Ethical Issues Regarding the Use of Criminal DNA

An Argument for Expanding the Criminal DNA Database, Including the Implementation of Familial Searching Procedures in New Jersey

Tag Words: DNA testing, criminal database, familial searching, codis, felony, new jersey, crime

Authors: Christine Dizenzo and Julie M. Fagan, Ph.D.

Summary: Since DNA is unique and can be used for identification, many states now require crime labs to obtain samples of every person arrested for a felony to database for future use. This project will outline the laws and regulations currently in place which require DNA samples to be entered into a national database. This project will also examine the full scope of how this may affect wrongly convicted individuals or individuals who have escaped prosecution. Finally, this project will address complications in DNA analysis, such as economic, social, and legislative obstacles. One such obstacle is the legislation regarding familial searching, a useful technique that is applied when no direct match is found in the DNA database for an unknown forensic profile found at a crime scene. This DNA can be used to find close relatives of the offender if such a relative has previously committed a crime and has also submitted their DNA to law enforcement officials. However, this practice is not very widespread in the United States, and only a few states have supported this technique with protocol and procedures. This project argues for the implementation of familial searches in New Jersey.

Video Link: https://www.youtube.com/watch?v=eFjCf_4WT9s&list=UUts4_1WyqXMmVDfu9ZffstA

Ethical Questions Involved with DNA as a Forensic Tool

DNA testing has rapidly evolved from its early days as a paternity test into a validated forensic tool. With DNA testing now renowned as the gold standard of forensics, several ethical issues have arisen. For instance, should individuals arrested for a felony be required to surrender their DNA? Or, if not arrestees, should individuals convicted of a felony be required to surrender their DNA? Laws in all 50 states currently require DNA to be collected from one of these two categories. The ethical issue goes further, however, when the DNA sample itself is considered; should these samples be kept if the individual is cleared of all charges, which category of offenders should DNA be taken for, and how long should they be stored? And, finally, should DNA from a family member be allowed to be used to find another person?

All of these issues are under debate because the fourth amendment tells us that our home is our castle and we have a right to privacy. However, innocent individuals have a right to not be violated, and DNA has the power to prevent future murders and rapes. DNA even has the power to exonerate individuals serving time for another person’s crime. However, our freedoms are important; use of DNA from individuals should only be used when the potential gain outweighs the imminent intrusion. A person’s DNA should only be kept in a database if they are convicted of the crime for which they were arrested.
Supreme Court Decision States it is Lawful to Collect DNA from Arrested Individuals

In June 2013 the Supreme Court ruled in a 5-to-4 decision that the police can take DNA samples from individuals arrested for felonies. This decision was reached in the case Maryland v. King in 2009. Alonzo Jay King Jr. was arrested in Wicomico County, Maryland under assault charges. Upon arrest, a cheek swab was used to collect King’s DNA. This DNA was matched to an unsolved rape case from 2003, and King was then convicted with rape in addition to his assault charges. King argued that the use of his DNA to convict him of rape is unconstitutional, violating the fourth amendment (1). The fourth amendment states the following right:

“The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and be particularly describing the place to be searched, and the persons or things to be seized.” (2)

Since King was arrested for a felony, his DNA was collected in agreement with the fourth amendment. Since the DNA was obtained via a non-invasive cheek swab, the collection is not considered unreasonable, but rather a routine booking procedure similar to photographing and fingerprinting in order to verify the arrestee’s identity (1). This was a landmark case for forensic science, since it upheld law enforcement’s right to collect DNA samples from individuals arrested, but not yet convicted, of felonies.

Who to Take DNA From

Some may argue that only DNA from violent offenders should be taken. Why take DNA from those who have only sold drugs, which many see as a less severe crime than homicide, assault, or rape? However, approximately 9% of drug and property offenders released from prison return to prison within five years for violent and sex crimes. Additionally, 85% of Virginia’s hits would be overlooked if the data were limited to violent and sex offenders. With this large subset of nonviolent offender population eventually committing more heinous crimes, it may be useful to have their DNA on file for future reference (3).

