

Dear Alders,

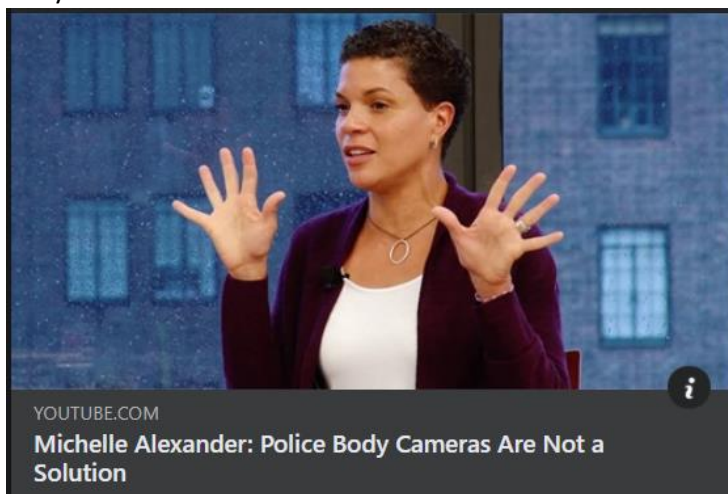
I served on the Body-Worn Camera Feasibility Review Committee. I am also a scientist, currently in the Department of Integrative Biology at UW-Madison. I resigned from the Body-Worn Camera Feasibility Review Committee on January 15, after I concluded that the committee would not generate a report with sufficient scientific validity. Some alders have requested that I provide comments on the final report of the committee, and thus I am writing this letter. I will start with a few key bullet points.

- The report grossly understates the financial cost of BWC implementation. At this time of budget shortfalls, the city would be well-advised to consider the full financial and staffing ramifications.
- If BWCs are to be implemented, I concur with all the preconditions for implementation specified in the report.
- The report contains numerous inaccuracies and omissions, painting a more favorable picture of BWCs than data and research support.

In my view, the basic problem, on the committee and in the report, was one of [confirmation bias](#). The primary author of the report is fundamentally a strong proponent of BWCs, and predominantly looked for evidence in favor of BWCs and selectively questioned or criticized the studies and articles that didn't provide results favorable to BWCs, etc. After the committee foreclosed the possibility of submitting edits to correct the errors and omissions, on the grounds that there was no time to do so before the report deadline, I saw no ethical choice but to resign. I will add that I believe all members of the committee were well-intentioned.

I myself started out as a strong advocate for implementation of body cameras in Madison. In 2015, I created the first petition in Madison requesting implementation of body cameras ([here is the petition](#)). However, as a scientist, I have very closely followed all the research on body cameras, reading pretty much every study published on the topic. Very slowly and incrementally, over the intervening years, the scientific evidence changed my mind (though that did not happen readily or willingly).

I have come to agree with [Michelle Alexander](#) – the highly acclaimed civil rights lawyer, advocate, legal scholar and author of *The New Jim Crow: Mass Incarceration in the Age of Colorblindness* – the bestselling book that helped to transform the national debate on racial and criminal justice in the United States. [Here is a video](#) of part of a lecture by Michelle Alexander, posted by the Ford Foundation: “Police Body Cameras Are Not a Solution.”



Here, I would also like to reference Seth Stoughton, who served as a consultant on the OIR Report for Madison. Stoughton is an Associate Professor at the University of South Carolina School of Law, is himself a former police officer, and is generally recognized as one of the [foremost experts on body cameras](#) in the U.S. [An article](#) quoting Stoughton gets at a basic problem:

“I started paying attention to the calls for body cameras, and it seemed to me that almost everyone on every side who was calling for body cameras was doing so with more enthusiasms than perhaps was warranted,” Stoughton said. “To say I was skeptical would be putting it lightly.”

Stoughton had heard this tune before: The faults of America’s criminal justice system could be patched up with flashy new gear. In the 1990s, departments across the country installed dash cameras in police cruiser as a way to deal with a rash of accusations about racial profiling. If the Department of Justice’s report on the systemic ways the police department in Ferguson, Missouri, preyed on the city’s African-American population is any indication, the root of the problem ran much deeper than whatever crevasse dash cameras could weed out.

“We can find this pattern, unfortunately, throughout the history of police reform. ... [It’s] something that happens in society generally: We all like the next thing,” Stoughton said with a sigh. “Quite frankly, the idea of a simple answer is really attractive. The idea of just slapping cameras on officers and everything will be better is a really, really seductive idea. But unfortunately, it turns out to be, I think, a mistaken one.”

An example of unrealistic expectations is even evident in survey data from public defenders (PDs) and Assistant District Attorneys (ADAs). Shortly after BWC implementation in jurisdictions, [a survey](#) found:

Slightly more than two-thirds of PDs (67.5 percent) agreed or strongly agreed that BWCs would increase the likelihood of dismissal, compared to 30 percent of ADAs... Sixty-six percent of PDs agreed/strongly agreed that BWCs increased the likelihood of acquittals, whereas 61 percent of ADAs agreed/strongly agreed that they increased the likelihood of convictions.

Instead of calling attention to the inherent contradiction, where a majority of both PDs and ADAs expected that BWC implementation would preferentially benefit their side, the BWC Committee report frames this survey information in glowing positive terms, of both PDs and ADAs supporting BWCs.

There is a lot of valid information in the report, much of which I provided. It’s not the case that all unfavorable information was excluded – there was just a strong bias in that direction, manifesting in multiple different ways. Where it was impossible to ignore unfavorable information, it was included, but often minimized, misconstrued, or selectively criticized.

I’ve included a set of appendices to this letter, providing further information and analysis. Each is hyperlinked here, so you can just skip to and look at information you might be interested in, without having to wade through all of it. Most of the appendices provide information about the financial cost of a BWC program. As I noted above, even aside from cost analysis, the BWC Committee report frequently provides inaccurate information about scientific research on BWCs, misrepresenting the research so as to paint a more favorable picture of BWCs than the scientific research supports. I haven’t the time or energy to exhaustively go through all such issues in the report (and this would require an analysis so long that no-one would read it), so I decided to just dissect two short representative examples, one

concerning evidence that BWC deployment may increase the rate at which officers are assaulted (Appendix 6) and the second concerning the potential adverse impact of BWCs on overcriminalization (Appendix 7).

My estimate of the total expense of full implementation of BWCs by MPD is ~\$23 million over 5 years. I use a 5 year timespan since this corresponds to the lifespan of a typical BWC or BWC contract.

The bulk of this estimate - \$3.7 million per year – is for the cost of officer time that would have to be allocated to BWC-related administrative tasks (time officers need to spend reviewing videos for case reports or court testimony, cataloguing videos, tagging videos with meta-data, specifying individuals or features that need to be redacted, uploading videos, etc.) and that would be unavailable for patrol, community policing, or other core policing functions. MPD already says it's greatly understaffed for patrol and there would be extreme pressure to hire additional officers. To fully implement BWCs while providing the same level of patrol and other core policing functions as now would appear to require hiring about 32 additional officers.

My estimate of the direct cost of BWCs over five years is ~4.7 million. This covers the cost of the BWC contracts (cameras, data storage, and maintenance), the personnel cost of training for all officers, and the cost of administrative and IT staff needed to run the BWC program. For this estimate, I assume that MPD purchases only 289 BWCs (rather than one per officer), sharing cameras across shifts to reduce expense. I also assume a somewhat below average cost for the BWC contracts, and assume that smartphones, which are often purchased to facilitate in-field BWC work, are not purchased. I assume that personnel receive an amount of BWC training that's typical for such programs, with several hours of BWC refresher training each year (as specified in the BWC Committee policy), and that the number of FTEs hired to administer and provide IT support for the program is similar to levels for other police departments.

[Appendix 1: Excerpts from the cost section of the report, pointing out problems/errors.](#)

[Appendix 2: A valid cost estimate – the true full financial cost of a BWC program.](#)

[Appendix 3: Quantitative empirical data on officer time requirements \(increased workload\) imposed by BWC implementation.](#)

[Appendix 4: Qualitative information on increased officer workload imposed by BWC implementation.](#)

[Appendix 5: Detailed information on costs for cameras, data storage, administrative + IT staff needed to run the program, and smartphones for in-field tagging.](#)

[Appendix 6: Potential increase in rate of assaults against officers with BWCs.](#)

[Appendix 7: Concerning adverse impact of BWCs on overcriminalization.](#)

Sincerely,

Dr. Gregory Gelembiuk

---

## Appendix 1

### Excerpts from the cost section of the report, pointing out issues.

1. *“For a pilot project, preliminary estimates from the MPD are that the costs of a North District BWC pilot program could be in excess of \$136,000.”*

This essentially ignores the fact that as a precondition for BWC implementation, the report calls for a rigorous randomized controlled trial. I agree that if BWCs are implemented by MPD, that should be a first step. [Here is a grant application](#) for an initial randomized controlled trial of BWCs in Milwaukee. The grant specifies 50 cameras. The total cost is \$624,206., including a \$399,746 contract with the Urban Institute to administer/analyze the trial, and \$124,455 in overtime costs (the Madison estimate assumes only \$53,045.42 in personnel cost for a pilot). \$136,000 is much lower than what the actual cost of a proper randomized controlled trial pilot program would be in Madison.

2. Report excerpt: *“A For a fully implemented BWC program, preliminary MPD estimates are that first-year startup costs would be approximately \$720,000. The \$720,000 startup figure would include purchasing 289 cameras (enough to outfit all patrol units with cameras) and managing their implementation (training, processing, storage, etc.) for \$575,000 plus another \$145,000 for additional equipment, specifically the hardware to permit automatic triggering of the cameras when squad car light bars are activated—an essential part of a successful BWC program, as discussed and recommended elsewhere in this report and Model Policy. MPD estimates, preliminarily, that thereafter annual operating costs might be approximately \$311,000 plus projected maintenance costs of \$65,000 per year, for an annual cost of approximately \$376,000”*

This greatly understates cost. This estimate assumes that the purchase would be of Panasonic Arbitrators BWCs. Panasonic is one of the cheaper vendors, but even so, the \$575,000 value (said to include training, processing, storage, etc.) appears to omit much of the actual cost for what’s said to be included. BWCs generally have a 5 year lifespan (after which they must be replaced). The \$575,000 estimate, with 289 BWC units, equates to an annualized cost, for what is said to be hardware + training + storage (excluding maintenance and the automatic triggering equipment) of \$398 per unit. This is approximately what other police departments are paying for Panasonic Arbitrator cameras with a service plan, warranty, and consulting, but without data storage cost or the actual cost of training (where the bulk of training cost is officer hours that have to be devoted to this). For example, Espanola, NM is paying \$443 in annualize cost per BWC unit in a contract for Panasonic Arbitrators, without data storage and with two days of on-site consulting. Fitchburg paid \$330 in annualized cost per BWC unit for Panasonic Arbitrators, without servers for data storage or training included. A quote provided to South Lake Tahoe, CA, for Panasonic Arbitrators, has an annualized cost per BWC unit of \$365, with one day of deployment services, no warranty, and no data storage covered.

Adding in the maintenance cost of \$65,000 annually and the automatic triggers brings the total cost, across 5 years, for hardware (and supposedly training and storage) + maintenance, to \$1,045,000, or an

annual cost per BWC unit of \$723. On a per BWC unit basis, the typical annualized cost for a BWC vendor contract, including data storage and maintenance, is in the \$900-\$2000 range (see [Appendix 5](#)).

Basically, it appears the actual cost of data storage may have been left out, contrary to what the report states. The committee was told that the cost covered server upgrades, but it's very difficult to see how the amount specified (\$398 per BWC unit per year) could be sufficient, even with the least expensive data storage options available. Panasonic offers a software product that's labeled an on premises "storage bundle", that's required for on premises storage, but that doesn't include the hardware (servers, etc.) required for data storage. A misunderstanding about the nature of that product may have led to a mistaken belief that it was a data storage device. Panasonic also offers a cloud storage bundle that includes actual data storage, at a cost of \$700 per camera per year (with a 5 year contract). With 289 cameras, that would be \$202,300 annually.

In addition, all officers need training. Looking across departments implementing BWCs, that appears to customarily be 1-3 days of training. A department slightly smaller than MPD, the Worcester Police Department, estimated that BWC training cost at \$372,225, assuming apparently two days of training at customary officer wage/benefit levels. So clearly, even though the report says training costs are covered, they were omitted. That training would be critical not just for learning to use the BWCs, but also for learning the complicated policy. I'll add that the model policy drafted by the BWC Committee requires annual BWC retraining for MPD officers (I would presume the number of hours would be much less than the initial training, but the ongoing cost would still be substantial). The vendor contract may well cover consulting and training services provided by Panasonic (e.g., under a train the trainer model), but that should not be confused with the overall personnel cost of training (time required from all officers). Meanwhile, what the report labels as \$311,000 in "annual operating costs" is the cost of additional staffing to administer the BWC program. That seems low relative to many police departments, but that cost does vary widely across departments.

The upshot – even setting aside the cost of officer time (the largest cost component in a BWC implementation), this doesn't appear to be a valid cost estimate (i.e., leaving out the true training cost and, apparently, all or most of the data storage cost).

I will also add that with BWCs, to some extent, you get what you pay for. The BWC Committee draft policy and report calls for BWCs with automatic triggering in various circumstances (such as when a weapon is drawn) and for capturing incidents with multiple BWCs (as would be enabled by BWC triggering by proximity with another activated BWC). But Panasonic Arbitrators are cheaper cameras and, unlike Axon BWCs, don't have such features. It may not be possible to both purchase the cheapest camera and fulfill the policy requirements. This was never discussed by the committee, which implicitly appeared to assume that a low cost BWC could fulfill all the requirements specified.

**3.** Report excerpt: *"Assessing just how much officer time will be required is very difficult, however. Survey data collected from officers in a few jurisdictions give one insight into the scope of the demands. In sum, the survey data suggests that officers believe they spend on average somewhere in the neighborhood of 39 minutes each shift classifying and/or reviewing video footage from the cameras."*

The committee actually had multiple good estimates available for officer time required. This included 1. Data from surveys of officers in the Spokane BWC pilot program. 2. Data compiled from work logs in Spokane, as part of a staffing analysis by ETICO, after full BWC implementation. 3. Data from surveys of all officers, in all types of positions, from the Toronto BWC pilot program. 4. Data compiled by U.S. Customs and Border Patrol in a BWC pilot. 5. Data from Rochester (with the limitation that the data was obtained in winter, with a lower volume of calls for service than summer). 5. Extensive data from a Montreal BWC pilot program, with the important limitation that data was only compiled for incidents charged as crimes (rather than all police responses). 6. A memo from Berkeley, conveying the results of a survey of other police departments with BWCs.

