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An Examination of Homicide Clearance Rates:

Foundation for the Development of a Homicide Clearance Model

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Introduction

Homicide rates around the country show that many individuals choose murder as the ultimate means of conflict resolution. According to the FBI's Uniform Crime Reports, 65 percent of homicides are cleared. Unfortunately, consistently high homicide clearance rates are not the norm for departments around the country. To help departments raise their clearance rates, it is important to discover which aspects of homicide case management and investigation produce the best results.

First it may be useful to review definitions of "clearance rate." Bottomley and Pease state, "[A]n offense is said to be cleared up if a person has been charged, summonsed or cautioned for the offense, if the offense is admitted and taken into consideration by the court, or if there is sufficient evidence to charge a person, but the case is not proceeded with..." (1986:44).

However, Rinehart (1993) points out that Greenwood, Chaiken, and Petersilia (1977:32) define a cleared case to exist "when police have identified a perpetrator, have sufficient evidence to charge him, and actually take him into custody," or he dies or is already in custody. According to Rinehart (citing Wolfe and Heaphy, 1975), the FBI concurs with this definition with regard to arrest, but does not include death, prior custody, or arrests in the definition of clearance.

Other research Rinehart cites would add additional factors to those definitions, such as the requirement that the suspect be formally charged with the offense (Griffin, 1958). She also points out that other researchers, such as Elliot and Sardino, have used far more complex, operational definitions of clearance. For the purposes of this paper, homicide clearance rates represent the closure of homicide cases with the arrest of suspects (Greenwood, Chaiken, and Petersilia, 1977). In addition, a case is considered closed if the suspect remains at large on outstanding warrants (Reuter, 1993).

An examination of homicide clearance rates illustrates how homicide cases are handled and the types of homicide cases that are most readily cleared, primarily through arrest.

This paper proposes that a homicide clearance rate model can be developed by studying examples of management practices, program strategies, and recommendations of law enforcement agencies nationwide with either high clearance rates or innovative homicide investigation approaches that have significantly increased their closure rates.

Changing Homicide Trends

Clearance rates for murder and non-negligent manslaughter, according to the Uniform Crime Reports, declined from 93 percent in 1961 to 65 percent in 1993. The most prevalent type of homicide 20 years ago was acquaintance homicide, in which the victim knows the assailant in some way. While the overall clearance rate of acquaintance homicide is increasing, the same cannot be said of stranger-to-stranger homicide. A wide range of social stressors, including guns and drugs, contribute to the rising incidence of stranger-to-stranger homicides. Law enforcement must now work with a type of homicide that has a high likelihood of never being solved.

A study of San Diego homicide trends between 1970 and 1980 (Gilbert, 1983) identified a marked increase among stranger-to-stranger homicides. While the proportion of acquaintance homicides decreased from 67 percent of all homicide cases in 1970 to 34 percent in 1980, the rate of felony homicides, specifically robbery-related homicides, increased significantly. The study concluded that the decline of homicide clearance rates can be attributed to the increase in stranger-to-stranger homicides.

What makes stranger-to-stranger homicide so difficult to clear? First, it is much harder for investigators to discern a motive. Unlike acquaintance homicides, which generally result from an argument or other personal conflict between the offender and victim, stranger-to-stranger homicides often involve a concurrent felony that required time and planning, lessening the likelihood that physical evidence will be left behind for investigators to discover. Second, the potential for identifying a suspect is reduced. In many acquaintance homicides, the offender will contact investigators or surrender to police. In a

stranger-to-stranger homicide, the offender is less likely to commit the act in the presence of a witnesses or have an easily traceable connection to the victim.

In examining homicide clearance problems, one can look at police behavior or at aspects of the cases themselves. This paper will take both approaches.

Low Solvability Issues

Administrative Issues

Numerous aspects of police behavior may significantly affect case clearance. Variables that have been studied include the number of police (Bottomley and Pease, 1986); workload, skills, training, and police-community relations (Greenwood and Petersilia, 1975); education level, age, and experience of the officers (Riedel, 1995, citing Bozza, 1973); the extent of follow-up investigations (Bynum, Cordner, and Greene, 1982); and information processing technology (Rinehart, 1993, citing Skogan and Atunes, 1979).

An interview of detectives (Rinehart, 1993, citing Pooley, 1992) in the New York City Police Department—including a lieutenant and the Manhattan North Homicide Squad commander, the chief of detectives, and two homicide detectives—illustrates the diversity of opinions regarding the elements essential to clearing cases. The lieutenant considered important the number of detectives on the force and their individual traits, especially imagination, tenacity, ability to improvise, and prior investigative experience. However, the two detectives did not mention those factors as essential to clearing cases. One detective considered the most relevant factors to be accountability, ambition, and the time allotted to solve a case. The other detective pointed to the impact that media coverage of a case has on the amount of time and attention given to that case. The chief of detectives said the most relevant factors were knowledge of the offender's motive, physical evidence, and eyewitnesses.

Resources

Lack of personnel and decreased resources are often presented as the greatest contributors to low clearance rates (LAPD, 1994). Budget constraints can translate into reduced

staff and resources for homicide units, increased workloads for individual homicide investigators, and a potential decrease in the quality of investigations. A police productivity study of homicide and auto theft investigations (Cloninger and Sartorius, 1979:397) examined police inputs (such as police expenditures on enforcement per capita and the number of officers per square mile) to determine whether the clearance rate for homicide increases as more police inputs are deployed. The study found no significant association between those variables and the homicide clearance rate (Hunter, 1997:28). The authors note that their data may be too aggregated and inaccurate when applied solely to homicide investigation. They suggest that a further factor could be "system strain," in which the size of the geographic area and the crime rate affect solvability more than the level of law enforcement. A study of a crime control team (Rinehart, citing Elliott and Sardino, 1971) also found manpower and financial resources not to be significant in terms of clearance rates; officer accountability, existence of a separate investigative unit, flexible deployment of police officers, and police–community relations were found to play a greater role.

Response Time

There is no agreement in the literature on homicide investigations as to the significance of response time. Some studies accord response time "a role in the likelihood of solving or clearing a case" (Rinehart, 1993, citing Kansas City Police Department, 1977). Faster response times are considered critical because they reduce the potential for the loss or contamination of evidentiary material (Hunter, 1997:20, citing Gerberth, 1989), and there is a greater likelihood that individuals involved in the homicide may still be present at the crime scene (Hunter, 1997:20). Other studies support the view that response time (which can also take into account the number of reported crimes processed and type of personnel responsible for processing crimes) is not a significant predictor of the clearance rate (Greenwood, Chaiken, and Petersilia, 1977).

Administrative Influences

All the research reviewed for this paper indicated that officer ambition has a significant impact on clearance rates. Officers with heavy caseloads often feel pressure during inter-

rogations of a suspect to elicit admissions of more than the crime at hand in order to increase the overall clearance rate (Rinehart, 1993, citing Bottomley and Pease, 1986; Ericson, 1982; Block and Bell, 1976). What drives administrative pressure on officers? One possible source is the negative attention focused on police, especially from some media sources. Media attention can affect the amount of time police administrators allow an investigator to work on a case (Bottomley and Pease, 1986), especially high-profile cases, which in turn affects the thoroughness and ultimate success of the investigation (Greenwood, Chaiken, and Petersilia, 1977). However, media attention does not extend to enough cases to produce a large shift in overall clearance rates (Bottomley and Pease, 1986).

