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Analysis of DNA Evidence in Property Crimes

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ABSTRACT

The analysis of Deoxyribonucleic Acid (DNA) evidence is a powerful tool for law enforcement. It is used extensively in violent crimes with positive results. Unfortunately, the collection and analysis of DNA on property crimes is not as common (Wilson, McClure, & Weisburd, 2010). Yet property crime in Texas results in billions of dollars lost and hundreds of thousands victimized every year. While violent crimes are justifiably a major focus of law enforcement, citizens are much more likely to be the victim of a property crime (Texas Department of Public Safety, n.d.). Due to the magnitude of this problem and the availability of a possible solution, it is surprising that DNA analysis is not more common in property crime offenses.

This underutilization of DNA evidence is primarily the result of a lack of lab capacity and fiscal constraints. Throughout the United States, public DNA labs have a backlog of cases. This forces delays in analysis and the need to prioritize cases. Violent crimes normally are processed ahead of property crimes. Faced with the added expense of DNA analysis and a long delay in obtaining results, few agencies have routinely collected and analyzed DNA from property crimes (Zedlewski & Murphy, 2006).

Based on field trials in Australia, the United Kingdom, and the United States, the use of DNA in property crimes has led to an increase in arrest, a higher prosecution rate, a higher conviction rate, a higher rate of guilty pleas, and the identification of violent offenders. These offenders identified by DNA evidence typically have an extensive criminal history. However, one of the critical factors in effectiveness was

timely analysis of DNA early in the Investigation (Briody, 2006; DNA Expansion Programme, 2005; Wilson et al., 2010; Roman et al., 2008).

This paper will examine these field trials, review available journal articles, government documents, and periodicals regarding high frequency property crime DNA analysis. The conclusion drawn from this review is that Texas law enforcement agencies should selectively collect and analyze DNA from property crime scenes. The backlog of cases in most public labs will necessitate the use of private labs. This may entail additional costs up front, but the benefits to the citizens will prove this to be a wise investment that will protect the public and in the long run save money for the criminal justice system.

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INTRODUCTION

The collection and analysis of Deoxyribonucleic Acid (DNA) has become an accepted practice in the investigation of violent or high profile cases (Roman, Reid, Chalfin, & Knight, 2009). Television programing is rife with police dramas, and it is not uncommon for DNA evidence to be part of the script. The news frequently runs stories about high profile cases that were solved by DNA analysis (Shelton, n.d.). There are even stories of people who were exonerated with DNA evidence. Yet, it is rare to read about a burglar who was arrested due to DNA evidence. This might be because news reporters and scriptwriters do not think of high frequency property crimes as dramatic, but it is also due to the infrequent collection and analysis of DNA evidence at the scene of property crimes (Zedlewski & Murphy, 2006).

While violent crime is obviously traumatic and causes harm to those involved, people in Texas are much more likely to be the victim of a property crime. In 2010, Texans lost over $536,000,000 worth of property in burglaries alone. This does not include theft offenses or the 68,219 motor vehicles that were stolen. Despite the high frequency of property crimes such as burglary, they are less likely to be solved than violent crimes. In Texas, the probability of a suspect being arrested and charged for a burglary offense in 2010 was only 10%. By comparison, in 2010, the clearance rate for robbery was 27% and sexual assault was 44% **(**Texas Department of Public Safety, n.d.).

The potential of DNA evidence to impact these high frequency property crimes has not gone unnoticed. England and Australia have conducted studies on the increased use of DNA in property of crimes (Briody, 2006; DNA Expansion Programme,

2005). In 2001, Miami Dade began sending some burglary DNA evidence for analysis. The positive results of this experiment led the National Institute of Justice (NIJ) to fund The DNA Field Experiment: Cost-Effectiveness Analysis of the Use of DNA in the Investigation of High-Volume Crimes. This was a major field study, conducted from 2005 to 2007, involving five jurisdictions. Each test site was given significant freedom in determining how to use the funds to explore the use of DNA in property crime investigations. This study addressed a cost benefits analysis of DNA use in property crimes including automobile theft, residential burglary, commercial burglary, and theft from a vehicle or burglary of a motor vehicle (Roman et al., 2008).

DNA analysis of property crimes has proven to be an effective tool in identifying and prosecuting criminals. The DNA Field Experiment demonstrated that DNA is effective at identifying suspects and increasing clearance rates in high frequency property crimes. In addition to property crimes, these suspects identified by DNA on property crime cases are more likely to be involved in more serious offenses that subjects identified through traditional investigations (Roman et al., 2009). The identification and arrest of criminals for property crimes would obviously benefit society by protecting property and providing a sense of safety and security to citizens by identifying and helping to punish criminals. Texas law enforcement agencies should selectively increase the frequency of DNA collection and analysis in property crime cases.

