

Dangerous Excursions: The Case Against Expanding Forensic DNA Databases to Innocent Persons

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Over the past fifteen years, the United States has witnessed an extraordinary expansion in the banking and mining of DNA for law enforcement purposes. While the earliest state laws governing forensic DNA limited collection and retention of DNA samples to sexual offenders – on the theory that these persons were especially prone to recidivism and most likely to leave behind biological evidence – today forty-three states collect DNA from all felons, twenty-eight from juvenile offenders, and thirty-eight from those who commit certain categories of misdemeanors.¹

A few states have expanded their databases beyond convicted criminals. Virginia, Louisiana, Texas, and California² have authorized DNA retention from persons merely arrested for various offenses, although to date only Virginia has implemented such a program. At the federal level, an ill-considered statute that allows for the seizure and storage of DNA from anyone arrested and from non-U.S. citizens detained under federal authorities was recently signed into law.³

There have been proposals to expand further the state's authority, to take DNA from innocent persons. Following 9/11, some suggested incorporating DNA collection into the U.S. visa application process.⁴ Attempting to appeal to notions of fairness, others have suggested that we take DNA databanking to the extreme and place everyone in the database. Proposed collection methods for a universal database include linking law enforcement with state newborn screening programs,⁵ taking samples as part of child vaccination requirements for entering school,⁶ making provision of a DNA sample a requirement for obtaining a driver's or marriage license,⁷ and creating a national identification card that incorporates DNA information.⁸

The move to permanently retain DNA samples from any category of innocent persons – including all persons – should be vigorously opposed on matters of principle, legality, and practicality. Key grounds for such opposition are discussed below.

The Presumption of Innocence

One of the central tenets of modern democracy, as reflected in legal doctrine throughout the world, is that persons are innocent until proven guilty. This legal right applies to everyone – even those who have been convicted of wrongdoing in the past.

The very existence of DNA databases turns the presumption of innocence on its head. Their routine trawl-

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ing by the police renders the persons represented in the database as suspects for any and all future crimes. This fundamental difficulty is one of the main reasons civil liberties organizations opposed the initial creation and use of these databases. Nonetheless, while subjecting persons who have been convicted of a crime to inclusion in a DNA database is inherently problematic, subjecting those who have never been convicted of a crime subverts our notion of a free and autonomous society and is characteristic of an authoritarian regime.

It should be noted that in the case of arrested individuals, law enforcement already has ample authority to collect a DNA sample from the arrestee as part of an investigation, and to compare that sample with the biological evidence taken from the scene of the crime. A court order is appropriately required for this action. In addition, a "one-time keyboard search" is often run, where that suspect's DNA profile is compared against those from unresolved crimes around the country that are contained in the Combined DNA Index System (CODIS), a software system maintained by the FBI that allows for state, local and federal authorities to share DNA profile information. These authorized practices more than meet public safety needs while ensuring that a person's DNA is not permanently retained in an offender database unless and until they are convicted of a crime.

The Fourth Amendment

The Fourth Amendment of our Constitution is intended to establish a zone of personal integrity into which the government cannot intrude absent compelling reason. It guarantees "the right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures."⁹ The conduct of a "search" generally requires probable cause and a warrant, or at least individualized suspicion.

In cases where forensic DNA databases have been challenged on the grounds of the Fourth Amendment, the courts have generally agreed that the taking and analysis of one's DNA constitutes a "search."¹⁰ However, they have nonetheless upheld forcible extraction and banking of DNA from convicted offenders, as well as upheld the conduct of suspicionless searches of these banks for one of two reasons: because the government's interest is one of "special needs, beyond the normal need for law enforcement"¹¹; or because convicted fel-

ons have a "diminished expectation" of privacy.¹²

Courts that have upheld DNA database statutes based on the "special needs" exception have had difficulty explaining why the government's interest in identifying and prosecuting criminals and determining recidivist acts were interests beyond "normal law enforcement."¹³ Furthermore, two recent Supreme Court rulings have further narrowed the scope of the "special needs" exception in ways that call into question whether this exception should apply at all to DNA databanks. In *City of Indianapolis v. Edmond* and *Ferguson v. City of Charleston*, the Court found that where the primary purpose of a program involving a search is related to the general interest in crime control, the "special needs" exception under the Fourth Amendment does not apply; in that circumstance a warrant supported by probable cause is required.¹⁴

