Existing and Ongoing Body Worn Camera Research: Knowledge Gaps and Opportunities

A Research Agenda for the Laura and John Arnold Foundation (Phase I Report)

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This report is part of an ongoing Criminal Justice project made possible by generous funding from the Laura and John Arnold Foundation (LJAF).

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CITATION FOR THIS REPORT:
Lum, C., Koper, C.S., Merola, L.M., Scherer, A., and Reioux, A. (2015). *Existing and Ongoing Body Worn Camera Research: Knowledge gaps and opportunities.* Report for the Laura and John Arnold Foundation. Fairfax, VA: Center for Evidence-Based Crime Policy, George Mason University.

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Introduction and Overview of the Project

Recent use-of-force events in Ferguson, New York City, South Carolina, and Baltimore have led law enforcement agencies, citizens, civil rights groups, city councils, and even President Obama to push for the rapid adoption of body-worn camera (BWC) technology. In a period of less than a year, BWCs transformed from a technology that received little attention by many police leaders and scholars to one that has become rapidly prioritized, funded, and diffused into local policing. The U.S. Department of Justice has dedicated $20 million to fund the purchase of and technical assistance for BWCs. In 2013, the Law Enforcement Management and Administrative Statistics survey estimated that about a third of local law enforcement agencies had already adopted BWCs, and this percentage has likely greatly increased since then.

At the same time, this rapid adoption of BWCs is occurring within a low information environment; researchers are only beginning to develop knowledge about the effects, both intentional and unintentional, of this technology. A recent review of the literature on the topic of BWCs conducted by White (2014) found only a handful of empirical studies of the technology completed by September 2013. These studies have also focused on a narrow set of research questions about the impact of the cameras on police behavior. Further, only a small subset of these studies rigorously examined BWCs using valid scientific methods. As Lum (2015) has emphasized, rapid adoption of technologies in the absence of high-quality information about the impact of those technologies can lead to unanticipated and unintended consequences that may work against both police and citizen interests. The need for more research in this area is paramount, as the adoption of BWCs will likely have important implications for police-citizen interactions, police management and budgets, safety and security, citizen privacy, citizen reporting and cooperation with police, and practices in the courts.

But what research questions and types of research should be pursued and why? How can we build a translatable knowledge base that is responsive and rigorous? An important first step in answering these questions is to identify not only existing knowledge but also current projects underway to see research gaps and opportunities. Equally important in building the evidence-base for BWCs is ensuring that research is responsive to the needs and concerns of police and citizens and that it also anticipates future uses and concerns of BWCs. Many types of research might be needed, including process and outcome evaluations, national surveys on prevalence and use, studies about the possible consequences of that implementation for both

police and citizens, and the views and perceptions that officers and citizens hold about BWCs in practice. Legal analysis is also needed regarding issues of privacy, public information requests, redaction of footage, and storage of BWC data. Additionally, empirical research is needed that focuses on the impacts of BWC evidence on court processes and case outcomes.

Toward this end, the research team at the Center for Evidence-Based Crime Policy at George Mason University (herein "GMU Team") will undertake four project phases to help the Laura and John Arnold Foundation (LJAF) achieve its goal of developing an evidence-based research agenda for the field:

PHASE I: A systematic review of existing and ongoing research knowledge relevant to BWCs for both law enforcement and the courts. This review will allow the LJAF and others to understand the scope of research and knowledge on BWCs through December 2015, as well as identify gaps and opportunities for future research projects.

PHASE II: Studies of current BWC use and concerns in law enforcement and the courts. This phase will include reviewing new survey evidence from the federal Bureau of Justice Statistics and the Police Executive Research Forum (supported by LJAF) regarding the prevalence and nature of BWC use in law enforcement.[1] The research team will also undertake a survey of prosecutors (led by Dr. Linda Merola) to understand the prevalence and nature of BWC use in the courts.

PHASE III: Develop an evidence-informed research solicitation for the LJAF based on the evidence assessment and survey results from Phases I and II. The research team will map priorities and opportunities for new research with the LJAF and develop a research solicitation that reflects these needs.

PHASE IV: The research team will assist the LJAF in implementing the solicitation, targeting a broad range of scholars and practitioner-researcher teams. The CEBCP team will also assist the LJAF in judging and investigating the merits of the proposals based on scientifically sound principles.

In this report, we present the results of Phase I.

[1] Because these surveys are already being conducted, the research team will not carry out an additional national survey.

Existing and Ongoing Body Worn Camera Research: Knowledge Gaps and Opportunities

The GMU team reviewed two areas of research to examine the state of, and research questions explored in, existing and ongoing empirical studies related to BWCs. Most research has been and is being conducted in law enforcement agencies (Section A). However, given the likely impact of BWCs on court processes, we also examined the literature and existing projects related to BWCs in that arena as well (Section B). Despite the rapid diffusion of BWCs, we discovered significant gaps in our knowledge about their uses, as well as their intended and unintended consequences in both policing and court processes. Significant opportunities for future research projects are highlighted for each.

A. Empirical Research on Body Worn Cameras in Law Enforcement

Almost all existing and ongoing BWC research is occurring in the arena of law enforcement. The first review of the research field was undertaken by White (2014) for the federal Office of Justice Programs Diagnostic Center. White found five evaluation studies of BWCs in policing as of September 2013. He also discussed a number of possible benefits and challenges related to BWC use.

Relying upon this document as a starting point, we expanded our search for BWC research to include both existing and ongoing research not yet completed/published. We specifically limited our search to only "empirical" research in policing, whether qualitative or quantitative, and therefore excluded opinion and theoretical discussions, descriptions of the technology or agencies using BWCs, and guidelines explaining how to use the technology (although this literature was used in determining research demands and future lines of inquiry as discussed below). Although we did not expect to find many more studies than those discussed by White (2014), we searched all major literary databases through the George Mason University library system (e.g., criminal justice abstracts, ProQuest), as well as Google Scholar and the National Criminal Justice Reference Service. For each study found, we recorded the citation and author information, funding mechanisms, duration of the study, date of completion, location of the study, research questions examined, and the results of the study.

