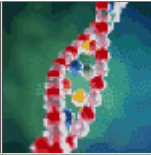
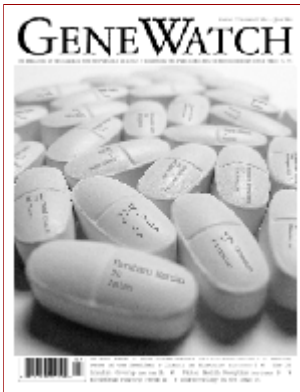


CRG



COUNCIL FOR RESPONSIBLE GENETICS

Advancing the public interest in biotechnology since 1983

[HOME](#) [ABOUT CRG](#) [PROGRAMS](#) [GENEWATCH](#) [PRESS](#) [GET INVOLVED](#) [BOOKSTORE](#) [INTERNSHIPS](#) [SUPPORT US](#)


Volume 19 Number 1
January - February 2006

**Expanding Databases,
 Declining Liberties**

by Tania Simoncelli and
 Helen Wallace

Essentially Yours

by Margaret Otlowski

Logics of Heredity

by Kelly Happe

**Headlines: Biotechnology in
 the News**

To find out more about
 subscribing to GeneWatch and
 having it delivered to your
 doorstep six times a year, **just**
[click here](#).

SEARCH >

search

Submit



RECEIVE CRG EMAIL >
 your e-mail here

Submit Query

[ARCHIVES](#) / [ABOUT](#) / [SUBSCRIBE TO GENEWATCH](#)

Expanding Databases, Declining Liberties

by Tania Simoncelli and Helen Wallace

The past decade has witnessed an extraordinary growth in DNA databases for use in criminal intelligence and health research, ranging in size from a few hundred to a few million samples.

The United Kingdom has led the world: its National DNA Database (NDNAD) is the oldest, largest and most inclusive national forensic DNA database in the world. Founded in 1995, it now contains DNA samples and profiles from more than 2.5 million individuals and is expected to expand over the next few years to include some 5 million people, nearly 10% of the country's population. [1,2] On file is DNA drawn from people convicted of a wide range of crimes, including serious violent crimes and minor public order offenses, as well as arrestees, many of whom have not been convicted of any crime.

The United States has followed closely. In 1998, three years after NDNAD went live, the FBI began operating its national database, along with a software system — the Combined DNA Index System (CODIS) — that enables local, state, and national authorities to share DNA profiles electronically. CODIS now contains more than 2.3 million offender DNA profiles. [3] Since 1998, all 50 U.S. states have actively collected DNA from varying populations in the criminal justice system, and by 2004, all 50 states were connected by CODIS.

The trend established by the UK to require sampling of ever-widening categories of individuals, including the most recent and disturbing precedent — the decision to collect and permanently retain DNA from people who are merely arrested — is dangerous and must be closely scrutinized. By examining how the United States has closely followed Britain's lead, we argue that the policies, trends and practices adopted in the UK are likely to be globalized, with potentially serious consequences for privacy and human rights, and uncertain, if not dubious, benefits for law enforcement.

The History and Trends of Forensic Uses of DNA

In 1994, the Criminal Justice and Public Order Act provided the foundations for the UK's national database by establishing police powers to take DNA samples without consent from anyone charged with any recordable offense. It also allowed the profiles to be speculatively searched to look for matches. The following year, Britain's NDNAD went into operation as the world's first national database. It was initially limited by funding considerations to violent and sexual offenses and domestic burglary.

From 1996 through 2003 UK police powers to take and retain DNA were continually expanded.[4] In 2000, Prime Minister Tony Blair announced the DNA Expansion Programme, aiming to include “virtually the entire active criminal population” — an estimated 3 million people — by the year 2004. This goal has nearly been achieved. Samples are now routinely taken and permanently retained from anyone who is arrested on suspicion of any ‘recordable’ offense (including being drunk in a public place, begging, or taking part in a prohibited public procession), even though DNA evidence is usually not relevant to the investigation.

The development and expansion of US databases has proceeded at a slightly slower, but nonetheless dramatic pace. State databases date back to 1989, and by 1998, all fifty states had authorized criminal DNA databases. At the federal level, the “DNA Identification Act of 1994” authorized the Federal Bureau of Investigation (FBI) to maintain a centralized, national DNA database and to develop its CODIS software system to allow for the sharing of information within and between the states. By 2004, all fifty US state databases were connected by CODIS.

