

**The Bill Blackwood
Law Enforcement Management Institute of Texas**

DNA Forensics and First Responders

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ABSTRACT

DNA forensics is relevant to contemporary law enforcement because it gets results. Everyday, there are news articles referencing cases that have been resolved by convicting, exonerating, and identifying criminals and victims of crime through the use of DNA evidence. The unidentified are being identified, and those wrongly accused of heinous crimes are being released after years in prison. First responders (the first officer at a crime scene) should be trained in DNA forensics. The purpose of this research is to examine the importance of DNA forensics, to discover whether or not DNA forensics is currently being used in Texas by law enforcement officers, to discover whether or not law enforcement officers are being educated in DNA forensics, and to propose some resources available to train law enforcement officers in DNA forensics.

The method of inquiry used by the researcher includes a review of articles and journals. Various internet sites were accessed to gain information on the use of DNA forensics and education. Two personal interviews were conducted along with attending educational seminars. Also, a survey was distributed to 50 participants of various upper management law enforcement personnel from across Texas to determine utilization of DNA forensics among first responders.

The researcher discovered that upper management law enforcement personnel in Texas is mostly in agreement with the necessity of educating first responders in DNA forensics. The research showed the need for prosecuting not only high profile cases (rape, murder, etc.), but also low profile cases, such as theft and robbery, using DNA forensic evidence. Law enforcement departments in Texas are not utilizing the technologies available to them and, consequently, are missing an opportunity to solve

crimes that might be solved. First responders need to be trained in DNA forensics; the training is available through the President's Initiative Program in conjunction with the Attorney General's Office and can be financed through grants and at no cost on the Internet if no other resources are available.

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INTRODUCTION

Deoxyribonucleic Acid (DNA) is one of the most effective tools in law enforcement investigations today. DNA evidence leads to more suspect identifications, arrests, and prosecutions than fingerprint evidence and eyewitness identification (The Urban Institute, 2008). The issue to be examined in this paper is whether or not first responders (the first officer at a crime scene) should be trained in DNA forensics. Education is the key to society as a whole, and educating law enforcement first responders in DNA forensics is essential to good police work (National Institute of Justice, 2008).

The purpose of this research is to examine the importance of DNA forensics. This research wishes to discover whether or not DNA forensics is currently being used by Texas law enforcement officers and whether or not law enforcement officers are being educated in DNA forensics. It will also address the resources available to train law enforcement officers for education in the use of DNA in the identification, proper collection methods, storage, and transportation of DNA evidence. The research question to be examined focuses on the use of DNA forensics in the solving and prosecuting of crimes in Texas.

The method of inquiry used by the researcher includes: a review of articles, Internet sites, journals, personal interviews, attendance at educational seminars, and a survey distributed to 50 survey participants of various upper management law enforcement personnel from across Texas. The intended outcome of the research is to prove the usefulness of DNA forensics and the importance of educating first responders. This research will also point out the ease of providing educational

opportunities to first responders so they can learn how to identify and collect DNA samples, without contamination, for testing and learn the importance of databasing their findings.

Law enforcement must acknowledge that DNA technology is fast becoming the most effective tool in law enforcement today; they can only benefit from its use. DNA forensics has been proven to be more accurate than fingerprint identification and, at times, better than an eye witness. Education in DNA can equip first responders with the proper tools needed to solve not only high crime cases such as sexual assault and murder, but also burglary and theft. Such education will also prevent them from contaminating DNA evidence at a crime scene. However, if law enforcement, especially the first officer on the scene, does not have the proper education in identifying and collecting DNA evidence or the department does not have a policy for collecting DNA evidence on all crimes, then the community suffers.

REVIEW OF LITERATURE

In the early 1950s, scientists discovered the structure of DNA, which enabled them to understand the many questions concerning the basic make up of all living organisms. DNA is considered the blueprint of an individual and is found in most every cell of the body. It determines inherited traits such as eye color, blood type, and body size. Except in the case of identical twins, no two people share the exact same DNA makeup (Spence, 1990). As an example of how accurate DNA evidence can be, when forensic scientists compare bloodstains from a crime scene to DNA taken from a possible suspect, if a match occurs, it is expected to occur in one in a quadrillion

individuals. Since there are only about six billion individuals on Earth, this would be overwhelming evidence against the suspected individual (Anjaria, 2007).

