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GENETIC PRIVACY:
CONSTITUTIONAL CONSIDERATIONS IN FORENSIC DNA TESTING*

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INTRODUCTION

The application of DNA profiling technology to a forensic setting has generated numerous unresolved legal issues. To date, much of the legal commentary1 and virtually all of the case law concerning DNA identification has focused upon the admissibility of these tests as legal evidence.2 The majority of courts have admitted DNA evidence, although some concerns remain regarding the statistical basis and interpretation of such tests.3

However, beyond the evidentiary questions attending this technology lies a set of concerns involving the impact of DNA identifica-

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tion testing on the realm of personal privacy. Much of this concern has arisen from the possibility that federal and state law enforcement agencies may begin to assemble DNA databases or databanks. The prospect of such state-sponsored privacy invasions has been given new urgency by the recent passage of the Omnibus Crime Bill of 1994, which gives explicit direction and funding to the FBI to develop such a DNA database. The centralized DNA database that some commentators have feared is now becoming a reality, and the significance of the privacy concerns that such commentators have raised is now a pressing question.

Accordingly, this article explores the question of whether DNA identification testing may be expected to impinge upon constitutional guarantees of privacy, and whether, if constitutional guarantees are inadequate, it is necessary to protect against state intrusion into genetic privacy through the use of statutory safeguards. Such an assessment requires first, a realistic evaluation of the limits of the present DNA testing technology, and second, an analysis of current constitutional privacy doctrines in light of those technological limits.

I. Assessing DNA Identification Technology

Courts and similar institutions called upon to resolve legal issues, such as the privacy issues attending DNA identification, do so through a process of legal reasoning. Legal reasoning is the application of legal principles to a particular set of facts to reach, one hopes, a socially optimal solution. However, like all processes based in Aristotelian logic, legal reasoning is subject to the failure that computer programmers know all too well: when one begins with an incorrect set of premises, one almost inevitably arrives at an incorrect set of conclusions. One cannot sensibly apply legal principles to the facts unless one has a correct set of facts. Consequently, legal analysis of the privacy issues attending DNA identification testing is unlikely to be helpful without a realistic assessment of the features of this technology. This assessment begins with a brief description of the molecular analy-

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sis techniques that now comprise the primary methods of DNA identification testing.

A. DNA Testing Technology

DNA testing procedures were initially developed as research tools for basic science, and although they remain important in the laboratory, their application has become far more widespread. Such tests are useful in a variety of settings: because DNA is the hereditary molecule passed from parent to offspring, DNA testing may be useful for assessing relatedness, as in determination of paternity. DNA tests may also be used to match forensic tissue samples to their origin; for example, the military has employed such tests to identify the remains of unidentified personnel. The most prominent use of these tests, however, has been in a law enforcement setting to match blood, hair, or semen from the scene of the crime to a criminal suspect. In any of these applications, however, the efficacy of the test is dependent upon the chemical characteristics of the test’s substrate: the DNA molecule.

1. The DNA molecule

Deoxyribonucleic acid, or DNA, is an enormously long chain of chemical subunits that lies coiled in chromosomal packages within the nuclei of almost every body cell. DNA is the genetic molecule passed from parent to offspring; encoded within the physical structure of the DNA nucleotide chain is the information necessary for cell structure and function. The DNA strand includes coding regions, called genes, as well as control regions responsible for the expression of genes.

The sequence of nucleotide subunits in genes directs cellular machinery to construct proteins, which provide structure to and mediate chemical reactions within a cell. Thus, proteins determine the characteristics of cells, which in turn collectively determine the char-

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10 See DAVID T. SUZUKI ET AL., AN INTRODUCTION TO GENETIC ANALYSIS 578 (3d ed. 1986).

11 See WATSON ET AL., supra note 8, at 40-41.

12 BENJAMIN LEWIN, GENES 3-5, 37 (3d ed. 1987).
acteristics of the individual. Ultimately, an individual’s physical characteristics are determined by her complement of DNA, called her genome. As a corollary principle, abnormalities in the DNA nucleotide sequence may lead to abnormalities in physical characteristics. Huntington’s disease, sickle cell anemia, cystic fibrosis, Tay-Sach’s disease, and colon cancer are but a few of the diseases arising from the inheritance of undesirable DNA sequences.

2. RFLP analysis

Although an individual’s DNA entails a complete genetic “blueprint” for all of the individual’s physical traits, DNA identification testing does not draw upon this wealth of information. Rather, these tests depend upon a particular feature of the molecule’s physical structure, the presence of restriction fragment length polymorphisms, or RFLPs. RFLPs appear as variations in the size of particular DNA fragments obtained when an individual’s DNA is digested in a particular laboratory process.

The most widely discussed form of DNA identification testing takes advantage of these variations in RFLP length by extracting DNA from a tissue sample, cutting the DNA into its characteristic lengths, separating those lengths on the basis of size, and visualizing the separated fragments on photographic film by means of radioactive probes. If performed properly, this process yields an RFLP banding pattern that is highly characteristic of the individual, and which may be useful for matching forensic samples to a suspect, or for determining relatedness between individuals.

RFLP banding patterns are generated by digesting a DNA sample with special proteins, called restriction enzymes, that will cut DNA

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13 SUZUKI ET AL., supra note 10, at 579.
14 WATSON ET AL., supra note 8, at 211.
16 See Jan A. Witkowski, Milestones in the Development of DNA Technology, in FORENSIC DNA TECHNOLOGY, supra note 7, at 13.
18 See Baird, supra note 7, at 39.
wherever a particular nucleotide sequence is found.\textsuperscript{20} Such enzyme cutting sites, or restriction sequences, are scattered at random throughout an organism's genetic complement.\textsuperscript{21} Digestion of an individual's DNA by a restriction enzyme yields a collection of DNA fragments that is characteristic of that individual: the collection of fragments generated depends on where the restriction sequences are located on that individual's DNA.\textsuperscript{22} Variations in the length of specific "polymorphic" fragments is the basis for comparisons of DNA among individuals.\textsuperscript{23}

Differences in fragment length can only be assessed, however, by sorting out the jumble of digested fragments. This is done by using an electrical current to draw the electrically charged DNA fragments along a length of gelatin-like substance called agarose.\textsuperscript{24} The agarose gel matrix impedes the movement of the fragments, slowing the larger fragments more than the smaller ones.\textsuperscript{25} As a consequence, the smaller fragments move farther than the larger fragments, and sorting by size occurs along the length of the gel.\textsuperscript{26} The gel also serves to hold the fragments in place once the current is turned off.\textsuperscript{27}

Because the gel is inconvenient to work with, the fragments are transferred, or blotted, onto a nylon membrane.\textsuperscript{28} The fragments are transferred to the membrane, called a "Southern Blot," in the same positions that they came to occupy in the gel.\textsuperscript{29} The polymorphic fragment sought is then visualized using a probe, a piece of single stranded DNA complementary to the nucleotide sequence of the polymorphic fragment.\textsuperscript{30} The entire membrane is exposed to the probe, but because of its complementary sequence, the probe will bind only to the fragment of interest.\textsuperscript{31}

\textsuperscript{20} STRYER, supra note 9, at 118-19; JAMES D. WATSON ET AL., RECOMBINANT DNA 520-21 (2d ed. 1992) [hereinafter RECOMBINANT DNA II].
\textsuperscript{21} See STRYER, supra note 9, at 118.
\textsuperscript{22} See id. at 119.
\textsuperscript{23} RECOMBINANT DNA II, supra note 20, at 521.
\textsuperscript{24} See STRYER, supra note 9, at 119-20; DAVID FREIFELDER, PHYSICAL BIOCHEMISTRY: APPLICATIONS TO BIOCHEMISTRY AND MOLECULAR BIOLOGY 216-20 (1976).
\textsuperscript{25} STRYER, supra note 9, at 44.
\textsuperscript{26} Id. at 44.
\textsuperscript{27} See FREIFELDER, supra note 24, at 216.
\textsuperscript{28} STRYER, supra note 9, at 119-120.
\textsuperscript{29} See id. at 120.
\textsuperscript{30} See id.
\textsuperscript{31} See id.
The probe allows visualization of the fragment's position because the probe also contains a radioactive isotope that will expose x-ray film. When the nylon membrane is brought into contact with a sheet of film, a dark band will appear at the position on the film corresponding to that of the probe on the membrane. The film, or autoradiograph, thus reveals where the probe has bound to the polymorphic fragment. The position of the band will vary among individuals in a population whose members carry DNA that yields restriction digest fragments of different lengths. By assaying for positions of several different polymorphic fragments, a distinctive pattern of autoradiographic bands can be obtained. Such patterns are useful in genetic analysis, and in differentiating among members of a species. These characteristics make RFLP analysis useful not only to laboratory research, but also to forensic investigations.

3. **PCR testing**

Recently, a new form of DNA analysis based upon the Polymerase Chain Reaction, or PCR, has been used in forensic DNA analysis. PCR is a relatively new biotechnology technique that allows small samples of DNA to be quickly amplified. This opens the way to testing of very small samples, perhaps as little as might be derived from a single hair root. Thus, even though this technique does not permit the same degree of discernment between individuals as does RFLP analysis, its use is beginning to gain acceptance.

PCR amplifies DNA by using each strand of the molecule as a template to assemble a complementary strand. By heating a sample of DNA, the weak chemical bonds between the strands are broken,

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32 See id. at 44-46, 120.
33 See id. at 120; FREIFELDER, supra note 24, at 130-31.
34 STRYER, supra note 9, at 120.
35 RECOMBINANT DNA II, supra note 20, at 561.
36 Id.; Baird, supra note 7, at 48.
37 See RECOMBINANT DNA II, supra note 20, at 521, 561.
38 See Ruth L. Guyer & Daniel Koshland, The Molecule of the Year, 246 SCIENCE 1543 (1989) (designating PCR the most important technology of the year).
40 See DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 69-70.
yielding two free molecules of single-stranded DNA. Short single-stranded lengths of DNA primer are then added; these primer molecules attach to the specific regions of the DNA that are to be replicated. The primers define the area to be replicated, giving a starting place to the polymerase enzyme that does the replication.

The polymerase enzyme itself is then added to the reaction mixture together with free nucleotides, the building blocks of DNA. Beginning at the primer, the polymerase rapidly assembles nucleotide building blocks into chains that are complementary to the single-stranded DNA. The result is two molecules of double-stranded DNA that can be heated to yield four templates for another round of the PCR process. The copies of amplified DNA double in each round of PCR; after many rounds, a small sample of DNA can be amplified into a large sample.

Once the target DNA sequence has been amplified, it may be tested for the presence of a particular sequence by use of a radioactive DNA probe. Amplified DNA is fixed to a nitrocellulose membrane; this process is called “dot-blotting” because the amplified fragments are attached in one spot, then exposed to the probe. Excess probe is washed away, and the membrane is exposed to x-ray film. If the probe binds to the amplified fragments, a spot of exposed film indicates the presence of the sequence at issue.

A dot-blot test has far less power to distinguish among individuals than does RFLP analysis, because there is no separation of fragments via electrophoresis. Far from displaying any polymorphism, the amplified fragments are all the same size and sequence, so no separation is practical or desirable. Thus, rather than yielding a potential

\[ \text{id. at 36-37; Henry A. Erlich et al., Recent Advances in the Polymerase Chain Reaction, 252 SCIENCE 1643, 1643 (1991).} \]
\[ \text{Arnhelm & Levenson, supra note 41, at 36-37.} \]
\[ \text{id.} \]
\[ \text{id.} \]
\[ \text{id.} \]
\[ \text{id.} \]
\[ \text{id.} \]
\[ \text{id. at 36.} \]
\[ \text{See George Sensabaugh & Cecilia Von Beroldingen, The Polymerase Chain Reaction: Application to the Analysis of Biological Evidence, in FORENSIC DNA TECHNOLOGY 63, 67 (Mark A. Farley & James J. Harrington eds. 1991).} \]
\[ \text{id.} \]
\[ \text{id.} \]
\[ \text{See DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 68 (discussing reverse dot hybridization).} \]
continuum of banding alleles, the dot-blot test yields a binary answer: either the sequence sought is present, or it is not. To increase the discriminating power of the test, a series of amplifications and dot-blots are usually performed for different target sequences, detecting the presence or absence of a variety of genetic loci. However, even with such multiple PCR amplifications, RFLP analysis continues to be the preferred method of forensic DNA analysis where a sufficient sample is available.

B. Privacy Concerns

Given that DNA is the molecule of heredity, encoding the physiological basis for each individual’s physical and behavioral makeup, governmental testing of DNA has naturally raised questions about personal privacy. Some commentators have suggested that DNA identification testing will reveal personal facts about an individual’s health and heredity, and perhaps lead to stigmatization on the basis of disability, heritable disease, or even race. Such accusations border on the hysterical, and indicate a poor understanding of the technology at issue. There are some legitimate concerns regarding state implementation of DNA identification testing, but these concerns are bounded by the individual and aggregate information content of such tests.