Information Processing

Case closure often depends upon police ability to access and analyze information from a wide variety of sources (Rinehart, 1993:49, citing Bock and Nelson, 1988:17). The manner and type of information collected and used is also significant to case clearance (Keppel and Weis, 1994:100, cited in Hunter, 1997:25). For example, a case is more likely to be solved when more information is known about the time and distance between what are known as the five locations of a murder incident (Keppel and Weis, 1994):

1. where the victim was last seen
2. the initial site of contact between the victim and assailant
3. initial assault site, where and when the offender kidnaps or assaults the victim in any way
4. murder site, where and when the victim sustains the fatal injuries
5. body recovery site

A study by Keppel and Weis involving 967 single victim–single offender murders in Washington state between 1981 and 1986 looked at the relationship between solvability and the information known about the five murder incident locations. When information was known about the initial site of contact, 77 percent of cases were solved. When the site and date of the murder were known, 81 percent of cases were solved. When the murder site was unknown, 41 percent of cases were solved (Keppel and Weis, 1994). The

The time and distance relationship between the "victim last seen" site and the "victim recovery" site is also significant to case clearance. The rate of solvability is significantly higher when the time between the two locations is less than 24 hours. The rate of solvability is also higher when the distance between sites is less, especially when it is less than 200 feet. This is especially true for the distance between the site where the victim was last seen and the other four sites.

Personnel

The role and impact of patrol officers versus detectives is controversial. Some studies have asserted that the primary responsibility for clearing cases lies with patrol officers, as they generally arrive first at the scene, conduct initial interviews, and determine whether sufficient evidence is present to effect an arrest. By contrast, detectives are responsible for processing paperwork and interacting with suspects who have already been identified by patrol officers. An analysis of Chicago murders between 1965 and 1969 found that 35 percent of all murders were cleared by responding patrol officers (Hunter, 1977:30, citing Skogan, 1979:221). A study of arrests by the Metropolitan (Washington, DC) Police Department (Reiss, 1971) found that 65 percent were effected by the patrol division, 21 percent by the detective division, and 13 percent by the traffic division. Since patrol officers are readily supplied with citizen information, which aids in identifying suspects, they are credited with the arrests (Hunter, 1997:30, citing Reiss, 1971:103). Other studies (Riedel and Rinehart, 1994, citing Eck, 1983, and Eck, 1992), however, suggest that patrol officers and detectives are both essential to clearing cases, given that both preliminary and follow-up investigations affect case closure.

Homicide Case Features

Type of Homicide

A study of murder in Chicago between 1987 and 1991 attempted to discover which case variables—victim's age, race, and gender; weapon used; and circumstances (felony or non-felony) surrounding the murder—most affected the probability of clearing a homicide (Riedel and Rinehart, 1994). The study sample consisted of 3,066 felony homicides (those committed while also committing a felony, such as robbery) and non-felony homi-

cides involving a single victim and offender. Of those, 998 were uncleared, resulting in a sample clearance rate of 67.5 percent. The study found that 57.6 percent of the felony murders remained uncleared, while only 10 percent of non-felony murders remained uncleared. Performing cross-tabulations of the data for all variables against clearance status, researchers concluded that only the circumstances surrounding a case were highly associated with clearance status.

The results can be explained by looking at the difference between non-felony and felony homicides. The victim-offender relationship is considered more significant to case clearance than even the emotional/rational nature of the homicide, investigator experience or workload, weapon used, race of the victim, or number of victims involved (Marche, 1994). Non-felony murders often involve acquaintances or family members, may occur after long-term arguments, and frequently are witnessed by individuals familiar with long-standing tensions between the victim and offender.

Felony murders, by contrast, often involve strangers, occur rapidly, and are not witnessed, so no one is available to provide police with information about the offender. The investigator in a non-acquaintance homicide typically has no evidence of motive, little crime scene evidence, and few or no witnesses associated with the case. The type of homicide committed is important to clearance rates because it reveals information about the offender and the victim-offender relationship, which in turn increases the possibility of discovering a motive, physical evidence, or potential eyewitnesses.

Physical Evidence

Physical evidence is a complex variable not susceptible to simple analysis. One study on the impact of physical evidence on clearance rates for all crimes found that physical evidence and investigation follow-up were not significant factors (Rinehart, 1993, citing Skogan and Atunes, 1979). This study consisted of interviews with 132,000 people nationally, conducted every six months between February 1973 and June 1974, regarding victimization, observed crime, and opinions as to the factors determining clearance rates.

Third Parties/Reluctant Witness

The type of homicide determines the availability and cooperativeness of potential witnesses and informants. Homicides can involve third parties in a variety of ways. The likelihood of violent interaction between victim and offender increases greatly if aggressive third parties are involved (Riedel and Rinehart, 1995, citing Felson, Ribner, and Siegel, 1984:93), particularly if the third parties are young males or significant others (Riedel and Rinehart, 1995). Friends or family members may also intervene on behalf of each other in disputes, leading to homicide. There is a much greater chance that witnesses and third parties close to the victim will cooperate in a non-felony murder investigation because of a larger vested interest in the outcome of the case. Witnesses to stranger-to-stranger homicides often fear retribution and feel that law enforcement is uninterested in their participation or indifferent to the case altogether. This is especially true for individuals viewed as "non-persons" by the larger society because they participate in drug or gang culture. Other witnesses may have actively provoked the homicide and thus be reluctant to come forward (Black, 1983).

Third parties are also potential sources of information and leads for police investigating homicides. A study of police departments in six U.S. cities found that over 50 percent of reported cases were solved when the identity of the suspect was known at the time the incident was reported to police. That study suggests that victim or witness identification of a suspect is the single most important factor affecting clearance (Rinehart, 1993, citing Greenwood, Chaiken, and Petersilia, 1977), because any such information helps reduce the pool of suspects (Hunter, 1997:30, citing Skogan and Atunes, 1979:221). Despite a lack of crime scene evidence and a clear motive, cases that are considered difficult to solve can be cleared through the cooperation of eyewitnesses (Rinehart, 1993; Reiss, 1972; Bottomley and Pease, 1986; Greenwood, Chaiken, and Petersilia, 1977; Bloch and Bell, 1976; Keppel and Weis, 1994).

Third parties may come upon relevant information in a number of ways: at the scene, by word of mouth, on the streets, from the offender, and through other social networks. The willingness of third-party observers to share information varies for personal reasons, such

as retaliation against the offender, a reduced plea on another charge, fear of retaliation from the offender or others, or a personal relationship with offender (Riedel, 1995:94). An evaluation of Crime Stoppers programs, which offer confidentiality and monetary rewards to witnesses, concludes that lack of citizen involvement is the largest factor affecting clearance rates.

Decker (1995) expands on the research on witnesses' roles in homicide cases. He cites the work of Felson and Steadman (1983), who found that 70 percent of homicides were witnessed, and of Luckenbill (1977-78), who found the same, to point out that witnesses' roles are significant. Studying homicides in St. Louis between 1985 and 1989, Decker classifies witnesses' roles into five major categories: surrogates, incapable guardians, facilitators, precipitators, and bystanders.

Surrogates join the event and act in concert with either the victim or the offender. Decker found that surrogates were present in 30 percent of the cases he studied. Incapable guardians try, unsuccessfully, to intervene in the acts leading up to the homicide. Decker found that incapable guardians were present in 24 percent of the cases he studied. He also found that incapable guardians were represented across a number of victim-offender relationships.

