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Document Title: Understanding the Broader Impacts of Body Worn Cameras on Police Work and Community Perceptions: A Multi-Method Assessment

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Document Number: 309992

Date Received: January 2025

Award Number: 2017-R2 CX-0011

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Understanding the Broader Impacts of Body Worn Cameras on Police Work and Community Perceptions: A Multi-Method Assessment

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Project period:

January 1, 2018 – April 30, 2023

Amount:

\$552,589

Prepared for:

National Institute of Justice 810 7th Street, NW Washington, DC 20531

This research was supported by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice through Grant 2017-R2-CX-0011 awarded to Temple University. Opinions, findings, and conclusions or recommendations expressed in this report are those of the authors and do not necessarily reflect those of the Department of Justice.

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Project Summary

With the widespread uptake of body worn cameras (BWCs) in police agencies across the country, researchers have grown the evidence base on a range of intended outcomes such as police use of force and citizen complaints as measured by official police data. Complementing these studies is research focused on perceptions of the technology on the part of officers, community members or both as measured by surveys and a relatively smaller set of qualitative and mixed methods studies. Focused on the context of Philadelphia, Pennsylvania, the purpose of this study was to contribute to this literature by producing a holistic, multi-dimensional understanding of citizen and officer perceptions of BWCs as well as the impacts of the technology on officer behavior.

Goals and Objectives

This study used a mixed methods quasi-experimental design involving qualitative and quantitative methods. The goals and associated objectives of the study were as follows:

- A. Discover and quantify perceptions of BWCs.
 - 1. Schedule and hold focus groups (police officers and citizens).
 - 2. Conduct literature review of existing survey measures (police officers and citizens).
 - 3. Develop survey instruments (police officers and citizens).
 - 4. Deploy pre- and post- surveys (police officers and citizens).
 - 5. Analyze focus group and survey data to broadly examine the impact of BWCs.
- B. Explore impacts of BWCs on officer behavior.
 - 1. Collect data on quantitative measures of officer behavior (official police data sources).
 - 2. Analyze quantitative measures to broadly examine the impact of BWCs using a pre-post design.

- C. Create tools (methods and survey instruments) for police agencies in other jurisdictions to conduct their own research.
 1. Produce officer perceptions survey data (pre and post), instrument and codebook.
 2. Produce citizen perceptions survey data (pre and post), instrument and codebook.
 3. Produce a methods module containing implementation details to aid replication, including focus group questions, protocols, and codebook for qualitative analysis.

Literature Review

This section highlights the existing literature on BWCs across three strands of research: (1) officer perceptions; (2) citizen perceptions; and (3) officer behavior as measured by official data.

Officer Perceptions

This section is organized around three topics in the officer perceptions literature: (1) Officer behavior change; (2) uses of BWC footage; and (3) community member behavior change.

Officer Behavior Change

Researchers have observed concerns and perceived changes in the use of discretion and this literature yields mixed results. For instance, a study with Tempe Police Department (TPD) found that most police officers reported feeling they had less discretion after the adoption of BWCs (White et al., 2018). In two Los Angeles police divisions, there was a significant decrease in perceived discretion post BWC implementation (Wooditch et al., 2020). Gramagila and Philips (2018) found that officers with more experience thought that BWC use would result in less discretion. In contrast, a study by Clare et al. (2019) found that after the implementation of BWCs in an Australian police jurisdiction, there was a significant reduction in the perception that BWCs reduced officer discretion. Some of the literature has found no differences in the way officers view their discretion in the presence of BWCs (Braga et al.,

2017; Gaub et al., 2016; Gramaglia, 2018; Grossmith et al., 2015). While officer perceptions of discretion change with BWCs are largely mixed, other officer perceptions of behavior change, like de-escalation, have been less varied.

Katz et al. (2014) and White et al. (2018) reported higher levels of officer agreement that BWCs would result in officers doing more to de-escalate a situation, although agreement levels declined over time. In their study sample, Gaub et al. (2016) found that most officers believed BWCs would result in an officer doing more to de-escalate a situation, and there were no significant changes in perceptions over time. Clare (2019) found significant increases in the perception that BWCs would result in officers doing more to de-escalate situations. Concerning officer use of force, researchers have found that officers tend to disagree that BWCs would impact their decision to use force (Clare, 2019; Headley et al., 2017; Hickman, 2017; Katz et al., 2014; Lawshe et al., 2019; White et al., 2018). Gaub et al. (2020), using focus groups, found that some officers felt BWCs might make them hesitate to use force. In studies measuring change in officer perceptions on the use of force from pre-to post-deployment periods, researchers have observed a decrease in agreement that BWCs would impact a decision to use force (Clare, 2019; Headley et al., 2017; Katz et al., 2014; White et al., 2018).

Another concern with BWC use in the context of officer behavior change is a decline in proactive policing efforts, or de-policing (Wallace et al., 2018; Headley et al., 2017). While the literature on police perceptions of BWC use and de-policing is limited, Headley et al. (2017) found that although officers perceived BWCs as negatively impacting aspects of their job, they did not hinder their actual performance on the job.

Uses of BWC Footage

The perceived evidentiary value of BWC footage has been noted across officer surveys, interviews, and focus groups. Through observation and semi-structured interviews, one study found that

officers perceived BWCs as capturing an “evidentiary reality”, that might better reflect how interactions with the public really happen (Falik et al., 2020). Studies employing interviews, surveys, and a focus group found officers to have positive perceptions of BWCs when it comes to note taking, obtaining high-quality evidence, aiding the investigatory process, and decreasing complaints (Pelfrey & Keener, 2018; Huff et al., 2020).

Other findings concerning evidentiary value have been more complex with some officers expressing that the addition of BWC footage as evidence will limit the value of their word and may not capture the whole picture of a situation (Pickering, 2020; Wy et al., 2022). There have also been changes in the perceived evidentiary value of BWCs post adoption. In those studies, officers lost confidence in BWCs ability to improve evidence gathering in preparation for court, and experienced a declining belief that BWCs can better aid evidence in the event of a complaint (Clare et al., 2019). Wy et al. (2022) found that officers saw the value in using BWCs to fight back against frivolous complaints, yet also identified a concern among officers that footage could be used to get them in trouble with their supervisors.

Across qualitative studies, officers expressed concern that BWCs implementation was a means for supervisors to monitor their behavior and use footage to sanction them for misconduct or policy violations (Pelfrey & Keener, 2016; Snyder et al., 2019; Wy et al., 2022). A study by Wy et al. (2022) on officer perceptions found a duality in perceptions when surveying two police departments that deployed BWCs. While both departments felt BWCs would impact internal accountability negatively if they were to get in trouble for minor infractions captured on BWCs, one, more so than the other, also felt that BWC footage could be used for protection where their actions could be justified (Wy et al. 2022). These initial concerns that BWCs are invasive and could be used to monitor officer behavior have also been found to lessen as officers’ experiences with BWCs increased (Pelfrey & Keener, 2016; Wooditch et al., 2020). Overall, the existing literature reveals that officers are concerned about “Monday Morning

Quarterbacking”, (i.e., situations in which supervisors use the footage to penalize or criticize officer behavior after the fact).

Community Member Behavior Change

Studies exploring police perceptions of BWCs on citizen cooperation have shown varying views. Although researchers have found that police perceived BWCs as a tool that could increase citizen cooperation (Kim et al. 2021), there was a lingering skepticism among officers that BWCs could transform community-police relations in the long term (Wood & Groff, 2019; White et al., 2019; Falik et al., 2020). Kim et al. (2021) found that perceptions of civilian cooperation had a positive influence on perceptions of BWC effects on community relations and officer job performance. Officer receptivity to BWCs has been found to increase as officers believe more strongly that BWCs will decrease assaults/attacks if citizens see the BWC is recording (Bartholomew et al., 2021). The literature also reports that officers feel BWCs might reduce the number of civilian complaints filed against them (Headley et al., 2017; Ellis et al., 2015; Cayli et al., 2018; Lawshe et al., 2019; Lum et al., 2020; Goetschel & Peha, 2017; Katz et al., 2014; 2015; Owens & Finn, 2018; Grossmith et al., 2015; Tankebe & Ariel, 2016; Jiang, 2020). These findings point to the potential for increased officer receptivity to BWCs when they perceive positive community member behavior changes post-BWCs.

Community Member Perceptions

Like the police perceptions literature, citizen perceptions of the effects of BWCs have been shown to vary. While research has found overwhelming public support for BWCs, upon further inspection this support is more nuanced in relation to perceived benefits and consequences of BWC use. Overall, citizens perceive that BWCs might make officers act more professionally towards the public, hold evidentiary value, and increase police legitimacy (Sousa et al., 2018; Clare et al., 2019; White et al., 2018; Crow et al., 2017; Wright & Headley, 2021). There have been significant demographic differences

identified when further exploring the benefits of BWC use. Sousa et al. (2018), Lawrence et al. (2018), and Mitchell (2019) found that Black respondents were less likely to have positive perceptions of BWCs with significantly lower expectations for police transparency, use of force, and police accountability with BWCs than White respondents. Alternatively, Kopp (2021) and Graham et al (2019) identified high levels of support for BWCs among Black respondents. Age was also found to have significant differences in citizen perceptions of BWCs where younger respondents report being more skeptical of BWCs than older respondents, particularly concerning privacy, technological limitations, costs, and potential erosion of the public-police relationship (Kopp, 2021). Overall, the literature reveals that younger respondents are more skeptical of BWCs than older respondents.

The following highlights from the literature on community perceptions are organized around three topics: (1) privacy and safety; (2) police-community relations and trust; and (3) officer behavior change.

