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# **Executive Summary**

## **Evaluation of the Phoenix Homicide Clearance Project**

**Final Report**

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# **Executive Summary Evaluation of the Homicide Clearance Project Phoenix, Arizona**

## **Introduction**

This Executive Summary provides key results from research conducted by the Institute for Law and Justice, Inc. (ILJ) on the Homicide Clearance Project within the Phoenix, Arizona, Police Department. Through grant support from the Bureau of Justice Assistance (BJA), the department assigned four crime scene specialists directly to the department's homicide unit with the aim of increasing homicide clearance rates. Prior to the Homicide Clearance Project, homicide investigators in the Phoenix Police Department were responsible for evidence collection at homicide scenes, which greatly reduced the time they could devote to investigations.

ILJ received a separate grant from the National Institute of Justice (NIJ) to conduct a process and outcome evaluation of the Homicide Clearance Project. The final report on ILJ's research consists of three volumes. Volume I gives the results of the process and outcome evaluation. Because of the cooperation of the Phoenix Police Department in providing information on homicide investigations, ILJ was able to expand its project to conduct other research on the nature of homicides in the city. Volume II describes ILJ's results from the research, which includes an analysis of factors affecting open and closed cases, a comparative analysis of homicides in the city with two other studies, a qualitative analysis of clearances, and a review of forensic evidence collected at homicide scenes and analyzed by the department's crime laboratory. Volume III is an analysis of the impact of forensic evidence in 22 trials that resulted from arrests during the Homicide Clearance Project.

## **Phoenix Homicide Clearance Project**

In July 2004, the Phoenix Police Department transferred four crime scene specialists from its crime lab to the department's homicide unit. Responsibilities of the crime scene specialists were to collect evidence at homicide scenes, prepare scene reports, develop scene

diagrams, and other support activities. The primary objective was to improve homicide clearance rates by increasing investigative time through the addition of the crime scene specialists.

The crime scene specialists were assigned to two of the four investigative squads within the homicide unit. This organizational arrangement provided for a performance evaluation of the squads with crime scene specialists (*experimental squads*) against the performance of the other squads (*comparison squads*). After two months of on-the-job training, the crime scene specialists were able to handle all aspects of evidence collection at homicide scenes with minimal supervision from investigators. The comparison squads continued to assign investigators as scene agents to collect evidence at homicide scenes.

For the evaluation, ILJ staff coded information from all homicides that occurred during the 12-month period prior to the transfers (July 1, 2003 – June 30, 2004), referred to as the *baseline period*, and a 10-month period starting September 1, 2004, referred to as the *test period*. In total, the evaluation consisted of baseline information on 195 cases (209 victims) and test period information on 167 cases (183 victims).

## **Evaluation Results**

ILJ's process evaluation showed that the project operated closely as planned during the test period. Three of the four crime scene specialists were with the experiment for its entire duration of 10 months. Because of an injury, one crime scene specialist was with the experiment for 4.5 months. ILJ concluded that his absence did not result in any significant problems with the conduct of the experiment because the other three crime scene specialists were able to handle homicide scenes where he would have been assigned.

ILJ conducted analysis on the types of evidence collected at homicide scenes to determine whether there was a drop-off of effort at the scenes handled by the crime scene specialists. ILJ paid special attention to the number of photos taken, shell casings found, and latent lifts obtained. No differences were found in these key performance indicators between the efforts of the crime scene specialists as compared with the efforts of the investigators in the comparison group and as compared with investigators assigned to evidence collection at homicide scenes during the baseline period.

Investigative time recovered through the efforts of the crime scene specialists was estimated to be approximately 24 hours per case. This estimate includes time at the homicide scene, preparation of scene reports, and development of scene diagrams. An important point is that the time recovered for investigators occurred at critical points of the investigation—either at the start of an investigation or later in an investigation when an arrest was imminent. Saving time at these key junctures could be important to the successful resolution of a case, and ILJ’s evaluation report includes examples where recovered time was important to the successful outcome of investigations.

