the BCII, incidence of inadequacy, and intensity of inadequacy, respectively, in the ten largest U.S. states, along with relevant 95% confidence intervals.¹⁴⁰ In each of these figures, states are reflected in descending order of the index depicted, and it is unfortunately not possible to determine whether state-level differences are statistically significant.¹⁴¹ As Figure 6 reflects, agency inadequacy appears to vary

140. See *2020 Resident Population for the 50 States, the District of Columbia, and Puerto Rico*, U.S. CENSUS BUREAU, <https://www2.census.gov/programs-surveys/decennial/2020/data/apportionment/apportionment-2020-map02.pdf> (last visited July 7, 2021); *The 50 US States Ranked By Population*, WORLDATLAS, <https://www.worldatlas.com/articles/us-states-by-population.html> (last visited July 7, 2021); *US States - Ranked by Population 2022*, WORLD POPULATION REV., <https://worldpopulationreview.com/states> (last visited Feb. 8, 2022).

141. The inability to determine statistical significance is primarily due to the small size of the states' samples.

across states, with, for instance, agencies in Pennsylvania and Illinois experiencing higher inadequacy on average than those in Texas or California. Agencies in states with higher inadequacy like Pennsylvania could, in theory and on average, need more support from policy-makers in order to reach the level of agencies in better-performing states like Texas. As Figures 7 and 8 reflect, however, the rank of these same ten states by incidence or intensity can be quite different than the rank based on BCII. For instance, Florida has the lowest incidence of inadequacy (Figure 7), the highest intensity of inadequacy (Figure 8), and a BCII (Figure 6) closer to the middle of the ten states. This finding may suggest that while the proportion of inadequate agencies in Florida is lower than in the other nine states, the average share of insufficiencies among inadequate agencies in Florida is higher than the average share of insufficiencies among inadequate agencies in the other states. Other states, like Texas, generally do not change much in terms of rank order across Figures 6, 7, and 8. The state-level ranked results should be viewed with these possible variations in mind.