Regardless of whether a DNA bank should be considered beyond the general needs of law enforcement, the proposition that the government's "special needs" outweigh the privacy interests of innocent persons seems beyond the pale, as a matter of Constitutional principle. While it is plausible that the courts could uphold the forcible taking and analysis of DNA of persons arrested on the basis of some diminished expectation of privacy while in confinement, the permanent retention of that DNA cannot be justified on this basis unless a suspect is convicted of a crime. Professor Tracey Maclin, in an article published in this symposium, argues that under current Fourth Amendment jurisprudence, the Virginia and Louisiana statutes authorizing DNA sampling of certain categories of arrestees should be held unconstitutional.¹⁵

It is even more incomprehensible that a mandatory universal DNA database containing samples obtained from free persons could ever pass constitutional muster.¹⁶ As stated by Justice Utter of the Washington Supreme Court:

We would be appalled, I hope, if the State mandated non-consensual blood tests of the public at large for purposes of developing a comprehensive... DNA databank. The Fourth Amendment guaranty against unreasonable searches and seizures would mean little indeed if it did not protect citizens from such oppressive government behavior.¹⁷

Individual Privacy

DNA data banks pose a number of significant individual privacy concerns in addition to those directly implicated by the Fourth Amendment. Unlike finger-

prints – two-dimensional representations of the physical attributes of our fingertips that can only be used for identification – DNA samples can provide insights into personal family relationships, disease predisposition, physical attributes, and ancestry. Such information could be used in sinister ways and may include things the person herself does not wish to know. Repeated claims that human behaviors such as aggression, substance addiction, criminal tendency, and sexual orientation can be explained by genetics render law enforcement databases especially prone to abuse.

Concerns of misuse of DNA information are driven by current laboratory practice, where the individual's biological sample is retained along with the generated profile. Since all of our genetic information is encoded in each and every one of our cells, the risk of abuse remains real as long as the biological samples remain on file.

These concerns should not be trivialized. We need only look to the history of our own country, where a eugenics movement resulted in thousands of involuntary sterilizations of the so-called “feebleminded,” “abnormal,” or “mentally deficient,”¹⁸ and where fears of crime and violence have resulted in repeated overreactions on the part of law enforcement.¹⁹

The best way to mitigate these privacy concerns is to destroy each individual's biological sample after a DNA profile is generated. One state – Wisconsin – requires such a practice by law for both offender and volunteer samples.²⁰ On the contrary, twenty-nine states require that offender samples be retained and twenty-four states explicitly allow DNA samples to be used for a variety of other non-law enforcement purposes. For example, Massachusetts law allows for the disclosure of DNA records for “advancing other humanitarian purposes,” while Alabama allows access to its DNA population statistics database “to assist...medical research.”²¹

Some states have responded to these concerns by imposing steep penalties for misuse.²² However, specific cases of abuse of police databases indicate that penalties alone do not sufficiently deter misuse. In 2001, it was revealed that more than ninety known cases of abuse of Michigan's Law Enforcement Information Network had occurred over five years. Abuses included police officers and other law enforcement personnel tapping into the network to obtain home addresses or other background information on love interests and seeking revenge or an upper hand in personal, legal or political conflicts. And while Michigan law clearly indicates that such an abuse qualifies as a misdemeanor, punishable by up to ninety days in jail and a \$500 fine upon conviction, only three of the officers were prosecuted for these crimes.²³

Privacy concerns associated with the misuse of stored DNA samples take on increasing significance as these databanks expand to include ever broader categories of persons and as researchers probe the interplay between genes, race, behavior, and disease. The best and only sure way to protect individual privacy from abuses related to the use of DNA databases is to destroy the offender samples.

Diminishing Returns to Law Enforcement

A common assertion made by those in favor of expansion is “the bigger the better.” The general argument is as follows: the more comprehensive the data bank, the higher the number of “cold hits” – occasions where biological evidence taken from a scene of a crime is matched with the DNA profile in a database of a person who was not otherwise a suspect for the crime – and therefore the more valuable the data bank is for law enforcement and the betterment of society.²⁴

There are several problems with this argument. First, while it is true that having more people represented in the database will result in a higher number of “hits,” – indeed, an all-population database should theoretically yield a hit rate of 100% – the “number of hits” is an insufficient criterion for measuring the success of the database. A “hit” does not necessarily lead to the resolution of a crime. Moreover, a comprehensive assessment of the value of a data bank to society must carefully weigh any benefits of this tool to law enforcement against its social and financial costs.