1. Information Content

RFLP analysis is not a wholesale investigation into the genetic makeup of the individual. The banding pattern generated by these tests reveals only specific and limited information about a particular physical feature of the DNA molecule. As a general rule, the pattern will not be useful for purposes besides identification. It does not directly reveal information regarding an individual’s physical or

53 See id.
54 See Smith, supra note 4, at 882-83.
56 See Arno Motulsky, Societal Problems of Forensic Use of DNA Technology, in Banbury Report 32: DNA Technology and Forensic Science, supra note 19, at 155 ("The current use of DNA technology appears to pose no greater threat to the right to privacy than does normal fingerprinting, placement of photographs in evidence, collection of blood or saliva samples, or other established forensic techniques.").
mental characteristics, neither does it directly reveal the presence of genetic disorders or any particular genetic predispositions.\textsuperscript{57} One scientist has commented that, looking at a bare pattern of DNA identification bands, it is impossible to tell the subject's race, gender, or even species.\textsuperscript{58}

Some types of RFLP patterns, when put together with other information about the subject's family history, may indicate the presence of defective genes; such RFLP markers are said to be "linked" to the gene.\textsuperscript{59} In order for a state actor such as a law enforcement agency to use DNA identification patterns to elicit this type of genetic information, the agency would first have to employ a RFLP marker near the gene of interest. However, the FBI and other agencies assert that they are, at present, going to some lengths to use markers that are \textit{not} near such genes.\textsuperscript{60} Even were they to employ such markers, information about pedigree and expression of the linked gene would be required before linkage mapping could be done.\textsuperscript{61} Law enforcement agencies do not routinely gather information on, for example, the incidence of colon cancer in a criminal suspect's family. The inception of such an information gathering practice would be extremely conspicuous.

Much as in the case of RFLP analysis, DNA identification via PCR testing is not a broad investigation into an individual's genetic makeup; the combination of amplification and dot-blotting shows only the presence or absence of the sequence bounded by the primers. Certainly primers could be prepared to amplify sequences with hereditary significance, even socially stigmatizing significance. Some concern may be warranted regarding the most commonly used target for PCR identification, as it is associated with a gene known to control important immunological functions.\textsuperscript{62} Consequently, selection of a more innocuous target sequence may be appropriate in order to avoid

\begin{itemize}
  \item \textsuperscript{57} Motulsky, \textit{supra} note 56.
  \item \textsuperscript{58} Tyler Enderby, \textit{Scientific Technique Focusing on DNA Aids British Police}, \textit{L.A. Times}, March 11, 1987, at 113 (statement of Dr. Alec Jeffreys).
  \item \textsuperscript{59} See Laurence D. Mueller, \textit{Population Genetics of Hypervariable Human DNA}, in \textit{Forensic DNA Technology} \textit{supra} note 49 at 51, 54.
  \item \textsuperscript{60} See \textit{DNA Identification: Hearing Before the Subcomm. on the Const. of the Senate Judiciary Comm.}, 101st Cong., 1st Sess. 68 (1989) (statement of John W. Hicks, Deputy Assistant Director, FBI Laboratory).
  \item \textsuperscript{61} See Motulsky, \textit{supra} note 56, at 5 (detecting the main gene via linked markers usually involves investigating several family members).
  \item \textsuperscript{62} See \textit{DNA Technology in Forensic Science}, \textit{supra} note 19, at 114.
\end{itemize}
any possibility that PCR identification could reveal personal genetic information.63

2. DNA Databanks and Databases

DNA identification patterns have proved to be powerful tools for investigating and for determining relatedness.64 They promise to be equally useful in other areas, such as identifying missing children or anonymous corpses.65 For this reason, law enforcement agencies and the military are anxious to begin compiling organized files of DNA identification patterns.66 The final form that these DNA databanks will take is as yet unclear. Eventually, RFLP patterns may be digitized and stored in a computer database much as FBI fingerprints are now stored.67 However, digitized patterns cannot be retested to confirm their accuracy or to employ new forensic techniques that may become available.68 "Southern blots" from the actual procedure may therefore be stored, or the original DNA sample may be preserved.69

To date, implementation of a comprehensive, centralized databank of DNA identification patterns has been delayed by technical obstacles. Perhaps the most serious of these obstacles has been the necessity that DNA testing procedures be standardized before the patterns can be assembled for comparison.70 However, in anticipation

63 See id. ("[A]voidance [of the use of loci associated with traits or diseases] is the best guarantee against misuse of such information.").

64 See supra note 19 and accompanying text.

65 See DNA Identification Hearing, supra note 60, at 70-71 (statement of John W. Hicks, Deputy Assistant Director, FBI Laboratory); CONGRESS OF UNITED STATES OFFICE OF TECHNOLOGY ASSESSMENT, GENETIC WITNESS: FORENSIC USES OF DNA TESTS 130 (1990) [hereinafter GENETIC WITNESS].

66 See GENETIC WITNESS, supra note 65, at 128-30; DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 125-26.

67 See GENETIC WITNESS, supra note 65, at 120; DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 111.

68 GENETIC WITNESS, supra note 65, at 133; see also DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 116 ("Premature development of a national databank based on current RFLP typing methods runs the risk of perpetuating a 'dinosaur' technology in the face of better techniques."); BANBURY REPORT 32, supra note 56, at 19-20 (statement of Jan S. Bashanski) (discarding samples locks law enforcement agencies into current technology).

69 GENETIC WITNESS, supra note 65, at 133; see also DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 122 ("Because DNA technology is changing so rapidly, we expect the profiles produced with today's methods to be incompatible with tomorrow's methods. . . . We are therefore persuaded that retention of samples after typing should be permitted for the short term . . . .").

70 GENETIC WITNESS, supra note 65, at 124-25; DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 112, 116.
of the eventual reality of such databanks, several states have enacted legislation mandating DNA testing for sex offenders. It has been suggested that the roster of those to be tested may quickly expand to parolees and even arrestees. At least one state now requires testing of all felons. In addition, the military has expressed interest in routine DNA typing of its personnel to facilitate the identification of casualties. Thus, there is a very real potential for proliferation of these databases; however, given the limits of RFLP and PCR analysis of the samples, the information found in these databases will probably reveal little more than the identity of individuals whose DNA patterns are matched to those stored in the database.

a. Computer matching and privacy

The combination of genetics and computerization presented in current plans for DNA identification databanks has also been a source of great concern. Governmental agencies already store a wealth of information about private citizens, and this information is routinely traded among state, federal, and local agencies. Private parties, including insurers and employers, often gain access to this de facto national database. The possibility that an individual's genetic information could become an additional subject of the interdepartmental information exchange, possibly even finding its way into the hands of private parties, concerns those who have written on DNA identifica-


72 See DNA Technology in Forensic Science, supra note 19, at 118-22; de Gorgey, supra note 5, at 397.

73 Va. Code Ann. § 19.2-310.2 (Michie 1990 & Supp. 1994) (providing that all felons, even non-violent felons, must provide a sample prior to eligibility for parole).

74 See Genetic Witness, supra note 65, at 130; DNA Technology in Forensic Science, supra note 19, at 125-26.

75 See Alan F. Westin, A Privacy Analysis of the Use of DNA Techniques as Evidence in Courtroom Proceedings, in Banbury Report 32 supra note 56 at 25, 33 (stating that DNA databases might be expanded to identify missing children, amnesiacs, homicide victims, and others).

76 See Genetic Witness, supra note 65, at 128-30.

77 See id. at 115, 128-29.
tion privacy. Some have suggested that hereditary information revealed by a DNA identification pattern could be used by employers, insurance companies, and other private parties to the detriment of the individual.

The true gravity of this assertion, like those considered above, seems diminished upon careful examination. Digitized DNA identification patterns will indeed be susceptible to speedier searches and to searches from a distance. Consequently, computerization of such patterns is likely to increase access to them. However, as outlined above, the actual DNA print reveals little or no sensitive genetic information; the digitized version of the pattern will likewise reveal little or no sensitive genetic information. Thus, the computerization of the patterns in itself would seem to offer no reason for additional concern.

However, the matching and cross-indexing power of computers might allow a careful researcher, in some cases, to glean from a computerized DNA databank information about an individual that could not be discerned from the individual's identification pattern alone. For example, where a child is not related to her parents in the manner purported — perhaps as the offspring of an extramarital union or as an adoptee who has never been told of the adoption — and the RFLP patterns of both parent and child are found in the database, this potentially embarrassing information might be revealed. The discovery of such information from a DNA pattern database is likely to be a definite, if infrequent, occurrence.

b. Preservation of samples

An entirely different and more substantial concern arises where the actual DNA sample, rather than simply a digitized banding pattern, is preserved by the law enforcement agency. Several of the state statutes providing for DNA testing require that the actual sam-

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78 See, e.g., Smith, supra note 4, at 881-83.
79 See de Gorgey, supra note 5, at 382-83; DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 114.
80 See BANBURY REPORT 32, supra note 56, at 11 (statement of Dr. Alec Jeffreys in discussion section following article) (commenting that databases may not contain information on individual propensity to disease, but may contain information on family relationships); see also DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 87 ("DNA databanks have the ability to point not just to individuals but to entire families . . . ").
81 See GENETIC WITNESS, supra note 65, at 133.
ple be preserved.\textsuperscript{82} As already noted, sample preservation provides an opportunity to test the sample according to new protocols or technologies that may become available in the future.\textsuperscript{83} In addition, some commentators have suggested that law enforcement agencies must preserve forensic samples in order to allow defendants to independently test the samples introduced as evidence against them.\textsuperscript{84} Where the actual sample is preserved, the opportunity for genetic testing beyond that needed for identification becomes a legitimate concern.\textsuperscript{85}

Billions of dollars of federal research money are now being allocated to identify genes giving rise to physical and behavioral traits;\textsuperscript{86} once this Human Genome mapping effort has identified genes of interest, preserved samples could be probed for the presence of such genes.\textsuperscript{87} Such additional testing, because it presumably falls outside the range of legitimate law enforcement concerns, would conceivably be performed covertly; past experience suggests that the possibility of such covert activity by state actors cannot be ignored, either to cut corners in prosecuting criminals, to conduct investigations into the nature of criminal behavior, or even to harass private citizens.\textsuperscript{88}

Commentators who have raised this concern point to previous incidents during the 1960s and 1970s involving the so-called "XYY syndrome."\textsuperscript{89} Genetic researchers at that time discovered a high incidence of males in mental-penal institutions who carried an extra Y

\textsuperscript{82} See, e.g., \textsc{Ala. Code} § 36-18-22 (Supp. 1994); \textsc{Cal. Penal Code} § 290.2 (West 1988 & Supp. 1995); \textsc{N.C. Gen. Stat.} § 15A-266.5(b) (Supp. 1994); \textsc{Va. Code Ann.} § 19.2-310.3 (Michie 1990 & Supp. 1994); see \textit{generally} \textsc{Genetic Witness}, supra note 65, at 122-24 (discussing retention provisions of state DNA testing statutes).

\textsuperscript{83} See supra note 68 and accompanying text.

\textsuperscript{84} See \textsc{Banbury Report} 32, supra note 75, at 37 (statement of Peter Neufeld in discussion section following article) (suggestion that due process may require sample preservation to allow independent testing).

\textsuperscript{85} See \textsc{Westin}, supra note 75, at 37; \textsc{DNA Technology in Forensic Science}, supra note 19, at 122.

\textsuperscript{86} See \textit{generally} James D. Watson, \textit{The Human Genome Project: Past, Present, and Future}, 248 \textsc{Science} 44 (1990). The Human Genome Project is a multi-million dollar research effort, funded by the National Institutes of Health, the Department of Energy, and several international organizations, to map and sequence the entire human genetic complement. Francis Collins & David Galas, \textit{A New Five-Year Plan for the U.S. Human Genome Project}, 262 \textsc{Science} 43 (1993).

\textsuperscript{87} \textsc{DNA Technology in Forensic Science}, supra note 19, at 122 ("In principle, retention of DNA samples creates an opportunity for misuse — i.e., for later testing to determine personal information.").

\textsuperscript{88} See id. at 159-60 (discussing possible misuse and abuse of DNA identification data).

\textsuperscript{89} See Philip Reilly, \textit{Reflections on the Use of DNA Forensic Science and Privacy Issues}, in \textsc{Banbury Report} 32, supra note 56 at 43, 44, 46.
The correlation between this genetic abnormality and the likelihood of incarceration became the subject of intense discussion and research, much of which was later abandoned or discredited. In the interim, children who were identified through mass screening as carriers of an extra Y chromosome were subjected to an arguably stigmatizing longitudinal study.

This history suggests that the possibility that DNA samples stored by law enforcement agencies might be exploited for correlative studies attempting to show genetic predisposition to social deviance is a legitimate concern. In particular, law enforcement agencies have expressed some interest in research into the genetic nature of violence; readily available genetic samples from convicted criminals might prove a tempting resource for such research. This concern of course extends well beyond the law enforcement context, implicating a broad range of issues regarding the proper place of genetic testing in society. However, law enforcement DNA databanking appears to be the context in which a state actor, employing the tools of modern molecular biology, will first have the opportunity to compile such genetic information.

