CHAPTER: 10

DNA DATABASES AND DNA DATABANKS

10.1 INTRODUCTION

In 1990,\(^1\) a series of brutal attacks on elderly victims occurred in Goldsboro, North Carolina, by an unknown individual the “Night Stalker”. During one such attack in March, an elderly woman was brutally raped and almost murdered. Her daughter’s early arrival home was the only thing that saved the woman’s life. The suspect before fleeing intended to burn the residence and the victim, in an attempt to conceal the crime. In July 1990, another elderly woman was brutally raped and murdered in her home. Three months later, a third elderly woman was raped and stabbed to death. Her husband was also murdered. Their house was burned in an attempt to cover up the crime, but fire rescue personnel pulled the bodies out before they would engulf in flames. The DNA analysis that was conducted upon the biological tissues as well as the vaginal swabs of the each victim revealed that the perpetrator was same in all the three crimes. However, there was no suspect. For 10 years, both the Goldsboro Police Department and the crime laboratory didn’t have any clue. Thereafter, the biological evidence was retested in all the three cases with new DNA technology, funded by the National Institute of Justice. The profiles were then entered into North Carolina’s DNA Database, and were compared to thousands of convicted offender profiles already in the Database. Resultantly, In April 2001,\(^2\) a “cold hit” was made from the convicted offender DNA profile in the Database. The perpetrator had been convicted of shooting into an occupied dwelling, an offense that required inclusion of DNA profiles in the North Carolina DNA Database and so a match could be found. The suspect was then brought into custody for questioning and was served with a search warrant to obtain his blood sample. That sample was analyzed and compared to the crime scene evidence, thereby confirming the DNA Database match. When confronted with the DNA evidence, the suspect confessed to all three crimes. Mark Nelson, special agent in charge of the North Carolina State

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1 Available at http://www.ncjrs.gov/pdffiles1/nij/194197.pdf.(Last visited on December, 12,2013)

2 Ibid.
Crime Laboratory, said, “Even though these terrible crimes occurred more than 10 years ago, we never gave up hope of solving them one day”\(^3\). Every law enforcement department throughout the country has unsolved cases that could be solved through recent advancements in DNA technology. The only requirement is the wisdom of an investigator to understand which evidence would yield a DNA profile, and thus can identify a suspect in ways previously seen only on television. The discussed case shows the relevance of DNA Databases during criminal investigation.

### 10.2 DNA DATABASE

A Database is an organized collection of data for one or more purposes, usually in digital form.\(^4\) A DNA Database has been defined as “a storehouse of genetic records which law enforcement agencies use for criminal identification purposes”.\(^5\) Construction of law enforcement Database would involve collection, analysis and deduction of DNA profile in a readable format ready to be accessed efficiently. Nowadays, the system which is followed includes collecting of samples from various markers and portion of them is analyzed whereas rest is stored and preserved. DNA profiles which are formed after analysis (the accused samples) are stored in the computerized systems to facilitate researches for matching with an unidentified crime scene sample.\(^6\)

### 10.3 DNA DATA-BANK

Data-bank carries broader concept including all the elements that provide information about the offender and the cases. This includes information about the samples (offender samples and casework samples), their analysis, and the method used for the deduction of DNA profile. In comparison, Database is a restrictive concept and is simply the computer repository of the basically required information needed to match cases with offenders but in organized manner. As in the case of fingerprints, the development of DNA Data-banks and Databases can substantially

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\(^3\) Justice department, National Institute Of Justice, Office Of Justice Programmes; NIJ Special Report: Using DNA to Solve Cold Cases, July 02; Government printing press.

\(^4\) Available at http://en.wikipedia.org/wiki/Database. (Last visited on December, 12,2013)


\(^6\) Abhijeet Sharma, DNA Tests in Paternity Disputes and Criminal Investigation, 295 (2007).
augment the utility of the advanced technology. While one’s fingerprints might be helpful in establishing one’s presence at the scene of crime, evidence of his peculiar DNA profile would help in strongly establishing that he was the only source.7

The Databases do not normally hold DNA except for a short time. The largest DNA Database in the world is CODIS,8 followed by the United Kingdom National DNA Database,9 and thirdly a Californian DNA Database (its records are included in CODIS). The Australian criminal DNA Database is called the National Criminal Investigation DNA Database10 (NCIDD) and the Canadian equivalent is the National DNA Data Bank (NDDB). A government Database of DNA profiles against aids the law enforcement agencies in many ways can match suspects DNA. A genetic genealogy Database is a DNA Database of genealogical DNA test results. A medical DNA Database is a DNA Database of medically relevant genetic variations11.

Law enforcement agencies are progressively turning to the establishment of DNA Data-banks in their war against crime. They are of the opinion that if this unique technology can help in inculpating or exculpating the suspects, then why the same cannot be used to ‘FIND’ them as well. Thus apart from saving precious time of the investigating agencies, Databases and Data-banks have other advantages too. Firstly, it can bring the offender to book early so that he may not commit similar crime again; Secondly, it leads the officers in the right direction; Thirdly, it helps to solve cold cases; Fourthly, it helps to establish the identity of the offender and lastly, it helps to avoid the unnecessary detention of the innocent. It may also help to solve minor crimes. The importance of DNA technology in investigations was emphasized in People v. Wesley.12

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11 Ibid
12 140 Misc. 2D 306,533 N.Y. 2D at 644. It was summarized by the Court that the immediate advantage of the DNA technology would be identification of an accused. It was also observed that in-case it is acceptable in the criminal Courts, then it would revolutionize the administration of criminal justice and would not only reduce the importance of the eyewitnesses but also reduce the cases where the offenders used to establish the plea of alibi by procuring false ocular or documentary evidences. It was also added by the Court that this single piece of evidence can add in the search for truth and the goal of convicting the accused and acquitting the innocent. A further benefit which was cited by the Court was that it will help in early disposition of the criminal cases and that can be further enhanced if this technology is not only appreciated by the Courts but also by the agencies by putting in labour to constitute the DNA Databases which, will help to expedite the identification of the offenders thus, saving the time of agencies, and the Courts, thus ensuring speedy justice to the victims and the litigants.
10.4 POSITION IN UNITED KINGDOM

The DNA Database of United Kingdom known as United Kingdom’s National Criminal Intelligence DNA Database (NDNAD) is a government database and a first and the largest national DNA Database that was set up in the year 1995\(^{13}\), using the Second Generation Multiplex (SGM\(^{14}\)) DNA profiling system\(^{15}\), followed by that of New Zealand\(^{16}\), France (FNAEG in 1998). In USA, FBI has organized the CODIS Database as early as in year 1990. As of the end of 2005, it carried the profiles of around 3.1 million people.\(^{17}\)

In England and Wales, anyone arrested and detained at a police station of recordable offence\(^{18}\), has to part with his bodily sample for DNA profiling retained in the NDNAD as a profile sans his full genomic sequence. The data held on the National DNA Database is governed by a tri-partite board consisting of the Home Office, the Association of Chief Police Officers (ACPO) and the Association of Police Authorities (APA), and also independent representatives from the Human Genetics Commission.\(^{19}\) The owner of the information in form of samples held on the NDNAD is the police authority. The nature of retention of samples is permanent by the companies that analyze them, for an annual fee. All forensic service providers in the UK which meet the accredited standards can interact with the NDNAD. The samples of 5.2% of the population is on NDNAD as compared to 0.5% in the United States of

