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DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage

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ARTICLES

DNA IDENTIFICATION DATABASES: LEGALITY, LEGITIMACY, AND THE CASE FOR POPULATION-WIDE COVERAGE

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INTRODUCTION

Over the past decade, law enforcement authorities have amassed huge collections of DNA samples and the identifying profiles derived from them. It is a development that has been greeted with ominous warnings[1] and extensive litigation.[2] Large DNA databanks routinely help to identify the guilty and to exonerate the innocent, but as the databanks grow, so do fears about civil liberties. Slogans like "government-sponsored bioinvasion"[3] vie with reports of "cold hits"[4] in cases of rape, murder, and theft that otherwise would go unsolved.[5]

Perhaps the most controversial policy issue in the creation of these databases is the question of coverage: Whose DNA profiles should be stored in them? The possibilities extend from convicted violent sex offenders to all convicted felons, to everyone arrested, to the entire population.[6] This Article questions the rationales for drawing the line at all convicted offenders—which is fast becoming standard practice—or at

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1. *See* D.H. Kaye, *The Constitutionality of DNA Sampling on Arrest*, 10 CORNELL J. L. & PUB. POL'Y 455, 456–57 (2001) (citing examples).

2. *See, e.g.*, Roe v. Marcotte, 193 F.3d 72 (2d Cir. 1999); Shaffer v. Saffle, 148 F.3d 1180 (10th Cir. 1998); Schlicher v. (NFN) Peters, 103 F.3d 940 (10th Cir. 1996); Bolling v. Romer, 101 F.3d 1336 (10th Cir. 1996); Kruger v. Erickson, 77 F.3d 1071 (8th Cir. 1996); Rise v. State, 59 F.3d 1556 (9th Cir. 1995); Gilbert v. Peters, 55 F.3d 237 (7th Cir. 1995); Jones v. Murray, 962 F.2d 302 (4th Cir. 1992); Gaines v. State, 998 P.2d 166 (Nev. 2000); Johnson v. Commonwealth, 529 S.E.2d 769 (Va. 2000); Doles v. State, 994 P.2d 315 (Wyo. 1999).

3. Paul R. Billings, Editorial, *DNA Data Banks Would Taint Justice*, BOSTON GLOBE, Jan. 14, 1999, at A19.

4. *E.g.*, Hooks v. State, 19 P.3d 294, 303 (Okla. Crim. App. 2001) (multiple murderer-rapist identified in national database search); D.H. KAYE, SCIENCE IN EVIDENCE 224-26 (1997); *State Boosts Felons' DNA Database: Crime-Fighting Cache Becomes Largest in U.S.*, S.F. CHRON., June 25, 2001, at A1 (reporting that California's DNA database of 200,000 profiles, now the largest in the nation, is producing approximately one "cold hit" per week).

5. These "cold hits" can stretch back decades to solve "cold cases"—those that the police had given up on. *See, e.g.*, NAT'L INST. OF JUST., USING DNA TO SOLVE COLD CASES (2002), *available at* http://www.ncjrs.org/pdffiles1/nij/194197.pdf; C.J. Chivers, *DNA Database Said to Link Inmate to 1979 Murder*, N.Y. TIMES, Mar. 13, 2000, at B1.

6. Every state collects DNA from individuals convicted of various offenses. M. DAWN HERKENHAM, U.S. DEP'T OF JUSTICE, STATE DNA DATABASE STATUTES: SUMMARY OF PROVISIONS, at i–ii (1999); Robin Cheryl Miller, Annotation, *Validity, Construction, and Operation of State DNA Database Statutes*, 76 A.L.R. 5th 239, 239 (2000). The federal government also takes DNA from federal offenders. *See* DNA Analysis Backlog Elimination Act of 2000, Pub. L. No. 106-546, 114 Stat. 2726. Most European countries have established similar programs, although there the DNA typically is collected at the time of an arrest. David Werrett, The Strategic Use of DNA Profiling, Address Before the 18th International Congress on Forensic Haemogenetics (Aug. 19, 1999).

all arrestees—which may be where we are headed. It suggests that such coverage results in sampling DNA disproportionately from racial minorities, which exacerbates racial tensions and undermines the preventative and investigative value of the databases. It argues that a population-wide database with strict privacy protections may supply the better answer to the coverage question, and to the privacy concerns raised by any government program to take and analyze individuals' DNA.

Part I discusses two theories that might dictate which offenders should be included in these databases. The first theory holds that by virtue of a conviction, offenders forfeit the Fourth Amendment right to be free from unreasonable searches and seizures. This forfeiture-of-rights theory would confine the databases to convicted offenders, but it cannot be squared with settled constitutional principles. The second theory holds that because convicted offenders are more likely to re-offend than are other groups, they pose a special risk that justifies the incursion on their Fourth Amendment rights. Although this recidivism theory may seem more protective of individual liberties, it fails to constrict coverage to convicted offenders or even to arrestees.

Part II considers extensions of coverage to various groups of people who have not been convicted of crimes. It suggests that the Constitution may permit DNA to be collected from persons who have only been arrested, and even from certain groups of persons who have neither been convicted nor arrested.

Part III questions the desirability of limiting database coverage to convicted offenders, or to convicted offenders plus arrestees (or "suspects"). It notes that by restricting coverage to these groups, we are fast producing a racially distorted system in which, however lawfully the DNA samples are taken, they are taken disproportionately from members of racial minorities. We conclude that a population-wide database would be more effective and more fair than any system in which conviction or arrest is the threshold for database inclusion. We also indicate how such a system can be structured to protect personal privacy.

I. WHICH OFFENSES SHOULD TRIGGER INCLUSION?

DNA profiles of convicted sex offenders are obvious candidates for inclusion in DNA databases. Indeed, most states began by authorizing databases limited to sex-offender profiles as part of their general effort to better protect women and children from sexual assault. Databases of convicted sex-offender records were not especially controversial given the general abhorrence of sex offenders, with the popular image of

rapists as sexual predators who strike again and again, and the ubiquity of potentially incriminating biological evidence in most rape cases.[7]

However, it soon became difficult to confine to this group the statutory authority to take DNA samples. First, the data never supported the view that recidivism was dramatically higher for sex offenders in general than for other categories of offenders. To the contrary, recidivism rates were and still are similar or even higher for other offender groupings.[8] Second, potentially incriminating DNA evidence is hardly peculiar to sex crimes. Traces of blood, saliva, hair, and other DNA-bearing material are left at the scene of many types of crimes.[9] Finally, although sexual assault is among the most detested of

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7. *But see* DNA ON TRIAL: GENETIC IDENTIFICATION AND CRIMINAL JUSTICE (Paul R. Billings ed., 1992) (criticizing the creation of sex-offender databases).

8. PATRICK A. LANGAN & DAVID J. LEVIN, BUREAU OF JUSTICE STATISTICS, RECIDIVISM OF PRISONERS RELEASED IN 1994 (2002). This study examines the arrest and conviction records of a representative sample of all prisoners released in 1994 from the prisons of fifteen states. The Bureau of Justice Statistics sample included 100% of those released who had been serving sentences for rape. Overall, more than two-thirds (67.5%) of all offenders were arrested on new charges within three years of their release. The rate of re-arrest was highest among property offenders (e.g., motor vehicle theft, 78.8%, and burglary, 74%). Among those who had been imprisoned for violent offenses, the rate of re-arrest was highest for robbers, of whom 70.2% were arrested—13.4% on new robbery charges. By contrast, fewer than half (46%) of those who had been imprisoned for rape were arrested within three years of release—2.5% on new rape charges. Offenders imprisoned for rape had the lowest re-arrest rate of any group of released prisoners (except for the 40.7% rate of arrest among the relatively few who had been released after being imprisoned for homicide). *Id.* at 9 tbl.10. For similar findings, see LAWRENCE A. GREENFELD, BUREAU OF JUSTICE STATISTICS, SEX OFFENSES AND OFFENDERS: AN ANALYSIS OF DATA ON RAPE AND SEXUAL ASSAULT 26-27 (1997) (reporting that, for rapists released from prisons of eleven states in 1983, the rate of re-arrest over the three-year period after release was 60%, and the re-conviction rate was 36%, while for all violent offenders, the rates were higher—60% and 42%, respectively).

9. By 1999, the United Kingdom's Forensic Science Service was able to develop a DNA profile in 5% of all property-crime samples, and most of the hits in the database for England and Wales were coming from burglary and vehicle theft cases rather than from rapes or murders. Werrett, *supra* note 6; *see also Forensics Help Trap 1,000 Car Thieves*, BRISTOL EVENING POST, June 27, 2001, at 7, *available at* 2001 WL 22486231.

Early critics of DNA databases seemed unaware of the potential value of DNA analysis in such cases. *See, e.g.*, Philip L. Bereano, *The Impact of DNA-Based Identification Systems on Civil Liberties*, *in* DNA ON TRIAL: GENETIC IDENTIFICATION AND CRIMINAL JUSTICE, *supra* note 7, at 121 ("[M]uch crime leaves no identifying tissue behind (e.g., burglary)."). Even the National Academy of Sciences' Committee on Forensic DNA Technology once thought it "clear" that a DNA database would not be useful for "crimes of most types," such as "larcenies, burglaries, and assaults," and that forcible rape was the only "major exception." COMM. ON DNA TECH., NATIONAL RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 120 (1992). Accordingly

crimes, the public does not have high regard for murderers, burglars, and petty thieves either.

The result is pressure to extend the coverage of the databases to all violent felons; and then to all felons and many misdemeanants.[10] Defining the point at which the collection of DNA profiles should stop requires a theory for including profiles in the database in the first place. Two such theories can be found in case law on the constitutionality of offender databases. One we call the *forfeiture theory*. It holds that upon criminal conviction, individuals forfeit any right they might otherwise enjoy to be free from having their DNA typed and the resulting profile placed on file.[11] But this notion of "forfeiture" is a conclusion in search of an argument. To be sure, a conviction at a trial where the defendant is afforded due process of law may trigger the most serious of punishments—from deprivation of life, to loss of liberty, to loss of property. The Constitution explicitly countenances these punishments.[12] But there are limits to what other deprivations of liberty or property are constitutionally permissible. As the Supreme Court explained in *Hudson v. Palmer*,[13] "prisoners [must] be accorded those rights not

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it intimated that databases should be restricted to "offenders convicted of violent sex crimes." *Id.*

10. As of 1999, all states required sex offenders to give samples, thirty-six included murder as a qualifying offense, twenty-seven included assault and battery, and a minority included other felonies such as kidnapping, burglary, and robbery. HERKENHAM, *supra* note 6, at unnumbered page 4 (chart of qualifying offenses). Five states demanded samples from all felons. *Id.* As of February 2000, thirty-nine states included murder, and eighteen included certain property offenses; seven states covered all felons, and twenty-three included some misdemeanants. *See* Jonathan Kimmelman, *Risking Ethical Insolvency: A Survey of Trends in Criminal DNA Databanking*, 28 J. L. MED. & ETHICS 209, 219 (2000). By July 1, 2002, the number of states requiring all felons to give samples had grown to twenty-two. KELLY FOX & DONNA LYONS, NAT'L CONFERENCE OF STATE LEGISLATURES, FIGHTING CRIME WITH DNA, Oct. 2002, *available at* http://www.ncsl.org.public/legis1042.htm.

11. *Cf.* Rise v. Oregon, 59 F.3d 1556, 1560 (9th Cir. 1995) ("[C]onvicted felons . . . do not have the same expectations of privacy in their identifying genetic information that 'free persons' have."); Jones v. Murray, 962 F.2d 302, 306 (4th Cir. 1992) ("With the person's loss of liberty upon arrest comes the loss of at least some, if not all, rights to personal privacy otherwise protected by the Fourth Amendment."); Editorial, *DNA Testing for All Convicts*, CHI. TRIB., Jan. 29, 2002, at 16, *available at* 2002 WL 2617486:

> Defendants give up plenty of rights when they're convicted of crimes and sentenced to prison. Chief among them is freedom. They also lose much of their privacy.
>
> That's why a new statewide proposal to require that all convicted felons be required to submit a DNA sample shouldn't raise the hackles of civil libertarians or anyone else.

12. *See* U.S. CONST. amends. V & XIV.

13. 468 U.S. 517 (1984).

fundamentally inconsistent with imprisonment itself or incompatible with the objectives of incarceration."[14] The state could hardly provide that a citizen convicted of even the most heinous crime thereby forfeits the right to free speech,[15] the privilege against self-incrimination,[16] or the plethora of other rights secured by the Constitution.[17]

How, then, could the bare fact of conviction work a forfeiture of the right to be free from unreasonable searches and seizures? It is true that in *Hudson*, a narrow majority of the Court, in upholding random "shakedown" searches of prison cells, wrote that "the Fourth Amendment proscription against unreasonable searches does not apply within the confines of the prison cell."[18] The reason, however, was not that those convicted of crime lose their Fourth Amendment rights. It was that "privacy rights for prisoners in their individual cells simply cannot be reconciled with the concept of incarceration and the needs and objectives of penal institutions."[19]

This is not to say that individuals who have been convicted of crimes must be treated as if they had not been. For example, unless

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14. *Id.* at 523

15. *See, e.g.*, Shaw v. Murphy, 532 U.S. 223, 231 (2001) (recognizing that prisoners retain some First Amendment rights, but refusing to accord "special protection to . . . speech that includes legal advice"); Prison Legal News v. Cook, 238 F.3d 1145, 1153 (9th Cir. 2001) (holding unconstitutional a state policy prohibiting the receipt by inmates of standard rate mail, as applied to subscription non-profit organization mail).

16. *See, e.g.*, Lile v. McKune, 224 F.3d 1175, 1192 (10th Cir. 2000) (holding that the state violated an inmate's Fifth Amendment privilege against self-incrimination when it required him to choose between admitting incriminating information as part of a sex abuse treatment program or suffering a transfer and loss of privileges).

17. *See Hudson*, 468 U.S. at 523-24 (citations omitted) (alterations in original):

> Like others, prisoners have the constitutional right to petition the Government for redress of their grievances, which includes a reasonable right of access to the courts.
>
> Prisoners must be provided "reasonable opportunities" to exercise their religious freedom guaranteed under the First Amendment. Similarly, they retain those First Amendment rights of speech "not inconsistent with [their] status as . . . prisoner[s] or with the legitimate penological objectives of the corrections system." They enjoy the protection of due process. And the Eighth Amendment ensures that they will not be subject to "cruel and unusual punishments." The continuing guarantee of these substantial rights to prison inmates is testimony to a belief that the way a society treats those who have transgressed against it is evidence of the essential character of that society.

See also Turner v. Safley, 482 U.S. 78, 99-100 (1987) (striking down a marriage regulation that prohibited inmates from marrying unless the prison superintendent had approved the marriage after finding compelling reasons for the marriage).

18. *Hudson*, 468 U.S. at 526.

19. *Id.*; *see also Roe*, 193 F.3d at 81-82.

there is some right to be free from surveillance in public places,[20] the police could decide to engage in more intense public surveillance of ex-convicts on the theory that they pose greater risks to public safety—just as they could decide to keep a close watch on teenagers hanging out in groups. A prior conviction also can be a factor in determining whether there is probable cause to arrest an ex-convict suspected of another crime, and, at trial, prior convictions often are admitted into evidence. Nevertheless, in itself, a conviction does not strip a person of the Fourth Amendment's protection against unreasonable searches, and there is no reason to view every post-conviction search as reasonable.[21] In sum, if convicts forfeit their Fourth Amendment rights, it must be for some reason beyond the fact of conviction or imprisonment.