The first use of DNA evidence by law enforcement was found in 1986 in Narborough, England. A 17-year-old mental hospital employee confessed to the murder of a young girl. This murder was very similar to another murder in 1983 of another young girl, but the suspect refused to accept responsibility for the 1983 murder. The local law enforcement decided to use DNA testing to link the two murders in an effort to implicate the suspect in both murders. The DNA samples matched in both cases, but neither of the samples matched the suspect who confessed to the 1986 murder. The 17-year-old recanted his story and, after spending three and half months in jail, was released. This prompted a community-wide DNA screening of over 1,400 townspeople. Colin Pitchfork was arrested and convicted for the 1983 rape and murder of Lynda Mann and the 1986 rape and murder of Dawn Ashworth after he attempted to get someone else to submit “his” DNA sample. This was the first use of DNA evidence in court. DNA technology is increasingly vital to ensuring fairness and to protecting the innocent in the criminal justice system, whether they are victims or suspects (Department of Justice, 2003).

DNA forensics within the criminal justice system is an indispensable tool that allows investigators the opportunity to solve crimes by convicting or exonerating suspects in current or “cold cases” or may assist in identifying unidentified human remains (UHR). The acting director of the National Institute of Justice, Glenn Schmitt, advised that on any given day in the United States, there are as many as 100,000 active missing person cases and tens of thousands of people disappear every year under

suspicious circumstances. Also, there are more than 40,000 human remains stored across the nation that cannot be identified by conventional means, many of which are known homicides or likely homicides (Schmitt, 2006).

The analysis of DNA evidence is becoming more and more sophisticated with new technology and new standards. DNA evidence is based on the "Locard" exchange principal from Dr. Edmond Locard, a French doctor and scientist who also studied law. The Locard exchange principal, developed around 1918, is the notion that among all contacts, there is an adding or taking away of something, so during the commission of a crime, something is always left or taken away by the actor and/or the victim (Chisum & Turvey, 2000). According to Locard (1910), "Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him... It is factual evidence... Only human failure to find it, study and understand it can diminish its value" (McInnis, 2008).

It is important to realize that almost all biological evidence found at crime scenes can be subjected to DNA testing. Criminal justice scholar, Gene Stephens (2008), stated, "One cubic centimeter of DNA holds more information than one trillion CD's" (p. 55). In the United States, DNA testing is primarily conducted in major criminal offenses such as rape and murder, but in England, law enforcement employs DNA testing in minor crimes, such as theft and burglary, as well as in all major crimes. Weeds and Hicks (2007) stated "...despite the advantages of DNA testing, little of this evidence is recovered from crime scenes, less is submitted to crime labs, and still less is analyzed" (p. 2).

DNA technology is not only available for the current or future crimes; it can reach back into the past to a time when DNA technology was not yet available, possibly resulting in overturned convictions and the release of the innocent. All that is required is evidence that can be tested. The United Kingdom uses databanked DNA evidence as a primary investigative tool and actually believes it has reduced the overall costs by eliminating extensive police investigations in some cases (Weeds & Hicks, 2007). In 2009, the California legislation will put forth Proposition 69, which will enforce the collection of DNA samples from not only convicted criminals but also all persons who are arrested, which will allow for more potential to solve crimes; however, it will also cause an even larger backlog of evidence (Pinchin, 2007).

