



An Examination of Body-Worn Camera Digital Evidence Management (DEM) Strategies

Brice Terpstra, M.S.
Michael D. White, Ph.D.
Aili Malm, Ph.D.
Janne E. Gaub, Ph.D.
Arizona State University

Craig Uchida
Justice and Security Strategies

March 2022



This report was supported by Grant No. 2019-BC-BX-K001 awarded by the Bureau of Justice Assistance (BJA) to the CNA Corporation with Justice & Security Strategies, Inc. (JSS) and Arizona State University (ASU) as sub-recipients. BJA is a component of the U.S. Department of Justice Office of Justice Programs. Points of view or opinions contained herein do not necessarily represent the official position or policies of the U.S. Department of Justice.

An Examination of Body-Worn Camera Digital Evidence Management Strategies

Executive Summary

Over the last few years, thousands of law enforcement agencies in the United States have adopted body-worn cameras (BWCs), and those agencies immediately had to deal with the tremendous amount of digital evidence generated by the technology. Digital evidence management (DEM) is the process by which an agency manages, stores, and transmits the data generated by BWCs and other devices (e.g., other types of cameras, cell phones). DEM is a critically important feature of a successful BWC program.

An earlier study of seven jurisdictions (Uchida et al., 2021). examined the way in which BWC footage flowed through policing agencies and in the criminal justice system. The report provided an understanding of the key challenges and issues faced by law enforcement agencies and prosecutor offices as they use BWCs routinely.

To further our knowledge, we conducted an online survey of agencies receiving federal funds for BWC through the Bureau of Justice Assistance Policy and Implementation (PIP) BWC funding program to address this gap. We asked agencies approximately 30 questions related to DEM including basic program management, internal uses of footage, external sharing, challenges, and future developments. Sixty-eight agencies completed our survey, and this report details those results. The primary findings are as follows:

- Most responding agencies are routinely monitoring the flow of footage into their organization. The majority regularly track activations (46%), uploads (60%), and storage use (69%). Most have a process to review untagged footage (82%).
- Just over half of agencies (53%) indicated they have a specific BWC management unit. These units perform various BWC-related tasks, from camera assignments and maintenance to audits and redaction. In plain terms, these units do it all.
- Nearly all agencies use the footage to accomplish internal objectives, whether that be investigating uses of force and citizen complaints (99%), monitoring BWC use (82%), or conducting performance evaluations (48%). About one-quarter of agencies (26%) examine metadata to inform their BWC program.
- About three-quarters of responding agencies (73%) share the footage with the public. Among those that do, nearly all have a policy in place to govern that public release process.
- Most agencies also share the footage with external agencies, including city and county prosecutors, public defenders, private attorneys, and law enforcement agencies. Agencies use several means to share footage, including direct access to cloud storage, secure email links, and physical copies (USB devices). Sharing method varies notably based on who is receiving the footage. Direct access to cloud storage is reserved primarily for prosecutors (49% have provided access to their prosecutors).

- Last, the primary DEM-related challenges center on cost/staffing/resources (28%), storage/infrastructure (25%), and video redaction (14%). Agencies identified the same areas as desired future developments, as most responding agencies focused internally on future needs rather than looking to vendors or others.

BWCs come with a high degree of difficulty on the back-end. Successful management of a BWC program requires a substantial commitment from the agency, financial and otherwise, and DEM is a central feature of that commitment.

An Examination of Body-Worn Camera Digital Evidence Management Strategies

I. Introduction

Over the past several years, thousands of law enforcement agencies in the United States have deployed body-worn cameras (BWCs). As agencies have deployed cameras, they have been forced to confront the complex realities of BWC program management. Buying the cameras and deploying them to officers is the easy part. The cost, resources, staffing, organizational understanding and adherence to policy requirements, and data storage needs for the proper management of a BWC program are daunting. Digital evidence management (DEM) is one of the most critically important features of a successful BWC program.

