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Kerry Abrams

University of Virginia School of Law

Brandon L. Garrett

University of Virginia School of Law

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DNA AND DISTRUST

Kerry Abrams*
Brandon L. Garrett**

ABSTRACT

*Over the past three decades, government regulation and funding of DNA testing has reshaped the use of genetic evidence across various fields, including criminal law, family law, and employment law. Courts have struggled with questions of when and whether to treat genetic evidence as implicating individual rights, policy trade-offs, or federalism problems. We identify two modes of genetic testing: identification testing, used to establish a person's identity, and predictive testing, which seeks to predict outcomes for a person. Judges and lawmakers have often drawn a bright line at predictive testing, while allowing uninhibited identification testing. The U.S. Supreme Court in *Maryland v. King*, for example, held that entering arrestee DNA in databanks does not implicate substantial Fourth Amendment concerns, since police do not test for genetic predispositions "not relevant to identity." We argue that policy implications of genetic testing laws cannot be so neatly demarcated. For example, federal welfare laws require states to use DNA to establish paternity to collect child support from "deadbeat dads," which may be relevant to identity, but also creates potentially destabilizing effects on families. We explore how genetic testing has been regulated across a variety of fields. We identify two dominant modes of regulatory action dealing with genetics: data-driven and ethics-based. Data-driven legislation is ostensibly focused on short-term benefits of gathering a population's genetic information. Ethics-based legislation, in contrast, is concerned with long-term consequences, such as effects on privacy. We particularly critique data-driven legislation, and we argue that judges, legislators, and scholars should focus squarely on the individual and government interests at stake. We set out a list of five factors that legal actors should consider when considering genetics regulation: (1) equality, (2) accuracy, (3) privacy, (4) finality, and (5) federalism. In particular, equality concerns permeate the short history of DNA regulation. In each of the areas explored, compara-*

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* Professor of Law, University of Virginia School of Law.

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tively disadvantaged groups such as arrestees, convicts, juveniles, noncitizens, and welfare recipients have received the most intrusive regulation and collection of their genetic evidence, while comparatively privileged persons benefit from enhanced genetic privacy. We conclude that the regulation of genetic evidence deserves far more careful legal scrutiny, since the ways that genetic evidence is deployed can profoundly affect constitutional rights and the structure of legal and social institutions.

INTRODUCTION

DNA testing, widely available for over twenty-five years, has revolutionized the way local, state, and federal governments understand identity by making it inexpensive to obtain a person's genetic profile and link people to biological evidence and to each other. With the benefit of different types of DNA testing, the state can now say with greater certainty whether a particular suspect was the culprit of a crime or whether a particular person is the biological parent of a child. DNA testing has been embraced with enthusiasm by courts, legislatures, and agencies, state and federal, across areas of law ranging from criminal law, employment law, family law, and health law because it is easy to obtain and offers apparent certainty. This Article critically assesses these developments, focusing on the seemingly unobtrusive collection of genetic data, and argues that heightened legal scrutiny of genetic regulation is needed.

As with any new technology, genetic testing has captured the imagination of scholars. Early on, some scholars predicted that genetic tests would supplant traditional legal tests. Many legal standards, particularly constitutional tests, are broad and vague, while DNA tests have the appealing ability to seemingly make evidentiary determinations certain. In 1992, Rochelle Cooper Dreyfuss and Dorothy Nelkin called the trend to reduce questions to genetics "genetics essentialism."¹ More recently, scholars have asked whether there is a "genetics exceptionalism" in which policymakers over-privilege the importance or uses of genetic evidence.² Still others have predicted that

1 Rochelle Cooper Dreyfuss & Dorothy Nelkin, *The Jurisprudence of Genetics*, 45 VAND. L. REV. 313, 316 (1992) ("[T]he trend toward what we will call 'genetic essentialism' deserves more study than it has received so far. . . ."); see also DOROTHY NELKIN & M. SUSAN LINDEE, *THE DNA MYSTIQUE: THE GENE AS A CULTURAL ICON* 41 (1995); Mary R. Anderlik & Mark A. Rothstein, *DNA-Based Identity Testing and the Future of the Family: A Research Agenda*, 28 AM. J.L. & MED. 215, 217-18 (2002) (outlining the social impact of federal welfare policy on DNA-based identity testing).

2 See, e.g., Sonia M. Suter, *The Allure and Peril of Genetics Exceptionalism: Do We Need Special Genetics Legislation?*, 79 WASH. U. L.Q. 669, 674 (2001); see also generally Lawrence O. Gostin & James G. Hodge, Jr., *Genetic Privacy and the Law: An End to Genetics Exceptionalism*, 40 JURIMETRICS J. 21 (1999); Deborah Hellman, *What Makes Genetic Discrimination Exceptional?*, 29 AM. J.L. & MED. 77 (2003); Mark A. Rothstein, *Genetic Exceptionalism and Legislative Pragmatism*, 35 HASTINGS CTR. REP. 27, 27-33 (2005).

DNA testing will reinvigorate the eugenics movement, as imagined in films such as *Gattaca*.³

“Genetic testing,” however, is not a legal subject. As many scholars have observed about other new areas of law, such as “cyberlaw,” the law of genetic testing is a version of “the law of the horse.”⁴ It is not a unified field but the analysis of a particular technology in relation to a cluster of existing legal fields. DNA testing has not led to universal genetics essentialism, genetics exceptionalism, or a new eugenics; instead, its uses have been inconsistent and variable depending on the social and legal context in which DNA testing is adopted. Rather than a story of genetics overtaking the law and rendering complex legal questions deceptively simple, DNA testing has itself been caught up in preexisting regulatory relationships between federal and state and local governments, privacy advocates and scientific researchers, law enforcement and social services, each with competing goals. And, as Gaia Bernstein has astutely observed, “technological innovation can both create and bring to the forefront legal values that for years lurked in the shadows of legal discourse.”⁵

These preexisting regulatory contexts often result in legal structures that reflect the concerns and perspectives of elites at the expense of other members of the political community. The amount of attention given to genetic privacy, we argue, depends in large part on the context in which a genetic regulation is initially conceived. Equality concerns permeate the short history of DNA regulation. In each of the areas we explore in this Article, comparatively disadvantaged groups such as arrestees, convicts, juveniles, noncitizens, and welfare recipients, have received the most intrusive regulation and collection of their genetic evidence. In contrast, more privileged persons are not subjected to government DNA collection and may instead benefit from legislation protecting their genetic privacy.

As John Hart Ely famously argued in his classic book, *Democracy and Distrust: A Theory of Judicial Review*, the legislative process, through its enactment of the majority will, can lead to discrimination against the politically powerless and block the channels of political change.⁶ According to Ely, when courts attempt to intervene, they often mistake specific problems “as isolated pockets of concern,” slotting them into “familiar pigeonholes.”⁷ These seemingly separate issues, however, may form a “unity,” or a larger problem in

3 *GATTACA* (Columbia Pictures Industries, Inc. 1997); see also, e.g., Lisa Schriener Lewis, Note, *The Role Genetic Information Plays in the Criminal Justice System*, 47 ARIZ. L. REV. 519 (2005).

4 See, e.g., Frank H. Easterbrook, *Cyberspace and the Law of the Horse*, 1996 U. CHI. LEGAL F. 207, 208; Lyria Bennett Moses, *Recurring Dilemmas: The Law's Race to Keep Up with Technological Change*, 2007 U. ILL. J.L. TECH. & POL'Y 239, 243 (describing how new legal problems arise in new technological contexts).

5 Gaia Bernstein, *Accommodating Technological Innovation: Identity, Genetic Testing and the Internet*, 57 VAND. L. REV. 965, 966 (2004).

6 See JOHN HART ELY, *DEMOCRACY AND DISTRUST: A THEORY OF JUDICIAL REVIEW* 172 (1980).

7 *Id.* at 177.

which “uncontrollable discretion” risks harm to undervalued individual and minority rights.⁸

Such, we argue, is the story of genetic regulation. Just as Professor Ely observed of the death penalty that “the system is constructed so that ‘people like us’ run no realistic risk of such punishment,”⁹ in genetic regulation, legislatures and judges have been far more careful and forward-thinking in instances where they, or people of their social class, are likely to be subject to regulation. This has led to some “pigeonholes” of genetic regulation being treated very differently from others.

Consider, for example, a case decided using the “pigeonhole” of Fourth Amendment privacy rights in criminal law. In *Maryland v. King*, the U.S. Supreme Court was faced with the question of whether taking and analyzing a cheek swab of an arrestee’s DNA is “like fingerprinting and photographing, a legitimate police booking procedure.”¹⁰ In his majority opinion, Justice Kennedy concluded that it was constitutionally reasonable for the state to take DNA evidence because of the “negligible” physical intrusion and the limited use of determining whether the individual was associated with the crime scene or victim.¹¹ A DNA test, according to the Court, was simply not very different from a fingerprint or a photograph. The Court understood the issue to be simple expansion of Fourth Amendment jurisprudence, not a new foray into issues of genetic privacy.

Even the majority opinion, however, revealed, perhaps unintentionally, that cabining off DNA evidence into the criminal law pigeonhole might not be as simple as it sounds. Although the opinion emphasized how current DNA testing of arrestees examines “noncoding parts of the DNA that do not reveal the genetic traits of the arrestee,” it also acknowledged that “science can always progress further, and those progressions may have Fourth Amendment consequences,” particularly if they seek to determine “an arrestee’s predisposition for a particular disease or other hereditary factors not relevant to identity.”¹² This application of DNA testing may not be so different from predicting future behavior or outcomes, when DNA databases are used both in the present, but also to potentially link a person to future crimes.¹³ The line between identification testing and predictive testing is not always so clear.

Federal lawmakers clearly believe such bright lines can be drawn. For example, Congress passed the Genetic Information Nondiscrimination Act of 2008 (GINA), which prohibits changing the terms of health insurance coverage based on genetic information and forbids employment discrimination

8 *Id.*

9 *Id.* at 173.

10 133 S. Ct. 1958, 1980 (2013).

11 *See id.* at 1969.

12 *Id.* at 1979.

13 For a wonderful exploration of the complex privacy and equality issues that DNA databanks pose, see ERIN E. MURPHY, *INSIDE THE CELL: THE DARK SIDE OF FORENSIC DNA* 138–241 (2015).

based on genetic information.¹⁴ As one federal court has put it, “[t]he basic intent of GINA is to prohibit employers from making a ‘predictive assessment concerning an individual’s propensity to get an inheritable genetic disease or disorder based on the occurrence of an inheritable disease or disorder in [a] family member.’”¹⁵ In contrast, few such privacy protections exist in the welfare context, in which Congress encourages states to conduct potentially intrusive paternity testing to promote child support collection.¹⁶

We argue that drawing a bright line between uses of genetics to identify and to predict is, at best, useful only as a starting place for judges, legislators, and policymakers. A court should not find a use of genetics “not relevant to identity,” and stop there, as the Supreme Court largely did in *King*. In this Article, we examine whether a clearer and more consistent framework for answering such questions is possible or desirable. Our framework makes the political process problems in current DNA regulation transparent and provides guidance to inform judicial review to intervene where important political constituencies are unrepresented.

This Article takes a broad look at how DNA has altered the legal landscape by canvassing several disparate areas to identify common themes and common questions.¹⁷ We analyze how legislatures have approached genetic testing, and use our analysis of these approaches to introduce new typologies that will help categorize and illuminate the regulatory choices genetic testing invites. In particular, we identify two modes of genetic testing: identification testing, which focuses on establishing a person’s identity, and predictive testing, which focuses on predicting outcomes for a person based on his or her genetic code. These two forms of testing have tended to result in different modes of regulation.

Next, we identify the two dominant modes of regulatory action in the genetics arena: data-driven and ethics-based. By “regulation,” we broadly refer to legal uses of genetic information, not only regulations promulgated by administrative agencies, but also statutes enacted by legislatures, as well as judicial decisions and the exercise of executive discretion.

In general, we argue, data-driven regulation tends to concentrate on the short-term benefits of developing comprehensive information about a population’s genetic information; ethics-based regulation, in contrast, is centrally concerned with the long-term consequences of using DNA, such as its effects on privacy or individual rights. In addition, data-driven regulation is often enacted or approved of with little or no discussion of its effect on genetic privacy; instead, the focus is often on some other, more immediate legislative

14 See generally Genetic Information Nondiscrimination Act of 2008 (GINA), Pub. L. No. 110-233, 122 Stat. 881 (codified in scattered sections of 26, 29, and 42 U.S.C.).

15 *Poore v. Peterbilt of Bristol, LLC*, 852 F. Supp. 2d 727, 730 (W.D. Va. 2012) (alteration in original) (quoting H.R. REP. NO. 110-28, pt. 3, at 70 (2007), as reprinted in 2008 U.S.C.C.A.N. 112, 141).

16 See *infra* Section II.C.

17 For a recent article exploring genetic-privacy rights through a property law lens, see Natalie Ram, *DNA by the Entirety*, 115 COLUM. L. REV. 873 (2015).

goal, such as collecting child support payments or solving a crime. Ethics-based regulation, in contrast, tends to be made with great deliberation and with an understanding that individuals have an interest in their own genetic privacy.

We argue that where a particular approach to DNA testing falls within this schema depends in large part on the area of law at issue, the political power of the constituents likely to be affected by the law, and the legal and social context in which the regulation arises. Data-driven approaches, we find, are more likely than ethics-based approaches to reflect a flaw in the political process that makes the population most affected by the regulation the least heard. In addition, we find a strong correlation between identification testing and data-driven regulation, and a similar connection between predictive testing and ethics-based regulation. This connection, at least so far, is likely the result of whether a crisis exists at the time a law is passed. Data-driven laws are often passed in response to a perceived emergency—the threat of millions of “deadbeat dads” failing to pay child support or a particular rape or murder that could have been solved had the perpetrator’s DNA been available in a databank, for example. But, we argue, as time goes on, there is a danger that the rules applied to identification testing may be expanded to cover predictive testing, and these rules, depending on the legal “pigeonhole” in which they originated, may offer little or no protection to individual genetic privacy.

The Article proceeds as follows. In Part I, we introduce the typology described above, first by describing the different types of DNA testing that can be conducted currently, both to identify personal genetic data and to predict outcomes, and then introducing how identity is litigated in different legal settings resulting in policy choices that may or may not directly regulate genetic evidence directly or intentionally. We suggest that one must ask (1) whether genetic regulation is predictive or for purposes of identity and (2) whether the regulation is data-driven or ethics-based regulation.

In Part II, we contrast genetic regulation in three fields: (1) employment and health law, where with the passage of GINA, Congress focused on direct regulation of genetics with a focus on ethics concerns; (2) criminal law, in which the Supreme Court has ratified the data-driven and direct regulation of genetics, through a federal project of assembling a vast national DNA databank, but in which legislators, law enforcement, and the Court have adopted a hands-off approach towards questions of ethics, neglecting privacy questions and reluctantly permitting DNA testing that might free the innocent; and (3) family law, in which the federal government has required states to focus on establishing paternity, incidentally regulating genetic evidence as part of accomplishing that data-driven concern, and to the exclusion of other important ethical concerns of real importance to state actors.

Part III considers the commonalities of these areas. When legal actors focus on collection of genetics data, they may do so directly and assess whether there are ethical concerns with doing so; we view that as preferable to indirectly regulating genetics while treating ethical concerns as not impli-

cated. We set out a list of five factors that legal actors should consider when examining genetics regulation: (1) equality, (2) accuracy, (3) privacy, (4) finality, and (5) federalism. We conclude by considering what the inconsistencies in regulating genetics suggest about our commitments to using information about genetic identity to regulate. We argue that far more legal and policy scrutiny is required to justify broad government collection and testing of genetic evidence.

I. DNA TESTING, IDENTITY, AND REGULATION

DNA testing, like blood-typing, fingerprinting, or any other means of biometric identification, is a scientific method for identifying personal characteristics of a living being. Unlike some of these earlier forms of biological testing, however, DNA testing provides the opportunity to both identify a particular person with near certainty and to predict characteristics as well as propensities that may be associated with that person's genetic makeup. The nuclear DNA of a person contains twenty-three pairs of chromosomes, and that DNA sequence is found in almost all of our cells. That nuclear DNA contains genes that provide important instructions for the functioning of each cell, but it acts along with other proteins, enzymes and ribonucleic acid (RNA), in complex ways that are still being studied. This genetic code can be used for many purposes. It can, for example, constitute proof that a particular person's genetic material was deposited, through blood, semen, or hair, in a particular place.

Genetic information is also shared; one's genetics are inherited from one's biological parents.¹⁸ Therefore, genetic tests can show that a particular person is related to another and even provide proof of ancestry, as the descendants of Thomas Jefferson and Sally Hemings have discovered.¹⁹ DNA can also be used to show propensities—a propensity to have a particular kind of cancer or perhaps even a propensity to commit a crime. Test results may be relevant not just to an individual, but also important to other blood relatives, if the tests indicate that a person inherited a genetic condition.

Standing alone, a DNA test may mean little. Scientific data require interpretation to be understood, and not just by the laboratory analyst that conducts the testing and reports the results, but by medical, legal, or government actors that seek to use that information. Perhaps even more importantly, scientific data, like any form of evidence, require that the actors using that data have a theory of why the data are probative. But in order to understand the limitations of and interpretative choices inherent in the use of DNA, we must first understand, in its basic outlines, the current science of DNA testing.

18 For an exploration of the legal implications of the shared nature of genetic material, see *id.*

19 See, e.g., FRONTLINE, *Jefferson's Blood: Is It True?*, PBS.ORG, <http://www.pbs.org/wgbh/pages/frontline/shows/jefferson/true/> (last visited Dec. 4, 2015).

These results have occurred because DNA tests are meaningless without interpretation. The interpreters of DNA's meaning—forensic analysts, judges, legislatures, prosecutors, police, and parents—are embedded within existing legal institutions with various regulatory goals and purposes. As Dorothy Roberts has put it well: “There is nothing either precious or sinister about the genetic tie by itself. The genetic tie's precise social import depends on the type of relationship to which it becomes relevant and the prevalent social conditions that influence that relationship.”²⁰ The availability of DNA has shaped these legal institutions, which simultaneously shape how DNA evidence is used and is itself regulated.

This feedback loop means that the interaction between DNA and legal change has differed markedly across various contexts. For example, in contrast to the narrow focus in Fourth Amendment challenges to DNA testing in criminal cases, in a family law case in which a putative father also brought a Fourth Amendment challenge to a DNA test, a federal judge emphasized broader policy concerns in finding: “DNA testing for paternity is not unreasonably invasive in light of the compelling state interest to protect the welfare of children.”²¹

A. *Types of DNA Testing*

There is not just one type of DNA test. There are many forms of genetic testing that examine different portions of the genetic sequence, making different comparisons, and for different reasons. Two general types of DNA tests, broadly speaking, are designed to identify specific individuals, as opposed to those designed to test for other genetic information, such as hereditary diseases or other health risks.

1. Identification Testing

In criminal cases, DNA tests are (currently) of the first type, used to try to identify individuals. The purpose of such DNA tests is to identify a culprit by comparing a person's genetic material to trace evidence left at a crime scene. DNA material can remain intact for years or even decades in good conditions or if samples are stored properly, but humidity and exposure to bacteria, heat, or chemicals can cause DNA to degrade quickly. Most criminal cases do not have biological material left at a crime scene by a perpetrator; such testing is particularly useful in sexual assault cases or in cases where the culprit left a piece of clothing or was known to have touched an object. Before DNA testing became common, ABO blood typing could sometimes be done in criminal cases, and it could readily exclude a suspect; however, since large portions of the population share each of the four blood types, it was not

20 Dorothy E. Roberts, *The Genetic Tie*, 62 U. CHI. L. REV. 209, 211 (1995).

21 *Allen v. Howard*, No. 13–233, 2014 WL 2120092, at *4 (E.D. La. May 21, 2014).

very probative evidence that a person had the same type as evidence tested from a crime scene.²²

DNA testing can provide highly probative evidence when there is relevant material that can be tested. While nuclear DNA contains many genes that do important work providing instructions for how to encode proteins, there are “noncoding” regions of the genetic sequence; in fact the vast majority of the sequences is non-coding, sometimes called “junk DNA,” and at minimum, its purpose is not known.²³ In the 1980s, geneticists identified particular noncoding regions of the DNA sequence that vary a great deal from person to person; the more variable the region of the DNA is the more useful it is to differentiate between people. In certain portions, there are quite variable repetitive sequences in which the same pattern of alleles (sequences of DNA at a particular position or locus) is repeated over and over.²⁴ Beginning in the 1980s, scientists developed techniques to isolate those repetitive alleles or regions of the DNA strand. Early Restriction Fragment Length Polymorphism (RFLP) testing required a large quantity of non-degraded genetic material, and interpretation of the results was potentially subjective.²⁵

By the mid-1990s, however, Short Tandem Repeat (STR) testing could be conducted, and unlike RFLP testing, it can be performed on very small samples. During the 1990s, polymerase chain reaction (PCR) methods permitted scientists to amplify small samples for STR analysis by making billions of copies of the sample, and then new capillary electrophoresis technology permitted rapid and largely computerized analysis of genetic material extracted from samples.²⁶ Those tests are now standardized, and in the United States, analysts now compare thirteen loci, or portions of a person’s genome, and examine the number of repetitions of particular alleles at each loci (soon to be expanded to include twenty loci).²⁷ A person’s DNA profile, as used in a criminal case, consists of thirteen pairs of numbers (one for each chromosome), with each number representing the number of “repeats” at each loci.