\(^{13}\) Available at http://en.wikipedia.org/wiki/National_DNA_Database .(Last visited on December, 12,2013)
\(^{14}\) Ibid. It is manufactured by ABI (Applied Biosystems).It contains primers for the STR (Short Tandem Repeat) loci and was superseded by Second Generation Multiplex Plus SGM+ DNA profiling system in 1998.
\(^{15}\) Available at http://en.wikipedia.org/wiki/National_DNA_Database .(Last visited on December, 12,2013)
\(^{16}\) Available at http://www.esr.cri.nz/competencies/forensicscience/DNA/Pages/DNAData- bank.aspx .(Last visited on December, 12,2013)
\(^{17}\) Available at http://en.wikipedia.org/wiki/United_Kingdom_National_DNA_Database .(Last visited on December, 12,2013)
\(^{18}\) A (crime) recordable offence is any offence under United Kingdom law where the police must keep records of convictions and offenders on the Police National Computer.
\(^{19}\) The Human Genetics Commission is a non-departmental public body that advises the United Kingdom Government on the Ethical and Social aspects of Genetics. This includes Genetic testing, Cloning, and other aspects of molecular medicine. The Commission is chaired by Professor Jonathan Montgomery and comprises 21 members whose backgrounds include the law, medicine, consumer affairs, philosophy and ethics, scientific research and clinical practice. Representatives of the Chief Medical Officers of England, Scotland, Wales and Northern Ireland also sit on the Commission. Available at http://en.wikipedia.org/wiki/Human_Genetics_Commission .(Last visited on December, 12,2013)
The data on NDNAD consists of both demographic sample data and the numerical DNA profile. Records on the NDNAD are held for both the individuals; ones sampled under the Police and Criminal Evidence Act 1984 (PACE) i.e. Volunteer’s and the unsolved crime-stains left at a crime scene. In January 2006, the Home Office released a report on the police National DNA Database (the NDNAD). The report claims that the DNA Expansion Programme, which began in 2000, has been a major success.

10.4.1 THE POLICE AND CRIMINAL EVIDENCE ACT, 1984 (PACE)

The Police and Criminal Evidence Act, 1984 (PACE), an Act of Parliament defines the powers of police officers in England and Wales to combat crime, as well as providing codes of practice for the exercise of those powers. The aim of PACE has always been to establish a balance between the powers of the police and the rights of members of the public. Although PACE is a fairly wide ranging piece of legislation, it mainly deals with police powers to search an individual or premises, including their powers to gain entry to those premises, the handling of exhibits seized from those searches, and the treatment of suspects once they are in custody, including being interviewed. Specific legislation as to more wide ranging conduct of a criminal investigation is contained within the Criminal Procedures and Investigation Act 1996. PACE sets out the circumstances in which samples can be taken from a suspect for use in connection with the investigation of an offence, termed as evidentiary samples. It also distinguishes between intimate samples and non-intimate samples.

On submission of a new profile to NDNAD, records are automatically searched for match between individuals and unsolved crime-stain profile records; and

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21 Available at http://en.wikipedia.org/wiki/United_Kingdom_National_DNA_Database . (Last visited on December, 22, 2013)
23 Ibid.
25 Section 65 of PACE defines the same. An intimate sample is generally referred to a biological sample obtained from a source such as blood, semen, tissue fluid, urine, public hair, dental impression, swab taken from the genitals, but other than the mouth (saliva) and head (hair).
26 A non-intimate sample would include the sample that is not intimate i.e. sample of saliva, hair.
unsolved crime-stain to unsolved crime-stain profile records to find linkage if any. Match if any, is reported directly to the police force, which submits the sample for analysis. NDNAD is widely acknowledged as an intelligence tool, for its ability to aid in the solving of crimes, both past and present. However, its rapid growth in size in recent years has been controversial because there are only few jurisdictions that allow the permanent retention of DNA from people who have not been convicted of any offence.\(^\text{27}\)

The latest innovative intelligence approach brought forward by the Forensic Science Service is in the use of familial searching. This is a process that may be carried out in relation to unsolved crime-stains whereby a suspects DNA may not be held on the NDNAD, but that of a close relative is. This method identifies potential relatives by identifying DNA profiles held on the NDNAD that are similar. Again many matches may be produced which may be restricted by demographic data. However, this technique raises new privacy concerns because it could lead to the identifying cases of non-paternity by police.\(^\text{28}\)

**10.4.2 CRIMINAL JUSTICE AND PUBLIC ORDER ACT, 1994: (CJPOA)**

The CJPOA made several changes in PACE for extending the circumstances in which the samples could be taken from a person for the purpose of DNA profiling. Section 2 of the act provides that CJPOA applies to proceedings before the Service Civilian Court; or Summary Appeal Court; or Court Martial; and the Court Martial Appeal Court. Further, Part IV of the Act, Sections 54 to 59 deals with the powers of the police to take body samples. Section 54 deals with the power to take intimate body samples and Section 55 deals with the powers to take non intimate samples. It allowed taking of intimate samples from a person in detention with his consent by a officer at-least of the rank of the superintendent, when there are reasonable grounds of believing that the person is suspected to have committed a recordable offence. Recordable offences represent majority of crimes that police investigate and that may result in the


\(^{28}\) Ibid
custodial detention. Prior to this amendment, the intimate samples could only be taken in serious arrest-able offences. The non intimate samples can be taken without consent from the person in custody either on the direction of the Court or through a police officer not below the rank of the superintendent, if, that person is suspected to have committed an recordable offense, or has been charged with a recordable offence or there are reasons that it may be involved in recordable offence. Such samples are called as ‘Criminal Justice’ or ‘CJ’ samples.

The persons whose samples are been taken have to be informed that the samples would be used for a speculative search. In case the sample which is taken doesn’t yield any result due to any reason, then there is provision for taking the second sample. Also, it has to be made sure by the investigation agencies that after the profiles have been obtained then the remaining samples have to be destroyed in-case the suspect was prosecuted or acquitted? However, the destruction of such samples as stated above was done away with the CJPOA, 2001, and now they could be retained provided the samples were obtained or extracted lawfully at the first instance. This expansion raised many privacy issues which, were challenged in the Courts subsequently. One of such cases is R. v. S. and Marper, in which the appellants contended that retention of their DNA profiles infringed their rights under Articles 8 and 14 of the ECHR however, all the three hearings were dismissed. More amendments in the said act are suggested keeping in mind the changed scenario’s and is currently before the parliament in the form of Criminal Justice Bill.

Initially in England and Wales, only samples from convicted criminals, or people awaiting trial, were recorded. The Criminal Justice and Police Act, 2001 changed this to allow DNA to be retained from people charged with an offence, even if they were subsequently acquitted. The Criminal Justice Act, 2003 later allowed DNA to be taken on arrest, rather than on charge. Since April 2004, when this law came into force, anyone arrested in England and Wales on suspicion of involvement in any recordable offence (all except the most minor offences) has their DNA sample

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30 Saliva, swabs from the mouth and hair with roots are re-classified as non-intimate samples. Generally mouth samples constitute majority of samples taken as ‘CJ’ samples.

