NOTES

AM I MY BROTHER'S KEEPER?: FAMILIAL DNA SEARCHES IN THE TWENTY-FIRST CENTURY

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Introduction

Over twenty-five years ago, British researcher Alec Jeffreys discovered DNA fingerprinting,[1] a technique used to identify the unique genetic material of an individual by analyzing sequences of deoxyribonucleic acid (DNA).[2] Today, DNA fingerprinting has expanded from a fledgling tool of law enforcement to a ubiquitous, valuable asset in criminal investigations and prosecutions. Correspondingly, criminal DNA databases have grown in size and function, ushering in a new advent of DNA searches. For example, "familial DNA searches" compare crime scene DNA evidence to offender profiles already in a DNA database, searching for a partial DNA match in the hopes that the perpetrator is a relative of an offender whose profile is already present in the database.[3] In July of 2010, California's use of familial DNA searches came to the forefront of the public eye with the arrest of Lonnie D. Franklin Jr., the alleged "Grim Sleeper" serial killer who may have been responsible for at least ten murders in the South Los Angeles area over a period of twenty-five years.[4]

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1 Jill Lawless, *DNA Fingerprints Debated at 25*, Chi. Trib., Sept. 11, 2009, at 41.

2 *See id.*

3 *See* Jennifer Steinhauer, *'Grim Sleeper' Arrest Fans Debate on DNA Use*, N.Y. Times, July 8, 2010, at A14, *available at* http://www.nytimes.com/2010/07/09/us/09sleeper.html.

4 *See id.*

Often called "familial" DNA searches, partial match DNA searches have been used in criminal investigations and in missing person identifications. Although the United Kingdom pioneered the use of familial DNA searches in criminal investigations, recent efforts in California and Colorado indicate a growing interest in the use of familial DNA searches in America.[5] However, familial DNA searches implicate concerns over false positive results and placing family members of offenders, whose DNA profiles remain in a DNA database, under lifelong genetic surveillance. Also, because minorities constitute a disproportionate percentage of offenders in DNA database systems, familial searches may have a disproportionate effect on minority communities. Such concerns are of even greater importance because recent state and federal laws are beginning to allow DNA collection from arrestees, rapidly expanding the pool of available DNA profiles. With these changes occurring, society and national and state governments must address the growing role of DNA profiling in the American criminal justice system.

Part I addresses the recent interest in familial DNA searches, while Part II analyzes the combined effects of allowing familial DNA searches in criminal investigations when DNA databases are expanded by requiring DNA samples from arrestees, in particular looking to California as a prototype. Part III asks whether these changes in the size and function of criminal DNA databases are a "database creep"[6] or the inevitable result of DNA profiling. This Note concludes that there are weak legal objections to expansions in the size and function of DNA databases while there are strong policy objections. Also, California is a likely prototype for other states interested in performing familial DNA searches and collecting DNA samples from arrestees. In addition, a universal DNA database is beginning to be recognized as a serious possibility and potential solution to disparities in nonuniversal, expanded DNA databases. This Note concludes that there should be greater discussion of the advantages and disadvantages to DNA profiling and expansion in the size and function of DNA databases.

I. The Emergence of Familial DNA Searches

A. *The Use of DNA Profiling*

DNA profiling has been a useful tool for law enforcement, and law enforcement agencies are eager to see expansion in DNA database

5 *See id.*

6 *See* Jeffrey Rosen, *Genetic Surveillance for All*, SLATE (Mar. 17, 2009), http://www.slate.com/id/2213958.

use and size.[7] DNA profiling can augment criminal investigations in many ways. A majority of crimes are committed by repeat offenders,[8] an important reason why DNA profiling is an effective tool.[9] DNA databases would likely provide more hits if criminals' "DNA profiles [could] be entered into the system early in their career, [so that] they can be identified when future crimes are committed."[10]

Because DNA matching "may succeed when other forms of forensic or witness evidence has proved insufficient or unreliable in helping bring offenders to justice for crimes committed some years earlier,"[11] it is increasingly used to generate suspect leads rather than support incriminating evidence against a previously identified suspect. However, DNA profiling remains useful as support for other incriminating evidence against a previously identified suspect, and DNA profiling can provide an "increased likelihood of generating reliable and persuasive evidence for use in court" as well as "a reduction in the cost of many investigations."[12] And of course, DNA profiling is an important postconviction tool to secure exoneration for innocent individuals.[13]

Other advantages of DNA profiling are "the likely deterrent effect of DNA databasing on potential criminal offenders[ ] and a possible increase in public confidence in policing and in the wider judicial process."[14] And DNA profiling has its uses outside the criminal justice system—in combination with family reference samples, it can be used in missing persons investigations, paternity testing, and mass disaster victim identifications.[15]

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7 *See* Solomon Moore, *F.B.I. and States Vastly Expand DNA Databases*, N.Y. TIMES, Apr. 18, 2009, at 1, *available at* http://www.nytimes.com/2009/04/19/us/19DNA.html ("Cops and prosecutors like it because it gives everybody more information and creates a new suspect pool." (quoting Harry Levine, Professor of Sociology at City Univ. of N.Y.)).

8 JOHN M. BUTLER, FORENSIC DNA TYPING 435 (2d ed. 2005). More than sixty percent of individuals jailed for violent offenses were rearrested for a similar offense in less than three years after their release. *Id.*; *see also* Moore, *supra* note 7 ("About 8 percent of the people commit about 70 percent of your crimes, so if you can get the majority of that community, you don't have to do more than that." (quoting Mitch Morrissey, Denver Dist. Att'y)). R

9 BUTLER, *supra* note 8, at 435. R

10 *Id.* at 447.

11 *Id.*

12 *Id.*

13 *See Postconviction Testing*, DNA INITIATIVE, http://www.dna.gov/postconviction (last visited Dec. 30, 2010).

14 Robin Williams & Paul Johnson, *Inclusiveness, Effectiveness and Intrusiveness: Issues in the Developing Uses of DNA Profiling in Support of Criminal Investigations*, 33 J.L. MED. & ETHICS 545, 546 (2005).

15 BUTLER, *supra* note 8, at 38. R

DNA profiling analyzes the genetic sequence of individuals. DNA is found in each cell of the human body[16] and provides a "genetic blueprint" for each person,[17] storing information in a sequence of four possible molecules called bases: adenine (A), thymine (T), cytosine (C), and guanine (G).[18] DNA is composed of two strands of paired bases (A paired to T, and G paired to C) in varying combinations.[19] There are approximately three billion base pairs in the human genome; consequently these four possible bases yield trillions of combinations.[20]

In human cells, DNA is packaged into forty-six different chromosomes.[21] A person receives half of his or her DNA from his or her mother and half from his or her father, so one chromosome in each chromosomal pair is derived from each parent.[22] Additionally, DNA has "coding" regions—known as genes, which provide molecular instructions for making proteins—and "non-coding" regions, otherwise known as "junk DNA" because these regions do not appear directly related to protein production.[23] A "locus" refers to a gene's (or DNA marker's) location on a chromosome.[24] Only about 0.3% of human DNA differs between individuals,[25] but DNA profiling examines multiple markers at certain loci to compare genetic variations and identify individuals.[26] A DNA profile is the combination of

16 DNA is found in each nucleated cell of the human body. *Id.* at 33.

17 *Id.* at 17. Most DNA is found in the nucleus of a cell, but some extranuclear DNA exists in human mitochondria, which are cellular organelles that create energy for the cell. A genome consists of the entire DNA in a cell. *Id.*

18 *Id.* at 18–19.

19 *Id.* at 19.

20 *Id.* at 18–19.

21 *Id.* at 20. Twenty-two matched pairs of autosomal (non-sex) chromosomes and two sex chromosomes. *Id.* The sex chromosomes are two X chromosomes for females, and one X and one Y chromosome for males. *Id.* at 20–21. Most DNA testing is performed using markers on the autosomal chromosomes, although Y-chromosome testing obviously uses a sex chromosome. *Id.* at 21.

22 *Id.* at 17, 21.

23 *Id.* at 22. Gene coding regions provide molecular instructions for making proteins, the basic machinery of cells, but comprise only about five percent of the human genome. *Id.*

24 *Id.* at 22–23.

25 *Id.* at 26.

