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Problem-Oriented Guides for Police
Response Guides Series
No. 4

Video Surveillance of Public Places

by Jerry Ratcliffe

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Video Surveillance of Public Places

Jerry Ratcliffe

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About the Response Guides Series

The response guides are one of three series of the *Problem-Oriented Guides for Police*. The other two are the problem-specific guides and problem-solving tools.

The *Problem-Oriented Guides for Police* summarize knowledge about how police can reduce the harm caused by specific crime and disorder problems. They are guides to preventing problems and improving overall incident response, not to investigating offenses or handling specific incidents. The guides are written for police—of whatever rank or assignment—who must address the specific problems the guides cover. The guides will be most useful to officers who:

- understand basic problem-oriented policing principles and methods
- can look at problems in depth
- are willing to consider new ways of doing police business
- understand the value and the limits of research knowledge
- are willing to work with other community agencies to find effective solutions to problems.

The response guides summarize knowledge about whether police should use certain responses to address various crime and disorder problems, and about what effects they might expect. Each guide:

- describes the response
- discusses the various ways police might apply the response
- explains how the response is designed to reduce crime and disorder

- examines the research knowledge about the response
- addresses potential criticisms and negative consequences that might flow from use of the response
- describes how police have applied the response to specific crime and disorder problems, and with what effect.

The response guides are intended to be used differently from the problem-specific guides. Ideally, police should begin all strategic decision-making by first analyzing the specific crime and disorder problems they are confronting, and then using the analysis results to devise particular responses. But certain responses are so commonly considered and have such potential to help address a range of specific crime and disorder problems that it makes sense for police to learn more about what results they might expect from them.

Readers are cautioned that the response guides are designed to *supplement* problem analysis, not to *replace* it. Police should analyze all crime and disorder problems in their local context before implementing responses. Even if research knowledge suggests that a particular response has proved effective *else*where, that does not mean the response will be effective *every*where. Local factors matter a lot in choosing which responses to use.

Research and practice have further demonstrated that, in most cases, the most effective overall approach to a problem is one that incorporates several different responses. So a single response guide is unlikely to provide you with sufficient information on which to base a coherent plan for addressing crime and disorder problems. Some combinations of responses work better than others.

Thus, how effective a particular response is depends partly on what other responses police use to address the problem.

These guides emphasize effectiveness and fairness as the main considerations police should take into account in choosing responses, but recognize that they are not the only considerations. Police use particular responses for reasons other than, or in addition to, whether or not they will work, and whether or not they are deemed fair. Community attitudes and values, and the personalities of key decision makers, sometimes mandate different approaches to addressing crime and disorder problems. Some communities and individuals prefer enforcement-oriented responses, whereas others prefer collaborative, community-oriented, or harm-reduction approaches. These guides will not necessarily alter those preferences, but are intended to better inform them.

For more information about problem-oriented policing, visit the Center for Problem-Oriented Policing online at www.popcenter.org. This website offers free online access to:

- the *Problem-Specific Guides* series
- the companion *Response Guides* and *Problem-Solving Tools* series
- instructional information about problem-oriented policing and related topics
- an interactive training exercise
- online access to important police research and practices.

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Introduction

The purpose of this guide is to provide an overview of the use of closed circuit television (CCTV) systems as a problem-oriented policing response to a crime problem. This guide explores the benefits and problems associated with CCTV and summarizes the findings of numerous CCTV evaluations (see Appendices A and B).

The public is now used to being watched by surveillance technology in many commercial and semi-public establishments such as banks, casinos, convenience stores, and shopping malls. About three-quarters of small businesses record who comes into their location on CCTV.[1] There are systems that recognize license plates on moving vehicles and systems that monitor traffic flow and catch people violating traffic laws. Although these systems fall under the label of video surveillance technology, they are not included in the discussion, as this guide is intended for the reader considering CCTV as a crime prevention option for a broader range of property and personal crimes in public places. Examples of relevant public spaces include:

- public parks
- pedestrianized streets in city centers
- outdoor public parking areas
- residential neighborhood streets
- public transport interchanges
- areas outside public facilities such as sports arenas and subway stations.

Although some see CCTV as a panacea to crime and disorder in public places, others view the growth of CCTV as an intrusion, with visions of an Orwellian "Big Brother" invading personal privacy. This guide will help you better understand the effectiveness of CCTV and address some constitutional and privacy concerns. The guide's two appendices summarize much of the available research about the effectiveness of CCTV as a crime control measure. After you read this guide, you should not only be aware of the strengths and weaknesses of CCTV in a public setting, but also be able to answer many of the public's concerns.

What is CCTV?

Closed circuit television (CCTV) is a surveillance technology. More specifically, it is "a system in which a number of video cameras are connected in a closed circuit or loop, with the images produced being sent to a central television monitor or recorded."[2] The term closed circuit television was originally used to differentiate between public television broadcasts and private camera-monitor networks. These days CCTV is used as a generic term for a variety of video surveillance technologies.

Although some systems are extremely sophisticated, employing bullet-proof casing, night-vision capability, motion detection, and advanced zoom and automatic tracking capacities, many existing systems are more rudimentary. More common CCTV installations include a number of cameras connected to a control room where human operators watch a bank of television screens.

Many (but not all) will have a recording facility that works in one of the following ways:

- recording the images from a selected camera
- using multiplex recording where the image switches from camera to camera thus allowing one tape to see every camera view on a rotating basis
- employing digital technology to record images from multiple cameras at once.

Often an operator can pan, tilt, and zoom a number of cameras. As the technology has developed, cameras with a full range of movement and control facilities have become the norm, and it is likely there will be continual improvements in optical and digital zoom, color, and pixel[3] resolution, all of which will enhance image quality.

Including the human element, we can categorize systems into *passive* – where banks of recording devices record images that can be replayed if a crime is reported, though nobody actively monitors the images, and *active* – where a person sits and monitors a series of displays in real time. In reality, many systems are a hybrid, where recording devices record all images, and an operator scans from monitor to monitor, concentrating on some and ignoring others.

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With an overt CCTV camera, the public (and offenders) can clearly see the surveillance camera and determine the direction in which it is facing.

Although most CCTV schemes employ overt cameras, which are obvious, it is possible to find systems in which cameras are mounted into protective shells or within frosted (polycarbonate) domes. Often termed semi-covert, these camera systems make it more difficult for people under surveillance to determine if they are being watched, as it is usually impossible to figure out in which direction the camera is facing. Some cameras employ dummy lenses to conceal the surveillance target. The advantage of using a one-way transparent casing is that it provides for the possibility of retaining the overt impression of

surveillance—and hence a deterrent capacity—without having to place a camera in every housing or to reveal to the public (and offenders) the exact location under surveillance.[4]

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This semi-covert CCTV camera may have a crime prevention advantage over an overt system because offenders can never be sure in which direction that camera is facing.

In addition to the cameras, the cabling to feed images to the monitors, and the recording devices, a CCTV system also requires an operator to watch the monitors or review the recordings. Because of this, a full description of CCTV should not ignore the human element. Reviewing video, acting on the information, and preparing video evidence for court all create a potential need for ongoing office space and personnel costs over and above any initial capital expenditure. There may also be extra demands placed on local law enforcement as a result of increased surveillance of an area. With increased surveillance, more public order crime may come to the notice of police. With technological and personnel costs, CCTV comes at a considerable price. Though

the technological costs continue to fall, the human costs do not. Therefore, you must give CCTV serious consideration before you purchase and install a system to combat a crime problem. A later section details some of the factors to consider before deploying a CCTV solution.

In summary, there is a range of CCTV configurations available. A complete CCTV system (for the purposes of this report) comprises:

- one or more cameras that view a public area
- a mechanism to transmit video images to one or more monitors
- video monitors to view the scene—usually accompanied by recording devices such as a time-lapse video recorder or computer hard drive for digital images
- a viewer or camera operator, such as a police officer or security guard.

Variations to this basic configuration include:

- the ability to transmit images across the Internet
- motion sensors that activate the camera when activity is detected
- normal or infrared lighting to enhance picture quality at night
- a pan and tilt capacity that allows an operator to change the camera's viewing direction, zoom, and focus.

More advanced systems can include limited facial recognition technologies or estimate the location of firearm incidents, though more advanced systems often rely on other technology. For example, a facial recognition program is of limited value unless it is linked to a computer database of suspect photos. Intelligence systems that can detect unusual activity (such as fights in the street) are also under development.[5]

In addition to determining if you want to install a CCTV system (and what type), you should consider how sophisticated you want it to be and if you have the resources to support it.

How CCTV Aims to Prevent Crime

A CCTV system is not a physical barrier. It does not limit access to certain areas, make an object harder to steal, or a person more difficult to assault and rob. This does not mean it is not an example of situational crime prevention. It is highly situational, and as will be shown, does have some crime prevention capacity in the right situations. Although CCTV has many functions, the primary preventative utility is to trigger a perceptual mechanism in a potential offender. It seeks to change offender perception so the offender believes if he commits a crime, he will be caught. In other words, CCTV aims to increase the perceived risk of capture, a factor which, assuming the offender is behaving in a rational (or limited rational) manner, will de-motivate the potential offender.[6] For this crime prevention process to succeed, two elements must exist:

1. The offender must be aware of the cameras' presence.
2. The offender must believe the cameras present enough risk of capture to negate the rewards of the intended crime.

Consider the first element. If, for example, a CCTV system is initiated to stem a perceived increase in disorder crime in a town center, the crime prevention mechanism requires that potential offenders know they are being watched. Evidence suggests that even though implementers install a system, have a publicity campaign, and place signage, there is no guarantee the population will be aware of the cameras. In Glasgow, Scotland, 15 months after 32 cameras were installed in the city center, only 41 percent of those interviewed were aware of the

cameras.[7] These findings are similar to other research that found only one-third of respondents were aware they were within the vision of a public-street CCTV system.[8]

Not only are there limitations with the public's perception of the location of cameras, the second element (the presence of cameras affecting offenders' perception of risk) is not guaranteed. In theory, CCTV should provide the capable guardianship necessary to prevent a crime, but this concept requires that offenders demonstrate rationality in their behavior. There is certainly the suggestion, and some qualitative evidence, that potential offenders who are under the influence of alcohol or drugs may not care or remember that they may be under surveillance.[9] This may be a factor in the reason CCTV appears to be more effective in combating property crime than disorder and violent offenses.