In addition to searching existing (completed) research, we also conducted a search for current and ongoing BWC research in the field. We examined all of our existing documents and literature collected for any mention of an ongoing research project. We contacted the major organizations funding BWC research, including the federal Bureau of Justice Assistance (through their Smart Policing Initiatives related to BWCs), the federal National Institute of Justice (through their research and evaluation portfolio), and also the LJAF itself, through its initial 2015 BWC research funding program. We also examined 2013, 2014, and 2015 conference presentations for the American Society of Criminology (ASC), the Academy of Criminal Justice Sciences (ACJS), and the International Association of Chiefs of Police (IACP) for any other hints at ongoing (or existing) research projects in the field. Finally, we reached out to colleagues in the field for their knowledge of ongoing research projects on BWCs. For all ongoing studies discovered, we contacted investigators to collect information about the research questions they were examining, funding mechanisms and amounts if available, the proposed duration and location of the study and any other information they were willing to share.

How much research is being conducted?

In total, we discovered 12 existing empirical studies of BWCs[2] and 30 ongoing research projects, shown in Table 1 and divided further by whether they are United States or international studies. Those studies which employ randomized controlled trials (RCTs) are bolded. Notable is the growth in not only the amount of studies that have been or are being conducted since White's review, but also the growth in RCTs that test the effects of BWCs. Compared to the existing studies which include only four completed RCTs (Ariel et al., 2015; Grossmith et al., 2015; Jennings et al., 2015; Owens et al., 2014), over half of the ongoing studies are RCTs. In particular, Barak Ariel at the University of Cambridge and students from the Police Executive Programme led by Lawrence Sherman[3] appear to be carrying out a large portion of ongoing experimental trials, many of which are unfunded studies outside of both the professors' and executives' normal research-related duties. Some of these are replications of the first RCT on BWCs, carried out in Rialto, California (see Ariel et al., 2015; Farrar and Ariel, 2013).

[2] It should be noted that three studies—Ready and Young (2015), Roy (2014), and Young and Ready (2015)—appear connected to the same Mesa, Arizona, project, but appear distinct in their analyses, so we counted them separately.

[3] See http://www.crim.cam.ac.uk/courses/police/

Table 1. Existing and Ongoing Empirical Research on Body Worn Cameras

Existing Empirical Research

U.S. Studies:

Ariel, B., Farrar, W.A., & Sutherland, A. (2015). The effect of police body-worn cameras on use of force and citizens' complaints against the police: A randomized controlled trial. *Journal of Quantitative Criminology, 31*(3), 509-535.

Also cited as Farrar, W.A. & Ariel, B. (2013). Self-awareness to Being Watched and Socially-Desirable Behavior: A Field Experiment on the Effect of Body-worn Cameras on Police Use of Force. Washington, DC: Police Foundation.

Jennings, W.G., Lynch, M., & Fridell, L.A. (2015). Evaluating the impact of police officer body-worn cameras (BWCs) on response-to-resistance and serious external complaints: Evidence from the Orlando Police Department (OPD) experience utilizing a randomized controlled experiment. *Journal of Criminal Justice*, 43(6), 480-486.

Jennings, W. G., Fridell, L.A., & Lynch, M.D. (2014). Cops and cameras: Officer perceptions of the use of body-worn cameras in law enforcement. *Journal of Criminal Justice*, *42*(6), 549-556.

Katz, C. M., Kurtenbach, M., Choate, D.W., & White, M.D. (2015). *Phoenix, Arizona, Smart Policing Initiative: Evaluating the Impact of Police Officer Body-Worn Cameras.* Washington, DC: U.S. Department of Justice, Bureau of Justice Assistance. *This appears to be the same source project as:*

Also cited as Katz, C.M., Choate, D.E., Ready, J.R. & Nuño, L. (2014). Evaluating the Impact of Officer Worn Body Cameras in the Phoenix Police Department. Phoenix, AZ: Center for Violence Prevention & Community Safety, Arizona State University.

Ready, J.T. & Young, J.T. (2015). The impact of on-officer video cameras on police-citizen contacts: Findings from a controlled experiment in Mesa, AZ. *Journal of Experimental Criminology, 11*(3), 445-458. *This appears to be the same source project:*

Roy, A. (2014). *On Officer Video Cameras: Examining the Effects of Police Department Policy and Assignment on Camera Use and Activation*. (Unpublished Masters thesis). Arizona State University, Phoenix, AZ.

Young, J.T. & Ready, J.T. (2015). Diffusion of ideas and technology: The role of networks in influencing the endorsement and use of on-officer video cameras. *Journal of Contemporary Criminal Justice, 31*(3), 243-261.

International Studies:

Ellis, T., Jenkins, T., & Smith, P. (2015). *Evaluation of the Introduction of Personal Issue Body Worn Video Cameras (Operation Hyperion) on the Isle of Wight: Final Report to Hampshire Constabulary.* University of Portsmouth: Institute of Criminal Justice Studies.

Goodall, M. (2007). *Guidance for the Police Use of Body-Worn Video Devices*. London: Home Office. http://revealmedia.com/wp-content/uploads/2013/09/guidance-body-worn-devices.pdf.

Grossmith, L., Owens, C., Finn, W., Mann, D., Davies, T., & Baika, L. (2015). *Police, camera, evidence: London's cluster randomised controlled trial of Body Worn Video.* London, United Kingdom: College of Policing and the Mayor's Office for Policing and Crime (MOPAC).

ODS Consulting. (2011). *Body Worn Video Projects in Paisley and Aberdeen, Self Evaluation*. Glasgow: ODS Consulting.

Owens, C., Mann, D., & Mckenna, R. (2014). *The Essex BWV Trial: The impact of BWV on criminal justice outcomes of domestic abuse incidents.* London, United Kingdom: College of Policing.

Ongoing Empirical Research

U.S. Studies:

Ariel, B. (Cambridge University). *The Effect of Wearing Police Body Cameras on Use of Force, Complaints and Arrests in Large Police Departments*. (Denver, CO [a]). Funding Agency: None.

Ariel, B. (Cambridge University). *Expanding Rialto: The Miami Beach Police Department Body Worn Videos Field Laboratory.* (Miami Beach, FL). Funding Agency: Bureau of Justice Assistance: Smart Policing Initiative.

Ariel, B. (Cambridge University). *Police Wearing Body-Cameras Increases 911-Calls for Service in Urban Residential Street Segments; No Effect on Hotspots of Crime*. (Denver, CO[b]). Funding Agency: None.

Coldren, C. (CNA Corporation). *Research on the Impact of Technology on Policing Strategies.* (Las Vegas, NV). Funding Agency: National Institute of Justice.