Despite the legitimacy of this concern, it must be emphasized that even if preservation of actual DNA samples by law enforcement agencies presents an opportunity for abuse, it does not present the opportunity for widespread electronic access, as some commentators have supposed. Preserved DNA samples will be found in the deep freeze, not in the proposed DNA profile computer database. Consequently, although preservation of DNA samples generates issues of concern, it is unlikely that such issues will include the availability of sensitive genetic information on every patrol car computer terminal, nor the

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90 Id. at 44. Normally, human females carry two X chromosomes, and males carry an X and a Y chromosome. See Watson et al., supra note 8, at 8.
91 See Suzuki et al., supra note 10, at 177.
92 Reilly, supra note 89, at 44, 46.
93 See Banbury Report 32, supra note 56, at 11-12 (statement of Dr. Eric Lander in discussion section following article) (finding that databases may be mined for data on “criminal” characteristics).
94 Motulsky, supra note 56, at 11-12; see also DNA Technology in Forensic Science, supra note 19, at 160 (“Biomedical and behavioral scientists are likely to want to screen felon databanks and develop new databanks to study various characteristics of convicted offenders.”).
96 See de Gorgey, supra note 5, at 382-83; Shapiro & Weinberg, supra note 5, at 484.
dissemination of such information from law enforcement records to the world at large.

II. PRIVACY AND THE CONSTITUTION

To the extent that forensic DNA identification raises legitimate privacy concerns, the application of legal doctrines to address those concerns is somewhat problematic. "Privacy" is an uncertain concept in the law, an ill-defined term that may derive from several sources. Some privacy rights are granted by statute, such as the rights under the Privacy Act of 1974 or the Right to Financial Privacy Act of 1978. Tort law recognizes several types of privacy interest, the violation of which may give rise to a civil suit for damages. Such injury to privacy is usually conceptualized in four discrete categories: intrusion upon seclusion, appropriation of an individual's name or likeness, unreasonable publicity given to an individual's private life, or publicity placing an individual before the public in a false light. Additionally, individuals may be granted other privacy rights by the provisions of particular state constitutions.

However, in the United States, the rights of privacy most frequently discussed by attorneys and by the lay public are those rights conferred by amendments to the federal Constitution. Oddly enough, the federal Constitution nowhere mentions the word "privacy." Nonetheless, the United States Supreme Court has recognized that certain enumerated guarantees in the Bill of Rights, together with certain guarantees implicit in the scheme of the Constitution, work to protect privacy. These explicit and implicit constitutional protections could arguably be implicated in governmental use of DNA identification testing. However, such an argument must be approached with caution. These constitutional guarantees have never been applied to disclosure of an individual's genetic information. Moreover, in light

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100 See, e.g., CAL. CONST. art. I, § 1 ("All people are by nature free and independent and have inalienable rights. Among these are enjoying and defending life and liberty, acquiring, possessing, and protecting property, and pursuing and obtaining safety, happiness, and privacy."); ARIZ. CONST. art. II, § 8 ("No person shall be disturbed in his private affairs, or his home invaded, without authority of law.").
of the limited information available from DNA identification tests and since that information is subsequently entered into databanks, the circumstances in which such constitutional doctrines may apply could be very limited.

A. Explicit Constitutional Guarantees

Among the enumerated privacy guarantees in the Constitution are those contained in the language of the First, Fourth, and Fifth Amendments, protecting respectively, freedom of religious practice, freedom from unreasonable searches, and freedom from coerced self-incrimination. Although these amendments were originally written to restrict only the actions of the federal government, the Supreme Court has, late in this century, held that the guarantees articulated in these amendments also restrict the states by way of the Fourteenth Amendment. Although there has been some suggestion that DNA testing could raise novel challenges to the interpretation of these explicit guarantees, in general, these areas of constitutional law are well developed, and any challenge to DNA identification testing on the basis of these enumerated rights will likely be analyzed and discarded by applying well-settled doctrines.

1. Self-incrimination

One possible challenge to the use of DNA identification testing might be the argument that these tests compel defendants to produce evidence against themselves in violation of the Fifth Amendment's prohibition on coerced self-incrimination. Such arguments have in the past been advanced with regard to other types of evidence, with some success. In *Rochin v. California*, the Supreme Court held that police seizure of evidence contained in a defendant's stomach violated the defendant's constitutional rights. The defendant in *Rochin* had swallowed two capsules when police, without a warrant, burst into his

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103 Cf. DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 155 ("[I]t is hard to think of any new moral rights not already recognized that come into play with the introduction of DNA technology into forensic science.").

104 U.S. CONST. amend. V ("[N]or shall [any person] be compelled in any criminal case to be a witness against himself . . . .").

The defendant was transported to a hospital where he was forcibly restrained while an emetic solution was pumped into his stomach. The capsules that he vomited up were subsequently introduced into evidence against him. The Supreme Court analogized the conduct of the police in *Rochin* to situations of forcibly coerced confession; because both are "shocking to the conscience," they offend the constitution.

Although the holding of *Rochin* was based upon an analogy to coerced confession, the Court retreated from this comparison in a later case, *Breithaupt v. Abram.* In *Breithaupt*, the police, again without a warrant, took a blood sample from an unconscious defendant in order to determine his blood alcohol level. The Court found such sampling to be minimally intrusive, even routine, and characterized by none of the brutality that had prompted the result in *Rochin.* The Court altogether abandoned the *Rochin* analogy in *Schmerber v. California,* which also involved the warrantless taking of blood from an unconsenting defendant. Since *Schmerber*, physical evidence in general has not been considered "testimony," a rationale that has been extended to a variety of identifying physical evidence that may be obtained from suspects, including voice exemplars, handwriting exemplars, and x-ray films. Thus, although in some sense the subject of DNA identification testing does in fact produce evidence against himself, this is unlikely to be considered "coerced testimony" under the Fifth Amendment.

This conclusion, of course, rests upon classification of DNA evidence as physical evidence. Some recent commentary has suggested that "the unique autobiographical nature" of DNA identification should place it in the category of testimonial evidence. This sugges-

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106 Id. at 166.
107 Id.
108 Id. at 167.
109 Id. at 172, 174.
111 Id. at 433.
112 Id. at 435-36.
114 United States v. Dionisio, 410 U.S. 1, 5-6 (1973).
116 State v. Emerson, 123 N.W.2d 382, 385 (Minn. 1963).
tion seems somewhat counterintuitive; despite the information content of DNA molecules, analogizing their physical removal from an individual to forced or coerced confession seems to strain the definition of the danger that the Fifth Amendment was designed to guard against. Additionally, this suggestion rests upon the presumption that RFLP autoradiographs will reveal extensive personal information that they in fact do not. In the absence of this presumption, there is no reason to believe that DNA evidence will be or should be treated any differently by the courts than any other type of physical evidence.

2. Search and Seizure

Since the Schmerber Court's retreat from the testimonial privilege analogy, use of identifying physical evidence has been approached as a matter of Fourth Amendment, rather than Fifth Amendment, jurisprudence. The Fourth Amendment safeguards the privacy of citizens against unreasonable searches and seizures:

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, to be supported by Oath or affirmation and particularly describing the place to be searched, and the persons or things to be seized.118

The Supreme Court has in general defined "reasonable" searches and seizures to be those in which the government first demonstrates "probable cause" — a well-founded, individualized suspicion that pertinent evidence is to be found in a particular place or with a particular individual.119 In some instances, however, the Supreme Court has indicated that unusual circumstances may permit a brief, minimally intrusive search based on something less than probable cause.120 In addition, the Supreme Court in Skinner v. Railway Labor Executives Association permitted administrative drug-testing without individualized suspicion where the circumstances were compelling.121 Similarly,

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118 U.S. Const. amend IV.
120 Terry v. Ohio, 392 U.S. 1 (1968) (stop-and-frisk permitted where officer suspects individual may be armed); see also United States v. Brignoni-Ponce, 422 U.S. 873 (1975) (international border stops permissible on less than probable cause).
DNA databanks may be such an instance where the government interest in obtaining an identification file for criminals will outweigh the minimal intrusion upon that person to obtain the DNA sample.

a. Searches for bodily evidence

Supreme Court decisions allowing searches in the absence of individualized suspicion may suggest the danger that courts might permit DNA sampling at the whim of the law enforcement community. However, a fair reading of the relevant cases suggests otherwise; the Schmerber case, discussed above, is particularly instructive. In addition to his Fifth Amendment challenge, the defendant in Schmerber also challenged the admission of blood analysis evidence on Fourth Amendment grounds. The Supreme Court held that the taking of a blood sample was in fact a search; however, it was done on probable cause, and did not offend the Fourth Amendment. Although the sample was taken without a warrant, the Court found this permissible because the evidence sought — blood alcohol levels — would vanish over time, so haste was necessary. In addition, the Court noted that the procedure entailed no great invasion of the suspect's privacy; blood sampling in our society is commonplace and considered minimally intrusive.

Since Schmerber, this approach of balancing the magnitude of the intrusion against the need for haste and the importance of the evidence has been applied to other areas involving search and seizure. For example, in Cupp v. Murphy, the Supreme Court held that scrapings from beneath a suspect's fingernails were permissibly taken without a warrant, where the police had probable cause to suspect that the evidence would be incriminating and the evidence was likely to be lost over time. More recently, in Skinner v. Railway Labor Executives' Association and in National Treasury Employees Union v. Von Raab, the Supreme Court applied this balancing approach to administrative searches utilizing urinalysis and breathalyzer screening

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122 Schmerber, 384 U.S. at 766-67; see also supra note 118 and accompanying text.
123 Schmerber, 384 U.S. at 770-72.
124 Id. at 770-71.
125 Id. at 771.
of federal railway and customs employees.\textsuperscript{129} The Court in \textit{Skinner} found that because such testing was a known requirement of employment, the employees had a diminished expectation of privacy.\textsuperscript{130} The Court found that this diminished expectation was outweighed by the government’s interest in public safety and law enforcement, as realized through reasonable searches.\textsuperscript{131}

These basic principles from \textit{Schmerber} and \textit{Skinner} have been recently applied to the drawing of blood from prisoners to obtain samples for DNA testing.\textsuperscript{132} In 1990, Virginia passed a statute requiring inmates who are felons to provide a sample of blood prior to the inmate’s release.\textsuperscript{133} The inmates in \textit{Jones v. Murray} filed an action under 42 U.S.C § 1983 and alleged \textit{inter alia} that the drawing of blood for the purpose of establishing a DNA databank was an unreasonable search and seizure in violation of their Fourth Amendment rights.\textsuperscript{134} The United States Court of Appeals for the Fourth Circuit drew upon the jurisprudence of \textit{Skinner}, \textit{Schmerber}, and \textit{Terry v. Ohio}\textsuperscript{135} to hold that the drawing of this sample was a search requiring individualized suspicion;\textsuperscript{136} however, the court indicated that there was no current jurisprudence requiring probable cause “or even a lesser degree of individualized suspicion, when government officials conduct a limited search for the purpose of ascertaining and recording the identity of a person who is lawfully confined to prison.”\textsuperscript{137}

Reasoning that the inmates’ incarceration was based on probable cause, the court found that “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.”\textsuperscript{138} Regarding the issue as to whether or not the search was reasonable, the court

\begin{itemize}
\item[\textsuperscript{129}] See \textit{Skinner}, 489 U.S. 602 (concerning urinalysis and breathalyzer testing of railroad employees); \textit{Von Raab}, 489 U.S. 656 (concerning urinalysis of customs officials).
\item[\textsuperscript{130}] \textit{Skinner}, 489 U.S. at 627.
\item[\textsuperscript{131}] \textit{Id.} at 633-34.
\item[\textsuperscript{133}] VA. CODE ANN. § 19.2-310.2 (Michie 1990).
\item[\textsuperscript{134}] 962 F.2d at 305.
\item[\textsuperscript{135}] 392 U.S. 1 (1967) (requiring reasonably articulable suspicion for police “stop and frisk” searches).
\item[\textsuperscript{136}] \textit{Jones}, 962 F.2d at 305.
\item[\textsuperscript{137}] \textit{Id.} at 306.
\item[\textsuperscript{138}] \textit{Id.} (citing \textit{Hudson v. Palmer}, 468 U.S. 517 (1984) (convicted felons lose a right of privacy and may be subject to routine searches of their bodies and jail cells)).
\end{itemize}
returned to the standards as established in *Schmerber* and *Skinner*. In weighing the minor intrusion of drawing the blood sample against the government's interest in improving law enforcement, the court held that there was no violation of the inmates' Fourth Amendment rights in the statute's application of the requirement to both violent and non-violent felons.