There is a second mechanism whereby CCTV has the potential to reduce crime. The cameras may be able to assist in the detection and arrest of offenders. This crime prevention mechanism requires that police can respond in a timely manner to any significant incidents identified by camera operators, and that the local criminal justice system can pursue the offenders' conviction. This mechanism will work if incarcerated offenders are prevented from committing further crimes within the CCTV area (or other local area). Although there may be some initial crime reduction due to the installation and publicity of a new system, offenders may soon learn what types of incidents elicit a police response and the speed of that response. The availability of local resources is therefore a factor in the success of this mechanism.

The desire to catch an offender in the act is often the rationale behind the placement of hidden cameras, as by police in New Orleans.[10] Undoubtedly CCTV evidence is convincing, though CCTV's ability to reduce overall crime levels through detection (rather than prevention) is less convincing and arguably a less effective way of impacting crime. For this mechanism to be effective, the implementer must believe arrests are the best way to solve a crime problem. There is some evidence from Australia that increasing arrests can have a short-term benefit, but the benefit fades in the long term without a more preventative policy.[11]

An important consideration in the effectiveness of a surveillance technology is the type of crime to be tackled, because this impacts the criminals' ability to adapt. Although a CCTV system may reduce the likelihood of burglary at a commercial location within the range of the camera, there is some evidence that drug markets can continue operation in the presence of CCTV by changing their operating practices. For example, at one location some offenders met and discussed business in the cameras' presence, but concluded the transaction at another site.[12] In other CCTV areas, however, drug crime that could not successfully relocate or adapt to the cameras was eradicated.

Fake cameras have been employed in some instances. Poyner[13] reports that crime was reduced on public buses after the installation of both active and dummy cameras onboard a number of buses (indeed crime reduced on more buses than the ones fitted with any cameras, a concept known as a diffusion of benefits). It is therefore possible that fake cameras could achieve the same

preventative aim as active systems. However, if users of the space under surveillance are led to believe—through signs, for example—that they are being watched 24 hours a day and an incident occurs, the misrepresentation of a form of guardianship may have liability implications.

A third, more general mechanism by which CCTV may reduce crime is through an increase in collective efficacy. Welsh and Farrington[14] argue that if residents see CCTV cameras being installed in their neighborhood, this will signal to them a degree of investment in and efforts to improve their local area. They argue that this might lead to greater civic pride and optimism, and, as a result, lead to an increased level of informal social control among the local people. A counter to this argument is that overt cameras may instead lead to a neighborhood being labeled as high-crime, accelerating the process of social disorganization.

Other Benefits

A number of other benefits, beyond a reduction in crime, may be accrued from a CCTV system, including:

- reduced fear of crime
- aid to police investigations
- provision of medical assistance
- place management
- information gathering
- diffusion of benefits.

The following section describes these potential benefits in more detail.

Reduced Fear of Crime

Numerous studies have tried to determine if the presence of cameras in public places reduces fear of crime in people who use the area. These studies, many of which interviewed people in the CCTV area, have examined whether consumer buying has increased in areas with new CCTV systems. The general argument is that the area will benefit from a positive economic impact when people feel safer. The findings are mixed but generally show there is some reduced level of fear of crime among people in CCTV areas, but *only* among people who were aware they were in an area under surveillance. Most studies exploring the perception of surveillance areas found that less than half the interviewees were aware they were in a CCTV area. Reduced fear of crime in an area may increase the number of people using the area, hence increasing natural surveillance. It may also encourage people to be more security conscious.

Aid to Police Investigations

Regardless of the potential for a CCTV system to have a role in crime prevention, it can still make a contribution in a detection role. There are numerous examples of CCTV tapes aiding in an offender's conviction. Camera footage can also help identify potential witnesses who might not otherwise come forward to police. CCTV camera evidence can be compelling, though issues of image quality are a factor if CCTV images are used for identification purposes. If the cameras record an incident, and police respond rapidly and make an arrest within view of the camera (and the offender does not leave the sight of the camera), the recording of the incident can help investigators gain a conviction, usually through a guilty

plea. The potential to assist in police investigations may also drive offenders away from committing offenses that take time, as they run a greater risk of capture.

Provision of Medical Assistance

As a community safety feature, CCTV camera operators can contact medical services if they see people in the street suffering from illness or injury as a result of criminal activity (such as robberies and assaults) or non-crime medical emergencies. The ability to summon assistance is a public safety benefit of CCTV. Squires found that police are called about 10 to 20 times for every 700 hours of observation.[15]

Place Management

CCTV can be used for general location management. The cameras can be used to look for lost children, to monitor traffic flow, public meetings, or demonstrations that may require additional police resources, or to determine if alarms have been activated unnecessarily thus removing the need for a police response. Brown reports that some police commanders claim that assaults on police have reduced because the cameras allow them to determine the appropriate level of response to an incident, either by sending more officers to large fights, or by limiting the number of officers to a minor incident and avoid inflaming the situation.[16]

Information Gathering

Cameras can also be used to gather intelligence and to monitor the behavior of known offenders in public places (such as shoplifters in public retail areas). Camera operators often come to know the faces of local

offenders, and the cameras become a way to monitor their movements in a less intrusive manner than deploying plainclothes police officers. For example, officers in one city were able to gather intelligence on the behavior of individuals selling stolen goods. This intelligence was gathered remotely by CCTV cameras and enabled police to interdict in an organized and coordinated manner.[17] Although intelligence gathering is a potential benefit of CCTV, the use of intelligence gathered from CCTV to control public order through surveillance is perceived by some to be a threat to civil liberties.[18]

Diffusion of Benefits

Although rarely addressed in the research literature, there is also the distinct possibility that if offenders are aware and cautious in the presence of cameras, they may be unaware of the extent of the cameras' capabilities. As a result they may curtail their criminal activity in a wider area than that covered by the camera system. In effect, this extends the value of the cameras beyond their area of operation, a process criminologists call a *diffusion of benefits*.[19]

Unintended Consequences

Although not discussed in the literature of companies that sell cameras, CCTV systems may also have some unintended consequences. These possibilities, discussed in the following section, include:

- displacement
- increased suspicion or fear of crime
- increased crime reporting.

Displacement

There are many different types of displacement. Instead of a reduction in offenses, you may see offenders react by moving their offending to a place out of sight of the CCTV cameras. This is an example of spatial displacement. The evaluations in Appendix A suggest that spatial displacement can occasionally take place, but—as is the case with the general crime prevention literature[20]—the amount of crime displaced rarely matches the amount of crime reduced. There is usually a net gain for crime prevention. In all of the studies evaluated for this report, there is not a single example of a complete displacement of all crime from a CCTV area to a neighboring area. In the evidence presented here, spatial displacement is not the issue many people think it is, and in most of the studies there is little evidence of spatial displacement.

A CCTV system may also force the criminal fraternity to be more imaginative and to diversify operations. For example, researchers reported that in a London drug market the presence of cameras encouraged the drug market to move to a system where orders were taken by mobile phone and then delivered, and as such increased "the speed and ingenuity of the drug transaction."[21] This is an example of tactical displacement, where offenders change their modus operandi to continue the same criminal acts. Even though this particular introduction of CCTV may not be seen as an unqualified success, that the CCTV system forced a change in behavior is positive. CCTV is likely to have forced drug dealers to adopt a less effective way of conducting business, resulting in a net reduction in crime.

Increased Suspicion or Fear of Crime

A second concern is the possibility of a negative public response to the cameras' existence. In one survey, one-third of respondents felt that one purpose of CCTV was "to spy on people."[22] In other surveys, some city managers were reluctant to advertise the cameras or have overt CCTV systems for fear they would make shoppers and consumers more fearful. In other words, it is hoped that most citizens will feel safer under the watchful eye of the cameras, but CCTV may have the reverse effect on some people.

Remember that the primary crime prevention mechanism appears to work by increasing a perception of risk in the offender. With their reluctance to advertise the system, some city managers may be inadvertently reducing the cameras' effectiveness. By failing to advertise the cameras' presence, fewer offenders will be aware of the system and so will not perceive an increase in risk. On the whole, however, the public appears to be strongly in favor of a properly managed surveillance system for public areas.

Increased Crime Reporting

A third unintended consequence is the possibility that there will be an increase in recorded crime for some crime types. Many offenses have low reporting rates, especially minor acts of violence, graffiti, and drug offenses. CCTV operators are better placed to spot these offenses and this can actually drive up their recorded crime figures, as happened with narcotics offenses in Oslo Central Train Station.[23] This is not to say there was an increase in actual crime, just recorded crime. This is a potential outcome, and you may need to prepare other people involved in a future CCTV system of this possibility.

Evaluations of CCTV

A number of surveys have examined the perception of CCTV system managers and the public in regard to CCTV's crime prevention benefits.[24] These perceptions are usually positive, but evidence of actual crime reduction is harder to find. In the early days of CCTV, many evaluations were carried out, but a number of significant methodological considerations draw into question their reliability. Problems included a lack of control areas, independence of researchers, and simplistic approaches to temporal crime patterns.

Establishing if CCTV reduces crime is often difficult because a problem-oriented policing solution is rarely implemented without incident or without other crime prevention measures being applied at the same time. The implementation can often run into problems and commence late or in piecemeal fashion; crime rates naturally vary and show evidence of seasonality and long- and short-term trends; offenders are not necessarily aware of the system or become aware at different times (a theoretically crucial mechanism to CCTV success); and, there are quantitative challenges to the measurement and detection of displacement and diffusion of benefits. These issues make it difficult to detect the impact of CCTV alone. For example, although CCTV was a factor affecting the operation of four street drug markets in London, the cameras were often used with other crime prevention/detection efforts, such as large-scale arrests of sellers and situational crime prevention measures.[25]

In some cases, the sheer lack of crime inhibits any robust evaluation. For example, the state of Illinois is reported to have spent $4 million installing cameras at all interstate

rest areas. The cameras are monitored by state police. However both the Illinois Department of Transportation and the state police admit that serious crime at rest areas is extremely rare, with the latter identifying about 50 total crimes per year at all rest areas in the state.[26] With such low crime rates, it may be impossible to demonstrate any crime reduction benefit for the millions spent.

Assessing the impact of CCTV is also complicated by the system's design. CCTV is designed to see crime. As a result, the cameras may detect offenses that police would not otherwise notice. This may inadvertently increase the crime rate, especially for offenses that have low reporting rates—as noted in this guide. In the United States, the reporting rate of violent crime is only 50 percent.[27] A process by which police can become aware of street violence without having to rely on the cooperation of the general public may increase reporting rates substantially. This does not mean crime will go up, but it is possible recorded crime may rise, as was probably the cause for a significant increase in reported woundings and assault in more than one British town.[28] Although Appendix A conducts a meta-analysis of existing CCTV evaluations by predominantly exploring any recorded crime reductions, this may be a less than ideal way to evaluate CCTV.