Privacy and Safety

Citizen perceptions of and support for BWCs has been tied to citizens expectations of privacy, whereby if citizens felt that BWCs violate the privacy of crime victims or those experiencing mental health crises, they expressed concern for BWC implementation and use (Miethe, 2021; Crow et al., 2017). Ray et al. (2017) identified a dichotomy of support for BWCs in the form of “structural skeptics” who do not believe that BWCs will change the systemic issues and power dynamics that harm minorities, and “privacy skeptics” who believe that BWCs might violate the privacy of citizens. Miethe (2021) found that those living in urban areas had more privacy concerns with BWC use than those living in rural or suburban areas.

Police-Community Relations and Trust

Community skepticism of BWCs in relation to reducing racial tension, improving trust in police, or improving police relationships with community members in general has been consistent and pervasive (Mitchell, 2019; Sousa et al., 2018; Sousa et al., 2015; Wright & Headley, 2021). Clare et al. (2019) found that respondents that had experience(s) with police BWCs were significantly less likely to agree that BWC increased feelings of safety, confidence in police, or changed their behavior compared to those that had not experienced police BWCs. Other studies have tied perceived BWC support among people to program implementation and community education where civilian perceptions of BWCs have increased as programs and subsequent awareness progressed (Lawrence et al., 2018; Goodison et al., 2017). While the literature has found skepticism surrounding BWCs having any long-term positive impact on police-citizen relations, there are implications for the addition of education and awareness campaigns for the public alongside BWC implementation.

Officer Behavior

Research investigating the impact of BWCs on officer behavior has been equivocal and mixed except for findings on officer BWC use and civilian complaints. Studies have found that there have been significant reductions in citizen complaints towards officers due to BWCs use (Ariel et al., 2015; 2017; Bennett et al., 2019; Braga et al., 2017; 2020; Stratton et al., 2015; Ellis et al., 2015; Ferrell, 2013; Huff, 2022; Lawler, 2018; Lum et al., 2020; Maskaly et al., 2017; Braga et al., 2018; White et al., 2017). Whether this change is tied to improvements in officer behavior or some other mechanism related to the reporting of citizen complaints is unclear (Lum et al., 2020). While research on citizen complaints has found significant changes post-BWC implementation, research on arrests following BWC implementation is mixed. Some studies found that arrests increased after BWC deployment (Braga et al., 2017; Huff, 2022; Katz et al., 2014; Morrow et al., 2016; Owens, 2014; Whynot et al., 2016), and other

studies identified a reduction in arrests post-BWC implementation (Groff et al., 2020; Ready, & Young 2015).

Research on BWC implementation and officer use of force due to BWCs has similarly been varied (Lum et al., 2020). There are some studies that have reported a reduction in officer use of force with BWC implementation (Ariel et al., 2016; Braga et al., 2017; 2020; Ferrell, 2013; Groff et al., 2019; Henstock & Ariel, 2017; Jennings et al., 2015; 2016; Lawler, 2018; Braga et al., 2018; Stolzenberg & D’Alessio, 2019; White et al., 2018). However, some of these studies note limitations to their findings. Ariel et al. (2016) only found a reduction in the use of force when officers had no discretion concerning when they turned the cameras on. White et al. (2018) found this reduction only happened in one group and the reduction dissipated after 6 months. Additionally, some studies found no reductions in some departments or nonsignificant reductions (Ariel et al., 2016; Lawler, 2018; Yokum, 2018). Henstock and Ariel (2016) found it was only applied to minor use of force events and not more aggressive use of force events and disappeared after 6 months. Studies have found that initial decreases in use of force tend to dissipate and sometimes even increase over time (Huff, 2022; Koslicki, 2019; Lawrence & Peterson, 2020; White et al., 2018). Miller & Chillar (2022) found a significant decrease in the use of deadly force. An update to the Lum et al (2020) study found that there was still a nonsignificant decrease in officer use of force (Williams et al., 2021).

Research Questions

This study was guided by five primary research questions:

1. What do officers perceive the impact of BWCs to be on how they undertake their policing activities, and on the type, quality, and quantity of their encounters with citizens?

2. What do citizens perceive the impact of BWCs to be on the nature and quality of their encounters with police?
3. Are there significant changes in officer perceptions pre-post at the district level?
4. Are there significant changes in citizen perceptions pre-post at the district level?
5. Are there significant changes in officer behavior pre-post at the district level?

Research Setting

This study took place in Philadelphia, Pennsylvania, which is the sixth largest city in the United States with an estimated population of 1,576,251 in 2021. There is a roughly equal portion of African American (41%) and white citizens (39%) in the city, and about 15% of the population identifies as Latino. About a quarter of the population (23%) lives in poverty, with its median income (\$52,649) resting at a significantly lower level than the national median (\$70,784). The Philadelphia Police Department (PPD) is the fourth largest agency in the United States with 5,983 sworn officers (City of Philadelphia, 2022). The city is divided into 21 police districts, each of which is commanded by a Captain.

The PPD has pursued a careful, phased deployment of body worn cameras (BWCs). They began by testing cameras with less than 50 officers in 2014. Then, they deployed BWCs to all officers in the 22nd District in May 2016. After incorporating feedback from the pilot officers and the evaluators, the PPD continued their phased deployment to increasing numbers of districts in 2017 (2), 2018 (2), 2019 (4), 2020 (5), 2021 (5), and 2022 (2).¹

¹ This summary pertains to patrol areas and does not capture specialized units such as Marine Unit, Counter Terrorism Unit or Detective Division which have been issued BWCs at time of writing.

Research Design, Methods, and Data Analysis Techniques

Study Design

The study used a mixed methods approach coupled with a quasi-experimental design. Major components of the design included an in-depth review of existing survey instruments, focus groups with community members and police officers, pre- and post-BWC deployment surveys of community members and police officers, and a quasi-experiment using official police data.

The study team began by conducting an in-depth literature review of existing studies and survey measures. The research team identified 35 different survey instruments that were the source for 50 articles or reports. Questions from each survey instrument were entered into a database and grouped by question content.

Concurrent to the literature review, members of the research team conducted focus groups with police officers and with community members to address research questions 1 and 2. The focus groups produced a multi-dimensional understanding of the concerns raised by both police officers and community members. In an iterative fashion, the research team identified a set of themes from the focus group recordings and notes taken during the groups through a rapid analysis process, noting emergent themes on a spreadsheet. For each theme, the research team discussed whether the theme could best be measured through a) survey question(s); b) more in-depth analysis of the focus group data; or 3) official police data. On this spreadsheet, the questions from previous surveys were grouped by the focus group themes that could best be measured via a survey. The research team discussed the wording of existing questions that represented each theme in terms of how closely the wording represented what was heard during the focus groups. Whenever possible the research team preserved the wording from an existing question. Through this rapid analysis process, the research team created

survey instruments for the police and the community, and novel survey questions were created where they did not exist in prior research.

The police survey instrument was drafted and revised through feedback and pilot testing in collaboration with members of the PPD. The community survey instrument was drafted and revised through feedback and pilot testing in collaboration with the Institute for Survey Research (ISR). These two instruments were administered in the four study districts (two treatment and two comparison) pre-BWC deployment and post-BWC deployment to discover whether anticipated outcomes from cameras were realized, addressing research questions 3 and 4. Concurrent to the collection of survey data, official data were collected to examine the extent to which police officer behavior was affected by the presence of cameras.

Methods and Data Analysis Techniques

Police Focus Groups

This component of the study was guided by the first research question noted above. *What do officers expect the impact of BWCs to be on how they undertake their policing activities, and on the type, quality, and quantity of their encounters with citizens?* This question was explored through focus groups involving PPD officers. The sampling approach, refined in collaboration with PPD leadership, was designed to achieve variation across attributes including gender, rank, years on the job, district-level characteristics such as crime and public safety challenges, and exposure to different forms of specialized or in-service training such as Crisis Intervention Training, foot patrol, bike patrol, and working with vulnerable populations experiencing homelessness. In the months of April through July 2018, a total of 65 officers were recruited from six of Philadelphia's police districts that had not yet received BWCs, as well as leadership staff working at headquarters. The number of participants per group ranged from 3 to

8 people. Across the sample, years on the job ranged from 0.5 to 37. Forty-eight officers (74%) identified as male and 17 (26%) identified as female. Thirty-eight officers (59%) identified as White, 23 (35%) identified as Black, and 4 (6%) identified as Hispanic.

Members of the research team attended on-site at a district or headquarters office at pre-established times to meet with potential focus group recruits, undertake the consent process, and implement the focus group process which was audio-recorded, transcribed and de-identified. A focus group guide was used to ensure coverage of 3 main domains of questions: (1) perceived impacts of BWCs on police behavior; (2) perceived impacts of BWCs on citizen behavior and expectations; and (3) perceptions of other positive and negative impacts of BWCs. In accordance with the focus group method, facilitators asked for elaboration on topics or themes raised organically through the focus group dialogue.

During the implementation of the focus groups, the research team met regularly to reflect on emergent themes and to iteratively develop a codebook with initial code labels and tentative definitions. Once a draft codebook was established, a team of 3 researchers engaged in 4 coding comparison exercises resulting in codebook adjustments. Once the codebook was finalized, a team member coded the set of transcripts using ATLAS.ti, a qualitative analysis software. For this report, ATLAS.ti was used to generate reports of all text segments (known in ATLAS.ti as 'quotations') for each code. Following a manual review of the reports for each code, a data matrix was developed to summarize the overall finding for each code. The overviews below of focus group findings and integrated study findings draws from the matrix produced.

Community Focus Groups

This component of the study was guided by the second research question. *What do citizens expect the impact of BWCs to be on the nature and quality of their encounters with police?* This question was explored through focus groups with community stakeholders in Philadelphia.

The sampling approach sought a range of perspectives from different community sectors (e.g., business representatives, police advisory participants, victims' services and violence prevention workers, and other community stakeholders such as those of the faith community, school personnel, and other community organizations). Community participants were recruited for focus group participation using two main strategies: (1) Developing a list of community leaders in collaboration with a Community Relations Officer (CRO) from the PPD and reaching out to them to provide a recruitment flier for distribution to local networks; (2) Snowball sampling through referrals to potential participants by contacts in different sectors.