Currently, the Department of Justice (DOJ) is focusing on several areas of research in an effort to improve crime scene investigations. DNA chip technology is one such area of research. Chip technology uses nanotechnology to reduce analyzing time down from several hours to several minutes, thus reducing time and cost of analyzing DNA samples. The development of field testing units to make identifying and collecting evidence easier and more practical is another area of research as is developing better methods for analyzing old, degraded, or compromised evidence. The development of technologies which will enable identifying mass samples, as in the 9-11 disaster, and technology which will allow identification of minute traces of male assailants from female victims (Stephens, 2005). The attorney general's office is also developing law enforcement training to give police officers, judges, prosecutors, attorneys, victim service providers, medical personnel, corrections officers, probation and parole officers, essential training in understanding the fundamental elements of DNA evidence (DOJ,

2003). This training will combine basic awareness training for patrol officers and other first responders; intensive training on identifying, collecting, transportation, and preservation of evidence; and education on the use of DNA databasing. This training will also encompass specialty training for medical personnel and victim service providers and training for forensic scientists and their labs.

Many law enforcement communities are realizing the importance of DNA training; for example, the Collin County Law Enforcement Academy has a web ad listed on their academy webpage which advertises free on-line courses on “What every law enforcement officer should know about DNA evidence: First responding officers” (as cited in Collin County Law Enforcement Academy’s website). This site, along with the DOJ and FBI websites, are excellent training sites to give first responders basic information and understanding of DNA forensics. All of this is being done to protect the innocent, solve crimes, keep dangerous criminals off the streets, and minimize miscarriages of justice by convictions of the innocent.

Fingerprinting was discovered in the 1930s and like fingerprinting, every person has a specific DNA Fingerprint. A DNA fingerprint is made up of a person’s DNA and printed out similar to a grocery store barcode. Scientists can make a DNA fingerprint by isolating the DNA strands, cutting, sizing, and sorting (also known as screening), transferring the DNA to a piece of nylon, and adding radioactive or colored probes which produces a pattern. This pattern is then repeated several times over for the DNA fingerprint, which looks something like a bar code (Betsch, 1994). DNA fingerprints can be used in the criminal justice system for the various reasons listed above. They can also be used by the medical field in diagnosing and developing cures for inherited

diseases. DNA fingerprints can be an invaluable source for personal identification by the US military in identifying missing in action and casualties of war much better than dog tags and dental records (Betsch, 1994).

In addressing DNA forensics as it pertains to first responders, the importance of having a DNA policy in every department is essential as is training in identifying, documenting, collecting, preserving, transportation, and databasing DNA evidence and cannot be underestimated. If an officer arrives on a crime scene and cannot identify DNA evidence, then his case may be lost. Evidence may be found in blood, saliva, semen, urine, hair, bones, and teeth. It is also possible to locate evidence on cigarette butts, chewing gum, envelopes, stamps, and almost any surface that has been touched. By not properly documenting and collecting DNA evidence, its origins and its biological activity can be lost. However, it is crucial for DNA evidence to retain its original integrity until it reaches the lab. If DNA evidence is not properly packaged and preserved, then contamination, decomposition, and deterioration can and will occur (McInnis, 2008). McInnis, of the Pasadena Crime Lab, advised that a lab technician can still find DNA evidence in an item washed and dried five times, but it is important to remember that water is detrimental to DNA evidence, and special care must be taken when water is present to prevent contamination (as cited in National Institute of Justice, 1999). Teaching first responders how to deal with the collection and preservation of DNA is, therefore, crucial to the integrity of any case where such evidence is submitted.

METHODOLOGY

The research question to be examined considers whether or not first responder law enforcement is trained in basic identification, collection, preservation, and

transportation of DNA evidence in all cases. The research will also ask whether or not law enforcement departments promote the collection and processing of DNA evidence and if these departments have a policy on processing such evidence. Another question will address whether or not the district attorneys are prosecuting high and low profile cases that local law enforcement have submitted and whether or not the officers themselves believe both high and low profile cases should be prosecuted based on DNA evidence.

The researcher hypothesizes that giving first responder law enforcement the proper education and tools to perform their jobs will allow for a more accurate system of properly identifying criminals in not only high profile cases but also low profile cases. Databasing crimes and victims will contribute to the effectiveness of quickly determining whether or not a crime occurred and identifying who was involved. It is a commonly known fact that as technology improves, costs usually decrease. The researcher believes it is best to take advantage of the inexpensive education and training available now to prepare for the increased availability of DNA forensic testing, while also requesting government funding, grants, and community support to further educate first responders and the local communities as to the benefits of DNA forensics. The researcher believes that most upper management law enforcement believe local departments should be training and promoting the use of DNA, and these departments should have a policy addressing this issue. The research will show that these departments believe DNA should be used to prosecute both high profile and low profile cases.