26 *Id.* at 26–27. A useful analogy is suggested by John M. Butler:

> DNA searches can be narrowed down by comparing multiple data points in a manner analogous to how the U.S. Postal Service delivers mail. The entire United States has over 290 million individuals but by including the zip code, state, city, street, street number, and name on an envelope, a letter can be delivered to a single, unique individual. Likewise, the use of more and more

genetic variations obtained from multiple loci.[27] DNA profiling can be completed using small amounts of DNA found in biological material such as blood stains, saliva, bone, hair, or semen.[28] Only a small amount of DNA sample is needed because the DNA can be amplified into enough copies for testing in a laboratory. The majority of DNA profiling uses a process called Polymerase Chain Reaction (PCR), which yields many copies of a particular DNA sequence.[29]

When there is enough DNA, it is examined for variations in repeated DNA sequences. The human genome is full of repeated DNA sequences.[30] DNA regions with repeated units two to six base pairs in length are called microsatellites or short tandem repeats (STRs) and are popular DNA repeat markers because: (1) they are easily copied through PCR, and (2) the number of repeats in STR markers can be highly variable among individuals.[31] STR loci used as markers have been standardized in order to be effective across a wide number of jurisdictions.[32] For example, the U.S. national DNA database, CODIS, uses thirteen core STR loci,[33] for a total of twenty-six markers to compare the genetic variations between individuals.[34]

In addition, although most DNA profiling examines DNA markers on non-sex chromosomes,[35] other types of DNA testing are available. Constituting a minority of DNA testing, Y-chromosome and mitochondrial DNA markers can be used to trace paternal and mater-

> information from DNA markers can be used to narrow a search down to a single individual. If marker 1, marker 2, marker 3, and so on match on a DNA profile between crime scene evidence and a suspect, one can become more confident that the two DNA types are from the same source. The likelihood increases with each marker match.

Id. at 27.

27 *See id.* at 23 (describing DNA profiling as "the process of determining the genotype present at specific locations along the DNA molecule").

28 *See id.* at 29; *see also id.* at 33 ("The most common materials tested in forensic laboratories are blood and semen or bloodstains and semen stains.").

29 *Id.* at 63–64 (explaining that PCR is an enzymatic process involving cycles of heating to denature the two DNA strands in order to copy each strand, then cooling to reanneal the strands, and then repeating the process); *see also id.* at 63 ("Without the ability to make copies of DNA samples, many forensic samples would be impossible to analyze . . . [because] DNA from crime scenes is often limited in both quantity and quality . . . .").

30 *Id.* at 85.

31 *Id.*

32 *Id.* at 93.

33 *Id.* at 94.

34 CODIS uses thirteen loci in chromosome pairs, so a total of twenty-six markers using thirteen loci.

35 BUTLER, *supra* note 8, at 21. R

nal lineage, respectively,[36] and may be important to the future of familial searches.[37] For example, courts in Maryland and Michigan have permitted the use of mtDNA evidence in a murder conviction.[38]

36 *Id.* at 201.

37 Y-chromosome testing is unique because the Y-chromosome is found only in males. *Id.* For that reason, Y-chromosome testing can be useful because a vast majority of crimes involve male perpetrators, and such testing can be particularly helpful for sexual assaults, especially where traditional testing is limited by the available evidence or unable to decipher the number of individuals involved in a gang rape. *Id.* at 202–03. For example, it is difficult to obtain results through traditional autosomal tests when there are high levels of female DNA in the presence of male DNA, which could occur in sexual assault evidence from azospermic or vasectomized males. *Id.* at 202. For gang rape situations, Y-chromosome testing may make it easier to identify individuals than traditional autosomal STR matching, because the crime scene samples would be mixtures of many individuals. *Id.* at 202–03. However, a limitation of Y-chromosome testing is that, barring random mutations, a majority of the Y-chromosome is transferred directly from father to son; therefore, a match between a suspect and crime scene evidence could mean that it was from an individual or his brother, father, son, uncle, or paternal cousin. *Id.* at 203. So "a match with Y-[chromosome]STRs does not carry the power of discrimination and weight into court as an autosomal STR match." *Id.* at 213–14. For these reasons, Y-chromosome testing may prove most useful in genealogical family history research. *Id.* at 223. Y-chromosome testing of direct male descendants of Thomas Jefferson's relatives and direct male descendants of Thomas Jefferson's slave Sally Hemings revealed a complete match at all Y-STR loci tested, indicating the likelihood that Thomas Jefferson, or at least one of his male relatives, fathered Sally Hemings's children. *Id.*

Additionally, mitochondrial DNA (mtDNA) testing traces maternal lineage. Most human DNA is located in each cell's nucleus, but there is some DNA in a cell's mitochondria, a cellular organelle producing energy for the cell. *Id.* at 241–42. MtDNA is inherited only from an individual's mother. *Id.* at 247–48. During conception, the sperm nucleus adds to the egg's nucleus but does not add to any other part of the egg cell. MtDNA is from the egg cell's mitochondria. *Id.* Similar to, yet different from, Y-chromosomes, a mother's mtDNA sequence passes directly to her children (barring random mutation), so maternal relatives have an identical mtDNA sequence. Also, mtDNA is present in higher copy numbers than nuclear DNA and consequently is more likely to survive degradation. *Id.* at 241. MtDNA is useful for older or badly degraded remains, or tissues such as bone, teeth, and hair, from which only a small amount of DNA can be extracted. *Id.* Although not as useful for criminal investigations, mtDNA is particularly useful for missing persons or mass disaster investigations, as well as in genealogical and evolutionary biology research. *Id.* at 249. MtDNA testing was used to identify Vietnam War remains from the Tomb of the Unknown Soldier as those of Michael Blassie by observing a complete match between his skeletal remains and a sample from his mother. *Id.* at 250–51.

38 *See, e.g.*, Wagner v. State, 864 A.2d 1037, 1044–49 (Md. Ct. Spec. App. 2005); People v. Holtzer, 660 N.W.2d 405, 410–12 (Mich. Ct. App. 2003).

The size and function of criminal DNA databases have dramatically expanded in the past several years.[39] The three largest DNA databases in the world are maintained by, in descending order, the United States,[40] the United Kingdom,[41] and California.[42] Each of these databases has been expanded to include DNA samples from arrestees.[43]

The United States national DNA database is known as the National DNA Index System (NDIS) and is comprised of a system of DNA profiles submitted by national,[44] state,[45] and local[46] law enforcement agencies,[47] totaling fifty-two State DNA Index Systems (SDIS)

39 Tania Simoncelli & Barry Steinhardt, *California's Proposition 69: A Dangerous Precedent for Criminal DNA Databases*, 33 J.L. MED. & ETHICS 279, 282 (2005).

40 The United States National DNA Index (NDIS) contains over 9.2 million offender profiles, as of December 2010. *CODIS-NDIS Statistics*, FED. BUREAU OF INVESTIGATION, http://www.fbi.gov/about-us/lab/codis/ndis-statistics (last visited Dec. 30, 2010).

41 The United Kingdom National DNA Database contains over 6.3 million subject profiles, for an estimated 5.4 million individuals, as of July 2010. *Statistics*, NAT'L POLICING IMPROVEMENT AGENCY, http://www.npia.police.uk/en/13338.htm (last visited Dec. 30, 2010).

42 The Total Data Bank (Offender) Profiles in the California CODIS total over 1.6 million, as of October 31, 2010. Office of the Att'y Gen., Jan Bashinski DNA Laboratory Monthly Statistics (Nov. 2010), http://ag.ca.gov/bfs/pdf/Monthly.pdf; *see* News Release, Office of the Att'y Gen., Cal. Dep't of Justice, Brown Announces Major DNA Lab Expansion (May 5, 2008) [hereinafter Brown Announces], *available at* http://ag.ca.gov/newsalerts/print_release.php?id=1553.

43 *See* Rosen, *supra* note 6 (United Kingdom); *infra* notes 73–83 and accompanying text (United States); *infra* note 204 and accompanying text (California). R R

44 *See Levels of the Database*, DNA INITIATIVE, U.S. DEP'T OF JUSTICE, http://dna.gov/dna-databases/levels (last visited Dec. 30, 2010) [hereinafter *Levels of the Database*] ("Profiles from the states (including the FBI) are uploaded into the National DNA Index System (NDIS). In accordance with Federal law [the Federal Justice for All Act 2004], specific rules govern whether a profile can or cannot be uploaded to NDIS . . . . Some categories of samples, as well as DNA profiles that do not meet minimum number of DNA loci, are not eligible for entry into NDIS.").

45 *See id.* ("The state database, or State DNA index system (SDIS), contains forensic profiles from local laboratories in that state, plus forensic profiles analyzed by the state laboratory . . . . [as well as] DNA profiles of convicted offenders. States may have their own regulations regarding which profile types can be maintained at SDIS . . . . The FBI is responsible for analysis of convicted offender samples in the federal prison system and for entry of those profiles. The FBI also enters DNA profiles from its forensic cases into CODIS. In this sense, it is functioning as an SDIS laboratory.").

46 *See id.* ("A local laboratory (e.g., Palm Beach Sheriff's Office Crime Laboratory) can maintain its own local database of forensic profiles—local DNA index system (LDIS)—and upload approved profiles to SDIS.").