Thus, a second justification for convicted-offender DNA databases is woven through the court opinions that find them permissible in the face of Fourth Amendment challenges. This is a *predictivist* theory: If persons convicted at least once are more likely to commit future crimes for which DNA evidence might be found than are those with no such criminal histories, then including DNA profiles of samples taken when these offenders are convicted would be expected to help—perhaps substantially—to deter and solve crimes. This theory thus distinguishes convicted criminals on the ground that they pose greater risks.[22] It

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20. No such right has been recognized. *See* United States v. Knotts, 460 U.S. 276, 281 (1983) ("A person traveling in an automobile on public thoroughfares has no reasonable expectation of privacy in his movements from one place to another.").

21. In *United States v. Knights*, 534 U.S. 112 (2001), the Supreme Court unanimously upheld a warrantless search of a probationer's apartment for explosives. The Court determined that the search satisfied the Fourth Amendment's "touchstone" of "reasonableness" because (1) the court granting probation imposed the condition that the convict submit to any search "by any . . . law enforcement officer," and (2) the officer here had "reasonable suspicion that a probationer subject to a search condition [was] engaged in criminal activity [involving explosives]." *Id.* at 116, 118, 121. The condition of probation, the Court reasoned, produced "significantly diminished privacy interests," rendering reasonable suspicion rather than probable cause sufficient "to make the intrusion on the individual's privacy interest reasonable." *Id.* at 121. Rather than rely on a pure forfeiture theory, the Court demanded individualized suspicion, and it explicitly avoided deciding "whether the probation condition so diminished, or completely eliminated Knights's reasonable expectation of privacy . . . that a search by a law enforcement officer without any individualized suspicion would have satisfied the reasonableness requirement of the Fourth Amendment." *Id.* at 120 n.6.

22. For example, in *Jones v. Murray*, 962 F.2d 302 (4th Cir. 1992), the Court of Appeals for the Fourth Circuit observed:

> Commonwealth officials say that the program attempts to address the problem of felony recidivism in Virginia by identifying and increasing the likelihood of convicting repeat offenders and by deterring those who might otherwise commit a second felony. According to a study of violent felons convicted in Virginia between 1985 and 1987, 36.4% had at least one prior conviction for a felony. Only 26% had no prior criminal record and just

requires us to look at the connection between "collection crimes"—those that trigger the collection of DNA upon conviction—and "target" or "traceable offenses"—those for which biological trace evidence might be found. For a crime to qualify as a collection crime, the probability that a person guilty of the collection crime (*C*) will commit, or has committed, any target crime (*T*) must exceed the probability that a person who has not committed any instance of *C* will commit, or has not committed, *T*. In other words, *C* must be a risk factor for one or more target crimes; meaning that individuals who are convicted for a collection offense *C* are a greater risk for committing a target offense *T* than people who are not guilty of the collection offense *C*.

The logic of the predictivist theory for limiting DNA databases to some subset of convicted offenders can be stated neatly, but it is difficult to apply. The justification turns on (1) the likelihood of future crimes, by category of current conviction, as well as (2) the likelihood that the scenes of future crimes committed by offenders of any given type will present investigators with incriminating DNA evidence. Currently available data on these probabilities are sketchy, and it proves difficult to limit the sweep of the predictivist argument to convicted offenders. A later arrest, upon probable cause to believe the arrestee has committed a crime, is more likely among those who have been arrested at some point in the past, and prior arrest generally has some predictive value, whether or not a conviction follows.

But there are many predictors of who will engage in future crimes—some of them more powerful than prior arrest or prior conviction. Dysfunctional family or neighborhood, disengagement from the labor market or school, past antisocial acts, age, gender, and a host of other personal and environmental factors are, particularly in

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> over 19% had previously been convicted of nonviolent felonies. A United States Department of Justice survey of more than half of those persons released from the prisons of eleven states in 1983 revealed that an estimated 62.5% were arrested again for a felony or serious misdemeanor within three years after release.

Id. at 304. Likewise, in *Rise v. Oregon*, 59 F.3d 1556 (9th Cir. 1995), the Ninth Circuit referred to "uncontroverted evidence documenting the high rates of recidivism among certain types of murderers and sexual offenders." *Id.* at 1561. If the predictivist thesis holds, then the forfeiture theory, even if it were valid, would not be necessary, at least for those offenders who are likely to reoffend. *See* Roe v. Marcotte, 193 F.3d 72, 82 (2d Cir. 1999) (declining to rely on the forfeiture theory and reasoning that "[b]ecause studies cited by defendants indicate a high rate of recidivism among sexual offenders, and because DNA evidence is particularly useful in solving such crimes, the statute passes the 'special needs' balancing test"); State v. Olivas, 856 P.2d 1076, 1086 (Wash. 1993) (concluding that application of the "special needs" balancing test was "a better reasoned approach" than the Fourth Circuit's analysis in *Jones*, which "diminished the privacy rights of convicted persons").

combination, statistical predictors of future criminal conduct.[23] Thus, the predictivist theory offers no satisfactory basis for separating people who have been convicted of crimes, or who have been arrested, from other people who carry comparable or even greater probabilities of leaving incriminating traces of DNA behind in the commission of future crimes.

If the simple forfeiture theory is untenable because convicts do not necessarily lose all civil rights, and if the predictivist theory tends to justify much more inclusive databases, what principle remains to confine the databases to convicted offenders? If inclusion were to hinge on conviction, not arrest, then perhaps the fact of a conviction could properly be used as a side constraint on predictivism. That is, one might acknowledge that there is some reason to include an individual's profile in the database whenever there is an elevated probability of that person subsequently committing crime of a type for which incriminating DNA evidence is sometimes found by investigators, but that it would be unfair to do so unless the individual at least once before has been found guilty of some crime.

This side-constraint argument sounds promising, but it too fails. Criminal punishment is a social practice of blaming and imposing significant burdens on individuals in response to their doing what a legislature has declared sufficiently wrong to deserve official censure and punishment.[24] It is appropriate to insist that these harms not be imposed on an individual in the absence of a fair adjudication establishing that the individual committed the crime.[25] But acquiring DNA profiles and storing them in a searchable database looks very little like punishment, for which conviction is a prerequisite. The bodily intrusion required to extract the information can be kept to a minimum by using saliva, buccal swabs (from the inside of the cheek), or a laser-based device that samples blood without leaving a mark. As we explain later, the loci used to type the DNA can be limited to those that are no more socially meaningful or potentially stigmatizing than a simple fingerprint. Rather than constituting a criminal sanction, collecting and storing DNA identification profiles in a database is a form of

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23. *See generally* 9 PREDICTION AND CLASSIFICATION: CRIMINAL JUSTICE DECISION MAKING (Don Gottfredson & Michael Tonry eds., 1987); PREDICTION IN CRIMINOLOGY (David Farrington & Roger Tarling eds., 1985); Jack F. Williams, *Process and Prediction: Return to a Fuzzy Model of Pretrial Detention*, 79 MINN. L. REV. 325 (1994); Daniel S. Goodman, Note, *Demographic Evidence in Capital Sentencing*, 39 STAN. L. REV. 499 (1987).

24. *See generally* Dan M. Kahan, *Social Influence, Social Meaning, and Deterrence*, 83 VA. L. REV. 349 (1997).

25. *See generally* Paul H. Robinson, *Punishing Dangerousness: Cloaking Preventive Detention as Criminal Justice*, 114 HARV. L. REV. 1429 (2001).

discovering and remembering information about someone. It is far less onerous than the requirement, recently deemed not to be punishment,[26] that a sex offender register with local police and have his conviction, home address, place of employment, and automobile described on the Internet.[27] In short, retaining DNA for identification purposes neither communicates condemnation nor burdens individual autonomy as do punishments authorized by the criminal law.

This is not to say that no burdens could flow from one's inclusion in a DNA identification database. Human error will inevitably cause a database sample to be mistyped or mislabeled in a way that raises suspicion about or produces an accusation against an innocent person whose profile is erroneously matched to a crime scene sample. However, the established practice of extracting fresh samples from suspects identified by database searches greatly reduces the chance of accusation, conviction, and punishment of innocent persons.[28] Of course, an initial false accusation entails some burden on a suspect even if it is quickly dispelled, but pursuing leads that turn out to be unproductive is not forbidden by the important principle that the state may not punish the innocent.[29] Indeed, that principle supports thorough

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26. Smith v. Doe, 123 S. Ct. 1140 (2003).

27. *Id.* at 1146. Even before *Smith*, lower courts repeatedly rejected claims that DNA database laws imposed ex post facto punishment on convicted offenders. *E.g.*, Roe v. Marcotte, 193 F.3d 72 (2d Cir. 1999); Rise v. Oregon, 59 F.3d 1556, 1562 (9th Cir. 1995); Jones v. Murray, 962 F.2d 302 (4th Cir. 1992); United States v. Sczubelek, No. CRIN.A.94-8-SLR, 2003 WL 1818109 (D. Del. Apr. 2, 2003).

28. The fear has been expressed that "if you are in the database, you have a greater chance of being erroneously accused of a crime—that's apparently occurred recently in England." Simon Cole, Address at the Conference on DNA and the Criminal Justice System (Nov. 20, 2000) (transcript available at http://www.ksg.harvard.edu/dna/transcribe_table_page.htm). Most news accounts of the incident are unclear as to whether the individual in the database of some 666,000 profiles was charged with the burglary being investigated. They consistently state, however, that the match occurred at only six loci. *See, e.g.*, Richard Willing, *Mismatch Calls DNA Tests into Question*, USA TODAY, Feb. 8, 2000, at 3A. With so few short tandem repeat (STR) loci, one would expect coincidental matches about one time in sixty. When the suspect provided an alibi, his DNA was retyped—this time at ten loci—and he was promptly excluded as a suspect. *Id.* In the United States, the usual number of loci examined in database searches is thirteen, making the frequency of a coincidental match (for the same size database) much smaller.

The lesson, then, is not that there is a significant chance that a database match will produce a false indictment or conviction, but that investigators and prosecutors must understand that the implications of a match in the database depend on the size of the database and the number and types of loci tested. A database match, standing alone, should be the beginning, rather than the end, of the investigation.

29. The risk of false accusations from database searches is a prudential consideration in designing and operating a law enforcement database. It is a reason to have strict quality control and assurance measures, and to educate police and the public

investigations, and any thorough investigation creates burdens for individuals about whom investigators have initial suspicions. As we explain below, innocents are far more likely to be burdened by suspicion and false accusation if we lack a comprehensive DNA identification database than if we use one.

In short, inclusion of an individual's DNA profile in a forensic database simply is not "punishment," and need not carry any stigma of criminality unless we make it so by the continued practice of including only the profiles of persons convicted of crimes.[30] There is not a persuasive argument why, under constitutional or other principles, a felony or other conviction is essential to inclusion. It therefore is prudent to consider in what ways the databases might become more inclusive, and what advantages and disadvantages extended DNA databases might bring.

II. WHICH OTHER GROUPS MIGHT BE INCLUDED?

A. Volunteers and Suspects

Some suspects give samples "voluntarily" when asked to do so by the police. For example, on the Fourth of July in 1992, someone killed Sean Googin next to Cazenovia Lake in upstate New York. His killer took his body out into the water in an aluminum canoe, weighted his fatigue jacket with rocks from shore, and then left him in a grave of lake grass. State police combed the area and quizzed local residents. They took blood from about fifty citizens, some of them possible suspects, others hometown kids who wanted to help solve the killing of one of their neighbors. "No one, not one, ever refused us in Cazenovia," said

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that a database "hit" is not the end of a criminal investigation. In fact, it is probable that a population-wide database will be administered more carefully than one that is restricted to those who have been convicted or arrested. *See* Simon Cole, *Fingerprint Identification and the Criminal Justice System: Lessons for the DNA Debate*, *in* TECHNOLOGY OF JUSTICE, *supra* note *:

> [I]t is likely that regulation and scrutiny will be more effective if everyone's DNA is in the database. If everyone is a potential victim of an erroneous or fabricated DNA match, then the politicians who fund the regulatory agencies, watchdog committees, and public defenders who protect us against such events will be more likely to maintain adequate funding over the long-term, even as forensic DNA profiling inevitably ceases to be a hot issue and fades into the woodwork of police practice.

30. Consistent with this view, courts have uniformly held that individuals can be compelled to provide DNA samples even though their convictions occurred before the enactment of DNA database laws. *See, e.g.*, *Jones*, 962 F.2d at 309–10; *Sczubelek*, 2003 WL 1818109.

the senior investigator. "They couldn't roll up their sleeves fast enough."[31]

Of course, not all suspects are so cooperative. But DNA often can be acquired by a court order based on probable cause or the lesser standard of "reasonable suspicion."[32] Inasmuch as any invasion of bodily integrity and informational privacy is complete once the sample is collected and analyzed, a strong argument can be made that the state has the constitutional power to add such lawfully acquired profiles to the database for use in unrelated investigations—even when the typing of a suspect's or volunteer's DNA excludes him from further suspicion in the case.[33] In essence, the argument is that there is no "search" when a lawfully acquired profile is entered in the database or is compared to the profiles from unsolved crimes.[34]

Even "elimination samples" could end up in databases.[35] For example, many of the men tested in the New York case were not considered suspects. Could the police create a database of such local residents for possible use in future investigations? Or consider a rape case in which a semen stain is found on the bed where the rape

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31. *See* Dick Case, *Trail of Blood in Worried Town*, POST-STANDARD (Syracuse), Apr. 3, 2001, at A7, *available at* 2001 WL 5536260 (internal quotation marks omitted). Even so, the case went unsolved until 2001, when the DNA profile of a man arrested in 1999 and convicted of sodomy was added to New York's statewide database.

32. *See, e.g.*, Bousman v. Iowa District Court for Clinton County, 630 N.W.2d 789, 800 (Iowa 2001) (explaining that although "[a] nontestimonial identification order [for oral swabs] must be . . . supported by reasonable grounds to suspect that the subject of the order committed the crime under investigation. Probable cause . . . is not necessary"); Wilson v. State, 752 A.2d 1250 (Md. Ct. Spec. App. 2000) (announcing order compelling suspect to provide a DNA sample based on probable cause); *In re* Non-Testimonial Identification Order Directed to R.H., 762 A.2d 1239 (Vt. 2000) (upholding the constitutionality of a Vermont rule as applied to an order for a saliva sample based on reasonable suspicion); Johnson v. Commonwealth, 529 S.E.2d 769, 774 (Va. 2000) (relying on a database match to show probable cause); *cf.* Doe v. Senechal, 725 N.E.2d 225 (Mass. 2000) (finding that even if the Fourth Amendment applies to civil actions not involving the government, a court-ordered buccal swab to test whether a member of the staff of a residential treatment facility for mentally ill adolescents fathered the child of a patient is a reasonable search and seizure).

33. Cases reaching this conclusion include *Bickley v. State*, 489 S.E.2d 167 (Ga. Ct. App. 1997); *Smith v. State*, 734 N.E.2d 706, 709 (Ind. Ct. App. 2000); *Wilson*, 752 A.2d at 1268–72; and *People v. King*, 663 N.Y.S.2d 610, 614 (App. Div. 1997).

