
FROM IDENTIFICATION TO SURVEILLANCE: DNA PROFILING, GENETIC DATA AND THE CONSTITUTIONAL LIMITS OF INDIA'S CRIMINAL PROCEDURE (IDENTIFICATION) ACT, 2022

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ABSTRACT

DNA profiling is the most discriminating identification tool in criminal justice, yet the databases built around it can turn evidence into a permanent biological record of people never convicted. This paper examines that shift from identification to surveillance and tests India's response against the *Puttaswamy* standard. It explains what a DNA profile is and is not, traces how databases, familial searching, forensic genetic genealogy and consumer genomics extend State reach, and analyses the Criminal Procedure (Identification) Act, 2022 (CrPIA) and its interaction with the Digital Personal Data Protection Act, 2023 (DPDP Act), with the United Kingdom and the United States as benchmarks. It argues that the CrPIA contains real but partial safeguards, leaves retention, destruction and secondary use of genome-bearing material under-constrained, and, through the DPDP Act's investigative exemption, produces a regime in which commercial genetic data is better protected than State-held data. It closes with targeted legislative reforms.

Keywords: DNA profiling; genetic surveillance; right to privacy; proportionality; Criminal Procedure (Identification) Act 2022; DPDP Act 2023.

Introduction

DNA profiling generates a numerical signature from a biological sample that is, for practical purposes, unique to an individual. *Genetic surveillance*, as used here, is the State's collection, retention, comparison, exchange and reuse of such signatures within the criminal justice system, increasingly in cooperation with private actors. A profile used in one prosecution is evidence, the same profile stored in a national database, searched repeatedly, matched to relatives and compared against commercial genealogy databases becomes a lasting biological record of a person who may never have been convicted.¹

The question is not whether DNA profiling works but whether the institutions around it protect privacy, proportionality and dignity. India is a revealing case: its constitutional protection of privacy is among the strongest in the world, yet it has no dedicated DNA statute, and its first general statute authorizing compelled biological sampling, the CrPIA, leaves key questions open. The paper seeks (i) whether DNA databases in criminal cases affect privacy (ii) whether India's framework adequately regulates genetic surveillance (iii) how India, the UK and the US differ; and (iv) what safeguards are needed. It hypothesizes that databases interfere with privacy where safeguards are absent, that India's framework is fragmented and does not fully protect against misuse, retention or unauthorized access, and that comparison identifies workable safeguards.

Scope and method. The study is doctrinal, analytical and comparative, using constitutional provisions, statutes, case law, reports and scholarship. It is confined to forensic DNA databases used by State agencies; consumer genomic platforms are considered only where law enforcement reaches them.

Literature Review

Genetic privacy. Rothstein's volume advances genetic exceptionalism, genetic information is sensitive, shared across relatives and predictive, and so warrants stronger protection.² Brassington and Costello add that genetic privacy is relational, because one

¹ Shen, C-H, 'The Genome' in *Diagnostic Molecular Biology* (2nd edn, Academic Press 2023) 127–156.

² Mark A Rothstein (ed), *Genetic Secrets: Protecting Privacy and Confidentiality in the Genetic Era* (Yale University Press 1997).

person's DNA discloses information about relatives.³ *Naveed* and others show how genomic data can be reidentified.⁴ This work is theory-rich but does not address forensic databanks, deletion rules or Article 21.

Forensic databases. The National Research Council established the technical legitimacy of DNA typing and flagged privacy early;⁵ *the Lazer* collection weighs public safety against civil liberties in databanks;⁶ and Kaye examines arrestee sampling under the Fourth Amendment.⁷ These predate or sit outside India's post-*Puttaswamy* framework and give little attention to retention, deletion and secondary use.

Indian and comparative scholarship. Padmanabhan argues that DNA data is sensitive personal data and evaluates the 2019 DNA Bill;⁸ Pandey and Singh compare India with the UK after *Marper*;⁹ and *Ahmed and Singh and Dixit and Chandrika* address human-rights and CrPIA issues.¹⁰ None joins Article 21, Article 20(3), statutory fragmentation, retention, deletion and genetic surveillance in a single framework.

The gap: DNA is recognized as powerful, genetic data as sensitive and relational, but privacy concerns are rarely operationalized in criminal-law doctrine. This paper addresses part of that gap.