Figure 6 – BCII in Ten Largest U.S. States

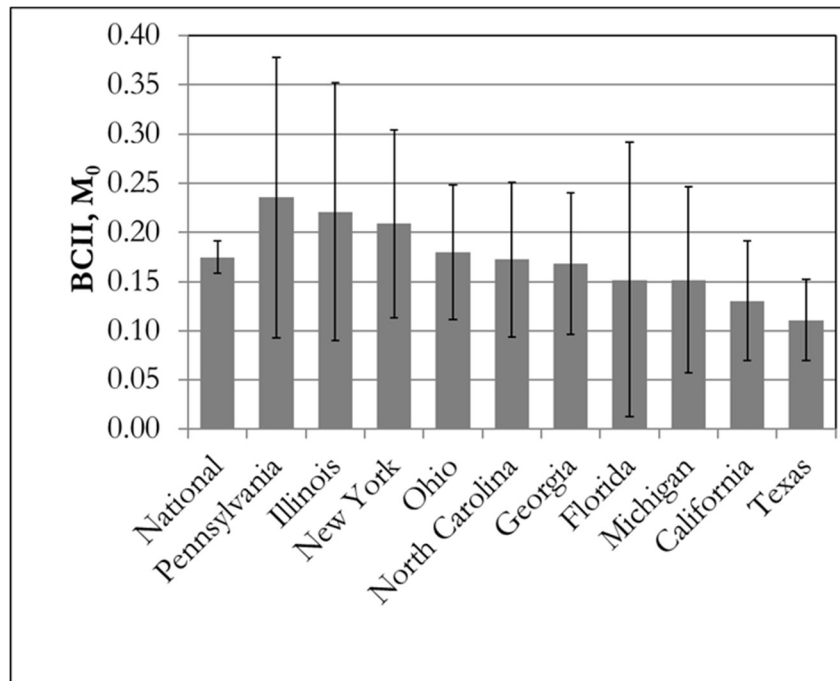


Figure 7 – Incidence of Inadequacy in Ten Largest U.S. States

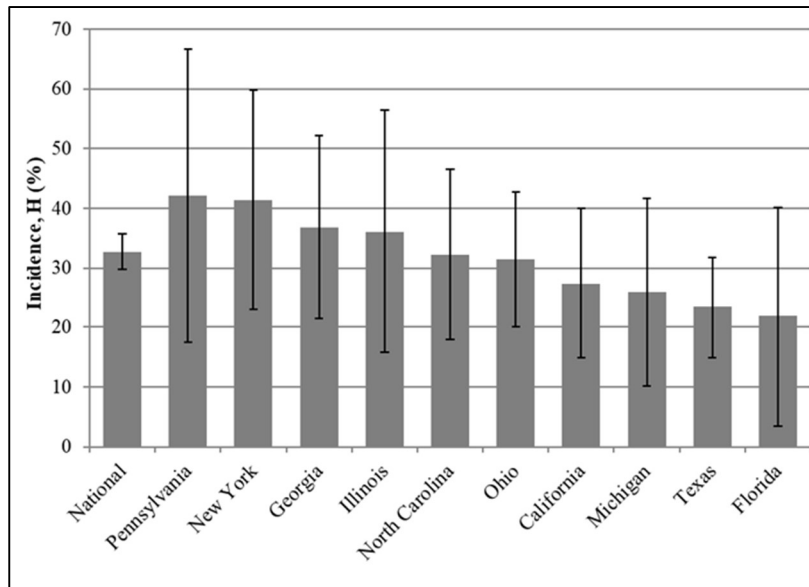
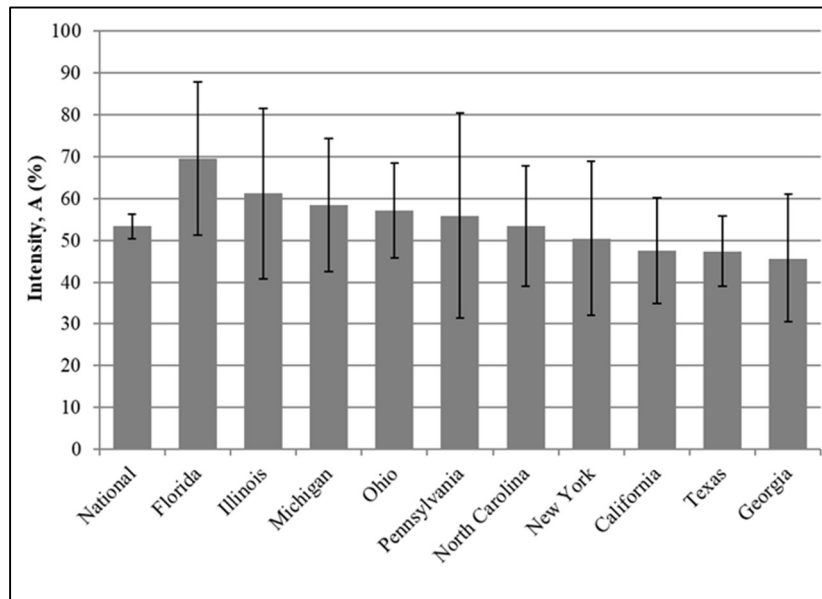
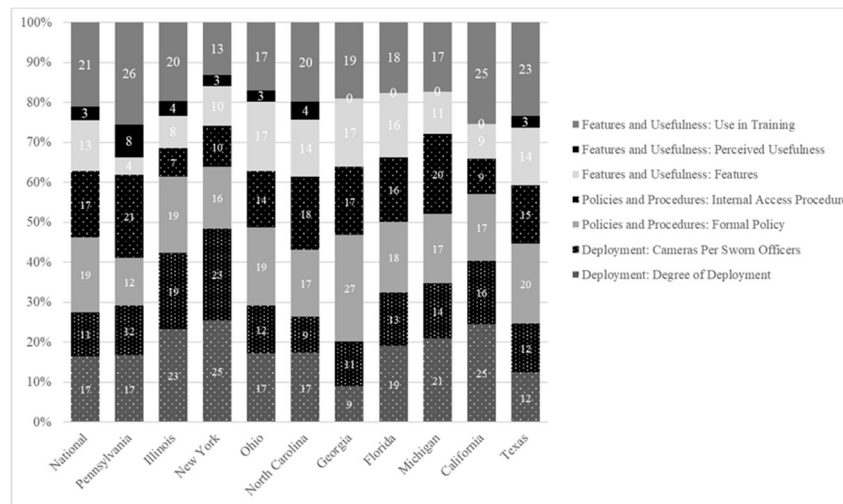


Figure 8 – Intensity of Inadequacy in Ten Largest U.S. States



The percentage contribution of each indicator to the BCII in the ten largest U.S. states is depicted in Figure 9. Figure 9 can help policy-makers in each state target resources toward items that will most efficiently improve the position of Local Agencies in their state. For instance, a policy-maker in New York might want to expend resources on improving the degree of BWC deployment (which contributes 25% to the BCII in New York) and less on other items, such as adopting a formal BWC policy (which contributes 16% to the BCII in New York). The exact opposite might be the case in Georgia, where the Degree of Deployment indicator contributes only 9% to the BCII, but the Formal Policy indicator contributes 27% to the BCII. Figure 9 also shows that there seem to be certain commonalities across the ten states. For instance, none need be particularly concerned with improving their agencies’ performance on the Perceived Usefulness indicator.