Next, several qualifications are in order regarding any increase in “hits” that may be generated by expanding a database. First, the number of hits will not increase *proportionately* with the number of persons entered into the database. This is because the vast majority of crimes in the United States are committed against property, not persons. This is true even for the most serious of crimes, which are tallied annually by the FBI in their “Crime Index.” Out of the 11.9 million Index offenses reported to the FBI in 2002, 1.4 million of these constituted violent crimes,²⁵ while 10.5 million were property crimes.²⁶

DNA is often not left or found at the scene of a property crime. To look for DNA where it is not obviously present requires painstaking and costly crime scene investigation, during which forensic technicians scour the scene looking for trace evidence that may or may not carry the DNA of the perpetrator. Moreover, DNA found in these situations may not be of sufficient quality and quantity to permit testing. According to the Chief of Investigation of the Denver Police Department, only eight percent of all burglaries can be investigated using DNA gathered from a crime scene.²⁷

On a related note, not all biological evidence is equal. A cigarette butt found, say, at the scene of the robbery is just as likely to have been dropped by an innocent passerby as the perpetrator, whereas a pool of blood, skin underneath the victim's nails, or a semen stain is likely to have come from the victim or the perpetrator. So, while investigators will be tempted to comb more crime scenes for DNA as more individuals are required to contribute their DNA to a forensic database, the proportion of spurious hits generated will increase. A recent analysis of Virginia's crime lab found that of the 2,744 cases in which DNA from a crime scene was matched to an offender in Virginia's database, only 597 resulted in convictions. In many of these cases, the evidence tested turned out to be irrelevant to the case.²⁸

In the very least, DNA databank expansions should be characterized as a situation of diminishing returns to law enforcement. Ultimately, the addition of scores of innocent persons to DNA databases could undermine criminal investigations by encouraging valuable time and resources to be spent typing DNA from people who will never commit a crime, combing crime scenes for DNA when there is none to be found, and chasing down spurious hits. Worse still, spurious hits could lead to a new suite of wrongful convictions, especially in cases where persons identified lack sound alibis or where no other evidence is available.²⁹

Prosecution Evasion and Crime Framing

A related concern with ever-expanding data banks is that they may encourage criminals to plant DNA evidence to frame someone else for the crime. Already there have been several instances reported where criminals have planted or tampered with evidence, or paid inmates to take DNA tests as a way of confusing investigators or evading prosecution. Prisoners have also been overheard coaching each other on how to plant biological evidence at crime scenes and how to avoid leaving their own DNA behind.³⁰ Consider the following examples:

- The very first recorded criminal case involving DNA in England – “the Pitchfork case” – was solved only after a local member of the community overheard the perpetrator describing how he had paid a co-worker to provide a DNA sample for him during a DNA dragnet that involved 4,500 men.³¹
- In 1999, a convicted rapist named Anthony Turner smuggled a sample of his semen out of prison, concealed in a ketchup packet. Turner's family members paid a woman \$50 to use the sperm to stage a phony rape as a way of casting

doubt on the DNA evidence that placed him in prison.³²

- Dr. John Schneeberger of Kipling, Saskatchewan, attempted to avoid prosecution for drugging and raping one of his patients by providing a false blood sample to the police. Schneeberger surgically inserted into his arm a plastic tube filled with another patient's blood so that the blood drawn was not his own, and the DNA would not match that of the sperm found in the victim.³³

DNA databases create an extraordinary resource of forensic evidence. Criminals will undoubtedly attempt to make use of this resource by obtaining and planting at a crime scene what is apparently unimpeachable evidence that someone else committed the crime. The more inclusive the database, the greater the resource, and the more likely such incidents will result in false accusations and false incriminations. The imprimatur of certainty that is attached to DNA makes this problem all the more worrisome. Faced with DNA evidence, an investigator may not look for the real perpetrator or may overlook other important evidence.³⁴ Taking these concerns together, we could be looking at a whole new class of miscarriages of justice should DNA databases continue to expand, unheeded.