31 2004 UKHL 39 House of Lords (Appelate Committee).
taken and stored in the Database, whether or not they are subsequently charged or convicted. This has led to increase in number of samples on the database. To quote, In 2005-06, 45,000 crimes were matched against records on the DNA Database; including 422 homicides (murders and manslaughters) and 645 rapes.\(^\text{32}\) However, there is nothing on record to conclude that by keeping large numbers of profiles/samples of innocent people on the Database have increased the likelihood of solving a crime using DNA.\(^\text{33}\) In Scotland, only samples from convicted criminals, or people awaiting trial, are recorded, although a new law will allow the DNA from people charged with a serious sexual or violent offence to be kept for up to five years after acquittal. Similarly, In Isle of Man Samples collected by the Isle of Man Constabulary’s Scientific Support Department from crime scenes are sent to the United Kingdom for testing against the Database. Samples from suspects are also added to the Database, but are removed if the suspect is not convicted of the crime\(^\text{34}\).

**10.4.3 HOUSE OFFICE REPORT (2000-2005)**

In England and Wales, changes in the law evolved that allowed the police to routinely take DNA without consent from anyone arrested in connection with any recordable offence following DNA expansion programme. Not only this, it involves permanent retention of profiles with access to the companies those analyze them even if a person is not charged subsequently or is acquitted.\(^\text{35}\) However, these changes have been controversial because of the privacy concerns concerning human rights\(^\text{36}\).

As per the house office report though, expansion in DNA database has been a success but statistical reports suggest that including innocent profiles on the database has no visible effect on the increase of detection/conviction rate. Rather DNA profiles

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\(^{32}\) Available at http://en.wikipedia.org/wiki/National_DNA_Database .(Last visited on December, 22,2013)  
\(^{33}\) Available at http://www.genewatch.org/ uploads/f 03c6d66a9b354535738483c1c3d49e4/ DNA expansion_brief_final.pdf .(Last visited on December, 22,2013)  
\(^{34}\) Ibid  
\(^{36}\) For e.g. the issue of taking fingerprints and a DNA sample was involved in a case decided at the High Court on March 23, 2006. A teacher who was accused of assault won the right to have her DNA sample and fingerprints destroyed as they had been taken whilst she was in custody, but after the decision that she was not to be charged. She was released expeditiously and after her release, her continued detention to obtain samples was unlawful, and thus the samples were taken “without appropriate authority” being post decision of discharge however, if the samples would have been taken prior to decision, it would have been lawful and retained as normal.
or samples from the unidentified crime scene samples or samples of the persons who re-offend help in detection of crime. The debate about the DNA Expansion Programme therefore involves an important discussion about how to balance the benefits of the Database in tackling crime “vis-a-vis” the threats to civil liberties. An informed debate requires an understanding of the role of the Database and the contribution of the permanent retention of DNA profiles and DNA samples from individuals for detecting and preventing crime.

The DNA evidence is a powerful investigative tool, able to incriminate as well as exculpate. Yet, increasingly common portrayals of DNA as being able to solve crimes almost instantaneously, beyond any doubt, even from ‘beyond the grave’, may overstate the degree to which DNA currently assists in criminal investigations. Despite this, DNA evidence remains marginal in terms of assisting the overall criminal detections. Experts now even suggest that the massive National DNA Database expansion has not resulted in the improvement in detection rates originally anticipated. Rather it is anticipated that too much reliance on DNA results may lead to “tunnel vision” in criminal investigations.

10.5 POSITION IN UNITED STATES

10.5.1 CODIS DATABASE

CODIS, The Combined DNA Index System, is a DNA database of United States funded by the United States Federal Bureau of Investigation (FBI). CODIS is a computer network that connects forensic DNA laboratories at the local, State, and national levels. DNA Database systems that use CODIS contain two main criminal indexes and a missing person’s index. CODIS is an index of pointers to assist US public crime laboratories to compare and exchange DNA profiles. In addition, it

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37 Available at http://www.genewatch.org/uploads/f_03c6d66a9b354535738483c1c3d49e4/ DNA expansion_brief_final.pdf (Last visited on December, 22, 2013)
38 Ibid
39 The Federal Bureau of Investigation (FBI) is an agency of the United States Department of Justice that serves as both a federal criminal investigative body and an internal intelligence agency (counterintelligence). The FBI has investigative jurisdiction over violations of more than 200 categories of federal crime. Its motto is an acronym of FBI, “Fidelity, Bravery, and Integrity”. The FBI's headquarters, the J. Edgar Hoover Building, is located in Washington, D.C. Fifty-six field offices are located in major cities throughout the United States as well as over 400 resident agencies in smaller cities and towns across the country. More than 50 international offices called “legal attachés” are in U.S. embassies worldwide.
provides a central Database of the DNA profiles from all user laboratories. A weekly search is conducted of the DNA profiles in this national Database, known as the National DNA Index System (NDIS), and resulting matches are automatically returned by the software to the laboratory that originally submitted the DNA profile. A record in the CODIS database, known as a CODIS DNA profile, consists of an individual's DNA profile, together with the sample's identifier and an identifier of the laboratory responsible for the profile. CODIS is not a criminal history database, like the National Crime Information Center (NCIC), and does not contain any personal identity information, such as names, dates of birth, and social security numbers 40.

Convicted offender Databases store potential suspect DNA profiles, against which DNA profiles developed from crime scene evidence can be compared. Given the recidivist nature of many crimes, a likelihood exists that the investigated individual who committed the crime may also had been convicted of a similar crime and has his DNA profile on a Database that can be searched through CODIS, the Combined DNA Index System. Moreover, CODIS also permits the cross-comparison of DNA profiles developed from biological evidence found at crime scenes. Even if a perpetrator is not identified through the Database, crimes may be linked to each other, thereby aiding an investigation, which may eventually lead to the identification of a suspect. 41 Advancements in DNA technology, together with computer technology and the Combined DNA Index System (CODIS), have created a powerful crime fighting tool for law enforcement.

When a DNA profile is developed from crime scene evidence, and entered into the forensic index of CODIS (index prepared from the samples of other crime scenes), the Database software searches thousands of convicted offender DNA profiles using profiles of individuals convicted of offenses such as rape and murder (The offender index). Similar to the Automated Fingerprint Identification System (AFIS), CODIS can aid investigations by efficiently comparing a DNA profile generated from biological evidence left at a crime scene against convicted offender DNA profiles and forensic evidence from other cases contained in CODIS. CODIS can also aid investigations by searching the missing person’s index, which contains DNA profiles

40 Available at [http://www.DNA.gov-solving-crimes/cold-cases/howDatabasesaid/](http://www.DNA.gov-solving-crimes/cold-cases/howDatabasesaid/) (Last visited on December, 22, 2013)
41 Ibid
41 Ibid
of unidentified remains and DNA profiles of relatives of those who are missing. Because of the relativistic nature of violent offenders, the power of a DNA Database system is evident not only in the success of solving crimes previously thought unsolvable, but perhaps more importantly, help in the prevention of crime. Properly documented, collected, and stored, biological evidence can be analyzed to produce a reliable DNA profile years, after it was collected. Just as evidence collected from a crime that occurred yesterday can be analyzed for DNA, today evidence from an old rape kit, bloody shirt, or stained bedclothes may also contain a valuable DNA profile that can be analyzed.