47 *Id.*

and 126 Local DNA Index Systems (LDIS).[48] The NDIS system contains offender DNA profiles, forensic (crime scene) DNA profiles, and missing person DNA profiles.[49] The DNA profiles in the NDIS are searched weekly for matches, and results are returned to the laboratory that originally submitted the matched DNA profile.[50]

There are some restrictions on both the types of profiles submitted and the use of DNA profile information. States must agree to adhere to FBI-issued quality assurance standards in order to include profiles in the NDIS.[51] Federal requirements are imposed on states through participation in the NDIS[52] or through their receipt of federal DNA grant funding.[53] NDIS access can be cancelled if these requirements are not met.[54] To be included in the NDIS offender index, a complete DNA profile of the thirteen STR core loci is required, while at least ten of the thirteen STR core loci are required to upload a forensic profile.[55]

The Combined DNA Index System (CODIS) is the automated DNA information processing and telecommunication system that supports NDIS.[56] CODIS was "developed specifically to enable public forensic DNA laboratories to create searchable DNA databases of authorized DNA profiles."[57] CODIS is comprised of LDISs, SDISs, and the NDIS,[58] and thus permits laboratories to share and compare DNA data nationwide, providing the NDIS as a central database of the DNA profiles from all user laboratories.[59] Corresponding to the local,

48 Thomas F. Callaghan, Chief, CODIS Unit, FBI Lab., Presentation at the Iberoamericana Police Laboratory Directors Symposium VI: Overview of CODIS & National DNA Index System 6 (May 10, 2007) (powerpoint available at http://www.minterior.gub.uy/webs/dnpt/CONFERENCIAS/codis.pdf).

49 The missing persons profiles are from unidentified human remains, from DNA of the missing person, or from relatives of the missing person. *Id.* at 21.

50 *Combined DNA Index System (CODIS)*, DNA INITIATIVE, http://dna.gov/dna-databases/codis (last visited Dec. 30, 2010) [hereinafter *Combined DNA Index System*].

51 BUTLER, *supra* note 8, at 441. R

52 *See* 42 U.S.C. § 14132 (2006).

53 Callaghan, *supra* note 48, at 31. R

54 *Id.* at 30.

55 BUTLER, *supra* note 8, at 441. The lower number of loci required for crime scene profiles is because crime scene DNA may be degraded and thus might not provide results at every marker. *Id.* R

56 *Levels of the Database*, *supra* note 44. R

57 *Combined DNA Index System*, *supra* note 50. R

58 BUTLER, *supra* note 8, at 440. R

59 *Combined DNA Index System*, *supra* note 50. R

state,[60] and national DNA systems that create it, CODIS uses an "offender index" of DNA profiles submitted for individuals involved in criminal activity[61] and a "forensic index" containing DNA profiles from crime scene evidence.[62] The system then searches for matches between these two indexes.[63] A "forensic hit" is a match between profiles in the forensic index, linking crime scenes to each other and possibly identifying serial offenders.[64] An "offender hit" is a match between an offender profile and a forensic profile which may provide investigators with the suspect's identity.[65]

If the CODIS system identifies a match between the thirteen STR loci markers,[66] the match must be confirmed,[67] after which laboratories may exchange information such as case details and the names of criminal investigators.[68] CODIS only stores a unique identifier and the DNA profiles for a sample; CODIS does not store any personal data, criminal history, or case-related information.[69] The CODIS database "enables Federal, State, and local crime laboratories to exchange and compare DNA profiles electronically, thereby linking serial violent crimes to each other and to known offenders."[70] Participating domestic CODIS laboratories include all fifty states, the FBI,

60 Convicted offender profiles account for most entries in a state's DNA database. *Types of Profiles in the Database*, DNA Initiative, http://dna.gov/dna-databases/types (last visited Dec. 30, 2010) [hereinafter *Types of Profiles*].

61 Previously this was those convicted of crimes, but with the collection of DNA samples from arrestees that may no longer be the case.

62 *See Combined DNA Index System*, *supra* note 50. CODIS is also used in missing R
persons investigations. *See Types of Profiles*, *supra* note 60 ("Some states also enter R
unidentified human remains, missing person, and/or relative of missing person profiles into CODIS. Often, these missing persons-related profiles include results from mtDNA analysis as well as STR profiles.").

63 *Combined DNA Index System*, *supra* note 50. R

64 *Id.*

65 *Id.* ("It is important to note that if an 'offender hit' is obtained, that information typically is used as probable cause to obtain a new DNA sample from that suspect so the match can be confirmed by the crime laboratory before an arrest is made.").

66 The markers are thirteen genetic locations, with two results per location. Callaghan, *supra* note 48, at 13; *see also* Butler, *supra* note 8, at 94–95 ("When all 13 R
CODIS CORE loci are tested, the average random match probability is rarer than one in a trillion among unrelated individuals.").

67 There is a five-step process for match confirmation: (1) confirmation of fingerprint ID, (2) confirmation of qualifying conviction (no fault clauses), (3) sample reanalysis, (4) peer technical review, and (5) issuance of official report. Callaghan, *supra* note 48, at 22. R

68 Butler, *supra* note 8, at 439. R

69 *Id.*

70 Callaghan, *supra* note 48, at 4. R

the U.S. Army Crime Laboratory, and Puerto Rico.[71] As of March 2007, the FBI reports that the CODIS system has aided over 47,000 investigations.[72]

Originally, NDIS was created to retain DNA profiles for offenders of violent crimes.[73] However, the DNA Analysis Backlog Elimination Act of 2000[74] authorized forcible collection of DNA profiles from qualifying federal offenders.[75] Then the Justice for All Act of 2004[76] added to the DNA Backlog Elimination Act by allowing CODIS to include almost any DNA information a state chose to collect, with the exception of uncharged arrestees and voluntary samples provided for elimination purposes.[77] Some people were concerned that this was an instance of CODIS "creep," with the DNA database being used for something other than its original purpose—to store DNA profiles only for offenders of violent crimes.[78]

Finally, the DNA Fingerprint Act of 2005[79] authorized the collection of DNA samples from all arrestees under the legal authority of the United States and authorized expungement procedures for certain unconvicted individuals.[80] In this expansion, the FBI joined fifteen states in collecting DNA profiles from uncharged arrestees and

71 *Id.* at 6.

72 *Id.* at 7.

73 *See* Ellen Nakashima, *From DNA of Family, a Tool to Make Arrests*, WASH. POST, Apr. 21, 2008, at A1, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2008/04/20/AR2008042002388.html.

74 Pub. L. No. 106-546, 114 Stat. 2728, *amended by* DNA Fingerprint Act of 2005, Pub. L. No. 109-162, tit. X, 119 Stat. 3084 (2006) (codified as amended in scattered sections of 42 U.S.C.), *held unconstitutional in part by* United States v. Mitchell, 681 F. Supp. 2d 597 (W.D. Pa. 2009). *Mitchell* held that the "universal requirement that a charged defendant submit a DNA sample for analysis and inclusion in a law enforcement databank" is a violation of the Fourth Amendment. *Mitchell*, 681 F. Supp. 2d at 610.

75 § 3, 114 Stat. at 2728–30 (codified as amended at 42 U.S.C. § 14135a (2006)). Qualifying offenses include any felony and certain types of violent crimes. *Id.*

76 Pub. L. No. 108-405, 118 Stat. 2260 (codified as amended in scattered sections of 18 and 42 U.S.C.).

77 *Id.* § 203, 118 Stat. at 2269–71.

78 The database expansion was part of an amendment to the Violence Against Women Act of 2000, Pub. L. No. 106-386, 114 Stat. 1491 (codified as amended in scattered sections of 2 U.S.C.), and was intended to aid the investigation of serial rapists and murderers. Ellen Nakashima & Spencer Hsu, *U.S. to Expand Collection of Crime Suspects' DNA*, WASH. POST, Apr. 17, 2008, at A1, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2008/04/16/AR2008041602729.html.

79 Pub. L. No. 109-162, tit. X, 119 Stat. 3084 (2006).

80 *Id.* § 1004, 119 Stat. at 3085.

detained immigrants.[81] However, when this database expansion took place, the FBI required state databases to allow arrestees to purge their DNA profile if they were uncharged or unconvicted.[82] Recently, this expansion for taking samples from all felony arrestees withstood a federal constitutional challenge and has failed a constitutional challenge.[83]

Since these changes, the size of the NDIS database has increased dramatically. From 2000 to 2006, the total offender profiles in NDIS increased by a factor of ten, from over 400,000 to approximately four million profiles.[84] During the same time, forensic profiles increased by a factor of eight, from around 22,000 to 160,000.[85] It is undisputable that the size of the American national DNA database has significantly expanded in the relatively short time it has existed.