From Profile to Surveillance

What a profile is and is not

A profile is a set of numbers at a limited number of short tandem repeat (STR) loci, generated by PCR amplification and capillary electrophoresis, a method that replaced the weeks-long

³ Iain Brassington, *The Private Life of the Genome: Genetic Information and the Right to Privacy* (Routledge 2023); Róisín Á Costello, 'Genetic Data and the Right to Privacy: Towards a Relational Theory of Privacy?' (2022) 22 *Human Rights Law Review* ngab031.

⁴ M Naveed and others, 'Privacy in the Genomic Era' (2015) 48(1) *ACM Computing Surveys* art 6.

⁵ National Research Council, *DNA Technology in Forensic Science* (National Academies Press 1992).

⁶ David Lazer (ed), *DNA and the Criminal Justice System: The Technology of Justice* (MIT Press 2004).

⁷ DH Kaye, 'A Fourth Amendment Theory for Arrestee DNA and Other Biometric Databases' (2013) 15(4) *University of Pennsylvania Journal of Constitutional Law* 101.

⁸ Abhishek Sharma Padmanabhan, 'The Privacy Implications of the Usage of DNA Profiling Evidence in Criminal Trials in India' (2022) SSRN Working Paper.

⁹ Shriya Pandey and Balwinder Singh, 'Genetic Privacy and DNA Profiling: A Comparative Legal Study of India and the United Kingdom' (2025) 5(2) *Journal of International Educational Research* 4894.

¹⁰ Sufiya Ahmed and Dinesh Kumar Singh, 'DNA Profiling and Human Right: Issue and Challenges for Application in Administration of Criminal Justice' (2022) *ILI Law Review* (Summer Issue) 139; S Dixit and Chandrika, 'The Legal Implications of the Criminal Procedure (Identification) Act, 2022' (2022) 5 *Shimla Law Review* 166.

RFLP technique first used by Alec Jeffreys in the Enderby murder investigation.¹¹ STR loci are chosen because they largely lie outside coding regions. The sample is different, it holds the whole genome and can reveal ancestry, disease susceptibility and physical traits. Regulation differs mainly on whether it covers profiles only or also samples. The distinction used to justify databases is eroding, since even a standard profile supports inferences about kinship and ancestry.

A profile's value lies in statistical comparison, usually a likelihood ratio that is typically in the billions for a full profile. But mixtures, low-template 'touch' DNA, degraded samples, subjective interpretation and laboratory error weaken it, and larger databases generate more coincidental partial matches that must be independently verified.¹² The principal risks lie less in the science than in institutional incentives and in treating a match as conclusive when it is only a lead.

Mechanisms of surveillance

The shift occurs on storage. National databases, beginning with the UK's in 1995, search every new crime-scene profile against all reference profiles and vice versa, so they operate speculatively; who enters the reference index is therefore the key policy choice. Four extensions widen reach. *Familial searching* uses partial matches to identify relatives and draws in people suspected of nothing. *Forensic genetic genealogy* uploads a dense SNP profile to consumer platforms such as GEDmatch, as in the 2018 identification of the Golden State Killer,¹³ raising consent and third-party issues because users consented to genealogy, not policing. *DNA phenotyping* predicts traits such as skin color, which map onto race and can entrench profiling while being presented with unwarranted certainty. *Dragnets* and *consumer genomics* extend sampling through social pressure and private databases that fall outside constitutional and statutory protection.

The recurring dynamic is *function creep*: systems built to solve serious violent crime come to serve property offences, research or immigration enforcement, because databases are permanent while political will to limit them is episodic. A regime should be judged by how

¹¹ AJ Jeffreys, V Wilson and SL Thein, 'Individual-Specific "Fingerprints" of Human DNA' (1985) 316 Nature 76.

¹² Nuffield Council on Bioethics, *The Forensic Use of Bioinformation: Ethical Issues* (2007).

¹³ *People v DeAngelo*, No 18F03257 (Sacramento Cnty Sup Ct 2020).

well it resists it.