The results of that DNA testing do not provide a “match,” even if all thirteen pairs consist in the same numbers, but rather a probability that

22 For a description of the uses of ABO blood enzyme group typing and its limitations, see Brandon L. Garrett & Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions*, 95 VA. L. REV. 1, 35–36 (2009).

23 For excellent descriptions, see SHELDON KRIMSKY & TANIA SIMONCELLI, *GENETIC JUSTICE* 7–8 (2011), and MURPHY, *supra* note 13, at 3–17.

24 See JOHN M. BUTLER, *FORENSIC DNA TYPING: BIOLOGY, TECHNOLOGY, AND GENETICS OF STR MARKERS* 22–23 (2d ed. 2005).

25 See *id.* at 146.

26 See *id.* at 12, 146.

27 *Short Tandem Repeats (STRs)*, DNA DIAGNOSTICS CTR., <http://www.forensicdna.center.com/dna-str.html> (last visited Dec. 4, 2015); see also *Notice of Release of the 2015 FBI Population Data for the Expanded CODIS Core STR Loci*, FBI.GOV, <https://www.fbi.gov/about-us/lab/biometric-analysis/codis/expanded-fbi-str-2015-final-6-16-15.pdf> (last visited Dec. 4, 2015).

genetic material could be expected to randomly match. Using population statistics, scientists can determine whether one person in many millions, or even billions or trillions could be expected to randomly match a particular DNA profile. One area of regulation, or lack thereof, lies simply with the calculation of those population statistics. In criminal cases at least, analysts rely on allelic tables prepared by the FBI. The FBI has been unwilling to share the underlying population data with researchers, who have criticized this unwillingness, and in 2015, it emerged that there were a series of errors in those tables, and those errors have resulted in thousands of notifications being sent about criminal cases in which the calculations may have been erroneous.²⁸

Other DNA tests sometimes used in criminal cases are less probative; DNA testing can be done on the Y chromosome (Y-STR testing), but all members of a paternal lineage would share the same results, and mitochondrial DNA tests, useful when hairs are found at a crime scene, also provide weaker findings since mitochondrial DNA is matrilineally inherited.²⁹

In family law, DNA tests are also of the first broad type and are used to identify individuals, but specifically to examine whether they have a familial relationship with each other. Genetic testing is typically performed using different types of DNA tests that involve a far wider array of genetic markers than the thirteen loci used in criminal cases, comparing the DNA profile of a child with that of the possible parent, with results that are 99.99% accurate.³⁰ A paternity test, for example, can cost as little as a few hundred dollars and as much as two thousand dollars and can be conducted prenatally (with lower cost “curiosity testing” and various companies offering tests for under \$100).³¹

28 See Megan Cassidy, *Crime-Scene DNA Errors Spark Complex Legal Questions*, ARIZ. REPUBLIC (June 22, 2015), <http://www.azcentral.com/story/news/local/phoenix/2015/06/22/crime-scene-dna-errors-spark-complex-legal-questions/29095963/> (describing that of over 1,000 cases used to calculate the FBI allelic frequently tables, thirty-three cases had errors, to which the FBI commented, “[w]e are of the view that these discrepancies are unlikely to materially affect any assessment of evidential value”).

29 See BUTLER, *supra* note 24, at 213–14, 241; see also David H. Kaye et al., *Statistics in the Jury Box: How Jurors Respond to Mitochondrial DNA Match Probabilities*, 4 J. EMPIRICAL LEGAL STUD. 797, 806 (2007).

30 For example, the SNP (single-nucleotide polymorphism) Microarray Technology examines 317,000 genetic markers, and LabCorp uses 21 markers. See Press Release, Lab. Corp. of Am., LabCorp Is the First National Laboratory to Offer Customers a 21-Marker Genetic Analysis in Combination with a Double-Blind Process on Every Sample for Parentage/Relationship Testing (Mar. 26, 2010), <https://www.labcorp.com/wps/wcm/connect/4f28db8041ecc8aca47ee5552702868a/Promega+Press+Release+03-26-10+Final.pdf?MOD=AJPERES&CACHEID=4f28db8041ecc8aca47ee5552702868a&CACHEID=caceff8041e4620cac73ec91f7118b4f&CACHEID=caceff8041e4620cac73ec91f7118b4f>; *Most Significant Innovation in Paternity Testing in the Last Decade*, DNA DIAGNOSTICS CTR. (Aug. 16, 2011), <http://www.dnacenter.com/media/prenatal-paternity-test-using-SNP.html>.

31 See, e.g., *Paternity Testing*, AM. PREGNANCY ASS'N, <http://americanpregnancy.org/prenataltesting/paternitytesting.html> (last visited Dec. 4, 2015).

In both family law and criminal law, the goal is to identify a person using a genetic test. DNA testing was not such a fundamentally new technology that the law had to radically shift to take account of it. Less precise blood typing could be used in the past, and in criminal cases, there may be a wide range of evidence connecting a person to a crime; for example, many criminals are caught in the act. In criminal law, identity matters in the sense that in some criminal cases (though not crimes involving non-strangers), there is a question who committed the crime. In family law, though, the identity of a biological parent may be relevant information, but sometimes the biological tie may not be so relevant after all, depending on, for example, who has formed a relationship with the child, who has taken on child-care obligations, whether there has been an adoption, and a range of other factors. The biological link standing alone is not at all dispositive as to child custody, and therefore, the advent of more precise modern DNA testing would not be expected to transform family law.

2. Predictive Testing

A second broad category of genetic testing examines a person's DNA, not to identify that person, but in order make predictions about the person's likely health or medical predispositions or risks, drug sensitivity, or perhaps even the person's future behavior.³² The term *phenotyping* refers to the identification of characteristics of a person that can be observed as having derived from their genetic traits, in interaction with the environment. Our focus in this Article is on genetic identity used to identify the relevant person and not in the sense of identifying a person's phenotype or genetic characteristics. Some of those genetic characteristics may be readily identifiable. For example, all fifty states require genetic testing for newborn infants, using DNA, protein, or metabolite analyses to screen for genetic disorders such as hypothyroidism, phenylketonuria (PKU), and sickle-cell anemia.³³ These tests are conducted on blood samples in order to identify and treat conditions early on. Legal challenges regarding the collection, storage, and retention of these blood samples have been rejected, although the Minnesota Supreme Court found consent must be obtained to use those samples for research.³⁴

There are currently genetic tests available for over 1,000 different diseases, but as National Institute of Health Director Francis Collins puts it well, "the field is moving so quickly that any genetic risk predictions based on today's understanding will need to be revised in the context of new discoveries tomorrow."³⁵ Of course, family health history has long been used to assess risk factors for a range of medical conditions. Given the increasingly

32 For an excellent overview, see FRANCIS COLLINS, *THE LANGUAGE OF LIFE: DNA AND THE REVOLUTION IN PERSONALISED MEDICINE* (2010).

33 Colin McFerrin, Note, *DNA, Genetic Material, and a Look at Property Rights: Why You May Be Your Brother's Keeper*, 19 TEX. WESLEYAN L. REV. 967, 976–978 (2013); see also, e.g., TEX. HEALTH & SAFETY CODE ANN. § 33.011 (West 2015).

34 See *Bearder v. State*, 806 N.W.2d 766, 774 (Minn. 2011).

35 COLLINS, *supra* note 32, at xxii.

low cost of genetic testing, more sophisticated efforts to engage in “personalized medicine,” both to predict and treat conditions, are increasingly possible.³⁶ However, for a wide range of common medical conditions and behavioral diagnoses, genetics may play a part, but so may environmental factors, and the precise role of genetics is the subject of intensive research.³⁷

B. Regulation of Genetics

Identification and predictive testing have been treated quite differently by the law. In addition to the distinction between identification and predictive uses of DNA, we will also explore an important distinction in how legislatures operate when they are regulating genetic testing. Sometimes, a legislature is intensely concerned with the morality and long-term consequences of using genetic information. We call this “ethics-based regulation.” By ethics, we broadly refer to a family of normative, moral, and individual-rights concerns, including privacy, equality, family and child welfare, dignity, and procedural due process concerns. Such ethical concerns have prevailed, we argue, where the long-term consequences are likely to be visited on wide swaths of population across socio-economic groups. Predictive uses of genetics may also make ethical issues salient, although we do not at all view it as necessarily the case that identity-focused uses raise fewer ethical concerns. In contrast, legislatures sometimes act in what we call a “data-driven” fashion. In data-driven regulation, the primary goal is the collection of genetic information to identify and track individuals. This form of regulation tends to be more concerned about short-term gains (often political ones) without attending to the long-term ethical problems that might arise. Data-driven regulation also tends to focus more on genetic identity, a narrower band of information about a person, than it does other types of genetic information. In the long run, data-driven efforts can lead unintentionally to breaches of privacy when information intended for one purpose is mined for another. Because data-driven regulation often bypasses ethical issues, it often disproportionately affects those who do not have political capital or an adequate voice in the conversation at the outset.

In fact, data-driven regulation can often be incidental, in that lawmakers or policymakers may not even be aware that they are regulating genetics. Instead, they think they are regulating something else—welfare law, for example, or immigration law.³⁸ In these instances, genetic information is one piece of a larger legislative goal lawmakers assume that a genetic tie stands in for another kind of relationship, for example, that a genetic father should automatically be a legal father, or a genetic parent should automati-

36 See *id.*

37 See Paul S. Appelbaum & Nicholas Scurich, *Impact of Behavioral Genetic Evidence on the Adjudication of Criminal Behavior*, 42 J. AM. ACAD. PSYCHIATRY L. 91, 91 (2014) (describing link between a specific gene variant and criminal behavior); *infra* Part III.

38 For a critique of immigration judges’ use of state family law, see Kari E. Hong, *Removing Citizens: Parenthood, Immigration Courts, and Derivative Citizenship*, 28 GEO. IMMIGR. L.J. 277 (2014).

cally confer citizenship on her foreign-born child. Here, the problem is less the long-term consequences of data-gathering (although it can be) but rather that the initial, unintentional genetics legislation skips the important step of thoughtfully considering what it means to be engaged in genetics regulation. As with data-driven regulation generally, incidental regulation can also have the drawback of further disadvantaging the already disadvantaged.

II. COMPARING APPROACHES TOWARDS GENETIC IDENTITY

We will now take a close look at the path of genetic regulation in three areas in which the law has responded to genetic testing: (1) health and employment law, (2) criminal law, and (3) family law. In each area, as noted, DNA tests have been used in multiple ways to predict health issues or establish identity, and DNA tests have also been sidelined or discouraged by regulation in important ways. Each area provides a set of important lessons about the interaction between genetic technology, evidence law, institutional interests, policy, and regulation.

A. *Predictive Testing: Regulating Genetics in Health and Employment Law*

Predictive genetic testing is useful for assisting individuals and their health providers in preventive care. It is also widely used to assist future parents in deciding whether to conceive and whether to carry a pregnancy to term. Predictive genetic testing has other potential uses—particularly, in the criminal law area, for predicting propensities to commit crimes—but so far, the areas of law in which it has been heavily regulated have been primarily health- and employment-related.

The primary concerns of these laws are privacy and discrimination. If the government, private insurer, or employer knows that an individual carries a gene that makes them more likely to suffer from a particular disability or disease, that entity might not want to provide health coverage or employ that particular individual. In 1996, Congress enacted the Health Insurance Portability and Accountability Act (HIPAA).³⁹ Although the better-known provisions of HIPAA concern protections for patient privacy and the ability of employees to take their insurance with them when they switch jobs, HIPAA also prohibits employer-sponsored health insurance from establishing eligibility rules based on a person's "genetic information."⁴⁰ More recently, Congress passed the Genetic Information Nondiscrimination Act of 2008 (GINA), which expanded the provisions of HIPAA to prohibit changing the terms of health insurance coverage based on genetic information.⁴¹ And in

³⁹ Health Insurance Portability and Accountability Act of 1996 (HIPAA), Pub. L. No. 104-191, 110 Stat. 1936 (codified as amended in scattered sections of 18, 26, 29, and 42 U.S.C.).

⁴⁰ See 42 U.S.C. § 300gg-4(a)(6) (2012).

⁴¹ See Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-233, § 105, 122 Stat. 881, 903 (codified at 42 U.S.C. § 1320d-9).

2011, Congress passed the Patient Protection and Affordable Care Act (“PPACA,” “ACA,” or, more colloquially, “Obamacare”). This law prohibited health insurers from denying insurance based on “pre-existing conditions.”⁴² Under GINA, an insurer could not deny coverage based on a genetic test but could deny it based on an already expressed genetic disease. The ACA closed that loophole.⁴³

In passing GINA in 2008, Congress not only expanded anti-discrimination measures in health insurance coverage but also extended these protections to cover employment. GINA amended the federal employment discrimination statutes by adding “genetic information” to the list of forbidden types of discrimination in employment.⁴⁴ Employment decisions ranging from hiring, firing, layoffs, promotion, benefits, or any term or condition of employment may not be made based on genetic information,⁴⁵ harassment based on genetic information is prohibited,⁴⁶ and an employer may not retaliate against an employee who complains of such discrimination.⁴⁷ Nor can an employer request or obtain genetic information about employees,⁴⁸ with some exceptions (including DNA testing for law enforcement purposes).⁴⁹ Further, EEOC regulations make clear that employers cannot seek genetic information from family members to, for example, find out about their medical histories and propensity for particular diseases or disorders;

42 See Patient Protection and Affordable Care Act, Pub. L. No. 111-148, § 2705(a), 124 Stat. 119, 156 (2010) (codified at 42 U.S.C. § 300gg-4).

43 See *id.*

44 See Genetic Information Nondiscrimination Act §§ 201–13, 122 Stat. at 905–20.

45 See 42 U.S.C. § 2000ff-1(a)(1) (“[It is unlawful] to fail or refuse to hire, or to discharge, any employee, or otherwise to discriminate against any employee with respect to the compensation, terms, conditions, or privileges of employment of the employee, because of genetic information with respect to the employee.”); *id.* § 2000ff(4) (defining “genetic information”); see also 29 C.F.R. § 1635.3(c) (2014) (defining “genetic information”).

46 See 29 C.F.R. § 1635.4; see also Regulations Under the Genetic Information Nondiscrimination Act of 2008, 75 Fed. Reg. 68912, 68918 (Nov. 9, 2010) (describing EEOC’s interpretation of prohibited practices including a cognizable harassment claim under 29 C.F.R. § 1635.4).

47 See Genetic Information Nondiscrimination Act § 207(f) (codified at 42 U.S.C. § 2000ff-6(f)); see also 29 C.F.R. § 1635.7.

48 Genetic Information Nondiscrimination Act § 202(b) (making it unlawful for employer “to request, require, or purchase genetic information with respect to an employee or a family member of the employee”). “Genetic test” is defined as “an analysis of human DNA, RNA, chromosomes, proteins, or metabolites, that detects genotypes, mutations, or chromosomal changes.” *Id.* § 201(7)(A); see also 29 C.F.R. § 1635.3(f) (containing a nearly identical definition of “genetic test” as 42 U.S.C. § 2000ff(7)(A), but with a slight difference in punctuation).

49 See Genetic Information Nondiscrimination Act § 202(b)(6); see also Intelligence Reform and Terrorism Prevention Act of 2004, Pub. L. No. 108-458, § 6403(d), 118 Stat. 3638, 3759 (describing reporting requirements for the Attorney General for criminal history record checks).

“family members” is defined broadly to include “persons related from the first to the fourth degree of an individual.”⁵⁰

An important goal of GINA was to prevent discrimination in employment decisions, as well as discrimination by healthcare providers and insurers at the federal level, and to promote additional genetics research without individuals fearing that results of genetic tests might cause them to lose their jobs.⁵¹ However, one central purpose of the law had nothing to do with workplace privacy, but rather was to encourage people to get DNA testing to identify medical conditions—and support research in genetics so that the future role that genetics plays in certain medical conditions can be better understood. The legislative findings noted that the law had the purpose to “protect the public from discrimination” but also to “allay [the public’s] concerns about the potential for discrimination, thereby allowing individuals to take advantage of genetic testing, technologies, research, and new therapies.”⁵² Then-House Speaker Nancy Pelosi commented that “[b]ecause of this legislation, Americans will be free to undergo genetic testing for diseases such as cancer, heart disease, diabetes, and Alzheimer’s, without fearing for their job or health insurance.”⁵³

Federal intervention in health- and employment-related genetic testing is an excellent example of ethics-based regulation of predictive genetic testing; for that reason, scholars have cited to it as an example of “genetics exceptionalism,” in which uses of genetics are treated as “special” despite similar or even greater concerns with regulation of other types of medical information.⁵⁴

We categorize this regulation as ethics-based because of the strong concerns about ethical issues exhibited in the test and legislative history of the law, including both privacy concerns and concerns about workplace discrimination. GINA in particular was the result of thirteen years of extensive advocacy by members of Congress who imagined a future world in which genetic testing could be used for nefarious ends.⁵⁵ The law was not passed, as so many are, in response to a particular tragic event or out of fear of an immedi-

50 Regulations Under the Genetic Information Nondiscrimination Act of 2008, 75 Fed. Reg. 68912, 68915 (Nov. 9, 2010) (codified at 29 C.F.R. § 1635.3(a)).

51 For additional discussion of the Genetic Information Nondiscrimination Act, see *infra* Part III.

52 Genetic Information Nondiscrimination Act § 2(5) (codifying GINA’s findings).

53 Press Release, Nancy Pelosi, Pelosi: “Genetic Information Nondiscrimination Act Will Protect Americans from Misuse of Genetic Information” (May 1, 2008), <http://www.democraticleader.gov/newsroom/pelosi-genetic-information-nondiscrimination-act-will-protect-americans-misuse-genetic-information/>.

54 See Rothstein, *supra* note 2, at 27; see also Suter, *supra* note 2, at 671.

55 Its principal sponsor, Rep. Louise Slaughter (D-NY), was a microbiologist with a Master’s Degree in Public Health. Jessica L. Roberts, *Preempting Discrimination: Lessons from the Genetic Information Nondiscrimination Act*, 63 VAND. L. REV. 439, 447 (2010) (citing Jonathan D. Rockoff, Senate Protects Genetic Test Data, BALT. SUN (Apr. 25, 2008), http://articles.baltimoresun.com/2008-04-25/news/0804250008_1_genetic-testing-genetic-information-genetic-alliance).

ate threat.⁵⁶ In fact, a common argument against GINA was that it was premature, since genetic discrimination was infrequent.⁵⁷ That said, more litigation under GINA may be coming. In 2015, in a case the district judge dubbed the “mystery of the devious defecator,” a federal jury awarded over two million dollars in a genetic discrimination case as compensation for the claimed invasiveness of submitting to the cheek swabs demanded by an employer seeking to conduct DNA tests on fecal matter left at a warehouse to try to identify the person responsible.⁵⁸ The case, however, addressed an attempt to identify individuals, though, not to predict future medical outcomes.

Why were lawmakers so focused on the unknown future when passing GINA and other genetic-privacy legislation? The predictive nature of the testing, bringing with it fears of eugenics, coupled with the intentional nature of the discussion, appears to have led to an ethics-based analysis. Both the predictive and intentional aspects of the inquiry were crucial. Predictive testing—testing for propensities, not actual identity—is far more speculative than identity testing.⁵⁹ A person could carry a gene associated with developing a certain type of cancer, for example, but that gene might never express itself. In contrast, a person whose DNA test demonstrates that his DNA matches the biological material found at a crime scene or establishes paternity of a particular child is actually that person, not simply likely to be. Certainly, the legislators were more concerned with protecting the rights of the

56 Cf. *Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT ACT) Act of 2001*, Pub. L. No. 107-56, 115 Stat. 272 (codified as amended in scattered sections of 8, 12, 15, 18, 20, 31, 42, 47, 49, and 50 U.S.C.) (passed in the wake of the September 11 terrorist attacks); Exec. Order No. 9066, 7 Fed. Reg. 1407 (Feb. 19, 1942) (presidential order to intern Japanese-Americans during World War II).