Goodison, S., Wilson, T., & Wellford, C. (Police Executive Research Forum). *Citizen Perceptions of Body Worn Cameras: A Randomized Controlled Trial.* (Arlington, TX). Funding Agency: Laura and John Arnold Foundation.

Goodison, S., Davis, R., & Wilson, T. (Police Executive Research Forum). *Costs and Benefits of Body Worn Camera Deployment.* (Nationwide). Funding Agency: Laura and John Arnold Foundation.

Groff, E.R. & Wood, J.D. (Temple University). *The Use of Body Worn Cameras in Policing: A Pilot Study with the Philadelphia Police Department*. (Philadelphia, PA). Funding Agency: None. *This is the same source project as:*

See also Wood, J D. & Groff, E.R. (Temple University). *Exploring the Intended and Unintended Consequences of Body Worn Cameras in Policing: A Qualitative Pilot Study with the Philadelphia Police Department.* (Philadelphia, PA). Funding Agency: Temple University Seed Grant.

Katz, C. (Arizona State University). *No Title.* (Phoenix, AZ). Funding Agency: Bureau of Justice Assistance: Smart Policing Initiative.

Koen, M. (George Mason University). *Technological Frames: Making Sense of Body-Worn Cameras in a Police Organization.* (Laurel, MD). Funding Agency: None.

Kyle, M. (Southern Illinois University). *No Title.* (Midwest and Southern Region Police Departments). Funding Agency: None.

Lawrence, D. & LaVigne, N. (Urban Institute). *Evaluating Body Worn Cameras: A Randomized Controlled Trial of the Impact on Use of Force, Citizen Complaints, and Community Trust.* (Anaheim, CA, Pittsburgh, PA, & Long Beach, CA). Funding Agency: Laura and John Arnold Foundation.

Merola, L.M., Bailey, J., Reioux, A., & Smedley, E. (George Mason University). *Discussing Emerging Technologies with the Public: A Content Analysis of Police Agencies' Websites and Other Communications.* (Nationwide). Funding Agency: None.

Merola, L.M., & Reioux, A. (George Mason University). *Media Coverage of Emerging Law Enforcement Technologies with Surveillance Capabilities*. (Nationwide). Funding Agency: None.

Newell, B.C. (Tilburg University). *No Title*. (Spokane, Bellingham, & Seattle, WA). Funding Agency: Partially funded by the University of Washington Information School and a grant from the Netherlands Organisation for Scientific Research (NWO).

Peterson, B. & Lawrence, D. (Urban Institute). *No Title*. (Milwaukee, WI). Bureau of Justice Assistance: Smart Policing Initiative.

Rosenbaum, D. (University of Illinois Chicago). *Impact Evaluation of Body Worn Cameras in Chicago*. (Chicago, IL). Funding Agencies: Bureau of Justice Assistance and City of Chicago.

White, M. (Arizona State University). *Assessing the Impact and Consequences of Police Officer Body-Worn Cameras: A Multi-Site Randomized Controlled Trial.* (Spokane, WA & Tempe, AZ). Funding Agency: Laura and John Arnold Foundation.

Uchida, C. (Los Angeles Police Foundation). *Testing and Evaluating Body Worn Video Technology in the Los Angeles Police Department.* (Los Angeles, CA). Funding Agency: National Institute of Justice.

Young, J. & Ariel, B. (Ventura Police Department & Cambridge University). *The Effect of Wearing Police Body Cameras on Criminal Justice Outcomes, Plea Bargains and Speed of Prosecution: The Role of Prospect Theory.* (Ventura, CA). Funding Agency: None.

International Studies:

Ariel, B. (Cambridge University). *The Effect of Body Worn Cameras on Corruption: A Multisite Experiment*. (Uruguay). Funding Agency: Uruguay Ministry of Interior Security.

Ariel, B. (Cambridge University). *The Effect of Body Worn Cameras on Police Legitimacy, Self Legitimacy, and Victim Satisfaction*. (Israel). Funding Agency: Israeli Police.

Ariel, B. (Cambridge University). *The Effect of Wearing Police Body Cameras on Convictions*. (United Kingdom). Funding Agency: None.

Ariel, B. (Cambridge University). *The Effect of Body Worn Cameras on Assaults Against Private Security Guards in Railway Stations: A Multi-site, Multi-player RCT.* (United Kingdom). Funding Agency: None.

Ariel, B. & Drover, P. (Cambridge University & West Midlands Police). *The Effect of Body Worn Cameras on Repeat Domestic Violence Victimisation*. (West Midlands, UK). Funding Agency: None.

See also Drover, P. & Ariel, B. (West Midlands Police & Cambridge University). *Leading an Experiment in Police Body-Worn Video Cameras.* (Wolverhamton, UK: West Midlands Police). Funding Agency: None.

Ariel, B. & Henderson (Cambridge University). *The Effect of Body Worn Cameras on Use of Force in Night-Time Economy Environments.* (Northern Ireland). Funding Agency: None.

Ariel, B., et al. (Cambridge University). *Global Multi-Site Randomized Controlled Trial* [multiple outcomes – complaints against the police, use of force, officer discretion, and citizen compliance/officer injuries] (United Kingdom, Northern Ireland, & United States). Funding Agency: None.

Byron & Ariel, B. (Cambridge University). *Testing the Effect of Body Worn Video on Assault on Staff: The Bus Revenue Protection Inspector Experiment.* (United Kingdom Buses). Funding Agency: None.

Demir, M. (Rutgers University). *Recorded Justice: A RCT of the Effect of Body Worn Cameras on Police and Citizens*. (Eskisehir, Turkey). Funding Agency: None.

Henstock, D. & Ariel, B. (West Midlands Police & Cambridge University). *Testing the Effects of Police Body-Born Cameras on Use of Force during Arrests: A Randomized Controlled Trial in a Large British Police Force.* (West Midlands, UK). Funding Agency: None.

See also Henstock, D. & Ariel, B. (West Midlands Police & Cambridge University). *A Closer Look into the Effect of BWCs in Arrests: More Officer Injuries but Fewer Suspect Injuries.* (West Midlands, UK). Funding Agency: None.

Tankebe, J. & Ariel, B. (Cambridge University). *Cynicism Towards Change: The Case Of Body-Worn Videos Among Police Officers.* (Global). Funding Agency: None.