With the third largest DNA database in the world, California has authorized DNA collection from arrestees, as will be discussed in Part III. Also, other states have authorized collection of DNA samples from certain arrestees: Virginia has authorized collection of DNA samples from arrestees for violent felonies,[86] Texas has authorized DNA collection from people indicted for certain felonies and arrestees previously convicted of certain offenses,[87] and Louisiana has authorized DNA testing for persons arrested for any felony.[88] State courts have had mixed responses to state laws authorizing DNA collection from arrestees.[89]

One concern over expanded use of DNA databases is "the potential for the future misuse of such samples held in state and privately

81 Moore, *supra* note 7. In 2006, states were allowed to upload profiles from uncharged arrestees. *See* Nakashima, *supra* note 73. R R

82 Rosen, *supra* note 6. Thirty-eight states have laws with specific procedures to purge DNA profiles. *Id.* R

83 *See* United States v. Pool, 645 F. Supp. 2d 903 (E.D. Cal. 2009); News Release, U.S. Dep't of Justice, Federal Court in Sacramento Upholds Constitutionality of Mandatory DNA Collection of All Individuals Arrested on Federal Felony Charges (May 27, 2009), *available at* http://www.justice.gov/usao/cae/press_releases/docs/2009/05-28-09MandatoryDNA.pdf. *But see* United States v. Mitchell, 681 F. Supp. 2d 597 (W.D. Pa. 2009).

84 Callaghan, *supra* note 48, at 27. R

85 *Id.* at 28.

86 *See* Va. Code Ann. § 19.2-310.2:1 (West Supp. 2010); Simoncelli & Steinhardt, *supra* note 39, at 282. R

87 *See* TEX. GOV'T CODE ANN. § 411.1471 (West Supp. 2009); Simoncelli & Steinhardt, *supra* note 39, at 282. R

88 *See* LA. REV. STAT. ANN. § 15:609 (West Supp. 2010); Simoncelli & Steinhardt, *supra* note 39, at 282. R

89 *See* Rosen, *supra* note 6. R

owned laboratories."[90] It has been suggested that expanding DNA databases will not only increase public reliance on the infallibility of DNA matching, but will also amplify potential for errors by overburdening DNA testing laboratories.[91] Widespread errors can occur through sample handling errors (i.e., the mislabeling or contamination of DNA samples),[92] analysis errors (i.e., misinterpretation of DNA tests because of mixed samples, sample degradation, or scientific error),[93] and reporting errors (i.e., failure to report the entirety of DNA test results or reporting misleading statistics).[94] In order to avoid testing errors, laboratories generally have a staff elimination database of the genotypes of laboratory personnel in order to have a record of possible contaminating DNA profiles.[95]

In addition, DNA database expansion also increases costs associated with DNA profiling and increases backlogs in state laboratories. Because less than ten percent of felonies are federal felonies, CODIS depends on state participation and profile submission.[96] Thus, "[t]he rate-limiting factor" in use and expansion of the CODIS database "has been the speed of states in spending the money needed to analyze the DNA samples they receive from convicts."[97] Backlogs are a big problem for federal and state DNA databases.[98] In order to reduce the backlogs on public forensic laboratories, DNA testing is increasingly contracted out to private contractor laboratories.[99] Farming DNA testing out to private laboratories may not only cost more, but it may also increase the risk of errors and misuse of information if private laboratories are not up to the standards of state DNA laboratories.

B. Partial Match and Familial DNA Searches

Traditional DNA searches look for a perfect match in all loci markers between crime scene DNA profiles and "offender" profiles. In contrast, partial match or familial DNA searches look for a partial match at several, but not all, of the markers. A partial match between

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90 Williams & Johnson, *supra* note 14, at 546. **R**

91 *See* Simoncelli & Steinhardt, *supra* note 39, at 286. **R**

92 *Id.* at 286–87.

93 *Id.* at 287.

94 *Id.*

95 BUTLER, *supra* note 8, at 79. **R**

96 Henry T. Greely et al., *Family Ties: The Use of DNA Offender Databases to Catch Offenders' Kin*, 34 J.L. MED. & ETHICS 248, 251 (2006).

97 *Id.*

98 Butler, *supra* note 8, at 436. **R**

99 *Id.* at 442. However, as of early 2004, Virginia state laboratories conducted testing of all their own samples. *Id.*

an offender profile and the crime scene DNA may indicate that the crime scene DNA originated from a relative of the offender.[100] The probability of a partial match being a familial match "depends both on the nature of the postulated relationship and on the rarity of the genotype (set of alleles) involved."[101] This is because genetic relatives share varying degrees of DNA depending on relationship. First-degree genetic relatives (parents, siblings, children) share on average approximately half of their DNA variations,[102] second-degree relatives (uncles, aunts, nephews, nieces, grandparents, grandchildren, half-brothers, half-sisters) share one-quarter,[103] and third-degree relatives (including first cousins, great-grandparents, great-grandchildren) share one-eighth.[104]

There are two important ways that a familial match can be identified. First, a close genetic relative will share a higher number of the alleles used to identify DNA profiles in each database.[105] However, the likelihood of shared alleles representing a family connection will vary with ethnicity.[106] Secondly, a close genetic match, such as that between a parent and child, will show allele matches in a way characteristic of a genetic relationship.[107] For example, parent-child matches must match one allele at each marker.[108] The chance that two unrelated people would match at thirteen or more sites (half of the CODIS markers) is one in two thousand.[109] However, with the millions of profiles in the CODIS database, there would be too many nonfamilial matches with a partial search of only thirteen alleles.[110]

100 Greely et al., *supra* note 96, at 251. R

101 *Id.*

102 *Id.* at 251–52.

103 *Id.* at 252.

104 *Id.*

105 *Id.* ("While two unrelated people usually share only a few CODIS alleles, a genetic parent, say a father, and his child *must* match at no fewer than thirteen alleles, and are most likely to match at fourteen, fifteen, or sixteen alleles.").

106 *Id.* For example, in the Caucasian population, on average, a father and child will share 15.7 of the twenty-six CODIS alleles while two completely unrelated Caucasian individuals will share 8.7 alleles. *Id.* On average, two siblings will share 16.7 alleles out of the twenty-six. *Id.* at 253.

107 *Id.* at 252.

108 *Id.* This is because one of the child's two alleles at that marker came from the parent (barring an unusual mutation). *Id.* Similarly, a genetic relationship between two siblings would show a pattern in that most markers would have at least one allele in common and often two alleles in common. *Id.* at 253.

109 *Id.* at 252.

110 *Id.* However, the probable efficacy of a partial search at this level depends on the rarity of the genotype. *Id.*

Prosecutors in the United States have already looked to the United Kingdom's DNA profiling system as a potential model for American law enforcement.[111] In 2003, a U.K. familial DNA search led to a conviction for manslaughter of a man who, while drunk, threw a brick off a bridge and killed a truck driver. DNA from blood on the brick, which did not have an exact match for any profile in the U.K. DNA database, gave law enforcement their only lead, and a familial DNA search provided a successful apprehension of the perpetrator.[112]

Following the United Kingdom's start in familial searches, several states and the FBI have considered authorizing familial searches.[113] California has recently authorized familial and partial match searches of convicted offenders, as will be discussed in Part II. Several states permit partial match searches, while California, Colorado, and Nebraska appear to be the only states expressly permitting familial DNA searches,[114] with California and Colorado having codified policies.[115] However, other states, including Indiana, Iowa, Kentucky, and Maryland, expressly prohibit familial DNA searches.[116] Currently, the FBI has declined to adjust the CODIS software for partial match familial searches, although individual states may decide to do familial searches on their own.[117] The FBI is reluctant to allow for partial match familial searches in the national database without congressional or judicial approval.[118]

However, the FBI has occasionally conducted partial matches and allows states to perform partial match familial searches.[119] The FBI

111 *See* Moore, *supra* note 7 (explaining how Denver district attorney Mitch Morrissey advocated for more expansive DNA searching, looking to Britain as an example); Rosen, *supra* note 6 (explaining how Morrissey met with U.K. officials to learn about familial DNA searches). R R

112 Rosen, *supra* note 6 (explaining the conviction of Craig Harmon for manslaughter). R

113 *Id.* (stating that Denver district attorney Morrissey urged the FBI to allow for familial searches with the CODIS system).

114 Natalie Ram, *Interactive Map: State Policies for DNA Crime Databases Vary Widely*, SCI. PROGRESS (Nov. 2, 2009), http://www.scienceprogress.org/2009/11/map-state-dna-policies.