The first U.S. DNA Database was created in 1989. Although State and local DNA Databases established in the early 1990s contained only DNA profiles from convicted murderers and sex offenders, the undeniable success of DNA Databases has resulted in a national trend toward Database expansion. All States require at least some convicted offenders to provide a DNA sample to be collected for DNA profiling and, in 2000, the Federal Government began requiring certain offenders convicted of Federal or military crimes to also provide a DNA sample for the criminal DNA Database. Recognizing that the effectiveness of the DNA Database relies on the volume of data contained in both the forensic index (crime scene samples) and the convicted offender index of CODIS, many States are changing their Database statutes to include less violent criminals too. Many States are enacting legislation to require all convicted felons to submit a DNA profile to the State Database. The tendency for States to include all convicted felons in their Databases dramatically increases the number of convicted offender DNA profiles against which forensic DNA evidence can be compared, thus making the Database system a more powerful tool for law enforcement. New legal approaches to DNA technology and DNA Databases have encouraged the development of new approaches to old cases. One such approach is the filing of charges by “John Doe” warrant. These warrants are based on the unique DNA profile obtained post analysis of unsolved crime scene evidence. Although John Doe warrants are traditionally filed based on the physical description or alias of an unnamed suspect, but investigators and prosecutors are now filing charges using the

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42 Ibid
43 Ibid.; A John Doe warrant is a warrant for the apprehension of a person whose true name is unknown. Generally, this kind of warrants are void because the violate the constitutional provision which requires that warrants of arrests should particularly describe the person or persons to be arrested. But if there is sufficient description to identify the person to be arrested, the warrant is valid.
suspects DNA profile as the identifier. This innovative approach has allowed charges to be filed that toll and permit old cases to be prosecuted when the person matching the John Doe DNA profile is identified. John Doe DNA warrants are one way to permit cases to remain active, allowing them the chance to be solved through the DNA Database in the future.\textsuperscript{44}

 Originally, CODIS consisted of the Convicted Offender Index and the Forensic Index, but in recent years, the Arrestee Index, the Missing or Unidentified Persons Index, and the Missing Persons Reference Index have been added. The Convicted Offender Index contains profiles of individuals convicted of crimes. State law governs which specific crimes are eligible for CODIS. (All 50 states have passed DNA legislation authorizing the collection of DNA profiles from convicted offenders for submission to CODIS.) The Forensic Index contains profiles developed from biological material found at crime-scenes.\textsuperscript{45}

 CODIS has a matching algorithm that searches the various indexes against one another according to strict rules that protect personal privacy. For solving rapes and homicides, for example, CODIS searches the Forensic Index against itself and against the Offender Index. A Forensic to Forensic match provides an investigative lead that connects two or more previously unlinked cases. A Forensic to Offender match actually provides a suspect for an otherwise unsolved case. It is important to note that the CODIS matching algorithm only produces a list of candidate matches. Each candidate match is confirmed or refuted by a Qualified DNA Analyst. (To become Qualified, a DNA Analyst must meet specific education and experience requirements and undergo semi-annual proficiency tests administered by a third party.\textsuperscript{46})

 CODIS databases exist at the local, state, and national levels. This tiered architecture allows crime laboratories to control their own data—each laboratory decides which profiles it will share with the rest of the country. As of 2006, approximately 180 laboratories in all 50 states participate in CODIS. At the national level, the National DNA Index System, or NDIS, is operated by the FBI at an undisclosed location.\textsuperscript{47}

\textsuperscript{44} Ibid
\textsuperscript{45} Ibid
\textsuperscript{46} Ibid
\textsuperscript{47} Ibid
The current CODIS software is designed for the storage and searching of short tandem repeat (STR) profiles. The same version of the software is used by all participating laboratories at the local, state, and federal levels. Although the main version of CODIS is for handling STR results, a separate version exists for the entry and searching of mitochondrial DNA (mt DNA) profiles. The four primary functions of the current CODIS software are:

- DNA profile entry and management: the function dealing with the Database DNA profiles.
- Searching: the function allowing a search of Database DNA profiles.
- Match management: the function managing search results. For example, it allows a laboratory to record and distinguish whether a particular match is an offender hit or a forensic hit, and whether the match is within or outside of the state.
- Statistical calculations: the function enabling laboratory personnel to calculate profile statistics, based on the laboratory’s or FBI’s population frequency data.

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48 Available at http://www.DNA.gov/DNA-Databases/levels/ (Last visited on December, 22, 2013)
49 Available at http://www.DNA.gov/DNA-Databases/codis (Last visited on December, 22, 2013)
A weekly search is conducted of all DNA profiles in the National DNA Index System (NDIS), and resulting profile matches are automatically returned to laboratories that submitted them. This communication between CODIS laboratories and NDIS is accomplished via the FBI’s Criminal Justice Information Service-Wide Area Network (CJIS-WAN). The CJIS-WAN is a secure Internet that allows data transmission between computers on the closed network. All communications between a state laboratory’s CODIS software and NDIS, as well as communications between CODIS software in different states, are conducted via the CJIS-WAN. A CODIS Web site is maintained by the FBI on the CJIS-WAN, accessible only to CODIS laboratories. The website contains such information as summaries of state DNA Database laws, nationwide DNA hit counts, and NDIS information. The FBI provides CODIS software to all public forensic laboratories at no cost. However, the cost of the computer hardware and all support software is the laboratory’s responsibility. Upgrades and technical support of the software is also provided free to all laboratories. Copies of CODIS software provided to some foreign countries are stand-alone copies not connected to the CODIS network in the United States.

DNA Database hits were very rare events until the late 1990s. A combination of the maturity of CODIS software, adoption of STR technology, and availability of funding, has resulted in a significant increase in the number of hits. There have been tens of thousands of DNA Database offender hits resulting from searches at the state and local levels. They included hits between states, linking unsolved forensic profiles to convicted offenders from other states, or to forensic cases from other states. DNA Database searches have provided breaks in numerous high profile rape and homicide cases. This demonstrates the effectiveness of such searches in providing investigative leads in unsolved cases.

The National DNA Index (NDIS) contains over 9,878,881 offender profiles and 380,702 forensic profiles as of June, 2011. Ultimately, the success of the CODIS program will be measured by the crimes it helps to solve. CODIS primary metric, the “Investigation Aided”, tracks the number of criminal investigations where CODIS has

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50 Available at http://www.nfstc.org/pdi/subject10/pdi-s10-moz-01.html (Last visited on March 22, 2014)
51 Available at http://www.DNA.gov/DNA-Databases/codis (Last visited on March 22, 2014)
52 Ibid
added value to the investigative process. As of June, 2011, CODIS has produced over 147,200 hits assisting in more than 141,300 investigations.  