Most of the early US state statutes explicitly limited their databanks to DNA of sexual offenders, on the theory that they are likely to be recidivists and that they usually leave biological evidence. Today, 34 states collect DNA from all felons, twenty-eight from juvenile offenders, and thirty-eight from those who commit some category of “misdemeanors.” Four states have started to move beyond convicted criminals — most recently California, which authorized last November the collection of DNA from felony arrestees to begin in 2009. Last year, a federal law expanded CODIS to allow states to upload DNA profiles from those convicted of or charged with any crime, and other persons whose DNA samples are collected under applicable legal authorities, with the exception of those that are voluntarily submitted. This recent change in the law has brought the US nearly in line with the UK.

UK policy has tended to lead US policy by about three years. As the manager of the UK DNA Expansion Programme recently stated: “The UK already leads the world in terms of population included in a DNA intelligence system (3.7% compared with 0.7% in the second highest country, Austria, and 0.5% in the USA). The USA has followed our lead and is now investing heavily to reduce backlogs and increase their own use of DNA.”[5]

Future Expansion

The expansion of DNA databases in the US and UK is likely to continue. In 2003 alone, eighteen US states passed laws to include more categories of people in their databases. In addition, proposals have been put forth to use DNA samples collected from newborns for both medical and law enforcement purposes.[6] In the UK, plans are underway to collect DNA samples from 500,000 adults for medical research and a proposal to collect DNA samples for health purposes from all newborns will be revisited in five years time. Although not law enforcement databases, in both cases samples would be linked to medical records held by the National Health Service, raising concerns about the possibility of the government using these medical databases as “back door” forensic



databases in the future.

Meanwhile, DNA databases are going global. Australia, New Zealand, and most European nations have created DNA databases and China and South Korea have plans to establish them. The government of Portugal recently announced that it would create the world's first universal forensic database.[7] Interpol has now established an international DNA database, which, whilst limiting access to the original DNA profile to the originating police agency, allows all member states to be notified of matches.

Comparison of UK and US Database and DNA Profiling Laws.

DNA databases used in criminal investigations contain DNA profiles and other information from individuals and from crime scenes, linked to the original DNA samples from which the profile is obtained. The DNA profiles are a string of numbers, or digital renderings of DNA samples, based on specific regions of each individual's DNA, known as short tandem repeats (STRs).

The UK is unique in permanently retaining both DNA profiles and samples from innocent people. Although California is starting to hold onto DNA samples from "suspects," (including those who presumably voluntarily submit DNA for purposes of exclusion in the case of a DNA dragnet) and arrestees, a person in California who is proven innocent has at least a right to request the removal of their information from the database. Three other US states — Virginia, Texas and Louisiana — have also authorized collection of DNA from some groups of arrested individuals.

One controversial use of DNA databases is "familial searching", which involves looking for "partial matches" between a crime scene profile and individual profiles in the database. Based on the fact that close relatives share similar DNA profiles, law enforcement tracks down close relatives of those individuals identified by a partial match and asks them for a DNA sample so that their full profile can be obtained and compared to the evidence from the crime in question. First used in the UK in 2002, this method has since been used in at least twenty cases and has led to the resolution of five.[8] The Director of the US FBI has stated that the FBI does not run this type of search. But at least two states — Massachusetts and New York — have regulations that explicitly allow it, and most other state laws do not forbid it.[9] So far, we know of no confirmed uses of familial searching in the United States, although in one recent case in Kansas it was alleged that the police were led to a suspect by retrieving a DNA sample from the suspect's daughter.[10]

Privacy, Surveillance and Discrimination

DNA databanks are not required in order to use DNA testing to establish evidence of guilt or innocence when there is a known group of suspects for a crime: a DNA sample can be taken from each individual and compared directly with a crime scene profile. Few people have problems with this use of DNA.

The permanent retention of DNA in a database for use in future investigations, however, is another matter. An individual captured in a police database becomes an automatic suspect for all future criminal investigations where database searches are

performed. This undermines the presumption of innocence that is central to criminal justice systems in the US, UK and most democracies around the world.