There have been a number of evaluation reviews. Phillips[29] concluded that CCTV can be effective against property crime, but the results were less clear regarding personal crime and public order offenses, and the results were mixed in regard to reducing fear of crime. Similarly Welsh and Farrington's meta-analysis of 13 programs found five that appeared to work, three that appeared not to, and five that produced inconclusive results.[30] Recently, Gill and Spriggs[31] evaluated 13 British CCTV systems, finding that six demonstrated a relatively substantial

reduction in crime in the surveilled area when compared to the designated control area. Of these six, only two showed a statistically significant reduction relative to the control zone.[32] In seven areas there was an increase in crime, though the increase could not be attributed to CCTV. Other potential causes for the crime increase included fluctuations in crime rates caused by seasonal, divisional, and national trends, and additional initiatives.

The evaluations in Appendix A go some way to confirming these rather confusing findings. The general findings suggest that:

- CCTV is more effective at combating property offenses than violence or public order crime (though there have been successes in this area).
- CCTV appears to work best in small, well-defined areas (such as public car parks).
- The individual context of each area and the way the system is used appear to be important.
- Achieving *statistically significant* reductions in crime can be difficult (i.e., crime reductions that clearly go beyond the level that might occur due to the normal fluctuations in the crime rate are difficult to prove).
- A close relationship with the police appears important in determining a successful system.
- There is an investigative benefit to CCTV once an offense has been committed.

Reading this, you may feel the answer is unclear. Academic evaluators tend toward caution in their language, as they understand there is often a complex pattern of factors that dictate whether a system is successful or not. The rigid requirements of statistical evidence often limit the conclusions that quantitative evaluators can draw.

To move beyond a strictly statistical interpretation, it is possible to say there was some evidence of crime reduction in most of the systems reported in the appendices. In other words, CCTV will almost certainly not make things worse (though crime *reporting* may increase), and there is a growing list of evaluations that suggest CCTV has had some qualified successes in reducing crime.

The important point is that the local context is central to determining the likelihood of success. For example, city streets with long, clear lines of sight may be more amenable to CCTV than short, narrow winding lanes with trees that might obscure camera views. The availability of police to respond to incidents in an appropriate manner may also be a local context that affects CCTV's success. Areas with high levels of property crime may be more amenable to CCTV than areas with low levels of public disorder. Smaller systems in well-defined areas may be more effective than broad-ranging systems that cover large areas. Understanding your local context is central to a successful problem-oriented policing solution.

CCTV appears to be somewhat effective at reducing fear of crime, but only among a subset of the population. There are examples of a reduction in fear of crime among some people who are in CCTV areas, but it requires them to know they are in a surveillance area, and this is often not the case. Relying on CCTV to reduce fear of crime may require a significant and ongoing publicity campaign.

Implementation Considerations

Consider the following aspects of CCTV should you decide to employ CCTV at the response phase of your SARA (Scan, Analyze, Respond, Assess) model.[33]

Is CCTV the Best Option?

In one survey, when asked to rank desired crime prevention strategies, the public was offered CCTV, more police officers patrolling on foot, more or brighter street lights at night, or more private security patrols. Mean scores showed CCTV ranked third behind more police patrols and more or brighter street lights.[34] Cameras can provide surveillance over an area, but they may not necessarily act as a replacement for police officers, as they cannot offer the same range of services an officer can provide. Furthermore, implementation times can be significant: not only does it take time to requisition and install cameras, but operating procedures, space allocation, and staffing arrangements can be time-consuming and costly. CCTV is not a short-term fix, but an ongoing commitment to the long term.

The evaluations described in the appendices suggest that CCTV is not a panacea that works in all circumstances. In a number of cases, CCTV has not reduced crime. In others, it has. The context is therefore important. There may be other solutions that are cheaper, more flexible, and quicker to implement than CCTV. Are you seeking to protect a single, specific target? If so, a response geared directly to that target may suffice. A reinforced door or security grills may not look attractive, but they may be more cost-effective and quicker to install. Similarly, street closures can redirect traffic and have an impact on

an area's crime level. The Center for Problem-Oriented Policing's website (www.popcenter.org) is an excellent resource for options to consider. If, after thorough research and analysis, you determine CCTV is worth further consideration, there are a number of decisions to make, some of which follow.

Deciding on a Camera Configuration

Overt Systems

Overt camera systems are common. The cameras are in view of the public and are often accompanied by signs indicating that people are now in a CCTV surveillance area. Overt systems have a strong crime prevention rationale but are more vulnerable to tampering and vandalism.

Semi-Covert Systems

These systems are in public view, but the cameras are concealed behind a one-way transparent casing. This approach retains most of the preventative rationale of the overt system, but the cameras have some protection. It also prevents the public from determining who is under surveillance and allows you to conceal the exact number of cameras in a system, as you are not required to install a camera in every casing.[35]

Covert Systems

With these systems, the aim is to hide camera locations. These systems are particularly well suited to crime detection; however, without public signage or a publicity campaign, they have little crime prevention function until word spreads within the offender community. The cameras are fairly immune to tampering.

Camera Functionality

If *deterrence* is the primary goal, then the mere presence of a camera should be sufficient. It may not be necessary to spend vast sums on the latest technology. This holds true if another aim is to alert police to any incidents as a reactive information mechanism, and then rely on police or local security to deal with the incidents. If the aim is to aid in the *prosecution and conviction* of offenders, then it may be necessary to purchase a system with high-resolution cameras and recording equipment. A suitable night vision capability may also be required. Cameras that have power to provide, often at some distance, images of sufficient clarity to support an evidential case in court are considerably more advanced than cameras in the majority of current systems. These additional requirements will increase costs.

Additional features available include night vision, bullet-proof casing, motion detection, facial recognition, and even defensive mechanisms that detect when a camera is under attack and train other cameras to that location.[36] These features do not necessarily improve the crime reduction function, though they may improve the system's survivability. They will also increase the costs.

Publicity

As stated elsewhere in this report, if the public—and especially the offending public—are not aware cameras are watching, the preventative aspect of CCTV will not function. Covert systems require no publicity, but you should consider the costs and the placement of any signage that advises the public about overt cameras. A media campaign can help, but can also be relatively

short-lived: the media can rapidly lose interest in CCTV, especially if they are not permitted to have access to camera footage. Bear in mind that even with publicity, a number of surveys have shown that most of the public tend to be unaware they are in CCTV areas, so significant effort should be made to advertise the cameras' presence if you want to maximize the system's preventative aspect.

Where Should Cameras be Located?

Guidelines are available for many of the activities involving CCTV;[37] however, guidelines for locating cameras are usually not provided. Crime analysis is not necessarily the sole arbiter of CCTV camera locations. The cities of New York and Cincinnati, Ohio used town hall meetings and liaisons with the public to determine potential locations for CCTV installation.[38] Although police recorded crime data are known to be incomplete, crime analysis still remains the most objective way to determine areas that may need CCTV. If caution is not exercised, it's possible cameras can be placed in locations that more reflect the vagaries of local politics and public misconceptions about fear of crime rather than actual crime hot spots. If schemes are orchestrated and primarily directed by local authorities, there is a risk police can be excluded from the crucial design stage, including the placement of cameras. If the system's measure of effectiveness is to reduce crime, then camera locations that are not primarily driven by the crime distribution are unlikely to demonstrate any significant crime reduction benefits.

The choice of camera locations should, ideally, result from a high quality crime analysis that not only incorporates a micro-level mapping of local crime patterns, but also an appreciation for the types of crime the system aims

to target. It is also valuable to conduct a number of site visits that examine the lines of sight for cameras and identify any potential obstructions. If time permits, visits during different times of the year are advisable because spring and summer foliage can obscure a camera image that appears clear in winter, and Christmas lights and other seasonal holiday decorations can also impede the view from some cameras. The main determining factor should be the crime problem, and crime mapping systems can be fundamental in identifying crime hot spots and other areas of need.[39] The design of the space to be surveilled makes a difference in CCTV's success.

Who Will Operate the System?

Although the aim of CCTV is to reduce crime, the actual operation of most schemes is split between police operators and civilian operators, who are either employees of the local authority or city, or occasionally (as in a small Detroit CCTV scheme) local civilian volunteers.[40] In much of the literature from the United Kingdom, it appears police are less concerned with the system's ownership than by ensuring they are the system's primary and priority users. Because police rarely have the funds for complete systems, a common arrangement is for police to enter into partnerships with local authorities and city management.

If a civilian organization operates the cameras, then the system will be most effective when integrated into a police command and control system, so a coordinated response to identified incidents can be made timely and effectively. This means you should arrange for a direct communication link from the CCTV control location to local police. To ensure rapid communication, some

civilian control facilities have police radios so they can communicate directly with officers on the street. An additional advantage is that operators with access to police communications can train their cameras on incidents that police become aware of without having to be contacted by police. For example, if a shop calls police to suspected shoplifters, or if police request further assistance to make arrests, the camera operators can train their cameras on the incident immediately upon hearing the information on the police radio.

In some configurations, police monitor the cameras' video displays, which are fed to monitors at the local police station. Often, the police operator is whoever is on duty. These individuals are often not trained in the system's operation, and have other duties to perform at the same time, limiting the actual surveillance.[41] As a result, the systems are less effective from a proactive stance, and become a reactive tool that merely aids the deployment of officers to incidents that have occurred.

One Detroit neighborhood plans for local volunteers to monitor cameras through a password-protected internet feed, though this proposal has raised civil liberty issues.[42] Similar concerns exist for a proposal in Soulard, a St. Louis neighborhood, that might allow any local resident to control the camera through an internet site.[43] The negative implications of this type of crime reduction intervention from a civil liberties perspective may outweigh any crime reduction benefits. Although it does reduce ongoing human costs, you should not select this type of system without careful consideration. A public survey of the proposed idea may convince you not to proceed with a system monitored and controlled by the public.

Do You Have Both the Capital and Revenue Funds for Operation?

Initial capital costs for CCTV systems fluctuate, though they are generally falling as the technology becomes more mainstream. Human costs continue for the life of the scheme and are often difficult to contain. Once a CCTV system is operational, there is likely to be considerable reluctance to downsize or dismantle it. A CCTV system is a permanent cost. In one scheme three staff members were let go after 18 months of operation, due to a lack of ongoing operating funds.[44]

Do the Local Police Have the Resources to Respond to Any Incidents?

