




F I N N

THE JOHN F. FINN INSTITUTE
FOR PUBLIC SAFETY, INC.

Public Surveillance Cameras: A Synopsis

Sarah J. McLean, Ph.D.
Robert E. Worden, Ph.D.

April 2010



423 New Karner Rd
Suite 5
Albany, NY 12205
PH: 518-456-6323
FAX: 518-456-6312

Robert E. Worden, Ph.D.
Director

Sarah J. McLean, Ph.D.
Associate Director

The John F. Finn Institute for Public Safety, Inc. is an independent, not-for-profit and non-partisan corporation, whose work is dedicated to the development of criminal justice strategies, programs, and practices that are effective, lawful, and procedurally fair, through the application of social science findings and methods. The Institute conducts social research on matters of public safety and security – crime, public disorder, and the management of criminal justice agencies and partnerships – in collaboration with municipal, county, state, and federal criminal justice agencies, and for their direct benefit. The findings of the Institute’s research are also disseminated through other media to criminal justice professionals, academicians, elected public officials, and other interested parties, so that those findings may contribute to a broader body of knowledge about criminal justice and to the practical application of those findings in other settings.

The Finn Institute was established in 2007, building on a set of collaborative projects and relationships with criminal justice agencies dating to 1998. The first of those projects, for which we partnered with the Albany Police Department (APD), was initiated by John Finn, who was at that time the sergeant who commanded the APD’s Juvenile Unit. Later promoted to lieutenant and assigned to the department’s Administrative Services Bureau, he spearheaded efforts to implement problem-oriented policing, and to develop an institutional capability for analysis that would support problem-solving. The APD’s capacity for applying social science methods and results thereupon expanded exponentially, based on Lt. Finn’s appreciation for the value of research, his keen aptitude for analysis, and his vision of policing, which entailed the formulation of proactive, data-driven, and – as needed – unconventional strategies to address problems of public safety. Lt. Finn was fatally shot in the line of duty in 2003. The Institute that bears his name honors his life and career by fostering the more effective use of research and analysis within criminal justice agencies, just as Lt. Finn did in the APD.

Introduction

The use of video surveillance technology is an increasingly popular crime control intervention.¹ Widely embraced abroad, particularly in the United Kingdom, video surveillance technology is now rapidly expanding in the United States, with many law enforcement agencies employing video technology.

Surveillance cameras offer a host of applications for use by law enforcement. These functions primarily include: in-car cameras to record citizen-police interactions, capturing video and audio footage of interrogations, covert investigative surveillance to aid in evidence gathering and tactical support, public surveillance, and to support prosecution. Surveillance technology varies widely in its application. However, to the best of our knowledge, evaluation research has primarily focused on the effectiveness of public surveillance technology as a means to deter and prevent street level crime. There is a body of literature suggesting that public video surveillance can be an effective tool to reduce crime and disorder, and it is this application – the use of surveillance cameras in public space – on which we focus here.

The presence of cameras may reduce crime through a number of different mechanisms. Camera footage may be used to identify, prosecute and convict offenders, yielding an incapacitation effect and thus preventing the crimes that incarcerated offenders would commit if they were free. Cameras, and the threat of detection, might also serve to deter would-be offenders, so long as the cameras are visible and/or publicity about cameras is sufficient to raise offenders' awareness. Furthermore, cameras might prompt or amplify the effects of other crime prevention activities. For example, increases in the number of citizens in an area, due to the presence of cameras, may, in turn, cause target hardening and related reductions in offending, producing deterrence through natural surveillance.² More generally, the use of camera surveillance corresponds with an emphasis on place-based crime reduction strategies that focus on crime hot-spots.³

¹ London has an estimated 500,000 public cameras and is regarded as having the most extensive public camera system. In the US, Chicago has one of the most extensive systems with an estimated 10,000 cameras in its integrated network of public and private cameras. Babwin, Don. (2010, April, 6). An American Metropolis Where Eyes are Everywhere. (Associated Press). Retrieved April 7, 2010 http://news.yahoo.com/s/ap/20100406/ap_on_re_us/us_chicago_cameras_everywhere

² Ratcliffe, J. (2006). *Video Surveillance of Public Places*. Washington, DC: U.S. Department of Justice, COPS; Welsh, D.P. and Farrington, D.P. (2009). "Public area CCTV and crime prevention: An updated systematic review and meta-analysis." *Justice Quarterly*: 1-30.