Sixty-eight community members participated in 10 focus groups between April and August of 2018. For logistical reasons, an additional in-depth interview was conducted with one individual representing the business sector. Therefore, the total sample was 69 people. Participants ranged from 18 to 79 years old, lived or worked in 6 different police districts² and represented strata or sub-groups reflecting specific vantage points (i.e., police chaplains, police advisory council members, victim services professionals, university students, young adult community members, school staff, business stakeholders, and both reentry service providers and clients). Thirty-three people (48%) identified as male, 34 (49%) identified as female, and 2 people referred not to report on their gender identity (3%).

² Among the 6 different districts where participants worked or lived, one district had seen the implementation of BWCs at the time the focus groups were conducted.

Forty-four (64%) people identified as Black, 16 (23%) identified as White, and 7 (10%) identified as Hispanic.

One or more members of the research team facilitated each focus group. A focus group guide was used to ensure coverage of 3 main domains of questions: (1) perceived impacts of BWCs on police behavior; (2) perceived impacts of BWCs on citizen behavior and expectations; and (3) perceptions of other positive and negative impacts of BWCs. Focus group facilitators asked for elaboration on topics or themes raised organically through the focus group dialogue.

Like the analytic process for the police focus groups, coding and analysis of the data occurred in three stages. First, the research team met regularly throughout the course of data collection to discuss observations and identify themes. Notes produced as part of these meetings laid the foundation for the codebook. The research team iteratively built this codebook throughout the data collection process, and subsequently through a series of coding comparison exercises to maximize the validation of the codebook, improve accuracy of the definitions, and to promote consistency in how the codes were applied. The same study team member that coded the police focus groups coded the community focus groups using ATLAS.ti. For this report, ATLAS.ti was used to generate reports of all text segments/quotations associated with each code. Following a manual review of the reports for each code, a data matrix was developed to summarize the overall finding for each code. The summary of results, as well as the summary of integrated findings, draw from this matrix produced.

Police Survey

This component was guided by the third research question. *Are there significant changes in officer perceptions pre-post at the district level?*

The themes that emerged from the focus groups were used in conjunction with existing literature to create the police survey instrument. The questions on the survey instrument represented a set of five themes from the focus groups: changes to community member behavior; changes to officer behavior; potential consequences from the presence of body camera footage; potential uses of the footage to advance the policing profession; and the potential impact of the cameras on police-community relations.

Pilot testing of the survey instrument took place in two phases and feedback informed the wording and length of the final survey instrument.³ The target population for the police surveys was uniformed personnel present at 'all-hands day' roll calls on data collection dates. An 'all hands day' occurs every 13 days where all officers are scheduled to work. Research personnel visited each of the six roll calls held and asked for volunteers. Participation in the survey was voluntary and anonymous.

The survey was administered in both the treatment and the comparison districts at pre- and post- BWC deployment. There were two waves of the survey. The study team administered a baseline, pre-survey in January, February, and March of 2019. A post-survey was administered in October, November, and December of 2020. The COVID pandemic delayed post-survey administration. A total of 613 responses were collected across both waves.

Community Survey

The Institute for Survey Research (ISR) housed at Temple University conducted the community survey. The survey component had a cross-sectional design. ISR used an address-based sampling frame within the four target and comparison districts and used a new random sample at each wave. The target

³ The research team pre-tested the survey using two different groups: the body worn camera steering group at PPD and a group of uniformed police personnel. The steering group was used to suggest questions that might be missing (Ruel, Wagner III & Gillespie, 2015). The group of uniformed police personnel were used to provide a formal pilot test using a sample of people who would be taking the survey (Ferketich, Phillips & Verran 1993) and a group debriefing assessment (Vogt, King, & King 2004).

sample size was determined using statistical power estimates. ISR purchased an address-based random sample within the target and comparison districts. The Delivery Sequence File (DSF) from the Postal Service, via Marketing Systems Group (MSG) was used to generate the sample. ISR mailed pre-notification letters to selected households prior to survey deployment. The letters described the survey and introduced the idea that the household would be visited by a field interviewer. Any adult resident of the selected housing unit, aged 18 years old or older, who was cognitively capable of understanding and responding to the survey questions were eligible to complete the interview.

ISR hired and deployed local, professional, and trained field interviewers into each district. Data was collected using computer-assisted, in person interviewing software CASES on 10-inch tablets. The interviewing teams worked in pairs and in proximity throughout data collection to maximize interviewer safety. Incentives were delivered upon completion of a survey.

Both waves of data collection, pre- and post- were more difficult than originally anticipated. During the pre-deployment administration, field interviewers spent six months obtaining the desired sample size. The post-deployment data collection took place between June and November of 2019 and ISR collected a total of 610 surveys (comparison districts = 308; treatment districts = 302). However, the post-deployment administration presented special challenges getting residents to answer the door. The post-deployment data collection was originally scheduled for spring of 2020 but was significantly delayed first by COVID, then by the 2020 Census, then by significant difficulties in recruiting interviewers to do an in-person survey. The post-deployment data collection commenced in late October 2022 and was terminated in February 2023. To improve response rates both telephone and web survey options were added. In person surveyors visited an address once. If no one answered the door, they left a door tag with information on how to respond via the web or telephone. A total of 160 surveys were completed across all districts in the post-deployment wave (comparison districts = 84; treatment districts = 76).

Community and Police Survey Analysis

The data from the surveys at pre-test and post-test were analyzed through cross tabulation. Cross tabulations highlight correlation changes between groups and find patterns, trends, and probabilities within the data. Cross tabulations allowed the study team to analyze the relationship between multiple variables on the survey. Cross tabulation is useful in assessing categorical responses like the survey responses. The team used cross tabulations to assess the impact of BWCs and those impacts over time on community members and the police. Additionally, research personnel assessed the impact of being in the treatment districts or the comparison districts. The significant relationships between the variables are discussed further.

Official Police Data on Police Behavior

This component of the study was guided by research question 5. *Are there significant changes in officer behavior pre-post at the district level?*

The Philadelphia Police Department provided anonymized individual-level officer information for 1,000 officers in the four study districts as well as one additional district that did not receive BWCs during the study period. Officers who received BWCs were compared to those who did not. Study personnel used propensity score matching (PSM) to identify similarly situated officers in the treatment and comparison districts. This process proceeded in two stages. First, researchers estimated a logistic regression model predicting whether an officer received a BWC after accounting for their demographic characteristics and pre-treatment counts of stops, arrests, use of force incidents, and complaints to obtain predicted probabilities for each officer. Here, the propensity score represents the odds that an officer received a BWC during the study period. Second, researchers used nearest neighbor matching with a (1:1) ratio and a caliper of (.05) to identify 'equivalent' officers in the treatment and comparison

districts. All officers with a propensity score outside the common support region were excluded from the matching procedure.

Since the treatment districts received BWCs at different times throughout the study period, researchers conducted separate matching procedures for each treatment district. Officers in A, B and C districts were matched separately to officers from the comparison districts. Although matching was conducted without replacement in each district, it is possible that officers assigned to the comparison districts were matched to more than one ‘treated’ officer from A, B, and C Districts. In other words, each treatment district represented its own quasi-experimental design, with officers from the D and E districts serving as the comparison officers.

Pre-treatment covariate balance was assessed by comparing sample means (and proportions) of the predictors used in the PSM logistic regression model for the treatment and comparison groups. Statistically significant differences in the predictors between each group before and after PSM were assessed using independent sample t-tests for continuous measures and Pearson’s chi-squared tests for binary measures. Standardized mean differences (or percent bias) were also calculated to assess balance between the treatment and comparison groups before and after matching (Austin, 2011; Rosenbaum & Rubin, 1983). After PSM, there were no statistically significant differences between the treatment and PSM comparison officers.

A series of negative binomial regression models were estimated to assess the effect of BWC adoption on the expected count of each outcome. The model for each outcome included a dichotomous treatment indicator (1 = assigned BWC), a period indicator (1 = post-intervention), and the interaction between the treatment and period indicators (difference-in-difference estimator). The period indicator represents the date at which an officer, or their matched counterpart, received a BWC. All officers included in this study had a full year of pre- and post-implementation data for each outcome. The

difference-in-difference (DiD) estimator is used to estimate the treatment effect in quasi-experimental research and compares the difference in a particular outcome for treated officers compared to the expected value if the treated officers had not gotten BWCs. The comparison officers are used to establish the change in the treatment officers that was due to non-BWC factors (see Lechner, 2010). All models were estimated with clustered standard errors using Stata 16's *poisson* and *nbreg* commands. Finally, all regression coefficients were transformed into incident rate ratios (IRR) for ease of interpretation (Long & Freese, 2006). In Poisson and negative binomial regression, an IRR can be interpreted as the percentage change in the expected outcome per one unit change in a predictor variable. IRR represents the factor change of using a body worn camera on the outcome variable.

Participants and other collaborating organizations

The study team worked collaboratively with two main organizations: the Philadelphia Police Department which partnered on all components of the research, except for the community member survey, and the Institute for Survey Research which was responsible for implementation of the community member survey.

Philadelphia Police Department

The Principal Investigator (PI) has worked collaboratively with the Philadelphia Police Department (PPD) since it began its implementation of BWCs with a single pilot district. This work produced 2 publications drawing on qualitative and quantitative assessments respectively (Groff et al., 2020; Wood & Groff, 2019). Over the course of PPD's gradual implementation of BWCs across its 21 police districts, the agency partnered with the PI to conduct this study, signing a letter of cooperation. The PPD assigned a point of contact and study champion (a Chief Inspector leading the BWC roll-out) to

facilitate study implementation throughout the study's phases. The Chief Inspector led and coordinated the following activities, in partnership with the research team:

- Identifying the treatment and control districts.
- Interfacing with operational personnel to organize recruitment for police focus groups and surveys.
- Assembling command staff and operational police to pilot test the police survey instrument.
- Liaising with PPD data analysts to prepare and de-identify administrative data required for analysis of officer behavior.
- Organizing de-briefings with district commanders and staff on police survey findings.

