Rethinking DNA Profiling in India

ELONNAI HICKOK


DNA profile databases can be useful tools in solving crime, but given that the DNA profile of a person can reveal very personal information about the individual, including medical history, family history and so on, a more comprehensive legislation regulating the collection, use, analysis and storage of DNA samples needs included in the draft Human DNA Profiling Bill.

DNA evidence was first accepted by the courts in India in 1985, and in 2005 the Criminal Code of Procedure was amended to allow for medical practitioners, after authorisation from a police officer who is not below the rank of sub-inspector, to examine a person arrested on the charge of committing an offence and with reasonable grounds that an examination of the individual will bring to light evidence regarding the offence. This can include

"the examination of blood, blood stains, semen, swabs in case of sexual offences, sputum and sweat, hair samples, and finger nail clippings, by the use of modern and scientific techniques including DNA profiling and such other tests which the registered medical practitioner thinks necessary in a particular case".

Though this provision establishes that authorisation is needed for collection of DNA samples, defines who can collect samples, creates permitted circumstances for collection, and lists material that can be collected, among other things, it does not address how the collected DNA evidence should be handled, and what will happen to the evidence after it is collected and analysed. These gaps in the provision indicate the need for a more comprehensive legislation regulating the collection, use, analysis and storage of DNA samples, including for crime-related purposes in India.

The initiative to draft a Bill regulating the use of DNA samples for crime-related reasons began in 2003, when the Department of Biotechnology (DoB) established a committee known as the DNA Profiling Advisory Committee to make recommendations for the drafting of the DNA profiling Bill 2006, which eventually became the Human DNA Profiling Bill 2007. The 2007 draft Bill was prepared by the DoB along with the Centre for DNA Fingerprinting and Diagnostics (CDFD). The CDFD is an autonomous institution supported by the DoB. In addition to the CDFD, there are multiple Central Forensic Science
Laboratories in India under the control of the Ministry of Home Affairs and the Central Bureau of Investigation, along with a number of private labs which analyse DNA samples for crime-related purposes.

In 2007, the draft Human DNA Profiling Bill was made public, but was never introduced in Parliament. In February 2012, a new version of the Bill was leaked. If passed, the Bill will establish state-level DNA databases which will feed into a national-level DNA database, and proposes to regulate the use of DNA for the purposes of

"enhancing protection of people in the society and the administration of justice".2

The Bill will also establish a DNA Profiling Board responsible for 24 functions, including specifying the list of instances for human DNA profiling and the sources of collection, enumerating guidelines for storage and destruction of biological samples, and laying down standards and procedures for establishment and functioning of DNA laboratories and DNA Data Banks. The lack of harmonisation and clear policy indicates that there is a need in India for standardising the collection and use of DNA samples. Although DNA evidence can be useful for solving crimes, the current 2012 draft Bill is missing critical safeguards and technical standards essential to preventing the misuse of DNA and protecting individual rights.

Concerns that have been raised with regards to the Bill are both intrinsic, including problems with effectiveness of achieving the set objectives, and extrinsic, including concerns with the fundamental principles of the Bill. For example, the use of DNA material as evidence and the subsequent creation of a DNA database can be useful for solving crimes when the database contains DNA profiles from DNA samples only from crime scenes, and is restricted to DNA profiles from individuals who might be repeat offenders. If a wide range of DNA profiles are added to the database, the effectiveness of the database decreases, and the likelihood of a false match increases as the ability to correctly identify a criminal depends on the number of crime scene DNA profiles on the database, and the number of false matches that occur is proportional to the number of comparisons made (more comparisons = more false matches). This inverse relationship between the effectiveness of the DNA database and the size of the database was found in the UK when it was proven that the expansion of the UK DNA database did not help to solve more crimes, despite millions of profiles being added to the database.

The current scope of the draft 2012 Bill is not limited to crimes for which samples can be taken and placed in the database. Instead the Bill creates indexes within every databank including: crime scene indexes, suspects index, offender's index, missing persons index,
unknown deceased persons’ index, volunteers’ index, and such other DNA indices as may be specified by regulations made by the Board.\textsuperscript{13} How independent each of these indices are, is unclear. For example, the Bill does not specify when a profile is searched for in the database – if all indices are searched, or if only the relevant indices are searched, and the Bill requires that when a DNA profile is added to the databank, it must be compared with all the existing profiles.\textsuperscript{14} The Bill also lists a range of offences for which DNA profiling will be applicable and DNA samples collected, and used for the identification of the perpetrator including, unnatural offences, individual identification, issues relating to assisted reproductive technologies, adultery, outraging the modesty of women etc.\textsuperscript{15} Though the Bill is not incorrect in its list of offences where DNA profiling could be applicable, it is unclear if DNA profiles from all the listed offenses will be stored on the database. If it is the case that the DNA profiles will be stored, it would make the scope of the database too broad.