Overburdened Crime Laboratories

Personally I cannot imagine doing DNA typing on every person who is arrested or even every person who is indicted. People that suggest these things have probably not been near their local crime laboratory in a long time. We have our hands full just handling cases going to trial and getting the evidence out there to either exclude or include someone.³⁵

*Dr. Samuel Baechtel, forensic examiner of the
DNA Analysis Unit, FBI Laboratory,
October 2001*

As this statement suggests, our short history of DNA database expansion has been one of consistent laboratory backlogs. As of March 2003, the National Institute of Justice estimated that more than 350,000 rape and homicide cases awaited DNA testing and that crime labs continued to be deluged with analysis requests for convicted offender samples.³⁶

Backlogs are intensified each time a database is expanded. For example, the near ten-fold increase in demand for DNA processing imposed by California's recent database expansion from violent felons to all

felons has so far resulted in a quadrupling of its backlog.³⁷ At the same time, shrinking state and local government budgets have left public laboratories with insufficient funding for hiring and training forensic scientists. Many labs cannot afford infrastructure improvements that would help them keep pace with testing demand, such as automated equipment, high throughput analyzers and quality assurance software. Unanalyzed samples often remain in the custody of police departments because laboratories lack ample storage space.³⁸

Expanding databases to include arrested individuals or other categories of innocent persons would clearly aggravate this problem. In 2002, some 13.4 million people were arrested, nationwide.³⁹ This represents nearly five times the number of people from whom DNA samples have been collected and stored in CODIS since its inception in 1994.⁴⁰ In California alone, 1.4 million people were arrested in 2002; 426,000 of these were arrested for felony offenses.⁴¹ In 2004, the California Department of Justice DNA Laboratory received for processing approximately 32,000 DNA

in a DNA dragnet.⁴⁵ In addition, human errors associated with the handling of samples or the conduct or interpretation of DNA analysis have occurred in laboratories that are under-funded and where lab analysts have been improperly trained or supervised, or felt the need to cut corners to manage their workload.⁴⁶ Such mistakes have already resulted in a few known cases where innocent people have been jailed for crimes they could not have committed.⁴⁷ These scenarios are only likely to become more commonplace under further database expansions.

Unjustifiable Costs and Practical Difficulties

Expansion of databases to include innocent persons is also inadvisable because of the expense. Billions of taxpayers' dollars have been expended to build and maintain forensic databases and their associated laboratories. In 2003, the Bush Administration announced a \$1 billion expenditure just to address the nationwide backlog in DNA testing.⁴⁸

The actual per sample costs of testing are difficult to estimate. A conservative estimate of \$50 per sample indicates that to test the entire population of arrested individuals in the United States would cost \$670 million per year. This estimate represents only the costs of DNA collection and profile generation, and does not reflect the infrastructure costs that would be associated with hiring and training additional laboratory and administrative personnel, purchasing equipment to meet increased testing capacity demands, and expanding laboratory space. In addition, while some people are arrested more than once, we do not have a system in place that would prevent duplicate collection and testing. To develop that capacity would require significant additional costs.

An all-population database is even more absurd when one considers the cost and logistical issues that would be associated with such a program. Today, CODIS contains some 2.8 million offender profiles that have been collected since the program's inception in 1994. Given the difficulty the labs have had in keeping up with select categories of felons, how are we to expect them to process hundreds of millions of samples? And how could this \$15 billion testing program be justified?

Some have suggested that one way to create an all-population database would be to collect DNA at birth as part of newborn screening programs.⁴⁹ Constitutional and other social and ethical issues aside, there are major practical problems with this proposal. First, such a program would be virtually useless for at least twelve to fifteen years while the first generation of participants is growing up. How would we justify

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samples.⁴² The testing of felony arrestees, as is dictated by California's new law to begin in 2009, will result in more than a thirteen-fold increase in testing demand; testing all arrestees would result in more than a forty-fold increase.⁴³

The basic collection, transportation, analysis, and tracking of arrestee samples alone would be an administrative nightmare. And because law enforcement does not have in place a sufficient communication system to prevent duplicate testing of persons who are arrested on multiple occasions, particularly across state lines, laboratories would likely waste precious time and resources retesting persons unnecessarily. This problem has already been identified in states with all-felon databanks.⁴⁴

Expanding databases to include arrestees or other categories of innocent persons is unconscionable, given the current state of laboratory backlogs, and would only serve to impede law enforcement and undermine quality control. In Truro, Massachusetts, law enforcement had a biological sample from the suspect in Christina Worthington's murder for more than a year, but had not gotten around to profiling it, in part because they were instead focusing their time and resources on rounding up and testing hundreds of local community members

spending at least \$3 billion per year profiling the DNA of four million newborns during these first years, not to mention the expenditure that would be required to establish the vast infrastructure that would be required for such a program? Next, the realization of a universal database demands that everyone participate. What happens when parents refuse newborn screening for religious, privacy, or other reasons? Will they face criminal charges? And what would we do about testing the twelve percent of the U.S. population that is foreign-born?⁵⁰