Institute for Survey Research

The other main partner on the study was the Institute for Survey Research (ISR) based at Temple University. ISR staff are specialists in the administration of surveys in real-world settings, particularly Philadelphia. The ISR performed the following main activities:

- Assist with question construction for the community member survey by reviewing drafts and recommending adjustments in language to enhance clarity in line with the benchmark for an 8th grade reading level.
- Collaborate with the research team to determine the survey sampling frame.
- Oversee and coordinate field data collection.
- Prepare and convey data to study team.
- Produce methodology report to account for data collection process and document any deviations from original study design.

Changes in approach from original design

This study was implemented between January 1, 2018, and April 30, 2023, a period that witnessed significant developments in the wider implementation environment of BWC implementation, including the COVID-19 pandemic, the changing national and local contexts affected by high-profile events of police brutality, a rise in race-relation tensions, and ultimately, a local rise in gun violence and other violent crimes.

These challenges most directly affected the following aspects of the study. First, it delayed the post-deployment police survey. The post-deployment wave of officer surveys had just begun in February/March 2020 when the shutdown occurred. Completion of surveys was delayed until November/December 2020. Second, the post-deployment wave of community surveys was scheduled to begin in the summer of 2020 but staffing issues (compounded by US Census data collection) delayed it to October 2022 – February 2023. Shifts in society negatively impacted the ability to obtain the target sample sizes in the community member survey. Third, delays related to the surveys also meant that study personnel delayed the quantitative analysis of official data.

There were other operational challenges. First, it took much longer than anticipated to identify community focus group participants in the first phase of the study. This delayed the development of the survey instruments. Second, the PPD made the operational decision to deploy BWCs in one of the comparison districts (District C) in January 2020. This action necessitated changes to the analytical plan. The study no longer had a balanced design of two treatment and two comparison districts. This also necessitated changes in the analysis plan. Because District C carried cameras for eleven months before they took the post-deployment survey, they became a treatment district and the researchers had only one comparison district, so the team limited the analysis to crosstabs. The analysis of official police data to quantify changes in officer behavior, the difference-in-differences, was done at the officer level

instead of the district level and has a moving 12-month pre- and post- period depending on when the BWC officer received training/a BWC.

Although the study originally aimed to explore relationships between BWC implementation and community health outcomes such as mental health-related incidents and drug overdoses, the team was not able to obtain data describing community health that could be accurately assigned to geographic locations. Thus, an analysis of the impacts of BWCs on community health was not conducted.

Outcomes

Activities/Accomplishments

- Held focus groups with police officers and community members
- Conducted a literature review of existing survey instruments and questions (police and citizens)
- Analyzed focus group data and identified themes (police and citizens)
- Developed survey questions from focus group themes (police and citizens)
- Developed two survey instruments using focus group- generated survey questions and questions from existing survey instruments (police and citizens)
- Administered pre- and post-deployment survey waves (police and citizens)
- Collected and analyzed measures of police behavior from official data

Results and Findings

Police Focus Groups

This component of the study was designed to address this primary question: *What do officers expect the impact of BWCs to be on how they undertake their policing activities, and on the type, quality, and quantity of their encounters with citizens?* As expected with a qualitative methodology, officers offered insights that were both directly responsive to this question, while also raising topics and themes in an organic manner that speak to broader contextual issues related to the BWC implementation environment in Philadelphia. This section reports on findings that are directly related to the primary

research question, and the organic issues or incidental findings are highlighted later in this report in the sections on integrated findings and/or expected applicability of the research. This section is organized around the topics of officer behavior change and citizen behavior change.

Officer Behavior Change

The theme of officer behavior change relates to the notion that officers might behave differently due to the presence and use of BWC footage. Overall, officers' narratives reflected the view that behavior change is contingent (it depends) on factors such as experience on the job or individual officer style. In general, officers noted concern about language and that BWCs will make them think about what they say and how they say it, akin to knowing they are "on stage", although it was suggested that choices around language may vary by place and/or circumstance (i.e., who the officers are interacting with and the situation they are trying to address). Some officers implied that experience, known colloquially as 'time on the job', is relevant to the potential effects of BWCs on behavior. Time on the job means that officers have learned from mistakes and have learned how to talk to people, inferring that BWCs would not be consequential to the behavior of seasoned officers. Some officers suggested that behavior change is contingent on an individual officer's personality or style. Some officers, it was suggested, will not change, but others might be less assertive with the cameras on, as when an officer stated, "I don't coddle people and I feel like I'm going to have to start doing that".

Another dimension of police behavior related to the theme of de-policing, which is the notion that the perceived risk of BWC footage being used against officers would prompt them to engage less with the public, as revealed in the comment that "[p]eople are going to be afraid to do their jobs because you're going to be afraid to get in trouble". Related to this was the concern that potential disciplinary sanctions against officers would be more likely with BWCs. The topic of discretion was also connected to the topics of de-policing and internal discipline. Some officers did reflect on the possibility of getting in trouble with superiors who might review the footage and question their actions, potentially

prompting some officers to be “more by-the-book”. The related theme of robotic policing emerged in certain officer comments. Some suggested that having the camera means that they will have to do things a certain way like adhering to a script.

The potential for “second-guessing” emerged as a concern with certain participants; in particular, the notion that police officers may second-guess themselves in the line of duty, in one form or another, for one reason or another. Officer opinions were quite mixed on when, who, and how second guessing would impact the job or if it would at all, but some agreed that second guessing has been and probably will be present. In contrast, some officers commented on the potential for BWCs to be protective of them, backing-up their decision-making when they are under scrutiny, including in situations involving citizen complaints. It was even suggested that BWC footage has the potential to cultivate a more positive image of the police.

Community Member Behavior Change

The theme of community member behavior change refers to the idea that civilians’ behavior will be impacted by the presence of BWCs. Overall, there were mixed opinions on whether behavior would be impacted since behavior change was generally seen as contingent. Different contingencies were raised, such as the nature of ‘the job’. Depending on the situation or incident, some people might change their behavior knowing they are being recorded. Some officers expressed concern about the potential for “baiting”, referring to the idea that the presence of BWCs might embolden some citizens to behave in a way where they are "performing" in order to provoke an officer behave badly, as in the comment, “I’m not saying everyone, but there’s going to be people of all classes of society that’s going to bait that officer into doing something wrong so they can sue them”.

Focus group participants also highlighted the contingent nature of behavior change with respect to compliance among community members, which relates to the question of whether the presence of

BWCs may or may not encourage citizens to follow officer directives. Overall, officers expressed the view that compliance depends on the person with whom an officer is interacting. Some people might calm down, while others might feel emboldened to act out. As one officer argued, some people may not care, but “the rest of the ones... don’t want to get in trouble and know that we got evidence if they want to act up”. It was also suggested that geography can matter, meaning that in certain areas of the city, people view the police positively, whereas in other areas they do not, thereby affecting the potential for compliance. It was further suggested that behavior change may be influenced by the generation of the person or people involved in an encounter. “It depends on the generation. You know the older generation [BWCs] would have an impact on. The younger generation coming up now, they're not going to care. They have no respect or no fear of police, nope.” Finally, it was noted that certain vulnerable populations, such as people experiencing homelessness or drug addiction, might not be influenced by the presence of a camera. One officer expressed this view in relation to people who are homeless and experiencing mental health problems who “don’t care about the camera...”.

Another dimension of community member behavior that emerged in the focus groups related to the topic of citizen disengagement, which relates to the idea that people would be less willing to share pertinent information related to crimes due to the presence of BWCs. Some officers expressed concerns that BWCs would decrease participation in investigations as people might fear being on camera will get them in trouble or put them in danger. It was suggested that in certain scenarios, where people are already nervous or hesitant to give information, cameras will make people even more hesitant and concerned that their identity will be known.

Community Focus Groups

This component of the study was guided by the second research question. *‘What do citizens expect the impact of BWCs to be on the nature and quality of their encounters with police? As with the*

prior section on police focus group findings, this section is organized around the topics of officer behavior change and citizen behavior change. Other results will be incorporated into the sections on integrated findings and expected applicability of the research.

Officer Behavior Change

With respect to officer behavior change in general, participants were not certain that BWCs would be impactful, but some suggested that officers who do good police work will continue to be good work. In essence, behavior change is dependent on the personality of the officer. One participant stated, “[y]ou've got an officer who will stick right by the book, you've got officers who believe in grace and mercy, and you've got those officers that just don't feel like doing their job that day". Generally, participants suggested that the BWCs might enhance the professionalism of officers with respect to tone and language, a finding consistent with the officer focus groups. Overall, participants were hesitant to say that BWCs could further the use of de-escalation during encounters. Yet, some noted it might be helpful for supervisors to see how their officers are approaching situations with an opportunity to correct behavior. It was also suggested that officer behavior change may be contingent on geography or place; that is, neighborhoods vary in terms of the quality of police-community relationships which influences the possibility that encounter dynamics could be improved. Some suggested it is the responsibility of both the police and community members to improve these relationships.

Some remarks from community participants echoed the police focus group findings regarding the potential for hesitation or second-guessing with the advent of BWCs. Overall, community members noted the possibility that in situations where split-second decisions need to be made, they may hesitate, and in some cases at risk to their own safety. The theme of potential de-policing was also discussed. There was concern that officers will step back or not respond, out of concern that engaging with the public might backfire on them, but it was suggested that good officers will continue to show up.

Community member comments mirrored the police focus groups regarding the concern that discretion might be limited with the introduction of BWCs.

Overall, community members contended that BWCs could hold officers accountable, and interestingly, many noted that they can be used for community accountability as well; a “double-edged benefit”, as someone noted. Although many noted the utility of BWCs in providing footage of encounters, some noted concerns about the risk of certain officers not turning the cameras on. Some community members expressed concerns that footage/audio could be edited in ways that could benefit an officer in providing an account of a situation, including situations involving police use of force. At the same time, community members did address the idea that the cameras could protect officers against frivolous complaints.