Normative framework

The article evaluates regimes against seven principles found across constitutional, humanrights and data-protection law: *privacy* in information about the body and family, *bodily integrity and dignity*; *proportionality* (legitimate aim, rational connection, necessity); *presumption of innocence*, which indefinite retention from unconvicted persons undermines, *non-discrimination*, since policing and therefore databases are unevenly distributed; *consent and third parties*, given relatives' interests and *data minimization and purpose limitation*, the principle genetic surveillance most often breaches. No jurisdiction honor's all seven, the value of the framework lies in showing which each system privileges.

India: Constitutional Baseline and Statutory Landscape

Article 20(3) bars compelled testimony and Article 21 protects personal liberty. *Kathi Kalu Oghad* distinguished testimonial compulsion from physical evidence such as fingerprints¹⁴ *Selvi* held that narco-analysis, polygraph and brain-mapping require consent but did not bar collection of blood or DNA where a statute or rule authorizes it and the evidence is not testimonial.¹⁵ Compelled sampling is therefore permissible only if backed by law, which makes the quality of that law decisive. *Puttaswamy* recognized privacy, including informational privacy, as a fundamental right and requires any interference to satisfy legality, a legitimate aim, proportionality and procedural safeguards.¹⁶

India has no dedicated DNA statute. Practice rests on general provisions of the Bharatiya Nagarik Suraksha Sanhita 2023, the Bharatiya Sakshya Adhiniyam 2023 (no DNA-specific rules), the Information Technology Act 2000 and the DPDP Act, none of which address forensic profiles or samples.¹⁷ The DNA Technology (Use and Application) Regulation Bill 2019, which proposed a regulator, national and regional data banks with several indices and consent and security rules, was withdrawn after criticism that it allowed collection from mere

¹⁴ *State of Bombay v Kathi Kalu Oghad* AIR 1961 SC 1808.

¹⁵ *Selvi v State of Karnataka* (2010) 7 SCC 263.

¹⁶ *Justice K S Puttaswamy (Retd) v Union of India* (2017) 10 SCC 1, departing from *Kharak Singh v State of Uttar Pradesh* (1964) 1 SCR 332; see also *Justice K S Puttaswamy (Retd) v Union of India* (2019) 1 SCC 1.

¹⁷ Bharatiya Nagarik Suraksha Sanhita 2023 (Act 46 of 2023); Bharatiya Sakshya Adhiniyam 2023 (Act 47 of 2023).

suspects, left deletion discretionary and did not secure the regulator's independence.¹⁸

The Criminal Procedure (Identification) Act, 2022

The CrPIA received assent on 18 April 2022, came into force on 4 August 2022, and is supplemented by Rules notified on 19 September 2022.¹⁹ It replaced the Identification of Prisoners Act 1920 and defines 'measurements' (s 2(1)(b)) to include fingerprints, footprints, iris and retina scans, photographs, physical and biological samples and their analysis, and behavioral attributes. Measurements may be taken from convicts and arrestees, certain preventive-detention categories and, on a Magistrate's order, persons not arrested; force may be used against resistance. Important limits apply: a person arrested for an offence that is not against a woman or child and carries less than seven years 'may not be obliged' to give biological samples. The NCRB holds records for seventy-five years; records are to be destroyed for those released without trial, discharged or acquitted after appeals, unless a court or Magistrate orders retention, and the Rules leave destruction procedure to a standard operating procedure.²⁰

The Act's strengths are real: it replaces a colonial statute, supplies the statutory authority *Selvi* requires, and adds officer-rank limits, Magistrate involvement, a seriousness threshold for compelled biological samples and a destruction duty. The table applies the *Puttaswamy* test.

Limb	What the CrPIA provides	Assessment
Legality	Act of Parliament; destruction procedure left to Rules and an SOP.	Met formally; quality of law contestable.
Legitimate aim	Identification and investigation in criminal matters.	Met in principle.
Proportionality	Compelled biological samples limited by offence seriousness; other measurements from any arrestee; Magistrate may order measurements from non-arrested	Partly met for biological samples; doubtful for retention, ungraded collection and bystanders.

¹⁸ DNA Technology (Use and Application) Regulation Bill 2019.

¹⁹ Criminal Procedure (Identification) Act 2022 (Act 11 of 2022); Criminal Procedure (Identification) Rules 2022.