34. *Cf.* United States v. Calandra, 414 U.S. 338, 354 (1974) (explaining that grand jury "[q]uestions based on illegally obtained evidence are only a derivative use of the product of a past unlawful search and seizure. They work no new Fourth Amendment wrong.").

35. *See* CECELIA CROUSE & D.H. KAYE, THE RETENTION AND SUBSEQUENT USE OF SUSPECT, ELIMINATION, AND VICTIM DNA SAMPLES OR RECORDS, A REPORT TO THE NATIONAL COMMISSION ON THE FUTURE OF DNA EVIDENCE (Feb. 6, 2001).

occurred. The prosecution may need to eliminate the victim's boyfriend or husband as the possible source of that stain so that it can be attributed to the defendant without equivocation. If the victim's partner consents, as is typical, and there is no discussion of what will be done with the information afterward, does the Fourth Amendment allow the state to add it to a database?[36]

The answer would be in the affirmative if an initial voluntariness standard applies. Under this approach, the pivotal question is whether the individual voluntarily supplied the sample in the first instance. If so, there was constitutionally sufficient consent to the initial search, and the police may make subsequent use of the resulting information without seeking a magistrate's approval. The sole issue is the voluntariness of the initial acquisition of the sample. This approach contrasts with a limited-scope-of-consent standard, under which one asks not merely whether the initial consent was the product of illegitimate coercion, but also whether there was consent, explicit or implicit, to the subsequent use of the sample.

1. THE INITIAL VOLUNTARINESS STANDARD

Cases can be found that seem to support these two distinct and anticlinal approaches. In the context of the search of a car in which stolen checks were found under the rear seat, the Supreme Court held in *Schneckloth v. Bustamonte*[37] that consent is effective as long as it is not coerced. Unlike a waiver of rights at trial, which must be "knowing" and "intelligent," consent to a search need not be based on complete information.[38] Indeed, in *Washington v. State*,[39] the Supreme Court of

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36. Of course, there may be statutory or other barriers to this practice. *See* Cerisse Anderson, *DNA Results Barred From City's Database*, N.Y.L.J., Nov. 18, 2002, at 1.

37. 412 U.S. 218 (1973).

38. *See, e.g.*, United States v. Drayton, 536 U.S. 194, 207 (2002) (reasoning that "[a]lthough [three armed police officers who boarded a Greyhound bus stopped at a terminal and asked passengers about their baggage] did not inform respondents of their right to refuse [a pat-down search of their persons, they] did request permission to search, and the totality of the circumstances indicates that their consent was voluntary, so the searches were reasonable"); *Schneckloth*, 412 U.S. at 241 ("There is a vast difference between those rights that protect a fair criminal trial and the rights guaranteed under the Fourth Amendment. Nothing, either in the purposes behind requiring a 'knowing' and 'intelligent' waiver of trial rights, or in the practical application of such a requirement suggests that it ought to be extended to the constitutional guarantee against unreasonable searches and seizures."). *Contra* Barry Scheck, Remarks at Meeting of the National Commission on the Future of DNA Evidence (Nov. 19, 2000) (asserting that the intelligent, knowing waiver standard used for trial rights also applies to pretrial encounters in which an individual is asked to consent to a search).

39. 653 So. 2d 362 (Fla. 1994).

Florida held that police may trick suspects into giving DNA samples for one investigation by asking them to provide them for unrelated investigations. Alice Berdat, a 93-year-old woman, was murdered in her bedroom. She had been badly beaten and vaginally and anally raped. Anthony Washington was imprisoned at a work release center two miles from the woman's home. He did not show up at his job during the time of the rape, and he sold Berdat's gold watch to a coworker. The detective investigating the murder did not tell Washington that he suspected him of this murder. Instead, he asked Washington for blood and hair samples to use in an unrelated sexual battery case. Washington provided these samples. When the state sought to use the samples in the murder case, Washington moved to suppress them. The trial court denied the motion, and Washington was convicted of the murder, burglary, and sexual battery. The Supreme Court of Florida affirmed the conviction. It reasoned as follows:

> Washington stated that he understood his rights, orally waived them, and freely and voluntarily provided [the detective] with hair and blood samples. . . . [O]nce the samples were validly obtained, albeit in an unrelated case, the police were not restrained from using the samples as evidence in the murder case.[40]

This result is consistent with decisions of the United States Supreme Court in Fifth Amendment cases[41] in which police obtain information while interrogating suspects without informing them of the true purpose of the interrogation[42] or by feeding them false information.[43] Thus, the

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40. *Id.* at 364.

41. The *Schneckloth* majority relied prominently on the conception of voluntariness derived from the interrogation and confession cases to determine the meaning of "voluntariness" for Fourth Amendment purposes. *See* 412 U.S. at 223-27.

42. In *Colorado v. Spring*, 479 U.S. 564 (1987), an informant told agents of the Bureau of Alcohol, Tobacco, and Firearms (ATF) that Spring was engaged in the interstate transportation of stolen firearms and that Spring had participated in a killing in Colorado. *Id.* at 566. The agents set up an undercover operation to purchase firearms from Spring. *Id.* They arrested him during the purchase, repeatedly advised him of his *Miranda* rights, and secured his consent to interrogation. *Id.* at 567. However, they did not reveal that they were interested in the Colorado murder, and they proceeded to question him about it. *Id.* at 567-68. At a trial in Colorado for the murder, Spring moved to suppress statements he made to the ATF agents as well as further statements to the police in Colorado on the theory that all these statements were the result of an invalid waiver of his right not to incriminate himself. *Id.* The trial court admitted the evidence, but the Colorado Court of Appeals reversed, and the Colorado Supreme Court affirmed this reversal, reasoning that "the absence of an advisement to Spring that he would be questioned about the Colorado homicide, and the lack of any basis to conclude that at the time of the execution of the waiver, he reasonably could have expected that

use of undercover agents and "sting" operations without prior judicial approval based on probable cause rests on the premise that the government can secure information by trickery,[44] or at the very least, without disclosing all the facts that a citizen might wish to know.[45]

2. THE SCOPE-OF-CONSENT STANDARD

However, the issue in *Schneckloth* was not the scope of consent. It was whether the consent to the search of the car then and there—a search of well-defined scope and duration—was valid notwithstanding the lack of a *Miranda*-like warning that would have revealed that the police had no right to search without consent. *Schneckloth* merely holds that the validity of such consent is measured by a totality-of-the-circumstances test for voluntariness.[46] There was no ambiguity about

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the interrogation would extend to that subject, *are* determinative factors in undermining the validity of the waiver." Colorado v. Spring, 713 P.2d 865, 874 (Colo. 1985).

The U.S. Supreme Court reversed the Colorado Supreme Court. Justice Powell's opinion for the Court observed that "Spring's argument strains the meaning of compulsion past the breaking point." 479 U.S. at 573. The Court explained that "[a]bsent evidence that Spring's 'will [was] overborne and his capacity for self-determination critically impaired' because of coercive police conduct, his waiver of his Fifth Amendment privilege was voluntary . . . ." *Id.* at 574 (alteration in original) (quoting Culombe v. Connecticut, 367 U.S. 568, 602 (1961), and citing Colorado v. Connelly, 479 U.S. 157, 163-64 (1986)). Emphasizing that "[t]he Constitution does not require that a criminal suspect know and understand every possible consequence of a waiver of the Fifth Amendment privilege," the Court held that the failure to inform Spring that the questioning could extend beyond the offense for which he was arrested and that his answers could be used in more than one case did not render his consent invalid or limit its scope. *Id.*

43. *E.g.*, Oregon v. Mathiason, 429 U.S. 492, 495-96 (1977) (per curiam) (recounting officers' falsely telling suspect that the suspect's fingerprints had been found at crime scene).

44. *See, e.g.*, Illinois v. Perkins, 496 U.S. 292, 297 (1990) ("*Miranda* forbids coercion, not mere strategic deception by taking advantage of a suspect's misplaced trust in one the suspect supposes to be a fellow prisoner. . . . Ploys to mislead a suspect or lull him into a false sense of security that do not rise to the level of compulsion or coercion to speak are not within *Miranda*'s concerns."); Hoffa v. United States, 385 U.S. 293, 304 (1966) (finding statements made to an undercover agent placed near a suspect to gather incriminating information are admissible where "no claim ha[d] been or could [have been] made that [they] were the product of any sort of coercion, legal or factual").

45. Of course, if the government uses false pretenses to make it appear that the individual has no choice but to acquiesce in a search, then the ostensible consent is ineffective. For example, if police falsely claim that they have a search warrant, "[t]he situation is instinct with coercion" and "[w]here there is coercion there cannot be consent." Bumper v. North Carolina, 391 U.S. 543, 550 (1968).

46. As Justice Stewart explained:

the extent of the search to which consent was given. Indeed, the occupant of the car opened the glove compartment and trunk for the police.[47] *Washington* involves the separate question of whether, having consented to give up the samples for one use—the sexual battery case—the suspect runs the risk that the state will make a second use of them in the murder cases.

It is tempting to suggest that the second use is permissible under the general principle that once the state acquires physical evidence legitimately, the Fourth Amendment does not bar subsequent uses of the same evidence. This principle rests on the theory that the invasion of privacy or liberty lies in the initial intrusion or seizure. The additional use may have adverse consequences to the defendant, but it is not itself a further invasion of privacy or liberty. It is, for example, reasonable to hold that information legitimately discovered in the search of an apartment pursuant to a warrant based on probable cause with respect to one crime also may be used in the investigation of a subsequent crime. After all, the entry into the apartment is complete and fully justified by the warrant.

Arguably, this subsequent-use theory breaks down when applied to consent-based searches. The invasion of privacy may be complete when the consenting individual allows the police access to property or gives them a bodily sample. But the justification is that the individual has elected not to invoke the right to be free from unreasonable searches and seizures. This justification may not be apposite when the consent is limited to a particular use. In that situation, the argument goes, the search cannot extend beyond the initial scope of consent—without subsequent consent or a court order.

The problem with this somewhat formal analysis is that the consent exception[48] to the general requirement of a warrant based on probable

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> Our decision today is a narrow one. We hold only that when the subject of a search is not in custody and the State attempts to justify a search on the basis of his consent, the Fourth and Fourteenth Amendments require that it demonstrate that the consent was in fact voluntarily given, and not the result of duress or coercion, express or implied. Voluntariness is a question of fact to be determined from all the circumstances, and while the subject's knowledge of a right to refuse is a factor to be taken into account, the prosecution is not required to demonstrate such knowledge as a prerequisite to establishing a voluntary consent.

Schneckloth, 412 U.S. at 248–49.

47. *Id.* at 220.

48. *See* 2 WAYNE R. LAFAVE, SEARCH AND SEIZURE: A TREATISE ON THE FOURTH AMENDMENT § 4.1(b), at 404 (3d ed. 1996) (explaining the rationale of the "well-established exception to the warrant requirement [of] search by consent").

cause flows from the reasonableness clause of the Fourth Amendment[49] rather than from the doctrine of waiver. The basic teaching of *Schneckloth* remains. Voluntariness, not informed consent, establishes that a warrantless search is constitutionally reasonable, at least in most contexts. To be sure, there may be unusual situations in which an individual must know of the contemplated secondary uses of a DNA sample for putative consent to be valid,[50] but the use of the sample in *Washington* in the murder case along with the sexual battery case does not seem to be one of them. It seems fair to say that unless the suspect is explicit about the limited scope of his consent, he runs the risk that the police will use the sample in more than one investigation.[51]

But even if the Constitution permits the state to incorporate the profile of a "voluntary" sample into a database without explicit consent, it is appropriate to ask whether police *should* do so. The objection to retention of the information has its greatest force with regard to pure "elimination samples." Individuals who were never suspected of wrongdoing and who fulfill what they may perceive as their civic duty to cooperate with the authorities could find themselves entangled in unrelated investigations. And, if the decision is made to allow law enforcement officials to retain the information, a further question arises: Should police seeking consent to DNA sampling be clear about their intention to use the DNA in future investigations? Should a form, much like a *Miranda* warning, be required that states something like, "I consent to having my DNA profile included in a database that will be used in future criminal investigations"? Or would such consent be an

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49. The first clause of the Fourth Amendment bars unreasonable searches and seizures, while the second clause requires that warrants be based on probable cause and meet certain other requirements. U.S. CONST. amend. IV. The Court has construed the Amendment as generally banning searches not based on a warrant supported by probable cause—subject to a list of categorical exceptions, such as consent. *See, e.g.*, Mincey v. Arizona, 437 U.S. 385, 390 (1978) (asserting that "[t]he Fourth Amendment proscribes all unreasonable searches and seizures, and it is a cardinal principle that 'searches conducted outside the judicial process, without prior approval by judge or magistrate, are *per se* unreasonable under the Fourth Amendment—subject only to a few specifically established and well-delineated exceptions.'" (quoting Katz v. United States, 389 U.S. 347, 357 (1967)).

50. *Cf.* Ferguson v. City of Charleston, 532 U.S. 67, 78 (2001) (holding that where state medical personnel induce a patient to provide a bodily sample for the intended but unexpressed purpose of enforcing the criminal law, the "waiver of known rights standard" supplants the normal voluntariness standard because "[t]he reasonable expectation of privacy enjoyed by the typical patient undergoing diagnostic tests in a hospital is that the results of those tests will not be shared with nonmedical personnel without her consent").

51. Following *Ferguson*, however, one might argue that the donor of an elimination sample has a reasonable expectation that the police will use the sample only for the stated purpose. *See id.*

empty formality, not voluntary at all, since many people who are approached by the police reasonably assume that if they do not consent, they will continue to be suspects in the cases then under investigation?[52] In our view, whenever police seek consent for DNA sampling, a clear record of the scope of consent at the outset is desirable. The fear that refusal to cooperate will heighten or create suspicions does not rise to the level of coercion that would vitiate consent under the normal voluntariness standard.

B. Arrestees

DNA collection during custodial arrests is explicitly authorized in a few states.[53] Various arguments to show the constitutionality of this practice have been advanced.[54] For instance, lower courts have long recognized a "true identity" exception to the warrant and probable cause requirements of the Fourth Amendment. They always have held that the state may create and store photographic and fingerprint records that establish a permanent record of the identity of all arrested individuals.[55]

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52. *See, e.g.*, David M. Halbfinger, *Police Dragnets for DNA Tests Draw Criticism*, N.Y. TIMES, Jan. 4, 2003, at A1; Jack Leonard, *Using DNA to Trawl for Killers*, L.A. TIMES, Mar. 10, 2001, at A1 (describing views of "privacy rights advocates").