57 See Louise Slaughter, *Genetic Information Non-Discrimination Act*, 50 HARV. J. ON LEGIS. 41, 45 (2013); see also Colin S. Diver & Jane Maslow Cohen, *Genophobia: What Is Wrong with Genetic Discrimination?*, 149 U. PA. L. REV. 1439, 1463–64 (2001) (“Few claims of such discrimination have in fact been systematically investigated, verified, or documented. . . . [T]o the extent that employers have used genotypic evidence to screen out certain persons from the workplace, we have no empirical evidence to indicate whether these acts of discrimination were ‘irrational’ in the sense of being unrelated to bona fide occupational criteria.”); Henry T. Greely, *Genotype Discrimination: The Complex Case for Some Legislative Protection*, 149 U. PA. L. REV. 1483, 1483 (2001) (“Genetic discrimination is a much greater threat in people’s fears than it is in reality, today or in the foreseeable future, for both scientific and social reasons.”).

58 See *Lowe v. Atlas Logistics Grp. Retail Servs. (Atlanta), LLC*, No. 1:13-CV-2425-AT, 2015 WL 2058906, at *2, *7–8 (N.D. Ga. May 5, 2015); see also Daniel Wiessner, *Georgia Workers Win \$2.2 Mln in ‘Devious Defecator’ Case*, REUTERS (June 23, 2015), <http://www.reuters.com/article/2015/06/23/verdict-dna-defecator-idUSL1N0Z916520150623> (describing the same case).

59 For the argument that GINA does not prohibit use of “genetic information” by employers to identify individuals, see David H. Kaye, *GINA’s Genotypes*, 108 MICH. L. REV. FIRST IMPRESSIONS 51 (2010), http://repository.law.umich.edu/mlr_fi/vol108/iss1/5/.

person being tested than they are with identity testing. With predictive testing, then, the chances of being “wrong” seem much higher.⁶⁰

The intentional nature of the discussion mattered, too. The legislators debating GINA knew that they were legislating about genetics. Granted, the legislation concerned health law and employment law, but legislators were specifically focused on the effect genetic testing could have on individual people and how the law could foster or deter scientific progress and how it might lead to invasions of privacy and discrimination.

Taken together, these two factors leant themselves to an ethics-based approach. Although many bioethics scholars might lament the degree to which their work is undervalued, the attention to ethical concerns during the passage of GINA is stunning when compared to what has happened in other legislative debates discussed in this Article.⁶¹ Legislators and activists brought up eugenics, especially Nazi-era racial eugenics, concerns about human cloning, etc. Granted, some of this involved a *lack* of scientific or ethical understanding—many members of Congress reportedly did not understand the difference between genetic testing and human cloning—but the concern with the long-term implications of legislation was there.⁶²

In addition to the concern with eugenics, legislators were also concerned with the rights of the disabled. This concern has also been the focus in debates over prenatal genetic testing.⁶³ If anything, the leading criticism of GINA is that it goes *too* far in using an ethics-based approach.

B. Identification Testing: DNA and Criminal Law

The story of GINA and the ethical debates surrounding predictive genetic testing are fairly well known. In contrast, Congress’s regulation of genetic testing in criminal law and family law has been less studied and critiqued. We argue that there are several reasons for this. First, the genetic testing at issue in those fields is identification testing, not predictive testing. Identifying a person, rather than predicting who they might become, appears at first glance to be less ethically fraught. Second, the approach has been data-driven, not ethics-based. The passage of laws allowing for the creation of DNA databanks and mandatory paternity testing occurred in response to perceived crises, not in response to concerns about the influence of new technology on individual rights. Taken together, these factors have led to unintended consequences, errors, and potential ethical quandaries.

The use of DNA testing in criminal law is an apparent success story, in which genetic evidence has made it possible to far more conclusively deter-

60 Of course, there are error rates with any form of genetic testing, and it would depend on how valid and probative the prediction is; currently, many forms of identification testing are highly accurate, while many forms of predictive testing are not. If the state of the technology changed, perhaps the regulation would proceed differently.

61 See, e.g., Suter, *supra* note 2.

62 See Slaughter, *supra* note 57, at 50.

63 See Paul L. Barber, *Prenatal Diagnosis: An Ethical and a Regulatory Dilemma*, 13 Hous. J. HEALTH L. & POL’Y 329 (2013).

mine guilt or innocence in serious criminal cases. The regulations are data focused, with the goal to identify past and future culprits. The legislation, regulations, and policies of law enforcement, together with judicial review of them, have all been direct and intentionally regulating genetic evidence. In so doing, such regulation has largely neglected ethical and individual rights concerns.

Moreover, the legal and regulatory story has been far more mixed. Relatively few criminal cases are susceptible to DNA testing. The databanks have done much good: they have helped to solve crimes and to free the innocent. But there are significantly diminished returns from expanding DNA databanks to include broad categories of felons, misdemeanor convicts, and arrestees, at the cost of overburdening crime labs, many of which face long backlogs in conducting testing on evidence from crime scenes, and with great costs to privacy.⁶⁴ Use of DNA is asymmetrical, with widespread use to assemble giant repositories of genetic information that raise real privacy concerns, but far more limited use of DNA tests to solve crimes and to potentially free innocent convicts, raising due process concerns as well as accuracy concerns, given unwillingness of law enforcement to permit study of those databanks. To return to our typology, not only have ethical concerns been sidelined, but data-driven regulation has not worked as well as had been hoped. Federal spending can be a blunt, unpredictable, and ill-managed instrument. Judicial review could have addressed at least some ethical concerns regarding privacy and due process, but so far, highly deferential review has largely elided those concerns.

1. DNA Arrives on the Scene

Beginning in the late 1980s, law enforcement in the United States began to use DNA testing to link evidence from crime scenes to suspects. The federal government played a key role in the development and standardization of techniques used. The British geneticist Sir Alec Jeffries pioneered the genetics research that made DNA testing possible in criminal cases by focusing on short repetitive sequences within the genome that are highly variable between individuals and can be isolated for testing. Jeffries later licensed technology to conduct tests isolating those sequences to Imperial Chemical Industries (ICI), which in turn opened its U.S. operation, called Cellmark, to initially focus on paternity testing.⁶⁵ Cellmark quickly began to market the new technology to law enforcement, promoting “DNA FINGERPRINTING” as a way to get “CONCLUSIVE RESULTS IN ONLY ONE TEST!”⁶⁶ Soon,

64 For an excellent exploration of the underappreciated role local police and prosecutors play in the use of forensics, see Jennifer E. Laurin, *Remapping the Path Forward: Toward a Systemic View of Forensic Science Reform and Oversight*, 91 TEX. L. REV. 1051, 1055–56 (2013).

65 See JAY D. ARONSON, GENETIC WITNESS: SCIENCE, LAW, AND CONTROVERSY IN THE MAKING OF DNA PROFILING 15, 17 (2007).

66 *Id.* at 19.

competing private labs entered the market, the FBI began to perform DNA tests, as did state crime labs.⁶⁷

The FBI took a leading role to determine the form DNA tests would take in criminal cases.⁶⁸ The FBI chose an incompatible DNA testing system using different enzymes than those used by Cellmark and the other leading lab at the time, Lifecodes.⁶⁹ The FBI trained forensic scientists on the new protocols, created a national DNA database, and built a new DNA Analysis Unit.⁷⁰ Having taken the lead “largely by fiat” in developing standards for DNA testing, the FBI left out not only private labs, but also academic scientists, defense attorneys, and others.⁷¹ Because of its head start and leadership role, crime labs around the country sent evidence for DNA testing to the FBI lab well into the 1990s.⁷²

DNA technology improved dramatically by the mid-1990s, and as a result, the use of DNA tests in criminal cases accelerated.⁷³ Courts quickly ruled DNA evidence was admissible evidence in criminal cases—admissible, typically, to show the guilt of the defendant. Meanwhile, the federal government and some states enacted statutes permitting statutes of limitations to be relaxed to allow prosecutors to bring charges years later based on DNA evidence, or by extending or abolishing statutes of limitations in rape cases.⁷⁴

Concerns regarding unclear and inconsistent standards used to reach conclusions about forensic DNA, in part because of the lack of transparency and validation as the FBI adopted its DNA testing protocols, led to high-profile court challenges and academic disputes, nicknamed the “DNA Wars” of the 1990s.⁷⁵ The result was a different type of federal intervention: two

67 See *id.* at 33–88; see also DAVID H. KAYE, *THE DOUBLE HELIX AND THE LAW OF EVIDENCE* (2010) (detailing developments in law and science concerning DNA admissibility in U.S. courts).

68 See ARONSON, *supra* note 65, at 93–97.

69 *Id.* at 97.

70 See *id.* at 98–99, 112–13.

71 *Id.* at 118.

72 See EDWARD CONNORS ET AL., *NAT’L INST. OF JUSTICE, CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL*, at xxviii–xxix, 20 (1996).

73 See NAT’L INST. OF JUSTICE, *POSTCONVICTION DNA TESTING: RECOMMENDATIONS FOR HANDLING REQUESTS* 27–28 (1999).

74 See, e.g., 18 U.S.C. § 3297 (2012); ARK. CODE ANN. § 5-1-109(b)(1)(B) (West 2015) (effective 2013); 11 DEL. CODE ANN. § 3107(a) (West 2015) (effective 2001); MICH. COMP. LAWS ANN. § 767.24(3)(b) (West 2015) (effective 2015); N.H. REV. STAT. ANN. § 592-A:7(II) (West 2015) (effective 2014); see also Scott Akehurst–Moore, Note, *An Appropriate Balance?—A Survey and Critique of State and Federal DNA Indictment and Tolling Statutes*, 6 J. HIGH TECH. L. 213 (2006); Amy Dunn, Note, *Criminal Law—Statutes of Limitation on Sexual Assault Crimes: Has the Availability of DNA Evidence Rendered Them Obsolete?*, 23 U. ARK. LITTLE ROCK L. REV. 839 (2001). Additional states permit “DNA indictments” to toll a statute of limitations. For example, see *State v. Dabney*, 663 N.W.2d 366, 372–74 (Wis. Ct. App. 2003).

75 ARONSON *supra* note 65, at 120. Perhaps the best known was the case of *People v. Castro*, 545 N.Y.S.2d 985 (N.Y. 1989); see also Jennifer L. Mnookin, *People v. Castro: Chal-*

National Research Council, National Academies of Sciences committees convened leading scientists to study the problem and arrive at standards for forensic use of DNA testing.⁷⁶ In addition, in 1993, Congress intervened and enacted legislation authorizing the FBI to assemble DNA samples in a national databank, the Combined DNA Index System (CODIS).⁷⁷

2. DNA and Claims of Innocence

Legal efforts focused on collecting genetic data from potential criminal culprits were largely one-sided. While legal actors moved quickly to allow DNA to provide powerful evidence of guilt, the use of DNA testing to free the innocent moved quite slowly. Although the first few convictions relying on DNA tests were quickly followed, in 1989, with the first exonerations relying on post-conviction DNA testing,⁷⁸ in the 1990s only two states had statutes providing a right to access post-conviction DNA testing.⁷⁹ Many of the people freed by DNA tests in the first decade and a half of its use waited many years to obtain those tests. Today, all fifty states have enacted statutes providing access to DNA and post-conviction relief.⁸⁰ However, many of those statutes contain sharp restrictions on access to DNA testing, including bars on testing if the defense lawyer should have requested testing at trial, limits on access to persons convicted of certain felonies, and bars to testing of persons who pleaded guilty or did not litigate the issue of identity at their trials.⁸¹ Further, courts have interpreted the statutes in strained ways that have made it still more difficult for prisoners to obtain testing.⁸²

In contrast to these developments in the states, beginning with its 1993 decision in *Herrera v. Collins*, the Court has remained steadfastly unwilling to

lenging the Forensic Use of DNA Evidence, in EVIDENCE STORIES 207 (Richard Lempert ed., 2006).

76 See ARONSON, *supra* note 65, at 146–72; COMM. ON DNA TECH. IN FORENSIC SCI. ET AL., NAT'L RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE (1992); COMM. ON DNA FORENSIC SCI.: AN UPDATE, NAT'L RESEARCH COUNCIL, THE EVALUATION OF FORENSIC DNA EVIDENCE (1996). For criticism of the federal role in forensics more generally, see Paul C. Giannelli, Daubert and Forensic Science: The Pitfalls of Law Enforcement Control of Scientific Research, 2011 U. ILL. L. REV. 53.

77 See H.R. REP. NO. 106-900, pt. 1, at 8 (2000), as reprinted in 2000 U.S.C.C.A.N. 2323, 2324.

78 Brandon L. Garrett, *Claiming Innocence*, 92 MINN. L. REV. 1629, 1648 (2008).

79 *Id.* at 1631, 1646–50, 1673–75.

80 For a graphic illustrating the adoption of post-conviction DNA testing statutes, see *Today, All 50 States Have DNA Access Laws*, THE INNOCENCE PROJECT, http://www.innocenceproject.org/files/imported/dna_innocenceproject_website.pdf (last visited Dec. 4, 2015).

81 See *id.*; see also BRANDON L. GARRETT & LEE KOVARSKY, FEDERAL HABEAS CORPUS: EXECUTIVE DETENTION AND POST-CONVICTION LITIGATION 164 (2013); Rebecca Stephens, Note, *Disparities in Postconviction Remedies for Those Who Plead Guilty and Those Convicted at Trial: A Survey of State Statutes and Recommendations for Reform*, 103 J. CRIM. L. & CRIMINOLOGY 309, 314–15 (2013).

82 See Garrett, *supra* note 78, at 1677–79; Stephens, *supra* note 81, at 320–23.

recognize, but has assumed the hypothetical existence of, any constitutional right to challenge a conviction based on “truly persuasive” evidence of “actual innocence.”⁸³ In the 2006 case of *House v. Bell*, when the Court had the opportunity to directly confront the question whether to recognize an actual innocence claim, it chose not to do so, again simply assuming its availability.⁸⁴

In *District Attorney’s Office v. Osborne*, the Court squarely confronted whether there is a constitutional right to secure DNA testing.⁸⁵ William Osborne, a man convicted of rape in Alaska, sought post-conviction DNA testing that the State conceded could conclusively establish his innocence. Alaska was one of three states at the time that had no post-conviction DNA testing statute and refused to grant the test. The Court ruled that Osborne had no freestanding constitutional right to DNA testing. However, the Court did say he had a procedural due process right to DNA testing based on “a liberty interest in demonstrating his innocence with new evidence under state law.”⁸⁶ The Court largely relied on federalism reasons in ruling that ability to obtain a post-conviction DNA test would be dependent on state law remedies. A state has no obligation to make post-conviction DNA testing available in the first place, but if a state does so (as all states, the federal government, and the District of Columbia have now done), a litigant like Osborne would have to show that state statutory mechanisms were arbitrary and violated procedural due process. Some litigants have successfully challenged state DNA testing laws on the basis that they arbitrarily exclude categories of individuals from access to testing, but other courts have ruled that the *Osborne* decision leaves wide latitude to states.⁸⁷ In effect, the Court, while recognizing the remarkable power of DNA testing, chose to leave the regulation of post-conviction DNA testing to the states, even where the state in question, Alaska, could offer no reason, much less a compelling reason, as Justice Stevens pointed out in dissent, for denying Osborne the DNA test he requested.⁸⁸ Once again, judicial review of rights in genetic evidence was highly deferential, and not based on any careful balancing of government and individual interests or analysis of individual rights.

83 506 U.S. 390, 417 (1993).

84 547 U.S. 518, 555 (2006).

85 557 U.S. 52, 67–72 (2009).

86 *Id.* at 68.

87 For additional discussion of the possible implications of the *Osborne* decision, see Brandon L. Garrett, *DNA and Due Process*, 78 *FORDHAM L. REV.* 2919 (2010).

88 *Osborne*, 557 U.S. at 97 (Stevens, J., dissenting) (“Throughout the course of state and federal litigation, the State has failed to provide any concrete reason for denying Osborne the DNA testing he seeks, and none is apparent. . . . Insofar as the State has articulated any reason at all, it appears to be a generalized interest in protecting the finality of the judgment of conviction from any possible future attacks.”).

3. Federal Support for DNA Databanks

In contrast to the slow and uneven response to the use of DNA to potentially free the innocent, a raft of federal legislation funded and expanded the use of DNA to identify the guilty. This legislation was intentionally and directly focused on collecting genetic data. The national DNA databank, CODIS, is a federal creation, but it is also a joint state and federal effort.⁸⁹ The effort began in 1990 informally, and CODIS was established in 1994, following federal legislation, the 1993 the DNA Identification Act, that allowed the FBI to assemble DNA samples in a national databank.⁹⁰ Each state collects DNA profiles, which can then be accessed and searched by the FBI software, with any resulting “matches” then provided to the law enforcement agency. The 1996 Anti-Terrorism and Effective Death Penalty Act (AEDPA) provided the FBI with authority to add to CODIS the DNA profiles of federal offenders, but the DOJ was uncertain as to its authority.⁹¹ In 2000, the DNA Act provided authority to collect profiles from federal offenders.⁹² CODIS now contains over eleven million profiles, and it continues to expand.⁹³ The FBI reports that it “has produced over 293,808 hits assisting in more than 279,741 investigations.”⁹⁴ These DNA profiles currently contain information from thirteen loci that are very useful for identification of individuals, but not for predicting future medical outcomes or characteristics of individuals.

All fifty states and the federal government have now enacted laws permitting collection of DNA from those convicted of serious felonies. Federal legislation has continued to expand the list of qualifying crimes, with the 2001 USA PATRIOT Act expanding qualifying federal crimes⁹⁵ and the 2004 Justice for All Act expanding collection to all federal felons.⁹⁶ In twenty-nine states arrestees and detainees—many of whom are never charged or convicted—can have profiles entered into the database; for example, over a dozen states require that all felony arrestees have DNA entered, half of the

89 See DEP'T OF JUSTICE, FBI, CODIS: COMBINED DNA INDEX SYSTEM 2 (2012), <https://www.fbi.gov/about-us/lab/biometric-analysis/codis/codis-brochure-2010>.

90 H.R. REP. NO. 106-900, pt. 1, at 8 (2000), as reprinted in 2000 U.S.C.C.A.N. 2323, 2324.

91 *Id.*

92 DNA Analysis Backlog Elimination Act of 2000, Pub. L. No. 106-546, § 6, 114 Stat. 2726, 2733 (codified as amended at 42 U.S.C. §§ 14132(a), 14135a(a)(1)(A) (2012)).

93 See FBI, CODIS—NDIS STATISTICS (2015), <http://www.fbi.gov/about-us/lab/codis/ndis-statistics>.

94 *Id.*

95 See USA PATRIOT Act of 2001, Pub. L. No. 107-56, § 503, 115 Stat. 272, 364 (codified at 42 U.S.C. § 14135a(d)(2)); see also Regulations Under the DNA Analysis Backlog Elimination Act of 2000, 68 Fed. Reg. 74855 (Dec. 29, 2003) (describing the final rule specifying federal offenses to be treated as qualifying offenses for DNA testing).

96 See Justice for All Act of 2004, Pub. L. No. 108-405, § 203(b), 118 Stat. 2260, 2270 (codified at 42 U.S.C. § 14135a(d)); see also DNA Sample Collection from Federal Offenders Under the Justice for All Act of 2004, 70 Fed. Reg. 4763, 4764 (Jan. 31, 2005) (publishing an interim rule to implement section 203(b) of Justice for All Act).

states require that murder and sex crime arrestees have DNA entered in the CODIS, while several states extend DNA collection to misdemeanor arrests.⁹⁷ These requirements were prompted by 2005 federal legislation permitting arrestee DNA to be entered into CODIS.⁹⁸ However, few of those states allow defense lawyers access to the databases for searches that might show clients' innocence; only nine states do so.⁹⁹ Very few states have conducted even ad hoc reviews of closed cases to discover potential wrongful convictions. One of the few such audits, conducted in Virginia, resulted in several exonerations.¹⁰⁰

DNA collection efforts have been challenged in lawsuits raising a series of privacy and constitutional challenges, all of which have proved unsuccessful.¹⁰¹ This litigation culminated in the case of *Maryland v. King*, in which the Supreme Court found it constitutional under the Fourth Amendment to take DNA from persons arrested for "serious offense[s]."¹⁰²

Federal largesse has facilitated DNA collection. In 2000, when CODIS was expanded yet again, Congress enacted the DNA Analysis Backlog Elimination Act to supply grants to states for DNA lab work.¹⁰³ The findings included the statement that although "States have received millions of dollars in DNA-related grants," nevertheless, not only had there been inadequate use of DNA testing post-conviction to potentially free the innocent, but "more funding is needed to improve State forensic facilities and to reduce the nationwide backlog of DNA samples from convicted offenders and crime

97 *State DNA Database Laws Qualifying Offenses*, DNARESOURCE.COM (Sept. 2011), <http://www.dnaresource.com/documents/statequalifyingoffenses2011.pdf>. For a more up-to-date summary, see *DNA Arrest Laws*, NAT'L CONFERENCE OF STATE LEGISLATURES, <http://www.ncsl.org/research/civil-and-criminal-justice/dna-arrestee-laws.aspx> (last visited Sept. 20, 2015). The three states extending DNA collection to misdemeanor arrests are Louisiana, Texas, and Virginia. See LA. STAT. ANN. § 15.609 (West 2015); TEX. GOV'T CODE ANN. § 411.1471(a)(3) (West 2015); VA. CODE ANN. § 19.2-310.2(A) (West 2015).