The method of inquiry will include a review of articles from various local newspapers, Internet sites, and library journals. Two personal interviews will be held and educational seminars will be attended. A survey will be distributed to upper management law enforcement. The instrument that will be used to measure the researcher's findings regarding the subject of DNA forensics for first responders will include a questionnaire consisting of ten questions, distributed to 50 upper management law enforcement survey participants from various local law enforcement agencies in the state of Texas.

The response rate to the survey instrument resulted in 47 survey responses returned answered. The information obtained from the survey will be analyzed by graphing four different charts (two bar graphs and two pie charts), which will give the researcher an idea of the percentages available from the survey questionnaire.

FINDINGS

The researcher found that over 80% of the departments surveyed do not promote the use of DNA evidence by first responders and less than 20% do, as shown in Figure 1. In Figure 2, the researcher observed that 68% of those surveyed believe DNA training should be instituted for all first responders, with 26% stating they did not believe this to be the case, and 6% had no opinion on this question. Thirty-six percent of the officers surveyed were personally trained in identifying DNA evidence whereas 64% had not. Thirty-eight percent of the officers surveyed reported training in the collection of DNA evidence and 62% had not been trained. Also, in the training of preservation and transportation of DNA evidence, only 32% officers had been trained and 68% had not. In addressing the issue of availability of crime labs used for processing evidence, the

researcher received multiple answers, thus assumed some departments have more than one lab in which to work with when dealing with the processing of evidence.

When the question of departmental policy as it refers to DNA evidence was posed, the researcher found that 6% did not know if they had a DNA policy, 23% advised they did have a policy, and 71% do not have a policy (see Figure 3). This especially surprised the researcher as most departments have a policy for every situation due to the many liability suits filed against governmental entities. On the question of the district attorney prosecuting with DNA evidence, the researcher found that 100% of all departments surveyed said their district attorney prosecutes high profile cases with the use of DNA evidence, but only 40% of low profile cases were being prosecuted with the use of DNA evidence. It is also important to note that a majority of those surveyed believed DNA evidence should be used in prosecuting not only high profile cases, such as rape and murder, but also low profile cases, such as theft and burglary. (See Figure 4).

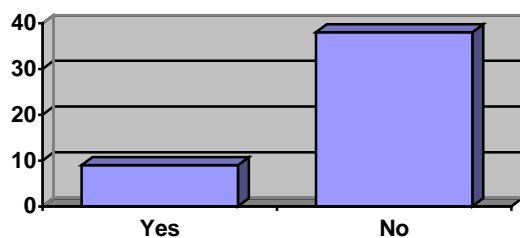


Figure 1. Department promotes DNA evidence by first responders

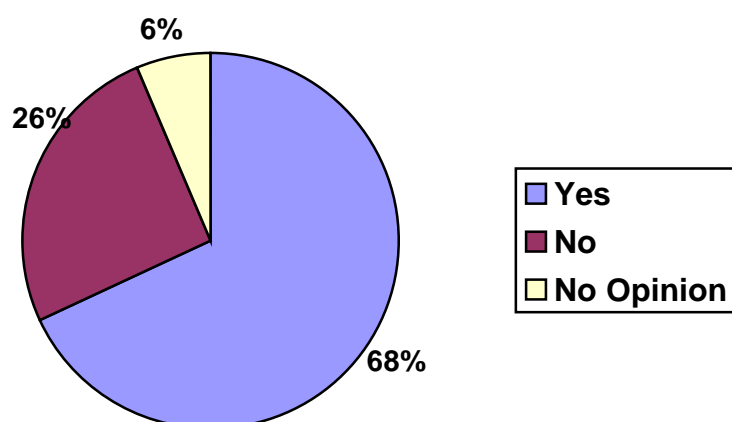


Figure 2. Participants who believe DNA training should be instituted for all first responders.