In other words, there was a very large volume of data, and the time requirements found were all pretty consistent – averaging to roughly 30 minutes per shift. But rather than conveying that the committee had all this data – from multiple cities and with large sample sizes – the report only cites and footnotes one source, and refers to it all as “survey” data – when in reality it included work logs, etc. And the paragraph starts off with “Assessing just how much officer time will be required is very difficult”, which would lead one to mistakenly believe there’s insufficient sound basis for conclusions.

Then, after minimizing how much of this data was conveyed, the report allocates three paragraphs to an anecdotal account from one officer in Fitchburg, making it appear that officer time requirements are minimal. This is very analogous to what climate change skeptics do – allocating equal attention and time to one scientist who disputes human-caused climate change as all the scientists who recognize human caused climate change, leaving the misimpression that they are equally supported positions. Comedian John Oliver had a good skit on this ([linked here](#) – see the 3:30 time mark).

In addition, the report fails to state the financial cost of this time requirement, since it would generate sticker shock.

**4.** Report excerpt: *“Another glimpse into the potential total costs of the system comes from the Milwaukee Police Department. Milwaukee, which has 1110 patrol officers (compared to Madison’s 486 total officers) has a contract with Axon for a five-year camera and storage solution for a total of \$4,351,014. This system includes the added hardware that activates the cameras as soon as the squad lights go on or the officer starts running, or dispatch engages the system remotely.”*

This is not entirely correct. Keith appears to be referring to an old contract. Moreover, one shouldn’t assume that the contract covered cameras for 1,110 officers over 5 years (as the report appears to do). BWC implementation was rolled out in expanding phases, starting with 179 cameras in late 2015. [Here’s](#) a Milwaukee Department of Administration document conveying the key elements of the current BWC contracts with Axon, approved in 2018. One contract covers 700 BWCs with data storage and maintenance at a 5 year cost of \$3,302,237.50, while a second contract covers additional BWCs and Taser upgrades.

**5.** Report excerpt: *“Lt. Hartwick from the Fitchburg Police Department, who presented to our Committee and then provided additional cost information subsequently, reported that it is very hard to assess how*

*much time officers spend working with the cameras and footage, but his best estimate was that each officer spends just three to five minutes per shift.”*

See my comment above. There’s a large body of hard data available from multiple departments. That data is not concordant with Hartwick’s anecdotal assessment, and even he admits that he doesn’t have a good sense of this.

**6.** Report excerpt: *“Lt. Hartwick also reported that time spent processing footage for sharing with the DA’s office, and for responding to Open Records requests, is quite minimal.”*

Note that the draft MPD policy constructed by the committee specifies far more tasks and direct provision of BWC footage to more parties than Fitchburg. Unlike Fitchburg, the draft MPD policy requires a report to the DA’s Office specifying relevant timepoints in the video. It requires direct release of BWC video to anyone charged with a crime. It specifies redaction under many circumstances. All of that is different from Fitchburg policy and will add up to a lot of administrative time. Many major city departments note having to spend vast amounts of time on open records requests – the experience of the small Fitchburg Police Department, anecdotally related, may not provide particularly relevant guidance on this.

**7.** Report excerpt: *They also spend \$57,000 for 60 TB of server storage space, but they have used only about 25% of that space, so that was far more than they needed.*

One shouldn’t assume that 60 TB was “far more than they needed”. Note that Fitchburg deployed BWCs only two years ago. The amount of data storage space required for a BWC program expands with time, since a portion of the footage, which has evidentiary value, must be kept for several years, or indefinitely (and Fitchburg is only two years into accumulating such data). The amount of storage space required is also a function of the resolution the camera is set to (using lower resolution greatly reduces storage space requirements, at the cost of the quality of the images) and what proportion of interactions with civilians are recorded (departments vary widely in officer compliance in recording all civilian interactions – ranging from recording 10% to over 90%). We don’t know what those parameters are for Fitchburg. In addition, when on premises storage is used rather than cloud storage, it is important to keep at least two copies of the footage (doubling storage space requirements), since without a backup copy on a separate server, you risk catastrophic data loss. But many smaller departments keep only one copy, and we don’t know what Fitchburg’s practice is.

**8.** Report excerpt: *“The Worcester, MA, Police Department, for example, which is very similar in size to MPD (Worcester apparently has 461 officers and Madison has 486), reports that bids from three vendors came in at total costs ranging from \$9.75 million to \$11.05 million over five years.”*

This reflects the general lack of attention to accuracy in the report. The linked document doesn’t report bids from three vendors. It reports three bids, for packages with different features (e.g., a newer versus older model BWCs), from one vendor – Axon.

9. Report excerpt: *“It is safe to say, then, that whatever the cost in Madison might be, it will likely be lower than the projected costs in Worcester.”*

This assumption is incorrect. The projected cost provided for Worcester does not include officer time for new BWC-related administrative tasks. Since that constitutes the largest cost in a BWC program, the actual total cost of the BWC program would be much higher than the cost quoted for Worcester.

The report notes *“Worcester budgeted for 453 cameras—apparently one for each individual officer—whereas MPD budgeted for 289 cameras—apparently planning for cameras to be shared and used by officers as they came on shift.”* I’ll point out that there’s a tradeoff here. Sharing cameras across shifts means more wear and tear on individual cameras. And where individual officers don’t have their own cameras, there’s less incentive to be careful with them. The increased wear and tear may be less of a problem with a vendor like Axon, where the department doesn’t actually purchase the cameras outright, and the vendor replaces cameras whenever needed. MPD apparently wants to use Panasonic Arbitrators, where the department does purchase the cameras outright, which would make it more of an issue. Though MPD would purchase a warranty (and it should be for 5 years).

The costs specified for Worcester includes purchase of some Tasers and some Taser-related training. The higher-cost packages include Tasers for every officer, but the lowest cost package includes only 150 Tasers. For the lowest cost package, after subtracting off Taser-related training cost and subtracting off the estimated cost of the 150 Tasers included in the package, one arrives at a total BWC program cost of \$9,038,000.

The Worcester cost also includes cell phones. Many departments purchase these to allow tagging of BWC video in the field (as opposed to officers having to return to the station to perform this task). It saves on officer time. Though the need and capacity to use cell phones for tagging appears to vary by BWC vendor (for Axon BWCs, departments generally purchase smartphones, but some departments instead use integration into the CAD system, though the latter is said to be less optimal). Subtracting off the cell phones from the Worcester estimate brings the cost down to \$8,288,000. But again, this doesn’t include officer time required on an ongoing basis.

---

## **Appendix 2**

### **A valid cost estimate – the true full financial cost of a BWC program.**

It is essential to estimate and consider the total cost of ownership. This is a standard management accounting concept - a financial estimate that allows buyers to determine the full cost of a product or service over its expected lifespan. As this excerpt from a Colorado Department of Public Safety notes:



Additionally, the total cost of ownership, including initial and recurring costs to procure (design, configure, train, implement, administrate, and support) should be carefully analyzed prior to the development of a BWC system. These costs include the following:

- BWC system functionality, features and capabilities required by a law enforcement agency
- Department personnel who will be assigned a BWC device – patrol, canine, foot/bike patrol, SWAT, fugitive unit, criminal investigations
- Number of primary and spare BWC devices that will need to be procured and maintained
- Potential for data center and network infrastructure upgrade
- Space requirement for BWC docking stations and desktop computers
- Need for new desktop computers to connect to BWC docking stations
- Personnel time consumption – Full Time Employee (FTE) hours required to implement and maintain a BWC system including the following:
  - Initial BWC system project management
  - Assignment of BWC system administrators
  - Training hours required for all personnel who interact with the BWC system
  - Total personnel time required to tag every incident and upload data per policy – potential for increase in overtime
  - Quality Assurance to ensure all personnel are utilizing the BWC system per policy
  - Timely and accurate responses to BWC information requests for the following:
    - Criminal justice system discovery process
    - Court orders and subpoenas
    - Freedom of Information Act (FOIA) requests
    - Department administrative requests
    - Redaction of private and sensitive information
    - Time required to save and purge BWC data per policy

A strategic plan that includes all cost factors should be completed in advance of a BWC system procurement decision to ensure all stakeholders have sufficient knowledge regarding the total cost of ownership of a BWC system.

For BWC implementation, the largest component of cost is personnel cost. Of that, the largest component is police officer time – specifically, time officers need to spend reviewing videos for case reports or court testimony, cataloguing videos, tagging videos with meta-data, specifying individuals or features that need to be redacted, uploading videos, etc. These are new bodycam-related tasks that officers have to spend administrative time on, reducing time available for patrol and other core policing functions. To maintain the same level of patrol and community policing, additional officers would need to be hired.

This is separate from the cost of staff to administer the overall program or specialized IT personnel that need to be hired to carry out technical tasks (e.g., maintaining the video database, performing redaction for open records requests, etc.), and it's separate from training time.

From multiple quantitative sources (see [Appendix 3](#)), a reasonable estimate of additional administrative time that officers would need to spend on new BWC-related tasks is 30 minutes per 8 hour shift. From [data from 2020, posted by the PSRC](#), total MPD personnel expenses from the adopted budget: \$73,588,390. There were 482 sworn officer positions and 116.7 civilian positions. Only sworn officers would be wearing bodycams.

So for a rough estimate of this bodycam expense, I'll take that proportion of shift time, times the proportion of MPD personnel that are sworn officers, times the total MPD personnel expense. This comes to ~\$3.7 million per year (i.e., this is the cost of officer time that would have to be allocated to new bodycam-related administrative tasks and that would be unavailable for patrol and other core policing functions).

With bodycam implementation, to retain the same amount of time that Madison officers currently spend on patrol and community policing (given time lost to bodycam administrative tasks) would appear to require hiring roughly an additional 32 police officers.

MPD already states that it's greatly understaffed for patrol (pointing to proactive versus reactive time metrics, noting time that has to be expended on administrative functions, etc.), such that with BWC implementation, there would be enormous pressure to hire many more officers (since each call for service would require more time). In recent years, an increased expenditure of time on an average call for service has already been cited by MPD as a reason why a large increase in authorized strength is needed (as MPD notes in its [2018 staffing analysis](#), "patrol officers are – in general – spending more time on fewer incidents"). In addition, the BWC policy generated by the BWC Committee imposes additional burdens on officer time beyond those of the average U.S. BWC program (e.g. increased video availability and redaction needs, specification of timepoints in videos for prosecutors, etc.). There are potentially some technical things that could be done to try to reduce officer administrative time (e.g. tools to facilitate tagging), but it would still remain very substantial, and would greatly exceed direct costs of a BWC program.

Under the Etico-based workload analysis methodology that MPD current uses to determine patrol staffing needs, the BWC-associated time increase would contribute to both the reactive workload and administrative task categories. [MPD notes](#) that its reactive workload has never been higher (for 2018 it was listed as 40.54 minutes per hour and for 2019 as 39.64 minutes per hour, relative to the MPD target value of 30 minutes per hour) and that in 2019, administrative tasks "account for an average of about 8 minutes per hour" (down slightly from 2018, which reflected the highest level for this measure since MPD has been conducting this analysis). BWC implementation would greatly exacerbate a staffing crunch which MPD already characterizes as dire.

In addition to the above cost in officer time, there are also the direct costs of BWCs. Estimates for each of those cost components are developed in [Appendix 5](#). From that data:

A reasonable estimate for the cost of a BWC unit, on an annualized basis, including data storage and maintenance: \$1000. I'll note that this is less than what most departments I found data for were paying (i.e. it's somewhat toward the low end; the median cost I found was \$1,269 per BWC unit on an annualized basis). With 289 BWC units (sharing BWCs across shifts), and assuming \$1,000 per BWC annually, the total comes \$1,455,000 for a five year contract. If all MPD officers had their own BWC, the total would amount to \$2,430,000.

A reasonable estimate for the cost of administrative and IT staff needed to run the MPD BWC program: \$500,000 annually. This is based on an assumption that MPD would hire a roughly similar number of administrative and IT staff (relative to the number of officers using BWCs) as the average department implementing BWCs.

A reasonable estimate of the total cost of training all officers (i.e., their pay and fringe for time spent in training) over a total of five years: \$744,450.

I will assume that smartphones, to facilitate in-field tagging of video, are not purchased (\$0 spent on this). If smartphones were purchased for all officers, the estimated cost would be \$996,685 over five years.

The total cost for the BWC contracts (for 289 BWCs), with data storage and maintenance, plus administrative and IT staff to run the program, plus training for all officers, comes to ~4.7 million (over five years).

Adding in the cost of officer shift time (time unavailable for patrol and other core policing functions) brings the total, over five years, to ~23 million. This is the estimated total cost of ownership over a five year span (~4.6 million on an annualized basis).

---

## **Appendix 3**

### **Quantitative empirical data on officer time requirements (increased workload) imposed by BWC implementation.**

A quick summary of data-based estimates for officer time requirements:

Spokane pilot program audit

30 minutes to 1 hour per shift based on officer surveys.

Spokane after full implementation

28.2 minutes per shift based on officer work logs.

Toronto

Front line officers 39 minutes per shift based on officer surveys. Various time allocations are specified for other classes of officers as well (detectives, sergeants, etc.).

U.S. Customs and Border Patrol

30 minutes per hour of footage; 1-2 hours per shift given 2-3 hours of footage per shift.

Rochester

When there are no technological problems, 20 minutes per shift in winter; expect would be longer in summer (given more calls for service in summer)

Berkeley

Memo based on survey of other departments, ~30 minutes per shift

Montreal

The analysis only quantifies administrative time on BWC videos that concerned incidents classified as crimes (where patrol officers had such an incident only once every four days, on average), rather than all police responses. For such incidents, patrol officer workload increased by 34 minutes. Averaged over all shifts, this required just over 8 minutes per shift. They estimated that a ~4% increase in departmental staffing would be required to implement a BWC program.

Detailed information on each data source:

### **1. Spokane pilot program audit**

<https://bja.ojp.gov/sites/g/files/xyckuh186/files/media/document/body-worn-camera-pilot-program-audit.pdf>

Excerpt:

How much time do you believe wearing the camera added to your work day? (Average)

The majority of officers stated the camera added anywhere from 30 minutes to 1 hour of extra work. The remaining group was divided evenly between adding less than 30 minutes and adding at least 1 hour of work. Twenty five percent of the officers commented that the amount of time added was dependent upon the type of incidents handled and police reports written. If it was necessary for an officer to review a video prior to writing their report it added a significant amount of time to the process.