Facilitators are instrumental in bringing the victim and the offender together, but they do not instigate or escalate any violence between the two, nor do they intend to. Decker found that facilitators were present in 20 percent of the cases he studied. Citing Wilson and Daly (1985), he points out that a disproportionate number of such cases involve disputes over romantic relations or women. Often, the facilitator has a relationship with both the victim and the offender.

Precipitators intend to instigate a violent event or homicide, or they spark or encourage the violence between the offender and the victim. When witnesses act as precipitators, they not only have a greater stake in either the offender's or the victim's welfare, but they also have shared interests with one of the parties (Decker 1995). According to other re-

searchers, a homicide that involves precipitators may be classified as an act of vengeance (Black, 1983; Katz, 1988).

Bystanders are entirely uninvolved in a homicide and just happen to be at a particular place for unrelated reasons. Decker found that bystanders were present in only 9 percent of the cases he studied. In the majority of cases, such a witness is unacquainted with the victim and offender.

Decker concludes that, because the majority of homicides have witnesses, it is important to classify and better understand witnesses' roles if homicides and their purposes are to be understood. Understanding the relationships between the witnesses, the victim, the offender, and the event is vital to understanding how the parties' interactions can escalate to violence or homicide in other situations.

The importance of witnesses' roles becomes even clearer when one examines research by Katz and others. Katz (1988) holds that homicide is the response to a process of interactions where "values" are defended. When witnesses are present during such an exchange, they are instrumental in translating emotions into action. In addition, a challenge to someone's identity becomes more important in the presence of third parties, particularly for those who have a high stake in maintaining a reputation on the street (Decker, 1995).

Violence often results from minor acts that have a strong cultural context. This particularly true for young adult, male African Americans of lower socioeconomic status and for southern and urban residents. Within these groups, strong cultural belief systems form the foundation for strong values and for reactions to minor acts that contradict those values. Luckenbill (1977-78) explains homicide as a "sequence of interactions between victims, offenders, and audience."

Law enforcement agencies are encouraged to deploy more resources to secure witness involvement, especially in felony homicide cases (Riedel and Rinehart, 1994; Skogan, 1979), because the "capacity of the police to solve any crime is severely limited by citizens, due partly to the fact that most crimes cannot be solved without securing the cooperation of citizens to link a person to the crime" (Hunter, 1997:30, citing Reiss, 1971).

Critics argue not only that witnesses-location resources are often unavailable or burdensome to police departments, but also that neither civic pride nor cash incentives at prevailing levels are enough to encourage witnesses to come forward (Greene, 1994).

Because low solvability and other homicide issues affect case outcomes and clearance rates, these issues must be thoroughly examined and addressed. Police departments are aware that budget constraints often translate into reduced staff and resources. However, it is necessary for management to develop or seek viable alternatives to meet this challenge.

How Much Do Police Matter?

A number of articles and research findings indicate that manpower, officers' personal traits (including ambition), training, workload, and specialization by investigators do not significantly impact clearance rates (Eliopulos, 1993; Greenwood and Petersilia, 1975). Some studies even suggest that police resources will only have, at best, a limited impact on clearance rates and that salient case factors are more significant (Reiss, 1971; Greenwood and Petersilia, 1975; Keppel and Weis, 1993; Marche, 1994; Wellford, 1974), particularly in large urban areas and communities where citizens are spread across wide areas with little social interaction (Felson, 1994).

The amount of police resources available—specifically effort, budget, police per capita, and ratio of civilian police employees to uniformed police—was shown to have no appreciable effect on clearance rates: "clearance of index crimes is largely a function of the nature of the crime (in particular, the identification of the offender by the victim or a witness)" (Hunter, 1997:31, citing Wellford, 1974:208).

Crime scene integrity and the preservation of evidence are major responsibilities for police, but other factors, such as weather, can contaminate a crime scene yet remain outside the control of the police (Hunter, 1997:20). While not diminishing the efforts of investigators, the Kansas City Police Department acknowledges that an overall low homicide rate and access to excellent trauma center facilities affects its clearance rates significantly by preventing the deaths of victims.

Investigator follow-up may produce leads that increase the likelihood of an arrest, but there are also many cases that lack substantial leads and are unlikely to be solved, regardless of police action. The fact remains that without quality work at the start of an investigation, further efforts by detectives are not likely to solve the case (ICMA, 1991:131, cited in Hunter, 1997:35).

Strategies for Maintaining or Improving Clearance Rates

Several police departments have met the challenge of changing homicide trends by developing specific programs, strategies, and innovations that help maintain the integrity and viability of their homicide divisions. As a result, these homicide divisions have increased or maintained high clearance rates. Data supplied by some police departments indicate that their success stems from implementing solutions based on the following:

- case management
- manpower deployment
- education and training
- management
- external relations
- research and programs designed to reduce violence associated with high-risk groups
- automated investigative systems technology

Case Management Systems

Case management refers to the process of monitoring the progress of an investigation from initial assignment to case closure. The importance of case management cannot be overstated, as it involves police reports and other documentation on which the prosecution will later be based.

The Oklahoma City Police Department has achieved a consistent homicide clearance rate of 90 percent, attributable, in part, to its Internal Manual Case Management System (IMCMS), in use since the mid-1970s. IMCMS organizes all documents pertaining to a

case and tracks every aspect of the subsequent investigation from start to finish through the use of logs and case books.

IMCMS consists of three core elements: an assignment log, an evidence log, and a case binder. A designated investigative supervisor fills out the assignment log at the crime scene, recording all individuals present and their activities. The assignment log, subdivided into instructions, an action graph, a list of officers assigned, and an action log, is considered the most important element of the system. Thus, it stays in the possession of the investigative supervisor. The case binder houses reports generated by the assigned actions in the assignment log and is subdivided into seven segments: victim information, scene reports, evidence, follow-up reports, witness interviews/statements, suspect information, and communication/warrants. Technical investigators assigned to the crime scene investigation have responsibility for the evidence log, a 14-point documentation of all aspects of evidence acquired and of the crime scene itself, including sketches of the crime scene.

The success of the Internal Manual Case Management System demonstrates how vital it is for a homicide division to organize the vast amounts of information received during a homicide investigation. IMCMS is an example of a "pen and paper" management approach. The Florida Department of Law Enforcement and the Dallas Police Department's Crimes Against Persons Division also consider information management systems necessary to increase or maintain acceptable clearance rates. Both departments, however, use an automated, on-line information management system that can be accessed via laptop computers in patrol cars.

A competent case management system may facilitate steady or increased homicide clearance rates by considering departmental needs and available resources in planning an effective investigation. Of course, a case management system is not the only factor affecting homicide clearance rates. Human factors—skills, working patterns, and relationships—also have an effect.

Arthur Westveer provides an outline of the death investigation process and the issues that arise in it (Westveer, 1992):

I. Structure of the Department
   A. Organization
   B. Selection of Personnel, Detectives, and Supervisors
      1. Legitimate Qualifications
      2. Training
II. Case Management: Monitoring Case Folder
III. Case Management Problems
   A. Inappropriate Investigation Policies and/or Procedures
   B. Interference by High-Ranking Officials
   C. Interagency Rivalry
IV. Management and Supervision
V. Supervising On-Scene Investigation
   A. Initial Receipt of Information
   B. Assigning a Member to Maintain Communication with Command: Duties upon Arrival at Scene
   C. Directing Specific Investigative Duties If Suspect Is in Custody
   D. Interview and Interrogation of Suspect at Scene
   E. Formal Interrogation at Station
   F. Examination of Suspect for Evidence
   G. Dying Declarations
   H. Evaluation of Suspect's Demeanor/Mental State from Time of Arrest to Arraignment (Diminished Capacity Defense)
   I. Supervising Crime Scene Search
   J. Supervisory Hypotheses
   K. Examining the Body at the Scene
   L. Releasing the Body
   M. Directing the Examination of the Outdoor Crime Scene
   N. Directing the Examination of the Outdoor Scene at Night
   O. Release of the Crime Scene

Manpower

The Boca Raton (Florida) Police Department uses a team approach in its homicide investigations. Along with a lead investigator, an additional investigator is assigned to act as an analytical officer. These two investigators work beside each other and share the responsibilities for case completion. The original files and paperwork of a case are maintained by the unit supervisor instead of the lead investigator, not only ensuring the accuracy and completeness of files throughout the investigation, but also freeing the lead investigator to operate in the field.