98 See 42 U.S.C. § 14132(a)(1) (permitting arrestee profiles to be entered); Violence Against Women and Department of Justice Reauthorization Act of 2005, Pub. L. No. 109-162, § 1004, 119 Stat. 2960, 3085 (codified at 42 U.S.C. § 14135a); Michelle Hibbert, *DNA Databanks: Law Enforcement's Greatest Surveillance Tool?*, 34 WAKE FOREST L. REV. 767, 775-76 (1999).

99 See Ethan Bronner, *Lawyers, Saying DNA Cleared Inmate, Pursue Access to Data*, N.Y. TIMES (Jan. 3, 2013), <http://www.nytimes.com/2013/01/04/us/lawyers-saying-dna-cleared-inmate-pursue-access-to-data.html>.

100 See Frank Green, *Results of Post-Conviction DNA Testing to be Released*, RICHMOND TIMES-DISPATCH (May 10, 2012), http://www.richmond.com/archive/article_431ce887-9459-52df-b0c7-aaf49b8f96dc.html.

101 See, e.g., *United States v. Reynard*, 473 F.3d 1008, 1021-22 (9th Cir. 2007); *United States v. Plotts*, 347 F.3d 873, 877 (10th Cir. 2003); Aaron P. Stevens, Note, *Arresting Crime: Expanding the Scope of DNA Databases in America*, 79 TEX. L. REV. 921, 937-40 (2001). But see *In re Welfare of C.T.L.*, 722 N.W.2d 484, 492 (Minn. Ct. App. 2006) (holding DNA collection of juvenile to be unconstitutional).

102 133 S. Ct. 1958, 1977-78 (2013).

103 See DNA Analysis Backlog Elimination Act of 2000, Pub. L. No. 106-546, §§ 1-3, 114 Stat. 2726, 2726-31 (codified as amended at 42 U.S.C. § 14135 (2012)).

scenes that need to be tested or retested using upgraded methods.”¹⁰⁴ The federal funding allocated was substantial. For example, between 1999 and 2007, the federal government allocated \$560 million to the states to eliminate backlogs as DNA database demands began to tax the capacities of crime labs.¹⁰⁵ In 2003, President Bush announced a one-billion-dollar “DNA Initiative.”¹⁰⁶ However, not all allocated money was spent. In 2010, the National Institute for Justice (NIJ) awarded less than \$65 million in DNA Backlog Elimination Program grants—less than half of the \$151 million that Congress authorized.¹⁰⁷

Underfunding explains in part why backlogs continue to tax state and federal law enforcement, with nationwide backlogs of over 500,000 cases.¹⁰⁸ These DNA collection efforts have been the victim of their own success; the result has been even greater backlogs in processing all of these DNA tests.¹⁰⁹ The voluminous DNA processing of convicted offenders and arrestees can be more straightforward and less expensive, in a given case at least, than DNA testing samples from crime scenes, which may involve mixtures of several person’s profiles, deteriorated samples, and more need for analysis and interpretation. The backlog problem is quite urgent at some labs. Consider, for example, the case of Cody Davis, an innocent man misidentified by the eyewitnesses to a robbery in Florida. The ski mask worn by the robber was not DNA tested before trial, due to backlogs at the crime lab; only four months

104 Paul Coverdell National Forensic Sciences Improvement Act of 2000, Pub. L. No. 106-561, § 4(a)(12), 114 Stat. 2787, 2792 (codified at 42 U.S.C. § 14135 note).

105 Richard Willing, *DNA Lag Leaves Potential for Crime*, USA TODAY (Sept. 3, 2007), http://usatoday30.usatoday.com/news/nation/2007-09-03-dnainside_N.htm.

106 COMM. ON IDENTIFYING THE NEEDS OF THE FORENSIC SCI. CMTY. & NAT’L RESEARCH COUNCIL, U.S. DEP’T OF JUSTICE, *STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD* 71 (2009).

107 See NAT’L INST. OF JUSTICE, *DNA Backlog Reduction Program*, <http://nij.gov/topics/forensics/lab-operations/evidence-backlogs/backlog-reduction-program.htm> (last modified Dec. 16, 2014); U.S. DEP’T OF JUSTICE, OFFICE OF LEGISLATIVE AFFAIRS, *LETTER TO HON. PATRICK J. LEAHY* (Mar. 20, 2012), <http://nij.gov/topics/forensics/lab-operations/evidence-backlogs/documents/dna-backlog-reduction-report-to-congress-2011.pdf>.

108 See Cindy Horswell, *Texas Policy Leaves Big Loophole in Criminal DNA Testing*, HOUS. CHRON. (Oct. 18, 2010), <http://www.chron.com/news/houston-texas/article/Texas-policy-leaves-big-loophole-in-criminal-DNA-1704366.php> (citing critics complaining that “rapid expansion of databanks is costly and creating backlogs of DNA profiling of serious offenders”); Solomon Moore, *F.B.I. and States Vastly Expand DNA Databases*, N.Y. TIMES (Apr. 18, 2009), <http://www.nytimes.com/2009/04/19/us/19DNA.html>. But see Dave Altamari & Matthew Kauffman, *DNA Evidence Sits for Months*, HARTFORD COURANT (Jan. 31, 2010), http://articles.courant.com/2010-01-31/news/10013012587669_1_dna-evidence-dna-sample-national-dna-databank/2 (describing effects of backlogs in Connecticut, “departments submitting DNA evidence from a homicide scene can expect to wait as long as nine months for processing, unless it is a high-profile case”); Horswell, *supra* (noting that Virginia claims that “11 percent of Virginia’s nearly 6,000 hits have come from arrestees”).

109 See Julia Preston, *U.S. Set to Begin a Vast Expansion of DNA Sampling*, N.Y. TIMES (Feb. 5, 2007), <http://www.nytimes.com/2007/02/05/washington/05dna.html>; Katherine L. Prevost O’Connor, Note, *Eliminating the Rape-Kit Backlog: Bringing Necessary Changes to the Criminal Justice System*, 72 UMKC L. REV. 193, 211–13 (2003).

after the trial was the mask DNA tested, and the results cleared him and led to his post-conviction DNA exoneration.¹¹⁰ The most recent statistics available on crime lab activities show the same problem: DNA tests are only a third of the work of public crime labs, but account for seventy-five percent of backlogs. In turn, although DNA analysis in actual criminal casework is less than twenty-five percent of the DNA testing crime labs performed, over one third of the 1.1 million backlogged requests were for DNA samples from casework.¹¹¹

Analyzing DNA from actual crime scenes can be far more expensive and complex than simply loading profiles into a database, as noted.¹¹² Congress has intervened to encourage more use of federal funding to do DNA testing in live criminal cases. However, these efforts have not been very successful. Money under the Act often remains unspent, which can result in denial of grant requests for the next year. Reasons may include cumbersome reporting requirements, poor reporting by local jurisdictions, the burden of growing backlogs, reluctance by local law enforcement to conduct DNA testing in criminal investigations, and perhaps most important of all, poor local law enforcement training and resources to collect DNA from crime scenes.¹¹³ In 2004, the DNA Backlog Elimination Act was renamed the Debbie Smith Act, after a rape victim,¹¹⁴ and in name and in its intent, the Act changed the focus to criminal investigations.¹¹⁵ The text of the Act requires that forty percent of grant money be used on “samples from crime scenes.”¹¹⁶ Yet that

110 See *The Cases: Cody Davis*, THE INNOCENCE PROJECT, http://www.innocenceproject.org/Content/Cody_Davis.php (last visited Dec. 4, 2015).

111 See MATTHEW R. DUROSE ET AL., BUREAU OF JUSTICE STATISTICS, DEP’T OF JUSTICE, CENSUS OF PUBLICLY FUNDED FORENSIC CRIME LABORATORIES, 2009, 4 tbls.4, 5 (2012); see also Brief of 14 Scholars of Forensic Evidence as Amici Curiae Supporting Respondent at 18–20, *Maryland v. King*, 133 S.Ct. 1958 (2013) (No. 12-207).

112 *Crime Labs Struggle with Flood of DNA Samples* (NPR broadcast Dec. 11, 2007), <http://www.npr.org/templates/story/story.php?storyId=17128750> (“If it costs around \$100 to test an individual, it could cost more than \$1,000 to test a crime scene” and a crime lab “suddenly has to balance an existing backlog of crime scene samples with tens of thousands of known offenders who have to be added to the database right away.”).

113 See Milli Kanani Hansen, Note, *Testing Justice: Prospects for Constitutional Claims by Victims Whose Rape Kits Remain Untested*, 42 COLUM. HUM. RTS. L. REV. 943, 949–50 (2011).

114 Pub. L. No. 108-405, §§ 201–202, 118 Stat. 2260, 2266 (2004).

115 During hearings, for example, then-U.S. Senator Joseph Biden stated:

There are over 800,000 so-called rape case kits sitting on shelves of the cities where you live and the States you represent. They have never been tested because of the cost of testing them. The bottom line is that an estimated 48 percent of outstanding rapes could be solved by just comparing the database that will come from testing these kits and the existing database in our State prison systems where DNA is already on the record.

150 CONG. REC. S10917 (daily ed. Oct. 9, 2004) (statement of Sen. Biden).

116 42 U.S.C. §§ 14135(a)(2), (c)(3)(B) (2012). The Act provides funding for: “DNA analyses of samples from crime scenes, including samples from rape kits.” *Id.* § 14135(a)(2). The Act does not specifically address rape investigations. In response, Senator Al Franken introduced legislation not enacted, which would allocate funding for

was a reduction: it had been the case that fifty percent of grants had to be used for testing of crime scene evidence.¹¹⁷ Federal grants are designed in a way that makes backlogs worse. Although federal grants have been chiefly allocated to crime laboratories, the demands of entering profiles into the CODIS extend far beyond the costs of the testing itself. Prison officials must track who must be tested and who has already been entered in the database, samples must be taken from prisoners, and then samples must be brought to the crime lab. The costs for enacting DNA collection from arrestees may be even more substantial. Some states have decided not to go that far specifically for cost reasons.¹¹⁸ On the other hand, police departments may create their own DNA databases that go farther.¹¹⁹ States can also defray costs through criminal fines; many states now charge DNA databank fees to convicts.¹²⁰ States vary in their participation in CODIS; some upload profiles more aggressively than others.¹²¹ A 2012 Senate Report noted that “a significant backlog of DNA samples and rape kits remains in public crime laboratories” and expressed concerns that large sums of grants approved by the National Institute of Justice have been awarded to “entities of dubious merit,” including policy groups that did not themselves do DNA testing.¹²²

That is not to say CODIS does not serve important goals. In many thousands of cases, CODIS identifies culprits or clears innocent people during criminal investigations. Forty-five percent of the first 250 DNA exonerations also involved the post-conviction identification of the culprit, often due

backlogs in rape cases specifically. S. 2736, 111th Cong. (2009); see also *Sen. Franken’s Floor Statement on the Introduction fo [sic] the Justice for Survivors of Sexual Assault Act*, AL FRANKEN (Nov. 5, 2009), <http://www.franken.senate.gov/?p=news&id=700>.

117 42 U.S.C. § 14135 amendments. Prior to repeal, former subparagraph (A) read: “For fiscal year 2005, not less than 50 percent of the grant amounts shall be awarded for purposes under subsection (a)(2)” *Id.*

118 Patrick Marley, *DNA Bill Finds Growing Support*, J. SENTINEL (Milwaukee, WI) (Dec. 26, 2009), <http://www.jsonline.com/news/statepolitics/80148687.html> (predicting that the measure “would cost \$6.4 million in its first year and \$4.1 million a year thereafter”).

119 See Tami Abdollah, *Arrested in O.C.? A DNA Sample Could Buy Freedom*, L.A. TIMES (Sept. 17, 2009), <http://articles.latimes.com/2009/sep/17/local/me-oc-dna17>; Joseph Goldstein, *Police Agencies Are Assembling Records of DNA*, N.Y. TIMES (June 12, 2013), http://www.nytimes.com/2013/06/13/us/police-agencies-are-assembling-records-of-dna.html?_r=0.

120 John Stith, *Judge Makes the Call on DNA Fee Even if Defendant’s DNA Is in State Databank, Some Judges Require the Fee Be Paid Again*, POST-STANDARD (Syracuse), Apr. 8, 2007, 2007 WLNR 6786237 (describing \$50 DNA databank fee, sometimes even where there is no need for an additional DNA test). The DNA databank fee in New York goes “into government coffers for general use.” Kirsten D. Levingston, *The Cost of Staying Out of Jail*, N.Y. TIMES (April 2, 2006), http://www.nytimes.com/2006/04/02/opinion/nyregionopinions/02Cllevingston.html?_r=0.

121 See FBI, *supra* note 93.

122 S. REP. NO. 112-78, at 77 (2011) (“NIJ appears to fritter away forensic and DNA analysis funding by broadly dispersing grants to agencies and entities of dubious merit.”); see also Ben Protess, *The DNA Debacle: How the Federal Government Botched the DNA Backlog Crisis*, PROPUBLICA (May 5, 2009), <http://www.propublica.org/article/the-dna-debacle-how-the-federal-government-botched-the-backlog-crisis-505>.

to a “cold hit” in CODIS.¹²³ Sometimes the exoneration was motivated in part because DNA showed not only innocence but the guilt of an identifiable person. CODIS is a powerful tool. However, its size and the resources allocated to it have come at a cost to not only the ethics-based concerns but also the very goal that legislators were focused on: the goal of using data to solve crimes.

Delays or failure to conduct DNA testing may undergird decisions not to pursue cases, and they may discourage victims from cooperating and lead to failures to prosecute.¹²⁴ A 2009 National Institute of Justice survey found that in “18 percent of open, unsolved rape cases, forensic evidence had not been submitted to a crime lab.”¹²⁵ One of the few surveys conducted of use of forensics in criminal cases, led by Joseph Peterson, sampled over 4,000 crimes in five jurisdictions, and found that “most evidence goes unexamined” and no evidence is collected and no forensics tests are conducted, even for quite serious offenses.¹²⁶ After all, crime scene investigators have “varying levels of training and experience.”¹²⁷

Individual rights are sidelined; for example, defense rights to access CODIS data to potentially prove innocence. CODIS does permit disclosure of data for “criminal defense purposes, to a defendant.”¹²⁸ However, only nine states provide defendants with access to the DNA databases, and absent such statutory authority, defense access may depend on whether prosecutors agree to request such a test.¹²⁹ DNA testing for the defense does not receive the same federal largesse. The “Justice For All Act” allocated five million dollars a year for conducting post-conviction DNA testing, under the Kirk Bloodsworth DNA testing program (named after the first death row inmate exonerated by DNA).¹³⁰ That funding is small compared with over \$100 mil-

123 BRANDON L. GARRETT, *CONVICTING THE INNOCENT* 5 (2011).

124 See, e.g., Armen Keteyian, *Exclusive: Rape in America: Justice Denied*, CBS NEWS (Nov. 9, 2009), <http://www.cbsnews.com/news/exclusive-rape-in-america-justice-denied/>.

125 Editorial, *Respect for Rape Victims*, N.Y. TIMES (Nov. 13, 2009), <http://www.nytimes.com/2009/11/14/opinion/14sat3.html>.

126 JOSEPH PETERSON ET AL., *THE ROLE AND IMPACT OF FORENSIC EVIDENCE IN THE CRIMINAL JUSTICE PROCESS* 9 (2010). For example, physical evidence was collected in only 20% of robberies, 30% of aggravated assaults, and 75% of rape cases. *Id.* at 15, 46. The one area in which physical evidence was typically collected was homicides, in which 97% ninety-seven percent had physical evidence. Even where the evidence was collected, it was not always tested. *Id.* at 77.

127 NAT'L RESEARCH COUNCIL, *supra* note 106, at 35. For a discussion of the importance of focusing more on crime scene evidence collection, rather than databank expansion, with detailed recommendations for informed improvements, see MURPHY, *supra* note 13, at 272–81.

128 42 U.S.C. § 14132(b)(3)(C) (2012).

129 Bronner, *supra* note 99; see Jason Kreag, *Letting Innocence Suffer: The Need for Defense Access to the Law Enforcement DNA Database*, 36 CARDOZO L. REV. 805 (2015).

130 42 U.S.C. §§ 14136e(a), (b). The Kirk Bloodsworth Post-Conviction DNA Testing Grant Program made available five million dollars per year for post-conviction DNA testing. It also incentivized states to enact post-conviction DNA testing laws. See Press Release, Sen. Patrick Leahy, Oversight of the Justice for All Act: Has the Justice Department Effec-

lion allocated each year for backlog elimination (which itself is apparently often not fully spent). The Bush Administration had “resisted implementing the program for several years,” and the funding remained entirely unspent for four years.¹³¹

Indeed, not only defense lawyers, but prosecutors may be left in the dark should evidence of innocence surface. CODIS is not well connected to local prosecutors. CODIS hits in cold cases result in notification to local police, who likely closed the case, but not to prosecutors, who would know if there had been a conviction (possibly of the wrong person).¹³² Many jurisdictions have no policy in place to respond to a DNA hit in a closed case.¹³³ As a result, CODIS hits may receive no follow-up.¹³⁴

The philosophy of “more data is good” has meant that labs have not focused on which data are the most useful or important. The labs themselves may make mistakes as they invest in processing entries and not in quality control and independent auditing.¹³⁵ Separate money was allocated for grants to improve the quality of forensics work.¹³⁶ That grant money went unspent entirely for years after the statute was passed.¹³⁷ An audit by the Office of the Inspector General found NIJ was not requiring recipient labs to comply with requirements that they put in place independent auditing mechanisms.¹³⁸ To this day, the Department of Justice still has not insisted labora-

tively Administered the Bloodsworth and Coverdell DNA Grant Programs? (Jan. 23, 2008), <http://www.leahy.senate.gov/press/oversight-of-the-justice-for-all-act-has-the-justice-department-effectively-administered-the-bloodsworth-and-coverdell-dna-grant-programs>.

131 Press Release, VTDigger, Leahy Continues Effort to Reauthorize Justice for All Act (Feb. 1, 2011), <http://vtdigger.org/2011/02/01/leahy-continues-effort-to-reauthorize-historic-justice-for-all-act/>; see also Laurie Kellman, *Those Exonerated Push DNA Analyses*, BOS. GLOBE (Jan. 24, 2008), http://www.boston.com/news/nation/washington/articles/2008/01/24/those_exonerated_push_dna_analyses/.

132 See NAT’L INST. OF JUSTICE, DEP’T OF JUSTICE, POSTCONVICTION DNA TESTING ASSISTANCE PROGRAM ROUNDTABLE SUMMARY 6 (2011), <http://www.nij.gov/topics/forensics/postconviction/roundtable/welcome.htm>.

133 Maura Dolan & Jason Felch, *The Peril of DNA: It’s Not Perfect*, L.A. TIMES (Dec. 26, 2008), <http://articles.latimes.com/2008/dec/26/local/me-dna26>.

134 *Id.* For example, Oakland police formed a cold case unit to run old cases in the CODIS and obtained an “overall offender hit rate of 48 percent.” Kamika Dunlap & Barbara Grady, *Oakland Cold Cases No Longer on the Back Burner*, ALAMEDA TIMES-STAR (Ca), May 29, 2009, 2009 WLNR 10261283 (also noting “backlogs of samples waiting to be analyzed”); *Tragic Consequences of Missing DNA Samples*, CBSNEWS (Dec. 14, 2009, 11:18 AM), <http://www.cbsnews.com/news/tragic-consequences-of-missing-dna-samples/> (“An Associated Press review found tens of thousands of DNA samples are missing from state databanks across the country because they were never taken or were lost.”).

135 Jason Borenstein, *DNA in the Legal System: The Benefits Are Clear, the Problems Aren’t Always*, 3 CARDOZO PUB. L. POL’Y & ETHICS J. 847, 855–57 (2006).