Not only is the increase in experimental research on BWCs noticeable, but the rapid response to research needs due to the deployment of this technology appears to be unmatched, historically. For example, despite the rapid adoption of license plate readers in policing since around 2009, this technology has still not produced a similar research response (Lum et al., 2011). Additionally, at least one national survey of police agencies (Goodison, Davis, and Wilson for the Police Executive Research Forum) is using a stratified random sample approach to survey agencies about the prevalence and nature of BWC use. The Bureau of Justice Statistics is also developing a survey and sampling instrument to gather information about BWC prevalence and use.

We refrain at this point from drawing any definitive conclusions about BWCs from the twelve existing studies because there are so few of them. Individually, nonetheless, these studies are beginning to hint at a few possible hypotheses. For example, it appears that officers may not necessarily have negative attitudes toward BWCs generally (see, e.g., Jennings et al., 2014; Owens et al., 2014; Ellis et al., 2015). However, some of the studies examining activation of the cameras find varying levels and nuances of compliance and activation of cameras (see Roy, 2014; Katz et al., 2015).

BWCs may reduce complaints against the police (see Ariel et al., 2015; Farrar and Ariel, 2013; Goodall, 2007; Katz et al., 2014) or result in quicker resolution of complaints (see Katz et al., 2014; ODS Consulting, 2011). However, whether or not that signals increased accountability, improved citizen satisfaction, or improved police or citizen behavior is still uncertain. It is also unclear, perhaps because of low incident rates, whether BWCs significantly reduce incidents of use of force (either excessive or non-excessive). For instance, Ariel et al. (2015) finds that BWCs reduce use of force incidents, but Katz et al. (2015) find that arrest activity increases for officers wearing BWCs (Owens et al., 2014, also seem to find similar impacts on individuals being charged). Interestingly, Ready and Young (2015) seem to find that officers wearing cameras, while less likely to perform stop and frisks or make arrests, are more likely to give citations.

But again, we caution the reader in making definitive conclusions from the existing literature. Once ongoing research is completed, reviews of this literature will be required to draw out more solid conclusions.

What types of research questions are being explored or need to be explored?

The research questions addressed by each of the existing and ongoing studies are categorized in Table 2 below. Table 2 also includes research questions not yet studied but raised in a number of documents and other sources of information we found pertaining to BWCs and law enforcement. We examined a much broader literature on BWCs because our goal was not only to identify the existing and ongoing supply of research but also to identify research demands and further questions that need to be studied.[4] Thus, included in our search described above were roundtable, symposia, and conference presentations, guidebooks on BWC use, congressional briefings, discussion forums, and opinion pieces to better understand

[4] Ideally, to understand demand in a more systematic way, a national survey is needed. We did not conduct a national survey given that two agencies are currently undertaking this research (the federal Bureau of Justice Statistics and the Police Executive Research Forum). When these results are available, we will include them in later reports and on the Technology web portal (see http://cebcp.org/technology/).

the interest and concerns of citizens, police leaders, researchers, and other interested parties. For example, we examined:

- The Final Report of the President's Task Force on 21st Century Policing (May, 2015) as well as individual written or oral testimonies provided during the "Technology and Social Media" listening session which took place on January 31, 2015.[5]
- All articles published in *The Police Chief Magazine* (International Association of Chiefs of Police) directly relating to BWCs (see e.g., Capps, 2015; Geis and Blake, 2015; Farrar, 2014; Ferrell, 2013; Fiumara, 2012).
- The federal Office of Community Oriented Policing Services and Police Executive Research Forum survey and conference held in Washington, DC, on September 11, 2013, and reported in Miller et al. (2014), as well as the Police Executive Research Forum "town hall" meeting in Philadelphia, October 20, 2013.
- Conference presentations highlighting the topic of BWCs at various national society meetings.
- Congressional briefing on "Body Cameras: Can Technology Increase Protection for Law Enforcement Officers and the Public?" by the Senate Judiciary Subcommittee on Crime and Terrorism held on May 19, 2015.
- Written and web-based guides on BWCs such as Goodall (2007), Man Tech Advanced Systems International, Inc. (2012), Miller et al. (2014), White (2014), the Bureau of Justice Assistance *National Body Worn Camera Toolkit*,[6] Peters and Eure (2015), Lum (2015), and Office of the Privacy Commission of Canada (2015).
- Other informally collected information from those present at various meetings and briefings that have not been documented, including the March 2015 White House summit on BWCs, as well as the Congressional briefing on BWCs hosted by the LJAF.

In total, all of the materials collected as described above, as well as the authors' experience in this area, helped us to identify seven general areas for research on BWCs and 30 possible research questions within these seven arenas:

1. Impact of BWCs on officer behavior
2. Officer attitudes about BWCs

[5] See "Listening Session: Technology and Social Media." http://www.cops.usdoj.gov/Default.asp?Item=2768.
[6] See https://www.bja.gov/bwc/.

3. Impact of BWCs on citizen behavior
4. Citizen and community attitudes about BWCs
5. Impact of BWCs on both criminal and internal investigations
6. Impact of BWCs on police organizations
7. Examination of national prevalence and use of BWCs

We then mapped all 42 existing and ongoing research studies by research question in Table 2. Note that many studies examine multiple research questions and are therefore repeated throughout the table. Table 2 reveals a number of interesting findings regarding the state and content of BWC research. First, some research questions are more commonly researched than others:

- The most common research that has been or is being conducted explores questions related to the impact of BWCs on the quality of officer-citizen interactions (including, for example, the nature of the interaction/communication, displays of procedural justice and professionalism, and misconduct or corruption), as often measured by complaints and/or surveys (20 studies). Also highly researched in 16 studies is the related issue of the impact of BWCs on officer use of force during these interactions.
- Another popular research topic is officer attitudes about cameras (11 studies).
- Research questions that have moderate levels of research include studies examining the impact of BWCs on citizen satisfaction with police encounters (8 studies); the broader impact of BWCs on community attitudes and perceptions of the police and their legitimacy (8 studies); the impact of BWCs on officer discretion (especially to arrest or cite individuals) (8 studies); and the impact of BWCs on suspect compliance to commands (and relatedly, assaults on officers) (8 studies). Studies examining BWC implementation challenges and practices also appear moderately researched (6 studies).
- Finally, research questions which seem to be gaining traction with a few studies include cost-benefit analyses of BWCs and studies of how BWCs may affect criminal investigations and police proactivity (i.e., the likelihood of police conducting traffic stops, pedestrian interviews, and the like).