Law enforcement agencies in Illinois are striving to better use their dwindling resources by cooperating and sharing resources. The Illinois State Police use outside expertise—including forensic and coroner staff, along with experts on such topics as DNA, blood spatters, stab wounds, and hair testing—to assist with a heavy workload. The state police also contribute criminal investigators and analysts to county-wide task forces, which typically deal with gang-related crime and violent crime. These task forces receive high-profile and difficult-to-resolve cases and are typically expected to develop proactive programs for crime prevention. Consolidated dispatch centers offer a unique opportunity for two or more police agencies to cover the same geographic location. Such centers also cut costs and enable agencies to share information on a real-time basis.

Chicago Police Area Four and Five Detective Divisions extend the team concept to unsolved cases. Squads of six detectives are assigned to investigate unsolved homicides more than seven days old that were initially investigated by other field detectives. In a two-year period, the Area Five squad cleared 52 murders, ranging from 1973 to 1996, 38 percent of which were over a year old. The squad's success is due to the fact it is not given other assignments and has the freedom to pursue these investigations and to work a case thoroughly on a full-time basis.

The Winston-Salem (North Carolina) Police Department attributes its high clearance rate to a specialized case management section that guides and provides quality control for each case. Detectives who respond to a homicide respond in a team with a squad sergeant and at least one detective from each relevant specialized unit—the sections on case management, fraud, property crimes, juvenile investigations, and crimes against persons. In a homicide case, the crimes-against-persons detective is the lead investigator, and he or she, along with the sergeant, directs the investigation. The specialized units provide necessary support; ensure that the investigation is handled by highly trained, focused professionals; and produce better investigative results.

Education and Training

In recent years, the criminal investigations division (CID) of the Metropolitan (Washington, D.C.) Police Department (MPD) reported comparatively low homicide clearance

rates as a result of many factors, including the infusion of crack cocaine into the area beginning in 1986, the availability of firearms, and increased caseload with decreased manpower. In an effort to increase homicide clearance rates, in November 1993 a homicide squad reorganization plan was drafted and implemented. The reorganization included a comprehensive and intensive training program that was developed for the group of 60 new detectives who were to be assigned to the homicide squad. The training program consisted of 10 weeks of formal training, followed by on-the-job training.

The formal training component was designed to address the fundamentals of death investigations. It included medicolegal investigation, death investigation, crime scene supervision, interview and interrogation, homicide investigation management, and forensic support. The training schedule consisted of the following:

- two weeks of classroom instruction on homicide and death investigations in cooperation with the D.C. medical examiner's office
- one week of training at the U.S. Attorney's office on the role of that office and on the preparation needed for successful prosecution
- one week at the FBI Academy in Quantico for interview and interrogation classes
- one week at the MPD Crime Scene Examination Section for instruction on gathering and processing evidence and on new forensic technology
- one week at the MPD Fingerprint Examination Section for instruction on new techniques and developments in fingerprint application to death/homicide investigations
- one week at the MPD Firearms Examination Section for instruction on firearms identification, weapons classifications, and ballistics
- one week at the MPD Handwriting Examination Section for familiarization with the science of handwriting analysis
- one additional week at the Medical Examiner's Office to learn about the role of the medical examiner in investigations and to observe autopsies for case documentation preparation

Students were required to maintain typewritten transcripts of the lecture notes, prepare at least two typewritten death reports, and achieve a grade of at least 70 percent on the final examination. If all the requirements were met, the students passed the course and became homicide detectives. Initially, the new detectives handled administrative tasks. They were then paired with seasoned detectives and assigned "cold cases" (unsolved homicide cases) to gain investigative experience.

In addition to training for newly assigned personnel, the MPD also proposed developing training on basic crime scene investigation to be presented to selected patrol officers. New personnel were assigned to work under the close supervision of a highly experienced investigator, who would provide additional on-the-job training. Assignment to the midnight response team was also used as on-the-job training in basic death investigative techniques.

Newly assigned detectives in the Winston-Salem Police Department's criminal investigations division go through a three-phase training regime. Initially they are required to complete a five-day in-house orientation that emphasizes interview and interrogation techniques, lineups, crime scene security, and homicide. They are also required to complete basic criminal investigations and interview and interrogation techniques at the North Carolina Justice Academy. In addition, these detectives must complete the Police Law Institute modules covering search warrants, warrantless searches, targeting suspects, and civil liability. The detectives are then partnered with a seasoned investigator until a supervisor indicates that the detectives can work alone.

Investigators must have education and training to process homicide cases effectively. Information supplied by police departments indicates that new homicide detectives are adequately trained. However, there is little investigative training after the initial formal training period. Detectives should receive periodic training to upgrade their skills and be introduced to innovative investigative techniques. The Minneapolis Police Department offers both career enrichment opportunities and specialized homicide training as an incentive to its squad (Barsness, 1997). Further training can also bolster morale if it is treated as a privilege for detective personnel (McCarthy, 1994).

Management

According to Vernon J. Gerberth, a retired lieutenant commander with the New York City Police Department, the two key principles in all homicide investigations are documentation and preservation (Gerberth, 1989). A department must have a management policy that is clearly established and based on these principles to ensure that crime scene investigations, and all the relevant information and evidence, are properly handled. Inter- and intra-agency rivalry can keep a death investigation from succeeding (Gerberth, 1989).

Trust is essential to fostering good relations within and among law enforcement agencies if the culture is to be "one that expects that murderers will be brought to justice..., [that] casts the Homicide Unit as an elite operation..., helps to attract outstanding candidates to the homicide squad..., [and] also sets a positive expectation that all homicides will be solved" (Scheff, 1995).

For such cooperation to succeed, officers must work with a team spirit, different divisions within an agency must decide how they will work together, and the department must discern the best ways to work with outside agencies, such as the coroner's officer and the district attorney's office. Gerberth suggests that the police department maintain personal contacts at each of the agencies and respect the roles of those agencies. Police and prosecutors should complement each other and should openly share information and seek advice from each other as necessary (Gerberth, 1989). In response to a high level of gang- and drug-related homicides, officers and detectives in Chicago Police Area Four worked to become familiar with gang members and narcotics agents in their assigned districts, a technique that provided information used to solve many homicides (Farrell, 1997).

Police departments should examine screening factors for potential investigators (qualifications, experience, seniority, recommendations), the selection process for investigative personnel, the type of training investigators need and have available, the assignment process (whether it is based on specialization, generalization, or rotation), and the selection process for supervisory investigative personnel (Gerberth, 1989:9). The Broward

County Sheriff's Office in Florida selects individuals "who are motivated self-starters..., aggressive without being offensive either to the public or fellow officers..., officers with a reputation for being hard workers, and the ability to communicate in all forms with all types of people, detectives who are enthusiastic, curious, and compassionate" (Scheff, 1995). When selecting supervisory personnel in homicide investigations, Gerberth suggests selection from within the existing investigation unit for best results.