³ Evidence from independent, scientific evaluations suggests that strategically focusing enforcement efforts on the places, people, and conditions associated with violent crime is effective. Camera surveillance applies the logic of crime and place research as cameras are typically found in hot spots in an effort to modify behavior in hot spot locations, and to reduce opportunities for criminal activity; Mazerolle, L., Hurley, D. and Chamlin, M. (2002). "Social behavior in public space: An analysis of behavioral adaptations to CCTV." *Security Journal*, 15(3): 59-75.

In this brief report we summarize the components of a public video surveillance system, we review the evidence on effectiveness, and we offer some guidance on the operational and policy considerations to which police managers might pay heed.

Components

Camera Technology

Systems of public surveillance cameras vary in their level of sophistication and capabilities. Surveillance systems can be broadly typified in terms of visibility: systems vary in the extent to which they are overt, semi-covert or covert. In an overt system – typically geared toward deterring would-be offenders - the cameras are in view of the public and are often accompanied by signage indicating that the location is under surveillance. In a semi-covert system the cameras are in public view but protected in casing and, thus, less obvious. A covert system – for undercover surveillance or detection – seeks to hide camera locations. Public surveillance cameras can be pole mounted, fixed to a building structure, or deployed via a mobile unit to various geographic locations within a network.

Many cameras offer the ability to pan, tilt, and zoom when manually manipulated, which is particularly helpful when monitoring live feed of an emerging incident or offering support for investigations. Cameras can be ‘fixed’ allowing only one specific area to be viewed; conversely they can be programmed to automatically operate on a patrol sequence, allowing for more coverage area.⁴ Systems can vary by the means the images are transmitted, with public IP networks serving as a popular cost effective option and as a sound means for transmitting higher quality images.

Furthermore, surveillance can be active or passive. In an *active* surveillance system, the camera footage can be viewed in real time on a central monitor (often located in a control room) where an operator can monitor or manipulate the cameras. Real-time monitoring potentially allows for a preventive approach whereby criminal behaviors may be detected and officers dispatched to the scene before a criminal act is carried out. A *passive* system allows surveillance footage to be recorded and archived so that it can be retrieved and extracted at a later time. Passive surveillance is presumably beneficial to support investigations and aid in prosecutions. For example, jurisdictions could routinely or only by request, pull footage of incidents known to have occurred in a coverage area. To date, there is a shortage of research exploring the value in devoting resources toward identifying incidents in coverage areas, extracting footage, and viewing the images for information. Advances in technology now make it possible to link

⁴ When operating on patrol sequence, a camera can pan each preset location for a predetermined length of time before moving to the next. Patrol sequences allow a single camera more viewing coverage than a fixed camera system, and while patrol sequencing sacrifices the duration of coverage for greater spatial range, it is often considered superior to fixed location cameras.

video surveillance cameras to acoustic or motion sensors (e.g. video cameras linked to gunshot detections systems).

Costs

As with most electronic technology, video surveillance capabilities are continuously advancing, and, with that, come associated costs. While costs may vary depending on the level of sophistication, it is likely that few local governments have the resources to maintain an effective surveillance system absent external funding support. Funds must be secured to build the network infrastructure and to purchase equipment. Maintenance, repairs, and other costs must also be budgeted to guarantee sustainability. As technology develops, the purchase of software and hardware upgrades may be necessary. In some occurrences, the purchase of new cameras or the relocation of existing units may be necessary as crime trends shift. Other financial considerations are the human element of any surveillance system – securing the staff to monitor, view and extract footage; personnel to draft and supervise adherence to policies governing the use of cameras; and personnel to respond to funding opportunities. Cities that have successfully created a public surveillance system have turned to local, state, and federal funding sources as well as establishing private partnerships with local business and other agencies. To minimize costs jurisdictions can utilize dummy cameras (typically in conjunction with real cameras) which do not capture any images yet look identical to their real counterparts, enhancing perceptions about the size of camera coverage areas.