DEM is the process by which an agency manages, stores, and transmits information from different devices or technologies, such as cell phone information, digital photographs, digital voice recordings, and BWC footage. BWCs produce a tremendous amount of digital evidence that law enforcement agencies must handle. BWC footage is often evidentiary, and as such, chain of custody, processing, access and storage (permanently, in some cases) considerations must be addressed. BWC digital evidence has unique value for agencies internally, from the evidence that can be used to resolve citizen complaints on officer's actions (including use of force) to data that can inform officer performance evaluations. Moreover, external entities often request BWC digital evidence, including prosecutors, defense counsel, other law enforcement agencies, citizens, and the media.

While digital footage from BWCs and other devices provide clear evidentiary value to law enforcement agencies, basic operational research describing DEM processes has not kept pace with the rapid adoption of technology and the sheer volume of digital data being generated.

The current research builds upon a pilot study conducted in seven jurisdictions across the country (Uchida et al., 2021). Researchers examined the way in which BWC footage flowed through policing agencies and in the criminal justice system. The report provided an understanding of the key challenges and issues faced by law enforcement agencies and prosecutor offices as they use BWCs routinely.

We still need to know more about how law enforcement agencies handle and leverage BWC digital evidence. Do agencies monitor the flow of footage into their organization? Do they use the footage for internal purposes, such as investigating complaints and completing performance evaluations? How do agencies share BWC digital evidence with external requestors? What are the primary challenges to effective BWC DEM? These are unanswered questions. To address this knowledge gap, we conducted an online survey of agencies receiving federal funds for BWC to better understand these issues. Sixty-eight agencies completed our survey, and this report details those results.

II. Methodology

We deployed a survey via Qualtrics to all law enforcement agencies that have received federal funding for the purchase of BWCs through the Bureau of Justice Assistance (BJA) Body-Worn Camera Policy and Implementation Program (BWCPPI). The survey was sent to all grantees, current and former, from fiscal years 2015-2020 (n=439). The survey (see Appendix 1) captures information related to DEM “basics” (e.g., BWC deployment and implementation, BWC program management, DEM characteristics), internal and external uses of DEM, challenges of DEM, and future directions for DEM.

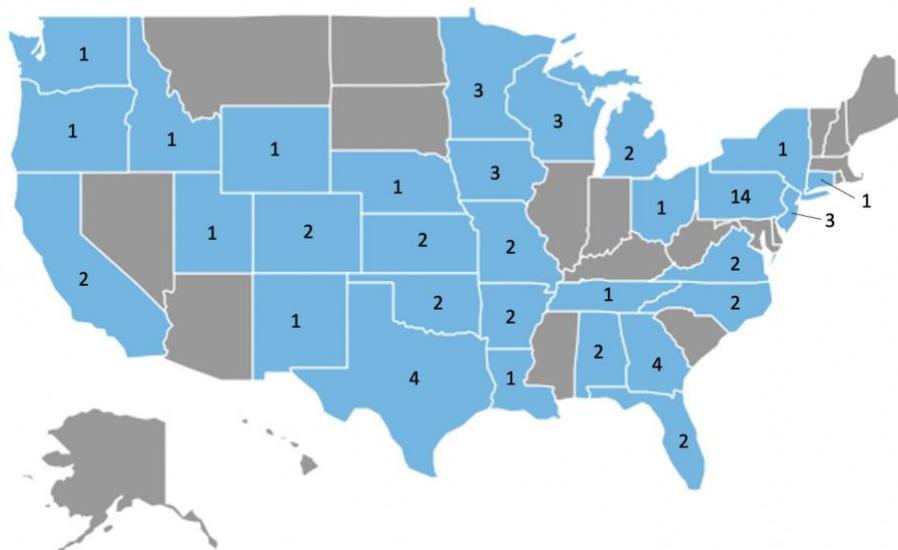
We sent the survey to the point of contact on record for the grantee. In addition to the initial survey invitation, we also sent three follow-up/reminder emails to the same email address. We had 58 email invitations returned (email address no longer active), resulting in 381 successful invitations. We received 68 completed surveys (response rate of about 18%) from 30 different states (see Figure 1). Pennsylvania is over-represented with 14 respondents (20.6%).