136 Paul Coverdell National Forensic Sciences Improvement Act of 2000, Pub. L. No. 106-561, 114 Stat. 2787 (codified at 42 U.S. Code §3797j et seq.).

137 Erin Murphy, *What ‘Strengthening Forensic Science’ Today Means for Tomorrow: DNA Exceptionalism and the 2009 NAS Report*, 9 LAW PROBABILITY & RISK 7, 11 (2010).

138 See *Oversight of the Justice for All Act: Hearing on S. 110-973 Before the Comm. on the Judiciary*, 110th Cong. 4–6 (2008) (statement of Glenn A. Fine, Inspector General, U.S.

tories comply with those rules. Also troubling may be the spillover effect on the vast majority of the work that crime labs do that is not DNA testing.¹³⁹ A landmark National Academy of Sciences report in 2009 explored the urgent need for national scientific standards and stronger oversight and quality control of our entire system of forensics, calling for the creation of a National Institute of Forensic Science.¹⁴⁰ None of those recommendations has yet been enacted in federal legislation.¹⁴¹

4. The Supreme Court Steps Away

Some of these policy dynamics, in which a focus on data generated too much information and not always the right kinds, and raising still additional individual rights concerns, might have been mitigated had the judiciary chosen to intervene. In *Maryland v. King*, however, the U.S. Supreme Court found suspicionless searches of arrestees permissible under the Fourth Amendment, justifying taking DNA from arrestees as a matter of identifying them for “routine booking” purposes.¹⁴² Yet, as Justice Antonin Scalia made clear in a forceful dissent, adding an arrestee profile to the national DNA databank does not help police identify the person at all: the sole purpose, since these people are searched as against unsolved crime scene profiles, is to solve unsolved crimes. As Justice Scalia put it: “The Court’s assertion that DNA is being taken, not to solve crimes, but to *identify* those in the State’s custody, taxes the credulity of the credulous.”¹⁴³ Indeed, the majority admitted that the reason to take DNA is “for the sole purpose of generating a unique identifying number against which future samples may be matched.”¹⁴⁴ There is no disagreement that people *convicted* of crimes can

Dep’t of Justice); *id.* at 14–17 (statement of Peter Neufeld on Behalf of the Innocence Project).

139 See MATTHEW R. DUROSE, BUREAU OF JUSTICE STATISTICS, U.S. DEP’T OF JUSTICE, CENSUS OF PUBLICLY FUNDED FORENSIC CRIME LABORATORIES, 2005 (2008), <http://www.bjs.gov/content/pub/pdf/cpffcl05.pdf>.

140 See generally NAT’L RESEARCH COUNCIL, *supra* note 106. For some of the large body of academic work criticizing the use of forensics and quality control at crime labs, see for example Garrett & Neufeld, *supra* note 22, Paul C. Giannelli, *Wrongful Convictions and Forensic Science: The Need to Regulate Crime Labs*, 86 N.C. L. REV. 163 (2007), and Erin Murphy, *The New Forensics: Criminal Justice, False Certainty, and the Second Generation of Scientific Evidence*, 95 CALIF. L. REV. 721, 745–56 (2007).

141 DOJ has now convened a National Commission on Forensic Science to examine systemic problems facing forensics in the U.S. and to establish national standards. See Press Release, U.S. Dep’t of Justice, Department of Justice and National Institute of Standards and Technology Announce Launch of National Commission on Forensic Science (Feb. 15, 2013), <http://www.justice.gov/opa/pr/department-justice-and-national-institute-standards-and-technology-announce-launch-national>. NIST has recently created an Organization of Scientific Area Committees to examine and approve standards for forensics as well. See *Forensic Science Standards Effort Takes Shape as NIST Appoints Scientific Area Committees Members*, NIST (Sept. 3, 2014), <http://www.nist.gov/forensics/sac-members-announcement.cfm>.

142 *Maryland v. King*, 133 S. Ct. 1958, 1980 (2013).

143 *Id.* at 1980 (Scalia, J., dissenting).

144 *Id.* at 1979 (majority opinion).

be searched in that manner, but it is far from clear that it helps police much to additionally search people arrested but not convicted (indeed, those people are far more likely to be the ones who were wrongly arrested). But for the Court to say that permanent DNA searching of people based on an arrest is nothing more than “an extension of methods of identification long used” is simply unsupported if not disingenuous.¹⁴⁵

Far more direct in its reasoning was a lower court decision citing to a government interest in “the development and maintenance of a DNA database to assist in the solving of past and prospective crimes.”¹⁴⁶ That ruling was a challenge to taking DNA from persons on probation, who traditionally have fewer expectations of privacy. The judge found it too “speculative” to assert an interest in the need to monitor an individual like the plaintiff, who had engaged in misuse of Social Security benefits, not a crime for which DNA testing would be useful to solve.¹⁴⁷ That decision was reversed by the First Circuit, which used reasoning prefiguring *King*, holding that absent evidence of “demonstrated misuse of the DNA samples” or predictive “new uses” for the DNA tested, DNA tests were permitted.¹⁴⁸

Some implications of the *King* ruling are quite troubling. Vast numbers of people, as many as one-third of Americans, have been arrested by age twenty-three, not including for traffic offenses.¹⁴⁹ Now any person arrested for a “serious” offense can have their DNA taken, even if charges are later reduced, or dropped, or the person is acquitted. The Court nowhere defines a “serious” offense (indeed, the Court may mean to include traffic offenses, which are named in the majority opinion as examples of crimes for which serious offenders might be stopped but remain undetected by the police).¹⁵⁰ The Ninth Circuit, sitting en banc, relied on *King* to find constitutional a California statute requiring DNA testing of persons arrested for *any* felony.¹⁵¹ And the Supreme Court’s rulings on what counts as probable cause for arrest, combined with broad criminal statutes, mean police will have nearly unfettered authority to obtain DNA samples.¹⁵²

145 *Id.* at 1976 (quoting *United States v. Kelly*, 55 F.2d 67, 69 (2d Cir. 1932)).

146 *United States v. Stewart*, 468 F. Supp. 2d 261, 269–70 (D. Mass. 2007), *rev’d*, 532 F.3d 32 (1st Cir. 2008).

147 *Id.* at 272.

148 *United States v. Stewart*, 532 F.3d 32, 36 (1st Cir. 2008) (quoting *United States v. Weikert*, 504 F.3d 1, 14 (1st Cir. 2007)).

149 Robert Brame et al., *Cumulative Prevalence of Arrest from Ages 8 to 23 in a National Sample*, 129 *PEDIATRICS* 21, 21 (2012) (“By age 18, the in-sample cumulative arrest prevalence rate lies between 15.9% and 26.8%; at age 23, it lies between 25.3% and 41.4%.”).

150 *King*, 133 S. Ct. at 1971 (“People detained for minor offenses can turn out to be the most devious and dangerous criminals. Hours after the Oklahoma City bombing, Timothy McVeigh was stopped by a state trooper who noticed he was driving without a license plate.” (quoting *Florence v. Bd. of Chosen Freeholders of Cty. of Burlington*, 132 S. Ct. 1510, 1520 (2012))).

151 *Haskell v. Harris*, 745 F.3d 1269, 1271 (9th Cir. 2014) (en banc).

152 *Tracey Maclin, Maryland v. King; Terry v. Ohio Redux*, 2013 SUP. CT. REV. 359, 402–03.

This dragnet will not help to solve many more crimes, for all of the reasons already described, even if crime solving was a permissible reason to conduct suspicionless searches under the Fourth Amendment. States like California, which had already expanded DNA databanks to include arrestees, did not generate many more matches between offenders and crime scenes, even as compared to states like New York and Illinois with much smaller databases. Why? As researchers at the RAND Corporation found, New York and Illinois still enter crime scene samples at rates comparable to California's.¹⁵³ Adding more samples from crime scenes, not taking DNA from low-level arrestees, solves more cases.¹⁵⁴ As Erin Murphy and one of us have put it, "The lesson is clear: The police solve more crimes not by taking DNA from suspects who have never been convicted, but by collecting more evidence at crime scenes."¹⁵⁵ The Court adopted a highly strained interpretation of the Fourth Amendment that will bring with it only minor gains to law enforcement; the result may overburden crime labs at the expense of live criminal cases.

Still more interesting were the Supreme Court's reservations concerning future uses of DNA tests of arrestees to do more than simply identify them, but to engage in prediction or examine other genetic characteristics. The majority in *King* emphasized how current testing examines "noncoding parts of the DNA that do not reveal the genetic traits of the arrestee," but also that "science can always progress further, and those progressions may have Fourth Amendment consequences."¹⁵⁶ The Court added that under Maryland's statute "[n]o purpose other than identification is permissible," and that "[i]f in the future police analyze samples to determine, for instance, an arrestee's predisposition for a particular disease or other hereditary factors not relevant to identity, that case would present additional privacy concerns not present here."¹⁵⁷ Similarly, the Ninth Circuit has ruled that retention of an underlying blood sample, post-DNA testing and entry into CODIS, is also permitted,

153 JEREMIAH GOULKA ET AL., *RAND CORP., TOWARD A COMPARISON OF DNA PROFILING AND DATABASES IN THE UNITED STATES AND ENGLAND 19–20* (2010).

154 Data from the United Kingdom showed the same pattern. Despite a "massive increase" in addition of arrestee samples under the United Kingdom's DNA Expansion Program, there was no "noticeable increase in the number of crimes detected using DNA." GENEWATCH UK, *NATIONAL DNA DATABASE: SUBMISSION TO THE HOME AFFAIRS COMMITTEE 7* (2010), www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/GWsub_Jan10.doc. Even what little data we have on "investigations aided" by hits in DNA databases are misleading, since we "know little about the outcomes of most 'hits'" and whether they in fact result in convictions that would not have otherwise occurred. Frederick R. Bieber, *Turning Base Hits into Earned Runs: Improving the Effectiveness of Forensic DNA Data Bank Programs*, 34 J.L. MED. & ETHICS 222, 227 (2006).

155 Brandon L. Garrett & Erin Murphy, *Too Much Information*, SLATE (Feb. 12, 2013, 8:22 AM), http://www.slate.com/articles/news_and_politics/jurisprudence/2013/02/dna_collection_at_the_supreme_court_maryland_v_king.html; see also MURPHY, *supra* note 13, at 160–63.

156 *Maryland v. King*, 133 S. Ct. 1958, 1979 (2013).

157 *Id.* at 1979.

although noting that “if scientific discoveries make clear that junk DNA reveals more about individuals than we have previously understood, we should reconsider the government’s DNA collection programs.”¹⁵⁸

Can a meaningful line be drawn between identification and predictive uses? Time will tell whether these databases will expand not just in the number of profiles, but also in the uses that this genetic information is put to. In a sense, the databases are designed not just to identify individuals in the present, but to link them with future crimes; such a system is not simply one that verifies a person’s identity. It is not predictive, but it is certainly not limited in time either. The constrained concept of “relevant to identity” that the Court adopted made its analysis of the privacy implications of having one’s genetic profile permanently entered in a database highly artificial.

This is all the more true where, although most states currently permit the use of DNA databank statistics for studying population statistics as well as identification of remains, as David Lazer & Viktor Mayer-Schönberger describe, few states address much less restrict other possible uses, including research, familial searches, or the “re-purposing” of the underlying DNA samples themselves.¹⁵⁹ The line between what is “relevant to identity” and not may not be so clear after all. Indeed, crime labs have already, without statutory authorization, permitted familial searches for partial matches that might lead law enforcement to family members of the offender.¹⁶⁰ The FBI changed its policy to permit such searches in 2009, and a number of states apparently now engage in the practice.¹⁶¹ Such searches are used to identify individuals, but by linking them through family members; is such a use really strictly “relevant to identity”? And there are local DNA databanks that are not shared with CODIS and not subject to these regulations.¹⁶² The FBI has announced interest in expanding CODIS to include additional loci for DNA testing, which it can do by providing Congress with written notice 180 days before doing so.¹⁶³ But most important, DNA technology is rapidly evolving.

158 United States v. Kriesel, 720 F.3d 1137, 1147 (9th Cir. 2013).

159 Elizabeth E. Joh, *Policing by Numbers: Big Data and the Fourth Amendment*, 89 WASH. L. REV. 35, 54 (2014); David Lazer & Viktor Mayer-Schönberger, *Statutory Frameworks for Regulating Information Flows: Drawing Lessons for the DNA Data Banks from Other Government Data Systems*, 34 J.L. MED. & ETHICS 366, 372 (2006); Tania Simoncelli & Barry Steinhardt, *California’s Proposition 69: A Dangerous Precedent for Criminal DNA Databases*, 33 J.L. MED. & ETHICS 279, 284 (2005) (“While law enforcement authorities would like us to believe that the samples will never be used for anything besides catching criminals, an unlimited span of improper uses remain plausible so long as those samples are retained.”). Others remain unconcerned. David H. Kaye, *A Fourth Amendment Theory for Arrestee DNA and Other Biometric Databases*, 15 U. PA. J. CONST. L. 1095, 1155–58 (2013).

160 Erin Murphy, *Relative Doubt: Familial Searches of DNA Databases*, 109 MICH. L. REV. 291, 302 (2010). For a defense of the practice, see David H. Kaye, *The Genealogy Detectives: A Constitutional Analysis of “Familial Searching”*, 50 AM. CRIM. L. REV. 109 (2013).

161 Murphy, *supra* note 160, at 302.

162 Goldstein, *supra* note 119. For an excellent in-depth analysis, see Jason Kreag, *Going Local: The Fragmentation of Genetic Surveillance*, 95 B.U. L. REV. 1491 (2015).

163 The Justice for All Act of 2004, Pub. L. No. 108-405, § 203(f), 118 Stat. 2260, 2271.

Other uses of DNA samples are under development and more dramatically expand beyond current uses. Examples of these expansions include a forensic chip that uses DNA samples to ascertain “biogeographic ancestry and externally visible characteristics” such as appearance, and a service called “Snapshot” that offers to produce a composite image of a person’s face using a DNA test.¹⁶⁴

To be sure, even if the Court had decided *King* another way, law enforcement could concededly test people convicted of crimes, and doing so could still assemble a vast and powerful DNA database. New York State now has an “all crimes” database collecting DNA from people convicted of felonies and also all misdemeanors.¹⁶⁵ However, the rationale for taking DNA from people not convicted of crimes is more equivocal. As Justice Scalia pointed out, where law enforcement can already take DNA from people like King who were convicted, the only net benefit offered by the Court is that DNA can now be taken from people who are eventually acquitted or who have charges dropped or dismissed: the very people for whom the privacy cost is greatest and the social interest in searching and retaining DNA is the least. In its reasoning, the Court emphasized what was “relevant to identity,” drawing a possible line at predictive uses of genetics, but without explaining why the line should be drawn at that place. The intrusion on the individual was described in terms of the swabbing of a cheek, and not the genetic nature of what was taken. At great cost to an unarticulated concern with genetic privacy, the Court provided law enforcement with equivocal gains.

There is another reason why closer scrutiny was warranted. Data-driven regulation of genetics may disproportionately impact the least politically powerful. All of this DNA collection in criminal cases has a racial impact. The collection of DNA from arrestees and convicts reflects the disproportionate numbers of minorities arrested and convicted.¹⁶⁶ Minorities are therefore far more likely to have their DNA included and more likely to be identified using those databanks. Some have argued that the largest DNA databases possible would avoid equality concerns and prove more effective.¹⁶⁷ Currently, the federal mandate has meant that states are unable to completely prevent this effect from spreading, but at the same time, states vary widely in

164 Garrett & Neufeld, *supra* note 22, at 38–39; Brendan Keating et al., *First All-in-One Diagnostic Tool for DNA Intelligence: Genome-Wide Inference of Biogeographic Ancestry, Appearance, Relatedness, and Sex with the Identitas v1 Forensic Chip*, 127 INT’L J. LEGAL MED. 559, 560 (2013); Laura Burgess, *Forensic Expert to Conduct Review of Parabon’s DNA Based Composite Sketch Tool*, AMMOLAND (Feb. 17, 2015), <http://www.ammoland.com/2015/02/forensic-expert-to-conduct-review-of-parabons-dna-based-composite-sketch-tool/#axzz3m8ARmLIp>.

165 Press Release, Governor Andrew M. Cuomo, Governor Cuomo, Senate Majority, Leader Skelos, and Assembly Speaker Silver Announce Historic Agreement on Expansion of DNA Databank (Mar. 14, 2012), <https://www.governor.ny.gov/news/governor-cuomo-senate-majority-leader-skelos-and-assembly-speaker-silver-announce-historic-0>.

166 Moore, *supra* note 108, at 4.

167 David H. Kaye et al., *Is a DNA Identification Database in Your Future?*, 16 CRIM. JUST. 4, 5–9, 19 (2001); see Michael E. Smith, *Let’s Make the DNA Identification Database as Inclusive as Possible*, 34 J.L. MED. & ETHICS 385 (2006).

the extent of their DNA collection, perhaps because of uneven compliance by local law enforcement in addition to differences in DNA collection statutes, but perhaps because of different attitudes towards the larger ethical concerns that broader DNA collection raises. Two state courts have, in contrast to the federal approach, called into question DNA collection statutes.¹⁶⁸ The implications of highly uneven use of genetic evidence in criminal cases may be felt far more over the years to come.

And compare the treatment of a more privileged group whose DNA is very important for crime solving: police officers. Their DNA is important to collect to rule out contamination of crime scene evidence; law enforcement unions have successfully opposed requirements to give DNA samples, and officers have sued claiming workplace relation for failing to give DNA samples.¹⁶⁹

C. DNA, Federal Benefits, and Family Law

Identifying criminal culprits is not the only potential use for identification testing. In family law, DNA can be used to identify with near certainty the genetic parent of a given child. Unlike in criminal law, federal actors have adopted an incidentally data-driven approach; the federal goal was not primarily in collecting genetic evidence, but rather to establish paternity and avoid non-payment of child support to welfare recipients. Unlike in criminal law, a data-driven use of genetics fits less comfortably with the larger legal and ethical goals of the area. It is not self-evident that family law's primary goal should be identifying the "real" genetic parent, as a police officer might find a "real" culprit through DNA testing. In many cases, it may not be the genetic parent-child relationship that is the most enduring at all, but instead an adoptive or functional parent-child bond. As a result, the data-driven use of identification testing in family law raises ethical concerns and complicates family law's traditional aims.

1. Parentage and DNA Testing in State Family Law

Traditionally, family law, like criminal law, has been an area dominated by the states.¹⁷⁰ State courts, not federal courts, grant divorces to married couples, determine whether someone is a child's legal parent, and decide

168 *State v. Medina*, 102 A.3d 661, 676 (Vt. 2014) ("The technology may better accomplish law enforcement goals but the invasion of privacy may change and increase, and the rules in place to protect legitimate privacy interests may become more fragile."); *People v. Buza*, 180 Cal. Rptr. 3d 753, 775–81 (Cal. Ct. App. 2014), *rev. granted* 342 P.3d 415 (Cal. 2015).

169 *See, e.g., Dave Collins, Conn. Officials, Detective Settle DNA Dispute*, BOS. GLOBE (Feb. 8, 2015), <https://www.bostonglobe.com/metro/2015/02/08/state-police-settle-detective-law-suit-over-dna-collection/59PBbvsQk4fsRGwrrF5t7N/story.html>.

170 *Cf. Jill Elaine Hasday, Federalism and the Family Reconstructed*, 45 UCLA L. REV. 1297, 1318 (1998) (arguing as a historical matter, courts' understanding of family law as "quintessentially local" is inaccurate).

which parents will receive custody rights or visitation with their children.¹⁷¹ State legislatures, not Congress, set out the laws of divorce, parentage, adoption, and child custody.¹⁷² Where the federal government does act, it does so interstitially, by, for example, regulating family law in territories that have not yet become states,¹⁷³ choosing which marriages to recognize for federal purposes,¹⁷⁴ using state family law as a basis for federal benefits,¹⁷⁵ and—critically, for our purposes—conditioning federal funding on the adoption of particular state family law rules.¹⁷⁶

DNA testing opened up new possibilities in state family law. Traditionally, it was birth or marriage—not genes—that led to legal parentage. A mother who gave birth to a child was its legal mother; a father who was married to a woman who gave birth was the child’s legal father. As Justice Scalia famously put it in *Michael H. v. Gerald D.*, it was this “unitary family,” husband, wife, and genetic child of the wife, that was given “historic respect—indeed, sanctity would not be too strong a term.”¹⁷⁷ These presumptions developed in part because of the impossibility of demonstrating genetic parentage in the era before blood typing and DNA testing. They were also a response to the stigma of illegitimacy, a concern that children might become “wards of the state,” and an interest in promoting stable marriages and families.¹⁷⁸

Over time, state family law has evolved from this fairly simple paradigm to a more complex system in which a variety of adults are potential legal parents to children. The law’s embrace of adoption was a first step toward the recognition of parents beyond the “unitary family,” and now many other possibilities exist.¹⁷⁹ The legal parent of a child might be the genetic parent, but not if the genetic parent is classified as a sperm donor or egg donor.¹⁸⁰ The legal parent might be the birth mother, but not if she is classified as a

171 See *Ankenbrandt v. Richards*, 504 U.S. 689, 693–701 (1992) (describing family law exception to federal diversity jurisdiction); Meredith Johnson Harbach, *Is the Family a Federal Question?*, 66 WASH. & LEE L. REV. 131, 172–73 (2009).