Unlike other types of identifiers, such as fingerprints, DNA can reveal very personal information about an individual, including medical history, family history and location.\textsuperscript{16} Thus, having a DNA database with a broad scope and adding more DNA profiles onto a database, increases the potential for misuse of information stored on the database, because there is more opportunity for profiling, tracking of individuals, and access to private data. In its current form, the Bill protects against such misuse to a certain extent by limiting the information that will be stored with a DNA profile and in the indices,\textsuperscript{12} but the Bill does not make it clear if the DNA profiles of individuals convicted for a crime will be stored and searched independently from other profiles. Additionally, though the Bill limits the use of DNA profiles and DNA samples to identification of perpetrators\textsuperscript{10}, it allows for DNA profiles/DNA samples and related information related to be shared for creation and maintenance of a population statistics database that is to be used, as prescribed, for the purpose of identification research, protocol development, or quality control provided that it does not contain any personally identifiable information and does not violate ethical norms.\textsuperscript{12}

An indication of the possibility of how a DNA database could be misused in India can be seen in the CDFD’s stated objectives, where it lists "to create DNA marker databases of different caste populations of India."\textsuperscript{24} CDFD appears to be collecting this data by requiring caste and origin of state to be filled in on the identification form that is submitted with any DNA sample.\textsuperscript{24} Though an argument could be made that this information could be used for research purposes, there appears to be no framework over the use of this information and this objective. Is the information stored along with the DNA sample? Is it used in criminal cases? Is it revealed during court cases or at other points of time?

Similarly, in the Report of the Working Group for the Eleventh Five Year Plan, it lists the following as a possible use of DNA profiling technology:
"Human population analysis with a view to elicit profiling of different caste populations of India to use them in forensic DNA fingerprinting and develop DNA databases."  

This objective is based on the assumption that caste is an immutable genetic trait and seems to ignore the fact that individuals change their caste and that caste is not uniformly passed on in marriage. Furthermore, using caste for forensic purposes and to develop DNA databases could far too easily be abused and result in the profiling of individuals, and identification errors. For example, in 2011 the UK police, in an attempt to catch the night stalker Delroy Grant, used DNA to (incorrectly) predict that he originated from the Winward Islands. The police then used mass DNA screenings of black men. The police initially eliminated Delroy Grant as a suspect because another Delroy Grant was on the DNA database, and the real Delroy Grant was eventually caught when the police pursued more traditional forms of investigation.

Other uses for DNA databases and DNA samples in India have been envisioned over the years. For example, in 2010 the state of Tamil Nadu sought to amend the Prisoners Identification Act 1920 to allow for the establishment of a prisoners’ DNA database – which would require that any prisoner’s DNA be collected and stored. In another example, the home page of BioAxis DNA Research Centre (P) Limited, a private DNA laboratory offering forensic services states, "In a country like India which is densely populated there is huge requirement for these type of databases which may help in stopping different types of fraud like Ration card fraud, Voter ID Card fraud, Driving license fraud etc. The database may help the Indian police to differentiate the criminals and non criminals." Not only is this statement incorrect in stating that a DNA database will differentiate between criminals and non-criminals, but DNA evidence is not useful in stopping ration card fraud etc. as it would require that DNA be extracted and authenticated for every instance of service. In 2012, the Department of Forensic Medicine and Toxicology at AFMC Pune proposed to establish a DNA data bank containing profiles of armed forces personnel. And in Uttar Pradesh, the government ordered mandatory sampling for DNA fingerprinting of dead bodies. These examples raise important questions about the scope of use, collection and storage of DNA profiles in databases that the Bill is silent on.

The assumption in the Bill that DNA evidence is infallible is another point of contention. The preamble of the Bill states that, "DNA analysis of body substances is a powerful technology that makes it possible to determine whether the source of origin of one body substance is identical to that of another, and further to establish the biological relationship, if any, between two individuals, living or dead with any doubt." This statement ignores the possibility of false matches, cross-contamination, and laboratory error as DNA evidence is
only as infallible as the humans collecting, analysing, and marshalling the evidence. These mistakes are not purely speculative, as cases that have relied on DNA as evidence in India demonstrate that the reliability of DNA evidence is questionable due to collection, analysis, and chain of custody errors. For example, in the Aarushi murder case the forensic expert who testified failed to remember which samples were collected at the scene of the crime; in the French diplomat rape case, the DNA report came out with both negative and positive results; and in the Abhishek rape case the DNA sample had to be reanalysed after initial analysis did not prove conclusive. Yet the Bill does not mandate a set of best practices that could help in minimising these errors, such as defining what profiling system will be used nationally, and defining specific security measures that must be taken by DNA laboratories - all of which are currently left to be determined by the DNA board.