Setting aside this fundamental problem, benefits of the use and expansion of these databases must be weighed against their societal costs. While the temptation on the part of law enforcement to put more and more people into the database seems logical (i.e. one would assume the more inclusive the database, the more likely a positive identification can be made), in practice, the benefits of expansion may be limited. In the UK, despite the large number of people in the database, DNA profiles are obtained from the examination of less than 1% of crime scenes, so that in 2002/3 only 1.6% of all crime detections were attributed to DNA database matches (including only 0.3% of all detections for violent and sexual offenses). Such a small contribution to crime detection may not warrant the onerous financial costs of large DNA databases, not to mention the dilatory effect backlogs have on crime solving.

At the same time, there are many reasons to be concerned about the use and expansion of police databases. [11] These include: impacts on people's privacy, potential for misuse by governments, discrimination, and the possibility of error and wrongful conviction.

Implications for Individual Privacy

Unlike a fingerprint, DNA has the potential to provide information about family relationships or health, including information about an individual's risk of having or developing one of several genetic conditions.

Many concerns about DNA collections stem from the permanent retention of the biological sample — a practice that is common to both UK and US databanks. The DNA profiles held in the database are usually sufficient for identifying a person (and his/her relatives), but are unlikely to reveal personal genetic information about health or other characteristics. However, the DNA samples contain virtually unlimited amounts of genetic information. In the UK, all DNA samples are currently retained indefinitely, linked to an individual's record on the database. In the US, samples are also retained indefinitely, except in some states that require purging of DNA records upon reversals or convictions.

Law enforcement authorities in both the UK and the US have argued that sample retention is necessary for "quality assurance purposes." But re-testing the same sample clearly cannot correct for many sorts of errors, such as sample mix-ups. In fact, in both the UK and the US, testing of a fresh DNA sample from the suspect is always required before the DNA evidence is admissible. Thus the stored samples do nothing to prevent future miscarriages of justice.

The UK Government's advisory body, the Human Genetics Commission, has concluded that the reasons given for retaining samples are "not compelling." [12] However, although the UK Home Office recognizes that retaining DNA samples is "one of the most sensitive issues to the wider public," it currently has no plans to change this practice. [13]

The potential for misuse of stored DNA samples is real, and includes disclosure of personal genetic or familial information, and conduct of controversial genetic

research.[14] Thirteen US state laws include a vague, open-ended authorization that allows the database to be used for “other humanitarian purposes.” Alabama explicitly authorizes the creation and use of a DNA population statistical database “to provide data relative to the causation, detection and prevention of disease or disability” as well as to assist in educational or medical research.

Currently in the UK, uses of the database are limited to crime detection and prevention. However, this includes controversial research such as developing a genetic test to predict the ethnicity of an offender.[15] Because DNA samples are collected without consent, any genetic research using the samples and/or database bypasses the usual safeguards of seeking informed consent from research subjects and review by an ethics committee.[16] Furthermore, categories in the NDNAD such as “ethnic appearance” (as determined by a police officer) are meaningless for scientific purposes and the DNA profiles and samples will not be representative of either the general or the “criminal” population. Genetic research using criminal DNA databases is therefore likely to be misleading as well as controversial.

Tools for Government Surveillance

Because DNA is a powerful tool to trace individuals, law enforcement databases could be used as instruments of government surveillance. The dramatic expansion of UK and US databases, particularly the inclusion of DNA samples from people who are merely arrested, has already redefined the very nature and purpose of these so-called “criminal” databases.

The UK national database now contains the first permanent list of all individuals arrested since April 2004, along with their DNA samples and profiles. The recent enactment of California’s “DNA Fingerprint, Unsolved Crime and Innocence Protection Act” means that this year alone, more than 600,000 people will qualify for testing, a ten-fold increase from the previous year.[17] Starting in 2009, all of California’s 425,000 felony arrestees per year will qualify for testing, yet 60% of these will ultimately not be convicted of any crime. Profiles from all arrestees who are charged with a crime as a result of an indictment or information will also be uploaded into FBI’s CODIS, even if they are ultimately proven innocent. Also in California, suspect DNA — including that which is voluntarily provided during “DNA dragnets” or “mass screenings” — will be retained for up to two years and DNA profiles can be “speculatively searched” during that time for matches with DNA profiles from any number of investigations.

