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# Legal, Ethical and Economic Challenges of DNA Profiling in India

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**Abstract:** DNA profiling refers to the process of creating a profile of a person generated by using their DNA. The use of DNA evidence in criminal investigations and court proceedings is governed by statutes and case law. To ensure ethical and legal use of the DNA database that does not infringe on people's rights, freedoms, and privacy, it is crucial to enact appropriate laws and supporting legal practices. This study considers legal issues including autonomy and privacy, self-incrimination, retention guidelines, and a variety of safeguards to protect data from tampering, loss, and unauthorized disclosure. Paper includes a cost-benefit analysis of the technology, considering the potential economic benefits such as crime reduction, healthcare improvements, and market growth in the sector versus the financial burden on the state and individuals. As DNA databases expand around the globe, there is a continuing need for policy debate and open discussions that address not only legal and ethical considerations but also the economic impacts to ensure a balanced approach to DNA profiling.

**Keywords-:** *Ethic, Legal, Law, DNA Profiling, DNA database.*

## Introduction

Since the invention of DNA Fingerprinting Technology in 1985, the utilization of DNA as evidence in legal processes has become prevalent in establishing the identification of individuals, encompassing both criminal justice administration and the resolution of civil problems, such as parentage testing. Except for identical twins, every cell in a person's body has DNA, the genetic code that makes each person unique. DNA analysis has developed into a highly effective forensic tool due to its uniqueness and improvements in molecular procedures. The area of forensics has undergone a revolution because to a very sophisticated and scientific method of DNA analysis known as DNA typing, profiling, or finger printing, which was developed by Sir Alec Jeffrey in 1984.

In recent times, there has been a growing consensus among experts regarding the acceptability of DNA as evidence, with a focus some of the key aspects. It is crucial to adhere to established protocols and approved procedures for the collection, labeling, and packaging of genetic samples, as well as maintaining a clear chain of custody, conducting laboratory analyses, and accurately reporting findings. Also, the process of DNA typing should be carried out with effectiveness and reproducibility, while adhering to scientifically and legally accepted standards. Lastly, it is imperative to ensure that the application of DNA profiling does not violate the principles of the Common Law Doctrine of Natural Justice in relation to its impact on individuals.

Although India does not have special legislation pertaining to DNA, the Code of Criminal Procedure, 1973 (Cr PC) includes provisions in sections 53 and 54 that allow for the utilization of DNA tests. These tests are widely employed in the resolution of intricate criminal cases. Section 53 pertains to the examination of the accused by a medical practitioner, upon the request of a police officer, on the condition that there exist reasonable grounds to think that such an examination will provide evidence regarding the commission of the offense. Section 54 of the Code of Criminal Procedure (Cr PC) additionally stipulates the provision for the evaluation of the detained individual by a duly registered medical practitioner, upon the request of the arrested party. The Cr PC underwent an amendment in 2005 through the Amendment Act, which included the addition of section 53-A. This new provision requires the mandatory examination of those accused of rape by a medical practitioner. This amendment expands the scope of DNA evidence to encompass the analysis of various biological substances, such as blood, blood stains, semen, sputum, swabs, sweat, hair samples, and finger nails, through the application of contemporary methodologies. These techniques, including DNA profiling and other relevant tests, are deemed essential in investigating sexual offenses, as determined on a case-by-case basis.

In the United States, the admissibility of scientific evidence, including evidence obtained by DNA identification analysis, is contingent upon meeting the criteria established by the jurisdiction in which the trial takes place. Typically, courts

employ one of two tests. The Frye test, was established by the US Circuit Court for the District of Columbia in the landmark case *Frye v. United States*. This test is widely employed in a majority of jurisdictions.

National DNA databases have developed over the years into very effective tools for criminal investigations, offering details on unknown people in an effort to identify the perpetrator of a crime. Although the public initially supported the criminal DNA database in large numbers, a considerable expansion of the database that allowed for the retention of a sizable number of innocent people's records caused great controversy. DNA databases, which were first created for sexual assault casework, have now been expanded to include all criminals because it has been found that repeat offenders conduct the bulk of crimes. A DNA database's usefulness lies in its ability to connect crimes or offenders who are not directly connected to a given case and to stop the same people from committing new crimes.