During a roundtable discussion for a Homicide Investigations Improvement Program training video, four homicide unit commanders (from Washington, D.C.; St. Louis, Missouri; Cincinnati, Ohio; and Aurora, Colorado) discussed several issues, including how homicide investigators should be chosen and how a homicide unit should be managed (PERF, 1998). While it is desirable for homicide investigators to have previous investigative experience of some kind, it need not be a stringent requirement. However, homicide investigators should possess certain skills that will enable them to carry out investigations. Investigators should be highly motivated and be able to handle several cases at once. They also should have good communication skills so they can prepare written reports and establish rapport with witnesses. In larger homicide units, these skills could be spread out among investigators; however, smaller units have the challenge of finding individuals who each possess all the necessary skills (PERF, 1998).

Homicide investigators must be able to take criticism, whether from supervisors or peers. But a supervisor must be able to articulate the criticism in a constructive way. The supervisor has to cite specific examples of where the investigator needs improvement instead of offering vague criticism. At the same time, homicide commanders have the responsibility to keep the investigators motivated (PERF, 1998).

In a 1987 study, Cohen and Chaiken set forth what they believe to be the best methods for selecting investigative personnel. Their findings are based on examination of the investigative personnel selection procedures in police departments nationwide and a review of the relevant literature. They found that officers' past performance becomes increasingly valuable to investigators in the selection and promotion of personnel the longer they are on the force. They also found that a small proportion of police personnel (ap-

proximately 20 percent) are responsible for a disproportionate number of arrests and convictions. But their most significant finding is this: "Although various changes in investigative policies, equipment, techniques, or organizational procedures have been suggested over the years as a way to improve the quality of criminal investigations, most detectives, and their administrators, say that choosing the right officers to be detectives is much more important than any of these practices or procedures" (Cohen and Chaiken, 1987).

They discovered four basic personnel selection styles: unstructured, semistructured, structured, and civil service. The unstructured style is characterized by departments with few or no written polices or procedures for selecting investigative personnel. In these departments, selection of an officer for investigative duty is highly discretionary, based on little concrete criteria, and those criteria and selection procedures are subject to constant change (Cohen and Chaiken, 1987).

The semistructured style exists in departments where some selection policies and procedures have been implemented. However, this style leaves room for substantial discretion on the part of decision-making personnel as to how the general requirements will be weighted and applied (Cohen and Chaiken, 1987:7).

By contrast, the structured style entails clearly defined policies and procedures for investigative personnel selection and affords little discretion to decision-making personnel. In many cases, rules and procedures for selecting investigative personnel are set forth in policy manuals or other written directives (Cohen and Chaiken, 1987:8). The civil service style is the most highly structured. This style allows decision-making personnel virtually no discretion. It is characterized by criteria such as time on the force, requisite scores on civil service exams, and minimum requirements for performance ratings. These factors are then weighted based on a clearly defined formula. The chief generally makes the final selection based on the scores and other relevant factors (Cohen and Chaiken, 1987:9).

Cohen and Chaiken observed that regardless of the type of selection process a department uses, selection most often falls to upper police management and the head of the agency

(1987:10). They also observed that most departments give candidates credit for seniority and time served (1987:10). With regard to training, they observed that departments that use structured selection processes generally require investigative candidates to participate in formal training sessions, while departments with unstructured selection styles generally rely on on-the-job training.

Cohen and Chaiken provide an outline of the important tasks, traits, qualifications, and outcomes relevant to good investigative personnel (1987:14):

I. Gathering Information

Crime scene management
Communication skills

II. Field Operations

Stakeouts
Patrol
Crime pattern analysis
Development of informants
Street knowledge

III. Arrests

Quantity
Quality

IV. Public and Victim Satisfaction

Crime reduction
Diminution of fear

V. Prosecutions

Quantity
Presentation of testimony in court
[Percentage that] lead to conviction

VI. Personnel Performance

Absenteeism
Complaints
Awards

VII. Personal Traits

Motivation
Stability
Persistence
Intelligence
Perseverance
Initiative
Judgment
Involvement
Dedication

VII. Qualifications

Education
Training
Previous assignment in department

After listing the qualities relevant to good investigative personnel, Cohen and Chaiken set about putting forth predictive factors, such as cognitive testing or other criteria, that can help decision-making personnel select the most qualified investigators. In doing so, they relied on work done by Roe and Roe (1982), who had developed a comprehensive summary of selection requirements and factors.

Cohen and Chaiken expanded on Roe and Roe's work, reanalyzing their findings and putting together a list of predictive tests and factors that could be applied to selecting the best investigative personnel. In their reanalysis of Roe and Roe's findings, they retained only those predictive factors that had been determined as valid in two or more of the existing studies (Cohen and Chaiken, 1987:17).

Based on this reanalysis, Cohen and Chaiken found that cognitive tests such as civil service exams were valid predictors of investigative qualities and future success (1987:17). Specifically, they found that civil service exams were most predictive of arrest activity and investigative skills (e.g., gathering evidence and managing crime scenes) (1987:17). They also found that candidates who score high on civil service exams also receive higher performance ratings from supervisors and advance more quickly. Cohen and Chaiken acknowledge that few departments use cognitive civil service exams; however, they recommend that more departments consider doing so.

Cohen and Chaiken also found that a test of verbal ability served as a good predictor of investigative personnel performance. Verbal ability is essential to gathering evidence, securing witnesses, and other relevant tasks. They also found that those with high verbal ability also received high ratings from supervisors. Other factors found to be relevant predictors included above-average ratings by supervisors, exemplary performance in the police academy, performance during an oral interview, prior work experience, numerical ability, IQ, and age (Cohen and Chaiken, 1987:19).

With regard to characteristics predictive of unfavorable performance in an investigative role, they found that past misconduct and disciplinary action tended to predict future conduct problems. They also found that candidates with less formal education tended to have more incidents of misconduct and complaints lodged against them. Conversely, they found that candidates with higher levels of formal education had higher ratings from supervisors and advanced more quickly.

Cohen and Chaiken discuss various detective selection techniques, including behaviorally anchored scales, peer assessment, peer review, assessment centers, personal interviews, arrest convictability, and expected case outcomes. They recommend behaviorally anchored scales as replacements for the traditional supervisory rating systems. Traditional systems ask for numerical assessments of a candidate's performance in various areas, and individual raters often place different emphases on or have different understandings of what is being evaluated. Behaviorally anchored scales, by contrast, break down general concepts and give the rater concrete behaviors by which to assess a candidate. Behaviorally anchored scales have been determined to be more reliable than traditional supervisory ratings.

Peer assessment as a selection technique may take three distinct forms: peer nomination, peer ranking, and peer rating. In peer nomination, detectives and officers nominate other detectives and officers who they believe are the best in the department. In peer ranking, each detective or officer ranks each of the other detectives or officers based on perceived ability and performance. In peer rating, a detective or officer rates all the other detectives or officers based on a scale.

Peer assessment is recommended for departments where supervisors are removed from personnel's day-to-day efforts and where peers are in a better position to observe behavior and performance (Cohen and Chaiken, 1987). Unlike peer assessment, peer review involves a review of work output and performance by a member or members of the same profession. For police departments, peer review involves a thorough analysis of an investigative file, with an eye to the level of contribution each investigator on the case made, areas in need of improvement, and areas where exemplary work was done (Cohen and Chaiken, 1987:25).