172 See *United States v. Windsor*, 133 S. Ct. 2675, 2691 (2013) (“The whole subject of the domestic relations of husband and wife, parent and child, belongs to the laws of the States and not to the laws of the United States.” (quoting *In re Burrus*, 136 U.S. 586, 593–94 (1890))).

173 See Act of July 1, 1862, ch. 126, 12 Stat. 501 (repealed 1910) (outlawing polygamy in the territories).

174 See Defense of Marriage Act (DOMA), Pub. L. No. 104-199, 110 Stat. 2419 (1996), *invalidated by Windsor*, 133 S. Ct. 2675.

175 Courtney G. Joslin, *Marriage, Biology, and Federal Benefits*, 98 IOWA L. REV. 1467, 1483–1510 (2013).

176 Tonya L. Brito, *The Welfareization of Family Law*, 48 U. KAN. L. REV. 229, 272–73 (2000).

177 *Michael H. v. Gerald D.*, 491 U.S. 110, 123 (1989) (plurality opinion).

178 *Id.* at 124–25.

179 See generally Sarah Abramowicz, *Childhood and the Limits of Contract*, 21 YALE J.L. & HUMAN. 37 (2009) (discussing the evolution of English and American adoption and psychological parent theories).

180 Pamela Laufer-Ukeles & Ayelet Blecher-Prigat, *Between Function and Form: Towards a Differentiated Model of Functional Parenthood*, 20 GEO. MASON L. REV. 419, 479–80 (2013).

gestational surrogate.¹⁸¹ The legal parent might be the birth mother's husband, but not if the marital presumption of paternity is rebutted.¹⁸² Under doctrines of de facto parenthood¹⁸³ and second parent adoption,¹⁸⁴ a legal parent might be an unrelated adult who has been in a relationship with another legal parent.

The traditional marital presumption of paternity recognized implicitly that it can be better for a child to have a stable relationship with a father, even if that father is likely not the child's genetic parent. Likewise, new doctrines such as de facto parenthood and second-parent adoption recognize that a non-genetic parent can establish such an enduring and substantial psychological bond with a child that it creates a parent-child relationship worthy of legal protection in the form of custody, visitation, or legal parenthood. On the other hand, doctrines such as parenthood by estoppel recognize a child's right to a continuing relationship with a non-genetic parent, even if the parent wants the legal relationship severed.¹⁸⁵ For instance, the Uniform Parentage Act, the 2002 version of which has been adopted by nine states,¹⁸⁶ provides that genetic testing requests may be denied if the father has already been acknowledged if "conduct of the mother or the presumed or acknowledged father estops that party from denying parentage" and if it would be "inequitable to disprove the father-child relationship."¹⁸⁷ The Act recommends judges look to factors including time that has passed since the father was "placed on notice that he might not be the genetic father," the manner in which he discovered he might not be the genetic father, the time during which he "has assumed the role of father," the age of the child, and the "nature of the relationship" with the child.¹⁸⁸

State family law, in short, is interested in much more than identifying DNA matches between parents and children; it is also interested in promoting the best interests of children, which may sometimes be furthered by fostering relationships with non-genetic relatives who are functioning in a parenting role. DNA provided an additional tool for states to use in establishing parent-child relationships, but the specific role DNA should play in individual family law cases is far from clear.

181 See *Johnson v. Calvert*, 851 P.2d 776 (Cal. 1993).

182 See, e.g., *V.C. v. M.J.B.*, 748 A.2d 539 (N.J. 2000); *Rubano v. DiCenzo*, 759 A.2d 959 (R.I. 2000).

183 See *Janice M. v. Margaret K.*, 948 A.2d 73, 87 (Md. 2008).

184 See *Sharon S. v. Superior Court*, 73 P.3d 554 (Cal. 2003).

185 *Glover v. Severino*, 946 A.2d 710 (Pa. Super. Ct. 2008); UNIFORM PARENTAGE ACT § 608(a) (2002); see also *Monroe v. Monroe*, 621 A.2d 898, 903 n.7 (Md. 1993) (describing a different doctrine of "equitabl[e] estopp[el]").

186 David M. Wagner, *Thomas v. Scalia on the Constitutional Rights of Parents: Privileges and Immunities, or Just "Spinach"?*, 24 REGENT U. L. REV. 49, 69 n.114 (2011).

187 UNIFORM PARENTAGE ACT §§ 608(a)(1)–(2).

188 *Id.* §§ 608(b)(1)–(5).

2. Federal Statutes, Child Support, and DNA Testing

When states had the opportunity to decide what role newly available DNA testing should play in parentage determinations, the federal government intervened, in an example of what we would term data-driven regulation of identification testing. Congress responded to the promise of DNA testing through a series of acts that increasingly conditioned states' receipt of welfare funds on the identification of genetic fathers.¹⁸⁹

The final and most famous of these acts, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) replaced the former welfare program, Aid to Families with Dependent Children (AFDC), with a new program, Temporary Assistance for Needy Families (TANF).¹⁹⁰ Where the goal of AFDC had been to supplement income of families (largely headed by single mothers) when children were in need, the aim of TANF, as expressed in its name, was to temporarily supplement income while simultaneously encouraging them to work or obtain other means of income by marriage to a breadwinner.¹⁹¹ The logic was simple: if a child had an available father, then he, not the government, should be supporting the child.

This message was particularly appealing in the mid-1990s, when the media launched an attack on “deadbeat” dads that was embraced by feminist activists, religious conservatives, and politicians of all stripes.¹⁹² Certainly, Congress's goal was a legitimate one; there really were many fathers who were capable of paying child support and yet evaded the authorities. Over time, however, many early proponents of these laws began to notice that they were often counterproductive. They turned their attention from “deadbeat dads” to focus instead on “dead broke” dads, or as some put it, “turnips” (as in, the kind of vegetable you can't get blood from, or the kind of father you can't get cash from—because there isn't any).¹⁹³

But Congress's approach was *not* to merely identify a genetic father and make him, and only him (along with the child's genetic mother), responsible for the child. Instead, Congress set up a complex legal web intended to

189 Social Services Amendments of 1974, Pub. L. No. 93-647, pt. B, § 101(a), 88 Stat. 2337, 2351 (1975) (codified at 42 U.S.C. §§ 651–60 (2012)); Family Support Act of 1988, Pub. L. No. 100-485, 102 Stat. 2343 (codified as amended in scattered sections of 5, 26, and 42 U.S.C.) (providing federal funding to largely cover the costs of genetic testing); Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, § 13721, 107 Stat. 312, 658–60; Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, Pub. L. No. 104-193, § 103, 110 Stat. 2105, 2112–61.

190 See 42 U.S.C. § 601.

191 For a discussion of federal marriage promotion efforts following TANF, see Angela Onwuachi-Willig, *The Return of the Ring: Welfare Reform's Marriage Cure as the Revival of Post-Bellum Control*, 93 CALIF. L. REV. 1647, 1673–82 (2005).

192 See Jane C. Murphy, *Legal Images of Fatherhood: Welfare Reform, Child Support Enforcement, and Fatherless Children*, 81 NOTRE DAME L. REV. 325, 350 (2005).

193 Tonya L. Brito, *Fathers Behind Bars: Rethinking Child Support Policy Toward Low-Income Noncustodial Fathers and Their Families*, 15 J. GENDER RACE & JUST. 617, 633 (2012) (quoting Ronald B. Mincy & Elaine J. Sorensen, *Deadbeats and Turnips in Child Support Reform*, 17 J. POL'Y ANALYSIS & MGMT. 44, 44–45 (1998)).

ensnare fathers using a variety of means, sometimes through a DNA test, but more commonly by inducing fathers to voluntarily admit paternity without a DNA test, or under threat of one. This regulatory scheme allowed Congress to identify fathers for many children, but it had some perverse effects.¹⁹⁴

a. Indemnification Actions

The most important use of DNA testing in the new federal scheme was a requirement that unmarried mothers receiving public aid cooperate “in good faith” to establish the identity of the genetic father and secure his legal paternity of the child.¹⁹⁵ This part of PRWORA requires a mother applying for welfare benefits to identify a putative father so that the state can file a lawsuit against him for reimbursement of welfare through child support payments.¹⁹⁶ The statute authorizes the use of DNA testing to determine genetic paternity, although the vast majority of men sued in such cases voluntarily agree to admit to paternity without actually undergoing testing or are identified as the parent through a default judgment.¹⁹⁷

This requirement forces a mother to make a choice: forgo welfare or enter into an adversarial relationship with the man she believes to be the child’s father. As Jane Murphy has argued, “being forced into repeated court appearances . . . undermines relationships.”¹⁹⁸ The state’s case may include a contempt action in which the father is threatened with incarceration and “[t]he mother’s name on the case may make it look like she instigated the case, though she actually has no control in the decision to begin a contempt action and is often not informed about the action until she, too, receives a summons.”¹⁹⁹ Professor Murphy also notes that many men respond to a child support action with a custody dispute of their own, a case in which the state will offer the mother no assistance in defending her right to remain the custodial parent of her child.²⁰⁰ Similarly, Daniel Hatcher has observed that “[t]he potential for collaboration between low-income mothers and fathers can be severely hampered by the forced child support and paternity requirements, and polarization can result.”²⁰¹

The role of DNA in these cases is substantial even though few judges actually order DNA tests. The threat of a finding of genetic parentage, protracted litigation, and incarceration for contempt is often enough to con-

194 Linda McClain has noted the irony of PRWORA’s embrace of “responsible fatherhood” while simultaneously requiring women with small children to work. LINDA C. McCLAIN, *THE PLACE OF FAMILIES: FOSTERING CAPACITY, EQUALITY, AND RESPONSIBILITY* 104–05 (2006).

195 42 U.S.C. § 654(29)(A).

196 *Id.*

197 Murphy, *supra* note 192, at 350.

198 *Id.* at 373.

199 *Id.*

200 *Id.* at 373–74.

201 Daniel L. Hatcher, *Don’t Forget Dad: Addressing Women’s Poverty by Rethinking Forced and Outdated Child Support Policies*, 20 AM. U. J. GENDER SOC. POL’Y & L. 775, 776 (2012).

vince a man to concede paternity, whether he is certain of it or not.²⁰² And in those cases where the man defaults, a judgment may be entered against him regardless of his genetic parentage. The law, then, assumes the primacy of genetic parentage by making a mother identify the person she believes to be her child's genetic father, but it does not require actual testing if the putative father's compliance can be achieved by other means.²⁰³

Despite the high number of settled or uncontested cases, federal law appears to have created a boom in genetic testing (and many parties may take DNA tests outside the judicial process so that they enter the proceedings already knowing the likely outcome of the case). The Child Support Enforcement program results in millions of dollars spent on genetic testing.²⁰⁴ Mary Anderlik and Mark Rothstein argue that "the growth of a commercial identity testing industry has undoubtedly been spurred by federal welfare policy."²⁰⁵ Thus, in this particular instance, a law intended to regulate welfare recipients has profoundly affected the rate of genetic testing among unmarried parents.

b. Voluntary Acknowledgments of Paternity

Paternity post-PWORA is sometimes determined through a judicial proceeding, but far more often, putative fathers simply execute a Voluntary Acknowledgment of Paternity, or "VAP." The vast majority of VAPs are entered into at the hospital of birth.²⁰⁶ The Department of Health and Human Services (HHS) calls the "happy hour" immediately following birth "the most opportune time for paternity establishment."²⁰⁷ A father deciding whether or not to sign a VAP may seek DNA testing,²⁰⁸ but federal law precludes state courts from requiring it.²⁰⁹

202 Some fathers forgo testing because if paternity is established, they will be billed for the costs of the test by the state. Leslie Joan Harris, *Reforming Paternity Law to Eliminate Gender, Status, and Class Inequality*, 2013 MICH. ST. L. REV. 1295, 1319–20.

203 Cf. David D. Meyer, *Parenthood in a Time of Transition: Tensions Between Legal, Biological, and Social Conceptions of Parenthood*, 54 AM. J. COMP. L. 125, 139 (2006) (noting that "[m]assive resources are . . . devoted to identifying genetic fathers and establishing their legal parentage").

204 OFFICE OF CHILD SUPPORT ENF'T, FY1998 ANNUAL REPORT—TABLE 25 (1998), <http://www.acf.hhs.gov/programs/css/resource/fy1998-annual-report-table-25>.

205 Anderlik & Rothstein, *supra* note 1, at 217.

206 See NAT'L CHILD SUPPORT ENF'T ASS'N, QUICK FACTS: PATERNITY ESTABLISHMENT (2011), <http://www.ncea.org/wp-content/uploads/2011/12/Paternity-Establishment-Quick-Facts.pdf>; OFFICE OF CHILD SUPPORT ENF'T, FY2010 PRELIMINARY REPORT (2011), http://www.acf.hhs.gov/programs/cse/pubs/2011/reports/preliminary_report_fy2010/.

207 OFFICE OF THE INSPECTOR GEN., IN-HOSPITAL VOLUNTARY PATERNITY ACKNOWLEDGMENT PROGRAM: EFFECTIVE PRACTICES IN HOSPITAL STAFF TRAINING 1 (1997), <http://www.oig.hhs.gov/oei/reports/oei-06-95-00162.pdf>.

208 NAT'L CHILD SUPPORT ENF'T ASS'N, *supra* note 206.

209 45 C.F.R. § 302.70(a)(5)(vii) (requiring states accepting federal welfare funding to establish "procedures under which a voluntary acknowledgment must be recognized as a basis for seeking a support order without requiring any further proceedings to establish

Under federal law, a state receiving welfare monies must establish a “hospital-based program for the voluntary acknowledgement of paternity.”²¹⁰ The continuing receipt of TANF funds is expressly conditioned on the success of these programs: states are required to achieve high rates of paternity establishment, and VAPs are generally the cheapest way to accomplish this.

The VAP programs established by states have been widely used. In 2009, for example, 1,810,000 children were born outside marriage and paternity was established by a VAP for 1,167,000 children.²¹¹ Once a VAP has been signed, it can be rescinded for sixty days; after that, federal law requires that it can be undone “only on the basis of fraud, duress, or material mistake of fact, with the burden of proof upon the challenger.”²¹²

Like the indemnification lawsuits, then, VAPs can lead to legal affirmations of paternity even where no genetic paternity exists. These can be very difficult to undo. These judgments are a bit like guilty pleas in a criminal case (recall how many states bar post-conviction DNA testing in cases in which defendants pleaded guilty); the question of legal identity is resolved through a contractual agreement, and near-conclusive finality attaches to that agreement. Yet very few men seek genetic testing before signing a VAP. One study found that “even when free genetic testing was offered to anyone who requested it before signing a VAP, only a tiny fraction asked for the test.”²¹³ As Leslie Harris has observed, “Parents who establish paternity by signing VAPs, like married parents, generally do not want to challenge the integrity of their relationships by requesting genetic testing at the time of birth.”²¹⁴ This reluctance bears a striking resemblance to the low number of fiancés who execute premarital agreements. Hope and trust can be undermined at such an early stage by a refusal to participate in whatever procedure has been designated as the norm.²¹⁵

paternity”). This regulation and 42 U.S.C. §§ 666(a)(5)(D)-(E) have been interpreted by the U.S. Department of Health and Human Services Office of Child Support Enforcement as precluding state courts from requiring genetic testing before accepting a VAP in a child support case. See *Paternity Disestablishment*, OFFICE OF CHILD SUPPORT ENF’T (Apr. 28, 2003), <http://www.acf.hhs.gov/programs/css/resource/paternity-disestablishment>.

210 42 U.S.C. § 666(a)(5)(C)(ii).

211 OFFICE OF CHILD SUPPORT ENF’T, FY2009 ANNUAL REPORT TO CONGRESS (2009), <http://www.acf.hhs.gov/programs/css/resource/fy2009-annual-report>.

212 Jeffrey A. Parness, *New Federal Paternity Laws: Securing More Fathers at Birth for the Children of Unwed Mothers*, 45 BRANDEIS L.J. 59, 67 (2006) (quoting 42 U.S.C. § 666(a)(5)(D)(iii)).

213 Leslie Joan Harris, *Voluntary Acknowledgments of Parentage for Same-Sex Couples*, 20 AM. U. J. GENDER SOC. POL’Y & L. 467, 477 (2012) (“Of the 1,660 nonmarital births examined, a VAP was signed in seventy-eight and a half percent, and only in 112 cases was a genetic test requested.”).

214 *Id.* at 477–78.

215 PRWORA and the other welfare acts expressly allow states to foreclose disestablishment of paternity for husbands. 42 U.S.C. § 666(a)(5)(G). Instead, a state may create a “conclusive presumption of paternity upon genetic testing results indicating a threshold probability that the alleged father is the father of the child.” *Id.* This exception aligns with the federal interest in privatizing children’s dependency. If a state is willing to lock marital

3. The Perils of Data-Driven Identification

In the family law area, then, DNA testing has been used selectively to further Congress's own goals of recouping welfare costs and preventing over-reliance on federal funds. This mode of regulation has enshrined in the law a particular vision of the importance and role of genetic relationships that was not inevitable and may not even be desirable. Because of the federal mandate, states have been required to establish *legal* paternity early—even where a non-genetic father is identified as the father—rather than identifying a *genetic* father early or waiting until an appropriate functional father emerges. States have also been required to expend resources to seek recoupment of federal welfare dollars from parents who likely cannot pay. And federal law has also put citizens of states at increased risk of domestic violence and privacy invasion in the name of federal fiscal goals.

a. Parentage

Federal welfare law has imposed a particular vision of the link between genetic identity and parentage rights onto states that they might not otherwise have chosen. Had Congress not exercised its federal muscle, states quite likely would have developed different approaches to establishing parentage than they currently do, perhaps focusing far less on genetic identity. We can see some hints of these likely differences in the variety of approaches states have taken in retaining or abandoning the marital presumption.²¹⁶ Without any requirement that states attempt to identify the genetic father of every child receiving welfare, and the requirement that all unmarried parents of children be encouraged to execute VAPs, states' recognition of marital, genetic, and functional parents would likely have varied even more than under the current scheme. Although the various possibilities are abundant, there are a few worth exploring further.

First, states might have retained the marital presumption.²¹⁷ The administrative costs of genetic testing and paternity hearings are high.²¹⁸ Some states might have attempted to reduce the number of these cases,

fathers into legal parenthood regardless of the results of genetic tests, then identifying the genetic father is unnecessary. See Jeffrey A. Parness & Zachary Townsend, *For Those Not John Edwards: More and Better Paternity Acknowledgements at Birth*, 40 U. BALT. L. REV. 53, 58 (2010) (“In recognizing that states may foreclose paternity disestablishments by husbands whose wives bear children from extramarital sex, federal law defers to state law on paternity.”).

216 For a deeper analysis of the differences among states, see Kerry Abrams & R. Kent Piacenti, *Immigration's Family Values*, 100 VA. L. REV. 629 (2014).

217 See generally Jana Singer, *Marriage, Biology, and Paternity: The Case for Revitalizing the Marital Presumption*, 65 MD. L. REV. 246 (2006).

218 For statistics on the number of paternity cases in family courts, see *Divorce Drives Domestic Relations Caseloads*, COURT STATISTICS PROJECT, <http://www.courtstatistics.org/Domestic-Relations/20124Domestic.aspx> (last visited Nov. 19, 2015) (showing paternity cases reaching up to twenty percent of the total docket in some family courts), and D.C. COURTS, STATISTICAL SUMMARY 4 (2014), <http://www.dccourts.gov/internet/documents/>

either by relying more extensively on marital presumptions or by refusing to tie genetic paternity, standing alone, to child support and instead waiting for fathers or mothers to initiate suits on their own.