The expected outcome of the Homicide Clearance Project was that the clearance rate for the experimental squads would be better than the comparison squads as judged against their performance during the previous year. For the evaluation, case clearances were reviewed with three different approaches. One approach was to examine performance on *quick action* and *whodunit* cases, which were the more difficult cases requiring significant investigative effort.<sup>1</sup> A second approach was to measure performance based on all clearances (clearances by arrest and exceptional clearances), and the third approach was to measure performance based only on clearances by arrest (excluding exceptional clearances). The outcome results can be summarized as follows:

- The experimental squads performed better on quick action and whodunits than the comparison squads. For these cases, the clearance rate for the experimental squads *increased* from 20.0 percent to 26.9 percent between the baseline and test periods, while the comparison squads *decreased* from 25.0 percent to 20.0 percent.
- The overall clearance rate (clearances by arrest and exceptional clearances) for the experimental squads was 42.9 percent during the baseline period, compared with 36.6 percent during the test period, a *decrease* of 6.3 percentage points. The comparison squads showed a *decrease* of almost 12 percentage points, from 51.9 percent during the baseline period to 40.0 percent during the test period. Chi-square tests indicated a statistically significant change (at the .10 level) for the comparison squads, but not for the experimental squads. In short, both groups had decreases, but the decrease for the experimental squads was less.
- Similar results were found for clearances by arrest. The experimental squads showed virtually *no change*, from 33.3 percent during the baseline period to 32.3

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<sup>1</sup> Arrests were divided into three categories. *Immediate arrests* are on-scene arrests in which suspects are immediately identified and arrested, sometimes even by patrol officers before investigators arrived. *Quick action* arrests are arrests made within a few hour or days based on actions taken by police, and *whodunits* are arrests which require extensive investigative effort extending over weeks, months, and even years.

percent during the test period. However, the comparison squads showed a *decrease* in clearances by arrest from 42.3 percent to 34.4 percent, almost eight percentage points. Once again, both groups had decreases, but the change for the experimental squads was negligible, while the change for the comparison squads was significant.

Overall, the experiment was of limited success because it did not meet the department's expectations of a significant increase in clearances. However, the project had an impact on cases that require greater investigative attention (quick action and whodunits), which is a result that would be expected with the assignment of the crime scene specialists to the unit.

Two other results support the evaluation conclusions. First, a survey of investigators in the experimental squads provided favorable ratings for the capabilities of the crime scene specialists to collect evidence (average score of 8.6 out of 10 points), and to take measurements at a scene (average score of 8.3). Second, ILJ compared scene reports prepared by investigators against those prepared by crime scene specialists. Reports from the crime scene specialists assigned to the experimental squads were judged better on initial observations with an average rating of 3.00 (out of a possible 4.0) against 2.36 for reports prepared by investigators in the comparison squads. Similarly, reports by the crime scene specialists were judged to be better in the areas of descriptions and measurements of evidence (3.39 compared with 2.73). Average scores for scene descriptions were about the same for comparison and experimental squads (2.56 and 2.76).

Finally, at the end of the test period, the Phoenix Police Department conducted its own internal evaluation of the project and concluded that the assignment of crime scene specialists to specialize in homicide cases was a beneficial approach for the department. The organizational outcome was that four more crime scene specialists were selected for a total of eight crime scene specialists devoted to homicide cases. The unit of eight crime scene specialists continued to be housed with the homicide unit. However, the unit was placed organizationally under the crime lab and assigned its own unit supervisor.

## Research Findings

The Phoenix Police Department provided excellent cooperation during the course of this evaluation. The ILJ staff was able to review the original and all supplemental reports for the cases occurring during the two-year span of the project. The department also provided access to crime lab reports summarizing the analysis of forensic evidence collected during the course of the investigations. Because of this cooperation, ILJ was able to conduct a more detailed analysis of homicides in Phoenix over the two-year period. The following sections highlight the research findings (see Volume II for more information).

### Factors Affecting Open and Closed Cases

A major part of this analysis was to analyze the differences between open cases and three types of cases closed by arrests (immediate arrests, quick action arrests, and whodunits).