Of the 68 responding agencies, the majority (45; 66%) were municipal police departments, 13 (19%) were of the respondents were county sheriff's departments, and 15% were classified as other: correctional agencies, university departments, or tribal law enforcement agencies. We also captured the size of the jurisdiction, which varied considerably:

- Less than 10,000 (16%),
- 10,000 - 49,999 (31%),
- 50,000 – 99,000 (15%),
- 100,000 – 249,000 (23%), and
- 250,000+ (15%).

Overall, 42 responding agencies (62%) serve jurisdictions with less than 100,000 people.

Figure 1. Survey Respondents by State



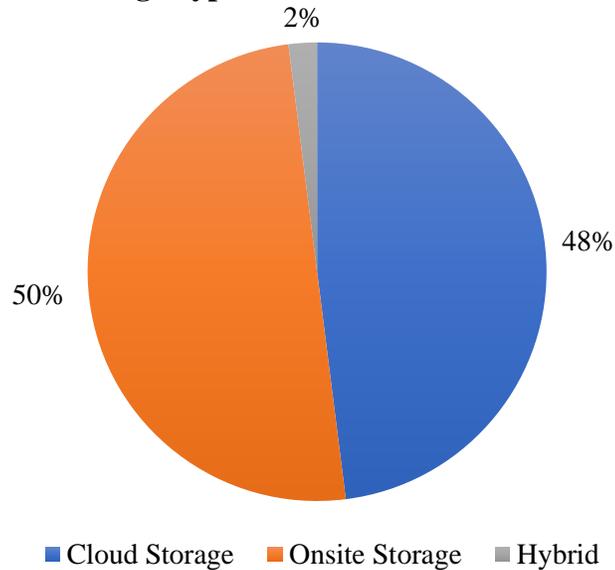
III. Results

Basic Elements of BWC DEM

We asked agencies about the number of BWCs currently deployed, and that number ranged dramatically, from 3 to 2,200 (mean=223, median=44.5). About three-quarters of the responding agencies are relatively evenly divided between two BWC vendors: Axon (41%) and Watch Guard (34%). The remaining 25% are split across a half-dozen smaller vendors.

Agencies were asked to describe their DEM storage system, annual costs, and data tracking procedures. Storage utilization varied among the agencies. Figure 2 shows agencies relatively evenly split between cloud storage (vendor-provided; 48%) and local, onsite storage (50%), with a small number adopting a hybrid approach (both local and cloud; 2%).

Figure 2. Storage Type



Costs associated with DEM varied considerably among the agencies, though most report BWC programs that are inexpensive. A handful of agencies (12%) reported no annual costs associated with DEM (e.g., server is fully paid for), and 46% reported annual costs at \$50,000 or less (median = \$4500). One large agency reported an annual cost exceeding \$2.3 million for DEM. Notably, 25% of the agencies reported not knowing annual costs as these expenses are written/bundled into larger contracts.

We also asked agencies about their day-to-day management and monitoring of their BWC systems (and related DEM). For example:

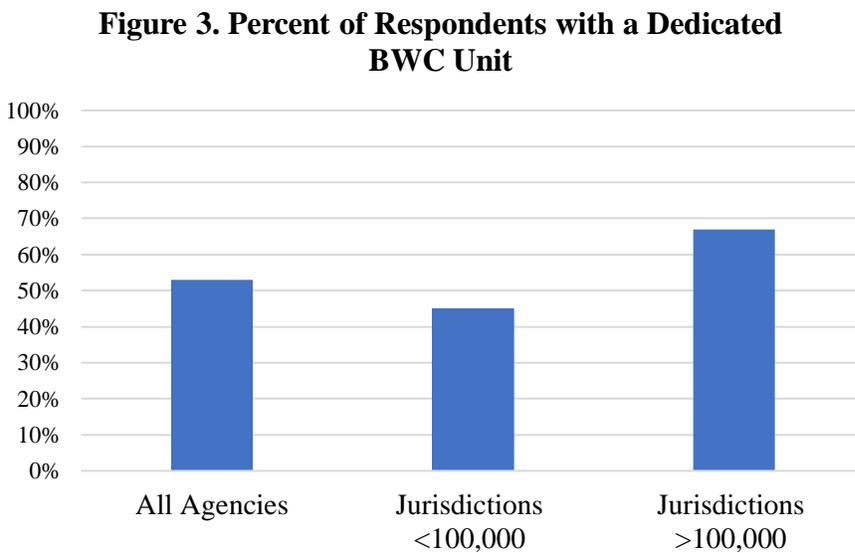
- 46% track number of activations,
- 60% track number of videos uploaded,
- 69% track storage use, and
- 82% have a process to review untagged footage.