The assessment center process involves several components, such as situational exercises, role-playing, writing exercises, and group discussions. Some assessment centers also administer personality tests. Assessment center evaluators receive training on effective evaluation. Assessment centers, more than other forms of evaluation, have met with approval from the Equal Employment Opportunity Commission and have received praise for effectively matching candidates with positions (Cohen and Chaiken, 1987). A drawback to assessment centers is that they have not been proven to be more valid indicators than traditional written exams, and they are far more costly and time-consuming than many of the more traditional evaluation processes.

Personal interviews vary from highly structured and formal to very informal. The interview format is generally determined by the individual department's personnel selection style. While personal interviews are widely used, their validity as evaluators and predictors of future performance is questioned.

Arrest quality has been determined to be a valid measure and predictor of investigators' future performance. Using arrest quality as a selection technique involves examining not only how many arrests a particular candidate has made, but also how many of those arrests have resulted in convictions (Forst, Lucianovic, and Cox, 1977). In researching arrest quality as a performance evaluator, Forst discovered that a relatively small number of officers make a disproportionate number of arrests that result in conviction. The same officers are also responsible for the highest number of total arrests.

Forst also discovered that officers with the most arrests and convictions commonly responded most rapidly to calls for service, were better crime scene managers, were best at identifying, locating, and questioning witnesses, and displayed more of the characteristics commonly identified as relevant to successful investigators. In addition, Forst discovered that cases in which an arrest was made within 30 minutes after the case was reported had the highest chance of resulting in a conviction. As a result of Forst's research, Cohen and Chaiken encourage departments to consider using arrest quality as an investigator selection tool.

Expected case outcome refers to the probability that a case will be solved, as determined by how much information is gathered in the preliminary investigation (Eck, 1983). Under the expected case outcome evaluation process, each case is assigned a difficulty level based on how much information is gathered in the preliminary investigation. The probability that the case will be solved is then determined. This probability is then compared with an investigator's actual case outcomes. Thus, the expected case outcome is used as a benchmark by which actual performance can be measured for multiple investigators across varying degrees of case difficulty.

The relationship between supervisors and detectives is crucial. Detectives "who feel second-guessed by their supervisors or peers will be reluctant to engage in innovative investigative methods when faced with cases that do not yield to standard investigative procedures. Detectives must be free to pursue their cases with a degree of freedom" (Scheff, 1995).

Gerberth suggests that homicide investigators should be specialized. For agencies that are too small for a full-time homicide investigator, Gerberth suggests that one or two investigators be selected to receive specialized training in homicide investigation, and that they be assigned to all homicide investigations. Gerberth strongly urges departments not to use a rotation system, as it leads to investigator frustration and does not result in well-trained investigators (Gerberth, 1989).

Specialization of homicide investigators contributes to a department's success because if "detectives are freed from handling other cases and are given the necessary time to work exclusively on murder investigations, they will more often result in a successful conclusion" (Keough, 1996). Winston-Salem's police department uses a separate case management section within its homicide unit to ensure that each facet of an investigation is handled by trained, focused investigators.

It is important that investigators respond to a homicide scene quickly so that they have the opportunity to witness the crime scene. This also provides an opportunity to interview possible witnesses and suspects. Because the first 24 hours of a homicide investigation are believed to be critical to the solvability of the case, the Des Moines Police Department over-deploys investigators to provide the supervisor with sufficient resources. Later, any extraneous personnel may be pulled off the investigation as warranted (McCarthy, 1994).

External Relations

A good working relationship with the county attorney's office allows for a useful discourse between investigators and the assistant county attorney. In Des Moines, an assistant county attorney responds to each homicide scene with the investigators. This allows the prosecutors to take advantage of observations at the crime scene and provides the investigators with legal input to facilitate the issuance of search warrants (McCarthy, 1994).

Careful sharing of information with the media can assist with the investigation. If the case appears to be generating unusual media attention, it is suggested that the case be presented in the most difficult light to adjust public expectations and provide investigators with breathing room. Secure telephones should be used in lieu of the police radio, when possible, to limit the premature release of information, particularly when the crime scene is outdoors (Petracco, 1995).

The Des Moines Police Department recommends that its investigative team, at the first opportunity, diagram (on a large drawing board) the progress of the investigation at that

point and then brainstorm about future directions for the investigation. This process brings out different perspectives and, if repeated several times during the first 48 hours of the investigation, can keep investigators "fresh" to generate further ideas (McCarthy, 1994).

Research and Program Implementation

Case management and technological factors may help police departments maintain or increase homicide clearance rates. However, homicide divisions that have these advantages may still have relatively low clearance rates. Once reason is that they are overwhelmed by the types of cases that are traditionally hard to solve (Ritchie, 1994). Therefore, research and program implementation are necessary to prevent low-solvability crimes such as gang- and drug-related homicides.

In an effort to examine the evolution of homicide and its attendant concerns for Los Angeles and surrounding jurisdictions, Detective Steve Madden of the LAPD Investigative Analysis Section created a report titled "Homicide Evaluation 1980 to 1989." The report suggests that stranger-to-stranger, gang-related, and drug-related homicide rate increases were fueled by escalating violence among youth in gangs and the infusion of illicit drugs (Madden, 1990). The report also provides data on homicide victim and suspect profiles, location of homicide occurrence, and weapons used.

In Los Angeles, black and Hispanic males run a great risk of becoming homicide victims. The homicide rate among Hispanic males increased over the decade studied to 42.6 percent of total homicides (Madden, 1990). The report also indicates where homicides occur. According to a longitudinal study (1970 to 1979) conducted by the Centers for Disease Control in Atlanta, on average, 48.4 percent of criminal homicides occurred in the home, more often than in any other defined location (such as bar, school, or bank). However, statistics indicate that for Los Angeles from 1988 to 1990, only 25 percent of homicides occurred in homes, while during the same period, 56 percent of homicides occurred on the streets. These statistics indicate a complete reversal of the trend in locations of homicide. From this data, it appears that as gang and drug-related homicide increases, homicide location moves from the home to the street.

Homicide investigation experts indicate that police officers and detectives must take certain actions to clear homicide cases. They must participate in self-evaluation of investigative skills, have knowledge of psychological issues concerning police presence, and be competent in the operation and use of automated investigative tools. Homicide investigators make several recommendations to meet those objectives. Detectives are encouraged to evaluate their investigative skills constantly and strive to have superior interrogation techniques (LAPD, 1994). They can achieve this through experience, departmental training, and law enforcement seminars. Observation of and communication with seasoned detectives is also advisable. Good detectives need to be part psychologist and part sleuth (LAPD, 1994). Detectives must know the people and criminal activity in their local area of assignment. Due to the increase in gang-related crime, detectives must familiarize themselves with the gang culture. They must understand and know gang methods of operation and, if possible, recognize members by face or attire (LAPD, 1994).

In 1992, the Chicago Police Department implemented a Gang Violence Reduction Program to help decrease the incidence of gang-related homicides. This program is a collaborative effort by police, former gang members, academic experts, and neighborhood council members to reduce and prevent gang-related violence (Chicago, 1994). The officers make certain that they know gang members by face and by name. That knowledge helps to deter crime by making gang members more conspicuous. The program functions as an informational outreach network to help gang members get out of the cycle of violence by receiving training and job placement. Similar programs implemented in gang-prone areas across the national report success. Research indicates that if young people can be educated early about the destructive consequences of gang involvement, then the gang violence cycle can be broken (Chicago, 1994).