10.5.2 INNOCENCE PROTECTION ACT

The Innocence Protection Act is part of the Advancing Justice Through DNA Technology Act of 2003, and is a United States Government initiative to utilize DNA and forensic evidence to prove the innocence of those wrongly convicted of a crime. The bill was introduced to eliminate the substantial backlog of DNA samples collected from crime scenes and convicted offenders, to improve and expand the DNA testing capacity of Federal, State, and local crime laboratories, to increase research and development of new DNA testing technologies, to develop new training programs regarding the collection and use of DNA evidence, to provide post-conviction testing of DNA evidence to exonerate the innocent, to improve the performance of counsel in State capital cases, and for other purposes. It extends the DNA Databases by providing funds to analyze samples in backlog and sets guidelines for the use of DNA testing post conviction for those who maintain their innocence. It allows convicted individuals access to DNA evidence in order to demonstrate their innocence. Numerous people convicted of crimes, including some on death row, have been exonerated based on DNA evidence that either wasn’t available or did not exist as an admissible Courtroom technology at their time of conviction.

10.5.3 MICROCHIP DNA PROFILING DEVICES

The US Department of Justice is currently funding a number of research projects to develop portable microchip DNA profiling devices to be used in the field. Reservoirs for PCR amplification primers, reaction chambers and capillary electrophoresis channels have been manufactured onto the surface of microchips. PCR amplification and STR analysis of a small DNA sample can be achieved on the microchips in a matter of minutes as opposed to the hours that current PCR STR analysis systems take.

10.6 POSITION IN AUSTRALIA

54 Ibid  
55 Ibid  
57 Ibid  
In 2001, CrimTrac\(^{59}\) a common wealth agency, established the National Criminal Investigation DNA Database (NCIDD). The NCIDD was established to assist law enforcement agencies across Australia to compare DNA profiles from crime scenes with DNA profiles from convicted offenders to either identify or eliminate them as potential suspects in other crimes; compare DNA profiles from suspects with profiles from unsolved crime scenes where legislation allows; eliminate persons from crime scene investigations; identify missing persons, unknown deceased persons and disaster victims; and provide police investigators with intelligence\(^{60}\).

The Database contains profiles from samples collected at crime scenes, from convicted offenders, suspects and unidentified bodies. In some circumstances, DNA profiles from volunteers may be compared with other profiles on the Database. Australian police may use DNA evidence when investigating cases. A sample is collected from a suspect or charged person (depending on state or territory law), from where DNA is extracted to fetch DNA profile which, is compared against DNA from the crime scene. DNA evidence has been used to find criminals in serious offences such as sexual assault, armed robbery, murder, and for solving many high volume crimes such as burglary. Just as, DNA has also clearly established the innocence of many people who might otherwise be suspects for a crime, the Database is also used to assist identification of deceased or missing persons\(^{61}\).

The National Criminal Investigation DNA Database (NCIDD) is the first Australian DNA Database that automates the destruction of profiles on the Database to meet legislative and privacy requirements. Profiles are removed from the NCIDD when destruction dates are specified. No trace of the DNA profile(s) or associated matches remain, except for a record of the destruction date within audit logs. The DNA markers held on the NCIDD have been specifically chosen for forensic use because they do not reveal any details about age, ethnicity, race, appearance or medical conditions. Researchers are not able to link a DNA profile to an individual’s medical history or conditions. They are derived from nine points of non-coding or ‘junk’ DNA and a sex determinant. Data security is of primary importance in ensuring

\(^{59}\) Available at http://www.crimtrac.gov.au/systems_projects/NationalCriminal
Investigation DNA Database.html (Last visited on February, 11, 2014)

\(^{60}\) Ibid

\(^{61}\) Ibid
the protection of personal privacy. The NCIDD was designed to incorporate best practice IT security. All activities on the NCIDD are logged including any modification or deletion of data. In addition to logging changes, the system requires two authorized users to confirm changes before they are implemented. The principal activity of users on the Database itself is also logged to ensure full audit/traceability of user operations to satisfy the Commonwealth Privacy Act 1988. Data is viewed via a web browser on PCs located in each jurisdictional forensic laboratory. All users of the Database must be authorized by their jurisdiction before access is granted. Each user must log in with a password before gaining access and users are logged out after a set period of inactivity. Passwords are maintained by Crim Trac. Only authorized users within each jurisdiction are able to access the records within the NCIDD. Information on specific records can only be obtained from the jurisdiction which owns the information and inquiries relating to records held on the NCIDD are directed to the appropriate jurisdictional officer. The period of time for which the NCIDD information is kept differs among the jurisdictions. This information can be found within the relevant jurisdictional legislation\(^{62}\).

The NCIDD uses the following categories for DNA profiles namely crime scene; offenders; suspects; missing persons; volunteers (limited purpose); volunteers (unlimited purpose), and unknown deceased persons. The information on the NCIDD is entered by the authorized users from the laboratory that processed the sample from which the DNA profile was obtained. The contributing jurisdiction identifies each of its NCIDD records by a unique number and also controls other information related to the DNA profile. CrimTrac itself does not enter data into the NCIDD. The NCIDD was deliberately designed to ensure that it is unable to identify individuals through the data held within the Database. The NCIDD cannot identify any individual from the information it holds. It does not contain any fields that are normally referred to as identity details such as names, addresses, dates of birth; or personal markings (tattoos, scars, eye colour, height, or weight\(^{63}\)).

**10.6.1 Crimes Act, 1914\(^{64}\):**

\(^{62}\) Ibid
\(^{63}\) Ibid
The Crimes Act, 1914 is a piece of Federal legislation in Australia. Part 1D of the act provides for forensic procedures to be carried out on suspects for federal indictable offenses, federal offenders for prescribed and serious offences, and on volunteers. The Part also provides for the matching of DNA profiles on a DNA Database system, offences in relation to profiles on the DNA Database system, the protection of information stored in the DNA Database system, and the destruction of forensic material.65

10.6.2 CRIMES (FORENSIC PROCEDURES ACT), 200066

This was an Act to make provision with respect to the powers to carry out forensic procedures on certain persons, and to make provision with respect to a DNA Database system; to make a related amendment to the Justices Act 1902 and consequential amendments to the Crimes Act 1914; and for other purposes. As per Section 3 (3) a sample which will be taken from a person would include a sample taken from the person that consists of matter from another person’s body. Similarly, Section 3 (5) defines what destroying forensic material would include. Destroying forensic material for the purposes of this Act means that a person who is required to destroy forensic material is required not only to destroy the material but also to ensure that any information that relates any such DNA profile derived from that material to a person whose DNA it describes is removed from the DNA Database system. Further, Section 58 dealing with samples and is reproduced as under67:

(1) This Section applies to a sample taken from a suspect under this Act if there is sufficient material to be analyzed both in the investigation of the offence and on behalf of the suspect

(2) The investigating police officer concerned must ensure that:

(a) A part of the material sufficient for analysis is made available to the suspect as soon as practicable after the procedure has been carried out, and

(b) Reasonable care is taken to ensure that the suspect part of the material is

65 Ibid
67 Ibid
protected and preserved until the suspect receives it, and

(c) Reasonable assistance is given to the suspect to ensure that the material is protected and preserved until it can be analyzed.

10.6.3 CRIMES (FORENSIC PROCEDURES ACT) AMENDMENT ACT, 2009 OF 11168

This is an Act to amend the Crimes (Forensic Procedures) Act, 2000 to make further provision with respect to the carrying out of forensic procedures and the use of forensic material and DNA profiles; and for other purposes. It amends Section 3 (5) of the original act of 2000 and removes the word ‘such’ from the definition of destroying forensic material69.