This kind of routine monitoring is less common among smaller agencies. Agencies serving populations <100,000 are less likely to track video uploads (4%), BWC activations (30%), or storage use (20%). This finding may reflect the resource burden associated with managing DEM among smaller agencies.

BWC Program Management

Agencies were also asked specifics about their BWC program management. Notably, over half of the responding agencies (36 agencies; 53%) indicated having a dedicated BWC unit.¹

Our findings show that as agency size increases, so too does the likelihood an agency has a dedicated BWC unit. For instance, Figure 3 shows that 45% of agencies with jurisdictions under 100,000 have a dedicated BWC unit, compared to 67% of agencies with jurisdictions over 100,000.



Responding agencies staffed their BWCs units with a combination of sworn and civilian employees (see Table 1). Most had at least some sworn officers assigned to the unit (83%), typically two or fewer officers (61% of those with a unit). More than half of agencies (53%) also had at least one civilian employee assigned to the unit.

Table 2 shows the diverse tasks taken on by BWC units. In simple terms, these units handle nearly all aspects of a BWC program, from malfunctions with BWC hardware (94%) and software (89%) to conducting audits for internal purposes (83%). Most also serve as a liaison to the BWC vendor (92%), other criminal justice agencies (86%), and city/county IT departments (75%). Other typical responsibilities include handling footage requests from the public (69%) and other justice agencies (81%), footage redaction (72%), and coordinating camera assignments (72%). This diversity of tasks did not vary significantly by agency size or program maturity.

Table 1. Staffing for BWC Units (n=36)²

<i># Assigned</i>	<i># Sworn</i>	<i># Civilian</i>
0	6 (17%)	17 (47%)
1	9 (25%)	10 (28%)
2	13 (36%)	2 (6%)
3	4 (11%)	4 (11%)
4	1 (3%)	1 (3%)
5+	2 (6%)	2 (6%)

¹ We did not define or specify what it meant to have a designated BWC unit. We allowed the responding agencies to answer the question from their perspective.

² One agency provided the number of civilian staff but did not specify the number of sworn.

Table 2. Responsibilities of Specific BWC Units (n=36)

<i>Responsibilities</i>	<i>N(% of Agencies)</i>
Conduct auditing/compliance for internal purposes	30 (83%)
Coordinate camera assignments	26 (72%)
Handle footage requests from other criminal justice agencies	29 (81%)
Handle malfunctions/problems with hardware	34 (94%)
Handle malfunctions/problems with software	32 (89%)
Handle public requests for footage	25 (69%)
Handle redaction of footage that has been publicly requested	26 (72%)
Serve as liaison to city/county IT	27 (75%)
Serve as liaison to other criminal justice agencies	31 (86%)
Serve as liaison to the BWC vendor	33 (92%)
Other	5 (14%)

Internal Uses

Agencies reported using digital evidence to assist with a host of internal tasks. These include:

- Reviewing footage for internal investigations (99%),
- Reviewing footage to investigate both citizen complaints and officer use of force (99%),
- Reviewing footage to monitor BWC use (82%),
- Reviewing footage to assess officers' general performance (48%), and
- Reviewing BWC metadata (26%).³

Those agencies who reported reviewing metadata cited a range of reasons for doing so, including to track complaints, identifying BWC malfunctions, assessing policy compliance (e.g., matching metadata to CAD and RMS), ensuring proper tagging/classification of videos, ensuring correct data retention periods, and assisting with program auditing.