### **2. Toronto pilot program audit**

<https://bja.ojp.gov/sites/g/files/xyckuh186/files/media/document/tps-body-worn-camera-pilot-project-evaluation.pdf>

Excerpts:

Front-line Officers:

Almost all (93%) of the officers believed that they spent more time on administrative work due to the body-worn camera....

Overall, the officers who wore the cameras during the pilot project estimated that, roughly, they spent an average of 39 minutes each shift classifying and/or reviewing video footage from the cameras....

Supervisors:

...Estimating roughly, most of the staff sergeants thought they spent 10 minutes or fewer each shift reviewing footage from the body-worn cameras. However, all the staff sergeants felt that their officers spent more time on administrative work.

The sergeants in the pilot estimated that they roughly spent 25 minutes on average per shift reviewing body-worn camera footage....

Investigators and Unit-Complaint Co-ordinators:

In the interviews at the end of the pilot, the investigators who had used body-worn camera videos said that their administrative, investigative, case preparation, and disclosure workload had increased because of the videos.... The investigators estimated roughly that it took 3 to 5 hours a week toward the end of the pilot to review video and confirm what needed redaction; as cases involving body-worn camera video reach court, this time will increase....

### **3. U.S. Customs and Border Patrol**

<https://www.cbp.gov/sites/default/files/documents/body-worn-camera-20151112.pdf>

Excerpt:

Calculations estimate that the officer/agent implementation of BWC technology per shift at a USBP Checkpoint could result in a 8.3% loss in available duty hours.

During the Field Evaluation Phase, average review, catalog and upload times were 30 minutes for every hour of footage recorded. BWC administrative functions can account for 1-2 hours per officer/agent per shift....

[Ancillary note: Most law enforcement departments with BWC programs report that, on average, 2-3 hours of BWC footage is recorded per shift.]

### **4. Spokane work log based estimate.**

From a [report](#) discussing Los Angeles Sheriff's Department personnel costs for BWC implementation.

Includes an additional Spokane estimate from after full departmental BWC implementation. The estimate is from ETICO, which uses a sample of officers maintaining daily logs to determine time on each administrative functions.

The SPD currently has 328 sworn officers and after the 2014 pilot program conducted in conjunction with Arizona State University, it fully implemented a BWC program in 2016. 251 BWCs have been acquired and assigned to all SPD patrol officers, from the rank of sergeant on down, and to some of its detective investigators....

the SPD has calculated that a patrol officer spends an extra 28 minutes per shift because of the need to review video as part of their report writing...

Etico Solutions Inc., "Spokane Police Department Patrol Allocation, Beat Design, and Shift Scheduling Study," 2017, 21, attached hereto as Exhibit 3 ...

In 2017, the SPD entered into a five-year contract for the equipment, licenses and storage for its BWC program. They have unlimited storage capability under their contract through Evidence.Com. They do not use their own servers as there is a great risk of the system crashing and having additional costs for its restoration. The total contract is \$1.7 million, or \$340,000 per year. They have one FTE, Officer Ryan Snyder, who manages the program. In addition to the contract costs, they have hired one FTE mainly for redaction of PRA video. Although not built

into its budget, the SPD has calculated that a patrol officer spends an extra 28 minutes per shift because of the need to review video as part of their report writing. In other words, part of the increase in workload related to BWCs reduces, on average, time spent on the streets by about a half an hour for each eight hour shift. For the Spokane PD to maintain its pre-BWC patrol coverage would require an additional 16 officers, or FTE.

ETICO estimates BWCs create 28.248 minutes (.4708 hours) of administrative work per day per officer.

General ETICO methodology for calculating time on administrative tasks (from another ETICO report):

*“Daily Administrative Duties In addition to answering calls for service and conducting self initiated activities, there are a number of administrative duties that must be performed each day by the patrol officers. A small number of officers were sampled and asked to complete a daily log depicting how much time they spent on administrative duties.”*

Further information from the Los Angeles County report:

Commander Chris Marks of LASD... discussed the substantial workload impacts of BWCs when implemented in the areas of investigative and administrative operations of the LASD, as well as the evidence management challenges arising from deputy and detective review of video footage and handling California PRA requests. Commander Marks noted that the additional FTE required to address the workload impacts became evident during the test and evaluation of BWCs...

Over the four year/four phases of BWC implementation, approximately \$18 million, averaging \$4.5 million a year, are for one-time startup costs. The real kicker is that the Sheriff seeks an increase in annual, recurring funding to support the BWC Plan of \$55.2 million. Most of this amount, slightly over 75%, is for the 239 additional FTE (Salary & Employee Benefits) for sworn and unsworn personnel that the Sheriff projects will be needed to effectively implement the program....

While the LAPD recognizes there are significant workload increases for its personnel, it has been in a position to absorb this workload evidently with no increase in authorized and funded FTE. Our knowledge of the LASD staffing challenges, even without a BWC program, convinces us that the LASD is not in a position to do likewise....

In some instances the law enforcement agencies implemented before fully comprehending the workload impact....

At a minimum, the LASD will need additional personnel in the form of several FTE for the new BWC Bureau and three FTE at each of its 23 Stations, plus nine other units with patrol-like functions (Transit Services, Parks, County Services, Community Colleges Bureaus). Additionally other support units (Headquarters detective units, Homicide, Internal Affairs, Internal Criminal Investigations, Audit and Accountability Bureaus, etc.) will have a potential 25% increase in workload.<sup>52</sup> Moreover, we note the additional time for report writing that will be needed for LASD patrol deputies when BWC video footage becomes available. The Spokane PD study indicates nearly 30 additional minutes each shift, and translates into additional FTE for patrol

deputies for the LASD if implementation of BWCs is to be accomplished without reducing patrol time in contract cities and unincorporated areas of the County.

The Committee has reviewed the cost of implementation of other LEAs. On the one hand, most police departments, large and small, have been able to implement a BWC program to all their patrol personnel at costs considerably less than the LASD request. On the other, most of these police departments did not factor in the additional staffing needed in the form of increased time by patrol officers in preparing reports, by detectives in reviewing evidence, and by internal affairs components. The Sheriff believes, and we agree, that a new BWC Bureau will be needed and at least several additional personnel at each of the LASD's 32 bureaus, including all 23 patrol stations. He also foresees the need for more staffing to comply with the California Public Records Act and other requests for video, including the redaction of same.

#### **5. Rochester BWC program [study](#).**

The information is mostly qualitative. The study also notes the limitation that it was conducted in winter, when calls for service, and thus BWC usage, would be lower than in summer. Excerpt:

##### **..Officer Workload**

How officers perceived the added BWC-related responsibilities was closely connected to the aforementioned technological issues. In the absence of technological issues, BWC-related tasks only consumed twenty minutes from a shift on average. However, in the case of docking station issues, the time spent on uploading BWC footage could be substantially increased....

The sergeants of the Clinton Section confirmed the experiences of the patrol officers within their section. In specific reference to supervisory responsibilities, the sergeants stated that BWCs have significantly increased their workload due to technological problems experienced....

The consequence of a non-functional docking system is having to drive back to the section headquarters, therefore, increasing the amount of time spent. When all the equipment is in functioning order, then uploading and tagging the footage takes an estimated one to two minutes per call-for-service..... when technological malfunctions occurred, officers stated that the expense of time spent on BWCs could be extensive. Notwithstanding, even if the technology is in working order, two officers expressed concerns that BWC-related time expenditures could become problematic during the summer months. The ride-along sessions were conducted during the winter months. During the winter months, there are generally less calls-for-service, and, as a result, BWC usage is lower. During summer months, generally there are more calls-for-service and consequently BWC usage is expected to increase. Increased time spent uploading and tagging footage would be expected to occur....

When technological malfunctions occur, the end result is fewer officers capable of responding to calls for service, and instead prioritizing time around the BWCs.

Researchers discussed with the sergeants the subject of changes in their workloads since the implementation of BWCs. According to both of the sergeants, as a result of BWC implementation, their workloads had increased substantially, however, this varied on a day-to-day basis. Both sergeants stated that as a result of BWC technical malfunctions, sergeants

have had to consistently assist patrol officers with their BWCs and make sure that their BWC is in functioning order. One sergeant stated that he was on his third body-worn camera as a result of technical issues with the camera's internal firmware. Additionally, one sergeant stated that he will soon have to begin monitoring and auditing videos to see if officers are complying with the policy, which will take a substantial amount of time to do during his shift.

## **6. Montreal pilot program report.**

[This report](#) was in French, and the excerpts below have been run through Google Translate.

For patrol officers, not all calls for service/police interventions were filmed (and the report notes that if all police interventions were filmed, time requirements would be higher). The analysis only quantifies administrative time on BWC videos that concerned incidents classified as crimes (where, on average, a patrol officer had such an incident only once every four days, on average), rather than all police responses. So, if BWCs were used as is being contemplated for Madison (where basically all police responses are filmed), with regard to patrol officer time, it would be a severe underestimate/lower bound. I'll also note that a Canadian Dollar equals 0.79 United States Dollars. Report excerpts:

### **Implications for operating budget**

The deployment of portable cameras throughout Montreal would require the addition of employees to the SPVM and would add additional pressure on its operating budget. For the purposes of presentation, the additional costs are grouped under two major categories: labor and goods and services.

#### **Workforce**

First, the additional workload associated with using the cameras for frontline police officers was assessed as equivalent to the work of 46 patrol officers. Moreover, given the number of investigation files in which it is estimated that there will be video recordings, 25 additional investigators would be necessary to complete the task. Thus, the hiring of 71 police officers would represent additional annual costs of \$ 9.5M.

The increasing volume of video recordings to be processed by the Module of video surveillance would require a structural reorganization and increase in staff to ensure efficient management of videos and respond to requests for reproduction of evidence on time prescribed. To achieve this, 117 police officers and civilians would be required, for additional costs estimated at \$ 9.3 million.

The SPVM will also have to strengthen its workforce in order to provide the necessary in terms of technologies, telecommunications and material resources, without forgetting the processing of access requests information that could be sent to it with the arrival of the port of cameras by the police, which would represent a total of 8 resources. Two (2) additional resources must also be hired in order to integrate content relating to portable cameras into its training programs offered to recruits. The IT Department, for its part, assesses its technological support and maintenance needs to 4 additional resources. For all the stated needs, 14 additional resources would be required, the annual cost of which is estimated at \$ 1.2 million. Thus, in terms of manpower, the annual cost additional expected would amount to \$ 20 million.



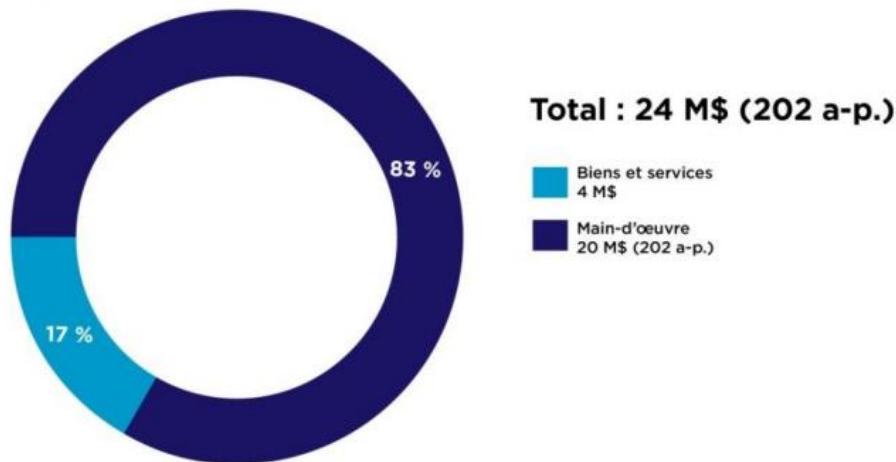
### 8.3.2 Goods and services

In addition, the large-scale deployment generates additional annual costs of around \$ 4 million mainly for the rental of the required premises and for technological costs (e.g. storage and replacement of cameras).

Ultimately, the deployment of portable cameras for all front-line police officers requires a work performance equivalent to 202 a-p. and generates additional costs estimated at \$ 24 million per year. This amount represents nearly 4% of the 2018 operating budget of the SPVM152.

Figure 70 illustrates the distribution of additional recurrent costs.

**Figure 70** : Répartition des coûts additionnels récurrents



### Workload, evaluation of efforts and financial aspects

#### Highlights

#### Workload

Police department

☐ On average, each event of a criminal nature classified as MEA or EAP generates 34 minutes of additional working time per patroller concerned.

☐ The arrival of the PC changes the distribution of tasks of the patrollers, who must do more than administrative work at the expense of their presence on the road.

☐ Supervisors make less frequent use of the PCs than the patrollers under their responsibility. Thus, their workload concerns more the addition of new tasks of supervision related to CPs such as viewing and writing additional reports such as that this was experienced by the patrollers.

☐ The average processing time of a request for reproduction and redaction of video recordings by police cadets is 1 hour 30 minutes for an offense in criminal matter, compared to 2 hours 50 minutes for a criminal offense, at the end of of the project.

☒ For investigators, the increase in workload is estimated at 25 minutes per investigation file.

CPs risk increasing the workload of yard patrollers.

o When contesting a criminal offense, the provisions of the Code of criminal proceedings concerning the admissibility of videos in evidence require that these are authenticated by the police officers who produced them, which requires systematically the police to come and testify.

Information Technology Department

☒ The cloud computing solution used required very little effort, either for its implementation or for updating the components and the application, which was done remotely.

☒ The installation and configuration of the solution hosted in local mode required effort important, mainly because of the changes that had to be made to its architecture. Thus, it is not possible to appreciate the efforts that the implementation of this kind of solution would have requested in normal times.

☒ Thanks to cloud storage, the storage costs which, according to the estimates of the STI and the SPVM, represented a significant expense in the deployment of CPs, were found to be less than what was originally planned.

Law courts

☒ Between the time the video is produced by the field patroller and the time it is produced as evidence in the context of a trial, the same recording may be the subject of a minimum of eight separate screenings by at least six different stakeholders from the SPVM and the judicial system:

o the patroller who made the video recording (2 to 3 times);

o the employee of the video surveillance module responsible for processing and redaction registration (1 time);

o the investigator on file (1 to 2 times);

o the prosecutor authorizing the complaint (once);

o the prosecutor responsible for the case in court (at least twice);

o the judge or the jury (1 time).