Community Member Behavior Change

Remarks from community members echoed the general view expressed in the officer focus groups that behavior change is dependent on the person, but overall, people might think twice about what they say or do. As one participant put it, “within our culture, we have a problem with police officers. We have a problem with authority. Not all of us, but some. Yeah, we'll think twice”. Participants also addressed the potential for baiting officers, noting that it could be possible, and there were some that suggested there is a generational dimension, with younger people potentially more inclined to do so. More broadly, participants suggested that younger people are more comfortable with technology and being recorded, and less likely to be concerned about what others think of their behavior. It was also suggested that BWCs might have the potential to drive criminal behaviors out of plain sight, implying that some people engaged in criminal activity will continue to do so, but less visibly, as expressed in the remark that “[t]hose cameras can cause a cultural shift. Because it can drive criminals even deeper into a subculture”.

Regarding the potential for more compliant behavior toward police, participants generally saw this as possibility while at the same time noting that people are generally compliant with officers who don't have a camera. The concern was expressed, however, about the potential for community members to disengage from police by not calling the police, reporting crimes, or speaking with them (and being seen speaking with them), and by not providing intelligence to police during an investigation. "Safety is the issue. Our victims and witnesses want to be safe. At the end of the day, the police officers are not going to be able to put them up in an undisclosed location to ensure they're safe".

Police Survey

This section discusses and compares the perceptions of officers in early 2019 and in late 2020. Treatment district results are compared with those from the comparison district.

Impacts of body cameras on community member behavior

Eight questions on the survey asked about the effect of officers wearing BWCs on community member behavior (Table 1). Significantly fewer officers agreed with each of the statements after receiving BWCs, than they did before receiving them. In other words, after wearing cameras they perceived that the presence of BWCs would not encourage community members to do what an officer asks, be less physically aggressive, be less willing to chat, or less willing to come forward with information about criminal investigations. They also perceived less impact on victims' and witnesses' willingness to provide information.

There were differences between the comparison and treatment districts post-BWC deployment on two questions; citizens are less likely to become physically aggressive and witnesses are less willing to provide information relevant to criminal investigations. In both cases, treatment officers perceived more negative of a change in behavior over time than comparison district officers.

Table 1. Police perceptions of BWC impact on community member behavior (percentage agreeing)

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
1. When interacting with a police officer wearing a body camera CITIZENS are...						
<u>more</u> likely to do what an officer asks them to do than before cameras.	69.14	44.75 ***	66.67	37.14 ***	69.61	46.58 ***
<u>less</u> likely to become physically aggressive than before cameras.	60.17	37.99 ***	55.26	17.14 ***	61.08	43.06 ***
<u>less</u> likely to become verbally aggressive than before cameras.	45.50	25.84 ***	47.22	17.14 ***	47.55	27.97 ***
<u>more</u> respectful than before cameras.	45.83	26.55***	36.84	22.86	47.52	27.46 ***
<u>less</u> likely to be willing to chat informally with police than before cameras.	59.58	47.19 **	71.05	42.86 ***	57.43	48.25 *
2. In the presence of a body camera ...						
VICTIMS are <u>less</u> willing to provide information relevant to criminal investigations than before cameras.	50	41.99 *	58.97	34.29 **	48.29	43.84
WITNESSES are <u>less</u> willing to provide information relevant to criminal investigations than before cameras.	55.37	44.75 **	68.42	42.86 **	52.94	45.21
3. When interacting with a police officer wearing a body camera, citizens in general are <u>less</u> willing to provide information relevant to criminal investigations than before cameras.	56.61	48.07 *	66.67	45.71 *	54.68	48.63

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Impacts of BWCs on officer behavior

Seven questions on the survey asked about the effect of BWCs on officer behavior and decision-making (Table 2). Officers were instructed to think about the average officer in their district when answering these questions. By the post-survey, significantly fewer respondents, but still a majority, agreed that officers:

- choose their words more carefully.
- think more about how to de-escalate situations.

Significantly higher percentages of respondents disagreed with the following statements about officer behavior at post survey:

- are less likely to give warnings to citizens for traffic violations.
- are less likely to make pedestrian or live stops.
- reduce the number of mere encounters they have with citizens.
- disregard their personal knowledge and experience with people in their patrol area when deciding how to resolve situations.

There were differences between the comparison and treatment districts post-BWC deployment. Both groups reported less agreement that officer behavior would change with two exceptions. A greater percentage of comparison officers thought they would be less likely to make pedestrian or live stops and reduce the number of mere encounters they have with citizens. Treatment district respondents were less likely to agree their behavior changed. However, a majority of treatment district respondents still agreed that officers choose their words more carefully, think more about how to de-escalate situations, and second-guess their decisions to use force to control situations.

Table 2. Police perceptions of BWC impact on police behavior

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
4. When wearing a body camera, OFFICERS						
choose their words <u>more</u> carefully.	90.98	79.67 ***	95	60.00 ***	90.2	84.35 *
think <u>more</u> about how to de-escalate situations.	69.14	53.85 ***	72.5	54.29 *	68.47	53.74 ***
are <u>less</u> likely to give warnings to citizens for traffic violations.	49.18	29.44 ***	45	20.00 **	50	31.72 ***
are <u>less</u> likely to make pedestrian or live stops.	36.93	27.53 **	28.21	33.33	38.61	26.21 **
reduce the number of mere encounters they have with citizens.	52.26	37.64 ***	50	54.29	52.71	33.57 ***
post-guess their decisions to use force to control situations.	61.73	52.78 *	67.50	52.94	60.59	52.74
disregard their personal knowledge and experience with people in their	30.06	20.56 **	23.08	17.65	31.84	21.23 **

patrol area when deciding how to resolve situations.						
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Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C District after one year.

Overall, the highest agreement regardless of group was that officers would choose their words more carefully. Respondents also reported majority agreement that they would think more about how to de-escalate situations and post-guess their decisions to use force to control situations. Fewer officers in the comparison and treatment groups agreed that cameras would change officer behavior at the end of the study than in the beginning.

Uses of body camera footage

One section of the survey asked about their views on different uses of body camera footage (Table 3). Officers overwhelmingly agreed that BWC footage reduces the number of citizen complaints (although significantly fewer than in the pre-survey) and that BWC footage accurately captures what officers see. Most officers anticipated greater numbers of disciplinary sanctions for violations of policies and this percentage increased significantly among respondents in the treatment group. In general, large majorities of respondents agreed that BWC footage should be used to reward good police work, provide positive examples of good police work to media, improve in-service training, be used to review and improve officer performance, and document what officers see and hear. Respondents also support release of BWC footage to citizens involved in a complaint and to the media after an investigation is concluded.

Table 3. Police views on BWC footage

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
5. The footage from body cameras ...						
<u>reduces</u> the number of false or exaggerated citizen complaints filed against officers.	90.16	82.51 **	97.50	88.57	88.73	81.08 **

increases the number of disciplinary sanctions against officers who have violated policies.	62.14	70.72 *	72.50	68.57	60.10	71.23 **
6. Body camera footage accurately captures the vantage point of officers.	97.95	98.81	100	97.14	97.55	99.32
7. The footage from body cameras should be used to ...						
identify and reward good police work.	82.86	85.08	80	85.71	83.41	84.93
provide the media with positive examples of good police work.	78.37	83.61	70	88.57 **	80	82.43
improve in-service training.	90.12	91.71	82.50	97.14 **	91.63	90.41
8. Reviewing BWC video footage after an incident might help me become a better police officer.	89.34	89.07	92.50	82.86	88.73	90.54
9. Body cameras are a helpful tool in documenting what an officer sees and hears.	92.62	93.96	90	100 *	93.14	92.52
10. When formally being interviewed by an internal investigator, citizens should be able to view footage from body-worn cameras in the following instances:						
When they are making a formal complaint related to officer behavior	64.20	67.76	72.50	74.29	62.56	66.22
When they are injured by an officer who used non-lethal force	69.01	73.63	70	80.00	68.81	72.11
11. At the conclusion of an investigation of police officer behavior that has BWC footage available, should that video be released for viewing by the general public?	70.42	79.44 **	71.05	68.57	70.3	82.07

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Impact of body cameras on police-community relations

Three questions asked about anticipated impact on police-community relations and which groups benefit the most from BWCs (Table 4). By the post-survey, significantly fewer respondents agreed that BWCs improved police-community relations. Almost a third of respondents thought BWCs mostly benefited the police (a significant increase).

There were nonsignificant differences between the comparison and treatment districts post-BWC deployment. Most treatment respondents felt BWCs might improve police community

relationships, but a greater percentage disagreed in the comparison district. This pattern suggests that actual experience wearing the cameras led to more positive expectations.

Table 4. Impact of BWCs on Police-Community Relations

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
12. Improvement in citizen trust in the Philadelphia Police Department due to body cameras will be noticeable in less than five years. Percentages are for response of less than five years.	50.21	39.89 **	47.50	37.14	49.25	59.46 *
13. Improved relationships between individual police officers and citizens in your district due to body cameras will be noticeable in ... Percentages are for response of less than five years.	53.31	41.21 ***	50	29.41 *	46.04	56.08 *
14. Overall, who benefits from body cameras? Percentages are for response 'mostly police'	25.51	33.70 *	15	47.06 ***	27.59	30.61

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Community Survey

This section discusses only the survey responses that changed significantly between pre-survey (the summer of 2019 and the fall of 2019) and post-survey (fall of 2022 and the winter of 2023). Readers should note that the historic events of spring and summer 2020 caused the extended delay between administration of the pre-survey and the post-survey. The survey instrument asked about citizens (people who live in the neighborhood) so this term is used to discuss the results. Responses are reported in five groups asking about the impacts of BWCs on: 1) citizen’s trust in the police and on perceptions of safety; 2) personal privacy; 3) officer behavior during interactions with community members; 3) citizen’s behavior during interactions with police. The fourth group asks about the potential uses of body worn camera footage.