Figure 9 – Percentage Contribution of Each Indicator to BCII in Ten Largest U.S. States



Policy-makers may utilize the aggregated and decomposed results from analysis of the BCII to confirm the inadequacy of BWC infrastructure in relevant agencies, diagnose what factor(s) are driving any such inadequacy, and target resources to areas likely to improve agencies’ positions. Importantly, the Adjusted Headcount Ratio framework is flexible. Policy-makers or other stakeholders may adapt the BCII to fit individual measurement needs by choosing their own indicators, dimensions, cutoffs, and weights.

B. Limitations & Robustness

The findings from the analysis of the BCII are subject to several limitations, a number of which are emphasized here.¹⁴² First, data limitations restricted inputs for the measure. In particular, not all available data that would have been helpful for constructing indicators was available in the LEMAS Study. For instance, it would have been helpful to: (a) have been able to better control for Local Agency resources; (b) have had data from additional questions on specifics of policies, procedures, features, and usefulness; (c) have had the ability to decompose data for additional subgroups; and (d) have had additional observations for certain survey questions that were included.¹⁴³ Any limitations reported for the LEMAS Study itself would also apply to the BCII, which used the LEMAS Study's data as inputs.¹⁴⁴ Second, there are measurement limitations. The Adjusted Headcount Ratio framework is—like any measurement framework of its kind—imperfect, and it may be that the BCII or given indicators failed to accurately measure what they purported to measure.¹⁴⁵ Third, and finally, there are subjectivity limitations. Some degree of subjectivity is implicit in selecting indicators and dimensions, assigning indicator weights, and setting relevant cutoffs. It may be that the BCII failed to incorporate the optimal set of parameters and values. Similarly, the indicators were constructed from the responses of the Local Agencies only, so the indicators may merely reflect the subjective beliefs of the responding law enforcement employees rather than that of the full agencies or other important societal stakeholders.¹⁴⁶

The findings presented in this Article have also been subjected to two checks for robustness. First, to help reveal the sensitivity of the ranking by agency size to different inadequacy cutoffs, Figures 10 and 11 present the inadequacy and incidence of inadequacy, respectively, by

142. Several of these limitations are analogous to those noted in Coleman, *supra* note 16, at 1389-90.

143. See Coleman, *supra* note 16, at 1389. The limitation in available data is not a criticism of the LEMAS Study's data collection, since there are good reasons to limit the quantum of questions, such that burdensome and lengthy surveys may be avoided. See *id.*; Phillips et al., *supra* note 131, at 462.

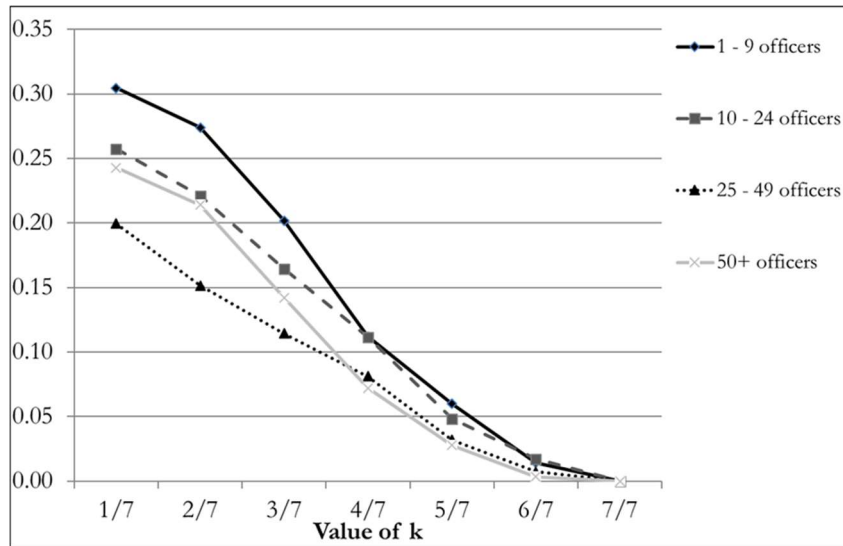
144. LEMAS STUDY, *supra* note 86, at 5-6.