115 Steinhauer, *supra* note 3. R

116 Ram, *supra* note 114; *see also* Nakashima, *supra* note 73 (noting Maryland expressly forbade the use of familial searches when it passed a law expanding its DNA database to include violent offenders). R

117 Rosen, *supra* note 6. R

118 Thomas Callaghan, then-head of the FBI CODIS, stated that "[t]he FBI would be more comfortable with congressional authorization to conduct familial searches." Nakashima, *supra* note 73 (quoting Thomas Callaghan); *see* Rosen, *supra* note 6. R

119 Nakashima, *supra* note 73. R

has stated that it is only aware of seven partial match searches using CODIS.[120] One of these partial match searches led to the exoneration of a man who spent nineteen years in prison and assisted law enforcement to find the man who actually committed the rape and murder.[121] The American Civil Liberties Union (ACLU) claims that even these partial match searches are familial searches, as they are "using the database to try to get to family members."[122] However, the then-head of the FBI CODIS database stated that these partial match searches did not constitute routine familial searches, as the FBI was "not deliberately trolling the database looking for relatives."[123] Regardless, some advocates are less concerned about the federal database and more concerned about familial searches by local databases not facing the same regulations as federal and state databases.[124]

C. Benefits from Allowing Partial Match and Familial Searches

Partial match or familial DNA searches can augment traditional law enforcement investigations or provide leads in cases that seemingly have come to a dead end. For instance, a serial killer known as the "Grim Sleeper" began killing young black women, and one man, in the South Los Angeles area in 1985, leaving their bodies in alleyways and dumpsters.[125] After a thirteen-year hiatus, the killings began again in 2002.[126] In 2010, police arrested Lonnie D. Franklin Jr.[127] After a familial search run through the California DNA database led to a partial match hit, authorities then narrowed their focus to Franklin, a direct relative of the partial match, because of factors including age, race, and his residence's proximity to the crime scenes.[128] During surveillance of Franklin, police retrieved a plate and napkin Franklin had used while eating pizza, which provided DNA that matched DNA evidence from the Grim Sleeper crime scenes, leading to Franklin's arrest.[129]

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120 Rosen, *supra* note 6. **R**

121 *Id.*

122 Nakashima, *supra* note 73 (quoting Tania Simoncelli, science advisor to the ACLU). **R**

123 *Id.* (quoting Callaghan).

124 *Id.*

125 Steinhauer, *supra* note 3. **R**

126 *Id.*

127 *Id.*

128 *Id.*

129 *Id.*

In another high-profile case, in 2005, police were able to secure an arrest warrant for the "Bind-Torture-Kill" (BTK) serial killer, Dennis Rader, after matching DNA evidence from BTK crime scenes to his daughter's DNA, which had been obtained through a court order for her Pap smear specimen, stored from when she attended a Kansas State University medical clinic.[130] Relatives of the BTK victims strongly supported law enforcement's use of such a familial DNA search to tie Rader to the crimes, and his daughter had no problem with law enforcement's use of her Pap smear to match her father to the crimes.[131]

However, there have been instances when family members have objected to the use of their DNA samples.[132] Also, the United Kingdom has several examples[133] of familial searches leading to convictions for rape[134] and manslaughter.[135]

Although a promising tool, some have pointed out that "[u]sually, the partial match by itself will not be overwhelming evidence that the person who left the crime scene DNA *is* a relative of the person in the [federal] Offender Index who provided a partial match."[136] Rather, "[t]he partial match is only a lead—a relatively weak one for a common genotype though possibly a very strong one for a rare genotype."[137] "[T]he partial match would only need to function as a lead and not as evidence in court."[138] Then, "[i]f a suspect were identified as a result of the partial match, his DNA could then be taken and analyzed (voluntarily, through a search warrant, or

130 Nakashima, *supra* note 73. **R**

131 *Id.*

132 For example, in a case in Louisiana, law enforcement investigating a series of rapes reviewed a separate rape case and discovered that the victim's DNA closely matched DNA evidence from the perpetrator in the original series of rapes, leading to the conviction of the victim's brother for that series of rapes. *Id.* However, the victim stated that she felt "betrayed" and that law enforcement went "behind [her] back." *Id.*

133 From approximately 158 familial searches since 2003, U.K. law enforcement has been led to the perpetrators in at least eighteen cold cases. Maura Dolan & Jason Felch, *Tracing a Crime Suspect Through a Relative*, L.A. TIMES, Nov. 25, 2008, at A1, *available at* http://articles.latimes.com/2008/nov/25/local/me-familial25.

134 A woman arrested for DUI had her DNA run against cold cases, yielding a close match to evidence from the "shoe rapist" who had attacked at least six women and stolen their high heels. Nakashima, *supra* note 73. Police arrested her brother and found more than 100 heels hidden at his business. *Id.* **R**

135 *See supra* note 112 and accompanying text. **R**

136 Greely et al., *supra* note 96, at 253. **R**

137 *Id.*

138 *Id.*

after arrest) and compared to the crime scene DNA, leading to a conclusive match or non-match."[139]

It would be easy to create algorithms for identifying parent-child and sibling-sibling matches in a DNA database.[140] Parent-child matches are more distinctive in their pattern but would likely be more useful in the future when the children of offenders who have DNA profiles in databases become older and are more of an age to commit crimes.[141]

There is little to no cost to see how many partial matches exist for a crime scene sample, but there could be extensive costs in following up on leads generated by familial searches.[142] Because of the low cost of determining how many partial matches exist, it is possible that police who did not obtain a perfect match from the state or federal DNA database would increasingly request partial match searches.[143]

In addition to linking offenders to crimes and providing a tool for law enforcement to increase convictions, it is important to remember that DNA profiling can be the key to exonerating innocent individuals spending time in prison for crimes they did not commit. A partial match familial search has already been used to exonerate at least one individual in the United States.[144]

D. Concerns over Allowing Partial Match and Familial Searches

As a new technique, the efficacy of familial searches is uncertain. Some have suggested that familial searches are unlikely to lead to an incorrect arrest or conviction, because the crime scene DNA would either match or not match the suspect's DNA if he provides a voluntary sample.[145] Familial searches could also potentially consume police time and money if crime scene DNA triggers too many partial

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139 *Id.*

140 *Id.*

141 *Id.* ("Most of those convicted of felonies are relatively young."). Currently, the siblings of offenders on offender databases are likely to be nearer the age groups responsible for most criminal activity, rather than the children of offenders. *See id.*

142 *Id.* Following up on leads could include interviewing offenders as well as finding and interviewing their relatives who could be possible suspects. *Id.*

143 *Id.*

144 *See* Rosen, *supra* note 6. For example, Daryl Hunt, a North Carolina man, spent nearly twenty years in prison for a rape and murder he did not commit. He was only exonerated when the original crime scene DNA was run through the state's DNA database and partially matched the DNA of a convicted felon already in the database. *Id.* This felon had a brother who lived in a nearby county, and police obtained the brother's DNA, which matched the crime scene DNA perfectly. *Id.* **R**

145 *See* Greely et al., *supra* note 96, at 258. The suspected genetic relative may also have an alibi. *Id.* **R**

matches, which could lead to interviewing thousands of relatives.[146] Partial match searches may identify a large number of false positives and subject relatives of arrestees and offenders to unnecessary investigations.[147] But there are various suggestions to improve the efficiency of familial searches.[148]

While some argue that familial DNA searches are merely a technological extension of fingerprinting, others find this comparison "deceptive," arguing that stored genetic profiles "may also implicate family members."[149] Additionally, the use of partial match and familial searches greatly expands the pool of possible suspects. Privacy advocates worry that such searches turn family members into "genetic informants"[150] and that routine use of such searches would "subject[ ] hundreds of thousands of innocent people who happen to be relatives of individuals in the FBI database to lifelong genetic surveillance."[151]

Another main concern is that "partial matching methods are designed to yield information about individuals not in the applicable database—individuals for whom no probable cause has yet existed with respect to *any* crime."[152]

In addition, there have been various constitutional arguments suggested to oppose familial DNA searches. One argument is that familial searches are an unreasonable search of the offenders' relatives in violation of the relatives' rights under the Fourth Amendment.[153] However, a search of an offender's DNA for a partial match is not a seizure from or search of a relative.[154] It has also been suggested that partial match searches can generate a "causal loop" with the existence of a partial match creating the necessary suspicion to justify the original search.[155] Another constitutional argument against

146 *Id.*

147 Natalie Ram, *The Mismatch Between Probable Cause and Partial Matching*, 118 YALE L.J. POCKET PART 182 (2009), http://www.yalelawjournal.org/the-yale-law-journal-pocket-part/criminal-law-and-sentencing/the-mismatch-between-probable-cause-and-partial-matching.