☒ Statistically, the use of the PC does not influence the rate of dispute of the findings violation by citizens. Rather, it is the amount of the offense report, combined with the presence of a PC, which has an impact on the appeal rate.

☒ Hand-held cameras have potential advantages for courts by reducing

in particular the duration of certain criminal cases and the number of people called testify in certain cases. For this to happen, certain elements must be present in the video recordings.

Financial aspects

☐ The biggest expense item under the pilot project is human resources. Thus, the cost of labor represents 94% of the cost of the project, while the associated costs goods and services are 6%.

☐ The project planning represents 14% of the total costs, the field phase, 47%, and the post-project activities, which include report writing, 39%.

#### **7.6.1.1 Patroller workload**

The additional workload resulting from the use of PCs is mostly of a nature administrative. The latter is considered by agents as a major irritant which has little or no of added value in their eyes and above all, which reduces the time spent on the road or solving crimes.

Several studies have mentioned that patrollers and investigators take longer to complete administrative or post-arrest tasks that solve crimes (Cordeau, 2011). In the poll completed, 90% of police officers indicated that the introduction of PCs had led to increase in their administrative workload.

For information, the local directive provided that the police officer who had produced a recording in the part of an intervention in criminal matters had to perform the tasks listed below<sup>121</sup>:

☐ the classification of the video and the registration of the number of the event in the viewing

☐ viewing

☐ the drafting of the additional report or the inclusion of a viewing note in the viewing platform

☐ the request for reproduction of CP recordings for redaction (form F. 550-53)

☐ the redaction check (viewing the redacted video)

In the opinion of the police themselves, the most demanding tasks were viewing, writing the additional report and verification of redacted DVDs.

As shown in Figure 59, as part of the pilot project, 16,937 video recordings were made by patrollers only. The latter viewed 7% (1,270), which corresponds to a little more 150 hours of viewing.

This proportion of recordings viewed refers to videos that the patrollers themselves produced. However, this result varies according to the type of unit (ranging from less than 1% to 13% of videos viewed). Indeed, a higher proportion of viewings is observable within neighborhood stations (13%). Metro and traffic patrollers, since they are less frequently confronted with events of a criminal nature, viewed fewer their records (1% and less). It should be understood that these proportions of viewing influence on the workload of the patrollers. In addition, the data collected as part of the assessment of the impact of cameras on police workload allowed us to quantify this workload. On average, each event of a criminal nature classified as MEA or EAP generates, for each of the police officers concerned, 34 minutes of additional work time (equivalent to 8% of a normal work shift, which corresponds to 8 hours 30 minutes including an hour of non-working dinner). Moreover, not every policeman is faced with this kind of event

every day, but rather every 4 days or so. Therefore, the workload resulting from the use of the PC for a PDQ police officer is estimated at just over 8 minutes, or 2% of the hours worked during a shift.

Currently, many police officers feel they do not have enough time in a day to do all the work expected of them. This is why the additional workload of 8 minutes per day (on average) is seen as important, especially when the number calls to be answered during a shift is high. The patrollers perceive that the procedures associated with viewing delay them during periods of high traffic, so that they should be able to free themselves quickly to get back on the road (Amicelle & Tanner, 2017). Thus, it is important to emphasize that the calculations on the workload presented above do not disregard this reality.

In general, the added value of the new tasks is difficult for the police to perceive, without reckon that these tasks often reduce their presence on the road.

In addition, although few cases have been heard at the time of this report, the CP video recordings will also have an effect on the amount of time police officers spend bear witness. In criminal matters, the police officer will have to testify not only on his report, but also on his or her his video recordings, in addition to witnessing the viewing of the video during the trial. In criminal matters, the police officers of the pilot project were systematically assigned to testify by the prosecutors when a video from a PC was introduced into evidence. This situation has the potential to generate a significant additional workload, as well as additional costs when police have to work overtime. As long as a solution allowing the authentication of the videos will not have been found, it is to be expected that more police be called to testify for statements of offense (CSR, RM) so that the video recordings provided are admitted into evidence.

Finally, in the context of the pilot project, not all police interventions were filmed and those which were may not have been captured in full. During workshops with prosecutors, some have proposed that all police interventions be filmed. Such a change would have like consequence of increasing the quantity and duration of video recordings made and would have repercussions certainly on the workload of the patrollers and all those who have the duty to view these recordings, among other things.

#### **7.6.1.2 Supervisors' workload**

Field experience has shown that supervisors, due to the nature of their work and their role, are less frequently called upon to use the camera during a shift. Indeed, the most of the time, the supervisors stay in the background and supervise the work of the patrollers of their team, which in turn intervene directly with citizens. In the PDQ units, the data indicate that supervisors make an average of 7 times fewer registrations per day worked than the patrollers<sup>126</sup>. As a result, the additional workload that results from their use personnel of the CP is lower than that of the patrollers, even negligible in certain cases.

In addition, the local directive stipulates that it is the responsibility of supervisors to regularly check and randomly record the police officers in their group to ensure that they comply with rules for the use of CPs, assess the performance of their staff and determine the needs of improvement. However, the experience of the pilot project shows that these checks for

supervision purposes were rather rare. Of the 16,937 video recordings made by the patrollers during the project, the 11 supervisors viewed 228, a proportion of just over 1%. This low rate of verification is found in all three types of units, as shown in Table 11. Several reasons can explain these results. On the one hand, these checks were not frequent because they were added to a batch of administrative tasks already considered important and binding by supervisors. Added to this is the fact that audits are seen as a hindrance to their availability to assist their patrollers on the road. In this context, the viewing of the recordings for evaluation purposes is hardly compatible with the use of time already loaded.

On the other hand, it is possible that the viewing of the videos was considered by the supervisors as it can alter the bond of trust with the patrollers and adversely affect the work climate, since it generates a certain feeling of mistrust among the agents, who perceive this exercise as an evaluation likely to result in sanctions against them. In addition, the layout of the workstations of supervisors was also not always ideal for ensuring the confidentiality of the content of video recordings.

Although the results show that viewing for supervision was not very frequent during the project, the cameras still increase the usual workload of supervisors, since they still have to make sure, following the production of one or more video recordings of an intervention related to a criminal offense, that their patrollers follow the steps and fulfill the obligations arising from the rules of disclosure of evidence to the court. Their responsibility in this regard requires, among other things, to check the quality of the redaction, which involves the viewing of all of several recordings (Amicelle and Tanner, 2017). Some supervisors assign this requirement makes it difficult to establish in advance when the critical elements of an intervention in which they did not participate. Overall, the tasks associated with viewing for supervisory purposes are seen as administratively burdensome.

### **7.6.1.3 Police Cadet Workload**

#### **7.6.1.3.1 Nature of the video surveillance work**

This indicator measures the number of hours that police cadets in the CCTV module have devoted to each of the main categories of tasks within the framework of the CP127 project. Each cadet police officer kept a record of the hours worked as part of the pilot project. The distribution of these hours is shown in Figure 60.

A total of 5,400 hours were spent on the project by a total of 11 police cadets. They spent the most of this time processing the various requests from investigators and the court, as well as answering agents' questions about redaction and processing of requests (53%). The rest of the time was spent compiling the indicators (18%), learning the different software for records management and document redaction (eg M-IRIS, Evidence, Getac), practical exercises (11%), improvement of the internal procedure for processing requests for redaction (6%) and other related tasks (12%).

#### **7.6.1.3.2 Distribution of requests**

To estimate the workload of the video surveillance team associated with processing video recordings, the volume of requests received by the CCTV module as well as the processing times required for each of these requests were measured.

As shown in Figure 61, the majority of treatment requests were made by investigators (n = 374; 57%) and the penal division of the municipal court of Montreal (n = 285; 43%); few of requests were made by citizens (n = 2) under the Act respecting access to documents of public bodies and on the protection of personal information or by other bodies wishing to obtain a registration<sup>128</sup> (n = 1). Figure 61 also shows that 67% of requests in criminal matters required redaction, compared to 41% in criminal matters.

Figure 62 shows the evolution of the reception of these requests between the start of the pilot project and September 2017. It is possible to observe that the number of requests received from investigators remains relatively stable (45 to 71) from the deployment of the CPs in the PDQs. The gap between the months of December and January can be explained by a slight delay in submitting applications, caused by the holiday season, which was caught up in January. In addition, the number of requests sent by the court municipal authority for contested offense statements (in criminal matters) has evolved according to the receipt of batches of video recording requests to be processed.

#### 7.6.1.3.3 Efforts devoted to processing according to the origin of requests

Figure 63 shows the average time spent responding to a treatment request of video recordings using the specialized tool that was chosen for the redaction of registrations, depending on the type of applicants. Within the framework of the project, only one request could contain between one and six recordings (e.g. if several police officers were involved in the event, or because of interruptions). Figure 63 shows a clear reduction in the processing time for requests from investigators (1 hour 40 minutes less on average) and the municipal court (3 hours 20 minutes less on average) between September 2016 and May 2017. This reduction reflects the gain in effectiveness of police cadets as they become more proficient with the redaction tool. The increase of the average time in September may be attributable to the departure of experienced police cadets during summer and the resulting staff turnover. Finally, the two access to information requests which were processed by the video surveillance module are within the average treatment for the corresponding period.

At the end of the project, given the learning curve for police cadets compared to the use of new technologies and compliance with the redaction rules adopted by the SPVM relative to video recordings from CP, the average of the observed processing times of March to May 2017 will be used as the measurement benchmark to establish the workload. Indeed, the times observed during the last three months of the field phase of the project correspond to the speed a real team with all the experience necessary to accomplish the tasks and would make it possible to establish the most accurate projections in the event of a general deployment of the cameras. At Ultimately, the analysis therefore indicates that the processing time of a request for an infringement criminal (investigators) was 2 hours 50 minutes and for a statement of offense (municipal court), 1 hour 30 minutes.

#### 7.6.1.4 Investigators' workload

At the SPVM, investigations are carried out by different people depending on the degree of complexity takes a folder. For example, patrol officers are referred to as "investigators of record" when they These are offenses such as shoplifting, impaired driving, etc. The investigators four divisions and the Investigation Service, meanwhile, deal with criminal offenses more complex requiring more in-depth investigative procedures or a particular level of expertise (e.g. search and meeting of several witnesses, requests for expertise, search for suspects).

The experience of the pilot project shows that the use of PC had an impact on the work of these investigators. Those met in the context of the exchange workshops emphasized that the viewing of the images allowed them to gain a better understanding of the procedure police, the climate in which it took place, in short, to better understand the general context of the intervention. In some cases, the video also provided a better understanding of the psychological and physical state of the individuals concerned. In return, the vast majority of investigators met within the framework of discussion workshops mentioned the fear of seeing their workload increase. Indeed, the new technologies improve and diversify the means of investigation, but at the same time, they increase the administrative task of the investigator. Added to this additional charge are the requirements increasing levels of the judicial system (requests for further investigations, Jordan judgment, etc.).

Here is, by way of example, an overview of the tasks that the investigator must perform for each case survey comprising one or more recordings made with the CP:

☐ Perform a first viewing on the Evidence platform.

☐ Perform a second viewing upon receipt of the DVD with the redacted video, validate the quality and accuracy of the redaction carried out by the video surveillance team in order to proceed to disclosure of evidence.

Moreover, in the case of cases involving an arrested person who must remain in detention in waiting to appear before a judge, the processing of the video recordings must be done quickly in order to meet the appearance deadlines. When a person remains detained for appearance in court, the appearance must be made within 24 hours of the arrest. Except exception, the rules of law provide for the forwarding to the prosecutor of the evidence which is necessary to authorize the complaint. The investigator must therefore have viewed the video recordings and recorded his observations in his investigation report. It should be understood that at the time of the pilot project, the Jordan decision put additional pressure on justice system stakeholders to relates to the authorization stage of the complaint.

Given the unique nature of each investigation file, a theoretical assessment of the effects of PCs on all the files were carried out in order to obtain an overall estimate of the working hours additional required by the use of the cameras in the pilot project. A quantitative analysis of criminal event reports including a PC recording was carried out in order to measure the additional workload of investigators. A theoretical number of viewings required by the investigator was determined for each investigator based on the type offense (criminal - levels 2 and 3), its classification (MEA or EAP) and whether or not there was arrest by the patroller. It is important to mention that the estimated viewing time for investigators is the actual length of video recordings for each case. Indeed, even if the patroller indicates in his additional report

that viewing the videos did not bring any change to the information contained in the initial report, the investigator responsible for the case judges that he must still check all the evidence and therefore view the recordings full. Thus, it is considered that in fact, the criminal events in which the PNs were used during the pilot project represented approximately 164 additional hours of work for the investigators who handled a total of 399 cases, which corresponds to an average of 25 minutes per investigation file.

Despite the favorable reception they would reserve for a general deployment, the investigators are keen to point out that viewing the video recordings from the PNs would have an impact on the processing time of investigation files, which could increase the time taken to take charge of other files. Some mentioned a few possible solutions during the discussion workshops, in particular that the addition of a person assigned to viewing videos in each of the divisions could reduce their workload. This suggestion, however, is not unanimous among investigators, many of whom consider that since they are responsible for the evidence, when even watch all the videos of an event.

Like the prosecutors, the investigators appreciated the fact that a good part of the proceedings were carried out by certain patrollers, namely the identification of landmarks and the sending of the request for processing of video recordings to the CCTV Module, which they underlined efficiency and which makes it much easier for them. Finally, the investigators expressed the wish that a mechanism be put in place to discuss with patrollers, SPVM court liaison officers and practice improvement prosecutors. It is interesting to note that this same suggestion was made during the workshops with the prosecutors.

#### **7. Berkeley memo from survey of other departments.**

Finally, information from [a 2015 memo](#) from the Berkeley Police Chief, to the Berkeley Mayor and City Council, based on a survey of other agencies that were using BWCs:

An impact of implementing a body-worn camera program is the impact on staffing and resource allocation. Other agencies report that officers spend approximately 30 minutes a day on body-worn camera administration. This could be downloading video, reviewing video, booking video evidence, and tagging videos with case numbers. When officers spend their time in this way, they are not spending it on other activities such as patrol, investigation, or other valuable activities. If 100 officers spend an average of two hours per week on body-worn camera administration, they will spend 10,400 hours on this activity per year. This is the equivalent work time of 5 full time police officers.