Table 2. Existing, Ongoing, and Future Research Questions for Law Enforcement and BWCs

	Research Issues and Questions	Possible Outcomes Measured	Existing Empirical Research	Ongoing Empirical Research	# of Research Projects
Officer Behavior	Impact of BWCs on the quality of officer-citizen interactions (nature of communication, use of procedural justice, display of professionalism, or other forms of misconduct and corruption)	Citizen complaints (various types; total and sustained), citizen/victim views and perceptions (as possibly measured by surveys or SSO), lawsuits, disciplinary actions, assaults on officers/resisting arrest	**Ariel et al.** (2015) / **Farrar & Ariel** (2013); Ellis et al. (2015); Goodall (2007); **Grossmith et al.** (2015); **Jennings et al**. (2015); Katz et al. (2014, 2015)	**Ariel** (Miami Beach, FL); **Ariel** (Uruguay); Ariel (Denver, CO[a]); **Ariel et al.** (Global); **Coldren** (Las Vegas, NV); **Demir** (Eskisehir, Turkey); **Goodison, Wilson, & Wellford** (Arlington, TX); Groff & Wood (Philadelphia, PA); **Katz** (Phoenix, AZ); **Lawrence & LaVigne** (Anaheim, CA; Pittsburgh, PA; Long Beach, CA); Newell (Spokane, Bellingham, & Seattle, WA); Uchida (Los Angeles, CA); **White** (Spokane, WA; Tempe, AZ); **Young & Ariel** (Ventura, CA)	**20**
	Impact of BWCS on officer's use of force	Use of force reports, both excessive and regular, police shootings	**Ariel et al.** (2015) / **Farrar & Ariel** (2013); **Grossmith et al.** (2015); **Jennings et al**. (2015)	**Ariel** (Miami Beach, FL); Ariel (Denver, CO[a]); **Ariel & Henderson** (Northern Ireland); **Ariel et al.** (Global); **Coldren** (Las Vegas, NV); **Goodison, Wilson, & Wellford** (Arlington, TX); Groff & Wood (Philadelphia, PA); **Henstock & Ariel** (West Midlands, UK); **Katz** (Phoenix, AZ); Newell (Spokane, Bellingham, & Seattle, WA); Uchida (Los Angeles, CA); **White** (Spokane, WA; Tempe, AZ); **Young & Ariel** (Ventura, CA)	**16**
	Impact of BWCs on officer's compliance with 4th Amendment standards	Violations (perhaps measured by examining stop and frisk or arrest videos)			**0**
	Impact of BWCs on officer willingness to be proactive and problem-solve, outside of responding to calls for service	Officer-initiated proactive activities, which may include directed patrol, traffic stops, field interviews/pedestrian stops, SQF, problem solving, different types of arrest indicating proactive activities (i.e., drug arrests, weapons, disorderly conduct, obstructing, loitering)	**Grossmith et al.** (2015); Ready & Young (2015)	**Coldren** (Las Vegas, NV); Groff & Wood (Philadelphia, PA);	**4**
	Impact of BWCs on officer discretion during activities and encounters, including impact on decision to cite or arrest	Likelihood of writing citations or making arrests for discretionary incidents	**Grossmith et al.** (2015); Katz et al. (2014, 2015); **Owens et al.** (2014); Ready & Young (2015)	Ariel (Denver, CO[a]); **Coldren** (Las Vegas, NV); Groff & Wood (Philadelphia, PA); Uchida (Los Angeles, CA)	**8**
	Impact of BWCs on implicit or explicit bias and differential treatment (race, age, sex, ethnicity, etc.)	Changes in racial patterns of various police activities, changes in citizen complaints of bias, changes in citizen/victim perceptions, as measured by surveys or SSO			**0**

	Research Issues and Questions	Possible Outcomes Measured	Existing Empirical Research	Ongoing Empirical Research	# of Research Projects
Officer Attitudes	Officer views about cameras, impact on implementation of cameras on their perceptions of various outcomes	Officer views of camera utility, operation, outcomes, purposes (including longitudinal designs to capture changing perceptions)	Ellis et al. (2015); Jennings et al. (2014); Katz et al. (2014, 2015); Young & Ready (2015); Roy (2014)	Groff & Wood (Philadelphia, PA); Kyle (Midwest & Southern Regions); Newell (Spokane, Bellingham, & Seattle, WA); Tankebe & Ariel (Global); Uchida (Los Angeles, CA); **White** (Spokane, WA & Tempe, AZ)	**11**
	Impact on job satisfaction and retention	Officer views on job satisfaction, agency, community, retention rates, maybe willingness to engage in proactivity/problem solving or COP, assessment of new recruits attitudes	Katz et al. (2014, 2015)		**1**
Citizen Behavior	Impact on citizen compliance to commands and officer authority (suspects of crime) including assaults on officers	Reports of resisting arrest, assaults on officers, disorderly conduct arrests, or "contempt of cop" arrests (however measured)	Katz et al. (2014, 2015)	**Ariel** (UK Railway); **Ariel et al.** (Global); Byron & Ariel (UK Buses); **Demir** (Eskisehir, Turkey); **Henstock & Ariel** (West Midlands, UK); **Katz** (Phoenix, AZ); Uchida (Los Angeles, CA)	**8**
	Impact on citizen compliance to commands and officer authority (non-suspects, e.g., crowd control or large events)	Arrests, time and resources needed to control crowds		**Katz** (Phoenix, AZ)	**1**
	Impact on victims and witnesses' willingness to call the police	Calls for service, citizen/victim views about willingness to report crimes or call about problems, increase use of informal mechanisms to alert the police (i.e., 311/internet), could also examine disproportionate effects with disenfranchised, minority or vulnerable populations		Ariel (Denver, CO[b]);	**1**
	Impact on citizen willingness to continue to cooperate with police as witnesses or victims (see also investigations below)	Liklihood of gathering witnesses for cases, ability/time to close cases, willingness to come to court, citizen views regarding willlingness to give information		Groff & Wood (Philadelphia, PA)	**1**
	Impact on crime and disorder when officer is present	Crime and disorder levels, arrests, additional calls for service when officer is present	Ellis et al. (2015)	Ariel (Denver, CO[b]);	**2**