Current DNA Analysis Technology

Genetic testing did not originate in the courts, but rather as a paternity test. In England in 1986, this same DNA testing was first used in forensic testing to prove a teenager’s innocence in two rape-murders. The following year in 1987 saw the United States’ first conviction using DNA testing, when Tommy Lee Andrews’ DNA matched semen found in a rape victim (4).

In order to analyze a DNA sample, the DNA is first isolated from an evidence sample such as saliva. After the DNA is extracted, it is cloned using a technique called polymerase chain reaction (PCR). This cloning allows the analysis of even trace amounts of DNA. After the DNA is cloned, it can be analyzed. The two more common methods currently in use to analyze DNA include Y-chromosome analysis and short tandem repeat (STR) analysis (5).

In the male population, markers can be used from the Y-chromosome. This is particularly useful in male lineage analysis, since the Y chromosome is transmitted directly from father to son. In cases of sexual assault with multiple male contributors, DNA can mix together and an identity
cannot be found. However by analyzing the Y-chromosome markers which are unique to each individual male, the identities can be found (5).

STRs are located in noncoding DNA, and consist of short repeated sections of the DNA. Being so short makes STRs easy to replicate using polymerase chain reaction and therefore can also be used on degraded or old samples. Since each person has a different number of STRs located in different places, these segments of DNA can be used for identification (6). If the STRs of the suspect do not match the STRs of the evidence, the suspect is innocent. If the STRs of the suspect do match the STRs of the evidence, this is considered a match. In order to validate this match, the DNA profile is compared to a set of unrelated individuals from a similar ethnic background as the suspect. This is because all individuals from the same ethnicity may have similar STR patterns. If this comparison supports that the suspect’s DNA profile is vastly more similar to the evidence than the random population, then the evidence supports that individual’s guilt (5).

**Current Use of National Criminal DNA Databases**

DNA offender profiles have been kept in DNA databases since the late 1990s. In 1994, the DNA Identification Act gave the Federal Bureau of Investigation the freedom to create a national database of criminal DNA. The Bureau then launched the Combined DNA Index System (CODIS), which allows crime laboratories from all 50 states to access criminal DNA. CODIS can be used when there is no suspect involved, since evidence from the crime scene can be compared to criminal DNA nationwide. DNA can be taken from various methods besides a standard cheek swab, some of the more common include drinking glasses, gum, envelopes, and blood (7). CODIS is minimally intrusive, since it uses non-coding DNA, which does not reveal any medical or trait information about the individual (1). For example, even for a high-profile serial killer such as Ted Bundy who confessed to 30 homicides within a 4 year span, the DNA profile is completely anonymous (8).

In order for CODIS to be utilized to its full potential, more resources must be invested. The United States Department of Justice cites several problems which limit the effectiveness of CODIS:

1.) In many public crime laboratories there is not enough time or personnel to process the copious amount of DNA samples. This is problematic because while a DNA sample is waiting to be processed in a storage facility, a violent offender may be committing more crimes.

2.) Limited equipment or outdated systems may detract from current DNA technology capabilities. More federal funding will be needed to process DNA samples more cost-effectively and time-efficiently.

3.) More research is needed to improve DNA technology. Future techniques should be quicker and at a lower cost than current methods, via the use of nanotechnology. The department would also like to develop technology that would be more useful in analyzing compromised or old evidence. The department hopes to achieve this goal by enhancing current analysis methods such as Short Tandem repeats (STRs), Single Nucleotide Polymorphisms (SNPs), mitochondrial DNA analysis (mtDNA), and Y-chromosome DNA analysis.
4.) Professionals working in the field are currently lacking the appropriate knowledge on the proper collection and storage techniques of DNA evidence. In order for DNA to be more acceptable in court, there are rigorous standards that must be met and upheld along the chain of custody, and a properly trained staff is essential.

As described above, there are several factors limiting the effectiveness of forensic DNA databases (9). The National Commission on Forensic Science was established in 2013 by the Department of Justice in order to advance DNA technology and standardize scientific protocol across the nation (10).

**An Increase of Samples and an Increase in DNA Backlog**

Douglas Hares, a scientist at the FBI Laboratory states that the number of DNA profiles in the CODIS system is what ultimately solves more crimes. He states that the database helps investigations more now in one year than it did in its first five years of existence, which proves the worth of a large database. He states that as more profiles are added to the system, more crimes can be solved and more innocent suspects can be ruled out (8).