10.7 POSITION IN CANADA

The Canadian police community had, for some time, called for the creation of a DNA data bank to assist police investigations. The government responded by assenting to the DNA Identification Act on December 10, 1998.70 This legislation allowed a DNA data bank to be created and amended the Criminal Code to provide a mechanism for a judge to order persons convicted of designated offences to provide blood, buccal or hair samples from which DNA profiles will be derived. The legislation became official on June 30, 2000. The use of forensic DNA analysis in solving crime is proving to be as revolutionary as the introduction of fingerprint evidence in Court has been more than a century ago. Remarkably, Canadian police have been using forensic DNA evidence for little more than a decade, yet it has emerged as one of the most powerful tools available to law enforcement agencies for the administration of justice. DNA analysis is the next generation of human identification in the science of police investigations and is considered a major enhancement for the safety of all Canadians.71

The National DNA Data Bank respects considerations of genetic privacy and follows strict guidelines as specified in the DNA Identification Act. The biological

69 Ibid
70 Available at http://www.nddb-bndg.org/main_e.htm (Last visited on february, 11, 2014)
71 Available at www.rcmp-grc.gc.ca/nddb-bndg/index-accueil-eng.htm (Last visited on february, 11, 2014)
samples collected from convicted offenders and the resulting DNA profiles can only be used for law enforcement purposes. The National DNA Data Bank contributes to the administration of justice and the safety of Canadians by ensuring that those who commit serious crimes are identified more quickly across all police jurisdictions in Canada while innocent people are eliminated from suspicion. It assists law enforcement agencies in solving crimes by Linking crimes together where there are no suspects; Helping to identify suspects; Eliminating suspects where there is no match between crime scene DNA and a DNA profile in the National DNA Data Bank; and, Determining whether a serial offender is involved.\textsuperscript{72}

Section 9(1) of the DNA Identification Act, provides that information in the convicted offenders index is to be kept indefinitely.\textsuperscript{73} Section 9(2) however provides for the removal of information from the convicted offenders index if the person’s conviction is set aside or if the person is subsequently acquitted of the offence. If a person’s profile was entered into the convicted offenders’ index and that person is subsequently granted a pardon then the Act stipulates that his or her profile may not be used for forensic DNA analysis (Section 9(8) of the Act). With regard to children, the Act provides that information may be kept on the convicted offenders’ register, but must be removed when the record relating to the same offence is required to be destroyed, sealed or transmitted to the National Archivist of Canada under Part 6 of the Youth Criminal Justice Act. Samples may only be used for forensic DNA analysis and may only be used for comparing offender profiles with crime scene profiles. The Act provides for the retroactive collection of profiles. In \textit{R v Rodgers} (2006),\textsuperscript{74} the Supreme Court of Canada upheld the legality of the DNA Database, including the retroactive collection of profiles. The Court held that “DNA sampling is no more part of the arsenal of sanctions to which an accused may be liable in respect of a particular offence than the taking of a photograph or fingerprints. The fact that the DNA order may have a deterrent effect on the offender does not make it a punishment.”\textsuperscript{75}

The birth of “DNA forensic identification” in Canada began with the tragic sudden death of fifteen-year-old girl, in the cold clear evening of November 21, 1983.

\textsuperscript{72} Ibid \\
\textsuperscript{73} Ibid \\
\textsuperscript{74} Ibid \\
\textsuperscript{75} Ibid
The location was “Black Pad”, a lonely footpath that divides the cemetery from the local psychiatric hospital in the British village of Narborough in Leicestershire. As the morning frost lifted, a hospital porter hurrying to work noted through the high wrought-iron fence, the pale lifeless body described initially as a partially clothed mannequin. Officially, listed as death by asphyxia due to strangulation, the brutal rape and murder of this teenager was different. The murderer had left his genetic calling card in the seminal stains found on the clothing and the body. The revolution of forensic DNA typing had begun and the use of serological or protein sub typing of biological tissues was ending.76

To date, several thousands of DNA samples from convicted offenders have been processed and added to the National DNA Data Bank, along with samples received from various crime scenes across the country. Thousands of police officers from every province and territory in Canada have been trained to collect DNA samples that are then forwarded to the National DNA Data Bank for analysis. The National DNA Data Bank is a shining example of the increasing importance of science and technology in modern law enforcement. Our complex, globalized world has created a whole new set of challenges for police. To stay ahead of the criminals, we must make better use of cutting edge science, such as forensic DNA. An idea that first surfaced more than a decade ago, the National DNA Data Bank has overcome major scientific and legislative hurdles along the way. One by one, each challenge has been met successfully. The final product is a forensic tool providing key evidence in criminal cases that have exonerated the innocent and brought suspected offenders before the Courts77.

The aim of the National DNA Data Bank is to provide an unprecedented investigative tool that will allow police to link crime scenes across jurisdictions and help in apprehending serial and repeat offenders. As well, it can help to focus an investigation by eliminating suspects whose DNA profile is already in the Data Bank, and can eliminate those wrongly suspected. By narrowing the field of suspects and linking crimes early in the investigation or helping to identify suspects, the Data Bank is expected to reduce the length and cost of many investigations. By providing greater certainty in the identity of suspects, it has the potential to reduce the length - and

76 Available at https://www.privacyinternational.org/article/canadian-supreme-court-upholds-DNA-Data-bank (Last visited on February 11, 2014)
77 Ibid
therefore the cost - of trial and to increase the likelihood of conviction.\textsuperscript{78}

Every effort is made by National Data-bank to balance a suspect’s right to privacy with the need for police officers to collect evidence. In accordance with the DNA Identification Act, the RCMP has imposed strict procedures governing the handling of DNA profiles and biological samples to ensure that privacy interests are protected. Information collected by the National DNA Data Bank will be used strictly for law enforcement purposes. All other uses including medical research are strictly prohibited and punishable by law. The National DNA Data Bank has strict controls on the handling of samples and the information derived from them. Procedures have been developed which separates the genetic information (DNA profiles and sample card) from the personal information\textsuperscript{79}

\textbf{10.8 POSITION IN NEW ZEALAND}

A national DNA Database is a government Database of DNA profiles which can be used by law enforcement agencies to identify suspects of crimes. The second one was set up in New Zealand It first raised the issue of DNA testing in 1978 when the New Zealand criminal law reform committee published a report on bodily examination and samples as a means of identification\textsuperscript{80}. At that time, the recommendation of testing criminal suspects was met with heavy resistance. During the next several years, the controversial report all but disappeared from the public conscience. In the late 80’s, however, a private bill was introduced that proposed many of the same recommendation. After remaining dormant for few years, New Zealand Minister of Justice announced government support for DNA testing and a national Data-bank.\textsuperscript{81} In 1995, New Zealand became the second country in the world to collect and store DNA profiles in a Data-bank. Since then, forensic scientists and police have used the National DNA Data-bank to solve thousands of crimes. The National DNA Data-bank is run by Environmental Science and Research (ESR) on behalf of the New Zealand police, who collect the DNA samples. There are currently over 70,000 DNA profiles in the National DNA Data-bank. The Data-bank includes

\textsuperscript{78} Available at https://www.privacyinternational.org/article/canadian-supreme-Court-upholds-DNA-Data-bank (Last visited on february,21, 2014)
\textsuperscript{79} Ibid
\textsuperscript{80} Ibid
DNA from three categories namely Suspects in criminal investigations who have volunteered a DNA sample; People convicted of certain offences who must provide a DNA sample; and Anyone who has volunteered a DNA sample for the Data-bank.