---

## **Appendix 4**

### **Qualitative information on increased officer workload imposed by BWC implementation.**



Video posted by the International Association of Chiefs of Police.  
<https://www.theiacp.org/perspectives-on-body-worn-cameras>

Featured in the video: Major Christian Quinn - Fairfax Co (VA) Police Department:

*There's a general notion out there that added technology makes our lives easier - it actually saves us time. But the reality is, when we're sitting on this much data, when we've got this much video to go through, it's actually considerably more labor intensive. It actually draws upon more resources to go through it all. In anticipation of court. To do performance management. To do all the other things we need to do. It's an undertaking both from a time standpoint and a resource standpoint, and a personnel standpoint, to do all that.*

A white paper on BWCs by Michael D. White, OJP Diagnostic Center.

[https://bja.ojp.gov/sites/g/files/xyckuh186/files/bwc/pdfs/diagnosticcenter\\_policeofficerbody-worncameras.pdf](https://bja.ojp.gov/sites/g/files/xyckuh186/files/bwc/pdfs/diagnosticcenter_policeofficerbody-worncameras.pdf)

Excerpt:

*The Mesa report also describes in detail the process and resources required for redacting video footage:*

*All public records requests involving on-officer video are forwarded to the officer who produced the video.... When an officer receives the public records video request, the officer is required to review the video in its entirety. The review consists of identifying images and information that should not be released, including NCIC/ACJIS information, personal biographical information, juvenile faces, undercover officers, informants, nudity and other sensitive information as determined by the staff attorney. Any items that need to be redacted are identified by the officer by providing a description and time stamp of the selected images. The request is then forwarded to the MPD Video Services Unit (VSU) for action. (MPD 2013, 10)*

*This redaction process requires substantial time commitment from the officers, as well as record management and video technician staff. During the Mesa project period, the department received three to four video records requests each month (MPD 2013). If no redaction is necessary, the resource burden is limited to the officer who must review the video (and those who manage the process to release the video). In three cases, redaction was necessary, and each case required about 10 hours to complete the video editing (ibid.).*

*The experiences in both Mesa and Phoenix highlight the considerable resources required to manage a body-worn camera project. Commander Michael Kurtenbach of the Phoenix Police Department noted that the project has a "profound" impact on the police department and other outside agencies (White 2013). The Mesa report concluded:*

*Program management of 50 on-officer body camera systems requires a considerable amount of operational commitment.... These duties will exponentially increase with any expansion of the on-officer body camera program.... Properly managed, the program is*

*an asset to the organization; however, it can also expose the department to increased liability without effective oversight. (MPD 2013, 5–6)*

A qualitative inquiry into police officer perceptions of BWCs. Nevena Aksin - Masters Thesis, Department of Criminology, University of Ottawa.

Study in the Toronto Police Department.

[https://ruor.uottawa.ca/bitstream/10393/37538/3/Aksin\\_Nevena\\_2018\\_thesis.pdf](https://ruor.uottawa.ca/bitstream/10393/37538/3/Aksin_Nevena_2018_thesis.pdf)

Excerpt:

*All of the officers reported an increased workload with the use of BWCs. All of the officers, except for one who vocalized his indifference, perceived limited officer availability as a consequence of BWCs. Specifically, the officers expressed frustration with the extra time it took to review, categorize and order video footage. In regards to reviewing the video, the officers felt that they spent more time redacting videos, making notes and completing extra paperwork.*

*Way, way more time. Like between the officers themselves, the supervisor, the detective it added hours. (Abel)*

*There was one officer at TAVIS that had an hour long video. It took him 3 hours to vet it because it's not just watching the video - it's making the notes. If you're going to review a 10 minute video it's not going to take you 10 minutes. An hour long discussion with somebody about a criminal matter that ends up being a suspect; that can take a long time to vet. (Jordan)*

*But with me and the crew and one of my major issues with body-worn cameras is that we are a very high volume service. We are one of the busiest divisions in Canada. So here is the dilemma: I get involved in a serious incident so I arrest whoever and bring them into the station. Now I have to sit for an hour or two, watch the footage so that everything lines up with my notes so you're potentially adding an hour to two hours of time. Do I think it'll gum up PRU (primary response unit)? Oh yeah. (Matthew)*

*With a minor traffic ticket, I'm spending an hour or two in the station just dealing with this paperwork. Why do I have to do this? (Michel)*

*There's so much extra work with the body-camera. And it's for that 1 percent of the time where it's like, "Oh that's great I'm glad I had my body-worn camera." But 99 percent of the rest of the time I just don't want to have the body-worn camera right now. I just want to be able to deal with this and be done with it like I used to do. So there is that 96 aggravation and also other officers are like, "My god the guy with the body-worn camera is here. We can't just do this." (Damian)*

*Jason was the only officer who did not view added paperwork as a consequence:*

*Paperwork is sometimes - we have to do it, we have to do it - it's my job. I'm not worried about that. Not a big deal. (Jason)*

*The Sergeants expressed frustration with having to categorize the videos:*

*So the supervisors would get notified and we had like hundreds of videos that aren't categorized and then we had to get officers to come in so we're pulling them off the road to sit for hours, watch their videos, categorize it. And then once that's done, I'd have to view it just to make sure they're acting appropriately. (Abel)*

*Officers were also required to order their videos for criminal proceedings and investigations which resulted in an increased workload. Well, me personally, I'm in traffic. Yeah, I wouldn't say more paperwork specifically but because of the evidentiary part of it you spend more time ordering those videos and hunting them down. There's code numbers that you need to do in order to get a particular video for court. So yeah that is definitely more time consuming. Especially for the guys in our officer who are writing a lot of tickets. They're spending hours doing stuff like that. (Andrei)*

*Finally, supervisors were responsible for reviewing the video footage of their officers in order to ensure professionalism:*

*Think of the labour-intensity that a Sergeant a supervisor, reviewing hundreds of clips of mine to see how I am applying the law to everybody. (Jax)*

*Every month I had to watch a certain number of officer's videos. And like I said, I had to watch it in real time so I could be sitting there for like an hour just to make sure they were behaving themselves properly and they weren't acting inappropriately. And I had to deal with the problems of all the officers. Like I had more access so I had to find theirs. I would literally spend hours sometimes like even just searching for their video and getting it in the right category. (Abel)*

A bit of additional info on Toronto.

Toronto Globe and Mail article.

<https://www.theglobeandmail.com/news/toronto/toronto-police-seek-approval-for-body-cameras-despite-stiff-costs/article31914678/>

*Both Mayor John Tory and Chief Mark Saunders said one of the main concerns was the amount of time officers spent dealing with the videos after their shifts – an average of 39 minutes and up to two hours per shift for some officers.*

*“This is clearly a major, major devotion of police resources to just managing video information and unless you spent a lot more money on a lot more police officers this is going to take away from policing in the community,” Tory said.*

Minutes of the Toronto Police Services Board, October 20, 2016, BWC Pilot Program – Request for Funds  
<http://www.tpsb.ca/component/jdownloads/send/40-body-worn-cameras/538-bwc-pilot-project-request-for-funds>

*Officers equipped with the cameras spent as much as two hours per shift performing administrative functions. These functions were necessary to upload, classify, and redact the videos. Performing these functions meant that officers were not available on the road to perform their primary mandate. The opportunity cost of an officer performing these administrative duties amounts to as much as \$20,000 per officer annually.*

Worcester Police Department - Body Worn Camera Pilot Program Report

[http://www6.worcesterma.gov/WebLink/PDF/ooo1ijljskmpk5qiy01upinlc/4/20200721ccm%20\(27\).pdf](http://www6.worcesterma.gov/WebLink/PDF/ooo1ijljskmpk5qiy01upinlc/4/20200721ccm%20(27).pdf)

*Other Program Conclusions*

*The administration of the program was more time-consuming than we expected. The six members of the BWC Unit found it difficult to watch all of the arrest and use of force videos, and still perform their regular duties. There were only three public records requests during the pilot, but this is likely to go up significantly if there is widespread adoption of BWCs. Between training, discovery requests, public records requests, equipment management, and supervision of the officers, BWCs create a significant amount of administrative work.*

A phenomenological analysis of BWCs. Paper in Journal of Qualitative Criminal Justice & Criminology. David A. Makin, Washington State University.

<https://s3.wp.wsu.edu/uploads/sites/1517/2018/03/Makin-2016-When-the-Watchers-are-Watched.pdf>

Excerpt:

*.....In an effort to highlight the individual, organizational, and social construction of the BWC, this research takes place in a small agency with 30–40 officers, primarily working patrol.....*

*Increased Workload. Overwhelmingly, officers reported increasing workload as a primary concern. Primarily, the time taken to tag videos with the appropriate information concerned officers. Officers who were on top of their tagging faced minimal increases in their workload, but if the call queue was elevated for a few days or calls took longer to clear, tagging could backlog, as demonstrated in this excerpt.*

*More or less, it's the cases that are going to put you into overtime. But then if you have that added you know, if you have 20 videos you have to tag, and some of them you have to look through a little bit, that could take you a little bit, like an hour overtime. But again, that's worst case scenario. That's cases that are going to really tie you up. But on a normal basis, as long as you keep up with it, and do it every day and keep everything tagged every day and not fall behind, it's not that big a deal. It gets to be a big deal though if you go three days without doing it, and each night you had 20 different videos, and now you have 60 videos.*

*The compulsive need for some to review recordings for accuracy in their documentation holds the potential to effectively double or triple the amount of time it takes to complete a report. As an officer shares, "Unfortunately, the cameras have not allowed us to decrease detail in written reports or other areas. There seems to be a trend in law enforcement to increase the amount of detail in our documentation, and the body-worn cameras just add to this."*

*Recognizing the increased workload, the agency responded by implementing a pilot test of smartphone tagging, allowing officers the ability to tag videos directly from their smartphones, interacting with the AXON device. For those in the pilot, this was an immediate benefit typified by the following statement, "I really do like it when I can use my phone app to do it, because it's*

*so much easier, so much faster. I mean, it makes a difference between night and day on tagging videos." Possessing the ability to tag at the scene, live tagging, is something officers discussed as a prominent factor in reducing their workload.*

*While smartphone tagging was a response to the increased workload, the volume of information needing to be tagged presented a challenge. This was further complicated by the addition of requests for tagging of specific sections or pieces of information at the request of prosecutors. The following statement summarizes the concerns of many officers: "I think the prosecutor would like certain sections highlighted, like: 'here's when we read Miranda, here's when we did...' you know?" By the officers' account, specific tagging requests exceeded the case information to include specific time stamps reflecting more requests for information from various stakeholders. Originally, officers anticipated an increased workload, but few anticipated the introduction of entirely new tasks. Still, they found themselves verifying the accuracy in the report based on the sequence of the video. The following excerpt highlights this specific concern.*

*I think it [BWC] brought along a whole another slew of issues. Recording laws, and what we're supposed to be doing, what the department expects us to do, what prosecutors expect us to do, what the law requires us to do, and ultimately how we're able to work that into our routine. As far as telling people when they're being recorded. What other things are required to Miranda, that sort of stuff. So it's just new things that you had to kind of learn and had to work in. Makes a lot of work in some situations too, because I think with some police officers, especially now in a more serious case, where before you were writing everything based off of your notes and your memory, and you're kind of putting together. When you take notes and you're memorizing things, those are all things you're making note of so you can write a better report. So you kind of do that. Well, when you have video, I know for me, well I stopped making note of that stuff, because, well, it's in the video. I'm going to focus on other things because it's going to tell the entire story, and I can go back and review that and that's going to trigger my memory or whatever. But that requires us to look at the video and watch what could be an hour-long section or we're watching maybe all of our stuff to put together a good report and something we can send over to our prosecutor. So, that can be kind of a headache.*

*Several officers identified frustration in that their attempts to overcome this workload were stifled. By this, they referred to the availability of the entirety of the incident and explained that they felt writing a detailed report and then tagging the video were a duplication of effort. They believed for lowlevel cases, such as a DUI blood test, they should be able to refer to the video timestamp, instead of explaining what occurred. As an officer remarked,*

*I'm of the thinking where, 'you know what, if you want to know what happened, watch the video. I'll give you a synopsis of everything so you can quickly read it. But if you want the details of what all they said, watch the video, because it's all in there.' It's just doubling up our work.*

*The final subtheme developed within this global theme of increased workload was unique and unexpected. The implementation of the BWC resulted in some officers noticeably increasing their own workload by verifying the accuracy of what they reported by returning to the video footage.*

*Unlike the subtheme of self-correcting, this specific subtheme speaks to a duplication of effort to verify information because the officers worried a potential inconsistency could exist between the report and the video record.*

*You know, I don't want to get anything wrong. I don't want to miss a small detail, or even contradict something. I mean, that would be the worst thing possible, is I say this happened, but the video shows this, or something like that. That's just... that would be awful. So I watch my videos from start to finish of the important stuff, so if I have an interview with someone... and we did that a lot before. We were getting recorded statements from people so we'd have their side of the fence from their version, not something that I'm taking notes of or interpreting. I want somebody else to tell the story, so basically what I end up doing instead is kind of a synopsis of everything that happened. But then again, that's still something we're going to have to go and watch the video for. I mean, someday it's going to make the written reports less detailed, but there're too many people that are opposed to that change right now.*

ETICO staffing analysis for College Station Police Department. It doesn't provide any data, but notes that BWC administrative time needs to be included in patrol officer staffing analysis.

<http://wtaw.com/wp-content/uploads/2019/04/CScoun041119cspd.pdf>

Excerpt:

*The administrative duties listed in Table 4 occur daily for every officer fielded in patrol. The time spent performing these administrative duties is time taken away from the ability to answer calls for service. Thus, each administrative duty increases the need for officers in the Field Operations Bureau. Many of these administrative duties are unavoidable either due to labor agreements or practicality. However, they should be reviewed continuously due to their direct effect on patrol staffing. Now that all officers are using body-worn cameras, the time spent donning and doffing the cameras, along with any additional administrative time to document camera footage, needs to be averaged across all officers and added to the administrative time per shift.*

---

## **Appendix 5**

### **Detailed information on costs for cameras, data storage, administrative + IT staff needed to run the program, and smartphones for in-field tagging.**

#### **1. Overview of BWC options.**

BWC vendors vary in the nature of contract arrangements and the features of their products. With some vendors, such as Axon, a department essentially rents the camera (e.g. with Axon, there's a policy of no-questions-asked replacement if problems arise with a BWC, and Axon replaces all BWCs with new ones every couple years), and data storage in the cloud is an intrinsic feature of each contract. With other vendors, such as Panasonic, a department purchases and owns the BWCs outright, and data storage must be arranged for separately. The vendors vary in the features of their product – for example, with

the types of automatic triggers that are available, the field of view, the amount of pre-incident buffering that's being recorded, BWC robustness to damage, battery life, etc. In general, the lifespan of a BWC is 3-5 years. To allow comparability when examining pricing, price is often expressed as an annual price per BWC unit (e.g. startup and operating costs over 5 years are summed, then divided by 5).