²⁰ See the petition summarised in 'SC refuses to examine constitutionality of Criminal Procedure Identification Act' *The Leaflet* (2024).

	persons; 75-year retention.	
Procedural safeguards	Officer ranks; Magistrate orders; destruction on acquittal subject to court-directed retention. No independent oversight, audit or erasure remedy.	Weakest limb.

Four weaknesses stand out. Non-biological measurements are not graded by offence or necessity. A Magistrate may order measurements from bystanders, converting biometric collection from a consequence of arrest into an investigative power. Force raises Article 20(3) and 21 concerns where bodily intrusion is greatest. And the destruction duty attaches to the *record*, it is unclear that it reaches the sample or genomic analysis, while nothing confines use of measurements to criminal investigation, giving function creep a statutory foothold. The Act has been challenged: the Supreme Court declined on 12 February 2024 to hear an Internet Freedom Foundation petition under Article 32 and left it free to approach the High Court, and the Delhi High Court has issued notice.

The CrPIA and the DPDP Act, 2023

The measurements taken under the CrPIA are personal data of the most sensitive kind, so the DPDP Act, with purpose limitation, storage limitation, erasure rights and an independent Board, would be expected to govern the NCRB database. It largely does not exempt State processing in the interest of preventing, detecting, investigating or prosecuting offences, and its duties fall chiefly on private processors.²¹ A private genetic-testing company must obtain consent, give notice and honor deletion. The police officer who takes the same specimen at arrest, without consent, acts outside the regime. Three gaps follow: an *erasure gap* (the only destruction right is the CrPIA's qualified, rule-dependent one) a *purpose-limitation gap* (the NCRB may 'collect, store, process, share and disseminate' without a limiting purpose) and an *oversight gap* (the Data Protection Board has no jurisdiction and no other body audits the police biometric estate).

Comparative Perspectives

In the UK, *S and Marper v United Kingdom* held that blanket, indefinite retention of DNA from

²¹ Digital Personal Data Protection Act 2023, s 17(1)(c).

unconvicted persons violated Article 8, Parliament responded with the Protection of Freedoms Act 2012, which introduced differentiated, time-limited retention, early destruction of samples and a Biometrics Commissioner.²² In the US, the DNA Identification Act 1994 established CODIS, and *Maryland v King* upheld arrestee swabbing for serious offences as a booking procedure under the Fourth Amendment.²³

The lessons are tiered, time-limited retention; early destruction of samples, which the CrPIA leaves unclear; and independent oversight, which India lacks. The US shows that a permissive ruling on arrestee sampling does not itself supply limits on retention and secondary use.

Reforms

To bring the regime within *Puttaswamy*, India should: (a) require destruction of biological samples once a profile is generated and extend destruction duties to samples and analysis. (b) apply an offence-seriousness and necessity threshold to all measurements. (c) require prior judicial authorization for collection from non-arrested persons and for any force. (d) make expungement automatic on acquittal, discharge or decision not to prosecute and reconsider seventy-five-year retention. (e) impose statutory purpose limitation barring secondary use, including for immigration. (f) create independent oversight with audit and erasure powers, or narrow the DPDP exemption so that necessity and proportionality apply to State processing; (g) regulate familial searching, genetic genealogy, phenotyping and access to consumer platforms by specific statute; and (h) fund laboratory accreditation, blind verification and standards for mixture interpretation, since uneven State laboratory capacity undermines any safeguard.

Conclusion

India combines strong constitutional privacy protection with a thin statutory regime for DNA. The CrPIA gives collection a statutory footing and contains real safeguards, but leaves retention, destruction, oversight and secondary use of genome-bearing material underconstrained, and the DPDP Act's exemption leaves State-held genetic data less protected than commercial data. The findings support hypothesis, qualified by the safeguards the CrPIA

²² *S and Marper v United Kingdom* (2008) 48 EHRR 50; Protection of Freedoms Act 2012; Forensic Science Regulator Act 2021 (c 14).

²³ DNA Identification Act of 1994, 42 USC § 14131 et seq; *Maryland v King* 569 US 435 (2013).

does contain. The papers central thesis is that genetic surveillance grows by default wherever the law does not expressly restrict it, the priority for India is not new investigative powers but a framework in which collection is authorized by law, retention is proportionate and timelimited, oversight is genuine, and profiles of unconvicted persons are destroyed as of right.

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