Multinomial logistic regression was the analytical basis for comparing the three types of cases against open cases. Significant results from the regression were as follows:

- Immediate arrest cases (compared with open cases) are:
  - More likely to be expressive homicides (odds ratio = 5.34)
  - More likely to occur indoors (odds ratio = 3.29)
  - More likely to have the victim transported to a hospital (odds ratio = 1.87)
  - Likely to have more patrol officers at the scene (odds ratio = 1.12)
  - Less likely to be Hispanic victims (odds ratio = 0.42)
  - Less likely to have latent prints at the primary scene (odds ratio = 0.23)
  - Less likely to involve firearms (odds ratio = 0.19)
- Quick action cases (compared with open cases) are:
  - More likely to be expressive homicides (odds ratio = 2.66)
  - Less likely to involve firearms (odds ratio = 0.18)
  - Likely to have more investigators (odds ratio = 1.31) and patrol officers (odds ratio = 1.11) at the primary scene.
- Whodunit cases (compared with open cases) are:
  - Less likely to involve Hispanic victims (odds ratio = 0.42)
  - More likely to have biological evidence (odds ratio = 2.00)
  - Likely to have more witnesses at the primary scene (odds ratio = 1.09)
  - Likely to have more investigators (odds ratio = 1.26) and fewer patrol officers (odds ratio = 0.88) at the primary scene.

In summary, the multinomial regression shows clear differences across the three types of closures as compared with the characteristics of open cases. Of particular note is that biological evidence is statistically significant for whodunit cases, but not for immediate arrest and quick action. Latent prints are significant in the opposite direction from what was expected in immediate arrest cases and are not significant for quick action and whodunit cases.

## **Comparisons with Other Studies**

At the request of NIJ, ILJ developed comparisons between ILJ's study and two past studies on homicide:

- Zahn, M.A. (1999). *Changing patterns of homicide and social policy in Philadelphia, Phoenix, and St. Louis, 1980-1994*.
- Wellford, C. and Cronin, J. (1999). *An analysis of variables affecting the clearance of homicides: A multistate study*. Grant project awarded to the Justice Research and Statistics Association (JRSA).

Results of the comparison (see Volume II, Chapter 3 for more information) provide insight into the changes in the characteristics of homicides and the possible impact of these changes on homicide clearances.

The Zahn study collected data on all homicides occurring in their three study sites (Philadelphia, Pennsylvania; St. Louis, Missouri; and Phoenix, Arizona) for the 15-year period, 1980-1994. For Phoenix, they coded cases on a total of 1,851 victims. ILJ obtained the dataset from this project through ICPSR. Less success was possible with the Wellford and Cronin study for two reasons. First, the dataset for the Wellford and Cronin study was not available at ICPSR. Second, the Wellford and Cronin study included many variables that were not captured in ILJ's study. In fact, they collected over 200 variables for the 798 cases in their study. Many of their variables did not match easily with ILJ's study. Because of these problems, comparisons with the Wellford and Cronin study were based on tables from their final report (see Volume II, Chapter 3 for comparisons with the Wellford and Cronin study).

The clearance rate for the cases in Zahn’s study was 74.0 percent over the 15 years, compared with 43.0 percent for ILJ’s two-year study. Compared with the Zahn study, the victims in ILJ’s study had:

- A higher percent of male victims—86.4 percent compared with 77.7 percent.
- A higher percent of Hispanic victims—60.7 percent compared with 32.0 percent.
- A lower percent of victims under 18 years old (6.7 percent compared with 13.0 percent), a higher percent of victims between 18 and 34 years old (59.8 compared with 52.8), and a lower percent of victims 50 years or older (9.2 percent compared with 12.2 percent).
- A higher percent of instrumental homicides—38.9 percent compared with 23.1 percent.
- A lower percent of victims found indoors—34.5 percent compared with 51.8 percent.
- A higher percent of victims killed by firearms—79.5 percent compared with 64.8 percent.

These differences help to explain the decrease in clearance rates between the two studies. For example, other studies have shown lower clearance rates for victims killed by firearms, for victims killed inside a premise, and for instrumental homicides. Increases in homicides with these characteristics, as reflected above, may result in lower clearance rates.

A related explanation for the differences in clearance rates, mentioned by many homicide investigators, is that the number of investigators has not kept pace with increased caseloads. During the time of ILJ’s study, the homicide unit had an average of about 24 investigators for case assignment plus three investigators in the cold case unit. According to the commander of the unit, during the 1990s, the unit had about 28 investigators for case assignment plus five investigators for cold cases. In summary, there has been a 20 percent decrease in the number of investigators available for case assignment.