[Here](#) is a November 2016 (slightly outdated but still informative) market survey of BWC vendors. Axon is by far the largest vendor of BWCs.

With vendor choices, to some extent, you get what you pay for (e.g. vendors that provide additional features will tend to have a somewhat more expensive product). For example, the draft BWC policy specifies that the cameras should have a number of automatic triggers:

Body-worn cameras shall be activated immediately, or as soon as practicable, when responding to all calls for service and during all law enforcement encounters and activities involving the general public. To ensure compliance with this requirement, technologies shall be adopted that automatically engage the recording equipment whenever squad car lights are activated, squad car doors are opened, officers are dispatched to an incident by the dispatch center, the camera system detects that an officer is running, or other similar automatic engagement systems offered by the technology.

The BWC Committee report also notes: "Committee's Model Policy requires all officers on the scene to activate their BWCs—to try to increase the likelihood that multiple angles and perspectives are captured."

Axon's BWCs have automatic triggering features that other vendors (such as Panasonic, with a cheaper product) lack, that facilitate this. Here's an excerpt from a [sole source contract justification](#) from South Lake Tahoe, discussing their decision to contract with Axon rather than Watch Guard or Panasonic.

Automatic camera activations are situations that cause the camera to automatically start recording. The camera can always be manually triggered, but one requirement the Police Department feels is of utmost importance is the ability to have the cameras auto activate under pre-programmed circumstances. Axon is the only manufacturer who has this technology to address all the scenarios listed here. The triggers we are looking for are;

#### 1. Emergency Lights/Collision activation

a. When an officer activates their emergency lights or the vehicle is in a collision, both the in-car camera and body worn camera activate. Driving is one of the highest liability areas for a police department and recording an officer's driving behaviour under stressful code 3 situations is necessary and if the officer is involved in a traffic collision, the recording is used to either exonerate the officer or find guilt in a collision. All three manufactures offer this function.

#### 2. Weapon Activation

a. When an officer draws his firearm from its holster or activates his Taser, the body worn camera will auto activate through a sensor in the duty holster or a signal from the Taser. When an officer is under stress and responding to an immediate threat, the officer should not need to be concerned about whether they remembered to activate their body worn camera. The camera

will auto activate and record the scene. Only Axon offers this option. Axon also activates the in-car camera if it is in range and all other Axon BWC's within a prescribed proximity.

### 3. Proximity Activation

a. When an officer comes within a pre-designated distance from another officer who has their camera activated, the incoming officer's camera will activate. This is important to capture a scene from as many angles as possible. We have all seen the body worn camera footage that is blocked by the officer's hands or has a bad angle. If one officer activated his camera, all officers at the scene need to have their cameras on. Only Axon offers this option.

## 2. A survey of BWC costs reported by different law enforcement departments.

For annual cost per BWC (including data storage and maintenance), most of the estimates I found were in the \$900 - \$2000 range.

The costs listed here are those of the vendor contracts. They don't include personnel costs in the department (e.g. additional administrative and IT staff needed to run the program).

[Analysis](#) from Civilian Oversight Commission for Los Angeles County Sheriff's Department:

*"the annual recurring contract costs for the average police department are approximately \$1,000 per user. In some instances the law enforcement agencies implemented before fully comprehending the workload impact."*

### [Spokane.](#)

Axon annual cost for 251 BWC units (including data storage and maintenance). \$340,000  
Annual cost per BWC unit. \$1,355

### [Ventura Police Department.](#)

Axon 5 year cost for 150 BWC units (including data storage and maintenance). \$1,070,077.50  
Annual cost per BWC unit. \$1,427

### [Los Angeles Police Department.](#)

Axon 6 year cost for 2645 BWC units (including data storage and maintenance). \$16,136,832.  
Annual cost per unit \$1017.  
Plus smartphones for data upload. \$8,805,450.  
Total nonpersonnel annual cost per BWC unit. \$1,572

### [Wichita.](#)

Axon 5 year cost for just over 400 BWC units (including data storage and maintenance). \$2,200,000  
Annual cost per BWC unit just under \$1,100

### [Phoenix Police Department.](#)

Annual cost per BWC unit (including data storage and maintenance). \$1, 608

### [Mesa Police Department.](#)

Annual cost per BWC unit (including data storage and maintenance). \$1,267



[Dallas Police Department.](#)

Annual cost per BWC unit (including data storage and maintenance). \$936

[Wauwatosa.](#)

Axon 5 year contract for 120 BWC units (including data storage and maintenance). \$762,064

Annual cost per BWC unit \$1,270

[Burnsville.](#)

Axon annual cost for 62 BWC units (including data storage and maintenance). \$62,000

Annual cost per BWC unit \$1,000

[Milwaukee.](#)

Current (2018) contract

Axon 5 year contract for 700 BWC units (including data storage and maintenance). \$3,302,237

Additional Axon 5 year contract for 500 BWC units and 500 Taser upgrades. \$2,856,750

Given complicated features of second contract (including Tasers, etc.), use former for per unit estimate.

Annual cost per BWC unit \$943

[Worcester.](#)

453 Axon Body Camera 2, 5 year contract (including data storage and maintenance), with 150 Taser 7s: 5 year total: \$4,400,000

453 Axon Body Camera 2, 5 year contract (including data storage and maintenance), with 453 Taser 7s: \$5,500,000

453 Axon Body Camera 3, 5 year contract (including data storage and maintenance), with 453 Taser 7s: \$5,700,000

Subtracting off the cost of the Tasers from the Axon Body Camera 2 plan, estimated annual cost per BWC unit: \$1,909

[Espanola, NM.](#) ([Wood Dale, IL](#) had very similar numbers).

Panasonic Arbitrator for 40 BWC units (including maintenance but not data storage): \$88,584.39

Annual cost per BWC unit \$443

Fitchburg, from committee report.

Panasonic Arbitrator (including BWC warranties and on premises data storage): \$149,000

Annualized cost per BWC unit \$573. Though on premises storage implies additional ongoing costs that aren't included here (there's \$57,000 specified in startup costs for server purchase, but this doesn't include ongoing costs for power, additional required IT staffing time, and server maintenance costs). It's also not clear if there's backup storage.

### **3. Data storage costs.**

For many vendors (e.g. Axon), this is not a separate cost, but is included in the base contract. For other vendors (e.g. Panasonic), a department needs to arrange for it separately – with either in cloud or on

premises data storage.

In general, the costs of on premises and cloud storage are relatively comparable. But there are tradeoffs between these data storage approaches. With on premises storage, the police department controls the servers and the data does not reside with a private vendor. And there's reduced bandwidth required in and out of the department. However, there's less redundancy (data in the cloud is stored redundantly) and thus, with local storage, you're more prone to catastrophic failure and data loss, unless a robust backup system is in place (with additional servers, which adds to expense). With local storage, you also need to cover more IT resource costs (personnel, etc.) to maintain the data storage.

Here's an excerpt from an Officer.com article, discussing these and important related issues:

[Millard] explains agencies must examine the type of department they have and what its officers are doing. A large, urban department may make a lot of traffic stops and come in contact with many folks. "They are going to generate a lot of footage very fast," he says. "A department like mine, that has a small number of officers operating body cameras, and no dash cameras, will generate far less."

Policy considerations also include whether officers will turn on their cameras for every contact or just certain types of contacts, the level of resolution the cameras will record at, and how long the video will be stored. All factors that affect storage.

Some body cameras hold eight to 16 Gigabytes (GB) while others hold up to 64 GB of footage. Newer cameras can change their resolution from 480p, 720p to 1080p. These settings impact the quality of the video—the lower the quality, the smaller the file. Agency policy needs to determine which quality setting makes the most sense. "We kept it in the middle, at 720p, in our policy," Snider says. "That works well for us."

Millard recommends selecting the highest quality setting an agency can afford to store. "There are differing opinions, however," he admits. "If you talk to someone concerned with the evidence, they would say higher is better. The higher the quality of the video footage, the higher the resolution, the more we can identify within the frame. But if I'm looking at it from a management perspective, I'm going to go just below the highest quality for budget reasons. If I could afford all the memory I wanted and all the servers I wanted, then I'd record everything in high definition."

Another consideration that impacts storage is how long an agency keeps the files, and how that changes depending on the type of case. An agency may retain a video record from a traffic stop gone bad longer than video footage from an uneventful shift, for example. "You need to ask yourself how long you plan to retain the footage and what types of footage you are retaining," says Millard. "You have to be very thoughtful about it, especially if you control a lot of cameras. I have known agencies that have run out of storage." ....

"Ten years ago, when the debate between on-prem storage and cloud storage first began, we expected small agencies to jump on board with the cloud and large agencies to handle it on their own," Parnofiello states. "But what we've actually seen is that large agencies understand

the value of the cloud. They have standards for it. So, we saw large agencies move to the cloud when we thought they had so much infrastructure that they would want to keep it on-prem.”

In contrast, smaller agencies that Parnofiello says were expected to race to the cloud, to avoid storing video on their own, have instead opted to manage it on-site. “They don’t have the policies and standards in place that larger organizations have to utilize the cloud as a platform,” he says...

Cloud models, whether private, public or hybrid, offer varying subscription rates, making them a pay-as-you-go type of solution, Parnofiello notes. “More agencies are moving to the cloud because it is tough to estimate exactly what you need for an on-premise solution, and with an on-prem solution, you become a storage infrastructure manager. For this reason, the cloud is becoming the de facto standard.” ...

“[With an on-site solution,] they’re responsible for the security aspect, the password credentials, how they manage access to the content and how they help ensure workflows work well,” he says. “They take on a bigger part of that responsibility. They also risk losing data, whereas in the cloud there is some redundancy in the storage.”

Miller admits data loss is a concern for him with the college’s on-site storage solution. “If my solution fails, I do not have server redundancy and that is one of the greatest advantages of the cloud. If budgeting became available, I might move toward a cloud solution down the line for that reason.”

[Here](#) and [here](#) is additional information on the tradeoffs between cloud and on-premises storage.

Here is additional relevant information – an excerpt from “[Three Considerations for Sizing Your Body-Worn Camera Environment](#)”:

What quality of imagery is required? Who needs your images? If images are designed to go to court, they need to be of acceptable forensic quality. 75 pixels per foot is usually sufficient. Out of the box, most cameras are set for 1080 pixels at 30 frames per second, which adds up to 7GB to 9GB per hour (versus ~1GB or less per hour for 75 pixels). Do you need that coverage? If not, you’re paying to store eight to nine times the amount of data necessary to accomplish a normal mission. To keep costs down, you need to test and adjust your cameras so that you can more accurately size your environment.

How much data do your devices generate over a given period? Our own internal studies show that the average body-worn camera records between 1.75 and 3 hours of data per 8-hour shift when officers are allowed to turn the cameras on and off according to policies. (See the Bureau of Justice Assistance Body-Worn Camera Toolkit for best practices guidelines.) Depending on camera settings, a single body-worn camera might generate anywhere from 600GB to 1.2TB of data per year.

How long do you need to retain that data for compliance? The typical retention period is 90 to 180 days for everything, and up to 5 years for evidentiary video.[Note: the BWC Committee draft policy specifies 180 days for most video; evidentiary video in criminal cases may need to be kept indefinitely.]

The general recommendation is that one should assume 1 TB of data per BWC per year (e.g. Dell – [“IACP: Body Cam Storage Success”](#): “On average, each body cam requires a minimum of 1TB of storage per year”). And various reports from individual departments are consistent with this – e.g., an Arvada, CO Police Department study found that an officer recording all citizen contacts during their shift generates 1.5 TB of footage a year (cited in [“Body-Worn Cameras: a Report for Law Enforcement”](#), The Colorado Best Practices Committee for Prosecutors). But still, this will be a function of the resolution the camera is set to, the percentage of citizen interactions that are actually recorded, etc. Various departments report less. For example, for the first 5 months of 2020, the Baton Rouge Police Department, which has distributed BWCs to each officer, [reported](#) that BWC data was being generated at a rate of 0.26 TB per camera per year. An assumption of 2 hours of moderate resolution footage a shift and 5 shifts a week, comes to ~0.5 TB per year. An additional consideration is that MPD is apparently assuming purchase of only 289 cameras with sharing of cameras across shifts, which would increase the amount of data captured on a per camera basis.

The total amount of storage needed will increase over time. Once 180 days is reached, the department will start deleting footage that’s not of interest. But some fraction of the footage, that has evidentiary value, will be retained long-term and the total amount of such footage, kept longterm, will grow with time. Overall, it’s reasonable to expect that by 5 years, 1 TB of data may be in storage for each BWC.

To calculate a data storage cost, I’ll use cloud data pricing per TB. On a per TB basis, the cost of on premises storage would be similar to this, or potentially somewhat higher – since you’d want sufficient server space for a backup copy of all the data and since it’s less scalable (so you may be paying for more unused server space).

I’ll use [Amazon S3 pricing](#), since that’s an industry standard. So I’ll assume \$0.023 GB per month. So, for a TB, about \$23 per month or \$276 per year. For 289 BWCs at 1 TB of data per BWC, that comes to \$79,764 annually.

Alternatively, I’ll note that Panasonic offers a [Panasonic Arbitrator Cloud Storage Bundle](#), if Panasonic were chosen as the BWC vendor. Storage is unlimited, as opposed to being on a per TB basis. The 5 year cost for a cloud contract comes to \$3,500 per BWC unit, for an annual cost per BWC unit of \$700. The total annually, for 289 BWCs, would be \$202,300. I’m sure the package has features that allow better integration with the Panasonic BWCs than using an unrelated cloud storage provider.

Again, I’ll note that for many vendors (e.g., Axon), cloud storage is an integrated part of the BWC product offered, so is already reflected in the BWC price listed in #2 above (and doesn’t need to be considered separately).

#### **4. Training officers throughout the department.**

Officers need to be trained on how to use the BWCs and they need to be trained on the BWC policies under which they will operate. Most commonly, it appears that 1-3 full days of BWC training are provided by a police department. What I’ll be calculating here is the cost of officer time (salary and fringe) required for this training.

Worcester is only slightly smaller than MPD (453 officers versus 486 officers for Madison), appears to provide 2 days of training, and has a reasonable estimate for training cost, so I'll just use that estimate.