In a subsequent case citing *Jones*, the court similarly held that the minimal intrusion of the blood testing was outweighed by the government's interest in improving law enforcement. In that case, *People v. Wealer*, on Illinois appellate court addressed the use of warrants to obtain DNA samples. Citing *Skinner*, the court noted that the warrant requirement protects privacy by assuring citizens "subject to search and seizure" that the intrusions "are not random or arbitrary acts of government" and "that the search is narrowly limited in its objective and scope." Applying this standard to the Illinois sampling statute, the court found that the scope and objective of the statute was sufficiently narrow and that the information obtained in this manner was confidential and available only to law enforcement personnel. Thus, a warrant requirement "would provide little, if any, additional protection in addition to the 'assurances of certainty and regularity' already inherent in [the statute]."

Based upon the holdings in these cases, it appears likely that the practice of drawing blood samples from prisoners to create a DNA databank will probably withstand further Fourth Amendment chal-

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139 Id. at 307.
140 *Jones*, 962 F.2d at 308. Judge Murnaghan dissented on this point, arguing that the government's interest in databanking samples from non-violent felons did not outweigh the intrusion upon a non-violent inmate who was "not significantly more likely to commit a violent crime in the future than a member of the general population." Id. at 313-14; see also *Ryncarz* v. Eikenberry, 824 F. Supp. 1493, 1500 (E.D. Wash. 1993) (adopting the *Jones* dissent). In the *Ryncarz* case, the court refused, on a motion for summary judgment, to grant qualified immunity to the defendant prison officials for drawing blood from a person whose conviction had been reversed. Id. The court indicated that if the prison officials knew the prisoner was not a convicted felon, they would have no valid reason for DNA typing. Id. Thus, relying on the dissent in *Jones*, the court in *Ryncarz* argued "that inmates have a right to not have their blood drawn absent evidence of a legitimate penological objective for that type of search." Id.
142 Id. at 1135.
143 ILL. ANN. STAT. ch. 38, para. 1005-4-3 (Smith-Hurd Supp. 1992) (providing that persons convicted of sex offenses must submit a blood and a saliva sample for DNA testing).
144 *Wealer*, 636 N.E.2d at 1136.
145 Id. (*quoting Skinner*, 489 U.S. 602, 624 (1989)).
Challenges. However, this result is at least partly based upon the supposition that little more would be gleaned from this DNA databank other than one’s identity, which is not constitutionally protected. The district court in Jones v. Murray clearly relied upon this assumption: “[A]lthough plaintiffs portray DNA analysis as the key to one’s physical and mental predisposition, the only characteristics available for use by the government are the DNA identification characteristics.”

This assumption will hold true for digitized images of DNA patterns, but is not necessarily a good assumption where actual samples are retained.

Additionally, the opinions to date have relied heavily on the fact that the subjects of the testing are convicted prisoners with diminished privacy interests. It seems unlikely that this analysis could be properly applied in the absence of an incarceration, as for example, to screen the general populace for DNA identification. However, one wonders how this analysis might apply to a population with an intermediate privacy interest, such as soldiers in the armed forces — the Supreme Court has frequently subordinated personal liberties to the need to maintain order in the military. Moreover, in a volunteer army, at least, acquiescence to a lessened expectation of privacy could be viewed as a contingency of induction, much as courts have viewed the expectation of other government employees in sensitive positions.

b. Mass screening

Additional concerns regarding DNA identification databases may focus on the danger that mass screening of suspects could occur without individualized suspicion of guilt. An incident of this type occurred in Britain during the notorious Pitchfork incident. In order to resolve an incident of rape and murder, British law enforcement officials requested that all males in a small English community submit to DNA testing; the social pressure generated from this mass testing eventually


147 See Jones, 962 F.2d 302, 306 (4th Cir. 1992). But see also Woods v. White, 689 F. Supp. 874, 876 (W.D. Wis. 1988), aff'd mem., 899 F.2d 17 (7th Cir. 1990) (right to shield personal information from disclosure continues even after incarceration).


149 See supra note 129 and accompanying text.
resulted in the arrest and conviction of the culprit, Colin Pitchfork.\textsuperscript{150} This incident, some fear, may point the way to screening suspect populations rather than suspect individuals whenever the police are faced with otherwise unsolvable crimes.

However, the Pitchfork investigation took place in the United Kingdom. In the United States, any similar inclination on the part of law enforcement officers to “round up the usual suspects”\textsuperscript{151} during an investigation would likely be foreclosed by the Fourth Amendment. In \textit{Davis v. Mississippi},\textsuperscript{152} the Supreme Court condemned the investigative round-up, detention, and fingerprinting of suspects where the police have no individualized suspicion.\textsuperscript{153} In \textit{Davis}, the victim of a rape was able to describe her assailant only as a “Negro youth.”\textsuperscript{154} Although fingerprints were left at the scene of the crime, the police had no clues as to whom the prints might belong.\textsuperscript{155} In the absence of any leads about the culprit’s identity, the police turned to mass screening of young black men, and eventually matched the forensic prints with the defendant’s.\textsuperscript{156} In \textit{Davis} and subsequent cases, the Supreme Court held that such investigative sweeps were impermissible because the requisite detention of the individuals in the investigative sweep occurred without a warrant and without probable cause.\textsuperscript{157}

Dictum in \textit{Davis} and its progeny suggests that a brief detention for fingerprinting, even without a warrant or probable cause, might not offend the Fourth Amendment.\textsuperscript{158} According to the Court, finger-


\textsuperscript{151} See \textit{In re Reed}, 663 P.2d 216, 218 n.5, (Cal. 1983) (quoting the character of the Vichy police inspector from the film \textit{Casablanca}).

\textsuperscript{152} 394 U.S. 721 (1969).

\textsuperscript{153} \textit{Id.}; accord \textit{Sullivan v. Murphy} 478 F.2d 938, 970 (D.C. Cir.), \textit{cert. denied}, 414 U.S. 880 (1973) (deploring the practice of “dragnet arrests”).

\textsuperscript{154} \textit{Davis}, 394 U.S. at 722.

\textsuperscript{155} \textit{Id.}

\textsuperscript{156} \textit{Id.}

\textsuperscript{157} \textit{Id.} at 727-28; see also \textit{Hayes v. Florida}, 470 U.S. 811 (1985); \textit{Dunaway v. New York}, 442 U.S. 200 (1979). Citing \textit{Davis}, the court in \textit{Jones v. Murray} stated that although it did not accept the minimal intrusion of fingerprinting on free persons without a Fourth Amendment constraint, “the same protections do not hold true for those lawfully confined to the custody of the state.” \textit{Jones}, 962 F.2d at 306.

printing is "unique" or distinguishable from other types of searches in several of its characteristics. The probative value of fingerprinting evidence is likely to be high and the process is relatively nonintrusive. The Court also stressed that unlike an interrogation, fingerprinting does not probe into the suspect's personal life.\textsuperscript{159}

It has been suggested that this last "unique" characteristic of fingerprinting distinguishes it from DNA testing, and so DNA testing should be evaluated under a more rigorous standard than that developed in \textit{Davis}.\textsuperscript{160} Indeed, some commentators have asserted that the general Fourth Amendment analysis for DNA identification testing should be different because these tests may be more intrusive than other identification procedures. One commentator has asserted that because "[t]he information obtained by DNA profiling . . . is potentially quite extensive and personal . . . this unique aspect of DNA profiling adds a new dimension to the entire Fourth Amendment analysis of what is a reasonable search in the context of compulsory identification procedures on less than probable cause."\textsuperscript{161} According to this commentator, "since DNA may reveal private information such as legitimacy at birth and genetically inherited diseases, it appears to have more qualities of forced testimonial evidences than simple physical evidence."\textsuperscript{162}

Unfortunately, this legal analysis is based upon the misconception of DNA profiling discussed above: that DNA identification patterns are likely to reveal significant private information in a way that fingerprinting does not. This analysis collapses when this assumption is removed. DNA identification patterns are unlikely to reveal more genetic information than fingerprints or photographs,\textsuperscript{163} and it is consequently unlikely, as evidenced by the opinion in \textit{Jones}, that the courts will treat DNA patterns differently for purposes of the Fourth Amendment.\textsuperscript{164} Admittedly, DNA testing uncovers an identifying pattern that is not normally displayed to the world, and some Fourth Amendment decisions have stressed the public display of facial features, hair, fingerprints, or other identifying traits in holding that a

\textsuperscript{159} 394 U.S. at 728-29.
\textsuperscript{160} See Hoeffel, supra note 117, at 530-33; see also Sally E. Renskers, Comment, \textit{Trial By Certainty: Implications of Genetic \textquotedblleft DNA Fingerprints,	extquotedblright} 39 EMORY L.J. 309, 327-30 (1990).
\textsuperscript{161} Hoeffel, supra note 117, at 531.
\textsuperscript{162} Hoeffel, supra note 117, at 533.
\textsuperscript{163} See DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 155.
\textsuperscript{164} See supra note 134 and accompanying text.
“search” of these identifying features was unintrusive. However, asserting that the RFLP pattern is not normally in “plain view” merely returns us to the analysis of bodily intrusion under Schmerber above, and a Fourth Amendment analysis of DNA testing under Davis appears fully consonant with that under Schmerber. Indeed, the Court in Davis suggested that because fingerprints are not subject to destruction, the exigency central to the Schmerber decision would not be present, and law enforcement officials should normally be expected to take fingerprints at a convenient time on probable cause. The same argument should hold true for DNA sampling, which shares the characteristic of indestructibility, and therefore allows law enforcement agencies the leisure to fully comply with the requirements of probable cause.

Of course, were a law enforcement agency to subject the DNA samples it collects to some other type of genetic testing, then the Fourth Amendment analysis might well change. Wholesale genetic testing of samples might well be analogized to “rifling through personal files” or as the functional equivalent of an illegal blanket warrant. Even so, however, such an analogy stands on a legal footing that is less than certain. It is not entirely clear, for example, that the Supreme Court would extend Fourth Amendment protection to such biological information. As one commentator has noted, the Court declined to extend such protection to bank records in United States v. Miller because it viewed the records as negotiable instruments rather than as personal records. Consequently, if the Supreme Court is unwilling “to make a conceptual leap to apply the fourth Amend-

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167 See Burk, supra note 7 at 455, 470 (arguing that because DNA, unlike the alcohol sampled in Schmerber, is not cleared from the blood, police should be required to obtain a warrant for sampling); James P. O’Brien, Jr., Note, DNA Fingerprinting: The Virginia Approach, 35 WM. & MARY L. REV. 767, 789 (1994) (same).
168 Hoeffel, supra note 117, at 531.
169 See Hoeffel, supra note 117, at 393-94.
170 425 U.S. 435 (1976). Miller was subsequently superseded by the Right to Financial Privacy Act of 1978, 12 U.S.C. §§ 3401-3422 (1988). The Act allows some customers to be notified of and challenge court administrative subpoenas of financial records; however, the Act is extremely limited in scope. Therefore, the analysis from Miller still applies in this instance.
ment to personal information held by others, it is unlikely that the Court would be willing to make the quantum leap from personal papers to biological materials.  

3. Religious Freedom

The First Amendment to the federal Constitution guarantees a number of foundational freedoms, including freedom of speech, freedom of the press, the right to assemble, and the right to "free exercise" of an individual's religious beliefs. This last guarantee, although it protects an aspect of personal privacy from government interference, is not generally associated with the rights of the criminally accused. However, in Ohio v. Biddings, the Free Exercise Clause became the basis of a constitutional challenge against forensic DNA testing. The defendant, a member of the Jehovah's Witness denomination, objected on religious grounds to the issuance of a warrant to obtain a sample of his blood, which was to be used for DNA testing. The Ohio appellate court noted that this belief was not strictly in line with the orthodox tenets of the defendant's religion, but also noted that a sincerely-held personal belief could be the basis for a Free Exercise claim. However, the court satisfied itself that the defendant's protest did not stem from a sincerely held belief, and so upheld the sampling. The court declined to deal with the question of whether the sample could have been taken by some less objectionable technique, such as plucking hair roots.  