There is scant evidence that CCTV significantly reduces public order and violent offenses, but the impact of these crimes can be reduced with a quick and effective police response, and this is a real potential benefit of CCTV. As interviews with offenders have shown, many are not deterred by the presence of CCTV,[45] though CCTV does work as a deterrent with offenders who have been caught with CCTV and are aware they were caught with CCTV. As a result, it is prudent to ensure an effective police response is available. This may require additional police resources for the long term, a cost that may need to be factored into CCTV running costs, or at least into the local community safety budget.

Who and What Should be Watched?

None of the six CCTV schemes studies by Goold[46] had established effective systems of control and regulation, and the lack of police involvement in the early implementation stages increased the difficulties for police to regulate the systems according to their needs, or for the camera use to reflect police priorities. Goold also noticed that in police-managed CCTV schemes, civilian operators tended to use the cameras to follow individuals based on their behavioral attributes (demeanor, aggressiveness, behavior to others, running in a busy street, and so on) more so than in civilian-run schemes. Regardless of who ran the system, the majority of surveillance was conducted based on a target's behavioral or categorical attributes (age, dress, gender, race), or because the camera operator had personal knowledge of the individual based on contact with police officers.

As a guide, it is prudent for any system to have:

- operational guidelines
- employee vetting
- effective training (in matters such as camera operation, recording practices, the length of time tapes are retained, and mechanisms to contact police)
- a clear policy about whom and what are the subjects of targeting.

With regard to the last item, a clear policy, intelligence on local crime patterns, and likely suspects based on thorough, sound and objective crime analysis and intelligence appears essential. A policy based on an objective interpretation of the criminal environment would help deflect some of the (occasional) criticism that CCTV operators unfairly target marginalized populations.

There is one scenario that is rarely discussed, but should be considered. What if the cameras capture images of police misconduct? This should be addressed for systems that are operated by police or local authorities. Hopefully this is only a hypothetical issue, but you should determine a policy. The majority of officers interviewed in one study said the cameras forced them to be more careful when on patrol.[47] It is possible that officers may be more reluctant to use reasonable force in circumstances that require a high level of force.

Evaluation

Many funding sources that can provide the money for a CCTV scheme also require an evaluation of the scheme. An ideal evaluation would be a robust one that avoids most, if not all, of the criticisms leveled at poorer evaluations.[48] Although a "quick and dirty" evaluation conducted locally and with little methodological rigor may satisfy a grant's minimum criteria, it is unlikely to be of wider benefit to the problem-oriented policing and crime reduction community. Partnering with a local university, which can provide statistical and evaluative advice, is suggested.

As said elsewhere in this guide, you should also prepare the implementation team for an evaluation's range of possible outcomes. In a number of cases, recorded crime has increased, but as stated earlier, this does not necessarily mean crime has increased. Consider the following scenario. A CCTV scheme is created to counter drug dealing in a local park. Drug dealing has a low reporting rate as both dealer and seller do not want police involvement. It is possible that much of the drug dealing in the park may stop because of the cameras' introduction,

but the cameras will also provide an opportunity for local police to spot and arrest those dealers initially unaware of the cameras. As a result, police arrests—the main source of drug-related recorded crime—can actually increase at first, inflating recorded crime figures even though drug dealing has actually declined.

Public Concerns

As stated earlier, surveys of public perception about the benefits of CCTV are usually positive. However, they are not universally so, and managers of any potential implementation should anticipate fielding questions about a range of public concerns. The next section aims to anticipate these questions.

Managing Public Concerns

Some have suggested that with the growth of public place CCTV and the already extensive network of private surveillance systems in the transport system, hospitals, commercial premises, schools, and so on, it is nearly impossible to escape (unregulated) surveillance.[49] This may be so, but we are probably some way yet from the type of overwhelming global surveillance network described in novels such as George Orwell's *1984*.[50] This does not mean a city-wide or nationwide network of cameras maintaining surveillance on the public is a fictional idea to be dismissed: discussions have been held at federal government levels regarding the growth of cameras in the nation's capital.[51] Public anxiety is usually more focused on specific areas.

Covert Cameras

Unlike overt cameras, which can be seen conducting surveillance of public areas, covert cameras are designed to be unseen. Although some consider covert cameras to be more intrusive, there are city managers who have used domed cameras (a semi-covert scheme) because they are deemed to be more discreet.[52] Some might argue there is less accountability with covert cameras because the general public has no way to determine the target of the surveillance, and this leads to concerns about privacy and the right to know if we are being watched by the government.

Privacy and Constitutional Concerns

In the United States, privacy issues related to the use of CCTV surveillance are first and foremost in regard to the Fourth Amendment of the United States Constitution, which protects a citizen from unreasonable searches and seizures by law enforcement and other government agencies. The emphasis is on the protection of people, not places. As a result, at least in terms of clearly public places, citizens cannot have an expectation of privacy. Surveillance of individuals in public places would therefore appear to be constitutionally acceptable. This interpretation stretches only so far. In the case of Katz v. United States,[53] the Supreme Court overturned the conviction of a man convicted on evidence gleaned from an FBI electronic listening device fixed to the outside of a public telephone booth. As one concurring opinion pointed out, a court must determine whether a suspect had a reasonable expectation of privacy in his activities, and if so, would society be prepared to accept the privacy expectation as reasonable.[54] Reasonable expectations of privacy tend to be subjective but for the purposes of simple video (not audio) surveillance of public space, the use of CCTV would appear to be on solid ground constitutionally.

A number of cases support the use of technological devices to enhance the natural ability of vision and hearing police officers could employ on the street if they were there in person. It is likely the courts would not look so positively on surveillance technology that is able to intrude where a police officer could not reasonably expect to be able to see. Future video surveillance equipment that employs x-ray technology to examine inside and under clothing may potentially fall foul of Fourth Amendment protections.

More generally, concerns have been voiced in regard to the use of CCTV as a surveillance mechanism in public order situations.[55] For example, some people expressed anxiety after New York City officials declared a desire to increase the number of cameras in operation before the 2004 Republican National Convention.[56] It would therefore seem prudent to stress to the public that a CCTV system is in place as a problem-oriented solution to an existing crime problem.

In summary, public agencies wishing to install CCTV systems in public places should consider these two key points:

- The area under surveillance should cover only clearly public areas.
- Surveillance equipment can use zoom, tilt, and pan to enhance video capture, and enhanced microphones to detect sound. However, technology that is able to intrude beyond reasonable limits of audio and visual capability may be constitutionally questionable.

This guide is not intended to provide advice on the legality of particular CCTV systems. Implementers should seek legal advice in their local area if they have concerns about the legality of introducing CCTV.

Ownership of Images

The public is unlikely to support CCTV if there is a risk that video of them shopping on a public street when they should be at work will appear on the nightly news. Therefore, a policy should exist that covers when recorded images are released to the police, media, or other agencies in the criminal justice system. Releasing video footage for any reason other than to enhance the criminal justice system is not recommended.

Future Systems

Implementers should be aware that technology is always on the march, and a number of particular innovations are imminent.

Two systems are undergoing rapid development. Backscatter low-level x-ray imaging is a technology that provides the potential to see through clothing and detect weapons and other prohibited materials.[57] Facial recognition systems require a link to another computer system within a police department, such as a database containing photographs of wanted individuals. A facial recognition system tied to an existing bank of 140 cameras was first used in East London in 1998.

Beyond their use to identify specific fugitives, the next generation of CCTV camera images may also be analyzed by problem recognition systems. Unlike basic motion detection systems (which activate a camera when a sensor is tripped), problem recognition systems are software programs that interpret video images from a CCTV camera. The program attempts to identify problems such as potential robberies or street brawls by seeking out unusual characteristics or patterns in digital images. They can also be programmed to identify out-of-place articles, such as abandoned packages or weapons.[58] Some cities are also considering the introduction of cameras with systems that can identify the source of firearm activity and automatically train their cameras on the source of that activity. All of these next-generation systems will carry with them particular issues in terms of police response, the public's perception of safety, and, may also influence the public's perception of the government's intrusion into private life.

Conclusions

Although much of the professional literature from manufacturers tends to over-hype CCTV's benefits, robust evaluations (where they exist) are apt to be more circumspect. Companies that produce surveillance systems claim unqualified success, while cautious academics often say the opposite.[59] As noted from one study, "open-street CCTV can 'work' in limited ways, but is not a universal panacea. It works in different ways in different situations."[60] The evidence suggests that CCTV works most effectively when bundled with a package of other situational preventative measures.[61] That CCTV is often implemented with other measures makes conclusive evidence of CCTV's effectiveness difficult to confirm. Media manipulation may place an important role in advertising a system, help increase public knowledge, and, therefore, reduce fear of crime. It may also inform offenders and increase their risk of perception. Advertising success also helps to maintain offender wariness as well as reinforce feelings of public safety (and the perceived additional benefit of economic improvement).

Conclusions about effectiveness that can be cautiously drawn are:

- CCTV works best in small, well-defined sites (for example, public parking areas) rather than across large areas (such as housing estates).
- CCTV is more effective in combating property crime rather than violence or disorder.
- A close relationship with the police will improve system effectiveness.
- A good quality CCTV system can aid police investigations.

Finally, you should consider the impact of a CCTV system from a societal view. It has been suggested that ever-increasing surveillance can make the local environment a less pleasant place to live.[62] Of course, it may also reduce fear of crime and increase public participation in public space. This may be an acceptable benefit from the ongoing costs of a CCTV scheme.

Appendix A

The following table summarizes a number of CCTV systems and the results of their evaluations. It is not an exhaustive list, as some studies may have been inadvertently omitted during the literature search for this guide. Also, a number of studies have been excluded. The main reasons for exclusion were when the evaluation report did not include sufficient information to corroborate any reported crime reduction, or where the evaluation was conducted by a party perceived to be heavily invested in the system.[63] This commonly occurred when a system was reported as a success in a newspaper article based solely on the comments of a city manager or local police. When some evaluations reported findings that did not appear to accurately reflect the changing pattern of crime, they were either excluded, or the language was changed to a more general tone. As a result of this last caveat, if you require further information you should refer to the original study reports. This is the best way to judge the reliability of the findings and conclusions, as the quality of studies varies considerably.

The table below emphasizes studies that have a strong quantitative component. This is not intended to negate the value of qualitative analysis, but to reflect the likely audience for the report. Most CCTV systems are implemented to tackle, at least as one aim, levels of reported crime. These are usually apparent in police recorded crime records and so the table reflects more positively on reports that demonstrate they have examined and evaluated recorded crime statistics in a robust manner. Studies are ordered by implementation date, with the most recent first.