The Criminal Investigations (Blood Samples) Act was passed in 1995 and went into affect in 1996. Under the Act, DNA samples from persons convicted of certain offenses, volunteers, and suspects are included in a national Data-bank. Over 11,000 samples have been entered in the Data-bank since its inception, and officials estimate that approximately three hundred samples are added each month. Starting in 1998 the Data-bank began to search for comparisons between the individual samples and unsolved crime scene samples. Currently, approximately thirty percent of the crime scene samples match an individual sample present on the Database. In addition, about twenty percent of the unsolved crimes match samples from other crimes on the Database.

Information in the Database is protected by the Criminal Investigations (Bodily Samples) Act, 1995. Only the police and ESR scientists are allowed access to this information for legitimate purposes. The National DNA Data-bank can be used to compare the profiles of samples taken from a crime scene with people on the Database, and to compare samples taken from different crime scenes. So far, ESR has been able to match 58% of the DNA profiles from unsolved crimes to individuals profiled on the DNA Database. They have also found that 34% of the DNA samples from unsolved crimes match samples from other crimes. This was a vital tool in identifying Maureen McKinnel’s murderer 16 years after her death.

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83 Ibid
84 Available at https://www.esr.cri.nz/features/databank/index.html (Last visited on February, 11, 2014)
85 Ibid
86 Ibid
87 Ibid
88 Ibid
89 Available at www.nzherald.co.nz/nz/news/article.cfm (Last visited on February, 11, 2014) and www.wikipedia.org/wiki/road_knights (Last visited on February, 11, 2014). In this case in the year 1987, on the boxing day, 38-year old Maureen McKinnel was strangled to death in her home in the quiet town of Arrowtown. Four days later, her body was discovered on the bank of the Arrow River. Around 500 people were investigated, but no suspects could be convincingly linked to the crime. Maureen had scratched her attacker and traces of his skin and blood were collected from under her fingernails. In 2001, these samples revealed information they had been keeping secret for 14 years: and police was successful in getting a DNA profile of her killer - they just needed to match it to a
In New Zealand, too the Government is currently proposing expansion of the criminal DNA Database. A new law will allow police to collect DNA data at the same time they take fingerprints from people they intend to charge and match it against profiles from unsolved crimes. Previously New Zealand police could only take DNA samples after conviction or obtain an order from a High Court judge. Until now, DNA could be taken only with consent, or where there were judicially-approved suspect orders or police-issued compulsion orders, and only after conviction. This law will enable police to take full advantage of this modern-day fingerprint in order to solve cold cases and there is no doubt that it will be a critical tool in the fight against violent crime. “Police have also developed guidelines to avoid any arbitrary or unreasonable application of this power. This tool would be doing as much for those who are innocent as for those who are found guilty of a crime”. The DNA Data-bank holds about 110,000 profiles and is expected to increase by 4000 each year. However, Privacy Commissioner Marie Shroff is calling on the government to create an independent oversight body to monitor New Zealand’s DNA Data-bank following Computerization’s revelations of a security breach. He recommended an independent oversight body be set up to ensure that the interests of individuals in such a state-run scheme are balanced and protected.

10.9 POSITION IN CHINA

Ever since the 1997 rape and murder of Democratic Progressive Party official Peng Wan-ju, sex crimes have become a central issue for the public in China. According to an analysis conducted by sociologists, approximately 10,000 sexual assaults are reported each year in Taiwan. In 1995, 624 people were prosecuted for sex crimes but only 216 were convicted. Sociologists claim that the low conviction rate is due to the difficulty of gathering appropriate evidence in such cases. Given
these troubling statistics, China was ripe to pass a law in early 1999 that allows the Ministry of Justice and the Ministry of the Interior to establish a DNA Data-bank.  

Under the law, convicted and suspected sex offenders would be asked to provide voluntary blood samples. If they refuse, a prosecutor may force them to provide samples via a subpoena. The legislation allows the DNA samples to be kept for at least ten years. In addition, written and photographic documentation of the DNA records may be retained until ten years after the death of the person who provided the sample.

A similar proposal in southern China that would allow the formation of a DNA Database, however, has encountered more resistance. Under the proposal, people suspected of committing crimes with a jail term of five or more years would be required to submit a non-intimate sample. The Database also would include samples from criminals convicted of serious offenses. In addition, the draft law allows people to volunteer to submit a DNA sample to eliminate themselves from suspicion for specific crimes.

Proponents of the law argue that the draft law is too restrictive because it would require judicial authorization or consent in order to force a sample from a suspect. They claim that this will cause a tremendous backlog in the Courts. On the other side of the debate, some argue that inclusion of convicts’ samples is unfair to ex-convicts who are supposed to have paid their debt to society. In addition, others argue that the law should not allow for the inclusion of voluntary samples. They claim that this is a tactic to collect samples from society as a whole. Although the samples would be voluntary, many maintain that this would shift the burden of proof

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96 Ibid.
98 Ibid.
99 Ibid.
100 Ibid.
101 Ibid.
102 Ibid.
103 Ibid.
104 Ibid.
105 Ibid.
106 Ibid.
107 Ibid.
onto the public to prove their own innocence. In addition, the Privacy Commissioner for Personal Data is closely reviewing the proposed legislation to ensure that it does not conflict with the Personal Data (Privacy) Ordinance.

10.10 POSITION IN EUROPE

In Sweden, only the DNA profiles of criminals who have spent more than two years in prison are stored. In Norway and Germany, Court orders are required, and are only available, respectively, for serious offenders and for those convicted of certain offences and who are likely to offender. Forty-nine states in the USA, all apart from Idaho, store DNA profiles of violent offenders, and a few also store profiles of suspects. In 2005, the incoming Portuguese government proposed to introduce a DNA Database of the entire population of Portugal. However after informed debate including opinion from the Portuguese Ethics Council, the Database introduced was of just the criminal population.

10.10 POSITION IN INDIA

In India, presently there is no legislation that provides for retention for DNA evidence in DNA Data-bank in particular. However, CCMB Hyderabad has created a DNA bank for carrying out Genetic Diversity Study of Indian population. DNA Analysis is being done on case by case basis based on the request by police. Author of the book, Guide to DNA, Tests in paternity determination and criminal identification, Mr. Abhijeet Sharma has posed a question to the Hon’ble President of India which was answered by the official site wherein it was answered that for the creation of DNA Data-bank, there is a dire need of a new enactment. There is absolutely no doubt about the fact that the other countries like U.K; U.S.A, Australia, New Zealand and many others have well developed DNA Data-banks and the legislation to safeguard not only the interests of victims but also the suspects. Those legislative enactments

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108 Ibid.
110 Ibid
112 Available at http://www.newropeans-magazine.org/index (Last visited on february,11, 2014)
also describe the procedure adopted while sampling, its testing, and its destruction. India while drafting the legislation can definitely take help from those experiences, keep in mind the drawbacks and the loopholes and while considering the scenario in India can draft a full fledged legislation\textsuperscript{115}.