Courts generally do not dispose of such constitutional claims on the strength of the claimant's belief. However, even had the court in Biddings taken the defendant's claim at face value, the outcome would not likely have been different; the Free Exercise Clause has generally been a poor choice to challenge governmental identification schemes. For example, in Bowen v. Roy, the plaintiffs asserted a Free Exercise challenge to governmental policies that denied their

171 de Gorgey, supra note 5, at 394.
172 U.S. CONST. amend. I.
174 Id. at 978.
175 Id. at 979.
176 Id.
177 See, e.g., Thomas v. Review Board, 450 U.S. 707, 715-16 (1981) ("Courts should not undertake to dissect religious beliefs . . . courts are not arbiters of scriptural interpretation.").
minor daughter welfare benefits because she had no social security number. The plaintiffs alleged that their Native American religious beliefs precluded them from obtaining or using a social security number on behalf of their daughter, Little Bird of the Snow.\textsuperscript{179} According to the plaintiffs, such a numerical identifier would “rob” their daughter of her spirit by adversely impacting her unique individuality. In a majority opinion by Justice Rehnquist, the Court held that the First Amendment’s Free Exercise Clause cannot be used to coerce the government into adopting certain practices that the individual believes would promote his or her spiritual development. Rather, the Free Exercise Clause dictates what the government \textit{cannot} do to an individual; as a complement to the Establishment Clause, it affords protection from governmental compulsion to adopt certain religious practices.\textsuperscript{180}

A similar Free Exercise challenge to DNA identification can be expected to evoke a similar response, as indeed occurred in \textit{Ryncarz v. Eikenberry}.\textsuperscript{181} The prisoner plaintiff, from whom a blood sample for DNA testing was forcibly drawn for inclusion in a computerized databank, challenged the coerced sampling on Free Exercise grounds. The plaintiff alleged that his religious beliefs prohibited him from shedding his own blood, and described the blood draw to a “demonic blood ritual” that he believed would deprive him of a portion of his soul.\textsuperscript{182} Without addressing the sincerity of plaintiff’s belief, the court ruled that the statute requiring convicted offender sampling was not directed toward burdening any religious practice, did not represent an ongoing restriction to the plaintiff’s religions practices, and was more than justified by a compelling governmental interest in law enforcement.\textsuperscript{183}

\textbf{B. Implied Constitutional Rights of Privacy}

In addition to the privacy rights conferred by the explicit language of the federal Constitution, the same language has been interpreted as conferring implied rights relating to privacy and autonomy. The Supreme Court has at times suggested that these implied rights

\textsuperscript{179} \textit{Id.} at 696.
\textsuperscript{180} \textit{Id.} at 700.
\textsuperscript{181} \textit{824 F. Supp.} 1493 (E.D. Wash. 1993).
\textsuperscript{182} \textit{Id.} at 1502.
\textsuperscript{183} \textit{Id.}
arise from the "penumbras" or "emanations" of the specific guarantees of the Bill of Rights. At other times, the Court has suggested that these implied rights are inherent in the concept of "liberty" found in the Due Process Clause of the Fourteenth Amendment. Whatever, their source, these implied rights appear to encompass two different aspects of privacy: a right of autonomy or personal decision-making, and a right protecting disclosure of personal information.

1. The Right of Autonomy

The most discussed and controversial implied right of constitutional privacy is that involving "autonomy" or "personhood." This right protects a narrowly-defined class of personal decisions from undue governmental intrusion. The decisions protected include those involving family relationships, marriage, procreation, use of contraceptives, child-rearing, and the decision to abort a pregnancy.

However, recent Supreme Court decisions have tended to diminish these constitutional safeguards, particularly the core protection against state intrusion into the decision whether or not to bear a child. In Roe v. Wade, the effect of any law or effort to restrict abortion was analyzed under strict scrutiny, since a woman's decision whether to bear a child or abort her pregnancy was held to be protected as a fundamental right. However, with the Supreme Court's opinion in

185 "Whether the right of privacy is located in the general language of the Ninth Amendment or emanates as a penumbra from the First, Third, Fourth, Fifth, and Ninth Amendments, or is inherent in the concept of liberty contained in the Fourteenth Amendment, is a subject of some dispute, as are the precise contours of the right itself." Lawrence J. Leigh, Note, Informational Privacy: Constitutional Challenges to the Collection and Dissemination of Personal Information by Government Agencies, 3 Hastings Const. L.Q. 229, 235 (1976).
191 Pierce v. Society of Sisters, 268 U.S. 510 (1925); see also Employment Division v. Smith, 494 U.S. 872, 882 n.1 (1990) (citing Wisconsin v. Yoder, 406 U.S. 205 (1972)) (stating that the Yoder holding regarding parents' liberty to control education of their children was based in part in the Due Process Clause).
194 Id. at 154-56.
Planned Parenthood v. Casey,\(^1\) the strict scrutiny test may now have been reduced to an analysis closer to rational basis review. Under this approach, the state still could not place an "undue burden" on a woman's procreative decision, but the decision would no longer be classified as a fundamental right requiring a compelling reason for state interference.\(^2\)

Despite its possible diminution, the right of personal autonomy still stands as a significant guarantee of constitutional privacy. At first blush, such a constitutional right might seem to be implicated in the privacy concerns surrounding DNA identification testing, due to the obvious relationship between DNA, heredity, and procreation. However, this right is unlikely to be implicated in such testing, the Supreme Court has tended to limit the scope of the autonomy right to matters directly bearing on decisions involving marriage, procreation, contraception, and child rearing.

For example, in Paul v. Davis,\(^3\) the respondent contended that the local police department had violated his Fourteenth Amendment privacy rights by circulating to businesses a flier that included his name among a list of "known shoplifters." The respondent had been arrested for, but not convicted of, shoplifting. The Supreme Court rejected the constitutional claim because it did not fall within the areas of personal decisionmaking protected by the right of autonomy.\(^4\) The Court noted that the suit was not a "challenge to the state's ability to restrict [the respondent's] freedom of action in a sphere contended to be 'private'. . . ."\(^5\) Rather, the claim was "far afield" from such protected areas, and the court declined to enlarge the right beyond those areas.\(^6\)

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\(^1\) 112 S. Ct. 2791 (1992).
\(^2\) The opinion in Casey, written by Justice O'Connor, was in part a plurality opinion and in part a majority opinion. Id. at 2803. Although the language of "undue burden" appeared in both parts, only the plurality expressly adopted the undue burden test. Id. at 2804. See generally 3 Rotunda & Nowak supra note 102, ¶ 18.29 (Supp. 1995) (discussing Casey).
\(^3\) 424 U.S. 693 (1976).
\(^4\) Id. at 713.
\(^5\) Id.
\(^6\) Id. at 713-14; accord Hodge v. Jones, 31 F.3d 157, 167 (4th Cir.), cert. denied, 115 S. Ct. 581 (1994) (declining to "expand penumbral privacy rights beyond the fixed boundaries of established precedent in order to establish a justiciable injury in confidential maintenance of 'unsubstantiated' or 'ruled out' [computerized] child abuse investigation reports."). A careful reading of the Hodge opinion suggests that the Fourth Circuit panel improperly conflated the interest in autonomy with the interest in informational privacy articulated in Whalen v. Roe, 429 U.S. 589 (1977), discussed infra note 219 and accompanying text. Unfortunately, this lapse in analysis is
As in the case of the reputational interest in *Paul v. Davis*, DNA testing is unlikely to impact protected decisionmaking — such testing does not foreclose any alternatives related to use of contraceptives, abortion, or similar procreative decisions.²⁰¹ Moreover, to the extent that *Casey* represents the bounds of autonomous privacy, any constitutional protection against DNA sampling that might have stemmed from a protected decisionmaking analysis would be approached from a rational relationship inquiry. Under this standard, state interests in law enforcement would, in most instances, satisfy the minimal showing necessary to uphold the practice of sampling.

### a. Protected Decisionmaking

Under the analysis of *Paul v. Davis*, an autonomy challenge to DNA identification testing would likely fail because such testing has not been explicitly recognized as a constitutionally protected matter. However, it might be argued that the information available from an individual's DNA could have an impact on protected choices concerning family, marriage, or procreation. This argument is likely to be unavailing because the Supreme Court has rejected not only arguments that would expand the right of autonomy beyond a limited field of protected decisionmaking, but has also rejected privacy challenges to governmental record-keeping that could impact decisions in those protected areas.

For example, in *Planned Parenthood v. Danforth*,²⁰² government record-keeping regarding abortions was challenged as a practice likely to deter women from freely exercising their right of choice not to bear a child.²⁰³ The Supreme Court rejected this argument, holding that characteristic of many of the cases in this area. See Leigh, supra note 185, at 246 ("Individual autonomy is likely to be restricted to a narrow range of situations dealing with home, family, and procreation. Confusion of the two rights may result in decisions similarly restricting the right of informational privacy." (citation omitted)).


such record-keeping has no "legally significant" impact on protected
decisionmaking. This analysis has also been followed in other
autonomy challenges to government classification or information
gathering. In Doyle v. Wilson, a federal district court rejected the
plaintiff's claim that state procedures requiring use of a social security
number for identification violated his right of privacy; the court stated
that mandatory disclosure of the social security number did not
threaten decisions involving marriage, family, and procreation.

In another privacy challenge to governmental use of social secur-
ity numbers, Chambers v. Klein, the plaintiffs explicitly alleged that
requiring them to obtain and use social security numbers interfered
with child rearing and other constitutionally-protected decisionmak-
ing. According to the plaintiffs, the use of the social security numbers
in conjunction with receipt of welfare aid was stigmatizing; the use of
social security numbers would facilitate future identification of chil-
dren as welfare recipients. This, they alleged, could interfere with
familial relationships, causing children to come to resent their parents
because of the children's continuing record of disadvantaged status.
The court, however, found this allegation to be too attenuated, stating
that simple association with child rearing was not enough to violate
precepts of constitutional privacy.

Similarly, when federal judges challenged the financial disclosure
requirements of the Ethics in Government Act of 1978, the United
States Court of Appeals for the Fifth Circuit held that the disclosure
of such admittedly personal information did not rise to the level of a
constitutional violation under the right of autonomy. The court
noted that disclosure of financial information was unlikely to deter
marriage, child-bearing, or the other intimate personal decisions pro-

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204 428 U.S. at 81.
206 Id. at 1348.
208 Id. at 581.
209 Id. at 583; accord Hodge v. Jones, 31 F.3d 157, 164 (4th Cir. 1994) (plaintiff failed to
show retention of computerized child abuse investigation records harmed a protected family
relationship).
211 DuPlantier v. United States, 606 F.2d 654 (5th Cir. 1979), cert. denied, 449 U.S. 1076
that an overly broad financial disclosure statute for public officials intruded into areas of
privacy protected by the federal constitution).
tected by the constitutional right of autonomy. In a similar challenge to the financial disclosure requirements of the Florida state constitution's "sunshine amendment," the Fifth Circuit relied on Danforth for the proposition that, even if financial disclosure had some influence on protected decisionmaking, the disclosure still did not rise to the level of a constitutional problem.

Together, these decisions indicate that the courts would not be inclined to analyze governmental DNA testing in terms of autonomy. The analysis in Paul v. Davis limits autonomy claims to those involving procreative and familial decisionmaking, while Danforth and its progeny further limit autonomy claims to those directly affecting such decisionmaking. It is perhaps possible to envision a DNA testing scenario that would fall within the protected area of decisionmaking — perhaps improper testing of a criminal suspect's DNA that revealed the presence of genetic disease would deter the suspect's marriage or decision to have children. But such a scenario likely does not rise to the level of a constitutional violation; although the state action would impact protected decisionmaking, it would not forbid the suspect from taking any particular course of action.

b. Bodily integrity

One additional issue of autonomy that might be raised in relation to DNA identification testing is that of bodily integrity. In order to obtain an identifying RFLP pattern from a person, that person's bodily integrity must be invaded to some degree to obtain the necessary tissue. The subsequent manipulation of that tissue to extract and process the DNA might also be viewed as an insult to bodily integrity. Although the Supreme Court has recognized that persons have such a right of bodily integrity, the Court has declined to analyze this right in terms of autonomy. In Cruzan v. Director, Missouri Department of Health, the Supreme Court considered whether the relatives of an

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212 DuPlantier, 606 F.2d at 669-70 (citing Plante v. Gonzalez, 575 F.2d 1119 (5th Cir. 1978)).
214 See Hosch, supra note 201, at 188 ("[G]overnmental dissemination of personal information does not remove any alternatives from the decision-making process. Although it might deter some actions, its effect on any pending decisions . . . is indirect.").
individual in a persistent vegetative state could exercise the individual’s right to refuse further nourishment and hydration. The Court began by characterizing the case in terms of a patient’s right to bodily integrity. Quoting from an earlier New York court case, the Court reaffirmed the existence of a right to refuse or consent to medical procedures: “Every human being of adult years and sound mind has a right to determine what shall be done with his own body....”216 However, even though the Court recognized that this right to make personal decisions was protected under the Due Process Clause of the Fourteenth Amendment, the Court declined to characterize the right as one relating to privacy.

Instead, the Court characterized the right as a protected “liberty interest” under the Due Process Clause.217 Significantly, this characterization, much like the characterization of privacy in Danforth, moves the inquiry out of the realm of “fundamental interests” and “strict scrutiny.”218 Where a fundamental interest is involved, the Court adopts a very demanding standard in reviewing any governmental intrusion upon that right.219 Under such “strict scrutiny,” the government is required to carry a heavy burden to justify its intrusion.220 However, the government carries a much lighter burden to justify intrusion upon a “liberty interest” that is not a fundamental right.221 The Cruzan case suggests that a governmental intrusion upon an individual’s bodily integrity to collect DNA would be analyzed as an intrusion upon a less important “liberty interest” rather than an intrusion upon a fundamental right. Presumably, the needs of legitimate law enforcement would meet the government’s burden under this lesser standard, subordinating the individual’s right to protest collection of DNA samples.

216 Id. at 269 (quoting Schloendorf v. Society of New York Hospital, 105 N.E. 92, 93 (N.Y. 1914)).

217 Id. at 279 n.7; see also 3 ROTUNDA & NOWAK, supra note 102, § 18.30, at 385-86 (discussing liberty interest standard in Cruzan).