	Research Issues and Questions	Possible Outcomes Measured	Existing Empirical Research	Ongoing Empirical Research	# of Research Projects
Citizen and/or Community Attitudes	Impact on citizen satisfaction with their specific encounters with officers	Citizen complaints, citizen satisfaction with their encounters with officers as measured by surveys or SSO (can include victims, witnesses, suspects, etc.)	Ellis et al. (2014); Katz et al. (2014, 2015)	**Ariel** (Israel); **Demir** (Eskisehir, Turkey); Groff & Wood (Philadelphia, PA); **Goodison, Wilson, & Wellford** (Arlington, TX); **Lawrence & LaVigne** (Anaheim, CA, Pittsburgh, PA & Long Beach, CA); Uchida (Los Angeles, CA)	**8**
	Impact on community level or broader satisfaction with police services, including confidence and trust in the police, perceptions of police legitimacy, fairness	Survey measures of citizen views on these outcomes, public protests of police, media portrayals, also variations across different places and demographics, community group engagement with the police	Ellis et al. (2015); Katz et al. (2014, 2015); ODS Consulting (2011)	**Ariel** (Israel); **Lawrence & LaVigne** (Anaheim, CA, Pittsburgh, PA & Long Beach, CA); Merola et al. (GMU); Merola & Reioux (GMU); **White** (Spokane, WA & Tempe, AZ)	**8**
	Impact on attitudes related to privacy	Citizen views on BWC use, data, storage, fears of loss of privacy		Uchida (Los Angeles, CA)	**1**
	Impact on fear of crime and safety (generally), not from officers (which would fall under impact on trust and confidence)	Measures of fear of crime; also possible measures related to officer reducing proactive or sentinel behavior, views of police visibility and activity, perceptions of police effectiveness in reducing crime			**0**
Investigations	Impact of BWCs on improved investigations and crime resolution	Arrest rates, higher clearance rates, faster processing, more use of videos for case building, how often BWCs are used for investigations	Katz et al. (2014, 2015); **Owens et al**. (2014); (mostly for Domestic Violence)	**Ariel & Drover** (West Midlands, UK)	**3**
	Impact on intelligence gathering efforts, specifically on developing informants (both formal and informal)	Number of informants; citizen willingness to provide information to the police; (see also impact on citizen willingnesss to cooperate with police above)		Groff & Wood (Philadelphia, PA)	**1**
	Impact of BWCs on investigations of critical incidents and officer-involved incidents, including officer deaths	Faster/more resolution rates, arrests, case clearances		**White** (Spokane, WA & Tempe, AZ)	**1**
	Impact on training systems for a variety of police activities (using cameras for training to improve learning)	Over long term, fewer complaints, use of force, discretion, officer views on training, see under officer behavior. Also training outcomes (use of videos; test scores, material retention, etc.)		**Rosenbaum** (Chicago, IL); **White** (Spokane, WA & Tempe, AZ);	**2**

	Research Issues and Questions	Possible Outcomes Measured	Existing Empirical Research	Ongoing Empirical Research	# of Research Projects
Organizational Concerns	Impact on agency's policies related to use of force, police-citizen interactions	Changes in policies			**0**
	Impact on accountability and disciplinary systems and internal investigations	Officers perceptions of fairness and procedural justice within agency, disciplinary actions, suspensions, dismissals, prosecutions, changes in procedures related to officer bill of rights, changes in union-police relationships and use of union legal representation		**White** (Spokane, WA & Tempe, AZ)	**1**
	Impact on complaint resolutions and lawsuits	Time, effort and costs regarding complaints and lawsuits; numbers and disposition of complaints and lawsuits	ODS Consulting (2011)		**1**
	Impact on management systems, including supervision	Officers perceptions of fairness and procedural justice within agency, relationships between ranks and units, disciplinary outcomes			**0**
	Challenges and best practices in the implementaiton of BWCs	Time and resources to implement, prevalence of use, types of policies used by agencies, problems encountered, successes, activation and use rates, national surveys of use and implementation, variations across agencies	Roy (2014)	Koen (Laurel, MD); **Lawrence & LaVigne** (Anaheim, CA, Pittsburgh, PA & Long Beach, CA); Peterson & Lawrence (Milwaukee, WI); **Rosenbaum** (Chicago, IL) ; **Katz** (Phoenix, AZ)	**6**
	Cost-benefits of adopting BWCs	Measurements of various costs and benefits of BWC use, including direct and secondary/tertiery costs	Goodall (2007)	**Coldren** (Las Vegas, VA); Goodison, Davis, & Wilson (Nationwide); Peterson & Lawrence (Milwaukee, WI)	**4**
	Impact of state laws on agency outcomes	Examination of how uses and outcomes vary based on state laws		Newell (Spokane, Bellingham, & Seattle, WA)	**1**
	Technical concerns for agencies	Types and prevalence of problems and solutions (data capture and storage, cataloguing of video for prosecution, use of cameras, wearability, interaction with other technologies)		Uchida (Los Angeles, CA)	**1**

	Research Issues and Questions	Possible Outcomes Measured	Existing Empirical Research	Ongoing Empirical Research	# of Research Projects
National Prevalence	Diffusion of BWCs as an innovation; prevalence and use of BWCs and types of use	Prevalence and use of BWCs in the field		Goodison, Davis, & Wilson (Nationwide)	**1**

Despite a great deal of progress that has been made in expanding research on BWCs, many questions have received little (if any) attention (see Table 3 below). For example, while much of the existing and ongoing research focuses on officer behavior, this research tends to focus on police professionalism, use of force, and misconduct (as measured by complaints and other reports). However, BWC adoption has also been spurred on by more critical and hard-to-measure concerns, including whether BWCs can reduce implicit or explicit bias and differential treatment based on race, sex, age, ethnicity, or other extralegal characteristics. Additional questions of misconduct or professionalism concern the potential impact of BWCs on officer compliance with 4th Amendment standards—another area not yet examined.

In a similar vein, while ongoing research is examining officer attitudes about BWCs, other measures of these attitudes, such as job satisfaction and retention, have not been investigated. Further research is also needed to assess whether the use of BWCs affects officers' likelihood of initiating proactive contacts (e.g., traffic and pedestrian stops) as well as their inclinations to issue citations or make arrests in discretionary situations. And if so, what implications might this have for both crime control and police-community relations?