145. See Alkire, Roche & Vaz, *supra* note 94, at 232 (discussing application of measure in the poverty context).

146. See Jordan C. Pickering, *Officers' Perceptions Regarding the Unexpected Effects of Body-Worn Cameras*, 43 POLICING 390, 400 (2020); see also Coleman, *supra* note 16, at 1391 (discussing value of objective metrics). Please note, Figures 10-13 are presented as lines for visual purposes, but they are made up of a discrete set of data points, so they are really more like "steps" than lines.

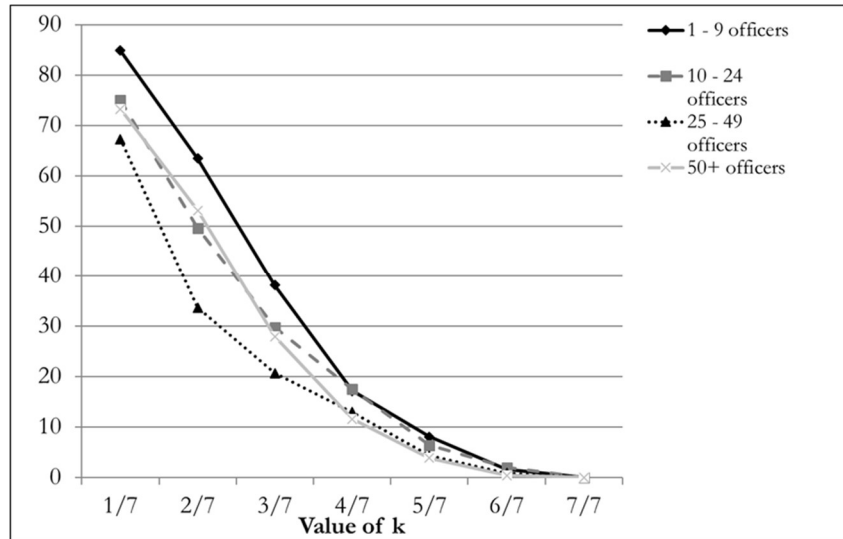
agency size for different cutoffs (i.e., for different values of k).¹⁴⁷ These figures reveal that there is some sensitivity to what cutoff is selected, but the two smaller agency size subgroups appear to generally stay on one side, while the two larger agency size subgroups appear to generally stay on the other. This suggests that regardless of cutoff, size appears to matter.

Figure 10 – BCII by Agency Size for Different Inadequacy Cutoffs



147. See Coleman & Vaz, *supra* note 20, at 270 (noting importance of checking sensitivity of results to changes in selected parameters).

Figure 11 – Incidence of Inadequacy by Agency Size for Different Inadequacy Cutoffs



Second, and for similar reasons, Figures 12 and 13 reflect the inadequacy and incidence of inadequacy, respectively, in the ten largest U.S. states for various possible cutoffs. The ranking of states is sensitive to the cutoff selected, so results should be interpreted with that in mind. Florida is, again, a particularly interesting case in this regard. For the lowest levels of k , Florida is ranked close to the middle of the ten states, while for the highest levels of k , it becomes the state with the highest level of inadequacy. Importantly, if a policy-maker wanted to use a different cutoff than that selected by this Article, the BCII could accommodate that, and the BCII could simply be adapted to fit such policy-maker's individual preferences.