We found clear associations between program maturity, jurisdiction size, and metadata use. For instance, older programs were more likely to use metadata. Of agencies that started BWC programs in or before 2017, 29% analyzed metadata, compared to 16% of those that implemented BWCs more recently (after 2017). Larger agencies also more frequently analyze metadata: 38% of agencies serving jurisdictions with 100,000+ population analyze metadata, compared to 17% of agencies serving populations of under 100,000.

External Uses of DEM

Agencies were also asked about processes and policies for sharing digital evidence with external entities. This sharing is a common occurrence, most typically with county prosecutors (82%), city prosecutors (40%), other law enforcement agencies (40%), public defenders (13%), and private attorneys (7%).⁴

³ Metadata are “data about data” (Martain et al., 2021). It is summary information about a BWC video captured automatically or entered by the officer, such as incident category, date, length of an encounter, specific aspects of the video (e.g., use of force), location (GPS coordinates), etc.

⁴ This question was designed as “select all that apply.” Eighteen percent of agencies did not select county prosecutor, which seems unusual. We were unable to get more detail on this finding.

Sharing Footage

Responding agencies share BWC footage in various ways, though there are clear patterns based on who is receiving the footage (see Figure 4). One option is to give the external agency their own access to the cloud-based storage system. This is a standard method for sharing footage with prosecutors (49%), but it is far less so for public defenders (13%) and other law enforcement agencies (10%). Since responding agencies typically do not provide cloud access to public defenders and other law enforcement agencies, physical copies (e.g., DVDs or thumb drives; 42-44%) and sending securing links via email are more common (44-49%).

Public Release and Redaction

We also asked agencies about sharing footage with the community, and 73% indicated that they release BWC footage to the public. Of the agencies that release footage publicly, nearly all (98%) have a policy governing the release of digital evidence. Moreover, 96% do their own redaction, though about half (52%) charge requestors a fee for doing so.

DEM-Related Challenges

Agencies were asked to identify their most pressing challenges from a list of well-established barriers associated with BWC programs (and DEM). Figure 5 details responding agency perceptions. The most common challenges include cost/staffing/resources (28%), storage/infrastructure requirements (25%), and video redaction (14%). Agencies also cited Freedom of Information Act (FOIA)/public requests for BWC footage (11%).⁵

Future Directions

We asked responding agencies to share their perceptions on the most important future developments in BWC digital evidence management. Not surprisingly, agencies identified future developments that closely aligned to the challenges they had identified in the prior section, such as better staffing, being more efficient with public records requests, better CAD integration, and more efficient processes for redaction and video sharing.

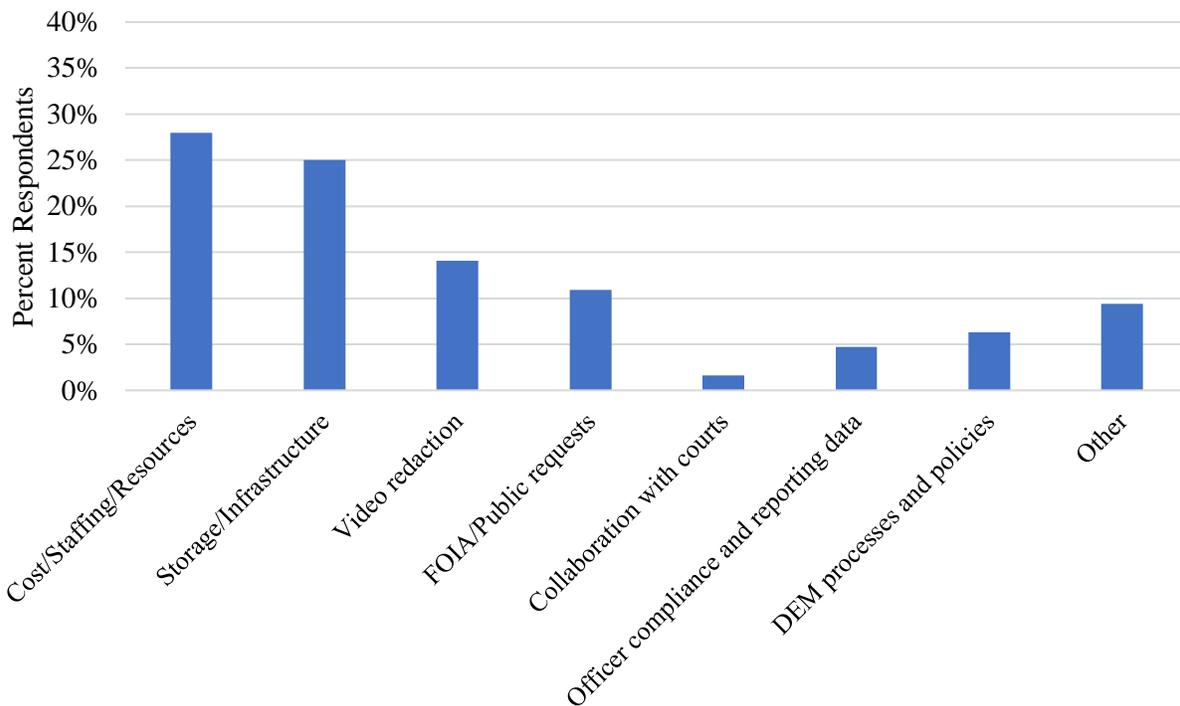
Other agencies focused specifically on expanding their BWC program in terms of cameras and staff: One respondent stated they hoped to “[expand] inventory of BWCs so every sworn detective can have an individually-issued unit.” Another would like to “hire more personnel” to help with DEM and requests for evidence.