Citizen perceptions of trust and safety

Three questions on the survey asked about perceived safety and trust of the police (Table 5). Significantly fewer citizens reported feelings of safety and trust in the post-survey. Notably, each of these questions reported significant differences in the treatment districts post-BWC deployment but not in the comparison district. Significantly fewer respondents in the treatment district at post-test reported having at least some trust in the police, feeling less safe in their neighborhood, and feeling safer in interactions with officers if they are wearing BWCs. In general, a majority of respondents felt they had at least some trust in the police, felt safe in their neighborhood, and would feel safer during interactions with officers if they are wearing BWCs at both waves.

Table 5. Citizen perceptions of BWC impact on citizen behavior (percentage agreeing)

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
1. How much do the residents in your neighborhood trust the police? (at least some trust)	73.28	63.98*	69.23	74.19	74.67	61.54***
2. I feel safe in my neighborhood	83.28	71.43***	78.85	83.87	84.80	68.46***
3. I would feel safer during interactions with officers if they are wearing body worn cameras.	94.43	84.47***	94.87	93.55	94.27	82.31***

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Impacts of body cameras on personal privacy

The survey asked about the effect of BWCs on privacy as a dimension of personal safety. Citizens were asked if they were concerned that BWCs can violate the personal privacy of residents, crime victims, and crime suspects (Table 6). Privacy concerns declined significantly across each question at post-test, but the decline was most prominent in the comparison district. The only question in which

respondents in BWC districts expressed concerns about privacy that significantly declined was about privacy of residents. There were two questions for which respondents in treatment districts had significantly different responses from the comparison district at pre-test and post-test respectively. At pre-test, respondents in the treatment districts had significantly lower levels of concern of privacy for crime suspects compared to the comparison district. At post-test, respondents in the treatment districts had significantly higher levels of concern of privacy for crime victims compared to the comparison district. The majority of respondents did not express concern BWCs would violate the privacy of residents, crime victims, and suspects. The percentage with this concern decreased at the post survey.

Table 6. BWCs and violations of personal privacy

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
4. I am concerned that body worn cameras can violate the personal privacy of:						
Residents in general	45.57	32.3***	48.72	19.35***	44.49	35.38**
Crime victims	49.18	36.02**	52.56	19.35***	48.02	40
Crime suspects	42.46	27.33** *	50	12.90***	39.87	30.77*

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Impacts of body cameras on transparency and accountability

Respondents were asked if the BWC program made it easier for the public to know about police behavior and if it would/did make police officers more accountable for their actions (Table 7).

Responses in treatment districts revealed a significant decrease in agreement that the BWC program would/did make police officers more accountable for their actions. In general, almost all respondents

perceived BWCs make it easier for the public to know about officer behavior and hold officers more accountable for their actions in both pre-and post-surveys.

Table 7. Transparency and accountability

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
5. The body worn camera program makes:						
it easier for the public to know about the behavior of police officers	95.74	91.93*	95.51	90.32	95.81	92.31*
police officers more accountable for their actions	94.59	88.20**	92.95	90.32	95.15	87.69***

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Impact of body cameras on police-community relations

Three questions asked about anticipated impact on police-community relations and which groups benefit the most from BWCs (Table 8). By the post-survey, significantly more citizens felt it would take longer than 5 years for BWCs to improve police-community relations regardless of whether the officers in their district were assigned BWCs. In other words, a larger proportion reported it would take longer for police-community relations to improve post-deployment. Interestingly, the proportion answering 5 or more years represented a majority of respondents from the comparison district versus a minority in the treatment districts. Given that this shift to greater pessimism about the impacts of BWCs occurred regardless of whether BWCs were deployed likely reflects the social and racial unrest of 2020 when the post-surveys were administered and the difficulty of improving police-community relations.

Significantly more respondents reported that BWCs benefit the police. These significant changes were seen in both the comparison and treatment groups. At pre-test, only a small percentage of citizens responded that the cameras benefited mostly police, and nearly a fifth of citizens at post-test expressed cameras mostly benefit police.

Table 8. Impact of BWCs on Police-Community Relations

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
6.) Do you think the use of body worn cameras will improve people’s trust in the Philadelphia Police Department in (more than 5 years)	29.34	47.20** *	33.33	61.29**	27.97	43.85***
7.) Do you think the use of body worn cameras will improve relationships between individual police officers and residents in your neighborhood in (more than 5 years)	24.92	44.72** *	28.21	61.29***	23.79	40.77***
16.) Overall, body worn cameras help (mostly police)	8.85	19.25** *	8.97	25.81**	8.81	17.69***

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Impacts of BWCs on Police Behavior

There were significant declines in agreement that officers would change their behavior after the deployment of BWCs (Table 9). The treatment group reported less agreement that officers’ behavior would change. Both the treatment group and comparison group experienced significant decreases in agreement that officers with BWCs will think more about how to calm situations after implementation.

However, citizen respondents also expressed significant declines in agreement that officers wearing cameras would be more respectful to citizens, suspects, victims. This was significant across the board for the treatment group. However, it was only significant for the comparison group regarding crime suspects. There were significant declines in agreement an officer would hesitate to take control of a dangerous situation, enforce the law more strictly, and explain their actions to citizens. This was significant across the treatment group at post-test but was only significant for the comparison group in hesitating to take control of dangerous situations.

Although there were declines in agreement in the post survey, most respondents agreed that BWCs will result in officers changing the way they interact with citizens. They will think more about how to calm a situation and listen more carefully to the needs expressed to them. They will also behave more respectfully towards citizens, suspects, and victims in the presence of BWC. Furthermore, they will enforce the law more strictly and explain their actions to civilians. However, this did not extend to how officers control situations. Most respondents in the post survey disagreed that an officer will/does hesitate to take control of dangerous situations when wearing a BWC.

Table 9. Citizen perceptions of BWC impact on police behavior

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
8. When wearing a body worn camera, will officers						
think more about how to calm situations	89.34	69.57** *	85.9	67.74**	90.53	67.74**
listen more carefully to what people need when they call the police to help them	86.07	63.98** *	81.41	74.19	87.67	61.54***

9. When wearing a body worn camera will officers behave more respectfully towards:						
Citizens in general	88.2	68.32** *	87.18	70.97*	88.55	67.69***
Crime suspects	76.89	60.87** *	76.28	54.84**	77.09	62.31***
Crime victims	87.87	74.53** *	87.82	74.19*	87.89	74.62***
10. When wearing a body worn camera, will officers:						
hesitate to take control of dangerous situations	51.15	36.02** *	54.49	25.81***	50.00	38.46***
enforce the law more strictly	78.85	61.49** *	72.44	58.06	81.06	62.31***
explain their actions more often to citizens	86.89	68.94** *	84.62	74.19	87.67	67.69**

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C District after one year.

Impacts of body cameras on citizen behavior

Four questions on the survey asked about the effect of officers wearing BWCs on citizen behavior (Table 10). Significantly fewer treatment district respondents, but still most, agreed that citizens are more likely to do what an officer asks them to or be more respectful to police officers. There were no significant changes in agreement between perceptions pre and post related to BWCs making victim and witnesses less likely to provide information to the police. Most respondents agreed both pre and post.

Table 10. Impacts of BWCs on citizen behavior

	All four districts		Comparison (E)		Treatment (C, B, and A)	
	Pre	Post	Pre	Post	Pre	Post
11. When interacting with police officers wearing body worn cameras, residents will be:						
more likely to do what an officer asks them to do	80.00	62.73***	82.69	70.97	79.07	60.77***
more respectful to police officers	73.61	54.04***	74.36	58.06	73.35	53.08***
12. In the presence of a body camera ...						
VICTIMS are less willing to provide information relevant to criminal investigations than before cameras.	63.28	59.63	63.46	48.39	63.22	62.31
WITNESSES are less willing to provide information relevant to criminal investigations than before cameras.	63.93	63.98	59.62	61.29	65.42	64.62

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Uses of body camera footage

One section of the survey asked about their views on different uses of body camera footage (Table 11). There were no significant differences in agreement on when and why citizens should review BWC footage. There was a significant increase in agreement that, at the conclusion of an investigation and if BWC footage is available, the recording should be released for viewing by the general public. However, this was seen primarily in the comparison group at post, not the treatment group. From pre to post there was not an overall significant decline in how footage should be utilized. But the comparison group reported significant decreases in agreement that BWC footage should be used to provide the

media with positive examples of good police work and improve in-service training. The comparison group had significantly lower levels of agreement compared to the treatment group for these respective questions. Additionally, the comparison group at pre-test expressed significantly less agreement that at the conclusion of an investigation available BWC footage should be released for the general public compared to the treatment group. In general, large majorities of respondents agreed that BWC footage should be used to reward good police work, provide positive examples of good police work to media, improve in-service training, be used to review and improve officer performance, and document what officers see and hear. Respondents also support release of BWC footage to citizens involved in a complaint and to the media after an investigation is concluded.

Table 11. Citizen views on BWC footage

	All four districts		Comparison (E)		Treatment (C, B and A)	
	Pre	Post	Pre	Post	Pre	Post
13. When a resident is being formally interviewed by an Internal Affairs investigator, he or she should be able to view footage from body worn cameras:						
When the resident is making a formal complaint related to officer behavior	98.36	96.27	97.44	93.55	96.68	96.92
When the resident is injured by an officer who used non-lethal force	98.85	97.52*	98.72	96.77	98.9	97.69
14.) At the conclusion of an investigation of police officer behavior that has body worn camera footage available, should that recording be released for viewing by the general public?	86.39	87.58**	80.13	93.55**	88.55	86.15
15.) The footage from body worn cameras should be used to:						

provide the media with positive examples of good police work.	87.05	81.99	83.33	64.52**	88.33	86.15
improve in-service training.	97.54	97.52	98.08	90.32**	97.36	99.23

Note: Significance tests are Pre v Post: *P<0.10 **p<0.05 ***p<0.01. Shaded cells denote significant differences between treatment and comparison districts. BWCs were deployed in C district after one year.

