

INDIA DNA BILL: Solving crimes and preventing miscarriages of justice

Solving crimes and preventing miscarriages of justice: issues for discussion

- € Will crime scenes be examined promptly if DNA evidence is likely to be relevant? How will contamination of crime scenes be avoided?
- € Should analysis take place only in laboratories with quality assurance?
- € Who should manage laboratories? Should they be independent of the police?
- € Will profiling standards be sufficient to minimise false matches occurring by chance? Will this take account of increased likelihood of false matches in transboundary searches, and with relatives?
- € Will individuals have a right to have a second sample taken from them and reanalysed as a check?
- € Will individuals have a right to obtain re-analysis of crime scene forensic evidence in the event of appeal?
- € Will convictions be allowed on DNA evidence alone or will corroborating evidence be required? Is there a risk that expert evidence and statistics could misrepresent the role and value of the DNA evidence in relation to the crime?
- € Is the number of individuals likely to have their DNA samples taken and their DNA profiles stored proportionate to the need to tackle crime and cost-effective?

Relevant provisions in draft India DNA Bill

The draft DNA bill states in its introduction:

"[DNA analysis] 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 without any doubt." [emphasis added].

This statement is incorrect. Firstly, matches between one DNA profile and another can occur statistically by chance (known as 'adventitious matches'): the likelihood of these depends on the DNA profiling system used and whether the profile is complete (crime scene DNA is often degraded and only a partial profile can be obtained). The likelihood of errors increases if there is a mixture of more than one person's DNA; if the DNA is from a very small sample; or if the suspect is related to the perpetrator of the crime (because relatives share parts of the same DNA sequence). Secondly, errors can occur in the process of collecting and analysing the DNA and reporting the results: one major source of error is laboratory contamination. Thirdly, the presence of a person's DNA at a crime scene can be misinterpreted: the person may have been there earlier in the day, or their DNA may have been planted at the scene (e.g. on a tea cup or cigarette butt) or transferred there accidentally.

Minimising the risk of miscarriages of justice requires:

1. A requirement for the courts to require corroborating evidence, so that individuals cannot be convicted on the basis of DNA evidence alone;
2. Measures to prevent contamination at crime scenes and laboratories, so that the DNA of innocent individuals does not become mixed up with crime scene DNA;
3. A right for all defendants to be re-tested using a second DNA sample before trial;
4. Restrictions on the numbers of individual and crime scene DNA profiles collected and stored on DNA databases, so that the DNA profiling system used has sufficient statistical power to minimise the likelihood of false matches occurring purely by chance.
5. Careful retention of crime scene evidence and a right to re-testing of that evidence if a

miscarriage of justice is suspected.

The India DNA Bill creates a "crime scene index" containing DNA profiles derived from material found at crime scenes.

Chapter II Definitions

(f) "crime scene index" means an index of DNA profiles derived from forensic material found;

(i) at any place (whether within or outside India) where a specified offence was, or is reasonably suspected of having been, committed;

(ii) on or within the body of the victim, or a person reasonably suspected of being a victim, of an offence, or

(iii) on anything worn or carried by the victim at the time when an offence was, or is reasonably suspected of having been, committed; or

(iv) on or within the body of any person, on anything, or at any place, associated with the commission of a specified offence;

Such crime scene DNA profiles will include DNA profiles from the victim and their friends, relatives and passers-by, as well as possibly from the perpetrator of the crime. Using this evidence to solve crimes requires careful analysis.

The DNA Profiling Board created in Chapter III of the Bill is responsible for quality control and assessment of DNA laboratories (III.12f) and authorizing procedures for communication of DNA profile for civil proceedings and for crime investigation by law enforcement and other agencies (III.12.j). Chapter IV requires approval of DNA laboratories by the Board, however it allows existing laboratories to operate until their applications have been specifically rejected (IV.14(2)). There is no requirement to publish a list of current applications and approvals or rejections. Chapter V addresses Standards, Quality Control and Quality Assurance Obligations of DNA Laboratories. It requires all approved labs to follow the quality assurance standards set by the Board, to conduct annual audits, and to employ qualified staff and implement measures to prevent contamination and provide adequate security. Chapter VI of the Bill specifies that laboratory infrastructure, maximum fees, staff training and security systems must meet requirements specified by the Board.