Money spent on DNA databases is money *not* spent on other law enforcement programs. For certain classes of crime, DNA databases have helped to lock people up and exonerate others, but they accomplish little in the area of prevention and treatment. Many other changes in law enforcement can and should be made, both to prevent crime in the first place and to improve the accessibility and efficiency of law enforcement before spending limited resources on expanding the DNA databases to innocent persons.

The Question of Fairness and an All-Population Database

The prospects of an all-population database appear minute, given the range of principled and practical objections outlined above. Nevertheless, it is worth examining the most commonly asserted arguments in favor of such a database. In particular, proponents of a universal database appeal to our sense of fairness in arguing that such a database would subject us all to the same privacy infringements, hereby alleviating racial distortions in our criminal justice system, and eliminating the need for controversial DNA dragnets.⁵¹

The first of these arguments ironically begins with the claim that it is unfair and arbitrary for certain categories of persons to be required to forfeit their Fourth Amendment protection against unreasonable searches.⁵² In particular, past conviction is not unique in its ability to predict future crime; other factors, such as antisocial behavior, family dynamics, neighborhood, and other social, economic and environmental factors are also reasonable predictors of crime. Therefore, the argument goes, it would be more fair to include everyone in the database rather than selecting arbitrary classes of persons.

Depriving everyone of their Fourth Amendment rights hardly seems an appropriate solution to the problem where conviction is not a perfect predictor of future criminal behavior. If we take seriously the premise that DNA databanking is contrary to our Fourth Amendment rights, and that it is unfair to deprive persons of these fundamental protections, then the logical

solution to this problem is to do away with the databanks entirely, not to expand them indefinitely.

To the question of whether a universal database will help correct racial distortions, it is important to recognize that racism is not simply a symptom of DNA databases, but is systemic to our criminal justice system. Unfortunately, it has been well documented that race plays a large role in who gets arrested, detained, charged, and convicted, who receives the most severe sentences, and who gets paroled. Racial profiling has been explicitly endorsed as a policy strategy to curb crime; The Reagan Administration's "Operation Pipeline," for example, trained thousands of law enforcement officers around the country to stop and search people who fit "likely profiles" of drug users. As a direct result of this policy, blacks accounted for more than half of those arrested for drug offenses, even though they made up less than twenty percent of the nation's drug users during this time, and dramatic shifts in black-to-white incarceration rates were witnessed around the country.⁵³

These patterns of racial disparity mean that our DNA databases are also racially skewed. But placing everyone in the database will not result in a more "race neutral" system, because the makeup of the database has no bearing on who is targeted for suspicion and arrest. Even if everyone is in the database, the majority of hits will continue to identify minorities, as long as the types of crime, neighborhoods and populations monitored and investigated are racially driven.⁵⁴

Finally, it *is* true that an all-population DNA database would avoid the necessity of multiple, highly controversial DNA dragnets. However, one of the primary areas of controversy surrounding dragnets stems from people's lack of assurance that their volunteered DNA will be destroyed after they are excluded from the crime in question. A universal database is hardly a solution to this problem; instead, it simply creates one giant, mandatory DNA dragnet. Re-examining whether dragnets should be conducted at all would be a far better task.⁵⁵

Conclusion

Unbridled DNA database expansion has caused, in a short period of time, narrowly defined DNA collections to be expanded to massive banks including all felons, juvenile offenders, and in a few cases, arrestees. While cascading down this slippery slope, little attention has been given to the extraordinary concerns associated with the permanent retention of DNA. Each time we expand a criminal DNA database to include more categories of people and more DNA samples, these concerns for privacy, legality, practicality, and cost escalate, while positive returns to law enforcement diminish.

DNA testing is a remarkable tool, and like many other technologies, it opens the door to a range of possibilities. Yet not all of these possibilities should be realized. In our quest to balance law enforcement needs with civil liberties, we must be sure that we are effectively harnessing DNA technology for the furtherance of justice, rather than allowing the technology to drive our policies.