## **Forensic Evidence at Trials**

Another area of research was the role of forensic evidence in murder trials. ILJ staff reviewed transcripts from 22 trials from arrests made during the two years of the Phoenix Homicide Clearance project. At these trials, forensic scientists testified on analytical results in the areas of DNA, ballistics, gunshot residue (GSR), latent prints, and trace evidence. Other

witnesses also testified for either the prosecution or defense: eyewitnesses who were at the scene when the murder took place, witnesses who heard something at the scene, and others who had knowledge about the circumstances or persons involved. Police officers and investigators were important witnesses with testimony about activities at the scene, interviews conducted, and the follow-up investigation that led to the defendant's arrest. A variety of other witnesses—medical examiners, psychologists, and expert witnesses—also testified.

By way of background, investigators at the Phoenix Police Department made 187 arrests, including multiple arrests for some cases, from cases that occurred during the two-year project period. The highest charges placed by prosecutors against the 187 arrestees were as follows:

- 77 charged with 1<sup>st</sup> degree murder
- 53 charged with 2<sup>nd</sup> degree murder
- 25 charged with manslaughter
- 9 charged with negligent homicide
- 4 charged with attempted child abuse
- 4 charged with assisting a crime syndicate (e.g., gang)
- 15 charged with other offenses (aggravated assault, misconduct involving weapons, etc.)<sup>2</sup>

The case dispositions of defendants charged with 1<sup>st</sup> degree murder included 13 defendants who pled guilty as charged; 13 released because the prosecutor decided not to prosecute; 11 found guilty at trial; two found not guilty at trial; five dismissed without prejudice; four dismissed by prosecution action; three who fled before prosecution; one who pled guilty to a reduced charge; and one who was declared not guilty by reason of insanity.

Of the defendants charged with 2<sup>nd</sup> degree murder: 11 pled guilty as charged; 16 pled guilty to a reduced charge; 13 were found guilty at trial; three were found not guilty at trial; five were dismissed by prosecutor action; one was dismissed on this charge due to plea to an offense in an unrelated case; one was dismissed without prejudice; and the trial of one defendant was declared a mistrial. The cases for 24 defendants charged with 1<sup>st</sup> degree murder and two defendants charged with 2<sup>nd</sup> degree murder had not been completely adjudicated by ILJ's cutoff date for data collection.

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<sup>2</sup> In cases with multiple offenders, prosecutors often charged a main offender with a serious charge and other offenders with less serious charges.

ILJ's initial finding from the 22 trials was that forensic analysis is not presented at every trial. In fact, in five trials, no forensic scientists from the crime lab testified, and the trial outcomes were based entirely on testimonies by other witnesses. On the other hand, forensic scientists provided DNA analysis in eight trials, ballistics analysis in 13 trials, GSR analysis in five trials, latent print analysis in three trials, and trace analysis in two trials.

In trials where forensic scientists provided analysis results, ILJ made subjective assessments on the impact of their testimonies. With DNA analysis, for example, ILJ determined that the testimony of the forensic scientists had a major impact in five trials, moderate impact in one trial, and a minor impact in two trials.<sup>3</sup> The following are examples of major impact:<sup>4</sup>

- In Trial # 2, the forensic scientist testified that the DNA profile from blood on the defendant's pants, boots, and t-shirt matched the victim's profile.
- In Trials # 4a and 4b, the DNA profile from blood on the defendant's pants and socks matched the blood of the victim, and all blood samples from inside the apartment matched the victim (thereby weakening the defense's theory that a third person broke into the apartment and fought with the defendant and victim).
- In Trial # 6, the DNA profile from blood on a witness's swim trunks, which he wore while in the vehicle where the two victims were killed, matched the profile of the male victim. This result placed the witness in the vehicle at the time of the shooting and gave credibility to his testimony.

For the 13 trials with testimony by forensic scientists on ballistics analysis, ILJ determined that the testimony had a major impact at five trials, moderate impact at two trials, and minor impact at six trials. Examples of major impact are as follows:

- In Trial # 3, the forensic scientist from the ballistics section testified that shell casings from the scene matched shell casings from bullets fired in the crime lab from the Beretta found in the defendant's vehicle.
- In Trial # 5, the casing recovered at the scene was identified as fired from the defendant's Ruger handgun, and the bullet recovered at autopsy was "entirely consistent" with having been fired from this handgun.