Figure 12 – BCII in Ten Largest U.S. States for Different Inadequacy Cutoffs

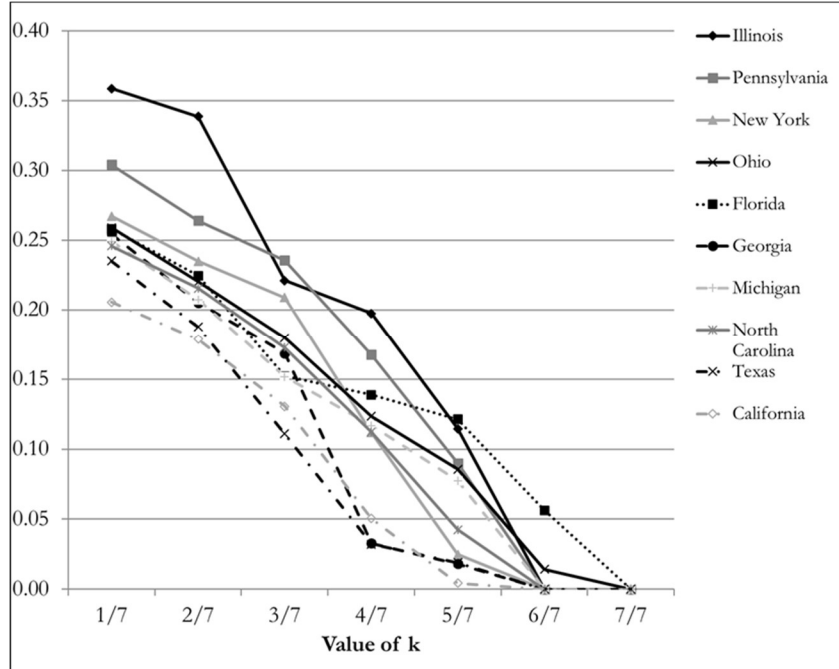
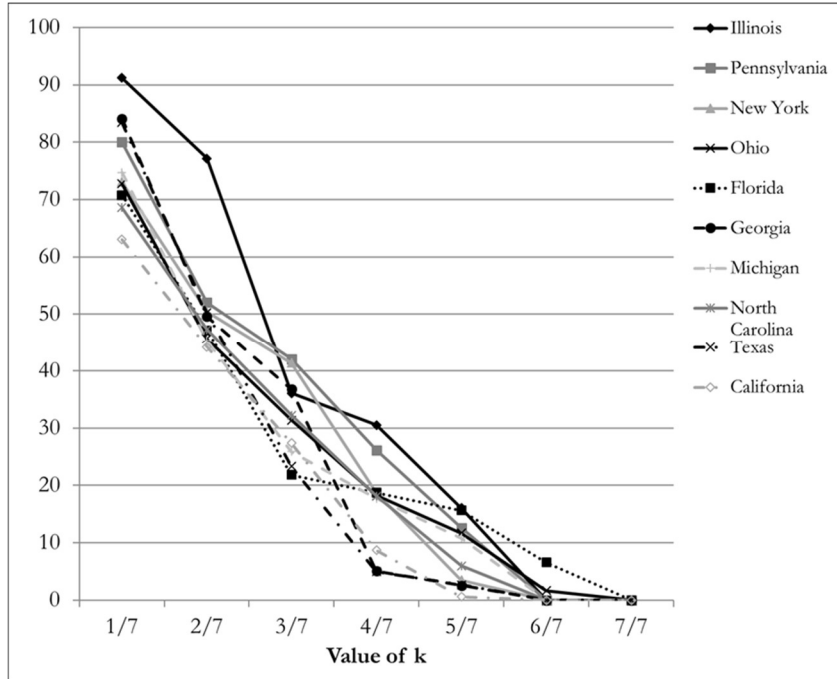


Figure 13 – Incidence of Inadequacy in Ten Largest U.S. States for Different Inadequacy Cutoffs



V. CONCLUSION

The goal of this Article is to present a measure of police body camera infrastructure—the BCII—and offer findings from analysis of it that will aid policy-makers, local stakeholders, and future researchers. Important limitations notwithstanding, the BCII appears to be the first multidimensional measure of its kind, and it provides both an overall and decomposed picture of inadequacy among local law enforcement agencies in the United States.

There are multiple avenues for future research in this area, certain of which are suggested here. First, it would be helpful to have additional large-N datasets on BWC programs. Robust data from a great variety of questions would allow for more precision in selecting indicators and dimensions. Second, it would be helpful to have new datasets that include perceptions of stakeholders other than law enforcement personnel, such as citizens, jurors, and attorneys.¹⁴⁸ Third, it would be helpful for future large-N datasets on law enforcement personnel to

148. See Coleman, *supra* note 16, at 1391.

include data decomposable by subgroups, such as gender, race, or disability status.¹⁴⁹ Fourth, it would be helpful to have additional multidimensional measures of BWC infrastructure using the M_0 or other techniques. The use of different measurement approaches may help confirm the findings of the BCII. Fifth, if sufficient data were available, it would be interesting to analyze the changes in BWC infrastructure inadequacy over time.¹⁵⁰ For example, how have Local Agencies' infrastructures altered since 2014 when Michael Brown and Eric Garner died, and how have or will the Local Agencies' infrastructures be altered following the more recent deaths of George Floyd and others? Sixth, and finally, if findings from the BCII induce implementation of any concrete policies at the state or local level, it would be interesting to see experimental data on the outcomes and impacts of such policies. Whether or not these six specific avenues are explored, it is hoped that this Article will at least spur continued research into BWC programs and highlight the value of measurement in constructing, assessing, and updating them.

149. *Id.*

150. See generally Alkire, Roche & Vaz, *supra* note 94.