POSITION

Although the crime rate has declined in recent years, the level of property crime in Texas is a significant problem. In addition to the property loss due to crime

mentioned earlier, there were over 950,000 victims of property crime in Texas during 2010 (Texas Department of Public Safety, n.d.). If multiple people work or live in most houses and buildings that are burglarized, then the number of people who were affected by these types of crime is much higher. Another consideration is that over half of the property crimes committed nationwide remained unreported (Truman & Rand, 2010). Thus the number of victims is actually much higher than one would suspect by a simple examination of crime statistics. In addition to the monetary loss, these victims suffer emotional trauma that cannot easily be measured (Zedlewski & Murphy, 2006).

The good news is that many of these crimes are committed by a relatively small percentage of the population. Intuition and common knowledge indicates that violent crimes are often crimes of passion, whereas property crimes are committed for monetary gain. One could expect passion to be temporary, but the desire for additional income to be more consistent. It has been estimated, from inmate surveys covering three states that the average incarcerated burglar committed 77.5 offenses per year, and a very active burglar committed 186.7 offenses per year (Chaiken & Rolph, 1985). Other researches put this last number as high as 232 offenses (Visher, 1986). Chaiken and Rolph (1985) indicated that the average respondent incarcerated for assault committed an average of five and one half offenses per year. A very prolific respondent committed 13.6 assaults per year. Texas was one of the states surveyed, and while the overall numbers were lower, the general trend was consistent. Property crime offenders are more prolific than violent offenders. It would stand to reason then that the identification and incarceration of a criminal is likely to solve and or prevent multiple crimes. For example, if DNA evidence were used to identify and arrest an assault

suspect, it would be reasonable to assume that as many as 13 assaults could be prevented for every year that person was incarcerated. Due to the higher activity rate of burglars, the arrest and incarceration of a prolific burglar could prevent as many as 232 burglaries (Visher, 1986). Furthermore, criminals may not specialize as much as assumed. In Florida, it was determined that 52% of their DNA database identifications for murder were originally entered into the database for property crime offenses. Similarly, in New York 82% of the DNA profiles in their system for rape or murder were first entered into the system for a prior conviction of minor crimes such as burglary or drugs (Zedlewski & Murphy, 2006). Although it is difficult to determine the number of crimes prevented, the DNA Experiment demonstrated that the average burglar arrested as a result of DNA evidence had an average of 2.9 prior convictions (Roman et al., 2008).

The increased use of DNA to identify and prosecute high rate offenders of property crimes would have a positive effect on the crime rate. The high number of offenses committed by prolific offenders increases the probability that they will eventually leave DNA at a crime scene. The DNA Experiment examined 500 cases in each jurisdiction with available DNA evidence across five jurisdictions. Half of the cases were investigated with traditional methods and half of the cases used DNA analysis. The experiment allowed each of the five jurisdictions discretion in implementing the program. Some agencies concentrated on touch DNA or training. Denver concentrated on burglary offenses, collection of DNA by officers, and reliance on blood and saliva when possible. The Denver DNA Project showed that cases with DNA evidence were 42% more likely to be prosecuted than cases without DNA evidence. The project

resulted in the conviction of 95 serial burglars between 2005 and 2007. During this time the burglary rate dropped 26% in Denver. The other cities showed positive, but less dramatic, results. The DNA Experiment showed that DNA was five times more likely to identify a suspect than fingerprints. Roman et al. (2008) concluded, “Property crime cases where DNA evidence is processed had twice as many suspects identified, twice as many suspects arrested, and more than twice as many cases accepted for prosecution” (p. 147). Although DNA evidence will not be available at most crime scenes it would be irresponsible not to collect and process evidence that is this effective at identifying suspects, some of whom are responsible for multiple crimes (Roman et al., 2008).

COUNTER POSITION

Those opposed to the use of DNA evidence in property crimes often point to the current and persistent backlog of DNA in laboratories across the country and argue that there is not enough lab capacity to process these extra cases. Underfunded, understaffed, and, in many cases, outdated, publicly funded labs are often unable to keep up with the demand for DNA testing. The common practice is to prioritize cases with violent crimes usually considered a higher priority than property crime (Stoiloff, Ferrara & Nagy, 2010). This results in delays in property crime analysis of months. The current backlog is also due to increased demand, from increased awareness of touch DNA, cold cases, and post-conviction cases (Nelson, 2010). The federal backlog of convicted offender DNA samples in 2009 was over 300,000 samples (U.S. Department of Justice, 2010). Much of this may be driven by legal mandates. Many states have passed laws requiring post-conviction DNA analysis. Texas has recently passed into

law Senate Bill 1636, which altered Texas Government Code, Chapter 420, to require submission of any DNA evidence of a sexual assault within 30 days from the date of recovery of the evidence (Sexual Assault Prevention, 2011). This law also requires that a publicly accredited laboratory analyze any DNA evidence on active sexual assault cases. The law took effect in September of 2011, and the full impact on Texas criminal labs has not yet been felt. Obviously, this law will increase the backlog of DNA evidence and make it difficult for Texas labs to absorb any increase in property crime DNA analysis.