53. *See* LA. REV. STAT. ANN. § 15:609(A) (1992 & West Supp. 2003) ("A person who is arrested for a felony sex offense or other specified offense on or after September 1, 1999, shall have a DNA sample drawn or taken at the same time he is fingerprinted pursuant to the booking procedure."); S.D. CODIFIED LAWS ANN. § 23-5-14 (1998 & Supp. 2002) (providing, that "[t]he Attorney General shall procure and file for record genetic marker grouping analysis information from any person taken into custody for a violation of the provisions of chapter 22-22"); Maria Gold, *Va. to Begin Taking DNA After Arrests for Felonies: Prosecutors, Rights Activists Split on Database Expansion*, WASH. POST, Jan. 1, 2003, at B1. Other states provide for the collection of DNA samples following an indictment for certain crimes. *See* CAL. PENAL CODE ANN. § 297(b)(3) (1999 & West Supp. 2003) ("For the purposes of this subdivision, 'a suspect' means a person against whom an information or indictment has been filed for one of the crimes listed in subdivision (a) of Section 296. For the purposes of this subdivision, a person shall remain a suspect for two years from the date of the filing of the information or indictment or until the DNA laboratory receives notification that the person has been acquitted of the charges or the charges were dismissed."); TEX. GOV'T CODE ANN. § 411.1471 (effective Sept. 1, 2001) (authorizing collection of DNA at the same time as fingerprinting in kidnapping, sexual assault, and other cases and providing for destruction of samples and records on acquittal or dismissal of the charges); Stephen Braun, *Virginia Aggressively Uses DNA to Solve Other Cases: A Law Allows Police to Compel Suspects in Violent Offenses to Give Samples for Study in Unsolved Crimes*, L.A. TIMES, Jan. 13, 2003.

54. *See* D.H. Kaye, *Two Fallacies About DNA Databanks for Law Enforcement*, 67 BROOK. L. REV. 179 (2001) [hereinafter Kaye, *Two Fallacies*]; Kaye, *supra* note 1.

55. Early cases are discussed in Kaye, *supra* note 1.

Although the DNA molecule itself differs from a fingerprint in that it could reveal significant hereditary conditions or propensities to contract certain diseases, a DNA type need be no more informative than an ordinary fingerprint. For example, the thirteen core STR loci used in current criminal offender databases are noncoding, nonregulatory loci that are not linked to any genes in a way that would permit one to discern any socially stigmatizing conditions.[56] The "profile" of an individual's DNA molecule that is stored in a properly constructed DNA identification database (like the FBI's Combined DNA Index System (CODIS)) is a series of numbers. The numbers have no meaning except as a representation of molecular sequences at DNA loci that are not indicative of an individual's personal traits or propensities.[57] In this sense, the CODIS 13-STR "profile" is very much like a social security number—though it is longer and is assigned by chance, not by the federal government. In itself, the series of numbers can tell nothing about a person.[58] But because the sequence of numbers is so likely to be

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56. *See* Mark Benecke, *Coding or Non-Coding, That Is the Question*, 3 EMBO REPORTS 498, 500-01 (2002); D.H. Kaye, *Bioethics, Bench and Bar: Selected Arguments in* Landry v. Attorney General, 40 JURIMETRICS J. 193, 198 (2000); Kaye, *Two Fallacies*, *supra* note 54, at 185-88; Randall S. Murch & Bruce Budowle, *Are Developments in Forensic Applications of DNA Technology Consistent with Privacy Protections?*, *in* GENETIC SECRETS: PROTECTING PRIVACY AND CONFIDENTIALITY IN THE GENETIC ERA 212, 224 (Mark A. Rothstein ed., 1997).

57. Biologists often use the phrase "DNA genotype" to refer to DNA sequences, even when the sequences have nothing to do with genes. *See, e.g.*, David H. Kaye & George F. Sensabaugh, Jr., *Reference Guide on DNA Evidence*, *in* FEDERAL JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 485 (2d ed. 2000). This is because all DNA sequences are inherited like genes, but the phrase can be terribly misleading if it invites people to think that all DNA loci contain significant, intensely personal information. The vast majority do not.

58. Some commentators have emphasized that even some noncoding sequences can be statistically associated with the socially constructed categories of race or ethnicity. *See* Troy Duster, *The Inexorable Expansion of the DNA Forensic Database and the Looming Spectre of an Early 21st Century Phrenology*, *in* TECHNOLOGY OF JUSTICE, *supra* note *; Kathy Hudson & Aaron M. Bailey, *The Human Genome Project, DNA Science and the Law: The American Legal System's Response to Breakthroughs in Genetic Science*, 51 AM. U. L. REV. 431, 442 (2001) (expressing "high concern" over "DNA-based racial profiling"). But conspicuously absent from such commentary is any explanation of why inferences of race based on crime-scene DNA evidence are any more problematic, when they serve to focus a criminal investigation, than eyewitness accounts of race, which often serve that purpose now. *See* Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413 (2001) (analyzing the constitutionality of inferring physical and ethnic characteristics from crime-scene samples). Racial grouping and physical features are not the kind of sensitive, personal information that one can reasonably expect to keep secret. *See* United States v. Dionisio, 410 U.S. 1, 14 (1973) ("[P]hysical characteristics . . . are constantly exposed to the public. Like a man's facial characteristics, or handwriting, his voice is repeatedly produced for others to hear. No person can have a reasonable

unique (with the exception of identical twins), it can be linked to identifiers such as name, date of birth, or social security number, and used to determine the source of DNA found in the course of criminal investigations or to identify human remains or persons who are lost or missing.[59]

If the Constitution allows the police to keep a fingerprint or a photograph as a biometric identifier, as many courts have held, then it is hard to see why they cannot keep a DNA profile if it is properly limited to "vacuous" loci. Once the state legitimately possesses the DNA record of an arrestee, it would require no further information from the individual to examine a database of DNA types found in the crime-scene evidence from unsolved crimes in order to ascertain whether any match the profile. Thus, using the arrestee's profile to query the database for a matching type would not be a new search or seizure within the meaning of the Fourth Amendment. Neither would it be a new search or seizure to add that profile to others taken from arrestees or convicted offenders, for use in future criminal investigations.

Two recent Supreme Court cases, however, cloud this simple analysis. Under *City of Indianapolis v. Edmond*,[60] and *Ferguson v. City of Charleston*,[61] the fact that a warrantless search could have been conducted for an administrative purpose and its fruits used to prove a criminal charge is not necessarily sufficient to dispense with the need for a warrant and probable cause. In *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. Distinguishing sharply between "highway safety interests and the general interest in crime control,"[62] the majority reasoned that "[b]ecause the primary purpose of the Indianapolis narcotics checkpoint program is to uncover evidence of ordinary criminal wrongdoing, the program contravenes the Fourth Amendment."[63] In *Ferguson*, the Court invalidated a program in which

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expectation that others will not know the sound of his voice, any more than he can reasonably expect that his face will be a mystery to the world.").

59. Because a DNA profile is inherited from one (the mother in the case of mitochondrial DNA, and the father in the case of the Y chromosome) or both parents (in the case of the nuclear DNA analyzed for law enforcement databases), the profile can be used in investigations of kinship, such as parentage determinations. This biological fact makes DNA profiles potentially more revealing than fingerprints or social security numbers—and also more useful in missing-person cases.

60. 531 U.S. 32 (2000).

61. 532 U.S. 67 (2001).

62. *Edmond*, 531 U.S. at 40.

63. *Id.* at 41–42. Six Justices subscribed to this view. Justice O'Connor wrote the *Edmond* majority opinion. Chief Justice Rehnquist's dissenting opinion, which was joined, in part, by Justices Scalia and Thomas, argues against "a new non-law-enforcement primary purpose test lifted from a distinct area of Fourth Amendment

a state university hospital tested urine samples from pregnant women for cocaine and reported positive results to the police so that those women, fearing prosecution, would be induced to participate in substance-abuse counseling offered as an alternative to criminal prosecution. Again, the majority of the Court emphasized "the relevant primary purpose," which was said to be "the arrest and prosecution of drug-abusing mothers."[64]

Edmond and *Ferguson* do not repeal the principle that police may make an additional use of lawfully acquired information, but they do reveal that the additional-use doctrine does not insulate a multipurpose program whose primary purpose is the enforcement of the criminal law. Certainly, the Indianapolis police could have employed roadblocks to check for intoxicated drivers if they conformed to established Supreme Court requirements for roadblocks having this purpose.[65] While conducting this check, they could have brought a drug-sniffing dog near the driver's vehicle. After all, the use of a dog to detect the odor of narcotics is not a search.[66] Therefore, the dissent argued, "[t]he State's use of a drug-sniffing dog, according to the Court's holding, annuls what is otherwise plainly constitutional."[67] To which the majority responded: "the constitutional defect of the program is that its primary purpose is to advance the general interest in crime control."[68] Likewise, the *Ferguson* Court focused on "programmatic purpose"[69] and emphasized that "the direct and primary purpose of [the] policy" was "to generate evidence for law enforcement purposes."[70] In bold, *Edmond* and *Ferguson* indicate that where the *primary purpose* of a *program* involving searches or seizures is to generate evidence for

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jurisprudence relating to the searches of homes and businesses." *Id.* at 53 (Rehnquist, C.J., dissenting). Justice Thomas also wrote a two-paragraph dissent signaling that he might be willing to reach the same result as the majority by overruling the Court's special-needs cases allowing suspicionless roadblocks in any circumstances. His explanation is terse: "I rather doubt that the Framers of the Fourth Amendment would have considered 'reasonable' a program of indiscriminate stops of individuals not suspected of wrongdoing." *Id.* at 56 (Thomas, J., dissenting).

64. *Ferguson*, 532 U.S. at 81-82 (internal quotation marks omitted).

65. *See* Mich. Dep't of State Police v. Sitz, 496 U.S. 444, 451-53 (1990).

66. Every Justice accepted this proposition. *See Edmond*, 531 U.S. at 42 ("[T]hat officers walk a narcotics-detection dog around the exterior of each car at the Indianapolis checkpoints does not transform the seizure into a search."); *id.* at 52-53 (Rehnquist, C.J., dissenting) ("[A] 'sniff test' by a trained narcotics dog is not a 'search' within the meaning of the Fourth Amendment because it does not require physical intrusion of the object being sniffed and it does not expose anything other than the contraband items." (citing United States v. Place, 462 U.S. 696, 706-07 (1983)).

67. *Id.* at 48.

68. *Id.* at 44 n.1.

69. 532 U.S. at 81.

70. *Id.* at 83-84.

criminal prosecutions, the Fourth Amendment ordinarily requires a warrant supported by probable cause.

"Normal law enforcement" would appear to be the primary purpose of a program requiring arrestees to provide DNA samples, typing those samples at standard forensic loci, and including the profiles in an identification database that can be searched for a profile matching DNA recovered in connection with unsolved past or future crimes.[71] By itself, the fact that an additional purpose of such a database would be administrative maintenance of unalterable, biometric identifiers of those who have been arrested would not automatically make the program permissible. Under *Edmond* and *Ferguson*, the "primary" law enforcement purpose would need to be justified on another theory.[72]

Such a theory is readily available. Stopping drivers to search automobiles for narcotics and testing women for cocaine use represent substantially greater intrusions on privacy than sampling individuals' DNA and typing it at the normal forensic loci. A DNA identification database can be structured to respect most individual privacy interests, and it can be administered fairly. Because there are powerful crime-control reasons for a state to establish arrestee DNA databases, it is neither heretical nor misguided to ask whether the Supreme Court will in due course recognize an exception to the warrant requirement for biometric identifiers like fingerprints and DNA profiles.

The answer turns on the Court's balancing of competing interests. The pivotal factors are the gravity of the privacy invasion, the practicality and value of requiring advance judicial approval and individual suspicion, and the importance of the government interests advanced by the database system. Although the point is surely debatable, a case can be made that this balance tips in favor of allowing arrestee DNA profiles to be retained in the databases.[73]

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71. United States v. Miles, 228 F. Supp. 2d 1130 (E.D. Cal. 2002). Several courts have reached a contrary conclusion, reasoning that gathering intelligence information before any specific individual is suspected of a crime is not "ordinary law enforcement." *E.g.*, *Sczubelek*, 2003 WL 1818109; Nicholas v. Goord, 2003 WL 256774 (S.D.N.Y. 2003); United States v. Reynard, 220 F. Supp. 2d 1142 (S.D. Cal. 2002). A few courts have upheld database laws by blithely ignoring *Edmond* and *Ferguson*. Groceman v. Dep't of Justice, No. CIV.A. 301CV1619G, 2002 WL 1398559 (N.D. Tex. June 26, 2002); State v. Maass, 64 P.3d 382 (Kan. 2003).

72. Having recognized that the government's "special needs" argument for compelling a probationer to submit a DNA sample for inclusion in the federal DNA databank was undercut by *Edmonds* and *Ferguson*, the district court in *Miles*, 228 F. Supp. 2d 1130, jumped to the conclusion that the federal statute was unconstitutional as applied to probationers. This conclusion is suspect because it overlooks the possibility that an exception other than the "special needs" exception might provide the necessary justification for the program of searches or seizures.

73. Kaye, *supra* note 1, at 499–504.

Of course, this judgment does not imply that it would be desirable to collect and retain DNA profiles of arrestees. It simply means that the Constitution does not necessarily preclude it. As we point out in Part III, there are significant drawbacks to using arrest as the threshold for acquiring database profiles.

C. Indirect Acquisition by the State

1. SHED DNA

Thus far, we have discussed classes of people whose DNA the police may acquire directly from the person. But, without giving it a thought, we all leave trails of DNA behind as we move through the world. New York police have taken a DNA sample from a suspect's "abandoned" coffee cup[74] and from saliva that a homeless man spit on the street.[75] In New Zealand, police extracted DNA from a drinking straw in a milk shake that a man was seen enjoying in a shopping mall just before he committed an armed robbery.[76] Checking the unsolved case database of samples led to his also being charged with twenty-eight other offenses.[77] In Chicago, police pocketed the butt of a cigarette they supplied to a suspect during an interrogation.[78]

If DNA or "genetic information" is the "property" of the individual in whose cells it is found, as a few state statutes declare, then is collecting and analyzing the DNA found on the cup, the sidewalk, the straw, and the cigarette an interference with this ownership interest?[79]

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74. Richard Willing, *As Police Rely More on DNA, States Take a Closer Look*, USA TODAY, June 6, 2000, at A1; *The Crier Report: Mandatory DNA Testing* (Fox television broadcast, Mar. 11, 1999), *available at* 1999 WL 18330169.

75. *See* Christopher Francescani, *Sex Fiend Admits He Killed 5 in Brooklyn*, N.Y. POST, Mar. 10, 2001, at 11; William K. Rashbaum, *Man Cleared by DNA Tests Led Police to Murder Suspect*, N.Y. TIMES, Aug. 6, 2000, at A25.

76. *Cf.* Ray Delgado, *How Cop Got DNA to Nail Rapist: She Got Suspect to Drink Soda, Then Snatched Straw*, S.F. CHRON. Aug. 14, 2001, at A1 (reporting on rape conviction that resulted from a detective's removing, to obtain a saliva sample, the soda cup a suspect was drinking at her invitation at an Orange County Taco Bell).

77. *See* S.A. Harbison et al., *The New Zealand DNA Databank: Its Development and Significance as a Crime Solving Tool*, 41 SCI. & JUST. 33, 36 (2001).

78. Tony Gordon, *DNA Sample Links Man to Burglary*, CHI. DAILY HERALD, July 3, 2001, at 5; *see also* State v. Buckman, 613 N.W.2d 463, 474 (Neb. 2000) (retention and testing of two cigarettes that a validly arrested suspect smoked at the police station gave rise to no meritorious Fourth Amendment objection because defendant abandoned the cigarettes).