148 Among these include: (1) collecting and storing information about the relatives of offenders in an offender database, (2) increasing the number of genetic markers analyzed for forensic DNA genotyping, and (3) scientific advances that would take into account both the identity of matching alleles and the identity of matching markers. *See* Greely et al., *supra* note 96, at 254. **R**

149 Ram, *supra* note 147. **R**

150 Nakashima, *supra* note 73. **R**

151 *See id.* (quoting Tania Simoncelli, science advisor to the ACLU).

152 Ram, *supra* note 147. **R**

153 Greely et al., *supra* note 96, at 257. **R**

154 *Id.*

155 Ram, *supra* note 146. **R**

familial DNA searches is that familial DNA searches violate constitutional rights associated with the family.[156] However, there are conflicting constitutional positions and legal arguments on partial match searches.[157]

Familial DNA searches also have important implications for families of those in DNA databases. These implications are difficult to enumerate, in part, because there is no clear guideline or discussion of what role family relationships should play in criminal investigations.[158] On the one hand, it could be assumed that family relationships may "be a relevant, and useable, fact for police or other investigations."[159] Knowledge of a family relationship could be useful because: (1) a family relationship may provide a motive for a crime; (2) relatives of organized crime groups or gangs may be more likely to be involved in similar crimes; (3) investigation of one family member may lead to evidence of crimes committed by another; and (4) visual family resemblance could assist police or a witness in identifying a suspect.[160]

Additionally, the cost to the relatives of an offender may provide an important policy argument against the widespread use of familial searches. Relatives of an offender whose DNA partially matches crime scene DNA may be the subject of a police investigation, which could include a police interview and request for a DNA sample.[161] While this could be considered an imposition on a genetic relative, the counterargument is that people are often interviewed by police for various reasons and that the successful use of familial searches may reduce the need to interview potential suspects and witnesses.[162]

Not only would immediate family members be involved, but the impact of a familial DNA search may have a "cascading effect" and affect a much larger family unit.[163] At the very least, a family may feel the "taint of criminality" resulting from their relation to the offender on the database.[164]

156 Greely et al., *supra* note 96, at 257. **R**

157 *See supra* note 83 and accompanying text; *see also* Greely et al., *supra* note 96, at 258 (concluding that there was "no general legal barrier to the use of family forensic DNA"). **R**

158 Greely et al., *supra* note 96, at 257. **R**

159 *Id.*

160 *Id.*

161 *Id.* at 258.

162 *Id.*

163 Erica Haimes, *Social and Ethical Issues in the Use of Familial Searching in Forensic Investigations: Insights from Family and Kinship Studies*, 34 J.L. MED. & ETHICS 263, 269 (2006).

164 *Id.* at 270.

It is also important to consider the impact of familial searches on the individual whose offender profile provided the partial match to the crime scene DNA. One question to be raised is the extent of the obligation this offender has to provide information (that is potentially damaging) about his relatives.[165] This offender could be labeled as a "genetic informant" in two different ways: first, through providing the original DNA offender profile to the database; and secondly, through providing information about his relatives and family relationships.[166] It has been suggested that this role as a genetic informant could cause feelings of culpability, in the individual and the family, for the entire consequences of the familial search.[167] Family members might also ostracize the offender if this is the first time they are made aware of his or her genetic presence on the database.[168] A family might assume that presence on the database meant a conviction,[169] when in California, for example, the individual may have been arrested but never convicted. Of course, it is possible that family members might regard the original offender's role as useful in exonerating them.[170]

Another important point is that "genetic relatedness does not necessarily entail family membership."[171] A familial search and ensuing investigation could reveal a previously unknown genetic connection[172] or reveal a lack of genetic connection between persons thought to have been related.[173] Familial searches may have a great sociological impact as well, because:

> To be told one is not genetically connected to someone with whom one had a close (assumed) relationship can be highly destabilising, not just of the direct relationship between the two people concerned but also of the other relationships (social and genetic) that are based on, and implicated with, that particular relationship.[174]

Furthermore, revealing new genetic relationships could reveal previously unknown medical information, such as the risk for inheriting a

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165 *Id.* at 269.

166 *See id.*

167 *Id.*

168 *Id.* at 270.

169 *Id.*

170 *See id.*

171 *Id.* at 264; *see id.* at 268 ("Therefore identifying the presence or absence of a genetic connection between individuals is not determinative of their ensuing relationship in either policy or personal terms.").

172 *Id.* at 269. For example, if a person thought to be a sister was revealed as a mother. *Id.*

173 *Id.* at 270 ("[T]he revelation of an absence of a [genetic] link might have a much greater impact than revelation of a new link.").

174 *Id.*

disease like Huntington's, which an individual may or may not want to know.[175]

Another potential problem with familial searches is that they may reinforce views about the alleged prevalence of criminality within families.[176] Also, familial searches could reinforce "stereotypes about the 'heritability' of criminality."[177]

Moreover, racial disparities are already prevalent in the American criminal justice system, so the addition of partial match familial searches might instigate "a growing self-consciousness within particular communities that will tend to be over-represented on forensic databases, by virtue of their age, gender, and ethnicity."[178] Although some argue that legal and policy arguments in general are weak against familial DNA searches, the racial disparity in the American criminal justice system raises some red flags.[179]

Although African Americans constitute approximately thirteen percent of the U.S. population, on average over forty percent of convicted felons in the United States each year are African American.[180] Assuming that African Americans constitute a corresponding forty percent of the CODIS Offender database and assuming that the average person in the offender database has five first-degree relatives, approximately seventeen percent of all African Americans might be identified as suspects through familial searching, compared to approximately four percent of Caucasians.[181] By another estimate, using familial searches for the national DNA database would effec-

175 *Id.*

176 *Id.* at 264.

177 *Id.* at 271.

178 *Id.*

179 *See* Greely et al., *supra* note 96, at 258–59. **R**

180 *Id.* at 258.

181 *Id.* at 259. These calculations were based on the CODIS Offender Index, which at the time contained approximately 2.75 million profiles. If African Americans made up forty percent of that, they would constitute 1.1 million offender profiles. *Id.* at 258. If each offender had five first degree relatives, 6.6 million African Americans could be identified through familial searching (5.5 million relatives and 1.1 million original offenders). *Id.* at 259. African Americans comprised approximately thirty-eight million people (about thirteen percent of the total U.S. population), so about seventeen percent of all African Americans in the United States could be identified through federal familial searching. *Id.* at 258. Comparatively, Caucasians (including non–African American Hispanics) make up about sixty percent of the offender database, at 1.65 million profiles. *Id.* at 259. If each had five first-degree relatives, 8.25 million relatives could be found from the 1.65 million profiles, for a total of 9.9 million possibilities. *Id.* If the Caucasian American population was about eighty-three percent, or 247 million people, 9.9 million would be four percent of that population. *Id.* at 258–59.

tively mean surveillance of approximately one-third of the African American population but only 7.5% of the Caucasian population.[182] For these reasons, African Americans may oppose familial DNA searching.[183] Additionally, Latinos were about thirteen percent of the national population and committed forty percent of federal offenses in 2008.[184] Latinos could also comprise a significant portion of the DNA database profile[185] and may object to familial searches for similar reasons.

Another consideration is that, if Y-chromosome testing is increasingly used,[186] males may be disproportionately represented in DNA databases and partial match searches. But since the majority of criminal perpetrators are male,[187] increased use of Y-chromosome testing might not have a great effect. It is also possible that in the future, mtDNA testing might be used to augment partial match searches. Overall, there are many strong policy reasons to object to regular use of familial DNA searches.

II. California: A Prototype for Familial DNA Searches

The recent success of California's familial search policy in identifying the alleged "Grim Sleeper" serial killer has brought discussion of familial DNA searches into the forefront of the public eye.[188] Some observers argue that California's success will encourage other states to promote familial DNA searches, while others argue that greater use of familial DNA searches has the potential to harass many innocent people in the pursuit of crime.[189] Due to California's recent acceptance of familial DNA searches, and its recent authorization of arrestee DNA

182 This estimate assumes that each person with a DNA database profile averages five first-degree relatives. Nakashima, *supra* note 73. R

183 Greely et al., *supra* note 96, at 259. However, African Americans are also disproportionately harmed by crime committed by other African Americans and some could react positively to the use of familial DNA searches in the investigation of these crimes. *Id.* Greeley and the other authors of this study found it unlikely that this "disparate impact" of familial searches alone would lead a court to hold that familial DNA searches violate the Equal Protection Clause, as the disparities are a consequence of vast disproportion in felony convictions between African Americans and Caucasians and not the result of some "unstated racially discriminatory purpose." *Id.* R

184 Moore, *supra* note 7. About half of these are immigration crimes. *Id.* R

185 *Id.*

186 Y-chromosome testing is part of California's protocol for partial match searches. *See infra* Part II.

187 Butler, *supra* note 8, at 202. R

188 *See* Steinhauer, *supra* note 3. R

189 *Id.*

collection, California can be looked to as a prototype for other states in pioneering DNA database expansion in both size and function.