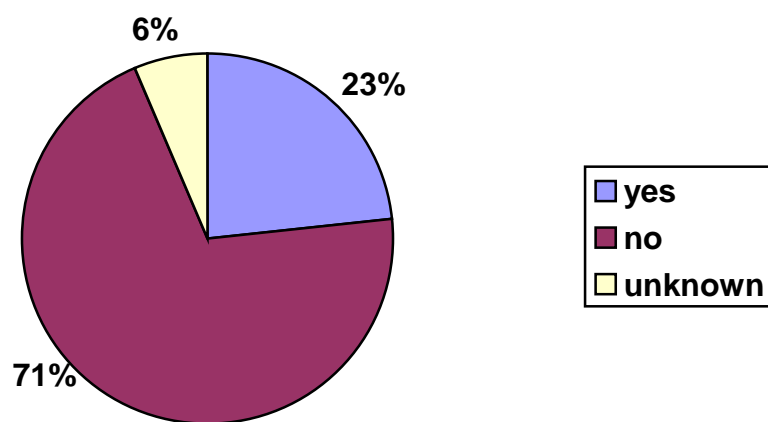


Figure 3. Departments who have a DNA evidence policy.

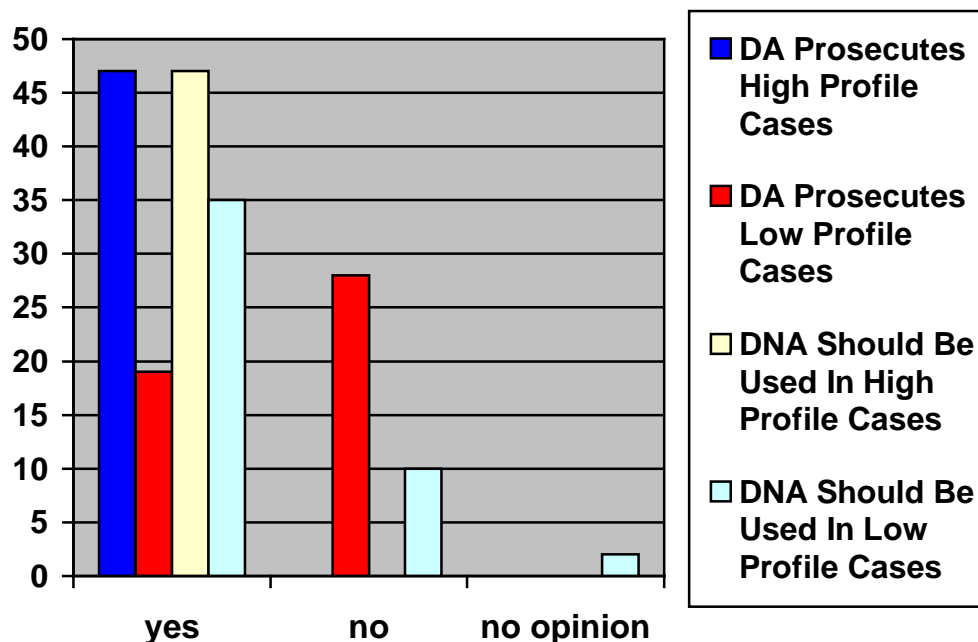


Figure 4. Case types prosecuted and whether or not DNA should be used.

DISCUSSIONS/CONCLUSIONS

The problem or issue examined by the researcher considered whether or not educating first responder law enforcement in basic DNA forensics (identifying, collection, preservation, and transportation) will benefit law enforcement agencies, victims of all crimes, and communities in general. It is important to decide whether or not basic DNA evidence is necessary in convicting or exonerating victims of crime. Once the decision is made, law enforcement officials need to decide on the proper education for DNA forensics and where funding for such ventures will come from. The use of DNA forensics may also raise issues concerning moral, religious, or privacy rights of citizens. It may be important for law enforcement agencies to educate not only their officers but also their communities in the use of DNA forensics and its benefit to victims of crime and the safety of communities in general.