Expanding these databases puts increasing numbers of people on a “list of suspects” even though they may never have been charged or convicted of a crime. This may subtly alter the way they are viewed both by the state and by their fellow citizens, potentially undermining the principles of “innocent until proven guilty” and of rehabilitation. Without adequate protections, these permanent records of arrest could be used in future to restrict people’s rights and freedoms, for example to make it difficult for them to obtain travel visas or employment.

Exacerbation of Racial Bias

Allowing people to be entered and kept on the database for life when they have been arrested but not charged, or have been acquitted, is also likely to exacerbate discrimination against certain groups of people, particularly ethnic minorities. Unjust and unfounded racial biases exist in both UK and US society and are well documented throughout the criminal justice system. For example, a study in California in the early 1990's revealed that an astonishing 92 percent of the black men arrested by police on drug charges were subsequently released for lack of evidence or inadmissible evidence.[18] In the UK, *New Scientist* magazine has calculated that the DNA database now contains DNA profiles from nearly a third of black adult men, compared to only 8 percent of white adult men.[19]

Some have argued that, to prevent discrimination, DNA databases should be expanded to include whole populations. The problem is that the outcome of who gets arrested, charged, tried and convicted is racially motivated; simply adding everyone to the database will not address those biased practices. Recent attempts to analyze crime scene samples to predict the genetic ancestry of potential suspects also raise discrimination concerns. In one murder investigation in Louisiana, DNA analysis was used to predict the "ancestry" of the offender as 85 percent Sub-Saharan African and 15 percent Native American. The company DNA Print Genomics has been aggressively marketing this service, as well as a new test for predicting eye color, to police departments.[20] However, these genetic tests are not regulated: results for ancestry may be misleading and the genetics of predicting eye, skin or hair color is extremely complex and still poorly understood.[21,22] The police may also misinterpret the information they are given. One test in the UK was recently used to claim that a suspected rapist was of Caribbean origin — information that cannot be deduced from broad genetic ancestry.[23] Without better oversight, there is a danger that these tests will be used selectively to reinforce existing prejudices about race or skin color.

Error Rates and Wrongful Conviction

Despite how it is often portrayed in the media, DNA testing is not infallible. DNA samples can be switched or contaminated, analyzes can be misinterpreted (especially when crime scene samples contain mixtures of DNA from more than one source or where DNA is degraded) and results can be mistakenly reported. All of these types of errors are known to have occurred.

The fallibility of DNA testing was made painfully clear when, in January 2003, the Houston, Texas Police Department's crime lab was shut down following an investigation that revealed widespread problems, including gross mishandling and misinterpretation of DNA evidence by laboratory personnel. Some 1,300 cases are under review. So far, one person, Josiah Sutton, has been released from prison after serving four years in jail for a crime he did not commit.[24]

Actual numbers of errors as well as error rates are likely to increase under rapid expansions of DNA databases, where DNA labs become saddled with extensive testing backlogs. While errors are so far thought to be the exception rather than the rule, the miscarriages of justice that have occurred so far should caution us against an over-reliance on this technology.

Conclusions

DNA profiling can be a useful and important tool in criminal investigations. However, the rapid expansion of DNA databases — including widening entry and retention policies, and expanding uses — pose threats to privacy and civil rights. Precedents set in the UK, largely in the absence of public scrutiny or debate, are now being adopted in the US and exported globally. Better safeguards are urgently needed to ensure a proper balance between effective crime detection and protection of our human rights and civil liberties.

Tania Simoncelli is a Science and Technology Fellow at the American Civil Liberties Union and a recent addition to the Board of the Council for Responsible Genetics. Helen Wallace, PhD, is the Deputy Director of GeneWatch UK.