However, forensic scientists are currently struggling to keep up with the backlog of DNA samples currently in existence. With the growing practice of analyzing the DNA from every individual arrested of a felony, more DNA is being sent to be analyzed than the crime laboratories are equipped to process. Figure 1 shows the significant increase in the number of samples sent to crime laboratories over the past few years. However, though the number of DNA samples submitted rises, the year-end backlog has not significantly risen. This is due largely to the DNA Initiative of 2004, which aimed to combat the DNA backlog. Federal funding was allocated via the DNA Backlog Reduction Program, which provided $330 million in grants between 2004 and 2009. Without this funding, the backlog would be insurmountable (11).

![Figure 1: DNA Casework: Supply, Demand, Backlogs](image.png)

**Fig. 1:** The increase of DNA samples waiting to be processed in state crime labs.
The monitoring of this backlog and continued federal support is crucial to our justice system. For example, Kellie Green was raped in 1994. It took the crime labs about three years to test the DNA left behind by her attacker. When the results were returned, she found out that this man had raped another woman previously. Had his DNA been tested in that earlier case, her rape may not have occurred (12). Kellie Green’s case is not an isolated event, and this situation occurs more frequently than it should. Reform is needed to reduce this backlog, so there are fewer unnecessary victims like Kellie Green.

**Economic Reform is Necessary to Further Forensic Reach**

There are several costs associated with expanding a DNA database. Material and personnel costs will be paid for by tax allocations. To process a strong sample that contains a good amount of DNA the average cost is $16. However, if the sample is weak extra work must be done, which elevates the cost to approximately $40 per sample. Out of the 1500 samples the CODIS laboratory receives each month, nearly 20% are duplicates. This wastes $12,000 per year, and could easily be avoided by checking the criminal history of the individual first to see that a sample has not already been taken (13).

The federal spending budget is comprised of three parts - interest on debt, mandatory spending, and discretionary spending. Mandatory spending is when Congress sets criteria to be eligible for a program such as Medicaid, and anyone eligible will receive benefits. In this way, mandatory spending varies per year as more or less people are eligible for the benefits. Approximately 2/3 of the federal budget, an estimated $2.56 trillion, is made up of mandatory spending, which includes programs such as Medicare, Social Security, unemployment compensation, and the Supplemental Nutrition Assistance Program (food stamps). This is in contrast to discretionary spending, which goes through an annual appropriations process, in which Congress sets the amount of spending each program can do for that year (14).

For the 2015 fiscal year the estimated discretionary budget for the Department of Justice will be $27.4 billion, with an estimated mandatory budget supplemental contribution of $4.3 billion. The allocations are distributed as follows (15):

- Law enforcement (48%)
- Litigation (12%)
- Prisons and detention (31%)
- Administration/technology/other (1%)
- Grants (8%)

These allocations do not seem to support more efficient and evolving forensic technology, since less than 1% of the Department of Justice’s funding is directed toward technology advances. It may be more efficient to spend less money on impeding the backlog, and more money investing in research to create faster and more efficient tests. These faster tests may help to reduce the backlog, allowing more felony cases to be solved and therefore creating fewer future victims.

**How DNA Can Free the Innocent**
DNA can do more than help prosecute the guilty; it can also be used to help prove innocence. Though DNA testing has been analyzed for its scientific validity, other common methods have not been as rigorously tested, such as bite mark analysis, ballistic identification, hair microscopy, and even the time-honored method of fingerprint analysis (16). A 2004 study suggests that cognitive bias can cause unconscious error in fingerprint analysis (17). In many cases, scientists have exaggerated the significance of these tests to juries, leaving the impression that they are more conclusive than they actually are. DNA found in bodily fluids is more validated, and will lead a higher degree of justice.

The Innocence Project is a program that was created in 1992 which has helped to exonerate more than 300 people by the use of DNA testing. Since DNA testing has only recently become advanced enough for use in court, it may not have been available at the time the individual was incarcerated. This program helps to prove innocence in cases where physical evidence has been collected and can be tested, such as sexual assaults, homicides, or assaults (18).