Many of us would argue that the current DNA databases are already skewed too heavily in the direction of law enforcement, and even that the databases ought never to have been created. Regardless of how one feels about the ethics and legality of DNA databases, we have a narrow window of opportunity to draw a crystal clear line in the sand and steadfastly oppose the expansion of these databases to innocent persons. To fail in this resolve would mean forfeiting some of our most basic notions of privacy, while undermining our pursuit of justice.

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6. See R. S. Peterson, "DNA Databases: When Fear goes too Far," *The American Criminal Law Review* 37 (2000): 1219-1238, at 1228.
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10. See for example *Jones v. Murray*, 962 F.2d 302, 306 (4th Cir. 1992). For a detailed overview of legal challenges relevant to DNA testing and retention, see M. Rothstein and S. Carnahan, "Legal and Policy Issues in Expanding the Scope of Law Enforcement DNA Data Banks," *Brooklyn Law Review* 67 (2001): 127.
11. In *State v. Olivas*, the court upheld the Washington DNA testing statute, stating that the purpose of the DNA data bank was to deter and prosecute recidivist acts, and that this purpose was a "special need" of government beyond normal law enforcement. 856 P.2d 1076, 1065-86 (Wash. 1993).
12. See for example *Landry v. Attorney General*, 709 N.E. 2d 1085, 1092 (Mass. 1999). See also *Hudson v. Palmer*, 468 U.S. 517, 523 (1984); *People v. Wealer*, 636 N.E. 2d 1129 (Ill. Ct. App.); *Jones*, 962 F.2d at 308.
13. For example, in *Shelton v. Gudmanson*, the court found that Wisconsin's DNA testing of prison inmates was related to law enforcement, but allowed it to be considered within the "special needs" exemption because it was "not undertaken for the investigation of a specific crime." 934 F. Supp. 1048, 1050 (W.D. Wis. 1996).
14. Under *City of Indianapolis v. Edmond* the Court struck down a program in which police used dogs to sniff for drugs in vehicles pulled over in groups at fixed roadblocks because they found the primary purpose of the checkpoint program to be related to the general interest of crime control. 531 U.S. 32 (2000). Similarly, in *Ferguson v. City of Charleston*, the court struck down a program in which a university hospital tested urine samples from pregnant women for cocaine and reported positive results to the police because the primary purpose of the program was said to be the arrest and prosecution of drug-abusing mothers, and therefore in the general interest of crime control. 532 U.S. 67 (2001).
15. T. Maclin, "Is Obtaining an Arrestee's DNA a Valid Special Needs Search under the Fourth Amendment? What Should (and Will) the Supreme Court Do?" *Journal of Law, Medicine & Ethics* 33, no. 1 (2005): 102-224. Report in *Journal of Law, Medicine & Ethics* 34, no. 2 (2006): 165-187. Compare D. H. Kaye, "Who Needs Special Needs? On the Constitutionality of Collecting DNA and Other Biometric Data from Arrestees," *Journal of Law, Medicine & Ethics* 34, no. 2 (2006): 188-198.
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18. See generally D. Kevles, *In the Name of Eugenics* (Cambridge: Harvard University Press, 1998). See also *Buck v. Bell*, 274 U.S. 200 (1927).
19. The ACLU has been at the center of many of these disputes about the balance between privacy and security. See S. Walker, *In Defense of American Liberties* (New York: Oxford University Press, 1990): at 246-252, 357-359.
20. See S. Axelrad, *supra* note 1.
21. *Id.*
22. *Id.* For example, unauthorized procurement of DNA samples constitutes a Class D felony in the state of Connecticut.
23. M. S. Elrick, "Penalties Uneven for Data Misuse," *Detroit Free Press*, August 1, 2001. See also M. L. Elrick, "Cops Tap Database to Harass, Intimidate," *Detroit Free Press*, July 31, 2001.
24. See, for example, J. P. Cronan, "The Next Frontier of Law Enforcement: A Proposal for Complete DNA Databanks," *American Journal of Criminal Law* 28 (2000): at 134.
25. "Violent Crime" includes offenses of murder, forcible rape, robbery and aggravated assault. FBI, *Crime in the United States 2002*, "Index of Crime," Table 2, available at <http://www.fbi.gov/ucr/cius_02/html/web/offreported/02-table02.html> (last visited February 14, 2006).
26. "Property crime" includes offenses of burglary, larceny-theft, and motor vehicle theft.
27. M. McCollum, "Award to Boost DNA Crime Lab," *Denver Post*, October 14, 2005.
28. R. Willing, "DNA Matches Win Few Convictions in Virginia," *USA Today*, November 7, 2005. For a more detailed discussion of "hits" as metric of forensic DNA database effectiveness, see in this issue F. R. Bieber, "A Home Run or Just a Base Hit? Measuring and Improving the Efficacy of Forensic DNA Data Bank Programs," *Journal of Law, Medicine & Ethics* 34 (2006): 222-233.
29. Already, we have seen at least one case of a wrongful conviction where the defendant had a strong alibi. Timothy Durham of