218 See generally LAURENCE H. TRIBE, AMERICAN CONSTITUTIONAL LAW § 16-33, at 1610-13 (2d ed. 1988) (discussing level of scrutiny associated with fundamental interests).

219 497 U.S. at 278-79; 2 ROTUNDA & NOWAK, supra note 102, § 17.4 (c).

220 TRIBE, supra note 218.

221 See 3 ROTUNDA & NOWAK, supra note 102, § 18.30, at 385-86; see also TRIBE, supra note 218 (discussing review of “negative liberty interest”).
2. The Right of Informational Privacy

Supreme Court decisions regarding constitutional privacy have also recognized an informational interest separate from the right of autonomy. Rather than protecting the right to make personal decisions, this informational interest protects an individual's expectation of privacy with regard to records containing personal data. Several commentators have recognized the possibility that the implementation of law enforcement DNA identification databanks may adversely impact this right of informational privacy.

The right in question was first articulated by the Supreme Court in *Whalen v. Roe*, a constitutional challenge to a New York record-keeping statute. The New York statute required computerized records to be kept of patients for whom doctors prescribed certain controlled pharmaceuticals. A group of patients challenged the statute, alleging that the computerized list of patients' names and addresses could become publicly known, stigmatizing the patients as "drug addicts." The Court recognized a privacy interest in such medical data, but found no evidence in the record to indicate that the disclosure requirement threatened that interest. In particular, the Court stressed the existence of physical and electronic security measures that protected the data. Because the statute was a legitimate exercise of the state's "police power" to protect public health and safety, and because the plaintiffs showed no evidence of improper use or administration of the information, the Court found no constitutional privacy violation.

This approach to informational privacy has been buttressed in one or two additional Supreme Court decisions. In *Nixon v. Administrator of General Services*, the former President of the United States challenged a governmental policy requiring that his papers be

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222 See Clouse, supra note 186, at 537.
225 Id. at 592-94.
226 Id. at 595.
227 Id. at 605.
228 Id. at 593-95.
screened to separate out public documents, which were to be archived, from private documents, which were to be returned to him. Nixon asserted that the review of his private papers by government employees violated his privacy rights. Citing Whalen, the Supreme Court recognized the former President's privacy interest in his personal papers, including family and financial records, that might be compromised during the sorting process. However, the Court also found a substantial governmental interest in separating out public documents for archiving, noting that only a small fraction of the documents were of a private nature and that any intrusion into the former President's privacy would be of a very limited nature. In balancing these factors against Nixon's privacy expectation, the Court found the policy permissible.

The Supreme Court has applied the holding of Whalen to an individual's privacy interest in criminal records as well. In United States Department of Justice v. Reporter's Commission for Freedom of the Press, news reporters attempted to gain access through a Freedom of Information Act request to FBI "rap sheets" concerning suspected Mafia figures. The "rap sheet" information included a history of criminal proceedings against a particular individual as well as personal information about age, physical description, and social history. The FBI denied the reporters' request, citing provisions of the Act that allow agencies to withhold information that would constitute an "unwarranted" invasion of an individual's privacy.

In reviewing whether the FBI could deny the request as an "unwarranted" invasion of privacy, the Supreme Court balanced the individuals' expectation of privacy against the social value of disclosure. The reporters contended that information concerning a possible criminal figure was of public interest and importance. Moreover, the reporters argued that the "rap sheet" information was publicly-available information that had simply been compiled from scattered sources by the FBI; because the information was publicly available,

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230 Id. at 456.
231 Id. at 457-58.
232 Id. at 459-60.
235 Department of Justice v. Reporters Comm., 489 U.S. at 757, 771.
236 Id. at 757, 774.
the individual's privacy interest was minimal.\textsuperscript{237} The Court, however, relied upon \textit{Whalen} for the proposition that the individual had a privacy interest even in scattered information gathered by a government agency.\textsuperscript{238} Showing a particular concern for the privacy of the individual in the face of governmental computer databases, the Court stated:

\begin{quote}
[T]he issue here is whether the compilation of otherwise hard-to-obtain information alters the privacy interest implicated by disclosure of that information. Plainly there is a vast difference between the public records that might be found after diligent search of courthouse files, county archives, and local police stations throughout the country and a computerized summary located in a single clearinghouse of information.\textsuperscript{239}
\end{quote}

The Court then analyzed the public interest in disclosure, and found that interest not to be of the type central to the Freedom of Information Act.\textsuperscript{240} Thus, when balanced against the privacy interest of the subject of the "rap sheet," the intrusion was "unwarranted" under the statute.\textsuperscript{241}

\textbf{a. The limits of Whalen}

Although these decisions appear to establish a constitutional right to informational privacy, the parameters of the right are far from clear, and its application to DNA identification testing would not rest on settled legal principles. As the United States Court of Appeals for the Fifth Circuit noted, the \textit{Whalen} decision did not directly address the question of governmental disclosure of personal information, only the question of governmental collection of personal information.\textsuperscript{242}

Although a governmental disclosure of personal information necessarily implicates governmental collection of such information, an individual's constitutional interest in each activity can be considered

\textsuperscript{237} Id.
\textsuperscript{238} Id. at 762, 769-71.
\textsuperscript{239} Id. at 764. \textit{Cf. Whalen}, 429 U.S. at 605, \textit{cited in} Dept. of Justice v. Reporters Comm., 489 U.S. at 770 ("We are not unaware of the threat to privacy implicit in the accumulation of vast amounts of personal information in computerized data banks or other massive government files.").
\textsuperscript{240} Department of Justice v. Reporters Comm., 489 U.S. at 774-75.
\textsuperscript{241} Id. at 780.
analytically distinct, and the latter interest could well exist in the absence of the former.\textsuperscript{243}

Some courts have refused to read \textit{Whalen} as establishing even a right with regard to information collection. The United States Court of Appeals for the Sixth Circuit rejected this view of \textit{Whalen} in \textit{J.P. v. DeSanti}.\textsuperscript{244} The plaintiff in \textit{DeSanti} argued that the dissemination of juvenile offenders' social histories, which had been compiled by probation officers, violated the juveniles' constitutional privacy rights. The Sixth Circuit rejected the claim, noting that no general right of privacy is explicitly mentioned in the Constitution,\textsuperscript{245} and "[i]nferring very broad 'constitutional' rights where the Constitution itself does not express them is an activity not appropriate to the judiciary."\textsuperscript{246} According to the court:

Some courts have uncritically picked up that part of \textit{Whalen} pertaining to nondisclosure and have created a rule that the courts must balance a governmental intrusion on this 'right' of privacy against the government's interest in the intrusion. . . . We do not view the discussion of confidentiality in \textit{Whalen v. Roe} as . . . creating a constitutional right to have all government action weighed against the resulting breach of confidentiality.\textsuperscript{247}

Even the courts that have accepted the \textit{Whalen} decision as enunciating a constitutional right of informational privacy have not applied it to all types of damaging governmental record disclosures. For example, the plaintiff in \textit{Doe v. United States Civil Service Commission}\textsuperscript{248} had applied for a position as a White House Fellow; during the background investigation that was routinely conducted on applicants for the position, statements claiming that the plaintiff was a "kleptomaniac" and that she had been dishonest in college were introduced into her file.\textsuperscript{249} Through an administrative procedure, the plaintiff produced evidence refuting the statements, including psychological certification that she was not a kleptomaniac, and requested that the

\textsuperscript{243} See Clouse, \textit{supra} note 186, at 557-58.
\textsuperscript{244} 653 F.2d 1080, 1088-91 (6th Cir. 1981).
\textsuperscript{245} \textit{Id.} at 1087.
\textsuperscript{246} \textit{Id.} at 1090.
\textsuperscript{247} \textit{Id.} at 1088-89.
\textsuperscript{248} 483 F. Supp. 539 (S.D.N.Y. 1980).
\textsuperscript{249} \textit{Id.} at 547.
incorrect information be expunged from her file. The investigating agency declined to do so, although it did add the new evidence to her file. The plaintiff filed suit alleging, *inter alia*, that her constitutional right to privacy had been violated. The federal district court, although recognizing the plaintiff's rights under *Whalen*, declined to apply *Whalen* to these facts. The court noted that the plaintiff had not been damaged by governmental gathering of personal but true information as in *Whalen*, rather, she was challenging the investigating agency's collection, reporting, and disclosure procedures. Consequently, the court analyzed the claim as deprivation of a due-process liberty interest in future opportunities, rather than as an informational privacy violation.

b. Balancing privacy interests

Despite the highly-restrained analysis of the *DeSanti* and *Doe* courts, the majority of courts in "right of informational privacy" cases have viewed *Whalen* and its progeny as establishing a constitutional interest in personal information. The types of information protected under this constitutional standard have included medical records, certain financial information, and information on personal habits. As in *Whalen*, however, this interest is not absolutely protected. In determining the quantum of constitutional protection this right affords, the courts have employed an "intermediate standard of review," under which the government must show something more than a rational basis for an intrusion. Following the analysis of

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250 *Id.* at 547-48.
251 *Id.* at 548.
252 *Id.* at 549.
253 *Id.* at 566-67.
254 *Id.* at 567; *Cf.* *Cruzan* v. Harmon, 497 U.S. at 278 n.7 (analyzing bodily integrity as a liberty interest, rather than a privacy interest).
258 *Barry* v. *City of New York*, 712 F.2d at 1559; *Plante v. Gonzalez*, 575 F.2d at 1134.
259 *Plante*, 575 F.2d at 1134.
Whalen, the governmental interest and the individual's privacy expectation are then compared through what has been called a "flexible balancing test." This type of scrutiny strongly resembles the balancing of Fourth Amendment privacy concerns, as discussed above.

For example, when a physician, under criminal investigation for insurance fraud, challenged on privacy grounds a search warrant pertaining to certain patients' medical records, the United States Court of Appeals for the Third Circuit balanced the patients' interest in maintaining privacy against the governmental interest in compelling disclosure. According to the Third Circuit, the factors to be considered in balancing the interests include:

- the type of record,
- the information it might contain,
- the potential for harm from a subsequent nonconsensual disclosure,
- the possible injury from such disclosure to the relationship that generated the record,
- the adequacy of safeguards against disclosure,
- the need for governmental access, and
- any articulated public policy favoring access.

This balancing approach has been adopted by other courts, and in general, the right to informational privacy has lain but lightly on the scales. Virtually any legitimate governmental interest has been found to outweigh the individual's privacy expectations, especially where some precaution has been taken to avoid improper disclosure of the information gathered. Thus, in Hodge v. Jones, the United States Court of Appeals for the Fourth Circuit held that parents who had been investigated and cleared of child abuse charges did not have a sufficient privacy interest under Whalen to have their files removed from a computerized state database of such investigations. Even though the charges had been found "unsubstantiated" and were

260 Fraternal Order of Police, 812 F.2d at 110.
262 Id. at 72.
264 Id. at 165.
"ruled out," the court held that continued maintenance of the files served a legitimate state interest in protecting children.265

Similarly, almost any precaution against unauthorized disclosure seems adequate to allow governmental information-gathering to pass muster. In the Hodge case, a misdemeanor criminal provision mandating a fine of no more than $500 was considered sufficient protection.266 Courts have held that the availability of judicial mechanisms, such as protective orders, constitute enough of a safeguard against unauthorized disclosure to permit the governmental interest to outweigh legitimate privacy expectations.267 Regulations mandating confidentiality may also be considered an adequate safeguard.268 In the case of United States v. Westinghouse,269 the United States Court of Appeals for the Third Circuit noted that the medical records gathered by the government were kept in locked cabinets, were not usually posted on computers, or, if placed in a computer database, were removed after six months. In contrast, where no safeguards at all were implemented to protect sensitive data gathered in police employment questionnaires, the Third Circuit upheld an injunction barring the Philadelphia Police Department from inquiring into matters protected under Whalen.270

Additionally, voluntary disclosure or similar actions by the individual may diminish the informational privacy expectation. Where

265 Id. at 166. The court in Hodge also relied in part on a perceived parallel to earlier decisions holding that there is no firm right to have arrest or conviction records expunged or corrected when the subject is released, acquitted, or pardoned. Id. The court's desire to rely on such decisions is curious, given the notorious inaccuracy, unreliability, and stigmatizing effect of criminal records as a result of just such decisions. See generally Anne Chwat, Privacy Interests in Criminal Records: Accuracy & Dissemination, 1986 ANN. SURV. AM. L. 545 (discussing rampant inaccuracy of criminal arrest and conviction records). One might think that the court would have considered correcting such a situation rather than extending it.

266 See Hodge, 31 F.3d at 165.

267 In re Search Warrant (Sealed), 810 F.2d 67, 72 (3d Cir.), cert. denied, 483 U.S. 1007 (1987); Watson v. Lowcountry Red Cross, 974 F.2d 482, 487-88 (4th Cir. 1992); General Motors v. Director of NIOSH, 636 F.2d 163, 166 (6th Cir. 1980).