The Los Angles Police Department's Harbor Division reported a decrease in gang-related murders during 1993. This decrease is attributed to the department's gang control unit and Community Resources Against Street Hoodlums (CRASH), which is a collaborative effort between the community and police (Lopez, 1993). In response to similar problems in Washington, D.C., the Metropolitan Police Department's Criminal Investiga-

tions Division (CID) worked with the Drug Enforcement Agency to create REDRUM, a task force of local and federal law enforcement agencies formed to use geographic targeting to combat drug-related crime. The program would focus on one neighborhood for 90 or 120 days. Although designed to fight drug crimes, REDRUM was more successful in decreasing violent crime. For example, before REDRUM, one target neighborhood had 16-18 homicides in one year. After REDRUM, the neighborhood had no homicides (McCann, 1998).

Computer mapping can be a valuable tool for developing intervention strategies that target neighborhoods at risk for violence, particularly violence fueled by drugs and gang activity. The technique is to use crime data, an automated database, and computer-assisted methods to summarize the data and determine "hot spots" or problem areas (Block, 1992). The central tenet of computer mapping is that reducing violence "that leads to homicide requires a two-pronged approach: first, identifying the problem, and second, targeting prevention efforts on that specific problem" (Block, 1992). Police, however, cannot prevent that violence by themselves, especially gang-related violence. Because gang violence occurs within ever-changing boundaries, gang homicides regularly shift place and time, therefore decreasing any identifiable patterns. Information must be reported on a constant basis for computer mapping to target the areas most at risk for violence. A further step is to work to prevent retaliatory violence.

By collecting information and identifying areas with a high propensity for escalating violence, police and other criminal justice agencies can develop and implement intervention strategies such as dispute mediation. The use of mapping and intervention strategies has been successful in two test sites, one in the Humboldt Park area of Chicago and the other in Philadelphia (Block, 1992, citing Spergel, 1984 and 1986).

To have an effective computer mapping or "hot spot" detection process, it is imperative that police receive the support and assistance of the communities where they are working. Information sharing has been identified as necessary for the success of a hot spot detection/computer mapping process and other community-based programs to reduce violence.

Community policing is another example of a community-based process to reduce violence. Proponents of community policing also emphasize the importance of information sharing between police, citizens, and community organizations (Block, 1992). Unlike the informal process for obtaining information in a community policing program, computer-mapping/hot spot identification, also known as the Early Warning System, provides a systematic and well-documented process for collecting such information. This system compiles law enforcement and address-based community data in a computerized database that allows the information to be updated and used to predict hot spots (Block, 1992:54).

The Early Warning System implemented in Chicago Police Area Four uses computer mapping techniques, crime and place information, and other technology to identify areas where gang-related confrontations may lead to increasing violence. This project is intended to serve as a prototype for other Chicago police districts and police departments nationwide. As of 1992, the Early Warning System project was continuing implementation of the computer mapping technology in Area Four and data was being collected for use in developing a model that would predict hot spots.

Automated Investigative Technology

A study of 374 detectives from 40 municipalities across the United States found that improved technology and increased access to information have a significant impact on clearance rates (Danzinger and Kraemer, 1985). Additional research highlights the importance of information processing, examining computer information systems such as automated fingerprint identification systems and other systems that help police obtain, record, and analyze information (Rinehart, 1993:49, citing Skogan and Atunes, 1979; Bock and Nelson, 1988; and Danzinger and Kraemer, 1985).

Criminal Incident Information Systems

Criminal incident information systems are used to track criminals through large databases created from information on violent crime and criminals. The Florida Department of Law Enforcement is participating in pilot research involving this type of information system. Its system, the Violent Crime Information System (ViCIS), is designed to facilitate the sharing of information about violent crime and criminals among local law enforce-

ment agencies across the state. The pilot database features the modus operandi (MO) elements of unsolved homicides, and agencies are invited to contribute data on violent crime cases. ViCIS is designed to help identify serial crime patterns by comparing MOs of crimes in different jurisdictions (FDLE, 1994). As of 1994, the program was still in development. However, it is hoped that with continued improvement and expansion ViCIS will become an investigative tool that contributes to steady or increased clearance rates in Florida and across the nation.

The Los Angeles Police Department's Homicide Information Tracking Management Automation Network (HITMAN) is a stand-alone computer database system that tracks MOs. It has been in use for close to a decade and contains over 9,100 cases. The system is designed to identify offenders through the use of MO clues to connect related cases and suspects. Detective Dennis Paine of the Los Angeles Police Department believes the system has been and will continue to be a contributing factor to the LAPD's steadily increasing homicide clearance rate.

Law enforcement agencies also have access to federal programs, such as the Violent Criminal Apprehension Program (VICAP), maintained by the FBI. VICAP is a larger, more complete database than either ViCIS or HITMAN, yet it is designed to accomplish the same result—offender identification. Instead of limiting the database to MO elements, however, VICAP's also contains behavioral characteristics and personality assessments (Witzig, 1994).

The Homicide Investigation and Tracking System (HITS) maintained by the Criminal Division of the Washington State Attorney General's Office is a murder and sexual assault homicide investigation system. Created in 1986 under a grant from the National Institute of Justice, HITS collects, collates, and analyzes data relevant to all murders and predatory sexual offenses in Washington.

Police agencies throughout the state voluntarily contribute data concerning the following (Keppel and Weis, 1992:11):

- murders

- attempted murders
- suspected murders
- predatory sexual assaults
- missing persons where foul play is suspected
- evidence victimology
- offender characteristics
- offenders' MOs, known associates, geographic locations, and weapons and vehicles related to murder and predatory sexual assault cases
- known murderers and sex offenders living in the community

Although submitting data to the HITS program is voluntary, HITS has achieved 100 percent participation. In Oregon, participation in the HITS program is mandatory (Lemaria, 1998).

Using a relational database, HITS is capable of interactive, ad hoc searches from among 250 fields of information. If a similar case is located in HITS, or information regarding a suspect matches that of an inquiring investigator, HITS is able to provide both the inquiring investigator and the investigator who entered the material in the system with each other's name, department, case number, telephone number, and other relevant information. The system also allows the HITS analysts to design and save pre-formatted queries for name inquiries, lists of murders by jurisdiction, drug-related cases, and particular offender descriptions (Keppel and Weis, 1992:4). HITS uses a two-form system that allows investigators to fill out a short form immediately, within 24-48 hours of the incident. As more information is gathered, investigators can add information with a longer form. HITS is designed to help investigators solve the case and to narrow the scope of the investigation, not just to link cases together (Lemaria, 1998).

The HITS program draws information from many different sources and stores it in various databases. All the files are linked and can be cross-checked and queried simultaneously. Among those databases are the following:

- *Murder file.* Contains information on over 4,000 murders regarding victim, offender, and MO, derived from voluntary submissions by police officers and from the FBI VICAP.
- *Assault file.* Similar to the murder file but covers predatory sexual assault cases and stranger and serial rapes reported by sexual assault investigators.
- *Preliminary information file.* Used until a full HITS report is submitted by a police agency. Data includes crime classification, victims, offenders, chronologies, geographic location, and other relevant details obtained from news clippings, teletypes, crime bulletins, sex offender registrations, and investigative requests for any violent crime including murder and rape cases. Information in the preliminary file is purged once a full report is received from a police agency.
- *State Department of Corrections Data File.* Covers current and former inmates who have murder or sexual assault convictions. Updated bimonthly, it contains over 103,000 files, including more than 54,000 records on the Green River serial murders.
- *Gang-related data file.* Contains over 74,000 entries obtained from the Los Angeles Police Department and law enforcement agencies in Washington state. This file was created to address the migration of gang members. It contains chronological data and information obtained from employment records, bank records, traffic tickets, and other records that might indicate an offender's movements.