A major omission is any discussion of the DNA profiling system that will be used. The longest established DNA databases in the world are in the UK and USA, but both countries are now looking to upgrade their DNA profiling systems as more DNA profiles are expected to be searched across the USA or the whole of the EU. Experts accept that the existing systems will give rise to large numbers of 'adventitious matches' due to the large number of comparisons between DNA profiles that are expected to be made. India's population is currently estimated at 1,170 million. The US population is about 313 million and the EU about 502 million, with the UK at 62 million. There is therefore a much greater potential for false matches to occur by chance in India than there is in other countries. Families in India are also much bigger on average than in Europe or the United States. This increases the potential for false matches to occur by chance because family members share some of the same DNA sequence. It is not sufficient for the Board to make a decision on the profiling system after the Bill has been adopted, as this does not allow sufficient public and parliamentary scrutiny of the expected number of false matches or the likely costs. Such an approach also removes the option for parliament to restrict police powers to collect or store DNA profiles in a way they might minimise this problem (for example, by narrowing the range of offences or requiring judicial oversight to ensure DNA is only collected where it is expected to be likely to be relevant to solving a specific offence).

The Bill does not make clear when DNA is going to be collected or what proportion of the Indian population is likely to end up on the DNA database. In the UK, the numbers of crimes solved using DNA has not increased despite the DNA database nearly tripling in size: this is probably because DNA

is collected from many people who have been arrested even when it is not relevant to solving a crime. This kind of approach is not likely to be cost effective. Data from the UK and US suggest a focus on increasing the number of crime scene samples analysed is more cost effective than widening the net to try to put more individuals on databases.

There is no information about what resources will go in to the collection and analysis of crime scene DNA. Collecting and analysing crime scene DNA and DNA from known suspects for a crime is much more important than testing large numbers of individuals. In the UK, crime scene analysis is now done promptly, whereas in the US there is a big backlog of untested crime scene DNA. However, there are many examples of police blunders in the UK, where the police did not take DNA from known suspects for a crime and instead took DNA from large numbers of innocent individuals.

The Bill also lacks any discussion of how crime scene examination will be controlled to prevent contamination or planting of evidence; how laboratory services will be provided and whether they will be independent of the police; what rules will be applied in court to prevent convictions based on DNA evidence alone and prevent juries being misled; and how the use and analysis of partial, mixed, degraded or very small samples will be overseen.

Section VII.45 allows an individual who is imprisoned or under sentence of death to apply to the court which convicted him for an order of DNA testing of specific evidence, under certain conditions. This is a welcome provision that may assist in the exoneration of wrongly convicted persons.

Examples of misuse and bad practice

DNA database in doubt after teenager spends three months behind bars for rape in city he has never even visited because gene samples were mixed up. Daily Mail. 18th May 2012.

<http://www.dailymail.co.uk/news/article-2114252/Teenager-spends-months-bars-DNA-blunder-fingers-rape-city-visited.html>

Las Vegas police reveal DNA error put wrong man in prison. Las Vegas Review Journal. 7th July 2011.

<http://www.lvrj.com/news/dna-related-error-led-to-wrongful-conviction-in-2001-case-125160484.html>

DNA Testing: Foolproof? CBS News. 11th February 2009. http://www.cbsnews.com/2100-500164_162-555723.html

Geddes, L (2010) Unreliable evidence? Time to open up DNA databases. New Scientist. 6th January, 2010. <http://www.newscientist.com/article/mg20527424.700-unreliable-evidence-time-to-open-up-dna-databases.html>

Geddes, L (2010) Fallible DNA evidence can mean prison or freedom. New Scientist. 11th August 2012. <http://www.newscientist.com/article/mg20727733.500-fallible-dna-evidence-can-mean-prison-or-freedom.html?page=1>

Jabr, F (2011) DNA doubts help clear Amanda Knox of murder. New Scientist. 3rd October 2011.