Worcester estimate:

Officer BWC training OT= \$ 56.59/ hour= \$ 240, 395  
Officials BWC training OT= \$ 73. 24/ hour= \$ 101, 950  
Trainers BWC OT = \$ 56.59/ hour = \$29, 880  
Total: \$372,225

Prorating to slightly adjust to MPD's size (486 officers) brings that to \$399,341.

I know this will be somewhat off, given differences in salaries between Worcester and Madison, but it still should be roughly correct.

In addition, the BWC Committee draft policy specifies annual retraining ("Annual retraining will be provided to all authorized users of the body-worn cameras). I don't know how much time would need to be allocated to this – obviously, much less than the original retraining. I'll make the arbitrary assumption of half a day (4 hours).

Over 5 years (given the initial training and the four retrainings), that brings the total cost (i.e. department personnel time devoted to BWC training) to \$744,450.

## **5. Cost of additional administrative and IT staff to run the BWC program.**

Implementing a BWC program requires hiring additional staff to oversee the program and to perform associated IT work. That includes staff for handling open records requests and performing redactions, for maintaining and troubleshooting equipment issues, etc. Departments appear to vary greatly in the number of such staff that they hire. But it is generally recognized that, for a BWC program to succeed, such administrative and IT staffing needs to be sufficient.

To ascertain the number of such staff hired relative to the number of officers in a department, I looked for law enforcement departments where such data was available. I included both cases in which BWCs were already implemented and cases in which there were concrete plans for implementation (with staffing details specified). I found such data for Worcester, Wichita, Phoenix, Los Angeles, Los Angeles County (Sheriff's Department), Rockford, Portland, South Lake Tahoe, La Palma, Montgomery County, Arlington County, Washington DC, Nashville, and Alexandria. For each, I then calculated the number per 100 officers, to allow legitimate comparison.

Across this set, the median number of additional FTEs hired for BWC implementation, per 100 law enforcement officers, was 1.27 (though the specific number varied greatly across departments – ranging from 0.5 to 4). The median number of officers across all the departments in this set was 700.

A representative department (resembling the median) is the [Rockford, IL Police Department](#). Rockford has 302 officers. For BWC implementation, it was hiring four additional staff people - two records staff to manage video data, one contract staff person to support the cameras and one legal staff member to handle FOI and records requests. The [Worcester Police Department](#) is another pretty representative department. It has 453 officers. Under the Worcester proposal, seven additional FTEs would be hired.

Brian Austin's estimate for the cost of BWC implementation in Madison assumed \$311,000 in additional staffing costs a year (for additional positions). Conversion of this dollar amount to a specific number of FTEs would depend on payscale and fringe, but it would appear to be about ~3 FTEs. This would appear to be less than the median number of FTEs added by the average department. Using the median value of 1.27 FTEs per 100 officers (from the set of departments I examined) and given MPD's 486 officers, one would expect ~6 FTEs total. Moreover, MPD frequently states that it is severely understaffed. This would make it more difficult to absorb the needed administrative functions without an adequate number of additional FTEs (for example, Milwaukee, with an officer to population ratio of 3.1 per 1000 should be better able to do this than Madison, with an officer to population ratio of 1.9 per 1000).

Increasing the administrative and IT staffing cost to \$500,000 annually would bring MPD closer to the average for a department implementing BWCs (though, admittedly, the precise amount is somewhat arbitrary).

## **6. Cost of smartphones.**

Without the capacity for in-field tagging (i.e., in which video is marked with needed meta-data labels) officers must return to the station to tag and upload videos. This is a suboptimal workflow and increases workload. Thus, many police departments are purchasing smartphones for all officers, to provide remote connectivity and allow in-field tagging. This can somewhat reduce the drain of BWCs on officer time.

As a [Los Angeles County analysis](#) notes:

To keep costs as low as possible, and officer availability as high as possible, BWC-equipped officers must have remote access to the BWC system to tag their footage after each incident in which the BWCs are activated. The technology most frequently used is smartphones, but in some cases, departments have BWCs that are integrated into their computer aided dispatch system (CAD), so they are able to use their in-car mobile data consoles (MDCs) to add the requisite metadata. Without some form of remote connectivity, officers are required to either return to the station after each call or spend time at the end of their shift to view footage and add the metadata. This latter circumstance can result in wasted productivity as officers wait for bandwidth and accrual of overtime pay that increases the cost of the BWC program.

The [Worcester Police Department](#) specifies an annual cost, per smartphone, of \$331, while the [Los Angeles Police Department](#) specifies an annual cost, per smartphone, of \$489. Taking the mean of these values, and multiplying by the number of MPD officers, the annual cost would be \$199,337.

---

## Appendix 6

### Potential increase in rate of assaults against officers with BWCs.

Throughout the BWC Committee report, scientific research on BWCs is often misrepresented or conveyed inaccurately, painting a rosier picture of BWCs than warranted. Often unfavorable information is minimized or brushed over. Here's a representative example:

#### Increased violence by civilians against officers

At least one global multi-site study, involving well-designed randomized controlled trials across ten sites in eight cities, found that the presence of BWCs increased the rate of assaults against officers (assaults against officers were 14% higher when cameras were present).<sup>104</sup> Importantly, however, the results were heterogeneous across sites—meaning the increase in assaults was observed in some locations but not others—and the reason for this variation was not clear. A follow-up analysis of the data provided some explanations, and pointed to differences in policies governing the use of cameras.<sup>105</sup> Especially given that little if any other research suggests that cameras increase violence by civilians, the Committee hopes that the full package of policies and reforms in Madison will ameliorate any such effect.

---

<sup>104</sup> Ariel, B. et al. (2016). Wearing body cameras increases assaults against officers and does not reduce police use of force: Results from a global multi-site experiment. *European Journal of Criminology* 13(6), 744-755.

<sup>105</sup> Ariel, B. et al. (2016). Increases in Police Use of Force in the Presence of Body-Worn Cameras are Driven by Officer Discretion: A Protocol-Based Subgroup Analysis of Ten Randomized Experiments, *Eur. J. Criminology* 12:453-463, 459.

There are multiple problems with what's stated here. It provides an erroneous understanding of the weight of the evidence and incorrectly implies that the BWC Committee policies and reforms would minimize this potential adverse effect, when the opposite would be true.

1. The study cited (by Ariel et al.), which provides the results of well-designed randomized controlled trials (randomized by shift) involving 2,122 officers at 10 sites in 8 different cities, with 2,188,712 officer-hours of trial data, is the best data available on this question (i.e., on whether BWCs lead to increased assaults against officers). The way this passage is written does not make that adequately clear.

2. re: *“assaults against officers were 14% higher when cameras were present.”*

Though this does reflect the percentage increase specified in the initial paper by Ariel et al, a later and more definitive re-analysis of the data set by these same authors, performing further analysis specifically on assaults and using slightly different methodological choices, concluded that “The odds of

assault in treatment shifts was 37% higher than in control shifts.”<sup>1</sup> It would have been more appropriate for the BWC Committee report to convey the latter value, reflecting the ultimate conclusions of the authors.

**3.** The BWC Committee report incorrectly states “*little if any other research suggests that cameras increase violence by civilians*”.

Setting aside the work of Ariel et al, what do other data show? A meta-analysis of other studies (five studies separate from the work of Ariel et al; this includes all studies for which data are available) that measured the effects of BWCs on the rate of assault against officers or rate of resisting arrest (a related overlapping metric), found a 34.2% relative increase in assaults and resistance against officers, with borderline statistical significance (p level just barely above .05).<sup>2</sup> Here’s a table conveying the results of that meta-analysis (see third line):

**TABLE 6** Overall mean percent change for constructs and associated statistics without Ariel et al.'s 10 global studies

Construct	Mean % change	95% CI		k	z	p(z)	Q	p(Q)	τ
		Lower	Upper						
Complaints against officer	-18.4	-32.7	-1.0	16	-2.062	.039	23.535	.073	0.222
Use of force	-12.8	-27.1	4.4	16	-1.490	.136	48.093	.000	0.278
Assault on officer/officer injuries/resistance	34.2	-0.1	80.1	5	1.956	.050	1.322	.858	0.000

Note: Percent change is based on the relative incident rate ratio (RIRR). For values of RIRR >1, the percent change is RIRR - 1. For values of RIRR <1 it is 1 - RIRR. A RIRR reflects the difference-in-difference percent change in counts. Negative numbers reflect lower counts for the BWC condition. k = number of effect sizes; z = z-test; p(z) = p-value for z-test; Q = homogeneity statistic; p(Q) = p-value for homogeneity statistic; τ = square-root of the random effects variance component.

An additional study by the Toronto Police Service also reported an increase in assaults against officers wearing BWCs compared to control group officers not wearing BWCs, though the sample size was small and no statistical analysis was provided.<sup>3</sup>

A meta-analysis including the ten Ariel et al sites and the other five studies with data available for analysis did not achieve statistical significance, but showed a mean magnitude of increase similar to that across the Ariel et al sites.<sup>4</sup> Here are those results:

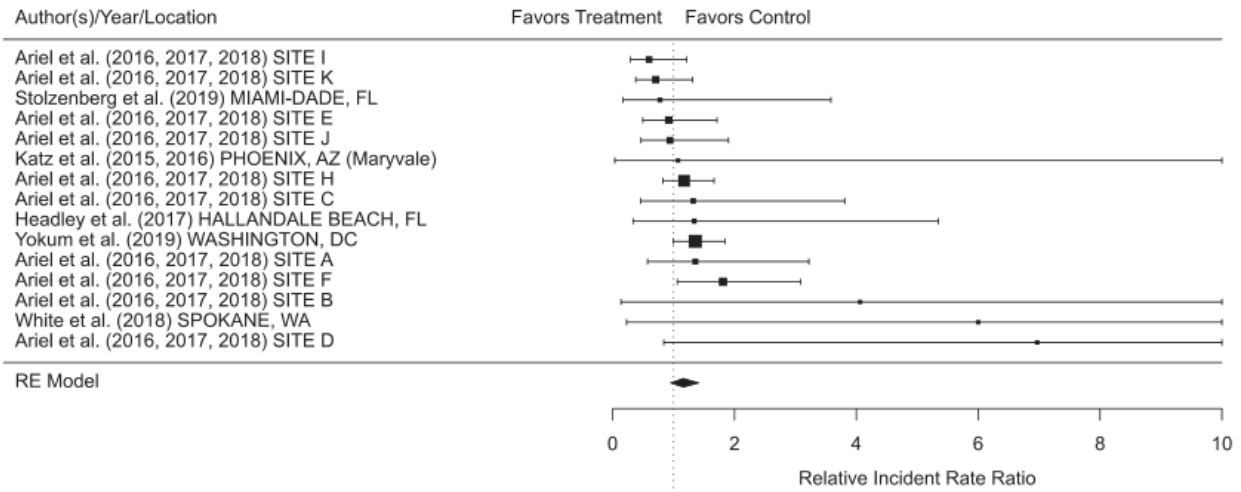
<sup>1</sup> Ariel et al. (2018). Paradoxical effects of self-awareness of being observed: testing the effect of police body-worn cameras on assaults and aggression against officers. *J Exp Criminol* 14:19–47.

<sup>2</sup> Lum, C., Koper, C.S., Wilson, D.B., Stoltz, M., Goodier, M., Eggins, E., Higginson, A., & Mazerolle, L. (2020). Body-worn cameras’ effects on police officers and citizen behavior: A systematic review. *Campbell Systematic Review*.

<sup>3</sup> Toronto Police Service. (2016). *Body-worn cameras: A report on the findings of the pilot project to test the value and feasibility of body-worn cameras for police officers in Toronto*. Toronto, ON, Canada.

<sup>4</sup> Lum et al (2020).





**FIGURE 3** Meta-analysis results of body-worn cameras (BWCs) and assaults against officers/officer injuries and resistance against officers

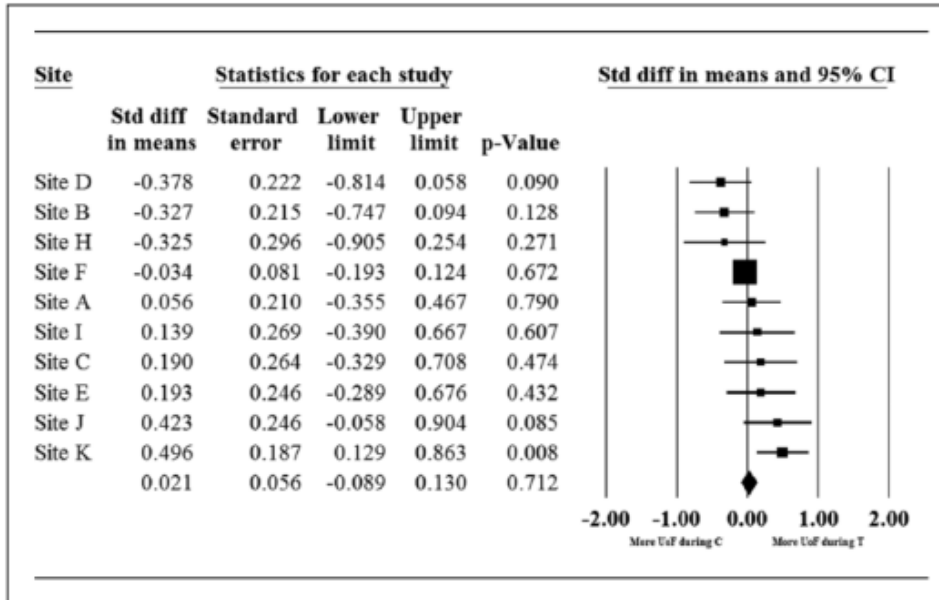
Overall, the statement “*little if any other research suggests that cameras increase violence by civilians*” is incorrect, though one can’t assert a definitive conclusion of an increase in assaults. Further trials are needed. Though most existing data appears suggestive of an increase.