Figure 4. Methods of Digital Evidence Sharing to External Agencies



⁵ We also examined the identified challenges by agency size. With few exceptions, size did not matter. The challenges varied little, except agencies serving larger jurisdictions were slightly less likely to identify storage as a challenge (20% vs. 28% for agencies serving smaller jurisdictions) and were slightly more likely to identify DEM as a challenge (12% vs. 3% for agencies serving smaller jurisdictions).

Figure 5. DEM-Related Challenges



Notably, most of the identified future developments are internally focused: that is, things that the departments themselves can/should do to address challenges. Very few responding agencies mentioned future developments involving the vendors or others outside their agency.

IV. Conclusion

We surveyed current and former BJA PIP grantees to understand the primary issues surrounding digital evidence management, as well as how agencies are handling those issues. Several themes emerged.

First, most responding agencies routinely monitor footage flow into their organization. The majority regularly track uploads, storage use, and activations. Most have a process to review untagged footage.

Second, about half of agencies have a dedicated BWC unit staffed by a combination of sworn and civilian personnel. These units tend to operate as a “jack of all trades” when it comes to BWCs. They handle everything from routine maintenance and camera assignments to redaction and auditing. It is unclear how agencies without a dedicated BWC unit handle these tasks.

Third, most agencies use the footage to accomplish internal objectives, whether that be investigating uses of force, resolving citizen complaints, or conducting performance evaluations.

Fourth, most agencies do share footage with the public and external agencies, though the nature of how footage is shared varies considerably by who is receiving the footage. About half of the agencies have allowed direct access to prosecutors through cloud-sharing.

Last, the primary DEM-related challenges center on cost, resources, and infrastructure. BWCs come with a high degree of difficulty on the back-end. Successful management of a BWC program requires a substantial commitment from the agency, financial and otherwise, and DEM is a central feature of that commitment.

The themes above should be considered in the context of study limitations. The survey sampling frame is a non-random group of agencies using BWCs. Respondents are likely not representative of the entire population of American law enforcement agencies (generally or those that use BWCs specifically) or even the smaller population of federal grantees (response rate is just over 18%). Consequently, the results presented may also not be representative of the experiences in other jurisdictions.

V. Policy and Research Implications

The findings from this report provide an important snapshot of DEM issues among agencies deploying BWCs. The report demonstrates that small, medium, and large policing agencies are following their internal policies by monitoring and tracking compliance with activation, uploads, and categorization of video footage. Importantly, these agencies are using footage for important public policy concerns – investigating use of force, resolving citizen complaints and for performance evaluations. They are releasing footage to the public as well. These are important considerations, and show how agencies are responding to the need for accountability and transparency.