<http://www.newscientist.com/article/dn21002-dna-doubts-help-clear-amanda-knox-of-murder.html>

Police track DNA of a cotton bud maker for two years. Bild. 14th May 2009.

<http://www.bild.de/news/bild-english/news/police-track-dna-of-cotton-bud-maker-for-two-years-7794056.bild.html>

US DNA profile upgrades:

FBI's DNA database upgrade plans come under fire. BBC 17th October 2011.

<http://www.bbc.co.uk/news/science-environment-1531171>

Ge, J, Eisenberg, A, Budowle, B (2012) Developing criteria and data to determine best options for expanding the core CODIS loci. Investigative Genetics, 3:1.

<http://www.investigativegenetics.com/content/3/1/1>

False matches in EU cross-border DNA profile sharing:

van der Beek, CP (2011) Forensic DNA Profiles Crossing Borders in Europe (Implementation of the Treaty of Prüm). <http://www.promega.com/resources/articles/profiles-in-dna/2011/forensic-dna-profiles-crossing-borders-in-europe/>

Schneider PM (2009) Expansion of the European Standard Set of DNA Database Loci—the Current Situation.

<http://www.promega.com/~media/Files/Resources/Profiles%20In%20DNA/1201/Expansion%20of%20the%20European%20Standard%20Set.ashx>

Geddes, L (2011) DNA super-network increases risk of mix-ups. New Scientist. 5th September 2011.

<http://www.newscientist.com/article/mg21128285.500-euro-dna-treaty-risks-false-positives.html?DCMP=OTC-rss&nsref=online-news>

Cleared murder accused victim of DNA blunder. Liverpool Daily Post. 10th March 2003.

<http://icliverpool.icnetwork.co.uk/0100news/0100regionalnews/page.cfm?objectid=12718961&met hod=full&siteid=50061>

'Troubling' cases seen in HPD crime lab report. Houston Chronicle. 17th June 2007.

<http://www.chron.com/news/houston-texas/article/Troubling-cases-seen-in-HPD-crime-lab-report-1616182.php>

More Problems at the Houston Crime Lab. Reason.com 13th January 2010.

<http://reason.com/blog/2010/01/13/more-problems-at-the-houston-c>

DNA Match Tying Protest to 2004 Killing Is Doubted. The New York Times. 11th July 2012.

<http://www.nytimes.com/2012/07/12/nyregion/suspected-dna-link-to-2004-killing-was-the-result-of-a-lab-error.html>

Guilty by a handshake? Crime-scene DNA tests may not be as accurate as we are led to believe. The Herald. 2nd May 2006. <http://www.heraldscotland.com/sport/spl/aberdeen/guilty-by-a-handshake-crime-scene-dna-tests-may-not-be-as-accurate-as-we-are-led-to-believe-1.21671>

Thompson, W C (2006) Tarnish On The 'Gold Standard': Recent Problems In Forensic DNA Testing. Champion Magazine. January/February 2006, Page 10.

<http://www.nacdl.org/public.nsf/0/6285f6867724e1e685257124006f9177>

William C. Thompson: The potential for error in forensic DNA testing:

<http://www.councilforresponsiblegenetics.org/GeneWatch/GeneWatchPage.aspx?pageld=57>

Presentation (videos):

Part1: <http://www.youtube.com/watch?v=oSv9BC3yyRU>

Part2: <http://www.youtube.com/watch?v=KhjAoNevi-g&feature=relmfu>

Part3: <http://www.youtube.com/watch?v=G3Ib-XAsuGI&feature=relmfu>

Privatisation is a catastrophe, warns godfather of forensics. The Independent. 2nd April 2012.