In 1995, the UK National DNA database became the first forensic DNA database to be established worldwide. While in the US, The DNA Identification Act of 1994, enacted in the United States, provided the legal framework for the establishment of the national DNA database known as the Combined DNA Index System (CODIS). This initiative was officially launched by the Federal Bureau of Investigation (FBI) in 1997. The CODIS program facilitates the comparison of DNA profiles at many levels, including national, state, and municipal, in compliance with applicable legal regulations.

In India, the collection of diverse biological and physical samples was previously authorized under the Code of Criminal Procedure, 1973 and the former Identification of Prisoners Act, 1920. The recently implemented Criminal Procedure (Identification) Act of 2022 aims to gather what it refers to as 'measurements' from specific groups of individuals. This legislation permits the processing, storage, preservation, dissemination, and destruction of these measurements, with the explicit objective of facilitating identification and investigation in criminal cases, as well as preventing criminal activities. In its pursuit of its objective, the Act revokes the Identification of Prisoners Act, 1920, while still engaging with the provisions of the Code of Criminal Procedure, 1973 that remain applicable. If the DNA Technology (Use and Application) Regulation Bill, 2019 is enacted, it will also have implications for the Act.

This article presents a thorough examination of the acceptability of DNA profiling in the context of India. It explores the implications of considering DNA as 'evidence' within the judicial system, considering the prevailing civil and criminal laws, legal regulations, and evolving ethical and societal perspectives worldwide. The study highlights the imperative for meticulous creation of DNA laws and legislation in India and beyond.

**Legal Challenges Of Dna Profiling**

The field of genetic science is widely acknowledged as a very reliable and trustworthy source of information, particularly in matters pertaining to human identity. Consequently, DNA profiling, often known as 'fingerprinting,' is progressively employed for the purpose of human identification inside the judicial proceedings of numerous nations. Forensic DNA technology is employed for the examination of DNA profiles, often derived from samples of human DNA. The collection of these samples may be conducted either at the locations where the crimes occurred or from the individuals who are either suspected of or have been affected by the crimes. Subsequently, DNA profiles, which refer to the analyzed outcomes derived from the acquired DNA samples, are juxtaposed with preexisting profiles kept inside the DNA database for the purpose of identifying corresponding matches. The utilization of DNA samples and profiles in forensic contexts has significantly bolstered the efficacy of both civil and criminal investigations. This procedure has already demonstrated its worth as an invaluable instrument in expediting legal proceedings and ensuring the administration of justice.

The Criminal Procedure (Identification) Act, 2022 has been recently passed by the Parliament in India. This legislation aims to grant authorization for the collecting, storage, processing, and transmission of sensitive data, including but not limited to fingerprints, retinal scans, and biological samples. The Act serves as a replacement for the previously existing Identification of Prisoners Act of 1920.The user's text is too short to be rewritten academically. There is a prevailing argument that the Act has the effect of broadening the scope of permissible data collection, extending the range of individuals from whose data can be acquired, and expanding the authority responsible for authorizing such collection.

***Human Rights and Privacy Issues***

Numerous concerns have been expressed regarding the use of DNA databases for forensic purposes, mostly focusing on the acquisition, storage, accessibility, and utilization of DNA samples that serve as the foundation for DNA profiles. A large number of forensic DNA databases store DNA samples obtained from individuals who have been acquitted following the conclusion of legal proceedings, cases where charges were dropped or not pursued, or instances where the samples belong to individuals who were excluded from investigation based on the same sample.