A. California's Authorization of DNA Partial Match Searches

Having the third largest DNA database in the world, California was the first state to follow in the United Kingdom's footsteps when California Attorney General Edmund G. Brown Jr. authorized DNA partial match searches to begin in 2009.[190] California has made DNA profiling a key tool of law enforcement and a priority,[191] culminating in the recent success of the arrest of the alleged "Grim Sleeper" serial killer[192] mentioned in Part I. The California CODIS is comprised of two DNA databases: one containing offender profiles and the other containing crime scene evidence profiles.[193] Before the partial match policy was in place, a match would only be declared if the crime scene profile exactly matched an offender's DNA profile.[194] The California Department of Justice (DOJ) developed a DNA Partial Match Reporting and Modified CODIS Search Policy to allow for partial match searches.[195] This policy allows for the release of the name of an offender who is not the source of the crime scene DNA evidence from an unsolved case, but who may only be a relative of the source of the crime scene profile.[196]

However, this information may only be released under two scenarios. First, information may be released when there is a Partial Match Obtained from a CODIS Search. If a routine search comparing crime scene DNA evidence against California's Offender DNA Data Bank results in a partial match sharing at least fifteen STR alleles, the information may be released if it meets certain conditions.[197] These conditions require that: (1) the crime scene profile is a single source profile; (2) the case is unsolved and all investigative leads have been

190 Memorandum from Edmund G. Brown Jr., Att'y Gen. of Cal., to All Cal. Law Enforcement Agencies and Dist. Att'ys Offices, Re: DNA Partial Match (Crime Scene DNA Profile to Offender) Policy (2008) [hereinafter Brown Memo], *available at* http://ag.ca.gov/cms_attachments/press/pdfs/n1548_08-bfs-01.pdf.

191 In September 2007, California Attorney General Brown announced that the backlog of DNA samples (295,000 in July 2006) had been completely eliminated. News Release, Office of the Attorney Gen., Cal. Dep't of Justice, Brown Unveils DNA Technique to Crack Unsolved Crimes (Apr. 25, 2008) [hereinafter Brown Unveils], *available at* http://ag.ca.gov/newsalerts/print_release.php?id=1548.

192 Steinhauer, *supra* note 3. R

193 Brown Memo, *supra* note 190. R

194 *Id.*

195 *Id.*

196 *Id.*

197 *Id.*

exhausted; (3) the agency and prosecutor have committed to further investigate the case if the name is released; (4) Y-STR (Y-chromosome) typing of the crime scene evidence is completed and corresponds to the offender's Y-STR type;[198] and (5) a California DOJ committee must discuss the case with the local law enforcement agency, laboratory, and prosecutor and decide to release the offender's name unless there is a reason not to release it.[199] A partial match search revealing a match of at least fifteen shared alleles between the unknown perpetrator and database offender causes the DOJ to contact the local laboratory to confirm that the case is not yet solved.[200] If the case is active, the local CODIS laboratory is to notify the investigator, who may request to follow the process for a partial match investigation as outlined in the DNA Partial Match Policy.[201]

The second method for releasing this data is through a Special Request for a Modified CODIS Search.[202] A law enforcement agency may request a modified CODIS search to attempt to identify any offender in the database who may be related to the unknown perpetrator.[203] Similarly, the name of the offender may only be released if certain conditions are met. These include: (1) a written request is sent to the Chief of the Bureau of Forensic Services describing the case, attesting that all other investigative leads have been exhausted, and committing the investigative agency and the prosecutor to further investigate the case; (2) the crime scene profile is a single-source profile; (3) the investigative agency completed Y-STR typing for the crime scene evidence; (4) the modified CODIS search must result in a manageable number of candidates, who are prioritized using appropriate statistical calculations for relatedness; (5) Y-STR analysis of the database offender's profiles completed based on prioritization of relatedness; (6) if the Y-STR profiles are consistent between the crime scene evidence and offender sample, the DOJ will review nonforensic information to identify any additional evidence bearing on relatedness; and (7) a DOJ committee will examine the case.[204] For the time

198 *Id.* If the Y-STR profiles are consistent, the California DOJ will review nonforensic information to identify additional information bearing on relatedness, if available. *Id.* This is probably so that investigators will have some idea whether the unknown profile is the offender's father, brother, cousin, etc. *See supra* note 37. **R**

199 Brown Memo, *supra* note 190. **R**

200 *Id.*

201 *Id.*

202 *Id.*

203 *Id.* (stating that the law enforcement agency must be "investigating an unsolved case that has critical public safety implications").

204 *Id.*

being, these partial match familial searches are being limited to convicted offenders.[205]

B. California DNA Database Expansion to Include Arrestee Profiles

The possible advantages and disadvantages of using familial DNA searches would be exacerbated by expansion in DNA databases. For example, in 2004, California's Proposition 69 allowed for a major expansion of California's DNA database by authorizing DNA collection from every felony arrestee starting in 2009.[206] Law enforcement estimated that DNA submissions would increase from approximately 200,000 DNA profiles annually to 390,000 DNA profiles annually.[207] However, this policy is not retroactive.[208] The DNA collection of arrestees is intended to occur at booking and after the collecting agency has checked the subject's criminal history record for a DNA collection flag.[209] The DNA sample is collected by a cheek swab, unless the California DOJ requests a blood sample.[210] Since November 3, 2004, California has been taking DNA samples from adults arrested for felony sex crimes, murder, voluntary manslaughter, or

205 Rosen, *supra* note 6. R

206 DNA Fingerprint, Unsolved Crime and Innocence Protection Act (Proposition 69), 2004 Cal. Legis. Serv. Prop. 69 (West) (codified at CAL. PENAL CODE § 296(a)(2)(C) (West 2008)); *see* Memorandum from Bill Lockyer, Attorney Gen. of Cal., to Cal. Law Enforcement Agencies and Personnel 3 (Mar. 15, 2005) [hereinafter Lockyer Memo], *available at* http://www.ag.ca.gov/bfs/pdf/69IB.pdf; Brown Announces, *supra* note 42. The 2009 database expansion does not apply to juveniles, R only to adults arrested for felony offenses, although samples will be taken from qualifying juvenile felony offenders after adjudication. Memorandum from Edmund G. Brown Jr., Attorney Gen. of Cal., to All Police, Sheriffs, and Dist. Att'ys (Dec. 15, 2008) [hereinafter Brown Memo II], *available at* http://www.ag.ca.gov/bfs/pdf/69IB_121508.pdf.

207 *See* Brown Announces, *supra* note 42. As of May 2008, California's state labora- R tory reported over 6,000 hits—matches between crime scene evidence and an offender's DNA profile or matches between different crime scenes. *Id.* Each month, the California state DNA laboratory identifies more than 200 cold hits. *See* Brown Unveils, *supra* note 191. R

208 *See* Brown Memo II, *supra* note 206 ("DNA sample collection from any qualify- R ing adult felony arrestee . . . must be based solely upon the offense that precipitated the arrest, and not upon the arrested individual's other criminal history (including prior felony convictions or adjudications).").

209 *Id.*

210 *See* CAL. PENAL CODE § 295(e) (West 2008); Lockyer Memo, *supra* note 206, at R 1 ("[A]pproximately 5% of buccal [cheek] swab collections may fail to generate a full DNA profile. In these circumstances, [the California] Department of Justice will require the supplemental collection of blood samples."). Additionally, the California "DOJ also recommends collecting blood samples when an offender refuses to cooperate with sample collection." *Id.* at 2.

attempts at these crimes.[211] It is a misdemeanor to refuse to provide a mandated DNA sample,[212] and a collecting agency is authorized to use reasonable force to collect DNA samples from a qualifying offender who refuses to provide them.[213] Additionally, it is a felony for a qualifying offender knowingly to facilitate the collection of a wrongfully attributed DNA sample or to knowingly tamper with any DNA sample with the intent to deceive the government as to his or her identity.[214] Also, any person who knowingly misuses or provides an unauthorized disclosure of a DNA sample or profile may be charged with a felony or misdemeanor offense,[215] and imposition of substantial fines may occur if the unauthorized use or disclosure was undertaken for financial gain.[216]

While the California DOJ has stated that "Proposition 69 DOES NOT authorize law enforcement to collect DNA samples from criminal suspects solely based upon their status as suspects,"[217] critics argue that "[a]rrest does not equal guilt and a person shouldn't suffer the consequences of guilt unless and until he or she has been convicted."[218] These critics suggest that "[t]o find otherwise is to empower police officers, rather than judges and juries, with the power to force persons to provide the state with evidence that harbors many of their most intimate secrets and those of their blood relatives."[219]