Official Data on Police Behavior

Table 12 displays the negative binomial regression models for each outcome in the A district. Only one outcome, citizen complaints, was significantly higher ($p < 0.05$) for BWC officers during the post-intervention period. In particular, the expected count of citizen complaints was roughly 172.7% higher for BWC officers during the post-intervention period than it would have been without BWCs. Both arrests and use of force incidents also trended in a positive direction but neither estimate reached conventional levels of statistical significance. Arrests were approximately 23.3% higher and use of force incidents were about 11.3% higher for BWC officers during the post-intervention period than they would have been without BWCs. In contrast, the expected number of stops trended in the negative direction, but again failed to reach statistical significance. BWC officers conducted approximately 11.9% fewer stops in the post-intervention period than it would have been without BWCs.

Table 12. Count Regression Models Examining the Effects of BWCs on Officer Behavior (District A)

	Stops		Arrests		Force		Complaints	
	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR
Treatment	-0.100 (0.170)	0.905	-0.006 (0.175)	0.994	-0.071 (0.244)	0.932	-0.167 (0.306)	0.846
Post-intervention	0.344** (0.105)	1.411	0.226** (0.085)	1.254	0.214 (0.180)	1.239	0.000 (0.308)	1.000
DiD Estimator	-0.126 (0.130)	0.881	0.210 (0.131)	1.233	0.107 (0.232)	1.113	1.003* (0.408)	2.727
Constant	4.613*** (0.130)	100.818	2.348*** (0.116)	10.465	-0.658*** (0.160)	0.518	-1.878*** (0.204)	0.153
Ln(alpha)	1.243		1.363		1.325		0.564	
pseudo R^2	0.0008		0.0013		0.0017		0.0241	

Notes: * p<.05, ** p<.01, *** p<.001. All models estimated using negative binomial regression with clustered standard errors.

The results for the B district are presented in Table 13. Overall, the negative binomial regression models suggest there were no significant differences ($p < 0.05$) for any outcome for BWC officers compared to what would have been expected if they had not been issued BWCs during the post-intervention period. Three outcomes trended in a positive direction but failed to reach conventional levels of statistical significance. Similar to the results found in the A district, the expected count of use of force incidents (100.7%) and citizen complaints (134.7%) were both higher for BWC officers during the post-intervention period. In addition, the expected number of arrests were about 76% higher for BWC officers during the post-intervention period. Only the expected count of stops trended in the negative direction but failed to reach statistical significance. BWC officers conducted approximately 7.4% fewer arrests in the post-intervention period.

Table 13. Count Regression Models Examining the Effects of BWCs on Officer Behavior (District B)

	Stops		Arrests		Force		Complaints	
	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR
Treatment	0.130 (0.264)	1.139	0.182 (0.220)	1.200	-0.425 (0.442)	0.654	-0.773 (0.489)	0.462
Post-intervention	0.385 (0.232)	1.469	0.148 (0.126)	1.160	0.208 (0.341)	1.231	-0.080 (0.317)	0.923
DiD Estimator	-0.077 (0.269)	0.926	0.073 (0.167)	1.076	0.697 (0.479)	2.007	0.853 (0.574)	2.347
Constant	4.044*** (0.213)	57.059	1.956*** (0.167)	7.074	-0.961** (0.309)	0.382	-1.655*** (0.294)	0.191
Ln(alpha)	1.189		1.162		1.232		0.678	
pseudo R^2	0.0010		0.0011		0.0103		0.0107	

Notes: * p<.05, ** p<.01, *** p<.001. All models estimated using negative binomial regression with clustered standard errors.

Finally, Table 14 displays the negative binomial regression models for the C District. Overall, the negative binomial regression models suggest there were no significant differences ($p < 0.05$) for any

outcome than there would have been without BWCs during the post-intervention period. Only one outcome, stops, was lower for BWC officers during the post-intervention period by 12.8%. Like the results presented above, the expected counts were higher for use of force incidents (16.7%), arrests (2.5%) and citizen complaints (2.6%) for BWC officers during the post-intervention period than would have been expected if they did not have BWCs.

Table 14. *Count Regression Models Examining the Effects of BWCs on Officer Behavior (District C)*

	Stops		Arrests		Force		Complaints	
	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR	<i>b</i> (SE)	IRR
Treatment	0.184 (0.178)	1.202	-0.059 (0.178)	0.943	0.343 (0.367)	1.409	0.534 (0.374)	1.706
Post-intervention	-0.982*** (0.126)	0.374	-0.359*** (0.086)	0.698	0.022 (0.237)	1.023	-0.754 (0.455)	0.471
DiD Estimator	-0.137 (0.158)	0.872	0.025 (0.124)	1.025	0.154 (0.357)	1.167	0.026 (0.572)	1.026
Constant	5.158*** (0.109)	173.820	2.592*** (0.124)	13.360	-0.704** (0.224)	0.494	-1.655*** (0.287)	0.191
Ln(alpha)	0.877		0.688		1.163		0.833	
pseudo <i>R</i> ²	0.0098		0.0022		0.0048		0.0245	

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$. All models estimated using negative binomial regression with clustered standard errors.

Integrated Findings

This section integrates findings from different components of the study (i.e., the surveys, official data and focus groups) where there was overlap.

Baseline perceptions of trust in the police, anticipated impact of cameras and feelings of safety in their neighborhood

Most respondents felt they had at least some trust in the police, felt safe in their neighborhood, and would feel safer during interactions with officers if they are wearing BWCs. However, in the treatment districts, the proportions of citizens who held these views was significantly lower after BWCs were deployed.

Impacts of body cameras on personal privacy

Most respondents did not express concern BWCs would violate the privacy of residents, crime victims, and suspects. The percentage with this concern decreased at the post survey.

Impacts of body cameras on transparency and accountability

One of the most frequently cited reasons for deploying cameras was that they would increase transparency and accountability. At the post-survey, over 91% of respondents agreed that it was easier for the public to know about the behavior of police and over 87% agreed it made officers more accountable for their actions. Although the percentages agreeing with these statements were significantly lower in the post survey, they still reflect an extremely high level of confidence that BWCs are achieving those goals. In the focus groups, community members generally perceived the cameras as a tool for holding the police accountable.

Impact of body cameras on police-community relations

Significantly more respondents thought that the effects of BWCs on police-community relations would take more than five years (as opposed to five years or less). In the community member focus groups, respondents were generally positive that relations could be improved, but that the process will take time. As one respondent put it, "if the process is handled correctly, then I do believe that [BWC implementation] is a way to rebuild relations. But it's going to take time to do it". The results from the police survey reveal that significantly more (and a majority) of respondents in treatment districts agreed that improvement in trust in PPD and in individual police-community relationships will happen in less than 5 years.

Impacts of BWCs on Police Behavior

Although there were declines in agreement in the post survey, most respondents agreed that BWCs will result in officers changing the way they interact with citizens. Officers will think more about how to calm a situation and listen more carefully to the needs expressed to them. They will also behave more respectfully towards citizens, suspects, and victims in the presence of BWCs. Furthermore, they will enforce the law more strictly and explain their actions to civilians. The community focus groups revealed more nuanced views about the contingent nature of officer behavior change (e.g., depending on such issues as officer personality, or area of the city), but also generally pointed to an optimism that BWCs could foster police professionalism. The police surveys revealed that after wearing BWCs, most officers in the treatment group still agreed that officers choose their words more carefully and think more about how to de-escalate situations. BWCs change officer behavior in ways that make it less likely that a conflict will escalate because they choose words more carefully and think more about how to deescalate situations.

In the pre-deployment police focus groups, officers expressed the general view that some might think more carefully about their use of language, with some expressing concern about the potential for hesitation. Overall, officers saw behavior change as contingent on factors such as officer style or time on the job. In the community surveys, a majority disagreed that officers would hesitate to take control of dangerous situations. This was significantly different from pre-survey results. In the community focus groups, some respondents suggested that BWCs might make officers hesitant to intervene, including hesitating in taking necessary physical action to protect themselves or others while on a job.

According to the police surveys, BWCs do not reduce use of police discretion and proactive activity (i.e., they still give warnings for traffic violations, still initiate mere encounters, still make pedestrian and live stops, and still use their experiences to resolve situations). Interestingly, a slight

majority (53%) agreed that they second-guess their decisions to use force at post-survey, but the change was not significant. In the police focus groups, it was suggested that BWCs may lead to second-guessing in the form of impeding officers in taking control of situations, but officers revealed nuanced views about how second-guessing might happen, depending on contingencies such as the training or experience of the officers involved, or the nature of a given situation or job.

Analyses of the official police data reveal that there was no significant impact of BWCs on stops, arrests, or use of force relative to what would have happened if officers had not been issued BWCs. One district had a significant increase in citizen complaints over what it would have been without BWCs. The finding of significantly more citizen complaints in one district is inconsistent with the views police reported changes related to changes in their own behavior. Police reported that they were choosing their words more carefully which should not have resulted in increased citizen complaints. One potential explanation for this mismatch has to do with unmet expectations. Citizens reported that they anticipated that officers would choose their words more carefully and think more about how to de-escalate situations. It is plausible that when the new expectations were not matched with officer behavior change, citizens were more likely to file a complaint.

Impacts of body cameras on citizen behavior

The community member survey had significantly fewer treatment district respondents, but still most agreed that citizens are more likely to do what an officer asks them to or be more respectful to police officers. This finding complements results from the community focus groups, where some respondents suggested that BWCs should foster better behavior on both the part of the police and people in the community, noting however, that there are contingencies, such as the people involved or the area of the city where encounters take place.