79. *See, e.g.*, COLO. REV. STAT. ANN. § 10-3-1104.7(1)(a) (1999 & West Supp. 2002) ("Genetic information is the unique property of the individual to whom the information pertains."). The language is patterned after a model "Genetic Privacy Act" prepared and promoted by a group at Boston University. *See, e.g.*, George J. Annas,

In this context, the meaning of "ownership" is opaque.[80] If I am struck by an automobile on a public street and bleed on the crosswalk, then does that mean that I can prevent everyone else from taking a few drops or demand that the blood be returned by the street sweeper who wipes it up?

Even if one accepts the proposition that a DNA sample which is left in a public place, or its profile, is in some sense the property of the individual from whom it originated, the Fourth Amendment does not bar the state from acquiring it.[81] If a robber being pursued by the police drops the keys to his apartment but outruns the police, they may pick up the keys, and the state may use them to show that a person who later is apprehended is indeed the robber who eluded capture. Similarly, shed DNA constitutionally can be taken to the laboratory, analyzed, and the profile placed in a database.[82]

2. RELINQUISHED DNA

Nearly 300 million DNA samples sit in tissue repositories in the United States.[83] Police agencies under public and political pressure to remove a serial killer from the streets will, in time, seek access to these

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Genetic Privacy, *in* TECHNOLOGY OF JUSTICE, *supra* note *; Patricia (Winnie) Roche et al., *The Genetic Privacy Act: A Proposal for National Legislation*, 37 JURIMETRICS J. 1, 2-9 (1996).

80. The discussion in Annas, *supra* note 79, only heightens the mystery. Annas writes that without a property-rights statute,

> the law is that you don't own your DNA, but everybody else can own and use your DNA for commercial purposes except you. That can't possibly be right. . . . We have laws against the purchase and sale of human organs, and it's going to turn out that human DNA is going to be much more important, both medically and personally than human organs are. I don't think that can be sustained.

Id. Such passages fail to clarify the "property" in question. Is it the molecules from human cells? Physical copies of those molecules, or copies of useful parts of them? Abstract representations of the molecules in the form of sequence data? Patents on human genes which would require an understanding of their functions? Which of these putative forms of property is an individual not allowed to own when everyone else is? If the concern is privacy of information about the individual, why change the common law as it applies to all body parts? *See, e.g.*, HUMAN DNA: LAW AND POLICY, INTERNATIONAL AND COMPARATIVE PERSPECTIVES (Bartha Maria Knoppers ed., 1997).

81. Imwinkelried & Kaye, *supra* note 58, at 438-40.

82. It could be argued, however, that analysis at loci that relate to socially significant characteristics rather than the loci that have only biometric significance should be treated as a search that requires a warrant and probable cause. *Cf.* Patterson v. State, 742 N.E.2d 4, 10 n.3 (Ind. Ct. App. 2000) (noting privacy concerns associated with such loci).

83. 1 NAT'L BIOETHICS ADVISORY COMM'N, RESEARCH INVOLVING HUMAN BIOLOGICAL MATERIALS: ETHICAL ISSUES AND POLICY GUIDANCE 13 (1999).

samples, not just for specific investigations, but also to include profiles of them in law enforcement databanks. Here too, a respectable argument can be made that, for better or worse, the Constitution poses no serious barrier. In *United States v. Miller*,[84] the Supreme Court held that when a person voluntarily relinquishes checks and deposit slips to a bank, subpoenas requiring the bank to produce these materials do not intrude "into any area in which [the defendant] had a protected Fourth Amendment interest."[85] Are medical records any different? Lower courts have reached conflicting results,[86] but *Miller* is not easily distinguished.[87]

In sum, under existing doctrine, the Fourth Amendment is quite porous to determined efforts by police to acquire the DNA of specific individuals and of large classes of individuals. If police are thought likely to abuse this power, legislation to limit such investigative efforts is called for. However, the true privacy interest in one's DNA identification profile is thin.[88] With our whole DNA (not just the identification profile) so accessible to law enforcement, in law and in fact, it is prudent to ask whether our privacy interest in that DNA would be better protected by deliberate, careful creation of a population-wide database of DNA identification profiles. As we discuss in Part III, such a database could be unrelated to medical or other records of our affairs, and it could be confined exclusively to the state's investigation of crime, natural disasters, and missing persons.

III. THE PROSPECT OF UNIVERSALITY

A. One Possible Path to a Population-Wide Database

Creating a national identification database all at once would be prohibitively expensive today, even if we had the laboratory capacity to do it. But DNA typing technology is advancing at a pace reminiscent of Moore's Law for microprocessor capacity that has made the "personal computer" a fixture on every desk.[89] Soon it will be feasible to create a

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84. 425 U.S. 435 (1976).

85. *Id.* at 440.

86. Imwinkelried & Kaye, *supra* note 58, at 431–34.

87. *See id.*

88. *See supra* Parts II.B, III.B.2.

89. In 1965, Gordon Moore observed that each new microprocessor chip contains roughly twice as much capacity as its predecessor, and each chip was released within 18 to 24 months of the previous chip. To date, "Moore's law" has remained surprisingly accurate. *See* Intel Silicon: Moore's Law, *at* http://www.intel.com/research/silicon/mooreslaw.htm (last visited May 8, 2003); *Laying Down the Law*, TECH. REV., May 2001, at 65. Prospects for miniaturizing

DNA identification record for everyone, at least prospectively. For example, it would be easy to extract identification profiles as an adjunct to public health programs that for many years have screened blood samples from almost all newborns, to identify infants with treatable genetic diseases.[90] The identification profiles could be transmitted to a single, secure, national database. To the extent that additional sampling would be necessary—to include immigrants or citizens born abroad, for example—these samples could be destroyed after they are typed. In fact, an instrument could be built that would extract an identifying profile and destroy the sample at the same time. Proper procedures for sampling the DNA, extracting the identifying profile, and immediately destroying the sample would protect everyone's genetic privacy.

The loci used for those identification profiles would be limited to sequences that have no relationship to health or other physical or mental traits and propensities. As discussed above, each profile would be a set of digits devoid of any special meaning, comparable to a social security or passport number. Access to the database would be limited to law enforcement personnel investigating specific crimes in which DNA trace evidence already has been found. Law enforcement agencies would not need—and should not be permitted—to handle, much less retain, the samples.

A system of this sort would resemble, to the greatest extent possible, a digitalized collection of identifying features very much like ordinary fingerprints. However, it would be far more useful in deterring potential offenses, in generating investigative leads, and in exonerating the innocent.[91] There would be no need to resort to inefficient "DNA dragnets" of entire neighborhoods, as have been conducted in California, Florida, Louisiana, Michigan, New York, and elsewhere[92] or to infer probable racial or ethnic status, as some

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systems for DNA analysis have been described as equally revolutionary. *See* Deirdre R. Meldrum & Mark R. Holl, *Microscale Bioanalytical Systems*, 297 SCIENCE 1197 (2002).

90. *See* Phil Reilly, *Legal and Public Policy Issues in DNA Forensics*, 2 NATURE REVS. 313, 315 (2001). Public health service programs for newborn screening reach practically all children born in the United States. *See, e.g.*, Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Laboratory Sciences, Newborn Screening, *at* http://www.cdc.gov/nceh/dls/newborn_screening.htm (last modified Apr. 23, 2003).

91. On the last point, see Akhil Reed Amar, *A Safe Intrusion*, AM. LAW., June 11, 2001, at 69. *See also* Akhil Reed Amar, *Foreword: The Document and the Doctrine*, 114 HARV. L. REV. 26, 126 (2000) [hereinafter Amar, *Foreword: The Document and the Doctrine*].

92. *See* Halbfinger, *supra* note 52; Leonard, *supra* note 52; Philip P. Pan, *Pr. George's Chief Has Used Serial Testing Before; Farrell Oversaw DNA Sampling of 2,300 in Fla.*, WASH. POST, Jan. 31, 1998, at B1.

observers fear.[93] Not only would a comprehensive database be valuable for public safety purposes, but it also could also be useful in identifying bodily remains in mass disasters or other tragedies and in returning missing persons to their families.[94]

Despite the understandable concerns over the privacy implications of all DNA databases,[95] we believe that a properly designed and

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93. *See supra* note 58.

94. Of course, one can attempt to obtain DNA samples from a missing person's belongings or relatives, but these ad hoc efforts can be agonizing and expensive, especially in cases of mass destruction. *See* David W. Chen, *Grim Scavenger Hunt for DNA Drags On for Sept. 11 Families*, N.Y. TIMES, Feb. 9, 2002, at A1 (reporting that "[a]fter Sept. 11, thousands of items were collected from families who lost relatives in the World Trade Center attack, in a hurried and often scattershot effort to help identify remains," but "the New York City medical examiner's office says that more than half of the possible DNA samples it has received are inadequate to make such matches" and "[a]s a result, hundreds of families must repeat an ordeal they never thought they would have to endure again: another round of the cruelly intimate search for traces of those gone forever").

95. *See* Barry Steinhardt, *ACLU Presentation on Privacy and Forensic DNA Data Banks*, *in* TECHNOLOGY OF JUSTICE, *supra* note *. Although we share the ACLU's concern for privacy, its description of the defects of current database laws is exaggerated. "For instance, the ACLU's assertion that twenty-four states allow DNA samples, which have been collected only for law enforcement identification, to be used for a variety of other non-law enforcement purposes" is plainly wrong. The ACLU points to a Massachusetts statute as a leading example, characterizing it as one that "contains an open-ended authorization for any disclosure that is, or may be, required as a condition of federal funding and allows for the disclosure of information . . . for 'advancing other humanitarian purposes.'" In fact, the Massachusetts statute explicitly forbids the disclosure of DNA samples for such purposes. It makes it a crime to purposely disclose "a DNA sample or record or portion thereof contained in the state DNA database . . . in any manner to any person or agency not authorized to receive such record." MASS. GEN. LAWS ANN. ch. 22E § 12 (1996 & Supp. 2002). Massachusetts defines a "DNA record" as "DNA information that is derived from a DNA sample." *Id.* § 1. The authorizations for disclosures for "federal grants or funding" and "humanitarian purposes" pertain only to "records." *Id.* § 10(c), (d)(4). The state is forbidden from releasing samples for these purposes. *See* Landry v. Attorney General, 709 N.E.2d 1085, 1096 (Mass. 1999). Many other states also distinguish between "records" and "samples." Davina Dana Bressler, *Criminal DNA Databank Statutes and Medical Research*, 43 JURIMETRICS J. 51, 51 (2002). Because the CODIS "records" are digital data (comparable to a passport number) that reveal essentially nothing about an individual's genetic make-up, it is misleading to confuse provisions that permit disclosure of database records with those that allow disclosure of databank samples.

This failure to distinguish between samples and identifying records (and among types of research that can be undertaken with either databank samples or database records) appears frequently among arguments against inclusive databases. For example, Peter Neufeld reported that although he was

> not the source of the count, . . . [i]n about fifteen of the fifty states, the statutes expressly permit that the databanks which are being created for law enforcement purposes can be used for research purposes in putting medical

administered national database might well be the best solution to the coverage question. It would entail but a limited intrusion on individual freedom and privacy while advancing both public safety and racial even-handedness in the criminal justice system and serving as a firewall against far greater intrusions on privacy by law enforcement authorities pawing through medical and other records looking for a "match" to DNA found at the scenes of notorious crimes. We began with no enthusiasm for the idea of an inclusive national database, but the more we considered the drawbacks of the likely alternatives and the plausibility of procedures for database creation that would limit the government's access to sensitive genetic information, the more we found it to be a viable policy choice.[96] To explain our conclusion, we survey the arguments that have been made against a national database, then consider in more detail the advantages it offers over the current system.

B. Opposition to a Population-Wide Database

1. PUBLIC ACCEPTANCE

Opponents of broad DNA databases sometimes suggest that it is pointless to consider a population-wide database because the public

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> research, humanitarian needs and what have you. And so there is no restriction on the kinds of research that can be used under the umbrella of the law enforcement function.

Peter Neufeld, Panel Discussion, Conference on DNA and the Criminal Justice System (Nov. 21, 2000) (transcript available at http://www.dnapolicy.net/dna/videos/transi.htm) (apparently relying on Kimmelman, *supra* note 10). But Dr. Kimmelman asserts only that "[a]nother fifteen states allow release of *records* for research." *Id.* at 212 (emphasis added).

96. We find it impossible to be anything but appalled at the prospect of government or others—perhaps others, more than government—possessing everyone's genome, and able to peer into and analyze at leisure the genetic code that can give up secrets we do not even know we have. This is the prospect that turns debate from the *method* of DNA sample collection to the uses made of the samples. We could not favor authorizing a more inclusive DNA database, much less a comprehensive one, unless its creation were coupled with transparent procedures to assure destruction of whatever tissue samples are used, once the non-phenotypic loci useful only for identification have been typed and their profile has been recorded. But we foresee technology soon being available that would permit destruction of a sample almost simultaneously with its profile being recorded, and we can specify procedures that would keep whole DNA out of law enforcement control when only an identification profile is transmitted to an identification database by a hospital or other agency which routinely analyzes samples for health or other non-law enforcement purposes. Similarly, we could not favor secondary analysis for the identification loci, of DNA sampled for other purposes—by health authorities, for example—unless transparent procedures assured that the samples themselves would be kept out of law enforcement's control.

opposes it.[97] They note that in the 1940s, Congress did not adopt proposed legislation providing for universal fingerprinting and identity cards.[98] Since the American public today regards DNA with a mixture of suspicion, horror, and awe, it is said a population-wide DNA database is too far from popular acceptance to be worth considering.[99] However, a database constructed in the manner we have described offers pronounced advantages over the present system of incremental expansions of law enforcement databases. The prospect should not be dismissed on the basis of surmises about public opinion, for public opinion is a fickle master and an unreliable determinant of future policy.[100] Certainly, public opinion has undergone sea changes on issues such as sexual mores, narcotics and the use of alcohol and tobacco, capital punishment, and gun control. The public has heard virtually no serious debate about the desirability or noxiousness of a population-wide

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97. *See, e.g.*, Neufeld, *supra* note 95 ("[T]he argument frankly is that most people in the country are not in favor of the universal databank.").

98. The fingerprint and identity card bills were the following: Citizen Identification Act of 1943, H.R. 601, 79th Cong. (1945) (requiring every citizen more than eleven years of age to appear, be fingerprinted, give information under oath, and carry an identity card); Citizen Identification Act of 1943, S. 1191, 78th Cong. (1943) (same); Citizen Identification Act of 1942, H.R. 6256, 77th Cong. (1941) (requiring every citizen more than fifteen years of age to appear, be fingerprinted, give information under oath, and carry an identity card); Universal Fingerprinting Act of 1941, H.R. 3157, 77th Cong. (1941) (requiring every person in or entering the United States to be fingerprinted); *cf.* Alien Identification Act of 1942, H.R. 6258, 77th Cong. (1941) (requiring every alien in the United States to appear, be fingerprinted, give information under oath, and carry an identity card).

99. Neufeld, *supra* note 95 ("[A] majority of this population in this country would oppose a universal database even if in the universal database they only looked at the 13 STR markers and then destroyed the sample."); *cf.* Peter Neufeld, Address at the Electronic Freedom Frontier Conference: Who's in Your Genes? (Mar. 19, 1992) (available at http://www.eff.org/pub/Privacy/Medical/cfp2_gene_panel.transcript) (suggesting that few people would "would be in favor of a law that would require each of you to donate a sample of your DNA, your children's DNA, and your loved ones' DNA into a national data bank controlled by police, which . . . might mean access to employers, insurers, or other social scientists or research scientists"). These assertions apparently rest on personal impressions rather than actual data.