268 See McKenna v. Fargo, 451 F. Supp. 1355, 1382 (D.N.J. 1978) (employee privacy interest in psychological profiles would be sufficiently protected by a formal policy for data access and retention).

269 638 F.2d 570, 580 (3d Cir. 1980).

270 Fraternal Order of Police v. Philadelphia, 812 F.2d 105, 118 (3d Cir. 1987). But see McKenna, 451 F. Supp. at 1382. In McKenna, the applicants for jobs as firefighters were subjected to a battery of psychological profiling tests; these records were subject only to voluntary access limitations. Id. The court held that the city's compelling interest in testing potential firefighters outweighed the applicant's informational privacy right so long as the city promulgated a formal standard on records access and retention. Id.
the identities of patients had already been disclosed by submission of medical records to insurance companies, courts have found the expectation of privacy in a subsequent federal fraud investigation to be diminished.\textsuperscript{271} Or, where the information has been previously revealed by a job application or similar questionnaire, the expectation of privacy may be likewise diminished.\textsuperscript{272} Similarly, the United States Court of Appeals for the Fifth Circuit in DuPlantier v. United States,\textsuperscript{273} held that public officials, even those appointed rather than elected, placed themselves in a position of increased scrutiny that lessened their legitimate expectation of privacy in personal financial records.

Of course where the government can show no legitimate interest at all, the informational right, light as it may be, tips the balance. In Fadjo v. Coon,\textsuperscript{274} the plaintiff alleged that he was subpoenaed to provide information regarding personal matters, and did so after assurances from the state attorney general's office that his testimony would be privileged and revealed to no one. However, the information gathered was passed on to an insurance investigator, who reported the information to insurance companies; the plaintiff claimed that as a result, he had been forced to move from his residence and was unable to obtain employment.\textsuperscript{275} The plaintiff admitted that the state had authority to obtain personal information in the course of a criminal investigation, but asserted that the information was improperly released to the insurance agencies. In reversing a dismissal of the suit, the Fifth Circuit noted that if the disclosure was in fact improper, there would be no legitimate state interest to balance against the plaintiff's privacy interest under Whalen.\textsuperscript{276}

This is certainly not the case where DNA identification records are concerned. There is clearly a substantial, even compelling governmental need to compile and centralize DNA testing results, particularly for law enforcement related to highly recidivist crimes.\textsuperscript{277} Under the balancing approach to informational privacy, this interest likely outweighs the privacy expectation of those tested, particularly given

\textsuperscript{271} In re Warrant (Sealed), 810 F.2d at 73.
\textsuperscript{272} Fraternal Order of Police, 812 F.2d at 113.
\textsuperscript{273} 606 F.2d 654 (5th Cir. 1979).
\textsuperscript{274} 633 F.2d 1172 (5th Cir. 1981).
\textsuperscript{275} Id. at 1174.
\textsuperscript{276} Id. at 1175; accord Woods v. White, 689 F. Supp. 874 (W.D. Wis. 1988), aff'd mem., 899 F.2d 17 (7th Cir. 1990) (under Whalen, no important governmental interest to be balanced where prison doctor casually disclosed sensitive medical information).
\textsuperscript{277} See DNA TECHNOLOGY IN FORENSIC SCIENCE, supra note 19, at 120.
the limited influence of countervailing factors such as the minimal personal information contained in the records and the remote potential for personal harm. Even such personal information, such as a lack of relatedness,\textsuperscript{278} that might be gleaned from a DNA identification database and subsequently publicized, probably does not implicate the right of informational privacy — as one federal appellate court has stated, freedom from embarrassment does not rise to the level of a constitutionally protected right.\textsuperscript{279}

This balance between informational privacy and governmental interest may shift somewhat if actual samples, rather than DNA patterns, are stored, but perhaps not enough to prevent sample storage.\textsuperscript{280} The governmental interest is lessened; law enforcement and similar goals can likely be accomplished by compiling only the less intrusive patterns — however, there may still be a legitimate interest in storing the samples to be used upon the advent of new testing technology.\textsuperscript{281} On the privacy side of the balance, the samples clearly contain far more personal information than DNA patterns,\textsuperscript{282} and disclosure of some of that information could be extremely harmful to the individual. Yet the courts may consider the possibility of disclosure too remote; as expressed by the Fourth Circuit in \textit{Hodge}, the "tangential possibility of public disclosure of the . . . investigation report . . . through such theoretical means as negligent or improperly-motivated state employees or fortuitous computer hackers, cannot by itself implicate a constitutional privacy right."\textsuperscript{283} Any lingering doubt regarding the dominance of the governmental interest could likely be dismissed by even the most minimal of safeguards,\textsuperscript{284} effectively negating the right of informational privacy for governmentally-held DNA samples.

\textsuperscript{278} See \textit{supra} note 19 and accompanying text.

\textsuperscript{279} See \textit{Watson v. Lowcounty Red Cross}, 974 F.2d 482, 488 (4th Cir. 1992).

\textsuperscript{280} See \textit{DNA TECHNOLOGY IN FORENSIC SCIENCE}, \textit{supra} note 19, at 115 ("Guidelines for release of DNA samples and disclosure of DNA typing information must be designed to safeguard the rights of persons . . . without burdening law-enforcement agencies and civil investigative authorities with unnecessarily protective policies.").

\textsuperscript{281} See \textit{supra} notes 68, 69 and accompanying text.

\textsuperscript{282} See \textit{supra} note 87 and accompanying text.


\textsuperscript{284} See \textit{supra} note 267 and accompanying text; see also \textit{supra} text accompanying note 268.
III. STATUTORY PROTECTION

If, as discussed above, the Constitution provides only marginal security against abuse of DNA identification technology, any additional assurance of privacy will stem only from congressional action. Such action on the part of Congress would not be unprecedented. When the Supreme Court held, in United States v. Miller, that the Fourth Amendment provided no privacy protection against governmental seizure of an individual's bank record, Congress responded by enacting the Right to Financial Privacy Act, which provided the lacking protection. Similarly, the enactment of the Privacy Act of 1974 appears to have been a congressional response to the lack of definite constitutional privacy constraints on governmental use of personal records. If careful consideration of the privacy concerns raised by DNA identification technology reveals significant problems that might slip through the gaps in constitutional guarantees, then supplemental legislation, similar to that previously enacted by Congress, may be warranted.

A. Early Responses

One early effort toward genetic privacy legislation arose out of concerns regarding the Human Genome mapping project. In 1990, Representative Conyers introduced the "Human Genome Privacy Act," and an abbreviated version of the bill was reintroduced the following year. The bill, which garnered very little attention in the U.S. House of Representatives, was directed at "safeguarding the individual privacy of genetic information from the misuse of records maintained by [federal] agencies...." Drawing on previous federal legislation, such as the Privacy Act and the Fair Credit Reporting Act, for the precept that "sunshine is the best disinfectant," the proposed genome legislation created rights of access, inspection, correction, and amendment for individuals who may have genetic records stored in the databases of federal agencies. Under the language of the bill,

288 See supra note 86 and accompanying text (describing Human Genome Project).
transfer of genetic information between governmental agencies for
law enforcement purposes would require the individual's consent or a
showing of probable cause.\textsuperscript{292} The bill also provided for criminal and
civil penalties for the negligent or intentional release of damaging
genetic information.\textsuperscript{293}

Although the Conyers bill contained a section dealing with law
enforcement databases, it probably failed to address the most trouble-
ling aspect of DNA identification testing: the disposition of actual
samples.\textsuperscript{294} As noted at the beginning of this Article, the genetic
information likely to be derived from an RFLP pattern, from a PCR
result, or from a database of such testing results is likely to be mini-
mal.\textsuperscript{295} Disclosure or misuse of this small quantum of genetic informa-
tion might be deterred by a statute such as that proposed in the
Conyers bill. However, the provisions of that bill appear to have been
directed entirely toward records of genetic information, such as digi-
tized genetic databases. Although this is the type of database that has
to date most concerned the commentators, the discussion here has
suggested that this should be an area of only marginal concern: soci-
ety's primary concern should be hinge upon the disposition of stored
samples,\textsuperscript{296} which the Conyers bill did not appear to address. Thus,
with regard to its law enforcement databank provisions, Conyers' pro-
posed legislation suffered from a failure to carefully assess the rele-
vant characteristics of the technology to which it was addressed.

\textbf{B. The DNA Identification Act of 1994}

A more recent attempt to statutorily safeguard genetic privacy
was contained in the DNA Identification Act of 1994,\textsuperscript{297} an amend-
ment to the Omnibus Crime Control and Safe Streets Act of 1968.\textsuperscript{298}
The Act generally encourages state and local development of DNA

\begin{footnotes}
\item[292] Id. § 131(a)(2)(D).
\item[293] Id. § 141.
\item[294] The bill addressed the disposition of "genetic information," which it defined as "any
information that describes, analyses, or identifies all or any part of a genome identifiable to a
specific individual." Id. § 101(2).
\item[295] See generally supra text, at 19-20.
\item[296] See supra notes 81, 83 and accompanying text.
\item[297] DNA Identification Act, Pub. L. 103-322, Title XXI, Subtitle C, 108 Stat. 2065 (codified
at 42 U.S.C.A. §§ 3751, 3751 note, 3753, 3793, 3796kk, 3796kk-1, 3796kk-6, 3797, 13701 note, and
14131-14134 (West Supp. 1995)).
\item[298] Pub. L. 90-351, 82 Stat. 197 (codified as amended in scattered sections of 5 U.S.C., 18
\end{footnotes}
testing capability; it also authorizes creation of a federally-sponsored DNA identification database. Unlike the Conyers bill, these privacy provisions are focused specifically on forensic DNA testing; also unlike the earlier Conyers bill, they have in fact been signed into law. However, the DNA Identification Act privacy provisions unfortunately share the earlier legislation's failure to address the procedure for the disposition of the DNA sample itself. Given the lack of serious constitutional safeguards against misuse of DNA samples, this legislative failure to address the disposition of samples makes initiation of systematic, state-sponsored collection DNA samples a matter of considerable concern.

1. The privacy provisions

In its consideration of the DNA Identification Act, Congress was apparently aware that state or federal agencies with access to actual DNA samples could use those samples for research or stigmatizing investigation beyond mere allele matching for identification. Some privacy protections were therefore written into the Act. Under these provisions, federal law enforcement funding to states to develop or improve DNA forensic testing capabilities is conditioned upon the state restricting access to samples and analyses. Permissible access to samples and results would be limited to criminal justice agencies for purposes of law enforcement identification or use in judicial proceedings, and to criminal defendants to prepare a defense in connection with the case in which they are charged. Samples and analyses could also be permissibly accessed for development of DNA identification methods and statistical databases if personally identifying information is removed.

301 Additionally, the FBI has begun to offer informal guidance to state legislatures attempting to enact their own DNA testing legislation; these legislative guidelines include suggestions for privacy provisions that are apparently intended to make the state statutes more resistant to constitutional challenge. See Manning A. Connors III, Comment, DNA Databases: The Case for the Combined Index System, 29 WAKE FOREST L. REV. 889, 898-99 (1994) (discussing FBI's suggested legislative guidelines).
303 Id. § 14132(b)(3)(A)-(C) (West Supp. 1995).
304 Id. § 14132(b)(3)(D) (West Supp. 1995).
The Act also authorizes the Director of the FBI to create a national index of DNA identification records and analyses.\(^{305}\) This index is intended to facilitate exchange of such identifying information among law enforcement agencies at the federal, state, and local levels.\(^{306}\) Information included in the index must be drawn only from federal, state, and local laboratories complying with the type of access restrictions described above.\(^{307}\) Additionally, law enforcement agencies would be required to comply with the access restrictions in order to enjoy use of the index.

Finally, Congress applied the same type of access restrictions to DNA testing by the FBI that would apply to participating state testing agencies.\(^{308}\) Under the Act, results of DNA tests performed by a federal law enforcement agency for law enforcement purposes may be disclosed only under the circumstances listed above.\(^{309}\) More significantly, the Act provides criminal penalties for unauthorized disclosure of individually identifiable information from federal law enforcement databases, or for unauthorized acquisition of DNA samples held by a federal law enforcement agency.\(^{310}\)

Although the inclusion of these provisions within the Act indicates that Congress was somewhat aware of the privacy questions attending the implementation of a DNA identification database, it is unclear whether Congress appreciated the most serious privacy issue: disposition of samples. For example, under the Act, state and local restrictions on access to samples is purely voluntary — other than loss of federal testing grants and loss of access to the FBI database, there is no penalty for invasive or stigmatizing use of samples.\(^{311}\) It seems likely that most states will make an effort not to lose these benefits, but the statute provides no recourse for private individuals in cases where the state efforts are inadequate or where unauthorized use of locally-held samples occurs. In the absence of a federal statutory protection or any serious federal sanction for improper sample use, there is no guarantee of privacy protection at the level of state testing.\(^{312}\)

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\(^{305}\) *Id.* § 14132(a)(1)-(3) (West Supp. 1995).