- Tulsa, Oklahoma, was convicted of raping an 11-year-old girl and sentenced to 3,000 years in prison, despite having produced eleven alibi witnesses who placed him in another state at the time of the crime. The prosecution's case rested almost exclusively on a DNA test that was later shown to have been misinterpreted. Durham served four years in prison before this error was uncovered.
30. See C. Rosen, "Liberty, Privacy and DNA Databases," *The New Atlantis* 1 (2003): 37-52.
 31. See Forensic Science Service, *Casefiles*, "Colin Pitchfork – First Murder Conviction on DNA Evidence also Clears The Prime Suspect," available at <http://www.forensic.gov.uk/forensic_t/inside/news/list_casefiles.php?case=1> (last visited February 14, 2006).
 32. See R. Willing, "Criminals Try to Outwit DNA," *USA Today*, August 28, 2000.
 33. See HBO Autopsy, "The Good Doctor," available at <www.hbo.com/autopsy/episode/episode_7_the_good_doctor.html> (last visited February 14, 2006). See also *The Minister of Citizenship and Immigration v. Steven John Schneeberger* (2003) FC 970, Office of the Commissioner for Federal Judicial Affairs website, available at <<http://reports.fja.gc.ca/fc/2004/pub/v1/2004fc33109.html>> (last visited February 14, 2006).
 34. The perceived infallibility of DNA testing has already resulted in a few known cases where innocent people have been wrongly convicted despite evidence of their innocence. In 1997, Timothy Durham was released from a prison in Oklahoma after he served four years for a rape he could not have committed. Despite having produced eleven alibi witnesses who placed Durham in another state at the time of the crime, he was convicted of raping an eleven-year-old girl and sentenced to 3,000 years in prison. The prosecution's case rested almost exclusively on a DNA test that turned out to have been erroneously analyzed. See W. C. Thompson, F. Taroni and C. G. G. Aitken, "How the Probability of a False Positive Affects the Value of DNA Evidence," *Journal of Forensic Science* 48, no. 1 (2003): 47-54, ASTM International website, available at <<http://www.astm.org/cgi-bin/SoftCart.exe/JOURNALS/FORENSIC/PAGES/4244.htm?L+mystore+zsy0773+1140652916>> (last visited February 27, 2005). Similarly, Josiah Sutton spent nearly five years in jail for a rape he did not commit. His conviction rested almost entirely on a wrongly interpreted DNA test performed by the Houston Police Crime Laboratory. See W. C. Thompson, "Review of DNA Evidence in *State of Texas v. Josiah Sutton*" (District Court of Harris County, Cause No. 800450), February 6, 2003.
 35. F. S. Baechtel, Proceedings of "The Human Genome Project, DNA, Science and the Law: The American Legal System's Response to Breakthroughs in Genetic Science," DNA Unit, FBI, Washington, DC, October 19, 2001, printed in *American University Law Review* 51 (2002): 367-501, at 401.
 36. National Institute of Justice, *Report to the Attorney General on Delays in Forensic DNA Analysis*, March 2003, available at <<http://www.ojp.usdoj.gov/nij/pubs-sum/199425.htm>> (last visited February 22, 2006).
 37. The California Department of Justice received for processing approximately 295,000 DNA samples in 2005, as compared to 32,000 samples in 2004. The DNA sample backlog on December 31, 2005 was approximately 264,000 samples. Email communication with L. Kleinberg, California Department of Justice, February 24, 2006. Prior to the enactment of Proposition 69, the California Department of Justice reported a backlog of 60,000-80,000 samples. L. Gima, Bureau Chief, California Department of Justice Bureau of Forensic Services, Statement at a Joint Informational Hearing on Proposition 69 before the California State Senate Public Safety and Assembly Public Safety Committees, September 23, 2004.
 38. National Institute of Justice, *Report to the Attorney General on Delays in Forensic DNA Analysis*, March 2003, available at <<http://www.ojp.usdoj.gov/nij/pubs-sum/199425.htm>> (last visited February 22, 2006).