Within agencies, however, they are now grappling with bigger questions about digital evidence. While thousands of cameras have been purchased by law enforcement agencies over the last seven years, the amount of footage and evidence has increased exponentially as well. This means that law enforcement and criminal justice agencies need to consider and plan for that growth. Many agencies acknowledge the internal challenges that they face and over half (53%) have created special units to manage the footage. Larger agencies are more likely to have a special unit, but smaller agencies do not. It is likely that these smaller agencies do not have the staffing or other resources to assist in this effort.

The report also shows that prosecutor and public defender offices are receiving digital evidence in some way – via the cloud, disc, or email, but in limited numbers.

These findings demonstrate that future research is needed to understand how agencies of all sizes are dealing with the tsunami of digital evidence being generated by BWCs. These process may be different among small, rural, and tribal law enforcement agencies, and their needs may be more acute. Additional research is need to better understand how digital evidence is used by downstream criminal justice agencies, including prosecutors, defense attorneys, and courts. Outreach to those

organizations is important to obtain a fuller picture of the issues and challenges of digital evidence management.

VI. References

Martain B. R., Harinam, V., & Ariel, B. (2021). Linking body worn camera activation with complaints: The promise of metadata. *Journal of Criminology*, 54(2), 143-159.

Uchida, C. D., Solomon, S. E., Connor, C., McCluskey, J., Katz, C. M., White, M. D., Patterson, Q., Markovic, J., Anderson, K., & Schmitz, J. (2021). *Managing digital evidence from body-worn cameras: Case studies in seven sites*. Retrieved from: <https://bwctta.com/managing-digital-evidence-body-worn-cameras-case-studies-seven-sites>

About the Authors

Brice Terpstra is a doctoral student in the School of Criminology and Criminal Justice at Arizona State University and a Research Assistant in the Center for Violence Prevention and Community Safety.

Michael D. White is a Professor in the School of Criminology and Criminal Justice at Arizona State University and is Associate Director of ASU's Center for Violence Prevention and Community Safety.

Aili Malm is a Professor in the School of Criminology, Criminal Justice, and Emergency Management at California State University, Long Beach.

Janne E. Gaub is an Assistant Professor in the Department of Criminal Justice and Criminology at the University of North Carolina, Charlotte.

Craig Uchida is President of Justice & Security Strategies, Inc.

Appendix 1. DEM Survey

Agency Characteristics

1. Agency name:_____
2. Where is your agency located? [dropdown menu with all states & territories]
3. Type of agency:
 - a. Municipal police department
 - b. County sheriff's office/department
 - c. State law enforcement agency
 - d. University/school district agency
 - e. Correctional agency
 - f. Other (please describe):_____
4. Jurisdiction population:
 - a. Less than 10,000
 - b. 10,000 to 49,999
 - c. 50,000 to 99,999
 - d. 100,000 to 249,999
 - e. 250,000 to 499,999
 - f. 500,000 to 999,999
 - g. 1 million+
5. Number of full-time sworn employees (as of today):_____
6. Number of non-sworn (civilian) employees (as of today):_____

BWC Deployment and Implementation

7. When did your agency begin deploying BWCs?
 - a. Before 2015
 - b. 2015
 - c. 2016
 - d. 2017
 - e. 2018
 - f. 2019
 - g. 2020
 - h. 2021
 - i. Other (please describe):_____
8. What BWC vendor do you currently use?
9. How many body-worn cameras are currently deployed in your agency?

Body-Worn Camera Program Management

10. Do you have a specific unit assigned to manage your BWC program?
 - a. No [skip to Q16]
 - b. Yes

11. How many sworn staff are assigned to the unit?

12. Are sworn staff assigned to the unit full-time, part-time, or both?
 - a. Full-time
 - b. Part-time
 - c. Both full-time and part-time

13. How many civilian staff are assigned to the unit?

14. Are civilian staff assigned to the unit full-time, part-time, or both?
 - a. Full-time
 - b. Part-time
 - c. Both full-time and part-time