In a successful camera project in Weston⁵, entrepreneurial project planners began the surveillance system with federal funding and used the pilot project as a means to generate state support for the work. The group was able to pull in funds from the State Division of Criminal Justice Services. From there, they further expanded the project with grants from the Department of Housing and Urban Development. Just a few years later, the Weston camera project now includes partners from local businesses and colleges who provide funds for the purchase of technology and to support infrastructure.

Outcomes

The United Kingdom has been at the forefront of using cameras to monitor public space and, thus, our understanding of how camera surveillance works is based mainly on experience and research there. Extant evidence from evaluation research on the crime-reduction effects of camera surveillance is inconclusive, subject to two contrasting interpretations, one stressing that the figurative crime control glass is half-full, and the other emphasizing that the glass is half-empty. The half-empty view holds that the

⁵ Weston is a pseudonym for a Northeastern US city.

research indicates that cameras do not work all the time, while the corresponding half-full perspective is that cameras do work some of the time.⁶

The efficacy of public surveillance has received research attention, and, as is the case with many emerging areas of study, the findings are somewhat difficult to draw conclusions across given the variation in design and methods as well as the rigorousness and objectivity of the work.

Walsh and Farrington conducted a systematic review of camera surveillance in which they paid heed to variation in the rigorousness of prior evaluation work.⁷ The authors reviewed the literature and included only the following types of evaluations in their study:

- those studies where CCTV was the main intervention,
- studies with crime as an outcome measure,
- studies that included both experimental and control areas, and
- studies where the experimental and control areas had a pre-intervention level of at least 20 crimes.⁸

Using the above criteria for inclusion the authors conducted a systematic review of twenty-two evaluations and concluded that camera surveillance does reduce crime. Half of the studies in their analysis indicate support for a crime reduction effect associated with CCTV, twenty-two percent of the works indicated a null effect on crime, and twenty-two percent actually identified a negative association between CCTV and crime. Overall, Welsh and Farrington conclude that the presence of cameras is associated with a crime reduction effect, an overall reduction of four percent.⁹

In their more recent meta-analysis of surveillance camera evaluations (using the same four criteria listed above), Welsh and Farrington studied effects of surveillance cameras on crime in four types of areas: city and town centers, public housing, public transport, and car parks.¹⁰ This meta-analysis found that surveillance cameras can be most effective in reducing crime in car parks, and in reducing vehicle crimes (as opposed to violent crimes). By far, most of the evaluations included in this meta-analysis were completed in the United Kingdom, though four were from the U.S. and one each was from Sweden, Norway, and Canada. Overall, in the forty-one studies included in this

⁶ Tilley, N. (1997). "Whys and wherefores in evaluation the effectiveness of CCTV." *International Journal of Risk, Security and Crime Prevention*, 2(3): 175-185.

⁷ Welsh, B.C. and Farrington, D.P. (2003). *Effects of Closed Circuit Television Surveillance on Crime: Protocol for a Systematic Review* (3rd revision), submitted to the Campbell Collaboration Crime and Justice Group.

⁸ Welsh, B.C. and Farrington, D.P. (2002). *Home Office Research Study 252: Crime Prevention Effects of Closed Circuit Television: A Systematic Review*. London: Home Office Research, Development and Statistics Directorate; Welsh, B.C. and Farrington, D.P. (2003). *Effects of Closed Circuit Television Surveillance on Crime: Protocol for a Systematic Review* (3rd revision), submitted to the Campbell Collaboration Crime and Justice Group.

⁹ Welsh, B.C. and Farrington, D.P. (2002) and (2003), *ibid*.

¹⁰ Welsh, D.P. and Farrington, D.P. (2009). "Public area CCTV and crime prevention: An updated systematic review and meta-analysis." *Justice Quarterly*: 1-30.

meta-analysis, Welsh and Farrington found a sixteen percent reduction in the crime rate. However, they also found that, when results were divided by country, the UK showed a 19% significant effect on crime reduction, while the other countries from which evaluations were included did *not* show a desirable effect on crime. The authors note that this may be in part because: 1) the follow-up periods were longer for the evaluation studies conducted in the UK than for those in the other countries, perhaps not giving the surveillance camera methods enough time to show an effect; 2) about half of those methods in the UK included other crime-reduction interventions (for example, improved lighting); and 3) cultural contexts such as less acceptance for public surveillance cameras in the US than in the UK.