Alternatively, some states might have developed more expansive de facto parenthood doctrines that test a father's functional relationship with a given child rather than his genetic link. Jane C. Murphy has argued that the "threat of DNA testing on demand destabilizes the relationships between parents as well as those between father and child and undermines all existing policies favoring fathers' continued involvement in children's lives."²¹⁹ Similarly, Leslie Harris has urged courts and legislatures to adopt a system "that recognizes the importance of biology while leaving room for protection of functional parent-child relationships."²²⁰ Other scholars have gone further, arguing that genetic identity and parenting should be delinked. For example, Melanie Jacobs contends that sex-based parentage should move towards an intent-based model, closer to how most states treat assisted reproductive technologies (ART). Demanding that genetic fathers who conceive through sexual intercourse but have no intent to parent become legal parents, she argues, violates their equal protection rights.²²¹ And Nancy Dowd has argued that legal fatherhood should depend on "acts of nurturing" rather than genetics, marital presumptions, or economic responsibilities.²²²

Finally, some states might have embraced DNA testing more wholeheartedly than PRWORA did. Rather than using DNA, the marital presumption, and VAPs as alternative but equally binding means of locking men into legal paternity, states might have decided that genetic identity is important enough to establish early on in life and encouraged or required all children to be tested. This approach has been advocated by family law scholars June Carbone and Naomi Cahn, who note that because of the widespread availability of DNA testing, children are likely to eventually "discover the truth of their biological origins whether all of the concerned adults wish it or not."²²³

2014-Statistical-Summary-FINAL-02-12-15.pdf (suggesting that in some years, up to thirty-five percent of family court cases are paternity cases).

219 Murphy, *supra* note 192, at 368–69.

220 Leslie Joan Harris, *The Basis for Legal Parentage and the Clash Between Custody and Child Support*, 42 IND. L. REV. 611, 633–34 (2009).

221 Melanie B. Jacobs, *Intentional Parenthood's Influence: Rethinking Procreative Autonomy and Federal Paternity Establishment Policy*, 20 AM. U. J. GENDER SOC. POL'Y & L. 489, 507–08 (2012).

222 Nancy E. Dowd, *From Genes, Marriage, and Money to Nurture: Redefining Fatherhood*, 10 CARDOZO WOMEN'S L.J. 132, 134 (2003).

223 June Carbone & Naomi Cahn, *Which Ties Bind? Redefining the Parent-Child Relationship in an Age of Genetic Certainty*, 11 WM. & MARY BILL RTS. J. 1011, 1012 (2003); *see also* Paula Roberts, *Truth and Consequences: Part I. Disestablishing the Paternity of Non-Marital Children*, 37 FAM. L.Q. 35, 42 (2003) (advocating required genetic testing at birth and stating that "[i]n this area, an ounce of prevention may well be worth a pound of cure"); *cf.* Anthony Miller, *Baseline, Bright-line, Best Interests: A Pragmatic Approach for California to Provide Certainty in Determining Parentage*, 34 MCGEORGE L. REV. 637, 711 (2003) (developing a model for parentage that begins with a baseline of a biological connection).

They use social science evidence to show that the mother's partner—regardless of whether he is a child's genetic father—is the person most likely to act as a functional father during a child's early years, but a man who knows he is a child's genetic father—regardless of whether he is still involved in an intimate relationship with the mother—is more likely to continue to play a role in the child's life throughout the childhood and teenage years.²²⁴ The current scheme, where a VAP can bind a man to a child even without a genetic connection, encourages the first type of parental care, but at the risk of a rupture when a father eventually discovers (or decides to confront the fact) that he is not the child's genetic parent.²²⁵

In contrast, if children were automatically tested for a genetic relationship immediately after birth (and those results could be searched against a large national DNA database of putative parents), some partners of birth mothers might abandon both mother and child at birth, some might decide to claim legal parentage knowing there is no genetic connection, and still others might discover a genetic connection early on that would otherwise have gone unknown.²²⁶ Given that any legal system will have to privilege one form of parentage over the other, Carbone and Cahn advocate for the second option. Early genetic information, they argue, prevents disruption later on, and would give partners of mothers who turn out not to be a child's genetic father the opportunity to legally bind themselves to the child, knowing full well no genetic relationship exists. Under this approach, states might have developed something akin to VAPs, but they would have been used not to obviate the need for genetic testing but to create legal ties where genetic testing disproved a relationship.

We do not adopt any of these particular approaches here. Our point is simply that Congress mandated a scheme of paternity adjudication that focused not on the privacy interests of parents, best interests of children, or relationship rights of both. Instead, Congress acted quickly to create a system that it thought would be likely to protect the federal fiscal goals, ignoring other factors. This hasty action not only stalled states' own experimentation with paternity adjudication systems, but also had unintended consequences for state courts systems.

b. Child Support Enforcement

There is ample data supporting the conclusion that the child support collection efforts mandated by federal legislation are not cost-effective. There are two main reasons for this: (1) the inability of fathers to pay and (2) the expense of the adjudication.

The primary reason so many genetic fathers with children on welfare are unable to pay child support is simple: like the mothers and children involved,

224 Carbone & Cahn, *supra* note 223, at 1023–39, 1066.

225 *Id.* at 1061–66.

226 *Id.* at 1066–70.

they too are poor.²²⁷ In 2006 there were over \$105 billion in unpaid child support arrearages nationwide.²²⁸ In one HHS study, researchers discovered that the obligors who owed over the most (with “high debtor” defined as someone who owed more than \$30,000 in arrears) were much more likely to have no reported income or reported incomes of \$10,000 a year or less.²²⁹ The same study estimated that in a ten-year period, less than half of the total arrears would be collected because “so much of the arrears are owed by obligors with no or low reported income.”²³⁰

Child-care enforcement is also enormously expensive for states to undergo. One study found that the average child support enforcement case yielded \$363 in welfare recovery but cost the state \$354 in administrative costs.²³¹

In addition to economic efficiency, states might also have been concerned about the best interests of children and the effect legal proceedings might have on already struggling families. As Daniel Hatcher has argued, some mothers might not want to cooperate with PRWORA’s requirement of identifying the child’s father because they desire positive relationships with the fathers of their children.²³² Fathers who are already giving in-kind or informal support (child-care, say, or housing or supplies) may be of great help to single mothers.²³³ In fact, the relationship between the genetic parents is likely to be an evolving one that is renegotiated on a daily basis, as is the relationship between the genetic father and his child. A mother may want to protect the father of her child from the state in order to protect herself.²³⁴

Another effect of VAPs has been an increase in the amount of “paternity fraud” litigation; men who sign VAPs frequently claim later on that they signed only due to fraud, and they seek to have the VAPs rescinded in the wake of a child support lawsuit.²³⁵ VAPs, coupled with paternity proceedings in which an admission of paternity is treated as the equivalent of a DNA test,

227 David L. Chambers, *Fathers, the Welfare System, and the Virtues and Perils of Child-Support Enforcement*, 81 VA. L. REV. 2575, 2594 (1995) (“Not surprisingly, a high proportion of the poorest children in this country also have poor fathers.”).

228 ELAINE SORENSEN ET AL., URBAN INST., *ASSESSING CHILD SUPPORT ARREARS IN NINE LARGE STATES AND THE NATION 1* (2007), <http://aspe.hhs.gov/sites/default/files/pdf/75136/report.pdf>.

229 *Id.* at 3.

230 *Id.* at 7.

231 Daniel L. Hatcher, *Child Support Harming Children: Subordinating the Best Interests of Children to the Fiscal Interests of the State*, 42 WAKE FOREST L. REV. 1029, 1073–74 (2007).

232 *Id.* at 1045–46.

233 *Id.*

234 Hatcher notes that an HHS report indicates that, of mothers who refuse to cooperate with child support investigations, 94% indicate that they want to protect the father, and 88% indicate that they fear losing informal support. *Id.* at 1046 (citing U.S. DEP’T OF HEALTH & HUMAN SERVS., OFFICE OF INSPECTOR GEN., *CLIENT COOPERATION WITH CHILD SUPPORT ENFORCEMENT: CHALLENGES AND STRATEGIES TO IMPROVEMENT 6* (2000)).

235 June Carbone & Naomi Cahn, *Marriage, Parentage, and Child Support*, 45 FAM. L.Q. 219, 220 (2011).

create a situation where many men claim paternity and either change their minds when their relationships with the children's mothers sour, or challenge paternity after discovering facts that lead them to believe they are not the child's genetic father. Family court dockets are now replete with "paternity disestablishment" cases, and the subject has recently been a favorite of legal critics.²³⁶

Because of all of these factors, it seems quite likely that without federal coercion, many states might have experimented with alternatives to tying the genetic paternity of impoverished men to child support obligations. The fact that many states, within the constraints of federal law, have attempted to increase indigent men's ability to seek exceptions from the child support guidelines or interest accruing on their arrears is one indication that states have an interest in lessening this burden.²³⁷

c. Domestic Violence

Congress's hasty foray into paternity adjudication also has led to perverse consequences for parents in violent relationships. Paternity testing can "serve as a trigger for marital violence and child abuse."²³⁸ This abuse can happen when a father is angry that a mother is attempting to create a legal relationship between himself and her child because he resents being sued for child support. Establishing paternity can also make survivors of domestic violence more vulnerable because of the legal parent-child relationship it creates between father and child. A mother seeking to have no contact with an abuser will have a more difficult time succeeding if she also has to facilitate visitation or joint custody with the father. Some fathers may seek custody or visitation in order to continue harassing the mother. And some abusers may "do things to harm children, even their own, as a means of continuing control over their wives or girlfriends."²³⁹ PRWORA also weakened the prior exception for domestic violence survivors, waiving child support cooperation and work requirements to protect victims of domestic violence and instead giving states more flexibility to design their own approaches.²⁴⁰

236 See, e.g., Mary R. Anderlik, *Disestablishment Suits: What Hath Science Wrought?*, 4 J. CTR. FOR FAMS. CHILD. & COURTS 3 (2003); Harris, *supra* note 202, at 1305–06; Caroline Rogus, *Fighting the Establishment: The Need for Procedural Reform of Our Paternity Laws*, 21 MICH. J. GENDER & L. 67 (2014).

237 See SORENSEN ET AL., *supra* note 228, at 10–12 (discussing various states' attempts).

238 Zanita E. Fenton, *Bastards! . . . And the Welfare Plantation*, 17 J. GENDER RACE & JUST. 9, 24 n.97 (citing Laura Crites & Donna Coker, *What Therapists See that Judges May Miss: A Unique Guide to Custody Decisions When Spouse Abuse Is Charged*, 27 JUDGES J. 9, 11 (1988); Martha R. Mahoney, *Legal Images of Battered Women: Redefining the Issue of Separation*, 90 MICH. L. REV. 1, 58–59 (1991)).

239 Fenton, *supra* note 238, at 25 n.97 (citing Judge Michael J. Voris, *Civil Orders of Protection: Do They Protect Children, the Tag-Along Victims of Domestic Violence?*, 17 OHIO N.U. L. REV. 599, 606 (1991)).

240 For an overview, see Ruth A. Brandwein, *Family Violence and Social Policy: Welfare "Reform" and Beyond*, in BATTERED WOMEN, CHILDREN, AND WELFARE REFORM 147, 156–164 (Ruth A. Brandwein, ed., 1999); Anna Marie Smith, *The Sexual Regulation Dimension of Con-*

d. Privacy

The DNA test itself is an imposition on the physical privacy of mothers and fathers whose children receive welfare.²⁴¹ In addition, the requirement that mothers provide a list of “all possible fathers” if the genetic father’s identity is unknown violates her sexual privacy, and this list can then be used to order the collection of DNA samples from these men and other third parties, including their children.²⁴² The adversarial proceedings between mother and father for indemnification of the state’s welfare payments as authorized by PRWORA are often open to the public, and the parents may be “seated apart as plaintiff and defendant and forced to divulge intimate details before crowded courtrooms.”²⁴³ Once states have this identity information, in addition to phone numbers, dates of birth, addresses, and other information, PRWORA gives them the authority to have their child support collection agencies collect information from employers, financial institutions, and governmental agencies to withhold a payer’s income and seize their assets.²⁴⁴ All of this is carried out with no judicial review.²⁴⁵

Once these records are created, they, like DNA databases, can be mined for other purposes. For example, federal officials have searched welfare and public housing rolls to identify individuals with outstanding warrants.²⁴⁶ Absent federal coercion, some states might have more robustly protected privacy of their citizens through alternative procedures, although to be sure, some might not. In addition, privacy might have been inadvertently protected; if no databases were created, federal agencies could not search them for other purposes. Thus, Congress’s approach to paternity adjudication is a prime example of how data-driven, identification-testing regulations can sideline a range of important ethical concerns.

III. THE POLITICAL ECONOMY OF DNA TESTING

The path of DNA testing over the past three decades is not single-minded. As Rochelle Dreyfuss and Dorothy Nelkin observed in the early days

temporary Welfare Law: A Fifty State Overview, 8 MICH. J. GENDER & L. 121, 153–159 (2002) (“[T]here is a tremendous variation among them where the domestic violence exemption is concerned, and that only a very few states have developed adequate policies.”).

241 See Michele Estrin Gilman, *The Class Differential in Privacy Law*, 77 BROOK. L. REV. 1389, 1399 (2012) (noting, in addition to many other ways in which welfare law invades the privacy of recipients, that welfare recipients must provide DNA if paternity is contested).

242 Smith, *supra* note 240, at 145–47, 147 n.103 (citing Kindra L. Gromelski, Note, *You Made Your Bed . . . Now You Are Going to Pay For It: An Analysis of the Effects Virginia’s Mandatory Paternal Identification in AFDC Cases Will Have on the Rights of Unwed Fathers*, 5 WM. & MARY J. WOMEN & L. 383, 396 (1999)).

243 Hatcher, *supra* note 201, at 779.

244 See Smith, *supra* note 240, at 147.

245 See *id.*

246 See Erin Murphy, *The Politics of Privacy in the Criminal Justice System: Information Disclosure, the Fourth Amendment, and Statutory Law Enforcement Exemptions*, 111 MICH. L. REV. 485, 509–10 (2013).

of DNA, “given the cultural appeal of science, and particularly genetic assumptions, as neutral information, the tendency is to apply these assumptions beyond the point of actual demonstration and beyond their relevance to particular situations.”²⁴⁷ Yet we have not seen DNA testing and genetic-based approaches dominate in every area where such information could potentially be useful. Instead, genetics has been used where politically powerful interests have demanded it, and genetics may even be underused where there is little political will to demand it. In criminal law, DNA information has been assembled in vast databanks but chiefly used to identify potential culprits, with barriers to its use to exonerate convicts. Legislatures have prioritized database expansion over crime solving. In family law, richer genetic information is tested but put to more limited uses, and in ways that raise privacy concerns, particularly as to less privileged families, e.g., welfare recipients. While preexisting law and inertia may counter change, regulatory incentives and high-profile cases have pushed legal change and the overturning of longstanding statutes and precedents—but selectively, and in some areas and not others.

The typology introduced in Part I and explored in context in Part II produces two steps for analysis of genetics legislation. First, we argue that one must ask whether that purpose is predictive or for purposes of identity. Second, one should examine whether the statute, rule, policy, or judicial ruling represents a data-driven or ethics-based approach. Following that framework, we have shown a pervasive tension between data-driven and ethics-based legislation. Ethics-based legislation emerges most commonly when legislators and courts consider predictive testing. The *Maryland v. King* decision, for example, dismissed privacy concerns with taking DNA from arrestees for serious crimes but noted that the analysis might be different had predictive uses of DNA been possible. Data-driven legislation has had an unfortunate tendency to lead to perverse unintended consequences. The approaches legislatures take to identification testing now have the potential to become the approach for predictive testing in the future.

How can a focus on ethics-based considerations improve the quality of genetic regulation? That is the subject to which we turn here in Part III. And to be sure, the ethics-based approach, exemplified in the passage of GINA, has its faults. In many instances, legislators focus on ethics when they see the possibility of their own rights being impinged upon, and they may do so even when there is little chance that such transgressions will actually occur. As with data-driven legislation, ethics-based legislation is sometimes passed for immediate political ends. Consider, for example, legislation banning genetic cloning or Sharia law; legislators were attacking politically unpopular groups for “ethical” reasons to score political points, not to tackle an imminent legal problem. Thus, by “ethics-based,” we do not mean simply some normative justification for a piece of legislation.

247 Dreyfuss & Nelkin, *supra* note 1, at 348.

Instead, our call for an ethics-based approach is for a careful balancing of the interests at stake, with attention to the potential long-term consequences of lawmakers' actions. This care is particularly important with a new technology such as DNA testing because early action will likely set a path for years to come. In this Part, we analyze five factors that should inform consideration of legislation on DNA testing: (1) equality, (2) accuracy, (3) privacy, (4) finality, and (5) federalism.

A. Equality

Equality concerns, whether the treatment of the disabled, of minorities targeted by police, or of welfare recipients, permeate the short history of DNA regulation. Vulnerable populations, the indigent, and racial minorities, or classes of people with fewer privacy rights like arrestees or welfare recipients, have been disproportionately asked to give up their genetic material to the government. DNA legislation has developed in a checkered fashion. For elites, paternity is determined by a broad set of considerations, while for indigent families, welfare is conditioned by pressure to acknowledge paternity immediately or be subject to DNA testing. Elites are unlikely to think of themselves as likely to be arrested for a crime they did not commit based on a DNA match in a databank, or accused of paternity by a welfare agency seeking reimbursement. They are, however, likely to see themselves as potential victims of genetic discrimination by employers or health insurance companies. Accordingly, their genetic privacy is protected, while the disadvantaged are put in databases.

At the extreme, some have responded to these equality concerns by arguing in favor of a universal DNA databank.²⁴⁸ Such a database would obviate equal protection concerns; everyone's genetic information could be accessed. Everyone's privacy would be equally invaded. Or would it? Whose DNA would most often be searched in such a database? The federal government has not gone that far—although since as many as one third of Americans have been arrested by age twenty-three for non-traffic offenses²⁴⁹ and the Supreme Court has now placed its imprimatur on DNA collection from arrestees, the DNA databank may become very large. That said, so long as minorities remain disproportionately subject to arrest as well as conviction, it is minorities that are most likely to be included in DNA databanks. Welfare recipients are most likely to be encouraged to use hospital bed paternity acknowledgements or DNA tests (but they may not be able to get federal benefits using a DNA test).

To add to that list of less privileged groups subject to intrusive DNA collection, juvenile offenders, as Kevin Lapp has described in detail, are sub-

248 David Seifman, *Getting DNA Samples at Birth Fine with Rudy*, N.Y. POST, Dec. 17, 1998, at 34; see *supra* text accompanying note 166.

249 *Maryland v. King*, 133 S. Ct. 1958, 1988 (Scalia, J., dissenting) (citing Robert Brame et al., *Cumulative Prevalence of Arrest from Ages 8 to 23 in a National Sample*, 129 PEDIATRICS 21 (2012)).

ject to mandatory DNA collection by the federal government, and in every state but Hawaii. The statutes seek to add their information to databases to “‘advance’ and ‘further’ the deterrent and rehabilitative goals of the juvenile court.”²⁵⁰ The federal statute requires DNA collection from all individuals, including juveniles, who are arrested (and/or later convicted) for any federal offense.²⁵¹ As Lapp describes, many of the states permit DNA collection from juveniles for misdemeanor delinquency findings.²⁵² Courts have found, when juvenile DNA collection has been challenged, that these statutes help to provide for “a juvenile offender’s needs for care and treatment, consistent with the prevention of delinquency,” and have a “deterrent and rehabilitative effect.”²⁵³ How DNA database collection helps rehabilitate juveniles remains unstated in those judicial rulings.

In contrast, more privileged members of the population do not face the prospect of intrusive genetic collection. Employees are federally protected against genetic discrimination in the workplace, including as against future developments in the technology that remain beyond the horizon. Less politically powerful groups may have great difficulty mounting privacy challenges—while more politically powerful groups may have their genetic privacy protected and more.

The appeal of new forms of data collection may be particularly great where less politically powerful groups shoulder the privacy burden. Groups like arrestees, convicts, juveniles, noncitizens, parolees, and welfare recipients have traditionally been subject to more intrusive government monitoring and tracking.²⁵⁴ Those power dynamics help to explain why the same federal funding that creates DNA databanks provides very little in the way of funding to encourage DNA tests used in a post-conviction setting to potentially free the innocent. While genetics is not having one consistent type of impact across these diverse areas, that is precisely the point. Political interests in particular, but also the litigation landscape and constitutional law, have each defined different roles for genetic testing in each area.

250 Kevin Lapp, *Compulsory DNA Collection and a Juvenile’s Best Interest*, 14 U. Md. L.J. RACE RELIGION GENDER & CLASS 50, 51 (2014) (quoting *In re Lakisha M.*, 882 N.E.2d 570, 579 (Ill. 2008); *In re Appeal in Maricopa Cnty. Juvenile Action Nos. JV-512600 & JV-512797*, 930 P.2d 496, 501–02 (Ariz. Ct. App. 1996)).

251 42 U.S.C. § 14135a(a)(1)(A) (2012); 28 C.F.R. § 28.12(b) (2010).