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<sup>3</sup> *Major impact* meant that the analysis testimony confirmed a relationship between an item of evidence and someone involved in the incident (e.g., the DNA profile of blood on the defendant's clothes match the DNA profile of the victim); *moderate impact* meant that the analysis testimony supported the prosecutor or defense attorney's theory of the case (e.g., gun recovered at the scene was the murder weapon); and *minor impact* meant that the analysis testimony provided information (e.g., a weapon was operational with a pull of 3 pounds) to the jury but did not include or exclude someone (e.g., victim, defendant, witness).

<sup>4</sup> The names of defendants are not provided in this report because post-conviction appeals were in process for several defendants at the time of analysis. Instead, the trials were numbered for reference purposes.

- In Trial # 6, the forensic scientist testified that two shotgun shells were fired from the shotgun found at the defendant's home.

GSR analysis proved to have a moderate impact at two trials, minor impact at one trial, and no impact at four other trials. Latent print analysis and trace analysis had very limited impact. Latent print examiners were called to testify in only three trials, and ILJ judged their testimony to have had no impact on the outcomes of these trials. ILJ determined the same result of no impact with the two trials in which trace analysis was presented.

As part of the analysis on the role of forensic evidence at trials, ILJ was able to make several conclusions about the collection of evidence at homicide scenes and the issues that arise at trials about evidence collection. These conclusions are as follows (see Volume III, Chapter 3 for more information):

- Scene agents should be prepared to testify at trial on all scene activities—evidence collected, measurements taken, photographs, invoice numbers on evidence bags, scene diagrams, and more. Because a trial may occur many months or years after the incident, it is important that scene agents carefully document their scene activities.
- Photographs are essential at trials in providing the jury with information on the surroundings of the incident, items of evidence found at the scene, and where the items were found.
- Precise measurements at a crime scene are important for documenting where evidence was located and the relationship between the locations of items of evidence.
- Using experienced judgment, scene agents should take as much evidence as practicable from a homicide scene rather than trying to make judgments at the scene about what is most important.
- Maintaining and documenting the chain of custody for physical evidence is critical in homicide cases.
- Homicide investigators have to be careful in their decisions to release evidence.
- The accuracy and comprehensiveness of police reports are often critical for investigators and scene agents to refresh their memories before and during homicide trials.

## **Conclusion**

The research conducted in this project provided considerable insight into the role of forensic evidence in investigations and prosecutions. The Homicide Clearance Project

highlighted the importance of collection of forensic evidence at homicide scenes. It demonstrated that crime scene specialists from the department's crime lab could be as effective in collecting forensic evidence as homicide investigators. The project was not successful in achieving an increase in the overall clearance rate of homicides; however, it had an impact on clearances of the more difficult cases (quick action and whodunit cases) that require extensive investigative time.

ILJ's multivariate analysis of open and closed cases incorporated variables on victim characteristics, case characteristics, on-scene characteristics, and the types of forensic evidence collected at homicide scenes. The results differ from other studies in several aspects. For example, the number of patrol officers responding to a homicide scene is important for immediate and quick actions arrests because these incidents result in more rapid apprehension of suspects. The number of patrol officers was determined to be less important in whodunit cases. The number of investigators was not a significant variable for immediate arrest cases, but gained significance for quick action and whodunit cases. This result is logical operationally because more investigative time is required for these latter types of cases. The analysis concluded that the number of witnesses becomes especially important in the most difficult whodunit cases.

Of particular note is the role of forensic evidence in investigations and prosecutions. ILJ's analysis did not identify any types of forensic evidence that had a statistically significant relationship to the investigative outcomes in immediate arrest and quick action cases. However, biological evidence was found to be statistically significant in whodunit cases. The operational importance of this result is that it supports the view that DNA analysis has greatly improved police investigations by (1) assisting in identification of suspects in particularly difficult cases (whodunits) where other investigative techniques have not been successful, (2) providing leads in cases with few witnesses, (3) reducing the number of wrongful arrests, and (4) linking cases that might not otherwise be identified as connected.