100. Even today, the true state of public opinion is unclear. What people would favor depends greatly on how the proposal is framed and what information they have before them. Already, there is advocacy for a population-wide database in the United States and in other liberal democracies. *See* Akhil Reed Amar, *A Search for Justice in Our Genes*, N.Y. TIMES, May 7, 2002, at A31; Martin Evison, *DNA Database Could End Problem of Identity Fraud*, 420 NATURE 359 (2002); Amar, *Foreword: The Document and the Doctrine*, *supra* note 91; Akhil Reed Amar, Editorial, *The Government Should Require a DNA Sample, But Keep it Private*, FULTON COUNTY DAILY REP., June 21, 2001; Michael E. Smith et al., *DNA Data Would Combat Crime, Racism*, USA TODAY, July 26, 2001, at 15A.

database. Until this debate takes place, we should not shy away from examining the merits and demerits of even the most expansive database.

2. CONSTITUTIONALITY

A second argument against pursuit of a population-wide database is that even if it were popular, it would be unconstitutional. The most powerful constitutional challenge flows from the Fourth Amendment requirement that government "searches" be "reasonable," which the Supreme Court has interpreted to require a judicial warrant based on probable cause, unless the search lies within one of the "specifically established and well-delineated exceptions" to the warrant requirement.[101] Yet, in some respects, a population-wide database such as we have described would be easier to defend under Supreme Court precedent than conventional convicted-offender databases.

For both practices, a threshold question is whether the acquisition of DNA would even amount to a "search" within the meaning of the Fourth Amendment. There is no doubt that blood samples taken from infants by governmental edict would "constitute searches of 'persons,' and depend antecedently upon seizures of 'persons.'"[102] But what if the DNA were acquired by applying a sticky pad to the infant's skin to acquire some exfoliating, epidermal cells without even a scratch? Would the reduced level of bodily invasion and the fact that these cells are constantly exposed to the public and being shed from the surface of the body lead a court to hold that no search is involved? In *Palmer v. State*,[103] the Indiana Supreme Court reasoned that the warrantless acquisition of defendant's fingerprints during his trial did not constitute a seizure forbidden by the Fourth Amendment because "fingerprints are an identifying factor readily available to the world at large."[104] Other courts have held that shining an ultraviolet lamp on a suspect's skin to expose chemicals transferred from stolen money is not a search.[105]

One might hope that the Supreme Court's latest encounter with defining a "search" in *Kyllo v. United States*,[106] would clarify the

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101. *See, e.g.*, Florida v. White, 526 U.S. 559, 568 (1999).

102. *See* Schmerber v. California, 384 U.S. 757, 767 (1966) (referring to blood samples taken from a driver being treated in a hospital for injuries received in an automobile accident).

103. 679 N.E.2d 887 (Ind. 1997).

104. *Id.* at 891.

105. *E.g.*, United States v. Richardson, 388 F.2d 842, 845 (6th Cir. 1968). However, this is probably the minority view. *See* People v. Santistevan, 715 P.2d 792 (Colo. 1986); State v. Hardaway, 36 P.3d 900 (Mont. 2001).

106. 533 U.S. 27 (2001).

viability of this "public exposure" theory. In *Kyllo*, a federal agent used an infrared detector to find that "the roof over the garage and a side wall of petitioner's home were relatively hot compared to the rest of the home and substantially warmer than neighboring homes in the triplex."[107] "Based on tips from informants, utility bills, and the thermal imaging, a federal magistrate judge issued a warrant authorizing a search of [Kyllo's] home, and the agents found an indoor growing operation involving more than 100 plants."[108] Before trial, Kyllo moved to suppress the evidence on the ground that the thermal imaging required a warrant.[109] When the motion was denied, he entered a conditional guilty plea and appealed.[110] The Ninth Circuit Court of Appeals ultimately affirmed, reasoning that the defendant had neither a subjective nor an objectively reasonable expectation that "amorphous 'hot spots' on the roof and exterior wall" would go unobserved.[111] In other words, according to the court of appeals, there was no "search."

A sharply divided Supreme Court reversed. At first blush, this reversal seems to undermine the view that inspecting materials on the surface of the body is not a search. After all, if the use of an instrument to capture infrared rays coming from the surface of a house is a search, it might seem that so is the use of an instrument to capture and analyze DNA on the surface of the body.

The rationale of *Kyllo*, however, is quite limited. Justice Scalia's opinion for a majority of five Justices looks to the historically recognized zone of privacy in which government surveillance is prohibited. Apparently assuming that eighteenth century constables would have had to enter the house to detect heat sources—a trespass that is the very paradigm of a search—the majority announced that the infrared scan also was a search. As the Court put it, "obtaining by sense-enhancing technology any information regarding the interior of the home that could not otherwise have been obtained without physical 'intrusion into a constitutionally protected area,' constitutes a search—at least where, as here, the technology in question is not in general public use."[112] In other words, *Kyllo* establishes no more than that the use of technology that is functionally equivalent to trespassing into a home to acquire information is a search. This result, the Court suggested, was necessary for "the preservation of that degree of privacy against

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107. *Id.* at 30.
108. *Id.*
109. *Id.*
110. *Id.*
111. *Id.* at 31.
112. *Id.* at 34.

government that existed when the Fourth Amendment was adopted."[113] To hold otherwise, the majority insisted, would "permit police technology to erode the privacy [originally] guaranteed by the Fourth Amendment."[114]

In contrast, the Fourth Amendment's protections against searches (as opposed to seizures) of the person lack "roots deep in the common law . . . ."[115] As the *Schmerber* Court observed, in "dealing with intrusions into the human body rather than with state interferences with property relationships or private papers—'houses, papers, and effects'—we write on a clean slate."[116] Therefore, *Kyllo*'s functional equivalence test does not dictate the conclusion that it is a "search" to take from the surface of a person's skin cells that are constantly being shed and to analyze the DNA they contain. Unlike infrared scanning that, in effect, places the police in the interior of a house, DNA sampling and analysis are not functionally equivalent to any eighteenth century practice proscribed by the Fourth Amendment.

Even so, the sensitive nature of some of the information locked in the helices of the DNA molecule leads us to believe that DNA sampling is a Fourth Amendment search, even if the sample is obtained noninvasively.[117] Our point here, however, is simply that the question is far from settled. Certainly, *Kyllo* does not dictate the outcome.

The same can be said of the next question in any Fourth Amendment analysis: If sampling DNA is a search, is it constitutionally "reasonable"? The reasonableness standard might well permit construction of a system such as we have described. Taking DNA from newborns who are already in the hospital where their DNA is routinely sampled does not detain them and would involve no additional search. With analysis at suitable loci, the extracted profile could be used only for identification.[118] The Court's opinions in *Edmond* and *Ferguson*[119] are less of a barrier here than they are to arrestee DNA databases. The primary purpose of acquiring the DNA samples from newborns always has been, and would remain, screening for treatable genetic conditions

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113. *Id.*

114. *Id*

115. *Id.*

116. *Schmerber*, 384 U.S. at 767–78.

117. Kaye, *supra* note 1, at 482.

118. An important qualification must be noted. Even loci on autosomal chromosomes that are noncoding and unlinked to genes that are related to diseases or behaviors are inherited as Mendelian traits. Consequently, records in a database that includes parents and their children could be examined to test parentage. Unwanted discovery of illegitimacy would constitute an obvious and real invasion of personal and familial privacy.

119. *See supra* Part II.A.2.B.

such as Phenylketonuria (PKU). And, even if the "primary purpose" were taken to be normal law enforcement, the argument advanced earlier for a new exception to the warrant requirement would apply.[120] A "biometric exception" would be less problematic than other exceptions, such as the "automobile exception," that have become fixtures of Fourth Amendment jurisprudence.

How these questions ultimately will be resolved is exceedingly difficult to predict. Perhaps the Constitution forbids government typing for identification purposes the DNA of anyone not convicted of a crime, or of anyone not arrested. Perhaps not. At this time, we simply cannot be sure that the Fourth Amendment guarantees that the line will be drawn at conviction, or even at arrest. Those who fear law-enforcement control of a DNA identification database unless it is predicated on conviction or arrest may need to seek more predictable protection than the Fourth Amendment. A comprehensive database will not come into existence if the general public comes to a clear and stable view that it is worth sacrificing the public safety and racial-justice advantages of a comprehensive DNA identification database, in order to limit possible state intrusions on our privacy and autonomy. Nonetheless, if the general public is ambivalent; if it remains uninformed about the likely consequences of pursuing or repudiating a comprehensive database; if the questions are not taken up in public and political discourse; or if false confidence is placed in a prediction about the future course of Fourth Amendment jurisprudence, then it is as likely as not that the nation will find itself, in time, with a near-universal DNA database that is *more* threatening to privacy than the one described here.[121]

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120. *Cf.* Amar, *Foreword: the Document and the Doctrine*, *supra* note 91, at 126 (suggesting that a universal DNA database would be permissible under a reasonableness inquiry "as defined by the values of the rest of the Constitution" but that "it is far from clear that current doctrine would allow this scheme, because it contemplates intrusions for criminal law-enforcement purposes in the absence of . . . individualized suspicion . . . a category of search that doctrine strongly disfavors").

121. More threatening because the vast collection of DNA samples and analyses held by hospitals, HMOs, and their corporate relatives, and the increasing digitization of those records, is generating a comprehensive DNA database which, though not ideally constructed for forensic use, is not really off-limits to law enforcement. If law enforcement authorities are not authorized to create a comprehensive database of DNA identification profiles, investigators will look to other databases when the offender-only database yields no "match" to DNA found at the scene of particularly notorious crimes—serial sexual assaults and homicides in particular. There, they will find identified whole DNA and DNA profiles of various kinds, linked to complete medical files containing a wealth of intensely private information. *See* Lawrence O. Gostin, *Health Information Privacy*, 80 CORNELL L. REV. 451, 463-70, 491-92 (1995).

3. NATION OF SUSPECTS

A third objection is that a universal database would constitute a "step toward an Orwellian society"[122] that will make "us a 'nation of suspects,' and radically alter[] the relationship between the citizen and government."[123] "Storing information on otherwise unsuspected individuals," it is said, "expresses an ethos of suspicion."[124] As rhetoric, this is powerful stuff, but its substance is fluffier. Privacy is an important value, but the privacy threat from digital records of DNA types that reveal nothing about a person's nature or status is not self-evident. Certainly, it bears no resemblance to George Orwell's dystopia in which the state monitored every conversation and action, and responded to mere thoughts of disloyalty with profound "re-education." Establishing a system that has the ability to link individuals to crime scenes to the greatest possible extent without probing their minds or invading their homes or possessions does not make everyone a "suspect" in any meaningful or problematic sense. Indeed, a population-wide database should quickly limit the number of suspects—typically to a single person—in many crimes. By promptly eliminating everyone else as a viable suspect, it would reduce the burden on many individuals who would have been primary suspects.

4. LOSS OF ANONYMITY

"Privacy" is a protean term that encompasses a heterogeneous set of interests. It is not privacy in general that is put at risk when the state has an ability to match found DNA with a profile retained in an identification database. It is not even autonomy. Rather, DNA databases threaten three forms of anonymity.

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122. Jean E. McEwen, *Sherlock Holmes Meets Genetic Fingerprinting*, BOSTON COLL. L. SCH. MAG., Spring 1994, at 44, 49.

123. George Annas, *Privacy Rules for DNA Databanks: Protecting Coded 'Future Diaries'*, 270 JAMA 2346, 2347 (1993) (citation omitted); Jean E. McEwen, *DNA Databanks*, *in* GENETIC SECRETS: PROTECTING PRIVACY AND CONFIDENTIALITY IN THE GENETIC ERA, *supra* note 56, at 236 ("[A] population-wide DNA data bank could fundamentally alter the relationship between individuals and the state, essentially turning us into a nation of suspects.").

124. Jonathan Kimmelman, *The Promise and Perils of Criminal DNA Databanking*, 18 NATURE BIOTECH. 695, 696 (2000); *cf.* Kimmelman, *supra* note 10, at 215 (complaining that "[a]n overly expansive and mandatory DNA databanking scheme injures the trust relationship between a government and its subjects").

a. Temporal anonymity

There is a largely unspoken assumption, deeply rooted in American history and culture, that if we are moved to do so, it is possible for us to leave the past behind and to re-invent ourselves in another place. But this seems a romantic, unrealistic prospect today. The lives we lead leave a trail in medical records, in credit card records, in school records, in employment files—in any records that link to our social security numbers, drivers' license numbers, and the like. We can be found if the state, or anyone with means, really cares to find us. No doubt, biometric identifiers, from fingerprints to facial recognition systems, iris scans to DNA profiles, make it harder to transform one's identity. But anonymity in the sense of recreating one's identity—of riding into town, as it were, to start a new life without carrying the weight of the past—is a quixotism.[125]

b. Conduct anonymity

There is a second sense of anonymity that is often worth protecting—the anonymity of those engaged in certain types of desirable conduct. The ability to act anonymously may be personally or socially valuable in contexts such as making charitable donations, expressing unpopular opinions, or informing authorities of wrongdoing or dangerous situations. Consequently, we sometimes protect such anonymity as a right guaranteed by the Constitution[126] or as a privilege

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125. Witness protection programs are an exception, but the government's ability to protect witness from retaliation by offering them new identities would not be compromised by a governmental database of DNA profiles.

126. Watchtower Bible and Tract Soc'y of N.Y., Inc. v. Vill. of Stratton, 536 U.S. 150, 153, 166-69, 171 (2002) (holding that ordinance requiring individuals to obtain a permit prior to engaging in door-to-door advocacy and to display upon demand the permit, containing one's name, violated the First Amendment as it applied to religious proselytizing, anonymous political speech, and the distribution of handbills); Buckley v. Am. Constitutional Law Found., Inc., 525 U.S. 182, 187, 205 (1999) (holding that statute requiring that initiative-petition circulators wear identification badges bearing the circulator's name violated First Amendment, as did statute requiring that proponents of an initiative report names and addresses of all paid circulators); McIntyre v. Ohio Elections Comm'n, 514 U.S. 334, 337, 356-57 (1995) (holding that a state's prohibition against the distribution of any anonymous campaign literature violated the First Amendment); Talley v. California, 362 U.S. 60, 63-65 (1960) (invalidating a city ordinance prohibiting all anonymous leafleting); NAACP v. Alabama, 357 U.S. 449, 460-66 (1958) (holding that order requiring association to produce records including names and addresses of all members and agents violated the right to freedom of association). *But see* United States v. Harriss, 347 U.S. 612, 623-26 (1954) (upholding disclosure requirements for lobbyists).

codified by statute[127] or established by common law.[128] But a population-wide DNA identification database maintained for law enforcement purposes would not interfere with those protections.