15. What are the primary responsibilities of the staff assigned to the BWC unit? (select all that apply)
 - a. Coordinate camera assignment
 - b. Handle malfunctions/problems with hardware
 - c. Handle malfunctions/problems with software
 - d. Serve as liaison to the BWC vendor
 - e. Serve as liaison to the city/county
 - f. Serve as liaison to other criminal justice agencies, such as prosecutors, defense, and courts
 - g. Handle footage requests from other criminal justice agencies
 - h. Handle public requests for footage
 - i. Handle redaction of footage that has been publicly requested
 - j. Conduct auditing/compliance for internal purposes (BWC policy compliance, untagged videos, etc.)
 - k. Other (please describe):_____

DEM Characteristics

16. What type of BWC digital evidence storage do you use?
 - a. Local server
 - b. Cloud server serviced by the vendor
 - c. Hybrid of local and cloud servers
 - d. Other (please describe):_____

17. What is the estimated annual cost for data storage per year?

18. Do you track how many calls for service each year would require BWC activation according to the written BWC policy?
- c. No
 - d. Yes
19. Do you track the total number of BWC activations each year?
- a. No
 - b. Yes
20. Do you track how many BWC videos are uploaded to your storage system each year?
- a. No
 - b. Yes
21. Do you track how much storage you use for BWC footage each year?
- a. No
 - b. Yes
22. Please list the categories that are available to your officers when they tag BWC videos.
23. Do you have a process for reviewing untagged or improperly tagged BWC videos?
- a. No
 - b. Yes

Internal Uses of BWC Footage

24. In calendar year 2020, what proportion of incidents did your officers activate their BWC, among incidents where activation was mandatory? In other words, what was your agency's BWC activation compliance rate? If you do not track activation compliance, please write "do not know."
25. Does your agency review BWC footage when conducting internal investigations, such as investigating citizen complaints or officer uses of force (including deadly force)?
- a. Yes, citizen complaints
 - b. Yes, officer use of force
 - c. Yes, both citizen complaints and officer use of force
 - d. No, my agency does not review BWC footage when conducting an internal investigation
26. How many citizen complaints did your agency receive in calendar year 2020?
27. How many use of force incidents did your agency experience in calendar year 2020?
28. Does your agency regularly monitor proper BWC use, including activation compliance?
- a. No

b. Yes

29. Does your agency use BWC footage for general officer performance review?

- a. No
- b. Yes

30. Does your agency review BWC metadata? If yes, for what purpose?

- a. No
- b. Yes (please describe):_____

BWC DEM and External Agencies

31. Which of the following criminal justice actors have agreements with your agency regarding BWC footage viewing or sharing? (Select all that apply)

- a. City prosecutor
- b. County prosecutors/district attorney
- c. US Attorney
- d. Public defender
- e. Private attorneys
- f. Other law enforcement agencies
- g. Other (please describe):_____

32. How do you share BWC footage with external agencies?

- a. Prosecutors (please describe)

- b. Defense (please describe)

- c. Other law enforcement agencies (please describe)

Media and Public Requests for BWC Footage

33. Do you release BWC footage to the public?

- a. No
- b. Yes

34. If yes, do you have a policy for public release?

- a. No
- b. Yes

35. Who is responsible for managing requests for public release?

- a. Chief of Police
- b. Public Information Officer (PIO)
- c. City Attorney
- d. District Attorney

e. Other (please describe): _____

36. Is your agency responsible for redaction of BWC before public release?

- a. No
- b. Yes

37. In an average year, how many public requests for BWC footage does the agency receive?

38. Do you charge a fee for the public release of BWC video? If yes, please indicate the cost.

- a. No
- b. Yes (please describe): _____

Challenges and Future Developments

39. What is the biggest challenge for your agency regarding BWC digital evidence management?
(select one option)

- a. Storage/infrastructure requirements
- b. FOIA/Public information requests
- c. Collaboration with prosecution and courts
- d. Officer compliance and reporting data
- e. Cost/staffing/resources
- f. Digital evidence management (DEM) processes and policies
- g. Video redaction
- h. Training (civilian and sworn personnel)
- i. Other (please describe): _____

40. What are the most important future developments in BWC digital evidence management for your agency?

41. Would your agency be interested in engaging in additional discussions with us regarding digital evidence management?

- a. No
- b. Yes