More research is also needed on citizen behaviors and attitudes related to BWCs, which have received less attention than those of officers. We still need research on how BWCs might impact citizen willingness to call the police, cooperate as victims or witnesses, help with investigations, or comply with commands and officer authority, for example, at large events, or in crowds or protests—all of which might have significant ramifications for the ability of police to control crime and disorder. And while research has begun to probe general citizen and community attitudes and perceptions about BWCs, we need more knowledge about their specific attitudes related to privacy concerns, which seem from media accounts to be a major issue.

Many police organizational concerns have also not been studied. These include whether BWCs can: facilitate the investigation of critical incidents, officer-involved incidents, or officer-involved shootings or deaths; improve training and affect policy changes; or impact accountability, supervision, management and disciplinary systems of an organization, including those related to internal investigations. While some inroads have been made into cost-benefit analysis of BWCs, much more needs to be accomplished in this area, including testing the most appropriate ways in which costs and benefits might be measured.

The mapping of research questions to research knowledge in Table 2 clearly indicates that much more research is needed.

Table 3. Research Questions with Zero or Few Studies

- Officers' compliance with 4th Amendment standards (0 studies);
- Implicit or explicit bias and differential treatment by police (i.e., based on race, age, gender, ethnicity, etc.) (0 studies);
- Police officer job satisfaction and retention (1 study);
- Citizen (non-suspect) compliance to commands and officer authority, such as in cases of large events or crowds (1 study);
- Citizen, victim, or witness willingness to call the police (1 study);
- Citizen willingness to continue to cooperate with police as witnesses or victims (1 study);
- Attitudes related to privacy concerns (1 study);
- Crime and fear of crime, insofar as BWCs change police and citizen actions in ways that might lead to increases or decreases in crime (0 studies);
- Intelligence gathering efforts (1 study);
- The investigation of critical incidents, officer-involved incidents or officer-involved shootings or deaths (1 study);
- Improving training (2 studies);
- Changes in agency policies related to use of force and police-citizen interactions (0 studies);
- Accountability and disciplinary systems, including internal investigations (1 study);
- Complaint resolutions and lawsuits against the police (1 study);
- Police managerial systems and supervision (0 studies);
- How the effects of BWCs vary based on agency policies and/or state laws (1 study);
- Technical aspects of BWCs, including how BWC footage is stored and used (1 study).

B. Empirical Research on Body Worn Cameras in the Courts

Similar to the literature search conducted above, we sought to identify published empirical research, research in progress, and also demands for research from the literature relevant to BWCs and the courts. Currently, few articles of any type address the impact of body worn cameras on the courts. The publications that do exist consist largely of reports and law review articles containing legal or other analyses. None of the articles are empirical in nature.

However, three unpublished research projects in progress may address some aspects of the impact of BWCs on court processes. These projects are listed as "in process" on the chart below (see Ariel, Young and Ariel, and White). White will examine the impact of BWCs on plea bargains in Spokane, Washington, and Tempe, Arizona, while Young and Ariel will investigate the effect of BWCs on case processing efficiency in Ventura, California. All three are also examining the impact of BWCs on convictions. While these projects will provide a useful foundation for further analyses related to the courts, it is an understatement to say that additional research is needed in the area of court processes and BWCs.

Given the limited research directly related to BWCs and courts, we expanded our search to include a wider scope of empirical articles containing theory or findings that may be relevant to the development of a research agenda in this area. In broadening our search, we focused first on foundational questions related to technology use and technologically-based evidence in the court system. While a wide range of articles have been published on a variety of court technologies, many of these articles are also not empirical.

One theme in this literature relates to the challenges that courts, judges, attorneys, and jurors encounter when they interact with emerging technologies and sophisticated forms of evidence. For example, there is empirical research related to juror decision making when confronted with technologically-sophisticated evidence (see e.g., Hans, 2007). Although the specific issues are not often duplicated across technologies, these articles raise potentially important questions, such as the impact of BWC evidence on juror decision making (discussed in greater detail below). Accordingly, these articles may be theoretically relevant to our study because they point to broad categories of inquiry, such as alterations to decision making, to court processes, or to the addition of resource burdens that may be encountered by courts. We envision our specific questions related to BWCs as a subset of this larger field of research.

Thus, during our search for empirical publications, we discovered a few lines of research activity which may prove useful in anticipating future BWC projects. One area of existing

research activity relates to the costs and benefits of using recordings as evidence. In 2004, for example, the IACP published a report examining the views of prosecutors on the topic of video evidence in court. The survey pre-dates body cameras and, as a result, examines prosecutors' beliefs about the utility of other types of video evidence (for example, dashboard camera footage). Yet, despite this, the survey findings are interesting in light of our planned survey of prosecutors. Specifically, 91 percent of responding prosecutors indicated that they had used video evidence captured from an in-car camera in court. Further, 58 percent of responding prosecutors reported a reduction in the time spent in court as a consequence of video evidence. Moreover, 41 percent of responding prosecutors reported an increase in their case preparation time related to such evidence. These and other findings from the report highlight important areas of inquiry. Future research may see similar reductions in time spent in court or increases in preparation time as a result of BWC evidence.

A second line of research related to video evidence may also be important. Within the field of law and psychology, multiple authors report findings suggesting that recordings may not be viewed by members of the public as "objective" accounts of incidents with police. Kahan, Hoffman, and Braman's (2009) study of dashboard camera evidence demonstrated that "objective" video evidence may be perceived differently by members of the public based on individual characteristics. Along similar lines, Lassiter and colleagues have demonstrated that recordings filmed from different perspectives tend to communicate significantly different impressions to mock jurors viewing the footage. Specifically, Lassiter's results showed that videotaped confessions filmed from the officer's perspective were more likely to be perceived as voluntary by experimental participants when compared with those filmed from a neutral perspective (Lassiter and Irvine, 1986; Lassiter et al., 2005; Lassiter, Munhall, Geers, Weiland, and Handley, 2001; Lassiter, Slaw, Briggs and Scanlan, 1992). In further experiments, the researchers also linked these perceptual differences to jurors' assessments of the defendant's guilt and recommended sentences (Lassiter et al., 2002, 2005). Moreover, results indicate that judges may also be susceptible to these effects (Lassiter, Diamond, Schmidt, and Elek, 2007). These findings may suggest that BWC footage (filmed from an officer's perspective) could lead to similar outcomes. It is also likely that these and other researchers will continue to examine research questions related to perception and video evidence in the BWC context.