\(^{306}\) *See generally id.* § 14132 (West Supp. 1995).

\(^{307}\) *Id.*

\(^{308}\) *Id.* § 14133 (West Supp. 1995).

\(^{309}\) *Id.* § 14133(b) (West Supp. 1995).

\(^{310}\) *Id.* § 14133(c) (West Supp. 1995).

\(^{311}\) *See generally id.* §§ 14131, 14132, 14133 (West Supp. 1995).

\(^{312}\) Indeed, state legislatures on their own appear to be giving little thought to this question. For example, the DNA sampling statute enacted by North Carolina, following the FBI's sug-
Similarly, at the federal level, the Act primarily focuses on the “results of DNA tests” conducted by federal law enforcement agencies, while unfortunately giving scant attention to the disposition of the samples used to conduct these tests. The provisions relating to establishment of the FBI index discuss only “records” of DNA identification and “analyses” of DNA samples; the samples themselves are not addressed. Unlike the provisions directed to state laboratories, the Act does provide criminal penalties for unauthorized persons’ use of samples held by federal law enforcement agencies. To the contrary, the Act places no restraint on what agencies do with the samples, or on authorized invasive or stigmatizing use of the samples.

Finally, the privacy provisions of the Act are unwisely silent regarding DNA testing applications outside the law enforcement context. The Act permits federal and state collection of data from laboratories that allow access to samples for “judicial proceedings,” this could conceivably include not only criminal proceedings, but also a range of civil proceedings including paternity disputes, wrongful death actions, and toxic tort suits. Thus, samples collected for law enforcement purposes could become widely disseminated pursuant to civil subpoenas and discovery orders. Additionally, no provision is made at all for other systematic sample gathering, such as that proposed by the military, or federal testing for purposes other than law enforcement. In short, although the Act offers some protection against privacy problems, it does not adequately address major privacy concerns.

gested privacy guidelines, mandates retention of samples without indicating any justification for retention. See Connors, supra note 301, at 907. The North Carolina statute does follow the FBI recommendation to state explicit policy goals for the categories of offenses that trigger the DNA record requirement, so as to withstand potential Fourth Amendment challenges to the statute. Connors, supra note 301, at 898-99. The end result is a state statute that satisfies the form of constitutional privacy requirements, without providing substantive privacy protections.

313 Id. § 14133(b) (West Supp. 1995).
314 Id. § 14132(a)(1)-(3) (West Supp. 1995).
315 Id. § 14133(c) (West Supp. 1995).
316 In its summary and purpose, Congress states that the purpose of the Act “is to promote the use of DNA identification technology for law enforcement purposes.” H.R. Rep. No 45, 103d Cong., 1st Sess. 4 (1993).
2. The legislative history

Some reasons for congressional oversight regarding the disposition of DNA samples may be gleaned from the legislative history of the DNA Identification Act. The committee report accompanying the Act indicates that the various provisions of this legislation were responsive to issues raised in hearings on DNA evidence conducted by Congress in 1991. Privacy questions relating to the creation of a national DNA databank were addressed in those hearings, as were questions relating to the disposition of actual DNA samples. During the 1991 hearings, John W. Hicks, Assistant Director for the FBI Laboratory, testified before Chairman Edwards and Chairman Simon, and in his report described the information to be included in the national DNA databank. Mr. Hicks's oral testimony and prepared statement discussed three ways in which the FBI intended to safeguard the privacy interests implicated by the storage of DNA information. First, the databank system would have protections from unauthorized access; only accredited crime laboratories could access the system. Moreover, the collection of personal information would be minimized: "The numerical form of the DNA profile (not the actual image) will be stored in the national index together with the identity of the submitting laboratory. . . . The FBI has no plans to store actual specimens from which DNA identification profiles are drawn." Finally, the FBI would be working with the National Crime Information Center to implement some of their procedures for ensuring protection of data. Thus, the FBI clearly indicated its intent not to store samples.

Legislators posed questions during the joint hearing to determine the proposed disposition of the actual DNA sample. When asked about the fate of the actual sample, Mr. Hicks replied,

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321 Id. at 27-28 (statement of John W. Hicks submitted to the Joint Subcommittees).
322 Id. at 15-18, 27-28.
323 Id. at 27-28.
324 Id. at 28 (emphasis added).
325 Id.
326 Id. at 73-75.
It would be destroyed. It would be returned typically to the investigating officer, the officer who collected the evidence initially, and it would be up to that officer to dispose of the material as they saw appropriate . . . [as for state labs retaining samples] I suppose that's a possibility, but I'm not aware of that being the practice anywhere, or even I've not heard it.327

At this point in the testimony, Mr. Gainer, Director for the Illinois state police, interjected that in Illinois, we would not be keeping those types of samples, either, for all the confidentiality reasons. . . . It is not our intention under the Illinois law, nor our desire, to retain those types of things. The Illinois law is structured now that, to the extent we do have something on file, its use is very limited.328

Others testifying at the joint hearing suggested that Congress, in its final bill, should not allow the storage of the samples;329 this issue was raised repeatedly. Yet, Congress chose not to explicitly include this issue in the final version of the legislation. This was clearly not due to any lack of understanding regarding the difference between DNA samples and DNA identification patterns. Indeed, the language used in section 4 of the bill, concerning the FBI index, refers to "analyses of DNA samples" as the component for the database, and only makes reference to the sample itself when writing that a criminal defendant may have access to the sample and the analyses.330 It would appear then, that the use of the word "analyses" within the bill itself distinguishes between the sample itself and data from that sample.

In addition to the language of the legislation itself, the questions posed at the joint hearing indicated that Congress was concerned with

327 Id. at 75. Furthermore, Mr. Hicks indicated to Mr. Kopetski that the disposition of samples was a "routine practice" as far as he knew. Id.
328 Id. However, this assurance is clearly not representative of the practices of many state testing agencies. See sources cited supra note 82 and accompanying text.
329 The Congressional Office of Technology Assessment suggested that Congress could "prohibit storage of DNA itself." Joint Hearing, supra note 320, at 93. Similarly, the report of the New York State Forensic DNA Analysis Panel urged that "[t]o avoid the improper use of the underlying DNA sample, the Panel recommends that the actual DNA sample itself not be saved." Joint Hearing, supra note 320, at 243.
330 H.R. REP. No. 45, 103rd Cong., 1st Sess. 2-3 (1993) (emphasis added). The reports from the joint hearing indicate that samples are usually retained at least until the trial has concluded. Joint Hearing, supra note 320, at 74-75.
the disposition of the samples, and understood that the database would contain numerical data, not samples. Given this degree of understanding regarding the nature of DNA samples, and the privacy implications of their disposition, Congress's failure to address such disposition cannot be attributed to simple ignorance or oversight. Based upon the statements made at the hearing, it appears that Congress relied upon the FBI's assurance that the routine practice is to dispose of the sample.\textsuperscript{331}

This congressional decision, if not made blindly, at least may be shortsighted. Voluntary destruction of samples may be the practice of law enforcement agencies today, but there is no guarantee that it will be the practice tomorrow. There is a strong, and arguably legitimate incentive to retain actual samples, or at the very least, "Southern blots" from the testing process.\textsuperscript{332} By discarding the actual DNA, law enforcement agencies effectively lock themselves into present technology, thereby removing the possibility of re-testing retained samples if more sensitive or more discriminating testing technology becomes available.\textsuperscript{333} Additionally, whether or not such retention becomes officially sanctioned, there remains ample opportunity for sample misuse during the period that samples are held for current testing procedures, and the privacy measure enacted by Congress may not adequately deter someone from gaining access to such sensitive information and putting it to inappropriate use.

In addition, by failing to recognize the issue of DNA sample disposition, Congress has also ignored the different status that different types of samples may hold.\textsuperscript{334} For example, some DNA samples may be derived from forensic material associated with unidentified human remains — there may be much to be gained and little to be lost in

\textsuperscript{331} Such assurances, however, raise the issue of the "fox guarding the henhouse." Several commentators in their submissions to the joint subcommittees expressed concern that the FBI, a law enforcement agency, would be overseeing the standards developed for this databank. \textit{Joint Hearing, supra} note 320, at 76-77. Congressman Coble expressed this concern, which Mr. Hicks addressed by explaining that the legal challenges to such testing have attacked the scientific basis of DNA testing itself, and not the FBI's creation of the testing standards. \textit{Joint Hearing, supra} note 320, at 76-77. Yet, Lifecodes Corp., a private laboratory which performs DNA analysis, noted in written testimony that "[t]he FBI would be in a clear position of perceived conflict of interest — developing standards for an industry where it is an active and major player." \textit{Joint Hearing, supra} note 320, at 140 (emphasis in the original).

\textsuperscript{332} See \textit{supra} notes 68, 69 and accompanying text.

\textsuperscript{333} See \textit{supra} notes 68, 69 and accompanying text.

\textsuperscript{334} See \textit{DNA TECHNOLOGY IN FORENSIC SCIENCE, supra} note 19, at 159.
preserving such samples. The sample donor's privacy cannot by definition be invaded if the donors identity is unknown, and relatively free access to the sample may aid in identifying the remains. A greater measure of caution should be required when addressing the disposition of samples taken from criminal suspects. The DNA patterns of suspects cannot be matched against a forensic database unless a sample is taken from the suspect; yet, the suspect is considered innocent until proven guilty, and may never be proven guilty. The samples from such individuals are not comparable to those individuals, such as the convicts in *Jones*, who have a lessened privacy interest because of their convictions.\(^3\) This final category of sample status might include samples from convicted felons who in fact have a lessened privacy interest, in which case governmental need to preserve the samples may be paramount as discussed above.\(^3\)

This possibility of differing categories of samples suggests further the issue of DNA profiling exchange between governmental entities, as for example, between the military and law enforcement agencies. As discussed previously, the armed forces have legitimate reasons for wishing to compile a record of DNA patterns for military personnel, in order to facilitate identification of human remains.\(^3\) However, the potential for transfer of such records to law enforcement agencies to facilitate a civilian criminal investigation is a troubling matter, especially with regard to the records of retired or inactive military personnel — the DNA records of such individuals are by no stretch of the imagination comparable to those of convicted criminals who have been accorded a lessened privacy interest after having been deprived of their civil rights via due process of law. Yet the lack of constitutional protection, coupled with the lack of statutory protection, invites such migration of genetic records.

3. **Necessary safeguards**

Given the lack of extant constitutional safeguards for genetic privacy, the problem of privacy protection for personal DNA information could most readily be alleviated by amending the DNA Identification Act to include procedures for the disposition of samples, preferably providing civil and criminal penalties for federal,

\(^3\) See *supra* note 146 and accompanying text.
\(^3\) See *supra* note 146 and accompanying text.
\(^3\) See *supra* note 66 and accompanying text.
state, or local use of DNA samples for anything other than identification purposes. Other desirable amendments might include:

- Injunctive relief to compel disposal. This should be available for individuals who believe that their samples have not been properly discarded. Such injunctive relief should incorporate a rebuttable statutory presumption of irreparable injury to the individual if her sample is not properly destroyed. The ability to compel disposal would then be contingent upon judicial balancing of the individual’s and the government’s respective interests in the disposition of the sample.

- Adoption of provisions similar to those in the Conyers bill allowing individuals a “freedom of information” type of inquiry into what materials are being held, and the status of such materials.

- Adoption of provisions similar to those in the Conyers bill requiring a warrant, or similar showing of probable cause, before DNA profiles or samples may be transferred between governmental entities, and limiting the use of the information or sample to the particular investigation for which it was transferred.

- Express preclusion of the use of governmentally collected data or samples for private litigation.

By taking these steps to clarify and strengthen the present provisions of the Act, Congress could provide a higher standard of privacy, minimizing the threat to civil liberties from governmental use of this technology.

**Conclusion**

In general, DNA identification procedures are only likely to raise legitimate privacy concerns where an individual’s actual DNA sample is preserved. Tests employing RFLP or PCR techniques to match identifying molecular characteristics are unlikely to reveal sensitive information. Constitutional challenges to DNA testing, either under the explicit or implicit privacy guarantees of the federal Constitution, will probably be scrutinized through an approach that balances the individuals’ reasonable privacy expectation against the government’s legitimate need. Given the minimal physical intrusion of this type of testing, and the relatively remote possibility that test results might
reveal any personal, embarrassing, or sensitive information, such a balancing approach is likely to validate the use of DNA tests, except where the government is unable to show any legitimate need for the test.

Thus, doctrines of constitutional privacy will provide some protection from truly flagrant or outrageous cases of governmental abuse, but no more. Society runs the risk that samples will be misused. Even if the possibility is remote — and it may well be substantial — the magnitude of the harm from even a single occurrence will be great. To protect against such abuses, additional safeguards should be required from some source beyond those privacy guarantees of the federal Constitution. Such safeguards are not offered by the privacy provisions of the DNA Identification Act, which primarily addresses disposition of records rather than disposition of samples. Until such omissions in the privacy provisions are rectified, misuse of DNA samples collected for identification remains a plausible threat to privacy.