Other evaluations have shown desirable effects on crime in the US. For example, an outcome evaluation studying the impact of camera surveillance yielded crime reduction findings consistent with previous studies but found cameras to be particularly successful in reducing disorder. The impacts of 11 public surveillance cameras were estimated on crime and disorder. Three of the 11 cameras were window versus pole mount. After the introduction of cameras, total monthly crime and Part I crime increased within 150 feet of all three window mount cameras in the post-intervention period. These increases were felt despite citywide declines at that same time.

The more visible pole mount cameras proved more effective at reducing crime – total crime in the area 150 feet around every pole mount camera in the evaluation declined. Moreover, in some locations the coverage areas experienced declines while citywide crime was increasing. Additionally, in other locations citywide crime decreases were of a lesser magnitude than those in coverage areas during the same time.

Effects of cameras on disorder were also estimated. Again, window mount cameras had little estimated impact with only one of the three experiencing lower disorder levels in the area 150 feet around the camera in the post-intervention period. On the other hand, all pole mount cameras were associated with declines in at least one disorder category. In fact, nearly all disorder categories (e.g. parking complaints, calls to report drug activity, persons annoying, fights and shots fired) were affected similarly.¹¹

Proactive camera usage may also decrease crime; though to date there are few rigorous evaluations (of which we are aware) assessing the efficacy of the more proactive applications of cameras. One exception is a study in the United Kingdom that examined the effects of CCTV on violence detection and injury. Researchers found that cameras were associated with increased police detection of violence and a reduction in injuries. The study authors posit that, when monitored, cameras may lead to faster police response to violent offenses and, in turn, a reduction in the incidence and seriousness of injury.¹²

¹¹ McLean, S.J., Worden, R.E., Kim, M., and Garmley, T. (2008). *Weston's Video Surveillance Project: An Outcome Evaluation*. Albany, NY: The John F. Finn Institute for Public Safety, Inc.

¹²; Sivarajasingram, V., Shepherd, J.P. and Matthews, K. (2003). "Effect of urban closed circuit television on assault injuries and violence detection." *Injury Prevention*, 9(4): 312-316.

As with other place-based crime prevention strategies, we would be properly concerned about the potential for camera surveillance to displace crime. The concern with displacement is that crime is not prevented but rather relocated, producing no crime reduction benefit at all. Displacement is more complicated than that, however. Crime may be *spatially* displaced to areas that do not have public surveillance, *temporally* displaced to times when cameras themselves are less visible or when darkness degrades the camera images, and *tactically* displaced in that one method of committing a crime is substituted for another presumed to be less susceptible to surveillance (e.g. from open air drug markets to indoor drug markets).¹³ Much research that has focused on the displacement effects of camera surveillance has not detected geographic displacement.¹⁴ Moreover, there is a body of research which has indicated some place-oriented interventions produce not a displacement effect, but rather a “diffusion of benefits”: the positive, crime prevention effects of the interventions “spilled over” into surrounding areas.¹⁵

Program Considerations/Options/Implications

Research on the effects of camera surveillance on crime and disorder is still in its infancy and many of the potential benefits of CCTV, as well as the numerous law enforcement applications of surveillance, remain untested. Moreover, even though the crime reduction effect of public surveillance has been the subject of numerous evaluation studies, additional research should allow for longer post-intervention periods, the inclusion of appropriate controls for an experimental design, and, where possible,

¹³ Spatial displacement could be delayed and/or incomplete, as offenders adapt to the strategy, and inasmuch as other locations are probably not as conducive to criminal activity, any such displacement still yields crime reduction benefits. Moreover, some forms of displacement may be, at the margin, beneficial; tactical displacement of open-air drug markets to covert, more discreet drug markets, for example, may be preferable, in that the latter are associated with fewer public nuisances. One of the most inclusive reviews of the literature on the issue concludes that “displacement is a possible, but not inevitable consequence of crime prevention. Further, if displacement does occur, it will be limited in size and scope;” Hesseling, R.B.P. (1995). “Displacement: A review of the empirical literature.” In: Clarke, R.V. (Ed.) *Crime Prevention Studies* (Vol. 2) (pp 197-230), Monsey, NY: Criminal Justice Press.