While it is true that there is a backlog of DNA evidence across the country, there are viable solutions available that will decrease this backlog and increase laboratory capacity. As DNA became an accepted practice in the investigation of violent crime, the demand increased. In 2004, there was a tremendous backlog of DNA evidence throughout the country. Congress passed the DNA Initiative, providing over 53 million dollars to reduce the backlog of evidence. The money was spent hiring additional personnel, outsourcing some work and improving the capacity of public labs. In many respects the program worked. The backlog of cases from 2004 is gone and capacity has improved. However, the demand has increased faster than capacity (Nelson, 2010). Continued funding, therefore, should lead continued capacity increases at public laboratories and help subsidize continued outsourcing to private laborites. This continued funding is available due to the Debbie Smith Reauthorization Act of 2008 which provides $147 million dollars over five years to decrease the federal backlog of DNA evidence (Geoghegan, 2009).

Private laboratories may help provide the real solutions, both short term and long term. In the short term, public labs cannot support the increased demand of analyzing additional property crime cases (Ritter, 2008). The solutions will continue to come from private labs. According to a survey conducted by the Police Executive Research Forum (PERF), over 85% of agencies do not have their own in-house crime lab. The vast majority of agencies depend on State, local or federal labs. Only 5.4% use private labs for DNA testing (Griswald & Murphy, 2010). In their publication, Griswald and Murphy (2010) made the recommendation that agencies selectively contract with private labs after carefully evaluating the risks and costs. One of the reasons for this recommendation is that private labs can be more accommodating to the Agencies priorities. As previously discussed, public labs prioritize their workload based upon their priorities (Nelson, 2010). Understandably, they consider violent crimes more important and will work violent crime cases first. As a private company responding to a specific customer need, private labs will prioritize evidence analysis based upon the customer's willingness to pay for service. Consequently, most private laboratories will expedite an analysis based upon an added fee (Griswald & Murphy, 2010; Stoiloff et al., 2010).

The long-term solution is to increase capacity through innovation. Again private industry and private labs are leading the development. Applied Biosystems, a subdivision of Life Technologies, has developed an automated system that allows for the analysis of up to 88 samples at a time. They have also developed software that separates DNA samples, a process that normally consumes about half of a forensic processor's time (Geoghegan, 2009). Another private company, Bode Technology, has successfully worked with Miami Dade, Virginia, and the Federal Government. They

succeeded in decreasing backlogs, analyzing evidence as part of The DNA Experiment, and identifying remains from the World Trade Center Disaster (Stoiloff et al., 2010). In their article, Stoiloff et al. (2010) stated, “private laboratories have adopted new, validated technologies to increase capacity via automated procedures in order to address the increased demand for forensic DNA analysis. Some Private laboratories have developed new tools like software and products that assist in improving efficiencies ” (p. 4). As these new technologies and improvements proliferate to more labs, both public and private, capacity will increase.

The other objection to using DNA to solve property crimes is the cost of collecting and analyzing the evidence. Many agencies rely on crime scene technicians to collect DNA evidence. These technicians may not currently respond to many property crimes and increasing their workload leads to increased labor costs. Even if officers or detectives are used to collect evidence, there will be a cost in time expended and in training (Ritter, 2008).

The cost of processing DNA should also be considered. The DNA Experiment collected information that showed the addition cost of identifying a suspect on DNA could average over $8,000 (Roman et al., 2008). The recent Supreme Court decision in *Bullcoming v. New Mexico* (2011) provides the defendant the right to confront the individual forensic expert who processed the evidence in their case rather any expert able to testify as to the reliability of the evidence and the processes performed. This will require that private lab forensic examiners testify in court, often travelling long distance to do so. The testimony is often an additional fee not included in the analysis cost. This fee can reach as high as two thousand dollars a day. In a time of shrinking budgets it

might appear that DNA analysis of property crime is simply not feasible for many agencies (Griswold & Murphy, 2010).