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Kabukicho, Tokyo	No information available	March 2002	Reduction in vehicle crime, slight reduction in violence, substantial reduction in larceny, within 50 meters of cameras.	No information available	No information available	(Harada et al., 2004)	Adequate. Geocoding crime events improved accuracy and better determined which crimes were within the CCTV area.
Although there have been few evaluations of CCTV in Japan, a system in the Kabukicho area of Tokyo was evaluated following system implementation in March 2002. Kabukicho is a large and popular entertainment district. Recorded offenses decreased by about 22% in the implementation area (within 50 meters of a camera), by 9% in the buffer zone (50-100 meters from a camera), and by 11% in the control area (100-150 meters from a camera). Research design: Adequate. The system was evaluated using the weighted displacement quotient approach (Bowers & Johnson, 2003), which quantifies program impact in relation to a control area and a buffer area (used to check for immediate spatial displacement). Offenses for one year before, and one year after, implementation were geocoded and compared to buffer and control areas. Results varied by crime type with larceny exhibiting the largest decrease. Geocoding crime events provided a significant advantage over many studies that aggregate crime counts to beats that may have only partial camera coverage, though the use of 50-meter zones was not clearly explained. It is possible that a camera's deterrence effect could still be viable at 70 meters, well into the displacement (buffer) zone.							

Cincinnati, Ohio	Cameras sited in three city locations	Early 1999	Some reduction in calls for service and anti-social behavior in two sites (one with some diffusion), but an increase in anti-social behavior in a third location, as well as some displacement on implementation.	No information available	No information available	(Mazerolle et al., 2002)	Strong. An ARIMA time series analysis of data derived from interpretation of video footage was combined with police incident data.

Three camera sites were examined in and around Cincinnati, Ohio. The city installed its first camera in 1996 and more cameras in 1998 and 1999. One was at a strip mall in a residential neighborhood, one in a mixed neighborhood with small shops, a park, and low-income housing, and the last at a site with a popular local market surrounded by residential and commercial buildings.

Research design: Strong. Employing an unusual research design, the authors examined random samples of video footage taken from three CCTV sites in the city (three, three, and two months of video, respectively). A stratified random sample framework was used to extract and examine video footage, from which incidents were examined and coded. Five-minute snippets of video activity were coded by students. A random selection was also recoded by an independent party as a reliability check. ARIMA time series analysis techniques were applied to the coded results. In addition, police calls for service data were examined in both the CCTV areas and buffered regions within 200, 500, and 1,000 feet of cameras, for a number of months before and after camera implementation.

The results suggest that one site had a significant decline in calls for service and some diffusion of benefits. A second site had a gradual decline in anti-social behavior compared to a slight increase in calls for service in the wider police district. The public market site experienced a drop in anti-social behavior, an effect that appeared to decline after some time. Although the police data period was relatively short, the combined approach makes this an interesting and relatively strong study.

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Central Train Station Oslo, Norway	Six cameras	January 1999	Decrease in robbery/theft from person and bicycle theft.	None	Civilians working at a police station	(Winge & Knutsson, 2003)	Adequate. The data have some limitations, and the surveys are not large; however, the incident data were examined for experiment, control, and displacement areas.

Due to drug abusers' use of the area outside the central train station in Oslo, the Oslo Police Department introduced a trial CCTV camera system in 1999. The area under surveillance was a typical city center with large numbers of people moving through, using nearby restaurants, shops, and hotels. Six cameras were installed and then monitored by trained operators based at the station. To assess the effects of the CCTV scheme, evaluators studied police incident log data from one year before, and one year after, the installation. This was supplemented by local crime data and three surveys that explored local reaction.

The research found that recorded crime increased in the study area, especially violent and narcotics offenses. However, the researchers suggest this is most likely due to increased detections by the police department as a result of proactive work directed by the cameras, as well as an increase in police patrolling the area. Most local businesses showed mainly insignificant changes in perception of crime and public order problems. Although local businesses had confidence in the system, confidence in effectiveness did decline after some time.

Research design: Adequate. Limitations of Norwegian crime data limit the ability to map crime events with precision. Business turnover also limited the value of the third survey, which had a poor response rate. However the study did examine changes in a control area and a displacement area as well as exploring public reaction in the experiment, control, and displacement areas.

East Brighton, United Kingdom	10 cameras in a housing project	Summer 1998	Crime continued a long-term increase.	Feelings of lack of safety continued after CCTV's introduction.	No information available	(Squires, 2003)	Weak, though some factors were out of the researchers' control. There were potentially significant differences between pre- and post-survey groups, and the crime analysis does not break down the data into more meaningful offense categories.
Ten CCTV cameras were installed in a housing project with a reputation for disorderly conduct and crime problems. The area also had high levels of unemployment and negligible rates of home ownership. Various crime prevention and community building initiatives did not appear to have solved some of the underlying troubles in the community. Pre and post surveys of 243 and 237 residents respectively found that knowledge of the CCTV cameras was high. Analysis of nearly three years of crime and incident data found the CCTV system did not significantly inhibit a long-term increase in crime and disorder that increased roughly in line with a comparable housing project that did not have CCTV. Research design: Weak, though some factors were out of the researchers' control. The research is predominantly a report of pre and post surveys. Researchers were unable to get the 300 respondents they sought for both surveys, and there were potentially significant differences between the two survey groups, especially in terms of home ownership (which doubled from the first survey), and the age structure (more elderly people were surveyed in the second visit). Reports of the crime and incident data do not break down the data into crime and disorder offense groups that CCTV could be expected to effect.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Greater Easterhouse, Glasgow, Scotland	Not reported	May 1998	No overall crime reduction. Drug offenses and violent crime increased, but at a lower rate than in other areas. Other crime types not reported in the paper.	No information available	Civilian operators working at a police station	(Hood, 2003)	Adequate, but not all quantitative results reported.

Greater Easterhouse is a large housing project with about 15,000 residents in northeast Glasgow, Scotland's largest city. Predominantly public housing, the area has long suffered from deprivation, depopulation, and crime. As the City of Glasgow installed CCTV in the city center (see Ditton et al., 1999) CCTV's profile was high and funding was received for Greater Easterhouse. The catalyst for the funding bid was the collection of two petitions, totaling more than 2,800 names, as a result of two gang-related homicides. The system went live in May 1998. At the time of system implementation, the Greater Easterhouse project was the largest residential-area CCTV system in Scotland.
Research design: Adequate, but not all quantitative results reported. Although the study employed crime data analysis, a pre-installation public survey (of 100 people), and key stakeholder interviews, much of the paper is given over to the qualitative elements of the evaluation and there is insufficient data presented to estimate CCTV's impact on recorded crime. A straight comparison on the year following implementation with the preceding year found that violent crime increased in three of five police beats in the CCTV area at a rate comparable with increases in violent crime across the whole police region (Strathclyde). However, these increases were less than the increases in the police district that includes Easterhouse. Drug offenses also increased but at a lower rate than in the Strathclyde area. Three other crime types were examined but the results were not reported.

Camberwell, London	17 cameras in a town center	January 1998	Street, vehicle and violent crime decreased at a faster rate than before CCTV's introduction, while the buffer and comparison areas saw an increase in crime.	Of public surveyed, who knew about the cameras, 69% felt safer.	Civilian, based at a public car park and linked to a police station	(Sarno et al., 1999)	Quite strong. Four years of crime data examined, and supported with numerous qualitative approaches.
The town had long suffered from street crime, the vast majority of which occurred in the town center. Short-term police crackdowns had the expected short-term effects. The local council led a local partnership and successfully bid for CCTV-system funding from the UK Home Office. The 17 cameras were installed so that they covered the main commercial areas of small shops and restaurants. As with the Peckham evaluation, the area was one of a number targeted for a street robbery reduction program by the Metropolitan (London, UK) police. The report found that although crime had decreased slightly before implementation, the rate of decrease increased after implementation. Recorded crime fell 4% before the cameras were installed and 12% afterward. Significant reductions in street, vehicle, and violent crime were recorded. By comparison, crime in the buffer and comparison areas increased. Research design: Quite strong. A good evaluation of CCTV, employing recorded crime statistics, operator logbooks and repair invoices, interviews, a survey of town residents (200 per site), and a survey of local businesses. Target areas were deemed to be within 200 meters of a camera with the remainder of the police beat assigned as buffer zones (to test for displacement). The remainder of the police district was assigned the role of comparison area. Crimes that were not expected to be affected by CCTV's presence were excluded from the analysis. Crime analysis consisted of two years of data before, and two years after, system implementation. No evidence that seasonal trends were explored.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
East Street, London	12 cameras covering a street market	January 1998	Vehicle crime and criminal damage decreased, though street crime increased (mainly in theft from the person; robberies decreased).	Of public surveyed, who knew about the cameras, 53% felt safer.	Civilian, based at a public car park and linked to a police station	Sarno et al, 1999	Quite strong. Four years of crime data examined and supported with numerous qualitative approaches.
The East Street area is dominated by one of London's oldest street markets. The area, a mix of commercial and residential land use, had been in decline, and crime levels had risen, before the evaluation. The CCTV system was implemented by a partnership between local market traders, the local council, and the police department. The target area for the 11 cameras (one fixed and 10 moveable cameras) was the market area and some local free car parks that had been the target of car crime. The aim of the system was to deter and detect crime, reduce fear of crime, provide quality video footage for prosecutions, and restore confidence in the area. The evaluation found that car crime and criminal damage reduced substantially, and, although street crime increased, robberies decreased by half. Crime in the target area decreased by 4% in the year before implementation and 10% in the year after. However, crime in the buffer and comparison areas decreased at a quicker rate than in the target zone. Research design: Quite strong. As a part of the previous study, this research had a good evaluation of CCTV, employing recorded crime statistics, operator logbooks and repair invoices, interviews, a survey of town residents (200 per site) and a survey of local businesses. Target areas were deemed to be within 200 meters of a camera with the remainder of the police beat assigned as buffer zones (to test for displacement). The remainder of the police district was assigned the role of comparison area. Crimes that were not expected to be affected by the presence of CCTV were excluded from the analysis. Crime analysis consisted of two years of data before, and two years after, system implementation. No evidence that seasonal trends were explored.							