<http://www.independent.co.uk/news/uk/crime/privatisation-is-a-catastrophe-warns-godfather-of-forensics-7606789.html>

Crimes solved by DNA evidence fall despite millions being added to database. The Telegraph. 10th

November 2008. <http://www.telegraph.co.uk/news/uknews/law-and-order/3418649/Crimes-solved-by-DNA-evidence-fall-despite-millions-being-added-to-dat>

Record number of DNA samples taken but crimes solved with them are down. The Times, 22nd October 2009. <http://www.timesonline.co.uk/tol/news/uk/crime/article6884681.ece>

Crimes solved by DNA drop by a fifth. The Telegraph. 22nd October 2009. <http://www.telegraph.co.uk/news/uknews/crime/6399228/Crimes-solved-by-DNA-drop-by-a-fifth.html>

The UK figures on DNA detections are available on: http://www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/UK_DNA_detections.pdf

"In assessing how DNA analysis is used to aid investigations in the U.S. system, we found that database matches are more strongly related to the number of crime-scene samples than to the number of offender profiles in the database. This suggests that "widening the net," which research indicates has only a minimal deterrent effect, might be less cost-effective than allocating more effort to samples from crime scenes. Indeed, the UK Home Office reached this same conclusion in an analysis of its National DNA Database (NDNAD) performance". RAND report: http://www.rand.org/content/dam/rand/pubs/technical_reports/2010/RAND_TR918.pdf

Delroy Grant (the Night Stalker) committed a string of serious sexual assaults in London: Police focused on mass DNA screenings of black men with motorbikes: when Grant was finally caught police discovered he never had a motorbike. They also used DNA to predict that the suspect came from the Windward Islands (this is not where Grant comes from). Grant was identified but never interviewed in connection with a burglary linked to the attacks: his DNA was not taken because another Delroy Grant was on the database, so the correct Delroy Grant was wrongly eliminated from inquiries and allowed to continue to offend. He was ultimately caught when police abandoned their focus on DNA.

Night Stalker: police blunders delayed arrest of Delroy Grant. The Telegraph. 24th March 2011. <http://www.telegraph.co.uk/news/uknews/crime/8397585/Night-Stalker-police-blunders-delayed-arrest-of-Delroy-Grant.html>

Kirk Reid: Opportunities to arrest multiple sex attacker and take his DNA were missed following several tip offs.

Blunders kept sex attacker free. BBC Online. 26th March 2009. <http://news.bbc.co.uk/1/hi/uk/7965809.stm>

John Worboys: This multiple sex attacker identified by his cab number in CCTV footage but officers did not believe victim's account so did not take his DNA.

Police errors left rapist John Worboys free to strike – but no officers face sack. The Guardian. 20th January 2010. <http://www.guardian.co.uk/uk/2010/jan/20/police-ipcc-john-worboys-errors>

Examples of good practice

Following concerns about errors and mistakes, the UK Government set up the Forensic Science Regulator: <http://www.homeoffice.gov.uk/agencies-public-bodies/fsr/>

This has not prevented errors but it does mean that they have been investigated promptly when they happen and steps can be taken to try to stop them occurring again.

England has no backlog of cases waiting to be analysed (i.e. crime scene samples), whereas the

United States has a considerable backlog. RAND Report:

http://www.rand.org/content/dam/rand/pubs/technical_reports/2010/RAND_TR91

The Innocence Project uses DNA evidence to overturn wrongful convictions in the USA:

<http://www.innocenceproject.org/>

In Texas, 41 Exonerations from DNA Evidence in 9 Years. Harper's Magazine. 5th January 2011.

<http://www.harpers.org/archive/2011/01/hbc-90007895>.

The process for DNA collection in the UK is very broad and would not be acceptable in most countries. However, there are some safeguards in the event of a match between an individual's DNA profile and a stored crime scene DNA profile, including a requirement for supporting evidence before charging or prosecuting the individual: <http://www.sussex.police.uk/about-us/policies-and-procedures/current-force-policies/suspect-identification-from-dna-fingerprint-recovered-from-crime-scenes/>

The UK system for accreditation for DNA laboratories is on: <http://www.ukas.com/library/Technical-Information/Pubs-Technical-Articles/Pubs-List/Lab32.pdf>