Education is one of the most important tools any profession can use whether that profession is a physician learning a new heart monitoring technique or a gardener mastering a new technique for ridding crops of disease. The purpose of this research was to bring to the forefront the knowledge that DNA is an indispensable tool, especially in the hands of the first responding officer to the scene of a crime. With proper DNA evidence, the legal system will be able to prove or disprove a crime, indicate guilt or innocence, and properly identify human remains. DNA forensic education can mean the difference between valuable evidence being missed or rendered unusable through improper handling and solving a major or minor crime.

The research question that was examined focused on specific education geared toward first responder law enforcement. By educating these officers, it is possible to make them better tools for their communities. Through basic education, criminals become more fearful of being caught. Another aspect looked at was law enforcement liability and whether or not citizens should have the right to request DNA forensics on not only major or high profile crimes, such as murder, but also on minor crimes, such as burglary or theft. This is important to consider especially because of the ease at which law enforcement can educate a first responder with little or no cost to their department.

The researcher hypothesized that by educating first responder law enforcement in basic DNA forensics, more crimes may be solved, including those committed in the past, present, and future. This will allow for the identification of unidentified human remains and the exoneration of people currently serving prison time for crimes they did not commit. More victims and their families, and communities in general, will be better served, and this will allow for closure. Proper DNA forensics on the first responder level

will lead to justified criminal charges with fewer appeals being filed and less money being spent on trying to convict those who protest their innocence.

The findings of the research did support the hypothesis. The reasons why the findings supported the hypothesis are probably due to the expanding technologies in law enforcement today. More upper management law enforcement are seeing the need to expand their understanding for more efficient techniques to better serve their communities in a changing world. Education in DNA forensics such as identification, collection, preservation, transportation, and databasing evidence for the first responder and updated departmental policies concerning DNA can only support a crime free community. Limitations that might have hindered this study resulted because the subject itself is so broad. Also many upper management officers have been in the department for years and do not necessarily see a need for DNA testing in minor cases. Another issue may have been the concern for violating certain civil liberties.

The study of DNA forensics for the first responder is relevant to contemporary law enforcement in today's more modern world, which is expanding every day in the areas of forensic technology. In an effort to keep the "business" of law enforcement ahead of the criminals, the law enforcement community needs to keep up with educational opportunities in all technologies including DNA forensics. The results of this research points out the lack of training first responders have in handling DNA evidence. The researcher believes the information presented here shows the need for such specialized training of first responders. DNA forensics can only benefit the general public by protecting the innocent, identifying victims, preventing the miscarriage of justice, and exonerating the innocent.

The Constitution of the United States starts out with the following:

We the people, in order to form a more perfect union, establish justice, insure domestic Tranquility, provide for the common defense, promote the general welfare, and to secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish the Constitution of the United States of America.

In an effort to establish justice, tranquility, defense, general welfare, and liberty, communities must implement scientific technology like DNA testing to secure these inalienable rights. Also, the Fifth Amendment states, "...nor be deprived of life, liberty or prosperity, without due process of law." DNA technology is due process of law. The Fourth Amendment advises of protection against unreasonable searches and seizures without probable cause. There are those who would argue the taking of DNA samples from citizens, victims, and/or criminals, and/or possible criminals is an unreasonable search or seizure. Section One of the 14th Amendments spells out due process and the equal protection under the law ...

No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

So, under the constitutional amendments, ordering DNA fingerprints of all citizens of the United States may possibly be a violation of constitutional rights. Then again, under these same constitutional amendments, it is a violation of constitutional rights if everything possible is not done to provide equal protection under the law. There may be moral or religious reasons not to take DNA evidence. There may be constitutional reasons not to take DNA evidence. But for the safety and security of these United States and her citizens, it may be necessary to reevaluate these civil liberties in

order to concentrate on what priorities are important in the education of law enforcement for the safety and security of the communities of this great nation.

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APPENDIX**Survey of Local Upper Management Law Enforcement
Professionals**