Although DNA analysis is costly, so is the failure to solve crimes. What is really needed is not just an examination of the cost, but a cost benefits analysis. The U.S Department of Justice has done just that with The DNA Field Experiment already mentioned (Roman et al., 2008). A major component of this study was to study the cost per arrest. This study was conducted over five jurisdictions that employed various methods of collection and analysis. The average total cost per suspect identified was $4,502. Sending samples to a private lab was more expensive than processing them in-house or in a government lab. However the study did not consider the cost associated with establishing or maintaining a laboratory. This figure was also an average of the five locations, with considerable variation between locations. Denver and Topeka were the lowest with a cost under $1500 per identification. Los Angeles was the highest with a cost of $8147 per identification. It should be noted that some sites concentrated on touch DNA collection while others concentrated on more reliable sources of DNA such as blood and saliva. The study concluded that blood and saliva were three times more likely to result in identification than touch DNA samples. The study also concluded that DNA collected by officers with minimal training was just as likely to yield results as that collected by crime scene technicians (Roman et al., 2008). Therefore, the selective collection of DNA by officers trained to recognize the type of evidence most likely to yield viable DNA would minimize the cost of DNA collection. The cost per identification can be minimized by carefully selecting for analysis those

cases most likely to yield viable results. The cost to identify and arrest a suspect is not the total cost to the criminal justices system. A cost per conviction is a better indicator.

In Denver, the District Attorney's Office analyzed the data from the Denver DNA Project, one of the five parts of the DNA Experiment. They considered the cost of arrest and prosecution in burglary cases, both with and without DNA evidence. It was determined that cases with DNA resulted in more guilty pleas, three times more guilty verdicts, and sentences averaging ten times the length of those without DNA. They then calculated the amount of property loss that did not occur due to the Denver DNA Project and the savings to the police and prosecutors. Ashikhmin, Berdine, LaBerge, Morrissey and Weber (2008) concluded that, "for each $1 invested in DNA forensics and related field (such as police and lab training) resulted in more than $90 of prevented police expenses and property loss" (p. 38). When considering the cost per identification or the cost to arrest and prosecute, it should be remembered that these are criminals who would otherwise not be identified. One must consider the emotional, economic, and physical danger to society that these offenders represent (Ashikhmin et al., 2008).

RECOMMENDATION

The use of DNA evidence has been demonstrated to be effective in solving crimes. DNA evidence is often not collected or analyzed in property crimes in the United States. This has been attributed to lack of awareness, lack of lab capacity, and lack of money. Due to television and other media, there is certainly no longer a lack of awareness of the potential for DNA evidence to solve cases. There may now be an unrealistic expectation among the general public that DNA evidence should be present at every crime scene and should solve every case. While this is not realistic, law

enforcement professions may underestimate the potential for DNA evidence to identify and convict criminals. When the true cost of DNA analysis is compared to the true cost of ignoring this potential evidence, it is clear that it is the duty of law enforcement to selectively utilize this tool to bring criminals to justice and protect citizens.

One of the primary benefits of using this tool is that each suspect identified has the potential to commit many offenses per year. It was also demonstrated that minor crimes are not always committed by minor criminals, or maybe, minor criminals become major criminals. Either way, identifying suspects and incarcerating them for property crimes should prevent not only property crimes, but also more serious offenses such as rape and murder. This danger that offenders who commit property crime offenses are likely to commit violent crimes, either contemporaneously or at a later date, is one of the most compelling arguments for the analysis of DNA evidence on property crimes (Ritter, 2008).

It is true that laboratories around the country are backlogged with DNA evidence and that the use of private labs is more expensive. With the advent of new technologies, capacity is increasing. The use of private laboratories can address the capacity issue but will cost more than using public labs. In order to minimize the cost of analysis and maximize the benefits, it is recommended that the submission of evidence be selective. Touch DNA is less likely than blood or saliva to yield positive results. Therefore, when possible, there should be a limit on submissions of blood or saliva. Limiting the number of samples submitted per case can also minimize the cost. Obviously, these will be case-by-case judgments. If a jurisdiction is experiencing multiple automobile thefts that appear to be linked, and only touch DNA is available,

then it may well be worth the cost to submit touch DNA. The principle to be followed is that agencies should only submit what has the best chance of success and carefully weigh the cost against the potential benefits of identification.

It is recommended that Texas law enforcement agencies develop a relationship with, and contract with, private laboratories to process DNA evidence. This contract should be viewed careful with attention paid not only to the cost of the analysis, but also to the guaranteed turn-around time, and any testimony fees that might apply. Minimizing these costs will require communication and coordination between the prosecutor, the agency, and the lab (Griswold & Murphy, 2010). Although public labs may be cheaper for the agency, the current economic situation and the high cost of updating or starting a lab dictate that many agencies will have to rely on private labs at this time to accomplish the turn-around times needed to reap the significant benefits of processing DNA for property crimes.