References

1. The National DNA Database Annual Report 2003/04, www.forensic.gov.uk/forensic_t/inside/about/docs/NDNAD_AR_3_4.pdf.
2. Jobling MA and Gill P (2004). Encoded evidence: DNA in forensic analysis. *Nature Reviews Genetics*, 5, 739-51.
3. National DNA Index System, Available at: www.fbi.gov/hq/lab/codis/national.htm
4. Williams R, Johnson P, Martin P (2004). Genetic information and crime investigation. August 2004. The Wellcome Trust. www.dur.ac.uk/p.j.johnson/Williams_Johnson_Martin_NDNAD_report_2004.pdf.
5. Home Office and ACPO, Forensic Science Conference Proceedings, "Beyond DNA in the UK - Integration and Harmonisation," 17-19 May 2004, Newport, South Wales, (edited by M. Townsley and G. Laycock), p. 11. Available at: http://www.policereform.gov.uk/docs/Forensics_Part_1.pdf.
6. These were proposed in New York City and in the state of Michigan. See D. McCullagh, "What to do with DNA data?" *Wired News* (Feb. 6, 1999). See also Michigan Communication on Genetic Privacy & Progress, Final Report & Recommendations (1999).
7. Boavida, Maria Joao, "Portugal plans a forensic genetic database of its entire population," *Newsropeans Magazine*, 8 April 2005.
8. Williams, Robin. Presentation at ASLME Workshop on DNA Fingerprinting and Civil Liberties, JFK School of Government, Cambridge, Massachusetts, September 2004.
9. Axelrad, Seth, "State regulation on low stringency/Familial searches of DNA databases," 2004. Available at: http://www.aslme.org/dna_04/reports/index.php
10. "DNA role in BTK suspect's capture questioned," *CNN.com*, 28 February 2005.
11. Staley K (2005). The police National DNA Database: balancing crime detection, human rights and privacy. *GeneWatch UK*, January 2005, www.genewatch.org/HumanGen/Publications/Reports/NationalDNADatabase.pdf.
12. Human Genetics Commission (2002). Inside information. May 2002.
13. Home Office (2005). Supplementary Memorandum, Appendix 20. In: House of Commons Science and Technology Committee (2005) Forensic science on trial, Volume II. HC 96-II, www.publications.parliament.uk/pa/cm200405/cmselect/cmsctech/96/96ii.pdf.
14. Editorial (2005). Your DNA in their hands. *New Scientist*. 9 April 2005.
15. Lowe AL, Urquhart A, Foreman LA, Evett IW (2001). Inferring ethnic origin by means of an STR profile. *Forensic Science International*, 119, 17-22.
16. House of Commons Science and Technology Committee (2005). Forensic science on trial. Seventh Report of Session 2005-05. HC 96-I, www.publications.parliament.uk/pa/cm200405/cmselect/cmsctech/96/96i.pdf.
17. Simoncelli, Tania and Barry Steinhardt, "California's Proposition 69: A dangerous precedent for criminal DNA databases," *The Journal of Law, Medicine & Ethics* (Summer, 2005).
18. See J.G. Miller, "From Social Safety Net to Drag Net: African American Males in the Criminal Justice System," *Washington & Lee Law Review* 51 (1994): 479-90; S. Nazano, "Odds Grim for Black Men in California," *Washington Post*, December 12, 1993, at A23.
19. Gosline A (2005). Will DNA profiling fuel prejudice? *New Scientist*. 8 April 2005.
20. See "DNAPrint Genomics is Encouraging Law Enforcement Agencies to Include DNAWitness™ in Their NIJ Grant Proposals," (August 16, 2004), available at http://www.dnaprint.com/2003/pressreleases/pr_08_16_04.htm.
21. Shriver MD and Kittles RA (2004). Genetic ancestry and the search for personalized genetic

histories. *Nature Reviews Genetics*, 5, 611-18.

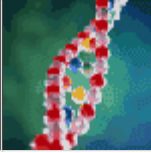
22. Sturm RA, Teasdale RD, Box NF (2001). Human pigmentation genes: identification, structure and consequences of polymorphic variation. *Gene*, 277, 49-62.

23. Adams D (2004). Can your DNA reveal where you're from? *The Guardian*. 6 May 2004.

24. See W.C. Thompson, "Review of DNA evidence in *State of Texas v. Josiah Sutton*" (District Court of Harris County, Case No. 800450), February 6, 2003.

CRG 5 Upland Road, Suite 3 Cambridge, MA 02140 p: 617.868.0870 f: 617.491.5344 e: crg@gene-watch.org

CRG



COUNCIL FOR RESPONSIBLE GENETICS

Copyright 2004 Council for Responsible Genetics