HITS is operated by a staff of 11: five investigator/analysts; a violent crime analyst; two computer programmers; a secretary; a data entry operator; and a manager who coordinates and maintains the HITS program and training, data collecting, and analyses (Keppel and Weis, 1992:12). The program receives $1.2 million in funding from the Washington state legislature and NIJ grants, enabling it to operate at no cost to participating law enforcement agencies, except for the investigator time dedicated to completing HITS forms. To save time, the system is arranged so that investigators can report to both VICAP and HITS with a single form, and they can submit their information electronically.

The HITS program has reportedly improved training for law enforcement officials, coordination of investigations, allocation of police resources, and the overall understanding of the investigative process among the relevant criminal justice agencies (police, coroners, prosecutors, and crime labs). HITS has also proven especially useful to smaller agencies that do not have much experience with violent crime investigations (Keppel and Weis, 1992:19).

A second automated tracking system, Supervision Management and Recidivism Tracking (SMART) will be implemented in Washington in September 1998. SMART is designed to track convicts who are released from prison and continue to commit crimes. When a convict violates parole or is even stopped for a traffic violation, the information will be entered into a computer database. When a crime is committed, investigators can access the database to see if a convict was in the vicinity of the crime at the time it was committed. A murder of a prostitute in South Kent County has already been solved in this way. A convicted sex offender and murderer had been stopped for a traffic violation, with the victim in his car, just two hours before the murder. The officer had recorded the traffic stop, including the name of the victim, and this report led investigators to an arrest (Lemaria, 1998).

Other Investigative Technology

After identifying a suspect, detectives often need to determine his or her truthfulness regarding the case. This is usually accomplished through traditional interrogation or lie detection techniques, yet both are not always effective, and polygraph examinations are always subject to legal challenge. New lie detection technology, computer voice stress analysis (CVSA), can indicate whether an individual is truthful or deceitful based on voice stress measurement (that od, voice patterns in wavelengths or intensities) (Ritchie, 1994). As of this writing, CVSA is still in pilot testing and has not yet gained acceptance nationally under the Frye test, which holds that scientific evidence must be based on a technique that has "gained general acceptance in the particular field in which it belongs." That test is named after the case *Frye v. United States*, 293 F.1013 (D.C. Cir. 1923).

However, police departments find that CVSA is useful for eliciting confessions (Ritchie, 1994).

Photofit, run by Interpol, is a computer graphics system that reconstructs and recreates faces based on pictures of different facial features. It is used for suspect identification based on eyewitness sightings. Despite Photofit's capabilities, its effectiveness is questionable, due to the ambiguities associated with face identification (Witzig, 1994).

Forensic services help to identify offenders through the use of information databases that contain material such as fingerprint profiles and DNA indexing. The Illinois State Police and the Dallas Police Department's homicide section have each initiated automated fingerprint identification systems and DNA indexing programs to enhance investigative techniques, believing that these investigative tools will contribute to an increase in offender identification. Before initialization of the systems, Illinois maintained a statewide clearance rate of 60 percent to 70 percent. Dallas's clearance rate has increased from 70 percent in 1990 to 77 percent in 1993 (Dallas, 1994). These agencies believe that upgrading their forensic services will help maintain Dallas's clearance rate and increase clearance rates in Illinois.

Based on the statements of and evidence provided by police detectives and officials, it is apparent that automated investigative tools play an important role in case outcomes. Therefore, it is important that investigators be aware of available technologies and understand how they work. Also, investigators' input can stimulate the development of additional technologies to address specific departmental needs. Investigators can then use applicable database systems and technical devices to the fullest to maintain or increase clearance rates.

Conclusion

This paper has sought to examine homicide clearance rates, based on research and input from police departments and other law enforcement agencies across the nation, and to extract those features that facilitate high clearance rates. The research shows that police

departments with high clearance rates share many common characteristics and features. Usually, they have homicide units with enough personnel and resources and are located in rural or suburban, demographically more homogenous areas with low homicide rates and little or no gang or drug activity.

Homicide units that achieve high homicide clearance rates tend to have the following features:

- strong case management systems to organize and structure the unit and investigations
- access to and use of automated investigative units and tools to strengthen and advance the investigative effort
- participation in research and development of programs designed to decrease homicides through the reduction of gang involvement and substance abuse (addressing low solvability issues associated with stranger-to-stranger and gang- and drug-related homicides)
- educated and well-trained detectives who extend their training beyond initial departmental seminars

These features allow the homicide units to examine the complete crime picture in their jurisdiction and surrounding areas so that when homicides occur, the investigators know how to proceed.

Evidence indicates that many police departments across the nation have low or decreased clearance rates (see table). They must take a comprehensive look at the total homicide picture relative to their investigative abilities. These homicide units should first go through a departmental evaluation to reveal the underlying factors that may be responsible for low or decreased clearance rates. It must be determined if the decreased clearance rates involve investigative processes, personnel problems, or other factors. Once the factors have been identified, managers, supervisors, and the unit staff can discuss measures to address those factors and devise a plan of action. The plan should include internal and external measures for the homicide unit to adopt and follow to enhance investigative procedures and thereby raise clearance rates.

The internal measures will address intradepartmental issues that affect clearance rates. For instance, if it is determined that a homicide unit is not functioning administratively at an adequate level, an alternative case management system may be researched and implemented that better suits specific departmental needs. Investigator concerns should also be included in the internal procedures. Because investigator education and training are important, measures to increase participation in seminars and training sessions can be considered as necessary enhancements. For example, training in specific areas such as cultural awareness issues, interview techniques, the psychology of grief, and coping strategies for death investigators may be useful to the investigative effort (Ritchie, 1994).

The external measures involve issues that are outside the department. For instance, police departments may recruit outside agencies to evaluate and provide recommendations for departmental improvements. Outside influences are not always welcomed by police departments, yet knowledgeable outsiders may offer viewpoints that contribute to departmental change. Also, federal, state, and local government agencies may provide assistance. Collaborative efforts with other law enforcement agencies and organizations might also help provide insight and information on solutions for low solvability concerns.

Appendix

Table: Clearance Rate Trends

Year	Homicide Unit	UNIFORM CRIME REPORTS Clearance Rate	Trend
1996	Aurora, CO	64%	Decrease
1993	Baltimore, MD	69%	Decrease
1993	Chesapeake, VA	87%	Consistent
1993	Charlotte, NC	78%	Decrease
1993	Chicago, IL	70%	Decrease
1993	Cincinnati, OH	90%	Consistent
1996	Dallas, TX	71%	Decrease
1993	Des Moines, IA	87%	Consistent
1995	Broward County Sheriff's Office (Ft. Lauderdale), FL	97%	Increase
1992	Illinois State Police	61%	Decrease
1993	Louisiana (statewide)	60%	Decrease
1996	Minneapolis, MN	66%	Increase/Consistent
1993	Nevada (statewide)	60%	Decrease
1993	New York City, NY	61%	Decrease
1993	Oakland, CA	43%	Decrease
1993	Oklahoma City, OK	95%	Increase
1993	Orlando, FL	83%	Consistent
1993	Pontiac, MI	70%	Decrease
1993	Sacramento, CA	85-90%	Consistent
1993	Vallejo, CA	90%	Increase
1993	Washington, DC	48%	Decrease

National average clearance rate = 65 percent

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