Five British towns	Varied	March to July 1997	Assault-related emergency room visits decreased, recorded violence increased, suggesting that police intervention due to CCTV surveillance increased arrests and reduced the escalation of violence.	No information available	No information available	(Sivarajasingam, Shepherd, & Matthews, 2003)	Fairly strong. Two years of pre-and post-intervention data were explored for five experiment and five control towns and cities.
This study focused on the nexus between recorded violent offenses and assault-related emergency room attendances across five English towns. Five control towns or cities were also selected, from locations in the general geographic proximity of the experiment sites and locations that had similar population sizes. The authors argue that the comparison of emergency room data and police data allow two hypotheses to be explored. First, if a deterrence effect for CCTV exists, then recorded assaults should decrease. Second, if CCTV increases police detections and provides the opportunity to intervene earlier in potentially violent incidents, then recorded violent incidents may increase but assault-related hospital attendances should decrease. The study found that CCTV surveillance was associated with increased police detection of violence and reduced numbers of people treated at the emergency department for assault. However, the impact was not the same for all locations. Research design: Fairly strong. The study collected data for the same four-year period for the control towns (May 1995 to April 1999) and a generally equivalent period for the experiment sites (all of the experiment sites installed CCTV between March and July 1997). The study employed quarterly moving average plots of emergency department and police recorded violence. Student tests were used to compare changes in the violence level before and after CCTV schemes were introduced. General trends in the data and the existence of long-term seasonality were unclear. Also, data collections areas for the intervention and control area police and hospital data were very large and not adjoining the target areas.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Ilford, Essex, United Kingdom	Town center. Number of cameras not available.	May/June 1997	Reduction over five months for every crime type examined. Lesser reductions outside implementation area for a number of crime types. Crime in the CCTV area also declined compared to the same months in the previous year.	Modest improvement after CCTV implementation	No information available	(Squires, 1998)	Adequate. A longer data period would have been able to correct the apparent seasonality.
The report provides little data regarding the operation or installation of the CCTV system other than it was implemented in Ilford town center, east of London. There is no information about system ownership or the number of cameras. Pre and post surveys of about 750 people each found strong support (more than 90%) for the CCTV system before and after implementation. There was also evidence that respondents who were aware of the cameras felt safer. There were reductions in all crime types in the five months post-implementation (the second half of 1997) compared to the months immediately preceding the implementation, as well as (generally smaller) reductions compared to the same months in the preceding year. Research design: Adequate. Used 18 months of crime data, though the combination of actual and moving average displays for the same data on some charts makes interpretation more difficult. The data suggest annual seasonality that a longer data period preceding and following the implementation would have been able to correct.							

Elephant and Castle, London	34 cameras around a shopping center	January 1997	Recorded crime fell 17% in both target and buffer areas. Steep decline in street robberies attributed to CCTV.	Of public surveyed, who knew about the cameras, about 60% felt safer.	Civilian, based at a shopping center and linked to a police station	(Sarno et al., 1999)	Quite strong. Four years of crime data examined and supported with numerous qualitative approaches.
Elephant and Castle is centered around a large shopping mall and a network of arterial roads and service streets. It is also a major local public transportation hub, with bus stops, a train station, and a subway stop. The main access to the shopping area is through a pedestrian subway system that had a reputation for personal robberies. The CCTV system was introduced after an initiative by a group of local council representatives, the local police, and local businesses to reduce crime and fear of crime. The extensive camera system is focused on the shopping area and the local transport terminals. The aim of the system was to reduce opportunist street and subway crime and to eliminate drug trafficking in the area. The research found (against a background of crime reducing in the area generally) that recorded crime in both the target area and the buffer zone fell by about 17% in the two years post-implementation. A portion of the steep decline in the incidence of street robbery was attributed to the CCTV system. Research design: Quite strong. A good evaluation of CCTV, employing recorded crime statistics, operator logbooks and repair invoices, interviews, a survey of town residents (200 per site) and a survey of local businesses. Target areas were deemed to be within 200 meters of a camera with the remainder of the police beat assigned as buffer zones (to test for displacement). The remainder of the police district was assigned the role of comparison area. Crimes that were not expected to be affected by the presence of CCTV were excluded from the analysis. Crime analysis consisted of two years of data before, and two years after, system implementation. No evidence that seasonal trends were explored.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Amsterdam, The Netherlands	29 cameras, in three areas, with variable viewing hours	Early 1997 to mid-2001	General reduction in crime levels. Some displacement to other areas, though still a net reduction. Some immediate diffusion of benefits.	Slight improvement in only one area	Variable hours, with two systems operational only during peak hours	(Flight, Heerwaarden, & Soomeren, 2003)	Adequate, though the quantitative data are not fully explored.
Against the background of significant growth in the use of CCTV across The Netherlands, this study reports on an evaluation of CCTV systems in three different Amsterdam locations that were initiated at different times. Unusual for a CCTV system, the cameras were monitored only for certain hours of the day on certain days of the week. For example, the system in the area perceived to have the worst crime problem was monitored Monday through Saturday from 8 AM to 10:30 PM. Images were not recorded unless an operator deemed it necessary. Research design: Adequate, though the quantitative data are not fully explored. The systems were evaluated by means of an analysis of police records for one year before, and one year after, CCTV implementation at each site. Data were collected for the CCTV area, and, for displacement and comparison purposes, from the wider police beat and the whole city. More than 2,000 questionnaires were completed and qualitative interviews were conducted with a smaller group of the same shopkeepers in two survey sweeps a year apart in each site. In-depth interviews were also conducted with local police, camera operators, and policy-makers. Unfortunately, the paper emphasizes the qualitative aspects of the research, and the potential value of the quantitative data is not fully explored. The qualitative aspects of the study found that fear of crime improved significantly in only one of the three areas. The research found that recorded crime dropped substantially in the CCTV area while the trend in the comparison regions either remained steady (or slightly improved) or increased.							

Gillingham, United Kingdom	Seven town center cameras	1997	Reduction in vehicle crime and robberies	No information available	Civilian.	(Griffith, n.d.)	Adequate. The evaluation compared crime rates in the target area with a comparison site in a similar town with five years of aggregated data.
This undergraduate dissertation evaluates the CCTV system in the town center of Gillingham, a town approximately 30 miles south of London. The town is described as a combination of market town and suburban center. A local partnership of police, borough council, local businesses, and community services successfully implemented seven city center cameras in early 1997. Comparison with a neighboring town (with no CCTV system) shows that recorded crime initially fell in Gillingham at a significantly faster rate than in the comparison town: a 44% reduction in recorded crime, compared to a 22% reduction in the comparison town. In later years, the comparison town returned to the pre-implementation crime levels, while Gillingham's crime rate remained at the new post-CCTV lower level. Research design: Adequate. The evaluation compared crime rates in the target area with a comparison site in a similar town. Crime data were gathered for police reported crime figures for one year before, and four years after, CCTV implementation. The quantitative work was supported by some qualitative findings. As expected changes in crime differed by crime type; substantial reductions occurred in thefts, vehicle thefts, and robberies. The study did not explore more micro-level interactions, such as displacement to local areas close to the CCTV cameras, and did not explore longer seasonal trends in the data.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Peckham, London	14 cameras in a public retail area	October 1995	Inconclusive, due to limitations in access to recorded crime data	Of public surveyed, who knew about the cameras, about 60% felt safer.	Civilian, based at a public car park and linked to a police station	(Sarno, Hough, & Bulos, 1999)	Weak, but due only to limitations in crime data outside the researchers' control.
The town center area had declined, becoming a hot spot for drug dealing and street robbery, which lead to the introduction of CCTV. The 14 new cameras were added to an existing system of 27 static car park surveillance cameras. The surveilled area consisted of a number of small businesses and larger retail chains. The evaluation of the CCTV system in Peckham is complicated by two factors. First, during the evaluation period, the area was one of a number targeted for a street robbery reduction program by the Metropolitan (London, UK) police. Second, the area also received major urban regeneration funding. Report authors are cautious in their findings; however, their research suggests that crime did fall in the target area, though in line with the same level of decline in the comparison area. Research design: Weak, but due only to limitations on crime data outside the researchers' control. There was a thorough evaluation of the qualitative aspects of the CCTV implementation. This included examining operator logbooks and repair invoices, interviews, a survey of town residents (200 per site), and a survey of local businesses. Target areas were deemed to be within 200 meters of a camera with the remainder of the police beat assigned as buffer zones (to test for displacement). The remainder of the police district was assigned the role of comparison area. Crimes that were not expected to be affected by the presence of CCTV were excluded from the analysis. Crime analysis was complicated by limited access to crime data due to the introduction date of a crime recording system. Researchers did manually gather data for a pre- and post-implementation period. No evidence that seasonal trends were explored.							

Burnley, United Kingdom	No information available	1995	Substantial decline in most crime types. Some diffusion effect for most crime types.	No information available	No information available	(Armitage, Smyth, & Pease, 1999)	Fairly strong. The study used a long-time series of data and also explored hourly temporal patterns.
Police beats were categorized as focal (with CCTV cameras), displacement (adjoining areas to CCTV beats), and other beats in the city (as a baseline comparison area). Data were collected for the year before CCTV installation, the year of CCTV implementation, and the two years following. The data showed crime reductions of 25% and 16% respectively in the two years following implementation. There was no evidence of displacement and some suggestion of diffusion of benefits. Research design. Fairly strong. The research used a long-time series of data post-implementation, though there does not appear to have been any correction for seasonal trends. The paper also reports a temporal analysis by hour of day, which is not conducted in other studies to the same degree.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Glasgow, Scotland	32 city center cameras	November 1994	Marginal, though the system has helped with some major crime investigations.	Marginal	Civilian	(Ditton et al., 1999)	Strong. Three years of crime data had seasonal variation removed before trend analysis, and pre and post surveys were conducted in control areas.

The Glasgow CCTV system started with a public survey that suggested strong support for the introduction of CCTV. Glasgow had, for many years, a reputation within the UK for higher levels of violence than other cities. CCTV was perceived as a potential solution. Although an autonomous body was set up to fund and manage the system, when the 32 city center cameras went live there were insufficient funds to support the system. Funding differences between who should pay (the public or the private sector) were never resolved. Eighteen months after implementation, three CCTV staff members were let go.

Three public awareness and perception surveys (one pre and two post) were conducted in both CCTV and control locations. The surveys found that fear of crime did not improve after CCTV's introduction and that the city center was still perceived to be relatively unsafe. Concerns about being a crime victim in the city center did improve slightly, but still remain higher than control areas outside the CCTV area. Support for CCTV was still strong, but not as strong as found in other research: some civil liberty concerns were voiced to researchers. Three years of crime data were examined. Seasonally corrected crime series indicated that recorded crime increased slightly, though some crime categories fell. The introduction of CCTV when crime rates were already low suggests that the slight increase in the adjusted rate may be a leveling or regression to the mean.

Research design: Strong. Surveys included control areas, and the crime data had seasonal fluctuation removed before the application of smoothing techniques to examine trends. Furthermore, two years of pre-implementation data enabled the estimation of seasonal variation, and a one year post-implementation data set gave a better indication of longer effects.