In the community survey there were no significant changes related to the willingness of victims and witnesses to provide information about investigations. Most still agree that victims and witnesses will be less willing. This is consistent with a concern expressed in the community focus groups that people may be hesitant to interact with or provide information to police out of concerns of safety and being seen talking with officers. In contrast, the officer surveys reveal the view that BWCs do not reduce police-citizen communication (i.e., make citizens in general, witnesses or victims less likely to be willing to talk to police). Most still disagreed that victims, witnesses, and citizens in general will be less willing to provide information.

According to the police surveys, officers perceive that BWCs do not change citizen behavior in ways that make it less likely that a conflict will escalate (i.e., comply with officer requests, be less physically or verbally aggressive, or more respectful). The officer focus groups revealed more nuance in officers' perspectives about potential behavior change. In essence, behavior change is shaped by different dimensions of an encounter, such as the person or people involved, potentially their age, the place or district where an encounter occurs, and the type of incident or situation that is underway.

Uses of body camera footage

There were no significant differences in both waves of the community survey in how respondents felt about the use of BWC footage, and most supported allowing complainants and the public to view footage. At the post-survey, respondents thought complainants should be able to view the footage when making a formal complaint (96%) and at the conclusion of an investigation of an incident in which a citizen is injured (98%). Respondents thought the public should be able to view footage at the conclusion of an investigation (86%). Additionally, respondents thought the footage should be used to provide positive examples of police work (86%) and to improve in-service training (99%).

The officer surveys revealed complementary findings. Overall, officers reported that BWCs have positive outcomes for the officers wearing them. They accurately reflect what the officer sees, and they reduce false citizen complaints. They also have great potential for identifying, rewarding, and publicizing good police work, for improving training and for making wearers better police officers. BWCs should be used for transparency and released to citizens making complaints and to the public after an investigation concludes. These findings are consistent with the police focus group results, which revealed the view that BWCs would be protective of officers in terms of exonerating them in cases of false complaints or supporting an officer's decision-making process.

Limitations

Limitations in the quasi-experimental design of the study stemmed from the study's focus on applied research and involved three issues. First, a longer than expected period to recruit and hold the focus groups which then delayed the development of the survey instruments. Second, the Philadelphia Police Department's operational necessities resulted in the deployment of BWCs in the original two treatment districts (A and B) earlier than planned. Then later in the study, PPD deployed BWCs in one of the comparison districts (District C) earlier than planned. This series of events changed the analysis plan and was related to some of the limitations discussed below.

Focus Groups

The officer focus groups were limited to officers working in select districts that did not have cameras at the time as well as leadership and administrative staff working at headquarters. The focus group design would have been strengthened by conducting an additional round of focus groups after the cameras had been issued and they became a normalized part of police patrol and operations. The survey findings suggest the need to explore qualitatively whether and how concerns or assumptions about behavior change might fluctuate or wane in the fullness of time. Given the qualitative findings

related to the contingency of potential behavior change in general, it would have been fruitful to conduct more focus groups, pre-deployment, and post-deployment, to tease out perceptions of how district contexts, and the history of police-community relations within those contexts, influence the potential for behavior change, accountability, transparency, and trust. The community focus groups were similarly limited from a sampling perspective, and the study would have benefited from an additional round of focus groups to follow up on initial qualitative findings and help explain the results from the surveys and official data.

Surveys

Although the design was successful in providing the opportunity for almost all officers in the study districts to participate in the survey, the sample consists of those who volunteered. The timing of the survey administration was not ideal. The administration of the pre-deployment police surveys took place a few months after the BWCs were deployed in two of the treatment districts (A and B). The citizen surveys took place 7 to 8 months after deployment. Thus, respondents could have had experience with BWCs when they answered the pre-deployment survey. This may have resulted in finding fewer significant changes between the treatment and comparison districts. The risk of contamination was higher for police than for citizens since police have direct, daily experience with BWCs but most residents have infrequent contact with police officers. The unexpected deployment of BWCs in one of the comparison districts meant that the original balanced design and analysis could not be used.

Official Data on Police Behavior

The analysis used officers from three study districts, one original comparison district, and another comparison district. The additional comparison district was chosen from the few districts that remained without cameras. It was the most similar district that was left. Thus, the matched officers may

or may not have been assigned to an original comparison study district. We mitigated this issue through propensity score matching but it is a conceptual mismatch. Additionally, one of the most critical assumptions of difference in differences is that of parallel trends for both treatment and comparison groups. Because of the low values for use of force and citizen complaints, the data is noisy (i.e., there is a great deal of variation in monthly values).

Expected Applicability of the Research

Although many police departments have completed their deployments of BWCs, many smaller and mid-size agencies still have not. Our findings provide valuable insights for the latter agencies, insights that can be employed to ease the transition for officers and the community. In particular, our findings point out the importance of communicating with both officers and the community clearly and often regarding the specifics of the BWC policy in a jurisdiction. Not involving the two most impacted groups is a missed opportunity to engage in conversations and set expectations of both officers and the community members they serve.

The materials developed to support the focus groups and the survey instruments are all archived with the data for this research. The methods module describes the design of the focus groups, provides the focus group instruments, offers data matrices that summarize high-level findings related to each code in the qualitative codebooks (police and community focus groups respectively), and describes the coding comparison process. The surveys can be administered in other jurisdictions and the results compared to our results. Use of these materials provides a level of replicability that is unusual in social science.

Finally, the story of this research is one of resilience. Research rarely unfolds as designed and that is especially true of applied research. The ability to pivot and then pivot again is essential. The

experience of this collaborative effort can serve as an inspiration to subsequent investigators to not give up but keep looking for ways to collect more data or add more observations and still achieve the purpose of the research.

Artifacts

List of Products

Research personnel submitted a scholarly manuscript for peer review on police focus group findings. Several presentations have also been delivered at the American Society of Criminology Annual meetings reporting on community focus group findings, police focus group findings, officer survey findings, and a supplementary Temple-funded study centered on an analysis of media narratives of policing in Philadelphia which helps to contextualize the political and social environment of BWC implementation in the city.

Journal Publications Under Review

Wood, J.D., Groff, E.R. & Talley, D. 'It depends': Officer insights on the potential for body-worn cameras to change police and citizen behavior. Revise and re-submit. *Policing: A Journal of Policy and Practice*

Conference Presentations

Bueno, E., Wood, J. & Groff, E. (2022). The narrative environment of body worn camera implementation: The importance of stories told and untold. American Society of Criminology 2022 Annual Meeting, Atlanta, GA.

Talley, D., Wood, J. & Groff, E. (2022). "Sunlight is the Best Disinfectant": Body-Worn Camera Implementation as a Window into Police Governance. American Society of Criminology 2019 Annual Meeting, Atlanta, GA.

Wood, J., Groff, E., & Talley, D. (2022). Behaving in Front of the Lens: Contingent Dynamics of Behavior Change in the Face of Body-Worn Cameras. American Society of Criminology 2022 Annual Meeting, Atlanta, GA.

Wood, J. (2021) *Behaving better in front of the lens: Possibilities of change according to police and residents in Philadelphia*, delivered at the webinar titled BWC Effects on Organizational and Individual Outcomes: Findings from the Latest Research, hosted by the Body-Worn Camera Training and Technical Assistance Program. December 1.

Talley, D. & Wood, J. (2019). Will police and residents change their behavior while on camera? Qualitative findings from a body-worn camera evaluation in Philadelphia [Conference presentation]. American Society of Criminology 2019 Annual Meeting, San Francisco, CA.

Data Sets Generated

Officer Survey Dataset. This data is derived from a repeated cross-sectional survey and the structure of the dataset is rectangular, with each column being a variable and each row being a record. The variables correspond to officer responses to survey questions. The survey captured officers' perceptions towards BWCs. The same survey was administered to officers in specific districts at a time period prior to the implementation of BWCs and post the implementation. The BWCs were only implemented in certain districts and the treatment variable denotes whether the district received the BWC condition or not (0 = no, 1= yes). The pre-post variable indicates whether the responses were recorded prior to the BWC implementation or post. In total there are 43 variables with 449 observations.

Community Survey Dataset. This data is derived from a repeated cross-sectional survey and the structure of the dataset is rectangular, with each column being a variable and each row being a record. The variables correspond to community members responses to survey questions which aimed to gather their perceptions of the use of BWCs by police. The survey was administered to community members living within the police districts that were surveyed in the officer survey. Data collection took place in two waves, the pre-deployment survey was prior to any implementation of BWCs with the police. During the second wave an identical survey was administered to the same communities following the implementation of BWCs in certain districts. The wave variable indicates whether the survey took place

prior to BWC implementation (wave=1) or post implementation (wave=2). In total there are 60 variables and 771 observations.

Official Police Outcome Dataset. This dataset comes from official records provided by the Philadelphia Police Department. There are three datasets, each representing a different district (A, B, and C), all identical in rectangular structure. The dataset provides records for an officer at a time period prior to BWC and post BWC. Thus, there are two records (rows) for each officer. The variables provide information on the number of complaints, use of force instances, arrests, and stops for each officer. In the District A dataset there are 7 variables and 680 observations; District B dataset has 7 variables and 272 observations; and the District C dataset has 7 variables and 356 observations.

Dissemination Activities

The research team has produced four practitioner-focused briefs. One summarized the results of the pre-deployment officer survey. A second focused on variation in the perceived impacts of BWCs on police discretion by sex, age, and length of time on the job. A third was a mixed methods study brief on police officer perspectives, and a fourth was a mixed methods brief on civilian perspectives.

Research personnel presented a study de-brief to the PPD Executive Team in January 2022. This involved a PowerPoint presentation and Question and Answer period related to key findings from the study except for the post-survey wave of the community surveys. As part of this presentation, the study team provided two briefing notes to the Executive Team; a mixed methods study brief on police officer perspectives, and a mixed methods brief on civilian perspectives, both of which integrated high-level insights from the survey and focus group findings. During the summer of 2022, research personnel held a series of meetings to brief police Inspectors, Captains, and any available command staff in each of the four districts that participated in the study on the study findings to date and to get their feedback.

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