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***Retention of DNA Profiles***

Cellular or DNA samples are preserved with the intention of potential future validation of a profile, rectification of errors, quality control (as observed in CODIS), resolution of eventual disputes, and facilitation of further research endeavors. The indefinite keeping of DNA samples and profiles presents significant concerns regarding the protection of personal and societal privacy. Privacy violations can manifest in two distinct manners. One method involves the infringement of an individual's physical integrity, specifically pertaining to their genetic privacy, in order to acquire a sample of their DNA. Another method involves gaining access to databases that may include far larger amounts of personal, sensitive, and intricate data. The acquisition of knowledge pertaining to an individual's life through the analysis of DNA samples is an unprecedented milestone in the annals of scientific and technological advancements. This development engenders significant inquiries over the safeguarding of human rights and privacy.

***Issues Relating to Informed Consent***

Another interrelated concern pertaining to the authority of law enforcement agencies is the matter of informed consent among individuals who supply samples, whether they are innocent volunteers, suspects, or individuals who have been accused. The acquisition and utilization of DNA samples in the investigation procedure, particularly when obtained without agreement or through coercion from suspects, also engenders concerns over the safeguarding of individuals' private rights. According to the domestic legislation in the United Kingdom, in cases where an individual is apprehended in relation to a 'recordable' offense, the police possess the authority to collect fingerprints and biological samples at their discretion, without requiring the consent of the individual.

In India, obtaining of samples does not necessitate obtaining consent. According to Sections 53, 53A, 54, and 311A, investigative agencies are prohibited from retaining the acquired samples beyond the duration of the inquiry or incorporating them into a database. As a customary procedure, criminal courts issue directives for the disposal of collected samples subsequent to the conclusion of the trial and the rendering of the judgement. Also, under the DNA Technology (Use and Regulation) Bill, 2019, it is necessary to obtain consent from individuals who have been arrested, with the exception of those who have been detained for crimes that carry the penalty of death or offenses that are punishable by imprisonment for a period exceeding seven years. In the event that consent is declined, the investigating authorities have the option to apply to the Magistrate. If the Magistrate is convinced that there is "reasonable cause" to suspect that the body substance could provide evidence either supporting or refuting the individual's involvement in the offense, they may grant an order for its collection.

***Familial Searching***

The act of gathering DNA samples from immediate family members, including offspring, in order to identify a potential perpetrator introduces an additional concern pertaining to human rights and privacy. Law enforcement authorities frequently employ a technique known as "familial searching" in order to facilitate the resolution of criminal cases. The investigative advantages of employing familial searching are readily apparent. However, it is important to acknowledge the potential for unanticipated genetic connections to be unveiled by this method, which raises legitimate issues. For instance, the data obtained through the utilization of the 'familial search' technique may uncover that several individuals inside the database exhibit familial relationships among themselves, as well as with the unidentified perpetrator of the criminal act. Furthermore, it is imperative to acknowledge the presence of a broader cultural concern for the preservation and advancement of intact and thriving family structures. The preservation of family integrity and privacy is a fundamental tenet of human rights principles. Consequently, the involvement of family members in an inquiry, particularly when a relative (either genetically or socially connected) is implicated, is anticipated to have significant social, cultural, and physical consequences for the affected family.

***Religion and Caste Based Profiling***

As previously mentioned, the utilization of DNA extends beyond the realm of criminal investigation. The individual's unique identifier possesses the potential to inadvertently disclose very sensitive and confidential personal information without any restrictions or safeguards in place. For example, the availability of such sensitive information could be exploited to target individuals on the basis of their caste and religion, as certain caste or religious affiliations may be erroneously linked to criminal or illicit actions.

When examining the historical oppression experienced by different socioeconomic groups, it is imperative for the legislation to consider the socio-political dynamics prevalent in Indian culture. The crime data demonstrates that some

marginalized populations, such as vulnerable groups and religious minorities based on gender, have been disproportionately incarcerated in criminal instances. Although conviction rates have exhibited a persistent decline, it is noteworthy that the majority of individuals apprehended may be attributed to a just three distinct communities.