In other situations, conduct anonymity is an enemy of public safety. It is a rare offender who expects to be identified and apprehended when he or she commits a crime. If witnesses to offenses do not recognize the offenders, the offenders will likely elude apprehension. Knowing this, a person bent on crime who is anonymous in a place where the opportunity presents itself is undeterred. Conversely, there is no special trick to apprehending a burglar, a robber, or a hit-and-run driver (or deterring an otherwise motivated offender) whose name can be given to police by a passerby. To the extent that a comprehensive DNA identification database merely reduces anonymity for criminal conduct, it infringes no interest worthy of protection.

c. Spatial anonymity

There is a particular form of conduct anonymity that is valued by nearly everyone in our culture, and is likely to remain so. It is spatial anonymity—the ability to keep one's movements and location confidential. Spatial anonymity is not threatened by all biometric identification systems, but it is threatened by systems that can link individuals to particular locations. The shadowy figure disappearing into the London fog and the nondescript face lost among many in the crowd are anonymous. The ability to be at a particular place and time without revealing one's identity is vital to criminal enterprises; but ordinary individuals want to be free to visit a friend, enter a store, or take a drive into the country without being tracked by the government. Pervasive government surveillance that tracks one's locations at all times of the day and night would strip us of the "breathing room" in which our liberty takes shape—we require a private sphere of action in which to be ourselves, free from observation.

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127. *See, e.g.*, ROBERT D. SACK, LIBEL, SLANDER, AND RELATED PROBLEMS, at app. 3 (3d ed. 2002) (reproducing these statutes); David A. Anderson, *Freedom of the Press*, 80 TEX. L. REV. 429, 487 (2002) (reporting that "[i]n more than half of the states, shield statutes give representatives of the press . . . at least a qualified privilege to refuse to disclose confidential sources").

128. *See, e.g.*, Senear v. Daily Journal-Am., 641 P.2d 1180, 1181-83 (1982) (common-law reporter's shield privilege); EDWARD J. IMWINKELRIED, THE NEW WIGMORE: EVIDENTIARY PRIVILEGES § 7.3 (2002) (government's privilege to keep the identity of an informant confidential); 8 JOHN HENRY WIGMORE, EVIDENCE IN TRIALS AT COMMON LAW § 2374(f) (John T. McNaughton rev. 1961) (1904) (same); *cf.* N.M. CT. R. EVID. 11-514 (1982) (establishing a reporter's shield privilege by court rule).

Nevertheless, a population-wide DNA identification database would not destroy all spatial anonymity—the confidentiality of one's movements could be preserved—since it is not feasible to reconstruct a person's travels by looking at DNA molecules. A comprehensive DNA identification database would not present the potential "abuse" of "twenty-four hour surveillance of any citizen" that gave the Supreme Court momentary pause in the course of holding that the use of a radio beeper to track a car to the defendant's house did not even rise to the level of a search within the meaning of the Fourth Amendment.[129] Still, the fact remains that it is technologically possible for a determined search for remnants of hair, saliva, or other DNA-bearing material to uncover traces of many peoples' DNA at crime scenes or other locations. For instance, there will be a loss of anonymity if and when police are able to deduce, from these biological traces, all the people who frequented the bedroom of the deceased. This power to reconstruct past events, however partially, will be invaluable to criminal investigators, but it must be recognized that it diminishes our spatial anonymity—the privacy of our movements—by reducing our ability to enter bedrooms or other embarrassing locations without risk of our presence there later being discovered.

5. EXPENSE

A final objection to a population-wide database is that it would not be worth the cost—which might be thought to be immense. These costs would include the capital investment in biochemical and electronic devices for collecting, analyzing, storing, and accessing the data as well as the labor cost of police and other personnel who would be needed to build and operate the system. However, these costs could be kept to a minimum with technology that types the identification loci at the same time that neonatal disease screening is done and uploads the biometric identification data to the national DNA identification database without law enforcement personnel ever possessing or even handling the DNA itself.

The marginal cost of creating DNA identification records in such a system would not be zero, but it would be small. Suppose that the cost

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129. United States v. Knotts, 460 U.S. 276, 283 (1983). The Court reasoned that "[a] person traveling in an automobile on public tboroughfares has no reasonable expectation of privacy in his movements from one place to another." *Id.* at 281; *cf.* Smith v. Maryland, 442 U.S. 735, 741 (1979) (holding that recording the telephone numbers dialed by a criminal suspect with a "pen register" in the telephone company's office infringes no legitimate expectation of privacy in the numbers dialed on the telephone).

of the additional DNA testing for law enforcement was one dollar per sample, and that the marginal cost of operating the larger database was twenty-five cents per sample. At present, some four million babies are born every year in the United States. Even unrealistically assuming that population growth were to double the annual number of births by the time a decision to implement the comprehensive database were made, the cost would be on the order of $10 million per year. Admittedly, marginal cost projections of this sort are speculative and could be quite optimistic. But if the actual costs were twenty times as great,[130] the annual marginal cost of the system would be $200 million, a cost that would be offset by savings as (1) the need to collect and analyze samples from convicted offenders diminishes; (2) expensive, area-wide, consent-based searches in notorious cases become unnecessary; and (3) more cases are resolved by database searches that cut the time of labor-intensive detective work. Considering that Congress has authorized hundreds of millions of dollars to help states process DNA evidence, the incremental cost of assembling a population-wide database prospectively is not obviously excessive. However, the cost-benefit judgment requires some attention to the hard-to-monetize benefits in crime reduction and racial equality that a comprehensive national database would bring. We turn, then, to the advantages associated with a population-wide DNA database.

C. Advantages of a Population-Wide Database

The current approach to creating law enforcement databases focuses exclusively on individuals' contacts with the criminal justice system. When a criminal conviction, an arrest, or a stop by traffic or foot patrol is the trigger for sampling a person's DNA, profiling it, and retaining that profile in a database for use in future criminal investigations, the database will be racially skewed and will fall far short of the full potential of this technology to exonerate innocent suspects, to identify the guilty, to protect victims of crime, and to assist in the identification of missing persons.[131]

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130. *Cf. How Effectively are States and Federal Agencies Working Together to Implement the Use of New DNA Technologies?: Hearing Before the House Subcomm. on Gov't Efficiency, Fin. Mgnt. and Intergovernmental Relations*, 107th Cong. 115 (2001) (statement of Jamie Downs, Director, Chief Medical Examiner, Alabama Department of Forensic Science) (noting that the *average* current cost of processing a CODIS sample is $25).

131. At least one state already encourages parents to obtain and store samples of their children's blood (at their own expense) in case the child is murdered or mutilated beyond recognition. *See Florida Tries Using DNA Sampling to Protect Children*, N.Y. TIMES, Jan. 27, 1999, at A14.

1. EFFICACY

Those who insist that it is sufficient to record the DNA profiles of felons are, perhaps without realizing it, proposing to sacrifice most of the preventative and investigative force of the technology. As explained in Part 1, the justification put forward for making felony conviction the threshold for amassing DNA profiles is that the likelihood of further felony offenses is especially elevated among those once before convicted of a felony. However, 62% of those arrested and prosecuted for a felony have no prior felony conviction.[132] Furthermore, among those arrested and prosecuted for serious felonies, those arrested and prosecuted for rape are the least likely to have a prior felony conviction of any kind—only about 30% have such a prior record, as compared to almost 50% for burglary.[133] A DNA database cannot deter or lead to apprehension before a profile is included in the database. Therefore, a convicted-felon database is of no help in deterring or investigating felonies committed by persons not previously convicted of a felony—and they are a majority of those now arrested on felony charges.

Moving the criterion for database inclusion back, to felony arrests or to arrests of any type, still excludes those responsible for a major proportion of all felony offenses. Of those arrested and prosecuted for serious felonies, 44% have never before been arrested on a felony charge; and about one-third carry no arrest record at all.[134]

Thus, substantial public safety benefits would likely flow from investment in a population-wide database. We know that many offenders commit other crimes—sometimes many other crimes—before they are first convicted. We also know that from 1993 through 1998, when Virginia's convicted-offender database had less than 30,000 samples, it generated between 0 and 13 hits per year. In 2002, with nearly 190,000 samples, it averaged over one hit every day.[135] In Great

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132. This is usually stated the other way: "more than half" of felony defendants have prior "felony records" and "two-thirds have prior arrests." *See, e.g.*, BRIAN A. REAVES, BUREAU OF JUSTICE STATISTICS, FELONY DEFENDANTS IN LARGE URBAN COUNTIES, 1994, Executive Summary, at 2 (1998) (reporting that "[a]bout two-thirds of all defendants had been arrested previously . . . . Fifty-six percent of defendants had a felony arrest record," and an "estimated 38% of defendants had at least one prior conviction for a felony").

133. *See id.* at 1 tbl.(Felony arrest and conviction record of felony defendants in the 75 largest counties 1994). Not surprisingly, in light of those data, half of those imprisoned after felony conviction are going to prison for the first time. *Id.*

134. *Id.* at 2.

135. *See* Virginia Division of Forensic Science, DNA Databank Hits & Samples Collected as of 12/31/2002, *at* http://www.dfs.state.va.us/information/whatsnew.cfm (reporting 445 hits in 2002, when the database had grown to 188,940 profiles). The

Britain, where the database reached 1.5 million profiles in February 2002, British criminal investigators were averaging 1,600 hits per week.[136] Many more would result from a truly comprehensive, national system combined with more thorough collection and prompt analysis of crime-scene DNA. When one considers the personal and social costs of the crimes that might be prevented, the balance might well favor the most inclusive database.[137]

2. RACIAL JUSTICE AND THE LEGITIMACY OF LAW

There can be no doubt that any database of DNA profiles will be dramatically skewed by race if the sampling and typing of DNA becomes a routine consequence of criminal conviction.[138] Without seismic changes in Americans' behavior or in the criminal justice system, nearly 30% of black males, but less than 5% of white males will be imprisoned on a felony conviction at some point in their lives.[139]

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dramatic growth in cold hits over time also may reflect improvement in the acquisition of crime-scene samples by the police.

136. *See Major Tool for Crime Detection Receives Boost*, M2 PRESSWIRE, Feb. 21, 2002, 2002 WL 4160490. The Home Secretary took the occasion of this milestone to announce that "[t]here is currently more than a 70 per cent chance of a stain found at a crime scene being matched to a name" in the U.K. national database. *Id.*

137. Of course, it is nearly impossible to document and quantify the net benefits, as we cannot know how many crimes would be prevented or solved by any given expansion of the national DNA identification database. We cannot even predict the extent to which those who are bent on crime will try to outsmart the technology by taking care not to leave any DNA at the scenes of their crimes or to obscure the evidence they do leave. *See* Richard Willing, *Criminals Try to Outwit DNA*, USA TODAY, Aug. 28, 2000, at 1.

138. States have been moving steadily in this direction. *See supra* note 6.

139. *See* THOMAS P. BONCZAR & ALLEN J. BECK, BUREAU OF JUSTICE STATISTICS, LIFETIME LIKELIHOOD OF GOING TO STATE OR FEDERAL PRISON (1997). The Bureau of Justice Statistics has projected the lifetime likelihood of imprisonment, in a state or federal prison, to be 28.5% for black males, 16% for Hispanic males, and 4.4% for white males. *Id.* at 2. These projections are all based on incarceration rates in 1991, when nearly two-thirds of all men sent to prison were from African American, Hispanic, or other minority groups. Although historically high, those imprisonment rates remained stable between 1991 and 1995. *Id.* at 5. Women are less likely to be imprisoned than men, but their projected lifetime chances of imprisonment show an almost identically disparate distribution by race. *Id.* at 6.

Similar data are not available to project the lifetime likelihood of *conviction* by race, but every group's lifetime likelihood of conviction will be higher than its lifetime likelihood of imprisonment. The likelihood of conviction is probably less racially skewed than the likelihood of imprisonment, because misdemeanor convictions are not likely to be as skewed by race as are felony convictions (without which it is rare for a term of imprisonment to be imposed) and because, for any given offense of conviction, the chances of being sentenced to prison are increased by the existence and weight of the offender's prior criminal record—and blacks are arrested and convicted more frequently

Arrest, prosecution, and conviction are so pervasive in black communities that, on any given day, a black American is five times more likely to be in jail than is a white.[140] An adult black male is four times more likely to be under some form of correctional supervision,[141] six-and-a-half times more likely to be incarcerated somewhere,[142] and eight times more likely to be in prison[143] than his white counterpart.

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than whites. Thus, although the prevalence of conviction would be to some degree less racially skewed than is the prevalence of imprisonment, a gross racial imbalance would characterize any database including those ever convicted.

140. ALLEN BECK & JENNIFER C. KARBERG, BUREAU OF JUSTICE STATISTICS, PRISON AND JAIL INMATES AT MIDYEAR 2000, at 7 (2001) (reporting 132 whites per 100,000 whites in the population were in local jails at midyear 2000, compared to 736 blacks per 100,000 blacks).

141. *See* Allen J. Beck, *Trends in U.S. Correctional Populations*, *in* THE DILEMMAS OF CORRECTIONS: CONTEMPORARY READINGS (K.C. Haas & G.P. Alpert eds., 4th ed. 1999) (reporting the following data, detailing the 4:1 black-to-white ratio):

Percentage of Men Under Correctional Supervision
by Race and Age, United States, 1996

Age	Percent of white men under supervision	Percent of black men under supervision
18-19	4.4	16.2
20-24	8.0	29.4
25-29	7.1	28.9
30-34	5.8	24.4
34-39	4.4	17.2
40 or older	1.3	6.1

142. The Bureau of Justice Statistics reports the following data on the total incarceration, including both jail and prison, of blacks and whites:

	MALE			FEMALE		
Age Group	BLACK	WHITE	Ratio	BLACK	WHITE	Ratio
18-19	6027	942	6.40: 1	231	71	3.25: 1
20-24	10593	1560	6.79: 1	525	137	3.38: 1
25-29	13118	1732	7.57: 1	993	187	5.31: 1
30-34	11892	1861	6.39: 1	1409	224	6.29: 1
35-39	10054	1460	6.89: 1	962	159	6.05: 1
40-44	6399	972	6.58: 1	513	87	5.90: 1
45-54	3409	553	6.16: 1	209	39	5.36: 1
55+	635	139	4.57: 1	28	7	4.00: 1

BECK & KARBERG, *supra* note 140, at 9 tbl.13 (Number of inmates in state or federal prisons and local jails per 100,000 residents, by gender, race, Hispanic origin and age (June 30, 2000)).

143. ALLEN J. BECK, PRISONERS IN 1999, BUREAU OF JUSTICE STATISTICS 9 tbl.14 (2000) (reporting 417 white males in state or federal prison per 100,000 white males in the population, compared to 3,408 black male prisoners per 100,000 black males).

Racial skewing of the DNA databases will be reduced somewhat if the legal authority to sample and type offenders' DNA continues to expand and comes to include the multitudes convicted of lesser, but more numerous, felonies and misdemeanors. Racial imbalance in the databases would be further reduced if, as leading law enforcement leaders have urged,[144] arrest rather than conviction becomes the occasion for sampling DNA and including profiles in the database.[145] But the decrease in racial disparity would come not come from a racial parity in arrest rates—the annual arrest rate among blacks is more than two and a half times the white rate,[146] and a black man's lifetime chances of being arrested are more than double a white man's.[147] Rather, expanding

144. *See* Kaye, *supra* note 1, at 458 n.12; Howard Safir, New York City Police Commissioner, Presentation to the National Commission on the Future of DNA Evidence (March 1, 1999) (transcript available at http://www.ojp.usdoj.gov/nij/dnamtgtrans4/trans-n.html) (calling for legislation to "give us the authority to take samples from all those arrested for fingerprintable offenses, which includes all misdemeanors in our penal law"); Rose Marie Arce, *Surveillance and DNA Testing Are Among the Latest Police Weapons*, NEWSDAY, May 30, 1999, at A17 (reporting that "Police Commissioner Howard Safir wants to expand [DNA] testing exponentially to include taking DNA samples from everyone arrested for 'fingerprintable' offenses [to retain in a database of] something like bar codes"); Laylan Copelin, *Allow DNA Samples at Arrests, Officials Urge*, AUSTIN AM.-STATESMAN, June 9, 2000, at A1.