One example of how DNA can exonerate individuals is in the case of Larry Peterson. Larry Peterson served 16.5 years in prison before being exonerated in 2006. He was found guilty of strangling and sexually assaulting a woman after Peterson, who lived in the area, had fingernail scratch marks on his arms. Peterson went to the police voluntarily and proclaimed his innocence. A forensic scientist used hair microscopy, a poorly substantiated technique, was used to link Peterson to the crime. In 2005 Peterson’s DNA was compared to the DNA found at the crime scene and he was excluded as a contributor. Peterson was exonerated in 2006 (19).

Not collecting DNA samples from individuals convicted of or arrested for a felony may result in fewer exonerations of innocent men and women. The expanded use of familial searching may also allow for more exonerations. For every correct criminal put behind bars, an innocent individual may regain their freedom.

**Familial Searching as a Tool to Solve Crime**

With so many victims being violated as an indirect result of the backlog, and so many innocent individuals being prosecuted for crimes they did not commit, something must be done to ensure that the proper criminals are brought to justice. Familial searching is a technique which may help to prosecute criminals more efficiently using DNA profiles already stored in the database. DNA analysis not only identifies an individual, but also can identify kinship. Families share set amounts of DNA among its members; each person shares 50% of their genetic material with their parents and siblings, 25% with their grandparents and aunts and uncles, and 12.5% with their cousins. The genetic profiles of two individuals can be compared to see how much shared DNA exists. This is particularly useful in cases where evidence is left behind at a crime scene but there are no hits on the national database. By searching for a close familial match, a relative of the unknown individual may be found if that family member has committed a crime and submitted their DNA to the database. Through this family member, the perpetrator can be found (20). Familial searches have widespread capability since the Department of Justice found that 46% of prison inmates have had at least one close relative who has been incarcerated (21). This means that familial searches may have the ability to close many unsolved cases.

The United States does not typically do familial searching, however, its use has been proven in the United Kingdom. In the United Kingdom, over 40 serious crimes between 2003 and 2011
have been solved using approximately 200 familial searches. Their success lies in their comprehensive searching techniques, which not only relies on genetics but also on geographical location and age. Expanding the use of this technique in the United States would be helpful to criminal investigation. Whether familial searching is used as a forensic procedure is decided by each individual state in the United States. Only a few states embrace familial searching, such as California, Texas, Colorado, and Virginia. In Los Angeles, familial searching helped catch the Grim Sleeper, a serial killer that was active for over 13 years and killed at least 10 people, police suspecting 6 more victims (22).

A study in California showed approximately 93% of fathers and 61% of full siblings could be found using a CODIS 13 loci (location marker) search. When more loci are used, more relatives can be found (20). Though familial searching requires alternative software in addition to CODIS, the Denver District Attorney Mitchell Morrissey has offered the use of such a program free of charge (23). If more states embraced this practice, many more criminals could be identified and brought to justice. The United States could frame this technique around the UK model, which involves a specific protocol including an approval process, research, and training of law enforcement officials. Familial searching could not only make more use of DNA already analyzed, therefore putting less pressure on eliminating the backlog, but familial searching could help to exonerate innocent individuals by capturing the actual perpetrator.

Community Action: Introducing Familial Searching to New Jersey

In this project several legislators in the General Assembly of the State of New Jersey were contacted to review a draft of a bill (Appendix I) which would implement familial searching in New Jersey. The act which the bill would establish would be called the New Jersey Familial DNA Searching Act and would direct the Attorney General of New Jersey to design a procedure to allow familial DNA searching. The act would include safeguards for privacy and scientific accuracy, to be as minimally intrusive as possible for innocent individuals in New Jersey.