 39. Federal Bureau of Investigation, *Crime in the United States: 2002*, "Estimated Arrests," Table 29, available at <http://www.fbi.gov/ucr/cius_02/html/web/arrested/04-table29.html> (last visited February 14, 2006).
 40. As of September 2005, the National DNA Index System contained 2,763,191 offender profiles. FBI's CODIS website, available at <<http://www.fbi.gov/hq/lab/codis/clickmap.htm>> (last visited February 14, 2006).
 41. FBI, *Crime in the United States 2002*, "Arrests," Table 69, available at <http://www.fbi.gov/ucr/cius_02/html/web/arrested/04-table69.html> (last visited February 14, 2006).
 42. Email communication with L. Kleinberg, California Department of Justice, February 24, 2006.
 43. These increases are calculated based on the number of samples the California Department of Justice received for processing, and not how many were actually processed.
 44. The NIJ Report to the Attorney General on Delays in Forensic DNA Analysis identified duplicate collections as one of several issues that contribute to wastes of time and expense. See *NIJ Report supra*, note 36, at 4.
 45. See ACLU Press Release, "ACLU of Massachusetts Warns that Random DNA Dragnets Hinder, Not Help, Crime Investigations," April 15, 2005, available at <<http://www.aclu.org/privacy/medical/15323prs20050415.html>> (last visited February 14, 2006).
 46. The severe problems associated with the Houston Police Department's crime lab that resulted in the closing of the laboratory in 2003 and a review of hundreds of cases involving DNA evidence have been directly attributed to inadequate resources, ineffective management, and a lack of adequate quality control and quality assurance. See M. R. Bromwich, *Fourth Report of the Independent Investigator for the Houston Police Department Crime Laboratory and Property Room* (January 4, 2006), Office of the Independent Investigator for the Houston Police Department Crime Laboratory and Property Room, available at <<http://www.hpdlabinvestigation.org/reports/060104report.pdf>> (last visited February 14, 2006).
 47. See T. Simoncelli and B. Steinhardt, "California's Proposition 69: A Dangerous Precedent for Criminal DNA Databases," *Journal of Law, Medicine & Ethics* 33, no. 2 (2005): 279-293, at 286-288. Reprinted in *Journal of Law, Medicine & Ethics* 34, no. 2 (2006): 199-213. For a comprehensive discussion of the fallibility of DNA testing see W. C. Thompson, S. Ford, T. Doom, M. Raymer and D. E. Krane, "Evaluating Forensic DNA Evidence: Essential Elements of a Competent Defense Review," *Champion Magazine* 24 (2003): 17-25.
 48. "Ashcroft Seeks \$1 Billion for DNA Crime Tests," *Associated Press*, March 11, 2003. Available at <<http://www.cnn.com/2003/LAW/03/11/ashcroft.dna.ap/index.html>> (last visited February 14, 2006).
 49. See D. Kaye and M. E. Smith, "DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage," *Wisconsin Law Review* (2003): 413-459, at 438.
 50. The U.S. Census estimated that out of a total U.S. population of 282,909,885 persons, 33,533,945 were foreign-born. U.S. Census Bureau, *Foreign-Born Population of the United States American Community Survey - 2003*, Table 1.1a, "Population by Sex, Age, and U.S. Citizenship Status: 2003," available through <<http://www.census.gov/population/www/socdemo/foreign/acst2.html#cit>> (last visited February 14, 2006).
 51. See D. Kaye and M. E. Smith, *supra* note 49, at 438.
 52. *Id.*, at 417-423.
 53. T. Duster, "Selective Arrests, an Ever-Expanding DNA Forensic Database, and the Specter of an Early-Twenty-First-Century Equivalent of Phrenology," in D. Lazer, ed., *DNA and the Criminal Justice System* (Cambridge: MIT Press, 2004): 315-334.
 54. *Id.*
 55. DNA dragnets have also proven ineffective. A recent survey demonstrated that only one of nineteen dragnets conducted in the U.S. resulted in identification of a suspect. See *Police DNA "Sweeps" Extremely Unproductive: A National Survey of Police DNA "Sweeps"*, A report by the Police Professionalism Initiative, Department of Criminal Justice, University of Nebraska at Omaha, Coordinated by Samuel Walker, September 2004.