Newcastle Upon Tyne, United Kingdom	16 city center cameras	December 1992	Reduction in burglary (57%), theft from vehicle (50%), vehicle theft (47%), and criminal damage (34%). Reductions occurred in areas outside the CCTV area, but not to the same level.	No information available	Police and civilians in a police station	(Brown, 1995)	Adequate. Crime data examined for 26 months before, and 15 months after, implementation.
The Newcastle Upon Tyne evaluation explored the impact of 16 CCTV cameras in the center of a large city in northeast England. The city center area is a major entertainment district. Although the system's funding originally came from the City Centre Partnership Security Initiative, the system is effectively under police control. Operators (both civilian and police) are housed in a police station, the civilian operators' wages and other ongoing costs are met by the local police authority, and the camera positions were determined through crime pattern analysis. Camera operators have direct radio contact with patrolling police officers. Research design: Adequate. Incident data were examined for 20 different crime types across four areas: the CCTV area, other parts of the city center not covered by CCTV, a nearby residential area (no CCTV), and the whole police region. Data were collected for 26 months before, and 15 months after, system implementation. Burglary, criminal damage, theft from vehicle, and vehicle theft all demonstrated greater reductions than in the other areas. Charts of monthly incident counts suggest a strong initial deterrence benefit that may fade over time. There was no evidence of displacement, but some suggestion of a diffusion of benefits.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
Airdrie, Scotland	12 town center cameras	November 1992	Overall 21% reduction, especially crimes of dishonesty and vandalism. Some crime types increased, but this may be due to increased detections.	No information available	Civilian operators working at a police station	(Short & Ditton, 1996)	Strong. Researchers controlled for seasonality and used a long-time series before and after CCTV implementation.
CCTV was introduced to Airdrie, a town of about 35,000 people in central Scotland (about 15 miles east of Glasgow), as the result of a local initiative. Members of a local youth club suggested the idea, which was championed by a sub-divisional officer at the local police station. Funds were raised from local councils and businesses, and 12 CCTV cameras became operational in November 1992. The monitors are based in the local police station and monitored by civilian employees. Research design: Strong. This study used 24 months of data before and after CCTV's introduction. Seasonality was controlled for using trend analysis software, to elicit a clearer indication of the real underlying trend in the crime level. Furthermore, the research design was able to control for general trends across the country and the region, as well as test for displacement at the local level. General crime levels fell by 21% in the CCTV area for the two years after CCTV installation. Some crime types (such as dishonesty) fell by 50%. Although some crime types increased, it appears likely this was due to the increase in detections following the cameras' introduction. Overall this study provides significant support for CCTV as a crime prevention measure, and the strong research design suggests the findings are robust.							

Birmingham, United Kingdom	Nine city center cameras initially	1991-1992	Apparent crime control benefits (in robbery, burglary, and theft from person) Possible displacement of robbery and theft from person out of the area, as well as displacement of offending from vehicle theft to theft from vehicles. Some evidence of reduced personal victimization in CCTV area.	A positive change only in people who were aware the cameras had been installed	Civilian staff employed by the police	(Brown, 1995)	Adequate. Nearly four years of data were used for the study, but the data were aggregated only to monthly beat counts.
At the suggestion of local police, the Birmingham City Centre Association created a trust to fund a CCTV program in the city center of England's second largest city. This region of low population is a significant business and entertainment area. It is also popular for demonstrations and public meetings that require police to perform a public order function in an area of heavy vehicle and pedestrian traffic. At the time of the evaluation, nine cameras were installed (the number has since increased significantly). The city center's high number of obstacles and complicated street layout make cameras generally less effective than in Newcastle Upon Tyne. Civilian operators, employed by the local police authority, monitor the cameras from a central location in the police station. Research design: Adequate. Monthly (aggregated to beats) crime data were gathered for one year before, and nearly three years after, system implementation. The evaluation is complicated by two factors. The target CCTV police beat had areas that were not covered by CCTV, and, although there were nine cameras in the initial period, two more cameras were added within a year. Robbery, burglary, and theft from person trends remained stable, comparably better than the increase that took place in the rest of the police division. Criminal damage patterns were unchanged, and vehicle crime pattern changes may be more attributable to traffic calming measures introduced to the city center than CCTV.							

Location	Camera Organization	Implementation	Effect on crime	Effect on fear of crime	Operation	Evaluation	Research design
London	Four different drug markets. Camera organization changed by site.	1990s	Effective in dispersing drug markets in two areas. In a third, users appear to have adapted to the cameras' presence.	No information available	No information available	(Edmunds et al., 1996)	Not able to assess from the information provided.

This report is not a strict CCTV evaluation, but it is interesting as it reports on drug dealers' techniques to avoid detection by CCTV in some areas. The report authors mainly examined six London drug markets and explored ways to tackle these markets. Of the six, four (B, D, E, and F) employed CCTV at some point in the study. CCTV was discussed in and around markets B and E.

Market B was in a deprived inner-city area of public housing and high unemployment, known for crime, drugs, and prostitution. At the time of the study, the drug market had evolved to a round-the-clock market split between two main areas and operated by about six main dealers with 20-30 runners. In Market B, some dealing took place in sight of the CCTV cameras. Dealers adapted by ensuring they were either dealing on the move or that the cameras could not get a good view of them. As the report states, "CCTV was thought to have helped increase the speed and ingenuity of the drug transaction" (p.16-17).

Market E, centered at a train station, was a well-established and accessible drug market in an area with high pedestrian traffic. Local authorities employed CCTV and covert surveillance (using video evidence where necessary) in the area. The impact of CCTV is difficult to gauge as these situational measures were introduced along with a local arrest strategy: targeting hotels known for drug selling, litter and debris removal, restrictions on licenses for fast food outlets, and other measures.

The report focused on site assessments, interviews with drug market users (about 30 interviews per site), and interviews with local drug workers and police. The findings are therefore anecdotal rather than quantitative. The authors report that in Market D, an inner-city area of shops, fast food outlets, and mixed private/public housing, the introduction of a single camera caused the drug market to disperse and client contact for local outreach workers to drop to 20% of former levels. In Market B, dealing disappeared from the CCTV surveillance area.

King's Lynn, United Kingdom	60 cameras around the town	1987-1994	Vehicle crime continued ongoing reduction, and reduced at a more significant rate compared to the surrounding police division. Burglary reduced in the evaluated CCTV area. Within two years, vehicle crime in the camera areas declined to nearly zero.	No information available	Civilian	(Brown, 1995)	Weak. The evaluation was limited to cameras overlooking car parks only. The number of crime events is low, limiting the application of any statistical measures.
King's Lynn is a market town about 90 miles north of London. Initial public area cameras were installed as early as 1987, and the system is well-developed and extensive. System funding has come from a variety of sources, including a tariff on area parking charges and increases in rent for public housing tenants and charges at a local sports center. At the time of the report, the cameras were monitored by civilian operators based at a local council office. These operators were in telephone contact with the local police station. Research design: Weak. Although the city center area had 60 cameras at the time of the report, the evaluation examined the impact of only 19 cameras in and around public car parks. These locations are likely to be non-contiguous and may also be surveilled by other cameras. Crime data were gathered for about one year before, and about two years after, system implementation. The number of crime events is low, limiting the application of any statistical measures. Different scales used on many charts make comparisons between the limited CCTV areas and the wider police division and police force area impractical. The evidence suggests that vehicle crime continued to decline at a more significant rate compared to the surrounding police division. Burglary also reduced in the evaluated CCTV area. Within two years, vehicle crime in the camera areas declined to nearly zero.							

Appendix B

During the writing of this report, a large UK Home Office study was published (Gill & Spriggs, 2005). This study evaluated 13 CCTV projects comprising 14 separate systems. The systems were implemented in a variety of ways, including at public car parks, in town centers, in residential areas and housing estates, and in hospital areas. Furthermore the systems varied in type. Some were fixed, others redeployable. Some were digital, others analogue. Some were monitored full time, others for less than 24 hours a day. The variations in the system therefore had an impact on the success of the system. The table below aims to concisely summarize the ten systems relevant to this report.

Research design: Strong. Police recorded crime statistics were examined in both the target area and the comparison areas. Some projects were also evaluated for displacement effects. Where possible (as was the case in nearly all studies) at least one to two years of pre-and post-intervention crime data were gathered. Time-series techniques were used to control for seasonal fluctuations. In 12 of the areas, public attitude surveys explored the public's perceptions of the CCTV systems and fear of crime. Researchers also identified other crime prevention measures taking place in the evaluation areas so the individual contribution of CCTV could be explored. Please note that in the original report the names of the locations were changed to preserve anonymity.

Location	Camera organization	Effect on crime	Effect on fear of crime
City outskirts	47 cameras installed in a deprived area of residential, park, hospital, and light industrial land use.	Significant reduction in crime.	14% fewer respondents reported being worried about crime after CCTV installation. Other measures less clear.
South City	51 cameras added to an existing system in a mixed affluent/ deprived city center area in southern England.	10% reduction in crime, though there was a 12% reduction in the control area with no CCTV. Increased public order.	About 7% fewer respondents reported being worried about crime after CCTV installation.
Shire Town	12 cameras installed in the town center of a Midlands former mining town.	Crime reduced 4% in the town, while it increased 3% in the control site.	12% fewer respondents at night and 4% during the day reported being worried about crime after CCTV installation. Greater reduction at night in control area.
Market Town	Nine evaluated cameras. two new cameras, with further cameras added to an existing system, in the center of an affluent market town.	Crime increased 18% in the town, while only increasing 3% in the comparison site.	No information available.
Borough Town	40 new cameras installed in a small town center aiming to reduce retail crime, alcohol problems, and criminal damage.	No change in crime in the town center, while crime increased 14% in the comparison area.	Fear of crime reduced.

Northern Estate	11 new cameras introduced to a deprived public housing project in northern England.	Crime decreased by 10% in the target area (especially burglary). Crime in the comparison area increased by 21%.	3% fewer respondents reported being worried about crime after CCTV installation. Similar reductions in control area.
Eastcap Estate	12 new cameras (10 evaluated) implemented into a deprived public housing project in southeast England.	Crime increased in the target area, but only by 2% compared to a 5% increase in the control site. Some displacement within the target area.	3% increase in feelings of safety, matched with a similar level in control areas.
Dual Estate	14 cameras (10 evaluated) installed to three areas of a deprived public housing project in southeast England.	Crime increased 4% in the target area, and decreased 19% in the control area, suggesting a statistically significant difference.	About 9-10% fewer respondents reported being worried about crime after CCTV installation. Significantly better findings than in control area.
Borough	Eight new cameras used in a redeployable system which could be attached to any lamp post across a mixed/affluent residential area of southeast England.	Crime increased by 73% in the target area, a statistically significant difference from the more modest 12% increase in the control area.	No information available.
Deploy Estate	11 new redeployable cameras implemented to different areas of a deprived public housing project.	A 21% increase in crime recorded in the housing estate, compared to only a 3% increase in the control area.	A slight improvement in those worried about crime in one area of the project compared to the comparison area. No change in the other area.