In addition to these empirical articles, the literature search yielded a moderate amount of legal scholarship directly relevant to BWCs. Some of these articles are published in law review journals (see e.g., Harris, 2010; Wasserman, 2015), while others take the form of reports issued by organizations, such as the ACLU (Stanley, 2015) and the American Constitution

Society for Law and Policy (Blitz, 2015). While not empirical or experimental, these articles and reports provide a useful categorization of issues and a reflection of the views of the legal community at this point. Legal organizations which have published reports in this area tend to endorse the use of BWCs within strict limitations related to privacy, access, redaction, limited data storage, chain of custody, and limits on officer discretion to erase or view the videos.

In terms of research demands, it should also be noted that the potential consequences of BWC usage for police legitimacy are often raised in the legal scholarship. Several authors call for: 1) empirical investigations into public opinions surrounding BWCs (particularly in greater detail than current polls allow and with respect to the associated issues of privacy, data access, and data storage), and 2) additional agency interactions with the public, as well as agency adoption strategies based in community engagement and approval.

As with the law enforcement arena, we document the possible research questions that might be explored for BWCs and the courts/court processes but which are not currently being investigated (Table 3). Specifically, no research exists related to:

- The impact of BWCs on prosecutorial behavior and practice, including alterations to charging patterns, types of plea bargains offered, prosecutorial discovery obligations, witness preparation, motions, strategy/presentation in court, or policies of prosecutors' offices.
- The impact of BWCs on defendant/defense behavior and practice, including changes to plea decisions, requests for bench/jury trials, motions (such as for dismissal or for the exclusion of evidence), or defense strategy or presentation in court.
- The impact of BWC evidence on decision makers (judges and jurors), such as on assessments of witness credibility, potential questions of police coercion, an individual's consent to police to search, the likelihood of guilt, sentencing, or expectations about the availability/credibility of evidence.
- The impacts of evidentiary issues surrounding BWC footage, such as the effects of loss, failure to record, technical issues, security failures, or destruction of footage on exclusions of evidence, dismissals or acquittals.
- The potential legal impacts of failure to warn individuals that a recording is being made (or a citizen who denies consent to be recorded), as well as the legal impacts of recording in private places on exclusions of evidence or outcomes.

- The impacts of increases in video evidence on court resources, efficiency, the need for training or specialized expertise or case processing time.
- The impact of BWC footage on court processes or outcomes generally, including case dismissals, convictions, sentences, or appeals.

Table 4. Existing, Ongoing, and Future Research Questions for Courts and BWCs

	RESEARCH ISSUES AND QUESTIONS	POSSIBLE OUTCOMES MEASURED	EXISTING EMPIRICAL RESEARCH	ONGOING EMPIRICAL RESEARCH	# OF RESEARCH PROJECTS
Prevalence of Video in Court Cases	Frequency and utility of video evidence in court cases	Presence of BWC, dashboard and other camera evidence, along with types of cases and courts	IACP (2004) (survey regarding video evidence generally)		**0**
Prosecutorial Behavior and Practice	Impact of BWCs on charges brought or plea bargains offered	Alterations to charging patterns in cases with BWC evidence; alterations to content of plea bargains offered		**Young & Ariel** (Ventura); **White** (Spokane, WA & Tempe, AZ)	**2**
	Impact on discovery obligations, trial preparations, practice of prosecutors or policy within prosecutor's offices	Alterations to evidence provided to defense during discovery, changes to witness preparation or other substantive changes to motions, strategy, or presentation in court; alterations to office policies			**0**
Defense/ Defendant Behavior and Practice	Impact on defendant willingness to plead guilty, defense practice	Changes to plea bargaining decisions, requests for jury/bench trials, motions (such as for dismissal or to exclude evidence); alterations to defense strategy or presentation in court			**0**
Impact on Decision Making	Impact on judges and jurors as they consider BWC evidence	Investigations of the impact of BWC evidence on decision-makers (for example, when assessing factual questions, such as degree of police coercion, voluntary consent to search, etc., as well as overall guilt or sentencing). Assessments of camera perspective bias; also studies of alterations to decision maker expectations about the availability of video evidence or the credibility of video evidence as compared with witnesses.	Lassiter, et al. (1992, 2001, 2002, 2005, 2007) and Lassiter and Irvine (1986) (Impacts of videotaped suspect confessions on decision making); Kahan, Hoffman and Braman (2009) (impacts of individual characteristics on the interpretation of dashboard camera evidence).		**No studies directly related to BWCs; studies related to other types of video evidence**

	RESEARCH ISSUES AND QUESTIONS	POSSIBLE OUTCOMES MEASURED	EXISTING EMPIRICAL RESEARCH	ONGOING EMPIRICAL RESEARCH	# OF RESEARCH PROJECTS
Evidentiary Issues	Impacts of loss, failure to record, technical issues, or destruction of BWC footage; impacts of data security failures, such as on chain of custody; impacts of video release; impacts of failure to warn individuals of recording or recording inside private places	Studies of potential Increases in case dismissals or evidentiary exclusions traced to BWC evidence issues			**0**
Court/ Prosecution Resources and Efficiency	Extent of additional resources needed to review, store, catalogue, redact, or present evidence, or of additional training needed	Delays in court proceedings due to efficiency issues; costs of increases in video evidence as a result of BWC expansion; speed of case processing		**Young & Ariel** (Ventura); **White** (Spokane, WA & Tempe, AZ)	**2**
Court Outcomes	Impact on case outcomes	Alterations to dismissals, convictions, sentences, appeals, court outcomes		**Ariel** (UK); **Young & Ariel** (Ventura); **White** (Spokane, WA & Tempe, AZ)	**3**

Conclusion and Next Steps

Our review of existing and ongoing research knowledge in the areas of both law enforcement and the courts reveals many research gaps and opportunities in both arenas, and especially a lack of empirical research on the impact of BWC videos in the courts. Although both government agencies and the LJAF have made quick and significant strides in trying to meet the demand for information given the rapid adoption of BWCs in the field, much more work is needed.

In Phase II of this project, we will continue to increase our understanding of research needs by examining current BWC use and concerns in law enforcement and the courts. This will include reviewing developing evidence from the federal Bureau of Justice Statistics and LJAF-funded Police Executive Research Forum surveys regarding BWC use by law enforcement. The research team will also undertake a survey of prosecutors (led by Dr. Linda Merola) to understand the prevalence, nature of, concerns, resource needs, and BWC use in the courts.

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