The assumption in the preamble that DNA can establish if a relationship exists between two individuals without a doubt is also misleading as it implies that the use of DNA samples and the creation of a database will increase the conviction rate, when in actuality the exact number of accurate convictions resulting purely from DNA evidence is unknown, as is the number of innocent people who are falsely accused of a crime based on DNA evidence in India. This misconception is reflected on the website of the Department of Biotechnology’s information page for CDFD where it states:

"...The DNA fingerprinting service, given the fact that it has been shown to bring about dramatic increase in the conviction rate, will continue to be in much demand. With the crime burden on the society increasing, more and more requests for DNA fingerprinting are naturally anticipated. For example, starting from just a few cases of DNA fingerprinting per month, CDFD is now handling similar number of cases every day."}

In addition to the claim that the DNA fingerprinting service has shown a dramatic increase in the conviction rate, is not supported by evidence in this article, according to the CDFD 2010-2011 annual report, the centre analysed DNA from 57 cases of deceased persons, 40 maternity/paternity cases, four rape and murder cases, eight sexual assault cases, and three kidney transplantation cases. This is in comparison to the 2006 – 2007 annual report, which quoted 83 paternity/maternity dispute cases, 68 identification of deceased, 11 cases of sexual assault, eight cases of murder, and two cases of wildlife poaching. From the numbers quoted in the CDFD annual report, it appears that paternity/maternity cases and identification of the deceased are the most frequent types of cases using DNA evidence.

Other concerns with the Bill include access controls to the database and rights of the individual. For example, the Bill does not require that a court order be issued for access to a
DNA profile, and instead leaves it in the hand of the DNA bank manager to determine if communication of information relating to a match to a court, tribunal, law enforcement agency, or DNA laboratory is appropriate. Additionally, the Data Bank Manager is empowered to grant access to any information on the database to any person or class of persons that he/she considers appropriate for the purposes of proper operation and maintenance or for training purposes. The low standards for access that are found in the Bill are worrisome as the possibility for tampering of evidence and analysis is increased.

The Bill is also missing important provisions that would be necessary to protect the rights of the individual. For example, individuals are not permitted a private cause of action for the unlawful collection, use, or retention of DNA, and individuals do not have the right to access their own information stored on the database. These are significant gaps in the proposed legislation as it restricts the rights of the individual.

In conclusion, India could benefit from having a legislation regulating, standardising, and harmonising the use, collection, analysis, and retention of DNA samples for crime-related purposes. The current 2012 draft of the Bill is a step in the right direction, and an improvement from the 2007 DNA Profiling Bill. The 2012 draft draws upon best practices from the US and Canada, but could also benefit from drawing upon best practices from countries like Scotland. Safeguards missing from the current draft that would strengthen the Bill include: limiting the scope of the DNA database to include only samples from a crime scene for serious crimes and not minor offenses, requiring the destruction of DNA samples once a DNA profile is created, clearly defining when a court order is needed to collect DNA samples, defining when consent is required and is not required from the individual for a DNA sample to be taken, and ensuring that the individual has a right of appeal.


4 Chhibber, M. Govt Crawling on DNA Profiling Bill, CBI urges it to hurry, cites China. The Indian Express. July 12 2010. Available at:

6 For example: International Forensic Sciences, DNA Labs India (DLI), Truth Labs and Bio-Axis DNA Research Centre (P) Limited

7 Draft Human DNA Profiling Bill 2012. Introduction

8 Id. section 12(a-z)

9 Id. Definition l. “DNA Profile” means results of analysis of a DNA sample with respect to human identification.

10 Id. Definition m. “DNA sample” means biological specimen of any nature that is utilized to conduct CAN analysis, collected in such manner as specified in Part II of the Schedule.

11 The UK DNA database and the European Court of Human Rights: Lessons India can learn from UK mistakes. PowerPoint Presentation. Dr. Helen Wallace, Genewatch UK. September 2012.


13 Draft Human DNA Profiling Bill 2012. Section 32 (4(a-g))

14 Id. Section 35

15 Id. Schedule: List of applicable instances of Human DNA Profiling and Sources of Collection of Samples for DNA Test.

17 Draft Human DNA Profiling Bill 2012. Section 32 (5)-(6)(a)-(b)). Indices will only contain DNA identification records and analysis prepared by the laboratory and approved by the DNA Board, while profiles in the offenders index will contain only the identity of the person, and other profiles will contain only the case reference number.

18 Id. Section 39

19 Id. Section 40(c)


21 Caste and origin of state is a field of information that is required to be completed when an ‘identification form’ is sent to the CDFD along with a DNA sample for analysis. Form available at: http://www.cdfd.org.in/servicespages/dnafingerprinting.html


Draft DNA Human Profiling Bill 2012. Introduction


37 Draft Human DNA Profiling Bill 2012. Section 35

38 Id. Section 41.