Endnotes

1 Usher (2003a).
2 Goold (2004: 12).
3 A pixel is an abbreviation of *picture element*. Pixel resolution refers to the quality of an image. For example, a digital camera with a resolution of 640 x 480 pixels (640 pixels wide by 480 pixels high) will record a better quality image than a camera with a resolution of 320 x 240 pixels. Higher resolution images are generally of better quality, but increased storage capacity is required for better quality recording.
4 Leman-Langlois (2002).
5 Surette (2005).
6 Clarke and Cornish (1985).
7 Ditton, Short, Phillips, Norris, and Armstrong (1999: 24).
8 Honess and Charman (1992: 6).
9 Short and Ditton (1998).
10 Usher (2003b).
11 See Makkai, Ratcliffe, Veraar, and Collins (2004). It could also be argued that this worked only in a city that was geographically isolated, such that a rapid replacement of prolific offenders was not possible.
12 Edmunds, Hough, and Urquia (1996).
13 Poyner (1988).
14 Welsh and Farrington (2004).
15 Squires (2000).
16 Brown (1995: 7).
17 Brown (1995: 14).
18 Harris, Jones, Hillier, and Turner (1998).
19 For example, see Clarke and Weisburd (1994), Green (1995), Ratcliffe and Makkai (2004).
20 For example, see Ratcliffe (2002).
21 Edmunds *et al* (1996: 16-17).

[22] Honess and Charman (1992: 17)
[23] Winge and Knutsson (2003).
[24] For example, see Honess and Charman (1992).
[25] Edmunds *et al*. (1996: 27).
[26] McCoppin (2002).
[27] 48.4% said they had reported the crime to the police. Bureau of Justice Statistics, 2002, Criminal Victimization in the United States, Table 91.
[28] Brown (1995: 59); Short and Ditton (1998).
[29] Phillips (1999).
[30] Welsh and Farrington (2002, 2004).
[31] Gill and Spriggs (2005) and see Appendix B.
[32] And as the report authors note, "in one of these cases the change could be explained by the presence of confounding variables."
[33] See www.popcenter.org for more information on the SARA model.
[34] Bennett and Gelsthorpe (1996: 87).
[35] You should consider the potential liability issues in the section "How CCTV aims to prevent crime."
[36] Davies (1996).
[37] For example, see Cavoukian (2001).
[38] Mazerolle, Hurley, and Chamlin (2002).
[39] For readers unaware of crime mapping, the website of the National Institute of Justice Mapping and Analysis for Public Safety (MAPS) program offers a good introduction to the concept (www.ojp.usdoj.gov/nij/maps). The reader is also directed to Chainey and Ratcliffe (2005).
[40] Bodipo-Memba (2004).
[41] When a system is monitored by the police officer in charge of a station front desk, the system is not monitored when the officer attends to a police station visitor (Leman-Langlois, 2002).
[42] Bodipo-Memba (2004).

[43] Smithson (2004).
[44] Ditton *et al*. (1999: 8).
[45] Gill and Loveday (2003).
[46] Goold (2004).
[47] Goold (2004: 180).
[48] See Tilley (1997).
[49] Norris and Armstrong (1999).
[50] Orwell (1949).
[51] House of Representatives (2002).
[52] Goold (2004: 86).
[53] 389 U.S. 347.
[54] For a detailed discussion of various cases, see Hickey, Capsambelis, and LaRose (2003: 549).
[55] Harris *et al*. (1998).
[56] Hamilton (2004).
[57] Leman-Langlois (2002).
[58] Surette (2005).
[59] The authors of a recent UK Home Office study said: "The most obvious conclusion to be drawn from the analysis in this chapter is that CCTV is an ineffective tool if the aim is to reduce overall crime rates and make people feel safer. The CCTV systems installed in 14 areas mostly failed to reduce crime (with a single exception), mostly failed to allay public fear of crime (with three exceptions) and the vast majority of specific aims set for the various CCTV schemes were not achieved. Despite all this we are reluctant to draw the simple conclusion that it failed." (Gill and Spriggs, 2005: 61).
[60] Ditton *et al*. (1999: 61).
[61] Home Office (1994).
[62] Koskela (2000).
[63] This is not to suggest or imply an inappropriate behavior on the evaluator's part. Simply, the evaluator's impartiality cannot be guaranteed and, therefore, the evaluation was excluded.

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Jerry H. Ratcliffe is an associate professor of criminal justice at Temple University, Philadelphia. He is a former police officer with the Metropolitan Police (London) but became an academic after 11 years service as a result of a winter mountaineering accident that curtailed his police career. Dr. Ratcliffe has held positions as a lecturer in policing (intelligence) with Charles Sturt University at the New South Wales Police College in Australia, and as a senior research analyst with the Australian Institute of Criminology. He holds a Bachelor's degree in geography from the University of Nottingham, a Ph.D. that focused on spatial and temporal crime analysis techniques (also Nottingham), and is a Fellow of the Royal Geographical Society.

Recommended Readings

- ***A Police Guide to Surveying Citizens and Their Environments***, Bureau of Justice Assistance, 1993. This guide offers a practical introduction for police practitioners to two types of surveys that police find useful: surveying public opinion and surveying the physical environment. It provides guidance on whether and how to conduct cost-effective surveys.

- ***Assessing Responses to Problems: An Introductory Guide for Police Problem-Solvers***, by John E. Eck (U.S. Department of Justice, Office of Community Oriented Policing Services, 2001). This guide is a companion to the *Problem-Oriented Guides for Police* series. It provides basic guidance to measuring and assessing problem-oriented policing efforts.

- ***Conducting Community Surveys***, by Deborah Weisel (Bureau of Justice Statistics and Office of Community Oriented Policing Services, 1999). This guide, along with accompanying computer software, provides practical, basic pointers for police in conducting community surveys. The document is also available at www.ojp.usdoj.gov/bjs.

- ***Crime Prevention Studies***, edited by Ronald V. Clarke (Criminal Justice Press, 1993, et seq.). This is a series of volumes of applied and theoretical research on reducing opportunities for crime. Many chapters are evaluations of initiatives to reduce specific crime and disorder problems.

- ***Excellence in Problem-Oriented Policing: The 1999 Herman Goldstein Award Winners.*** This document produced by the National Institute of Justice in collaboration with the Office of Community Oriented Policing Services and the Police Executive Research Forum provides detailed reports of the best submissions to the annual award program that recognizes exemplary problem-oriented responses to various community problems. A similar publication is available for the award winners from subsequent years. The documents are also available at www.ojp.usdoj.gov/nij.

- ***Not Rocket Science? Problem-Solving and Crime Reduction***, by Tim Read and Nick Tilley (Home Office Crime Reduction Research Series, 2000). Identifies and describes the factors that make problem-solving effective or ineffective as it is being practiced in police forces in England and Wales.

- ***Opportunity Makes the Thief: Practical Theory for Crime Prevention***, by Marcus Felson and Ronald V. Clarke (Home Office Police Research Series, Paper No. 98, 1998). Explains how crime theories such as routine activity theory, rational choice theory and crime pattern theory have practical implications for the police in their efforts to prevent crime.

- ***Problem Analysis in Policing***, by Rachel Boba (Police Foundation, 2003). Introduces and defines problem analysis and provides guidance on how problem analysis can be integrated and institutionalized into modern policing practices.

- ***Problem-Oriented Policing***, by Herman Goldstein (McGraw-Hill, 1990, and Temple University Press, 1990). Explains the principles and methods of problem-oriented policing, provides examples of it in practice, and discusses how a police agency can implement the concept.

- ***Problem-Oriented Policing and Crime Prevention***, by Anthony A. Braga (Criminal Justice Press, 2003). Provides a thorough review of significant policing research about problem places, high-activity offenders, and repeat victims, with a focus on the applicability of those findings to problem-oriented policing. Explains how police departments can facilitate problem-oriented policing by improving crime analysis, measuring performance, and securing productive partnerships.

- ***Problem-Oriented Policing: Reflections on the First 20 Years***, by Michael S. Scott (U.S. Department of Justice, Office of Community Oriented Policing Services, 2000). Describes how the most critical elements of Herman Goldstein's problem-oriented policing model have developed in practice over its 20-year history, and proposes future directions for problem-oriented policing. The report is also available at www.cops.usdoj.gov.

- ***Problem-Solving: Problem-Oriented Policing in Newport News***, by John E. Eck and William Spelman (Police Executive Research Forum, 1987). Explains the rationale behind problem-oriented policing and the problem-solving process, and provides examples of effective problem-solving in one agency.

- ***Problem-Solving Tips: A Guide to Reducing Crime and Disorder Through Problem-Solving Partnerships*** by Karin Schmerler, Matt Perkins, Scott Phillips, Tammy Rinehart and Meg Townsend. (U.S. Department of Justice, Office of Community Oriented Policing Services, 1998) (also available at www.cops.usdoj.gov). Provides a brief introduction to problem-solving, basic information on the SARA model and detailed suggestions about the problem-solving process.

- ***Situational Crime Prevention: Successful Case Studies***, Second Edition, edited by Ronald V. Clarke (Harrow and Heston, 1997). Explains the principles and methods of situational crime prevention, and presents over 20 case studies of effective crime prevention initiatives.

- ***Tackling Crime and Other Public-Safety Problems: Case Studies in Problem-Solving***, by Rana Sampson and Michael S. Scott (U.S. Department of Justice, Office of Community Oriented Policing Services, 2000) (also available at www.cops.usdoj.gov). Presents case studies of effective police problem-solving on 18 types of crime and disorder problems.

- ***Using Analysis for Problem-Solving: A Guidebook for Law Enforcement***, by Timothy S. Bynum (U.S. Department of Justice, Office of Community Oriented Policing Services, 2001). Provides an introduction for police to analyzing problems within the context of problem-oriented policing.

- ***Using Research: A Primer for Law Enforcement Managers***, Second Edition, by John E. Eck and Nancy G. LaVigne (Police Executive Research Forum, 1994). Explains many of the basics of research as it applies to police management and problem-solving.

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