Conclusion

Mandatory DNA sampling of felons is a worthwhile cause; however, collecting DNA from individuals arrested but not convicted of a felony will contribute to the DNA backlog and cost taxpayers with little benefit. If DNA was collected only from individuals convicted of a felony, the backlog would not be as severe, and impediment on fourth amendment rights is minimal. We cannot just turn away in cases such as King’s where the truth was blatant and could not be ignored - we have a civic duty to put dangerous criminals behind bars before they create another victim. Though familial searching will not help to decrease the backlog, it will help investigators to use the current DNA database more efficiently, catching more criminals with less DNA. These measures may instill a fear in previous offenders, and may even help to abate crime. DNA is the gold standard of forensic investigation, and has much more potential to solve crime than for which it is currently used. Expanded and more efficient use of these databases will result in a more just justice system in the United States.
References


2. U.S. Constitution, Amendment 4


18. Innocence Project a. FAQ. Retrieved from http://www.innocenceproject.org/Content/How_can_somone_ask_the_Innocence_Project_to_get_involved_in_a_case.php


Appendix I

AN ACT to direct the Attorney General of New Jersey to design and implement a procedure to permit familial DNA searching.

WHEREAS, familial DNA searching is used to identify a close blood relative of a person who commits a crime in such cases where the DNA profile of the person who committed the crime is not identified in a routine search of the state’s DNA database; and

WHEREAS, the authority to decide upon the legality of familial searching is dependent on state policy and several states such as California, Colorado, Texas, and Virginia perform familial searches; and

WHEREAS, the state of Colorado has offered the free use of their familial search software which is necessary for scientific validity, and

WHEREAS, under which circumstances familial searching is appropriate should be determined; therefore,

Be it enacted by the General Assembly of the state of New Jersey,

SECTION 1. SHORT TITLE.

This act may be cited as the “New Jersey Familial DNA Searching Act”.

SECTION 2. PROCEDURE AND POLICY.

(1) General statutes.—Not later than one year after the date of enactment of this Act, the Attorney General of New Jersey shall adopt policies and procedures in accordance with this section to ensure that

(A) forensic laboratories in New Jersey may conduct familial searches on DNA samples collected from crime scenes in New Jersey;

(B) the procedures shall include appropriate safeguards to assure scientific accuracy;

(C) the privacy interests of persons identified in familial searches remain strictly protected while the investigation of the crime is pending, and intentional release of private genetic information will be a punishable offense; and

(D) a familial search is only conducted if there is intent to pursue the case if evidence allows, such that the statute of limitations has not expired.

(2) Search requirements.—Familial searches in New Jersey may only be conducted if in accordance with the following requirements:
(A) No identical match for the DNA sample is identified in a routine offender index search.

(B) The New Jersey bureau of investigation shall study other states’ policies and procedures to determine under which cases familial DNA searches may be appropriate.
Letter to the Editor

Dear Editor of the Press of Atlantic City:

Please consider my letter for the Opinion section of your paper. If you have any questions or would like to contact me, please use the following information:

Christine Dizenzo
XXXXXXXXXXX
XXXXXXXXXXX

Are you your brother’s keeper? Maybe you should be. Violent crime rates in Atlantic City are significantly higher than for Atlantic County as a whole. Atlantic City used to be a famous New Jersey town, known for its historic beaches, boardwalks, and casinos. Lately, it is more commonly associated with drugs, gangs, and corruption. As a tourist town, it is imperative that Atlantic City is perceived as the safe, family friendly resort it once aspired to be. The closure of a third of Atlantic City’s casinos this past year indicates that tourists may be opting for safer alternatives for their vacations, such as Cape May or Ocean City.

Advancements in DNA technology may be able to restore Atlantic City. DNA is found in everyone’s body, and is unique to each person. Due to this uniqueness, DNA is a powerful tool that can be used to identify the perpetrator of a crime. Currently, all fifty states require DNA be taken from individuals convicted of a felony. When DNA is left behind at a crime scene in bodily fluids, the perpetrator may be found if their DNA is in the database. However, what if the perpetrator’s DNA is not in the database? The case may run cold and they may go on commit another violent crime. Familial searching is a technique where a criminal can be located by finding a previously convicted relative of the unknown suspect’s DNA. This technique would greatly expand the database’s current effectiveness, since over one third of inmates have had at least one close relative that has been incarcerated. Familial searching is not currently practiced in New Jersey, but has the potential to reduce violent crimes in the state. Lower crime rates would lead to more tourism for Atlantic City, providing South Jersey with the surge in economy it so desperately needs. So I ask again – are you your brother’s keeper? Perhaps you should be.

Sincerely,

Christine Dizenzo