¹⁴ Central Research Unit, The Scottish Office. (1998). “Does closed circuit television prevent crime?” *Crime and Criminal Justice Research Findings*, 8. Edinburgh, Scotland: Central Research Unit. ; Welsh, B.C. and Farrington, D.P. (2002). *Home Office Research Study 252: Crime Prevention Effects of Closed Circuit Television: A Systematic Review*. London: Home Office Research, Development and Statistics Directorate Ratcliffe, J. (2006). *Video Surveillance of Public Places*. Washington, DC: U.S. Department of Justice, COPS. However, Ratcliffe and his colleagues, in a later study, found a geographic displacement effect in two of eight areas evaluated in their research on the crime-reduction effects of CCTV; in one of these areas the reductions of crime in the target area outweighed the displacement effect in the buffer area, while in the other area experienced the reverse- reductions of crime in the target area were outweighed by displacement in the buffer area. Ratcliffe, J.H., Taniguchi, T. and Taylor, R.B. (2009). “The crime reduction effects of public CCTV cameras: A multi-method spatial approach.” *Justice Quarterly*: 1-25.

¹⁵ Ratcliffe, J.H., Taniguchi, T. and Taylor, R.B. (2009). “The crime reduction effects of public CCTV cameras: A multi-method spatial approach.” *Justice Quarterly*: 1-25.

should include evaluation designs that directly test for evidence of diffusion and displacement.

The extant literature offers support for the efficacy of public video surveillance. Studies conducted to date suggest that camera surveillance is best suited for small, defined areas (e.g. parking garages) and for property crimes.¹⁶ The evidence that cameras are more often associated with reductions in more pre-meditated or planned crimes suggests a deterrent effect.¹⁷ Moreover, it appears that crime and disorder reduction associated with public surveillance might be amplified if program developers draw attention to the presence of cameras (though the extent to which the effect signage has on raising and then maintaining awareness and deterring behavior remains untested).¹⁸ Where there is evidence that cameras may create crime reduction effects, there is also evidence that these effects may decay over time as publicity and awareness of cameras decrease.¹⁹

The placement of cameras is a key component of a public surveillance system. Placement decisions should be guided by analysis, though practical considerations of the ability to tie individual cameras into existing infrastructure and the entire camera network, along with identifying locations with unobstructed views, must weigh into the placement decision. Moreover, as the number and type of sponsors diversifies so too, one might presume, will the opinions and factors that go into camera placement decisions. For example, some sponsors may tie fund allocation to stipulations about camera placement (e.g. around schools, outside a particular business or in a state or federally supported housing development).

Localities considering the adoption or expansion of a public surveillance system should be mindful of public opinion. In the City of Weston, planners report no public resistance to the project and attribute this to the fact that the project began with citizen inclusion thus creating a sense of shared ownership. Project developers should, from the outset, address concerns about privacy and civil liberties. Additionally, we recommend that developers anticipate requests from the legal community, particularly defense attorneys, to obtain footage. Policies should be drafted that clearly state the uses to which cameras can be put and which address the parameters surrounding footage access, storage and maintenance.

¹⁶ Ratcliffe, J. (2006). *Video Surveillance of Public Places*. Washington, DC: U.S. Department of Justice, COPS.; Welsh & Farrington, 2004 Brown, B. (1995). *CCTV in Town Centers: Three Case Studies (Crime Detection and Prevention Series, paper number 68)*. London: Home Office Police Department, Police Research Group.

¹⁷ Spriggs A., Argomaniz, J.; Gill, M. and Bryan, J. (2005). *Public Attitudes towards CCTV: Results from the Pre-Intervention Public Attitude Survey Carried Out in Areas Implementing CCTV*. London: Home Office.

¹⁸ The Weston experience –in which all overt pole mount cameras were associated with crime and/or disorder reduction, while not a single one of the more covert building mount cameras were associated with such reductions- supports the hypothesis that signage may still further enhance crime and/or disorder reduction effects of surveillance cameras.

¹⁹ Brown, B. (1995). *CCTV in Town Centers: Three Case Studies (Crime Detection and Prevention Series, paper number 68)*. London: Home Office Police Department, Police Research Group.