252 Lapp, *supra* note 250, at 57.

253 *In re Lakisha M.*, 882 N.E.2d at 581; *In re S.M.L.*, 705 N.W.2d 906, *4 (Wis. Ct. App. 2005); Lapp, *supra* note 250, at 62 (analyzing the reasoning of these and other judicial decisions).

254 On the ubiquity of law enforcement exemptions from privacy requirements in federal statutes, see Murphy, *supra* note 246, at 485; on conditional welfare receipt on providing personal information or consenting to inspections, see *id.* at 510. Similar arguments have been made about invasive welfare drug tests; a Florida law was found to result in high costs and few users caught. Lizette Alvarez, *No Savings Are Found from Welfare Drug Tests*, N.Y. TIMES (April 17, 2012), <http://www.nytimes.com/2012/04/18/us/no-savings-found-in-florida-welfare-drug-tests.html>.

B. Accuracy

The value of accuracy depends on what use that evidence is being put to in litigation. Identity does not always matter in a case. Sometimes the issue is conceded. In fact, it is usually conceded in criminal cases through a guilty plea. DNA tests are most useful in sexual assault cases, because semen evidence can be isolated in the laboratory for DNA tests—but even in that area, the vast majority of sexual assault cases involve acquaintances in which there is no dispute about the identity of the rapist, but rather the question is whether there was consent or not. Despite the limited relevance of identity in most criminal cases, the Supreme Court in *Maryland v. King* emphasized the importance of law enforcement’s ability to obtain DNA from arrestees for purposes of “identification” during routine booking procedures. DNA may not provide useful information if law enforcement already knows the person’s name (police can ask for identification, take a mugshot, and take fingerprints). What DNA provides is “identification” in the sense that police can use the genetic information to search unsolved cold cases. Where identity matters and a DNA test can answer the relevant question, there is the question of how reliably the forensic technique is used. DNA testing is far more reliable than traditional forensics still commonly used in criminal cases, and it has a sound statistical basis. As noted, though, there have been errors in DNA tests, and erroneous statistics used. Novel new forms of DNA testing continue to raise questions about the reliability of tests and their use in criminal matters.²⁵⁵

Accuracy and identity are less relevant in family law cases. While there may be more instances than we might think where a person thinks they are a genetic parent and are actually not, what matters to the child may chiefly be the relationship and not the genetics. And if we do not want employers discriminating, even based on accurate genetic information about employees, because we think employers should serve a role in ensuring the health of employees, then accuracy and genetic identity may not be relevant at all in the employment context. When getting genetic identity “right” matters is entirely a normative question, but it has powerfully impacted statutes and interpretation of constitutional rights.

C. Privacy

Across a host of areas, governments local, state, and federal have interests in collecting data about individuals, and in turn, those efforts increasingly raise complex privacy questions, both statutory and constitutional in nature. The federal government has the greatest resources to do so and the greatest interest in tracking individuals across state lines and solving coordination problems that might make it hard for any locality to effectively gather

²⁵⁵ See, e.g., *People v. Collins*, 15 N.Y.S.3d 564, 587 (N.Y. App. Div. 2015) (finding inadmissible as not generally accepted low copy or “high sensitivity” DNA testing technique used by medical examiner in criminal case). But see *People v. Megnath*, 898 N.Y.S.2d 408, 413 (N.Y. App. Div. 2010) (finding low copy DNA testing admissible).

data. Erin Murphy describes “perhaps the watershed moment of government databasing”: when J. Edgar Hoover created the FBI crime lab (a moment dramatized in Clint Eastwood’s 2011 film *J. Edgar*) and the FBI subsequently created its first fingerprint database, “a card sorter that capitalized on the technology created to tabulate the census and that led to the formation of IBM.”²⁵⁶ From those humble origins in 1924, when the FBI first began assembling a national collection of fingerprints, the FBI has now developed “the largest criminal fingerprint database in the world”: the Integrated Automated Fingerprint Identification System (IAFIS), a system of fingerprint databases, interconnected with state databases much like the DNA databank and with more than one hundred million sets of prints.²⁵⁷

More recently, the FBI has linked federal and state systems of maintaining criminal records, creating the National Crime Information Center (NCIC) in 1983, providing grants to upgrade criminal information records, and as part of the Brady Handgun Violence Prevention Act, creating a National Instant Criminal Background Check System.²⁵⁸ James Jacobs and Tamara Crepet describe how the FBI continues to push for expanded data collection, seeking, for example, adding arrest information, juvenile offenses, and misdemeanor offenses to the NCIC records keeping system.²⁵⁹ Similarly, in 2006 Congress enacted the Adam Walsh Child Protection and Safety Act, which denies federal funding to states that fail to create and maintain sex offender registries that comply with federal guidelines, and authorizes the FBI to create a combined national registry, the Sex Offender Registration and Notification Act (SORNA).²⁶⁰ All of this fits well with the federal focus in the DNA context on ever-expanding collection of DNA information and encouraging states and localities to supply more and more genetic data to the federal system.

A universal DNA databank would potentially allow the state to access genetic information for all sorts of purposes, and not just through databanks used to locate culprits of crimes, but perhaps also those used to identify putative parents or family members of non-citizen detainees, or those used for other purposes. Perhaps there could be a convergence, in which the criminal databanks would be used for family law and welfare law matters, or immigration matters, or national security matters. Interoperability of genetic databanks would raise a host of privacy concerns. Applying for welfare might

256 Erin Murphy, *Databases, Doctrine & Constitutional Criminal Procedure*, 37 *FORDHAM URB. L.J.* 803, 805–06 (2010); J. EDGAR (Warner Brothers, 2011).

257 See *Integrated Automated Fingerprint Identification System*, FBI.GOV, http://www.fbi.gov/about-us/cjis/fingerprints_biometrics/iafis/iafis (last visited Dec. 4, 2015) (“IAFIS is the largest criminal fingerprint database in the world, housing the fingerprints and criminal histories for more than 70 million subjects in the criminal master file, along with more than 34 million civil prints.”).

258 James Jacobs & Tamara Crepet, *The Expanding Scope, Use, and Availability of Criminal Records*, 11 *N.Y.U. J. LEGIS. & PUB. POL’Y* 177, 180–82 (2008).

259 *Id.* at 187–90.

260 Adam Walsh Child Protection and Safety Act of 2006, Pub. L. No. 109-248, 120 Stat. 587 (codified as amended in scattered sections of 18 and 42 U.S.C.).

make one's family and partners' genetic information available to law enforcement, or an arrest might make one's genetic information available to a family court, and the separate procedural and constitutional rules in place to regulate each area would fall by the wayside. Convergence would make for bigger data but with troubling implications.

Nor is the privacy concern with convergence an idle one, given a federal push to collect more biometric information in interconnected databases. Since September 11, the federal government has gone far beyond maintaining social security records, tax records, criminal records, banking records,²⁶¹ and the like, and has invested in remarkable data-mining efforts creating vast collections of data from public sources and some private ones as well, such as the effort by the National Security Agency to monitor telecommunications in the United States.²⁶² DNA databanks may pale in comparison to the size and sophistication of other federal data collection efforts now underway. They may arise from the same urge, however, where states would lack the resources and collective will to create a unified system. Moreover, since September 11, Congress has proposed new biometric "identity management" tolls, such as "cardless" verification relying on DNA, iris scans, or fingerprints.²⁶³

Mass DNA screening is not completely farfetched, and the federal government would likely be the driving force behind it. In contrast, states can balance the need to invest in data collection as against all of its other law enforcement priorities (like crime prevention, rehabilitation, incarceration, etc.). The federal government has less need to engage in careful cost-benefit analysis. At the same time, the federal government may sometimes depend on states and local government, as well as third-party providers, to obtain the raw data that it depends on, and in turn, any information generated through these databases may be relied upon by state and local government, employers, and other third parties.

D. Finality

One might not think of rules of finality as raising ethical considerations, but they do reflect a decision that legal judgment should at some point not be reopened. Willingness to reopen legal judgments reflects an ethical view that accuracy or fairness should permit a second or successive look at whether that judgment should still be adhered to. In a range of areas, traditional rules of finality have been relaxed to permit DNA testing, whether it is statutes of limitations that limit prosecutors, rules on introducing new evidence of innocence helpful to prisoners post-conviction, or tolling rules for contesting paternity.²⁶⁴ Yet the priority on finality changes depending on

²⁶¹ See 31 U.S.C. § 5312(a)(2) (2012); Daniel J. Solove, *Privacy and Power: Computer Databases and Metaphors for Information Privacy*, 53 STAN. L. REV. 1393, 1403 (2001).

²⁶² Fred H. Cate, *Government Data Mining: The Need for a Legal Framework*, 43 HARV. C.R.-C.L. L. REV. 435, 436 (2008).

²⁶³ Margaret Hu, *Biometric ID Cybersurveillance*, 88 IND. L.J. 1475, 1483, 1487 (2013).

²⁶⁴ See *Jackson v. Newsome*, 758 N.E.2d 342, 351–52 (Ill. App. Ct. 2001).

underlying values. Courts have cited to the value of “finality” when denying requests for post-conviction DNA testing.²⁶⁵

Finality also has great weight in the family law context, where the concern is with disrupting relationships and attachments between a child and parents, and therefore the priority is placed on establishing paternity at birth using a VAP or genetic testing. Yet not only is DNA testing now used for paternity testing, but finality has been somewhat relaxed in jurisdictions where paternity laws have changed, permitting use of DNA to rebut the presumption that the husband is the father.²⁶⁶ A wrongful conviction has similarly irreversible consequences; one would think that a deprivation of liberty would deserve the relatively inexpensive step of releasing genetic evidence for DNA testing. Of course, a DNA exoneration of a convict shows that law enforcement, the judge, jurors, and lawyers all made a grave error. The Court’s criminal law rulings suggest that accuracy matters far more when it helps law enforcement convict the guilty than when it helps to free the innocent. Finality is not valued in the same way for those whose DNA is in a databank and may face potential identification and use of the DNA in perpetuity, even if the person was arrested but not charged or is acquitted.²⁶⁷ In contrast, a DNA test may help (or not) the court to adjudicate a child custody or child support dispute—but the results do not implicate any failures by the state.

E. Federalism

A federalism-related concern that may be unique to the DNA context is the linking of multiple databases under one national government and the potential for abuse that linkage creates. Governments collect some data for particular purposes but then may be tempted to use it for others. Sometimes, Congress has been thoughtful about the potential for abuse (think, for instance, of HIPAA, which prevents the use of medical data for other purposes), but in other instances, especially where law enforcement concerns are paramount, it is tempting to allow free-ranging use of information once it is obtained. Thus, we could see welfare databases trolled for names of criminal suspects. One advantage of a state-by-state system is its cumbersome nature; it is simply more difficult for the states to cooperate to become “big brother” than it is for the federal government to take on that role. The consequences of allowing one government are especially dire with biomedical information. Nationwide databanks provide a much more dangerous form of government oversight, vulnerable to hackers and those who would abuse power, than a diffuse set of state and local databanks.

265 See *Harvey v. Horan*, 278 F.3d 370, 375–76 (4th Cir. 2002).

266 4 DAVID L. FAIGMAN ET AL., *MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY* §§ 32:2–4 (2010).

267 On the difficulty in having one’s DNA expunged, see Elizabeth E. Joh, *The Myth of Arrestee DNA Expungement*, U. A L. REV. ONLINE (forthcoming 2015).

On the other hand, states may resist federal requirements in ways that may be unintentionally harmful to privacy or policy, or just haphazard. Lax federal oversight of its spending is by no means unique to the DNA testing context. CODIS has had slow, uneven growth (states widely vary in how many DNA profiles they submit) and compliance. Similarly, as of a July 2011 deadline, the 2006 Adam Walsh Child Protection and Safety Act had only fourteen states in substantial compliance with its requirements to create new sex offender databases.²⁶⁸ One can imagine all sorts of reasons why compliance might be slow. Even with federal grant assistance, creating a new offender database may be expensive. It may be politically unpopular; the public may oppose creating new consequences for convictions or may fear doing so could undermine rehabilitation. States may view their existing offender registries as adequate. Further, states may know that the federal threat of withdrawing funding lacks teeth; the DOJ press release announcing lack of compliance even noted that the statute permits only a ten percent reduction of funding under a particular grant program—and that money can be returned should the state represent that it will use the money to implement the Act's requirements.²⁶⁹

None of these concerns means that Congress should not participate in criminal, family, or employment law, much less promote uses of genetic evidence in a given area of law. Nor do they preclude Congress from engaging in the regulation of genetics, whether intentional or incidental. However, they do highlight some of the problems with congressional action in this area. Some of these are the usual justifications for federalism and could apply equally to other areas of congressional intervention. Some, however—the privacy concern in particular—are especially important in the context of DNA evidence. The states have resisted federal efforts in criminal law and family law in certain respects, and sometimes those interventions have blunted poor policy choices made by Congress. As Chief Justice John Roberts recently put it, “The States are separate and independent sovereigns. Sometimes they have to act like it.”²⁷⁰

268 See Press Release, Dep't of Justice, Justice Department Finds 24 Jurisdictions Have Substantially Implemented SORNA Requirements (July 28, 2011), http://ojp.gov/newsroom/pressreleases/2011/SMART_PR-072811.htm.

269 *Id.* at 2 (“The Act also permits states and territories to potentially recoup the 10 percent reduction in a future fiscal year if they demonstrate these funds will be used to implement SORNA programs.”). Take another example: in the wake of the Virginia Tech shootings, Congress enacted the NICS Improvement Amendments Act of 2007 to require states to collect data on individuals with mental illness and report them to the Attorney General. NICS Improvement Amendments Act of 2007, Pub. L. No. 110–180, 121 Stat. 2559 (2008). Although grants were provided to create electronic systems to collect the data, and states not in compliance could lose their federal funds under the Crime Control and Safe Streets Act of 1968, nevertheless, “[t]he deadline to comply with the NICS Improvement Amendments Act has come and gone, and in spite of the threat of losing federal funds, not all states are complying.” Jana R. McCreary, *Falling Between the Atkins and Heller Cracks: Intellectual Disabilities and Firearms*, 15 CHAP. L. REV. 271, 279 (2011).

270 *Nat'l Fed'n of Indep. Bus. v. Sebelius*, 132 S. Ct. 2566, 2603 (2012).

CONCLUSION

Have the United States Supreme Court and courts more generally over- or under-constitutionalized genetics, exacerbating the larger problem of regulating genetics by focusing on data and not on ethics? The courts have tended to remain on the sidelines or divided about the significance of modern genetic testing, in the face of legislation and increasing use of genetic evidence. Far from embracing “genetic essentialism,” courts sometimes remain wary of relying too heavily on genetic evidence across most of the diverse contexts discussed. In family law, as in *Michael H.*, perhaps this is a good thing, since overreliance on genetic identity may unsettle healthy and established family relationships. In contrast, finality of a legal arrangement is not a good thing if it is an erroneous conviction, causing an innocent person to remain in prison and the guilty to go free. We have criticized *Osborne v. District Attorney’s Association*, in which the Court refused to recognize a due process right to post-conviction DNA testing, out of concern with interfering with state experimentation, despite the fact that nearly all states already provided DNA testing post-conviction—the Court was unwilling, in effect, to ratify a national consensus that DNA testing should be used to free innocent convicts.

We have described how there is no uniform policy on regulation of genetic testing any more than there is a uniform policy towards collection of other forms of personal information or use of other types of evidence across quite different types of litigation. In each area, whether genetic evidence makes a decision more “accurate” depends on what use we have for that data. One should not uncritically accept that a DNA test is either relevant or irrelevant, but should instead ask what purposes are served by attaching legal consequences to genetic identity. First, we suggest that one must ask whether that purpose is predictive or for purposes of identity. Second, one should examine whether the statute, rule, policy, or judicial ruling uses a data-driven and ethics-based approach.

Only by unpacking the precise interests at stake can one then assess whether there is a concern with the adequacy of the state’s justification for regulating and collecting genetic evidence and whether the affected persons are legitimately burdened in their genetic privacy. In areas chiefly focusing on data collection, whether intentionally as in criminal law or incidentally as in family law, ethical concerns have been sidelined. A high-profile example comes from the Supreme Court’s ruling in *Maryland v. King*. As Justice Scalia put it in his dissent, the majority in that case “disguises the vast (and scary) scope of its holding,” rather than admit the implications of the broad police power to collect DNA the Court recognized in *King*.²⁷¹ The Court emphasized, in response, that the genetic information was relevant only to “identity” and not to predicting future conditions. However, similar reasoning can be found in a host of lower court decisions approving DNA collection from arrestees, convicts, juveniles, and others.

271 *Maryland v. King*, 133 S. Ct. 1958, 1989 (2013) (Scalia, J., dissenting).

DNA has reshaped some aspects of the law, but its use should be more closely tied to well thought out genetic policy, and not so heavily influenced by the more data-driven (and quintessentially federal) interests, such as that in tracking and screening individuals. Although genetics have not supplanted traditional legal analysis, they have occupied some fields but have been neglected in others. Genetic evidence can provide an appearance of scientific neutrality, in the mere collection of identifying information that can disguise difficult ethical and policy choices.

Still more troubling are the potential predictive uses of the architecture already in place as genetic technology continues to advance. As predictive uses of genetic information become more powerful, the regulatory discussion will likely change from data-driven uses of genetics to a broader ethics-based discussion that has been lacking in areas like criminal and family law. Sooner or later we will have technology for near-instant DNA analysis. A universal DNA database or a government-required use of DNA as a method of personal identification are no longer farfetched. Collection of genetic information for criminal purposes, family and welfare law purposes, or medical and employment purposes would then be very difficult to separate, if the information were to be housed in the same databases.

The disparate paths that genetic testing has taken in each legal context then start to look preferable to that uniform alternative. There may be pressures to interconnect genetic information through databases, yet in the future we may be able to generate far more information from DNA tests about a person, their appearance, their medical history and predispositions, their family, and more. Interconnected databases may be far more susceptible to hacking. The Supreme Court in *King* merely noted “additional privacy concerns” should a “predisposition for a particular disease or other hereditary factors not relevant to identity,” be possible through DNA analysis by police.²⁷² Family searching of DNA to solve crimes may become more common, but if databases became interconnected, there would be the potential to locate parents to pay child support or to predict medical conditions or even violent predispositions. Routine DNA testing to screen for diseases and other medical conditions may become inexpensive and commonplace, while at present, genetic testing and counseling is not generally routine and it can be expensive. Each of those additional ethical and privacy concerns will be raised in the near future. And when that comes to pass, the government’s role in regulating DNA collection and use should not be accepted uncritically, whether it is incidental or intentional.

Genetic research and technology have reshaped our legal system in unforeseen ways and will continue to do so. Genetic information is not just a subject of law and regulation, but it can in turn shape regulation and the law. Genetics regulation has been a driving force as DNA testing has become a fact of everyday life, and as a result, across very different areas of the law we see new data-driven policy at the expense of constitutional rights and ethical

272 *Id.* at 1979.

concerns. The types of interest-based scrutiny that we develop, by setting out the competing individual and government interests at stake in genetic regulation, should form the basis for more rigorous analysis. Indeed, not only could they provide for deeper analysis under existing constitutional rights, such as the Fourth Amendment or due process, but they could form the basis for a freestanding right to genetic privacy, of the type recognized in other related areas, such as fundamental rights regarding family decisions and reproduction and due process rights concerning privacy and bodily integrity.²⁷³

The thrust of this Article has been to unpack how seemingly disparate areas of law raise analogous questions regarding the legitimacy and degree of state interests in genetic evidence and the degree of imposition on individual genetic privacy. These are not separate problems to be relegated to their traditional doctrinal “pigeonholes” but a unified problem of poorly conceived and differentially reviewed regulation of genetic identity, raising the concern, as John Hart Ely put it, that there are not adequate safeguards to “ensure that decisions are being made democratically” and to “reduce the likelihood that a different set of rules is effectively being applied to the comparatively powerless.”²⁷⁴

A story of unequal treatment emerges when comparing genetic regulation across legal fields. Groups such as arrestees, convicts, juveniles, noncitizens, and welfare recipients, who already receive less privacy protection, have received the most intrusive regulation and collection of their genetic evidence, while comparatively privileged persons obtain enhanced genetic privacy. Whatever the mode of legal analysis, constitutional or statutory, regulatory or judicial, courts, commentators, and the public must be far more vigilant in scrutinizing the “genetic panopticon”²⁷⁵ that will only grow in size and in its uses in the years to come.

273 Developing such a constitutional theory raises questions beyond the scope of this Article, but any such analysis would depend on the categories and interests identified here.

274 ELY, *supra* note 6, at 177.

275 *King*, 133 S. Ct. at 1989.