145. Removing the DNA profiles if a conviction did not follow the arrest would reduce the effects described here. However, if the British experience is any indication, even if legislation initially provides for such removal, in time it will transform into a system of permanent retention.

146. BUREAU OF THE CENSUS, STATISTICAL ABSTRACT OF THE UNITES STATES: 2000, 12 tbl.10 (reporting 224,611,000 whites and 34,862,000 blacks in the 1999 U.S. population); FEDERAL BUREAU OF INVESTIGATION, CRIME IN THE UNITED STATES 1999, 230 tbl.43 (reporting 6,283,294 arrests of whites and 2,600,510 of blacks in 1999).

147. The lifetime likelihood of arrest cannot be drawn directly from routinely collected data, but it can be projected from annual arrest statistics and from cohort studies, in which a jurisdiction's police records are combed for contacts with anyone born in that jurisdiction in a given year. *See* Alfred Blumstein, *Systems Analysis and the Criminal Justice System*, 374 ANNALS AM. ACAD. POL. & SOC. STUD. 92, 99 (1967) (using the FBI's Uniform Crime Reports for 1965 to estimate that a city male's chances of being arrested for a nontraffic offense some time in his life are about 50% for males, about 60% for males living in cities, and about 90% for African American males living in cities); Alfred Blumstein & Elizabeth Graddy, *Prevalence and Recidivism Index Arrests: A Feedback Model*, 16 L. & SOC'Y REV. 265, 279-80 (1981-1982) (using various national data sets and the Uniform Crime Reports for 1968 through 1977, to estimate the lifetime chances of *felony* arrest at 51% for black males in the nation's fifty-six largest cities, more than triple the 14% chance of felony arrest for white males there).

The lifetime likelihood of adult felony arrest is high, particularly for urban black males, but the likelihood of arrest is even greater when account is taken of juvenile arrests and misdemeanor arrests—and higher again if arrests for moving violations are included. *See* MARVIN WOLFGANG ET AL., DELINQUENCY IN A BIRTH COHORT 54 (1972) (among males born in Philadelphia in 1945 who grew up there, 50% of the nonwhites

DNA databases to include arrestees would diminish the racial disparity by bringing many more whites into the databases—about half of *all* males experience at least one misdemeanor or felony arrest in their lifetimes.[148]

Thus, although a black man's relative chance of being included in the database would be reduced from at least four times that of a white man's in a convicted offender database to roughly twice a white man's in an arrestee database, about 90% of urban black males would be included if DNA were routinely sampled on arrest. Such an "arrest-

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had at least one recorded police contact for a felony or misdemeanor before turning 18, in contrast to 29% of white males); PAUL E. TRACY ET AL., DELINQUENCY CAREERS IN TWO BIRTH COHORTS 38-40 (1990) (among males born in Philadelphia in 1958 who grew up there, 42% of the nonwhites had felony or misdemeanor police contacts before their 18th birthdays, in contrast to 23% of the whites); Robert Tillman, *The Size of the "Criminal Population": The Prevalence and Incidence of Adult Arrest*, 25 CRIMINOLOGY 561, 567 (1987) (finding that 65% of non-white males born in California in 1956 were arrested there at least once in the twelve years between their 18th and 30th birthdays, compared to 34% of white men, and that 30% of black women were arrested during that period compared to 10% of white women); DAVID VAN ALSTYNE & VINCENT MANTI, THE PREVALENCE AND INCIDENCE OF ARRESTS AMONG ADULT MALES IN NEW YORK STATE 2 (N.Y. State Div. of Criminal Justices Services, 1987) (finding that overall, 46% of males born in New York in 1956 were arrested at least once for a felony or misdemeanor in New York between age 16 and 29, and that 71% of non-white males were arrested, in contrast to 41% of white males); Lyle W. SHANNON, ASSESSING THE RELATIONSHIP OF ADULT CRIMINAL CAREERS TO JUVENILE CAREERS (Office of Juvenile Justice and Delinquency Prevention, 1980) (finding that 29.9% of males born in Racine, Wisconsin, in 1942, had a police contact for a felony or misdemeanor before reaching 18, as did 35.7% of a 1949 cohort and for 31.0% of a 1955 cohort, and that if moving violations are included 60% of males eventually found their ways into police records); Jerome G. Miller, *From Social Safety Net to Dragnet: African American Males in the Criminal Justice System*, 51 WASH. & LEE L. REV. 479, 485 (1994) (on review of these studies and others, estimating that "the percentage of nonwhite males [in cities] who could expect to be arrested and at least briefly jailed would [be] 90%"). The studies cited here that report less than 50% of black males experiencing arrest cover relatively short lifetime segments.

148. That a majority of males will be arrested for a nontraffic offense, at some point in their lives, is evident from the studies described *supra* note 143; *see also* Joan Petersilia, *Criminal Career Research: A Review of Recent Evidence*, *in* 2 CRIME AND JUSTICE: AN ANNUAL REVIEW OF RESEARCH 321, 344 (Norval Morris & Michael Tonry, eds.) (showing, on reanalysis of data covering the adult years of Shannon's cohorts in Racine, Wisconsin, that 46.5% of the 1942 cohort, 59.9% of the 1949 cohort and 43.7% of the 1955 cohort had had at least one recorded police contact for a felony or misdemeanor by age 29); Tillman, *supra* note 147, at 565 (concluding that "[t]aken together, the results of previous [studies of the prevalence of arrest] indicate that among urban males 60% will have been arrested (or have a recorded 'police contact') for a nontraffic offense and 25% will be arrested for an index offense at some point during their lifetimes"); Marvin Wolfgang, *Delinquency in Two Birth Cohorts*, 27 AM. BEHAVIORAL SCIENTIST 75 (1983) (finding, upon following to age 30 the cohort of males born in Philadelphia in 1945, that 47% had had at least one police contact by that point in their lives, and that 22% had been arrested at least once for an FBI Index offense).

only" database would have the look and feel of a universal DNA database for black males, whose already jaundiced view of law enforcement's legitimacy[149] is itself a threat to public safety.[150] White men would not likely be pleased either. Some would surely be offended by the racial imbalance in their favor—particularly one so redolent of past genetic discrimination—and many white males would be distressed to learn that, absent dramatic change in their behavior or in police practices, at least half of them would have their DNA profiles entered into the database, following arrest for a felony or misdemeanor. If legislation were to authorize DNA sampling for traffic offenses as well, then a majority of the entire population might eventually find its way into the database.[151]

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149. *See* RANDALL KENNEDY, RACE CRIME AND THE LAW 24-26 (1997); MICHAEL TONRY, MALIGN NEGLECT: RACE, CRIME AND PUNISHMENT IN AMERICA (1995). Kennedy argues that America remains caught in the crisis of legitimacy described half a century ago by Gunnar Myrdal:

> Negroes . . . are hurt in their trust that the law is impartial, that the court and the police are their protection, and, indeed, that they belong to an orderly society which has set up this machinery for common security and welfare. They will not feel confidence in, and loyalty toward, a legal order which is entirely out of their control and which they sense to be inequitable and merely part of the system of caste oppression. Solidarity then develops easily in the Negro group, a solidarity against the law and the police.

Id. at 24 (quoting 1 GUNNAR MYRDAL, AN AMERICAN DILEMMA: THE NEGRO PROBLEM AND MODERN DEMOCRACY 52 (1944)). Kennedy points to the deep roots and longevity of our crisis of legitimacy:

> For a long time, criminal law—not simply the biased administration of law but the law itself—was the enemy of African-Americans. In many places, for several generations, it was a crime for blacks to learn to read, to flee enslavement, or to defend themselves, their families, or their friends from physical abuse. It was a crime, in sum, for blacks to do all sort of things deemed to be permissible or admirable when done by others. . . . [During the civil rights era], [b]y using the criminal law against [those] involved in resisting racial oppression, officials . . . destabilized the moral meaning of conforming to law and violating it. . . . [This history invites the view that administration of the criminal law is] pervasively infected by a systematic racial bias that nullifies its legitimacy [and] reinforce[s] hostility toward the agencies of crime control . . . .

Id. at 26-27.

150. *See* TOM TYLER, WHY PEOPLE OBEY THE LAW (1990) (finding that compliance with the criminal law is secured not so much by the threat of punishment as by perceptions that the laws are congruent with moral obligations, or at the least enacted properly by legitimate authority, and that they are executed fairly).

151. The Supreme Court has distinguished "interrogation relating to one's identity or a request for identification," which "does not, by itself, constitute a Fourth Amendment seizure," from "a detention under the Fourth Amendment," and from a

If arresting officers were given discretion not to sample DNA, this fraction might well be reduced, but there is little comfort in the prospect of individual officers on the highways sampling DNA from those who strike them as likely perpetrators of other crimes, while sending the rest on their way. Under those conditions, racial conflict in police encounters with civilians and racial disparities in the database would be likely to grow considerably worse. Neither are state legislatures likely to make parsimonious decisions about which arrests permit or require DNA sampling. As is happening with convictions, if arrest becomes the threshold for inclusion in the databases, then the pressure for comprehensive coverage is likely to be nearly irresistible.[152]

"traditional arrest." INS v. Delgado, 466 U.S. 210, 215–16 (1984). In drawing these lines, it has offered the following rather general guidance:

> Given the diversity of encounters between police officers and citizens, however, the Court has been cautious in defining the limits imposed by the Fourth Amendment on encounters between the police and citizens. As we have noted elsewhere: "Obviously, not all personal intercourse between policemen and citizens involves 'seizures' of persons. Only when the officer, by means of physical force or show of authority, has restrained the liberty of a citizen may we conclude that a 'seizure' has occurred." . . . While applying such a test is relatively straightforward in a situation resembling a traditional arrest . . . , the protection against unreasonable seizures also extends to "seizures that involve only a brief detention short of traditional arrest." What has evolved from our cases is a determination that an initially consensual encounter between a police officer and a citizen can be transformed into a seizure or detention within the meaning of the Fourth Amendment, "if, in view of all the circumstances surrounding the incident, a reasonable person would have believed that he was not free to leave."

Id. at 215 (citations omitted). Most automobile stops would seem to entail a seizure of the person under these principles, but whether they would be an arrest within the meaning of a statute authorizing the taking of a DNA sample "upon arrest" would depend on the specific legislation.

Even if an automobile stop for a traffic violation starts out as something less than an arrest, however, it usually lies within the officer's discretion whether to escalate the stop to an arrest, whether to search incident to that arrest, and whether to transport the driver to a facility for booking and detention pending first appearance in court. Moreover, when a motorist is stopped by police for an offense for which "a traditional arrest" is permissible in the jurisdiction, the officer almost always has probable cause to arrest, and there is no constitutional bar to police consummating the arrest and conducting a full search incident to it. United States v. Robinson, 414 U.S. 218 (1973); *cf.* Atwater v. City of Lago Vista 531 U.S. 990 (2000) (holding it not unreasonable, and therefore no violation of the Fourth Amendment, to make a full custodial arrest of a driver for failing to fasten her seatbelt and the seatbelts of her children, and to take her in handcuffs to a police station, to search her person, and to detain her there for over an hour).

152. *See, e.g.*, Editorial, *Testing Suspects to Prevent Tragedies*, N.Y. POST, Aug. 18, 2000, at 33 ("If cops were allowed to take DNA samples from all the suspects they arrest, Laura Nusser and Patricia Sullivan might be alive today.").

The likely reach of an arrest-based database should give pause to anyone hoping to limit database coverage to a small fraction of the population. Inclusion in a DNA identification database of half or more of the male population and nearly all African American men is an odd result for a policy intended to limit government's control of samples and profiles of our DNA—and it is one that would further damage the legitimacy of the criminal law and of law enforcement agencies in areas where public safety is most in disrepair.[153] Finally, the data on prevalence of arrest in the population should provoke skepticism about two propositions often advanced in opposition to a comprehensive identification database: (1) that it is financially and logistically feasible to sample DNA on arrest, but not feasible to sample everyone; and (2) that privacy interests will be substantially protected if DNA is taken and typed "only" from those who have been arrested.

In contrast, a population-wide DNA database could serve as at least a partial, much-needed antidote for the racial distortions that plague the criminal justice system. DNA evidence does not care about race. A database profile either does or does not match a crime-scene sample. With a population-wide database, the identity of any matching individual would be known—no matter what the race. Routine production of a short list of people whose DNA matches samples found at a crime scene thus could help counteract the presence or perception of racism in the investigation of crime. When a person is arrested and incriminating crime scene DNA evidence points to the guilt of another person whose DNA profile is in the database, prompt exoneration and release of the innocent is likely to follow—regardless of the initial suspect's race or status. If an innocent defendant does go to trial in such a case, the crime scene DNA evidence and the results of the database search would be available, regardless of the defendant's race, to raise reasonable doubt about guilt.

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153. Furthermore, making arrest the threshold for inclusion in law enforcement DNA databases reflects a naïve view of what it means to be arrested. If sampling were "limited" to those who are arrested, then what would legitimately distinguish them from the half of us whose profiles would not routinely be available to criminal investigators? The legal threshold for DNA profiling in this scenario would be the existence, at some point in time, of probable cause to believe the person is committing or has committed a crime. As most young black males know all too well, police have nearly unfettered discretion to arrest when probable cause exists, and officers are not constitutionally prohibited from making pretextual arrests or focusing arrest activity in any particular area or on any particular subgroup of the population—so long as a rational basis for the selection can be offered in justification. Indeed, probable cause to arrest is spread thick and wide through the populace, attaching to the innocent-in-fact as well as to those guilty of the crime for which probable cause exists. Probable cause is thus an extremely low threshold, and a poor shield against the government taking and profiling our DNA—and against abuse of that power.

This is not to say that a population-wide database would eliminate all racial inequities in law enforcement. Obviously, it would not. For instance, even the most inclusive database will not cure the racial distortions that result from selectively enforcing drug laws against African Americans or from enforcing even-handedly drug laws that have a disparate impact on these citizens. But to concede that a comprehensive DNA identification-only database is no panacea for the racial ills that beset the criminal justice system is not to deny its power to mitigate what has become a crippling problem. It is simply more fair and more useful to include DNA identification profiles from all whites as well as all from all other groups than it is to amass databases predominantly consisting of the DNA profiles of African Americans and other minorities.

CONCLUSION

The current debate over the scope of DNA databases for law enforcement is myopic in its focus on which crimes should be collection offenses and at which stage in the criminal process DNA samples should be taken. In principle, it is not at all clear why the obligation to provide personally identifying DNA data should be restricted to those individuals who are swept into the criminal justice system. In practice, settling for a DNA identification database restricted to convicts, or to convicts and arrestees, is sure to aggravate racial polarization in society, undermine the legitimacy of law and law enforcement, and further compromise public safety by halting far short of the deterrent and investigative capability that a population-wide database would afford. Like the double helix of the DNA molecule, privacy and equality are intertwined in complex ways. When they are untangled and evaluated, the case for a population-wide DNA database is strong.

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