The FBI has a DNA index system. The UK has a similar Database and if Parliament passes the DNA Profiling Bill, 2007, India will soon join the league, creating a national DNA Database that will help police arrest serial offenders and give a boost to forensic investigation”. The bill, drafted and sent to all ministries and departments for their feedback, has been modified. The final version has been sent to the law ministry, which has sent it to the legal department for final drafting”, says Dr. J Gowrishankar, head of Laboratory of Bacterial Genetics and director, Centre for DNA Fingerprinting and Diagnostics (CDFD), which has been piloting the bill. “We are hoping it will be submitted to the cabinet in a few weeks”. Six regional laboratories - to be established in Kolkata, Chandigarh, Hyderabad, Bhopal, Pune and Guwahati - will facilitate the exchange and comparison of forensic DNA profiles created from evidence gathered from crime investigations and convicts. The move to create the Database is part of the 11th Plan and has a financial outlay of Rs 42.6 crore.\textsuperscript{116}

Nehru Nagar would be the first region in country to have DNA profiling database following the serial rape and murder of three minors. The data will be used to cross-match the DNA samples of suspected criminals during investigations, especially in serious offences. The development assumes significance since Parliament is considering to introduce a DNA Profiling Bill - aimed at regulating all DNA laboratories in the country with the formation of National and State databases

Officials at the Directorate of Forensic Laboratory in Kalina said around 800 people from Kurla belonging to all age groups have so far been subjected to DNA tests in connection with the rape and murder cases of the minors. The incidents, which took place between May and August, put tremendous pressure on the police to nab the culprits. The cases helped us build a huge data base of all the anti-social elements and

\textsuperscript{115} \textit{Ibid}

\textsuperscript{116} “India may soon have a DNA Database to Crack Crime”, \textit{Times of India}, September 15, 2010, available at http://articles.timesofindia.indiatimes.com/2010 (Last visited on feburary,11, 2014)
other people from the area. DNA tests were conducted on suspected criminals. It led to the arrest of Javed Sheikh, 19, who worked as television cable executive in the area. He allegedly raped and murdered an eight-year-old girl - the third such incident in Nehru Nagar. The earlier cases still remain unsolved\textsuperscript{117}.

A PIL filed by a Haryana-based doctor Shamsher Malik pointed out that over 37,000 people die without their identity ever being found out and the methods and procedures adopted for their identification becomes a futile exercise, leaving their kin in darkness about them.\textsuperscript{118} The Court had issued a notice on November 16, 2009 to the Centre after Malik’s counsel had argued that DNA profiling is the best available technique to reach the family members in case of unidentified bodies. The petitioner argued that the DNA profiling technique can be used in cases of identification of an individual with the help of previously preserved sample of material evidence or by matching the profile with close relatives”. It can be used in identification of criminals from the biological material evidence at the site of crime. It has been used with certainty in cases of disputed maternity/paternity. But this technique can be of grand success with regard to identification of unidentified bodies by matching the profiles with close relatives”, the petition said. While submitting that reasons behind identifying unidentified bodies are numerous which involve humanitarian, social and judicial elements, the Hissar-based doctor had provided the data for three years received from National Crime Records Bureau (NCRB) to buttress the need for DNA profiling. The Supreme Court then asked the Government to explore the possibility of empowering the magisterial Courts to order DNA profiling of unidentified bodies which could be effectively used for detecting the family members of such persons\textsuperscript{119}.

\section*{10.11 FAMILIAL SEARCHING}

Familial searching is an additional search of DNA Database conducted after no profile matches are identified during a routine search. Unlike a routine Database search that may spontaneously yield partial match profiles, familial searching is a deliberate search of a DNA Database conducted for the intended purpose of

\begin{thebibliography}{99}
\bibitem{117} Ibid
\bibitem{119} Ibid
\end{thebibliography}
potentially identifying close biological relatives to the unknown forensic profile obtained from crime scene evidence. Familial searching is based on the concept that first-order relatives, such as siblings or parents, will have more genetic data in common than unrelated individuals. Practically speaking, familial searching would only be performed if the comparison of the forensic DNA profile with the known offender/arrestee DNA profiles has not identified any matches to any of the offenders/arrestees. Familial searching is often confused with what occurs when a partial match results from the routine search of the DNA Database. A partial match is the spontaneous product of a regular Database search where a candidate offender profile is identified as not being identical to the forensic profile, but because of a similarity in the number of alleles shared between the two profiles, the offender may be a close biological relative of the source of the forensic profile. Familial searching is now being performed in several jurisdictions in United States, however, United Kingdom has the most experience of conducting familial searching of their National DNA Database. Since 2003, the UK has conducted approximately 200 familial searches, resulting in investigative information used to help solve approximately 40 serious crimes (as of May, 2011). The United Kingdom has developed detailed protocols for familial searches that include an approval process, considerations for priorities, research of family history, and training of law enforcement officers. One of the key components responsible for the effectiveness of the United Kingdom’s system is that the search is not based upon genetics alone. Age and more importantly, geographic locations—are combined with the genetic data to produce a ranked list of potential relatives of the unknown forensic profile.

10.12 SUMMARIZED

The utility of DNA profiling would increase manifold if we have storage of information in form of DNA data-banks and DNA data-bases, as it is done for traditional fingerprinting. Presently, in India we don’t have any data-bank or a

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120 Available at http://www.fbi.gov/about-us/lab/codis/familial-searching (Last visited on February 11, 2014)
121 Ibid
database. Though other countries across the globe has a systematic wide arrangement for the same. This probably is one reason why in India, we don't apply probability laws during DNA analysis. Another drawback is, here in India we compare the crime scene sample to the sample of alleged victim suspect or police suspect. But, in cases where the crime is blind, we have no mode to find suspect from the crime scene sample. Only the profiles of unidentified bodies are processed and saved for legal purposes. Interestingly, the number of police samples received for DNA analysis is much less than the samples received for DNA profiling of unidentified bodies. For instance, as per statistical information from DNA profiling wing, Madhuban, at Karnal, Haryana, in year 2012, 2013 and 2014, 200 samples each year were received through police. However more than 500 samples each year were received for profiling of unidentified bodies. DNA profiling bill, 2012, is awaiting nod from both the houses of legislature. But, the core question to be decided would be who should be chosen for retention. In case of fingerprinting, only convicts are suppose to give the fingerprints before they are lodged in the jail premises. However, empirical studies disclose that accused of major and minor felonies both along with convicts should tender their sample for retention in data-banks or databases. DNA profiling bill, 2012, is littered with significant and striking human and ethical issues, so, it must be checked thoroughly by a committee organizing of legal experts, forensic experts and police officials. So, if the unique technique can aid in inculpating or exculpating the suspects, why not use to find them as well. Not only this, it will save precious time of investigation team; lead investigation in right direction and prevent unnecessary detention of an innocent. Also, it will help to reduce arbitrariness on the part of police officials. U.S President Barrack Obama desired to have everyones profile on the DNA data-base, however, studies done in the human rights field suggest that retention of everyones profile would have no effect on conviction rate, but, certainly may cause inconvenience to general public. Retention of innocent peoples samples and profiles lead to tunnel vision and can raise many privacy concerns in light of new technique “familial searching”.