**4.** Re: “*the results were heterogeneous across sites—meaning the increase in assaults was observed in some locations but not others—and the reason for this variation was not clear. A follow-up analysis of the data provided some explanations, and pointed to differences in policies governing the use of cameras.*”

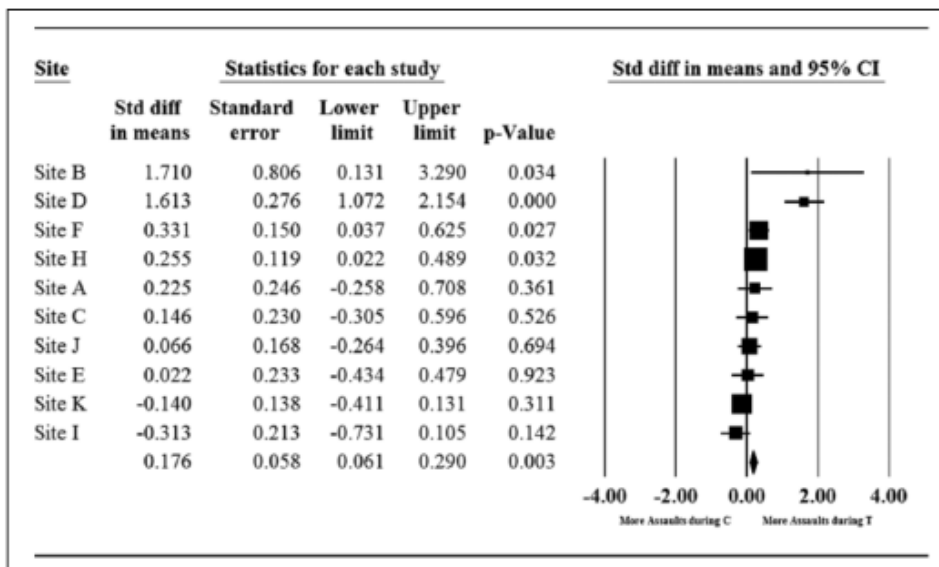
Here, I’ll explicate the conclusions of the study authors.

The Ariel et al study measured not just rates of assault, but also rates of officer use of force. Across sites in the Ariel et al study, changes in rates of police use of force and changes in assault rates showed opposing trends (assault rates rising the most where rates of use of force fell). It’s a clear pattern. See data here:<sup>5</sup>

<sup>5</sup> Ariel, B. et al. (2016). Wearing body cameras increases assaults against officers and does not reduce police use of force: Results from a global multi-site experiment. *European Journal of Criminology* 13(6), 744-755.



**Figure 1.** Rate of use of force (UoF) by officers per 1000 arrests per shift.



**Figure 2.** Rate of assaults against officers per 1000 arrests per shift.

The Ariel et al study also examined the effect of officer discretion in activation of the BWCs, across the ten test sites, in a post-hoc subgroup analysis. Across all sites, officers in the BWC trial arm were supposed to activate BWCs for all civilian interactions (and inform members of the public during any encounter that they were being recorded), and control arm officers were not supposed to use BWCs, but the degree of compliance with this protocol varied across sites. At sites where officers complied fully with the protocol (had no discretion in use of the BWCs), use of force fell and assaults rose the most (i.e., in the BWC arm relative to the control arm of the trial). At sites where officers in the BWC trial arm were allowed to choose when to turn cameras on and off (used their own discretion, rather than

following the experimental protocol), use of force rates were elevated and rates of assault were lowest in the BWC arm relative to the control arm of the trial.

In the original paper, the authors had hypothesized a number of potential reasons for the rise in assaults for officers wearing BWCs. This included that, because officers were aware they were being recorded, they were inhibited in their actions and, effectively, mishandled incidents (being insufficiently assertive, etc.), leading to more assaults on them. In subsequent papers, given the data showing a correlation between assault rates and officer discretion in being recorded on BWCs, and other analyses, the authors concluded that this was the primary cause of the rise in assaults - that “under some circumstances, self-awareness [of being recorded] can lead to excessive self-inspection that strips power-holders of their ability to function under extreme situations.”

There are some methodological weaknesses in the authors’ analysis of officer discretion (it was a post-hoc subgroup analysis, etc.), so it’s certainly not definitive, but it is strongly suggestive (and plausible). A correlation between the degree to which BWC policies allow officer discretion (in camera activation) and use of force rates is also suggested by a meta-analysis of BWC trials. There may also be other contributing factors to the rise in assaults – for example, in arrest situations, officers are often dealing with people who are in crisis and not fully rational, inebriated, etc. As Ariel et al noted – announcing to such an individual that they are being recorded could further inflame an already tense situation.

**5. Re: “the Committee hopes that the full package of policies and reforms in Madison will ameliorate any such effect.”**

If the BWC Committee policies were used and their use was actually enforced – minimizing officer discretion in BWC activation/deactivation – the implication of this study appears to be that it would cause more assaults, not “ameliorate any such effect.”

In the Ariel et al study, at sites where the BWC protocol was followed most stringently (i.e. without officers having discretion in BWC use, as the BWC Committee policy seeks to enforce), assaults went up the most. Under such conditions, the odds of assaults against officers with BWCs were 157% greater than under control conditions – a very large apparent increase.

Moreover, the BWC policy requires that “Officers wearing a body-worn camera must notify any persons being recorded, as soon as practicable, that they are being recorded by a body-worn camera.” But Ariel et al speculate that such notifications may contribute to the observed increase in assaults.

There are very good reasons to have these policy provisions. For example, it is important that officers film all incidents (without discretion), since allowing officers to film selectively, whenever they want, would allow officers to frame incidents falsely, distort understanding of incidents, potentially increase use of force, etc.

But, given the research data, implementing BWCs along with the BWC Committee policy (and enforcing the policy) would potentially lead to a very large increase in assaults against officers – the direct opposite of “ameliorating” the problem, as the report misleadingly implies. Though I’ll again note – one can’t definitively conclude that BWCs increase assaults against officers. More trials are needed to get a definitive answer to that question, though the research to date does suggest it.

Overall, this section of the BWC Committee report illustrates a pattern found throughout all the rest of the report. The report is written in a way that views BWCs through rose colored glasses – with covert positive assumptions that aren't made explicit. Policy-makers reading the report are thus left with a distorted understanding of the science and evidence-base around BWCs.

---

## **Appendix 7**

### **Concerning adverse impact of BWCs on overcriminalization.**

Here is a second short example of the report conveying an erroneous understanding of scientific research. Citing a study by Groff et al (2018), the report states:

Interestingly, the researchers also found that, while prosecution rates went up when BWC footage existed, that BWC footage had that effect only when prosecutors failed to review the footage prior to charging....

That is actually not what the study finds.

Cases in which BWC video was available were prosecuted at much higher rates than cases in which BWC footage was not available. In addition, cases in which BWC video was available and viewed by prosecutors were prosecuted at a slightly lower rate than cases in which BWC video was available and not viewed by prosecutors, but the difference (for viewed versus not viewed) was not statistically significant.

Here's a table from the paper, showing the difference in charging rates when BWC footage was available versus not available, with its figure legend.

*Table 23 contains the results of three alternative multinomial logistic regression models predicting filing outcome, with coefficients exponentiated to represent relative risk ratios. Relative risk ratios greater than 1 indicate positive effects, whereas those less than 1 indicate negative effects. Model 1 is the unadjusted model that does not control for covariates, Model 2 is the entropy weighted model, and Model 3 uses the 1-to-1 propensity score matched sample. Recall, outcomes include misdemeanor file, hearing, other, with misdemeanor reject serving as the reference group.*

Table 23. Effects of BWC Video Availability on Filing Outcomes

Outcome	Model 1 Unadjusted	Model 2 Entropy	Model 3 PSM
<i>Misdemeanor File</i>			
Video Available	1.86*** (0.09)	2.42*** (0.13)	2.49*** (0.15)
<i>Hearing</i>			
Video Available	2.54*** (0.21)	1.26** (0.11)	1.22* (0.12)
<i>Other</i>			
Video Available	0.64 (0.16)	0.65 (0.16)	0.59 (0.16)
<i>vs. Misdemeanor Reject</i>			
Loglikelihood	-98141.50	-5050.82	-5096.32
$\chi^2$	201.27***	357.62***	274.32***

*Treatment: Video Available.*

*Control: Video Not Available.*

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Exponentiated coefficients (i.e., Relative Risk Ratios) are reported. Standard errors are reported in parentheses.

Entropy=Entropy Weighted Control; PSM=Propensity Score Matched Sample

After controlling for covariates, the odds of being charged for a misdemeanor are ~2.4 times greater if BWC footage is available. And the difference (a greater charging rate when BWC footage is available) is highly statistically significant ( $p < 0.001$ ).

The data just shows the difference in filing rates in cases with or without BWC video. Theoretically, this could be due to either an increase in charging for cases with BWC video or a decrease in charging for cases without BWC video. However, the latter explanation appears fairly implausible in the case of the data analyzed by Groff et al.

The authors note: “Across the entire study period, cases where BWC evidence was available represented a very small fraction of all cases” (and they provide data for the number of BWC videos made available each month, that prosecutors could use, and indeed it was very small relative to the number of cases in which Los Angeles prosecutors were making charging decisions). Having BWC footage available in only a very small fraction of cases should not cause a large (2.4 fold) reduction in charging rates in all the cases that lack BWC footage, so as to produce the pattern observed in this study. Though the authors also noted that the number of BWC videos available was surging (and when a point is reached when most cases have BWC video available, one could imagine that prosecutors might be loath to charge cases without it).

The study also examined charging rates when BWC video was available and viewed versus when it was available and not viewed. See tables 24 and 25.

*Table 24 contains the results of three alternative models estimating the effects of video viewing on filing outcomes. The unadjusted model suggests that the relative likelihood of a misdemeanor filing outcome is 43 percent lower when a video is viewed before the filing decision as compared to cases where available video was not viewed prior to the filing decision. However, once accounting for demographics, crime type, and other covariates, both the entropy weighted and propensity score matched models do not find that video viewing significantly reduces the likelihood that a case is filed. Compared to misdemeanor case rejection, the relative likelihood for a misdemeanor filing, case hearing, or other outcome are all lower but not significantly so.*

Table 24. Treatment Effects Estimates of BWC Video Viewing on Filing Outcomes

<i>Outcome</i>	Model 1 Unadjusted	Model 2 Entropy	Model 3 PSM
<i>Misdemeanor File</i>			
Viewed Before Filing Decision	0.57*** (0.07)	0.75 (0.12)	0.79 (0.14)
<i>Hearing</i>			
Viewed Before Filing Decision	0.42*** (0.11)	0.72 (0.20)	0.69 (0.22)
<i>Other</i>			
Viewed Before Filing Decision	0.53 (0.41)	0.22 (0.17)	0.20 (0.23)
<i>vs. Misdemeanor Reject</i>			
Loglikelihood	-2142.25	-618.49	-545.37
$\chi^2$	21.60***	6.48	3.76

*Treatment: Video Viewed Before Filing Decision.*

*Control: Video Not Viewed.*

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Exponentiated coefficients (i.e., Relative Risk Ratios) are reported. Standard errors are reported in parentheses.

Entropy=Entropy Weighted Control; PSM=Propensity Score Matched Sample

The relevant columns in table 24 are for models 2 and 3. In these, covariates (such as race, age, gender, agency originating the case, etc.) are controlled for. There is no statistically significant differences between cases in which video was viewed versus not viewed, though the values when video was viewed are nominally lower (risk ratio <1).

*Table 25 contains the results of two alternative multinomial logistic regression models, an unadjusted model and a MMWS weighted model that estimate the effect of the multivalued treatment on filing outcomes. Turning attention to the MMWS model that accounts for covariates, results indicate that having a video available but not viewed is associated with a 178*

percent greater likelihood of filing a case ( $p < 0.001$ ), whereas viewing an available video increases the likelihood a case will be filed, as compared to rejected, by 101 percent ( $p < 0.01$ ). That is, the relative likelihoods are 2.78 and 2.01 times greater. This finding is not surprising as the relative likelihood for video availability generally (i.e., when these categories were combined) was 2.49 (see Table 23). Post-hoc tests found the coefficients of 'viewed before filing decision' and 'not viewed' to not significantly differ ( $p = 0.20$ ), which confirms findings reported in Table 24.

Table 25. Treatment Effects Estimates of BWC Video Availability and Viewing on Filing Outcomes

Outcome	Model 1 Unadjusted	Model 2 MMWS
<i>Misdemeanor File</i>		
Not Viewed	2.03*** (0.11)	2.78*** (0.22)
Viewed Before Filing Decision	1.16 (0.14)	2.01** (0.48)
<i>Hearing</i>		
Not Viewed	2.87*** (0.25)	1.50*** (0.17)
Viewed Before Filing Decision	1.21 (0.29)	1.79 (0.77)
<i>Other</i>		
Not Viewed	0.70 (0.19)	0.85 (0.26)
Viewed Before Filing Decisions	0.38 (0.27)	0.13** (0.10)
<i>vs. Misdemeanor Reject</i>		
Loglikelihood	-98131.21	-67743.26
$\chi^2$	215.92***	213.25***

Multivalued treatment: 1) Video Not Viewed, 2) Video Viewed Before Filing Decision.

Control: Video Not Available.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Exponentiated coefficients (i.e., Relative Risk Ratios) are reported. Standard errors are reported in parentheses.

MMWS=Marginal Mean Weighting through Stratification

The column for model 2 is the one to look at. It shows a large increase in charging rates when BWC video is available, whether or not it is viewed, but when it is viewed before the charging decision, the increase is slightly lower (a 2.01 fold rather than 2.78 fold increase).

The study concludes: “In sum, when BWC evidence is associated with a case, the likelihood that the case is filed increases. However, there is no discernable difference in case filing between videos that are not viewed and those that are viewed before the filing decision date.”

The study also sampled a smaller subset of cases with survey data from prosecutors, and noted that in those cases:

BWC video was viewed by the filing attorney 1.6% (n = 77) of the time and not viewed 98.4% (n = 4756) of the sampled cases matched to CCMS (n =4833) (Table 11). Cases where video was viewed had a lower filing percentage (45.5% versus 51.9%) and a higher rejection rate (45.5% versus 39.0%). If the same proportions occurred in a larger sample, it would suggest that the use of BWC evidence by attorneys reviewing cases reduces the proportion of cases being filed.

So again, there was a slightly lower charging rate in cases in which the video was viewed. However, the sample size for cases in which video was viewed was small, no statistical analysis was done with this data, and no correction was performed for covariates (race, age, etc.).

The upshot is: cases in which BWC video is available and viewed might have a slightly lower charging rate than cases in which BWC video is available and not viewed. However, cases in which BWC video is available have a much higher charging rate than cases in which BWC footage is not available. If there is a decrease in charging rates upon viewing video, it appears to be swamped by the large increase in charging rates for all cases with BWC video available.

In other words, this assertion in the BWC Committee report:

“the researchers also found that, while prosecution rates went up when BWC footage existed, that BWC footage had that effect only when prosecutors failed to review the footage prior to charging”  
is flatly wrong.