**Ethical Concerns And Challenges Of Dna Profiling**

The practice of DNA analysis is accompanied by a number of ethical problems. Minimizing the likelihood of misuse that may be detrimental to the welfare of the general public is of paramount importance. The practice of DNA tests is authorized by specific legislation that establishes the statutory grounds for its implementation. Several crucial factors, such as examination standards, laboratory accreditation, and expert qualifications, directly impact the trustworthiness of the evidence. The advent of technical advancements has given rise to certain phenomena, namely the manipulation and unauthorized acquisition of DNA. DNA theft has been officially classified as a criminal offense in the United Kingdom. The ability to differentiate between authentic and intentionally manipulated DNA samples is not possible using a DNA profile. The establishment of a stringent set of guidelines for the handling of DNA is important in order to prevent its misuse and ensure the protection of privacy, as the existence of a DNA databank poses potential risks to personal privacy. The presence of caution is crucial, as it has the potential to result in the miscarriage of justice.

The DNA Profiling Bill of 2019 also includes measures pertaining to the formation of a databank. The Indian government has been engaged in the process of formulating a bill pertaining to the practice of DNA since 2003. The draft framework received repeated criticism due to its inadequate addressing of privacy concerns. The DNA Technology (Use and Application) Regulation Bill 2019 was approved by the Lok Sabha, the lower house of the Indian Parliament, in 2019. Currently, the bill is awaiting consideration in the Rajya Sabha, the upper house. This legislation will establish the legal framework for the utilization of DNA profiling in the identification of victims, perpetrators, missing individuals, and unidentified deceased individuals. The proposed legislation encompasses 10 distinct sections that outline various aspects related to the DNA Regulatory Board, financial support for its functioning, the creation of a DNA databank, processes for accreditation, and the structure of a DNA laboratory. The measure additionally outlines the procedures for safeguarding the genetic information of individuals, as well as the consequences for any unauthorized disclosure or improper utilization of said data. The proposed legislation aims to enhance the legal framework for DNA profiling in India, hence bolstering its future trajectory.

**Conclusion And Suggestions**

DNA profiling and databases offer law enforcement organizations a potent instrument that has the potential to significantly transform the global justice delivery system. The increasing progress in DNA technology may enhance the significance of such databases. The utilization of advanced technology in the analysis of DNA samples has the potential to provide a substantial amount of information pertaining to an individual. The criminal justice system has widely recognized and embraced the utilization of DNA technology since its inception. This observation highlights that while DNA profiling is known for its accuracy, it is not devoid of potential fallibility. It is imperative to exercise caution and discernment when considering the admission of DNA as evidentiary material. DNA technology is accompanied by a multitude of ethical concerns, which provide significant obstacles. There is a recognized necessity for increased public understanding regarding the appropriate utilization of DNA evidence within the criminal justice system. Ensuring a harmonious equilibrium between individual rights and technological advancements is of paramount significance. Upon examining the legal frameworks of various nations, it becomes apparent that all governments have established laws with the intention of ensuring justice by safeguarding fundamental rights and minimizing the occurrence of wrongful convictions. The legal framework has placed significant emphasis on establishing standardized procedures in order to assure the reliability of DNA evidence. The assessment of evidence's authenticity is contingent upon two critical factors: accreditation and the qualifications of the expert.

***Suggestions***

Following are some of the suggestions according to the authors which should be taken care of while enacting a DNA specific legislation in India-:

- Establishing comprehensive guidelines and conditions pertaining to the collection, retention, and utilization of biological samples for DNA profiling purposes within the realm of law enforcement. These guidelines will be specifically tailored to address the diverse sources of DNA samples and profiles, encompassing individuals who have been arrested, suspected, convicted, victimized, juveniles, or those with mental illness.

- Elucidating the precise technical requirements that must be satisfied prior to integrating DNA profiles, specifically those that are partial or mixed, into the database.
- Establishing the duration for retaining biological samples and DNA data, contingent upon the nature and severity of the associated crime.
- Establishing protocols for the disposal of biological samples and DNA profiles.
- Determining the procedures for the exchange of data, which includes determining what data are communicated, to whom such data are sent, and how the data are protected.
- Laying down transparency and safety measures into the law, rather than putting them in bylaws, which are easy to change. This would stop or at least make it less likely that the database would be misused or abused.

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