REFERENCES

Ashikhmin, S., Berdine, S., LaBerge, G., Morrissey, M., & Weber, D. J. (2008, July/August/September). Using DNA to solve high-volume property crimes in Denver: Saving money lowering crime rates and making Denver safer, *The Prosecutor*, *42*(3), 34-42. Retrieved from http://www.denverda.org/DNA_Documents/Denver%20Burg%20Project%20NDAA.pdf

Briody, M. (2006). The effects of DNA evidence on property offences in court. *Current Issues in Criminal Justice, 2006. 17*(3), 380-396.

Bullcoming v. New Mexico, 2011 564 U.S. (2011).

Chaiken, M.R., & Chaiken, J.M. (1982). Varieties of criminal behavior. Santa Monica, CA: Rand Corporation.

Chaiken, M.R., & Rolph, J.E. (1985). Identifying high-rate serious offenders. Draft Report. Santa Monica, CA: The Rand Corporation.

DNA Expansion Programme 2000-2005: Reporting achievement. (2005, October). *Forensic Science and Pathology Unit.* Retrieved from http://webarchive.nationalarchives.gov.uk/20081023081903/http://www.homeoffice.gov.uk/documents/DNAExpansion.pdf?view=Binary

Geoghegan, S. (2009, June 1). Forensic DNA. *Law and Order*, *57*(6). Retrieved from http://www.hendonpub.com/resources/article_archive/results/details?id=2239

Griswold, M., & Murphy G. (2010, September). It's more complex than you think: A Chief's guide to DNA. *Police Executive Research Forum*. Retrieved from http://www.policeforum.org/library/dna-forensics/DNA-Book10.10.pdf

Nelson, M. (2010, June). Making sense of DNA backlog- myths vs. reality. *NIJ Journal*, *266*, 20-25.

Ritter, N. (2008, October). DNA solves property crimes (but are we ready for that?). *National Institute of Justice Journal*, *261*, 2-12.

Roman, J.K., Reid, S., Reid, J., Chalfin, A., Adams, W., & Knight, C. (2008). The DNA field experiment: Cost-effectiveness analysis of the use of DNA in the investigation of high-volume crimes. Washington, DC: Urban Institute-Justice Policy Center.

Roman, J. K., Reid, S. E., Chalfin, A. J., & Knight, C. R. (2009, December). The DNA experiment: A randomized trial of the cost-effectiveness of using DNA to solve property crimes. *Journal of Experimental Criminology*, *5*(4), 345-369.

Sexual Assault Prevention And Crises Services, Tex Gov. Code, 420 (2011).

Shelton, D.E. (n.d.). The CSI "effect": Does it really exist? *NIJ Journal, 259*. Retrieved from http://www.ncjrs.gov/pdffiles1/nij/221501.pdf

Stoiloff, S., Ferrara, P., & Nagy, R. (2010, February 1). Working together to solve crime. *Forensic Magazine*. Retrieved from http://www.forensicmag.com/print/301

Texas Department of Public Safety. (n.d.). Annual report of 2010-UCR data collection. Retrieved from http://www.txdps.state.tx.us/administration/crime_records/pages/crimestatistics.htm

Truman, J.L., & Rand, M. (2010, October). *Criminal victimization 2009*. Retrieved from The Bureau of Justice Statistics website: http://bjs.ojp.usdoj.gov/content/pub/pdf/cv09.pdf

U.S. Department of Justice, Office of the Inspector General. (2010, August). *Review of the Federal Bureau of Investigation Laboratory's Forensic DNA Case Backlog (*Report 10-39). Retrieved from http://www.justice.gov/oig/reports/FBI/a1039.pdf

Visher, C. (1986). The Rand Inmate Survey: A Reanalysis. In A. Blumstein, J. Cohen, J.A. Roth, & C.A. Visher (Eds.), *Criminal Careers and Career Criminals, Vol. 2,* (pp. 161-211). Washington DC: National Academy Press.

Wilson, D. B., McClure, D., & Weisburd, D. (2010, November). Does forensic DNA help to solve crime? The benefit of sophisticated answers to naive questions. *Journal of Contemporary Criminal Justice*, 26(4), 458-469.

Zedlewski, E., & Murphy, M. B. (2006, January). DNA analysis for "minor" crimes: A major benefit for law enforcement. *NIJ Journal, 253*. Retrieved from http://www.nij.gov/journals/253/dna_analysis.html