Under certain circumstances, destruction of the DNA sample and expungement of the corresponding profile from a DNA database may be requested by a person who has provided a DNA sample under Proposition 69 if the person has no other qualifying offense on record.[220] Circumstances for expungement include:[221] (1) a DNA sample was

211 Cal. Penal Code § 296(a)(2); *see* Lockyer Memo, *supra* note 206, at 3. **R**

212 Cal. Penal Code § 298.1(a) (West Supp. 2010); *see* Lockyer Memo, *supra* note 206, at 5. **R**

213 Cal. Penal Code § 298.1(b)–(c); *see* Lockyer Memo, *supra* note 206, at 5. This is authorized without a court order, if mandated regulations are in place. *Id.* **R**

214 Cal. Penal Code § 298.2; *see* Lockyer Memo, *supra* note 206, at 5. **R**

215 Cal. Penal Code § 299.5(i)(1)(A); *see* Lockyer Memo, *supra* note 206, at 5. **R**

216 Cal. Penal Code § 299.5(i)(1)(B); *see* Lockyer Memo, *supra* note 206, at 5. Civil damages are also authorized. *See* Cal. Penal Code § 299.5(i)(2)(A). **R**

217 Lockyer Memo, *supra* note 206, at 4. However, law enforcement agencies may submit a suspect's DNA sample that has been legally obtained. Cal. Penal Code § 297(c)(1) (West 2008). However, the agency must notify the California DOJ whether the person remains a suspect in the investigation within two years. *See* Lockyer Memo, *supra* note 206, at 4. **R** **R**

218 Simoncelli & Steinhardt, *supra* note 39, at 284. **R**

219 *Id.*

220 Lockyer Memo, *supra* note 206, at 5. **R**

221 *Id.*

collected on arrest, but no charges were filed within the applicable statute of limitations;[222] (2) a DNA sample was collected upon arrest, but the person was found not guilty or otherwise acquitted;[223] (3) a DNA sample was collected based on a conviction for a qualifying offense, but the conviction was subsequently reversed and the case dismissed;[224] (4) a DNA sample was collected based on conviction for a qualifying offense, but a court subsequently found the person to be factually innocent of that crime;[225] and (5) a DNA sample for a suspect was profiled and entered into the database, but the person is no longer considered a suspect by the investigating agency.[226]

In a recent challenge to this California statute requiring mandatory DNA sampling of arrestees, a federal district court judge denied a motion for a preliminary injunction.[227] The two plaintiffs had been arrested, for separate reasons, but one was never charged and the other's charges were dropped.[228] The injunction asked the Court to enjoin California "from seizing, searching, analyzing, or making any use of DNA samples or analysis of DNA samples from persons arrested for, but not convicted of, a crime."[229] While accepting the plaintiff's argument that arrestees have a greater privacy interest than convicted felons, the court denied the motion for a preliminary injunction because the plaintiffs failed to show that their privacy interest "outweighs the government's compelling interest in identifying arrestees, and its interest in using arrestees' DNA to solve past crimes."[230]

C. California as a Prototype for Other State Systems

The effect of the combination of the Proposition 69 DNA database expansion and allowance of partial match searches in California has important implications. First, California is home to approximately thirteen percent of the entire American population,[231] so California's actions will affect a significant portion of the total population. Secondly, California has previously established national legal

222 CAL. PENAL CODE § 299(b)(1).
223 *Id.* § 299(b)(4).
224 *Id.* § 299(b)(2).
225 *Id.* § 299(b)(3).
226 *Id.* § 297(c)(2).
227 Haskell v. Brown, 677 F. Supp. 2d 1187, 1189–90 (N.D. Cal. 2009).
228 *Id.* at 1192.
229 *Id.*
230 *Id.* at 1201.
231 Simoncelli & Steinhardt, *supra* note 39, at 280. R

precedents,[232] so it is possible that a successful combination of DNA database expansion and use of familial searches could allay or promote fears about a similar national system. Although for the time being, these partial match familial searches are being limited to convicted offenders,[233] there is no guarantee that they will stay that way. It may be interesting to observe how long California limits partial match searches to offenders and whether it would expand partial match searches to arrestee profiles. Additionally, California is an important example of how the size and function of a criminal DNA database can change dramatically in a relatively short time—only five years.

California has already experienced some backlash over these recent changes to its DNA database system, and some advocates of DNA databases are apprehensive of expanding the size and function of DNA databases too rapidly.[234] There are already concerns that California's database expansion would "encourage an over-reliance on DNA technology and 'cold hits,'"[235] a problem that would likely be exacerbated by law enforcement use of familial searches to provide leads.

Additionally, the former head of the FBI CODIS has indicated that the FBI declined allowing familial searches in the CODIS system because of a lack of congressional or judicial authorization, as well as from a concern that a negative public reaction to familial searches would destabilize support for recent federal laws expanding the national DNA database by requiring DNA samples from arrestees.[236]

The United Kingdom has also recently experienced a setback in the expansion of its DNA database. The European Court of Human Rights declared that the U.K. DNA database expansion, including unconvicted arrestee profiles, was illegal because it retained the profiles of innocent people.[237] Since then, the U.K. Home Office proposed measures so that the DNA of innocent people will not be kept for more than six years, with certain exceptions.[238]

232 *See id.* (referring to national replication of California air quality standards and tax reduction laws).

233 Rosen, *supra* note 6. **R**

234 *See, e.g.*, Simoncelli & Steinhardt, *supra* note 39, at 284–90. **R**

235 *Id.* at 284.

236 Rosen, *supra* note 6. **R**

237 *See* S v. United Kingdom, App. Nos. 30562/04 & 30566/04,48 Eur. H.R. Rep. 50 (2009).

238 *Six-Year Limit on DNA of Innocent*, BBC NEWS (Nov. 11, 2009), http://news.bbc.co.uk/2/hi/8354850.stm. The exceptions would be that the police may be allowed to keep DNA from terrorism suspects, even if later freed or found not guilty. *Id.*

III. Expansion of DNA Database Function and Size: Database Creep or Inevitable Result?

It is clear that DNA databases are increasing in size and function, but it is not clear whether this is resulting from a database "creep"[239] or is instead the inevitable result of using DNA profiles in criminal investigations. Opponents of DNA collection from arrestees and partial match searches argue that such changes are examples of a dangerous database "creep," with the government using a database for purposes other than those for which it was created.[240] Critics of DNA database expansions worry that "[t]his trend of rapid expansion in size and function [of DNA databases] heightens existing concerns that these massive amounts of aggregated data could be misused."[241] In particular, the main concern is over "function creep," that "databases created for one discrete purpose, despite the initial promises of their creators, eventually take on new functions and purposes."[242] These critics argue that "[a] pattern of 'function creep' [has] already emerg[ed] with regard to criminal DNA databases."[243] These critics argue that additions of arrestees and noncriminal individuals to DNA databases "represent a radical shift in the purpose and intent of these databases."[244]

Partial match familial searching has been cited as a form of "function creep" "where DNA analysis and database information is beginning to be used in new ways to create suspects when none are generated through a 'cold hit.'"[245] In particular, these critics argue that concerns about "function creep" are "heightened" by the lack of statutes requiring destruction of the biological samples after testing is completed and should raise concerns about inappropriate uses of stored DNA.[246]

239 *See* Simoncelli & Steinhardt, *supra* note 39, at 283. **R**

240 *See id.*

241 *Id.*

242 *See id.* at 283 (identifying various instances of "function creep," including the gradual change to use Social Security numbers as universal identifiers, the uses of census records to round up Japanese Americans during World War II, and the sharing of consumer information with the Department of Homeland Security following September 11, 2001); *see also* Rosen, *supra* note 6 (describing fears over a "CODIS creep"). **R**

243 *See* Simoncelli & Steinhardt, *supra* note 39, at 283. **R**

244 *Id.*

245 *Id.* at 284. Another instance of "function creep" mentioned by these authors includes a new method of DNA analysis to predict the "ancestry" of an offender, which was used in a Louisiana murder investigation to predict that the offender was eighty-five percent Sub-Saharan African and fifteen percent Native American. *Id.*

246 *Id.*

However, it can be argued that expansion of DNA database size and function is merely the inevitable result of advances in science and technology and changes to societal approaches to genetic information. Increasingly, DNA samples also are collected from individuals in ways not related to criminal investigations. For example, Louisiana requires DNA samples from new police applicants,[247] and proposals have been made for collection of DNA samples from all newborns for medical and law enforcement purposes.[248]

This leads to the question of whether it is inevitable, or preferable, to create a universal DNA database. While recognizing policy arguments against DNA database expansion and familial searches, some feel that many policy arguments would disappear if a universal, population-wide DNA database was implemented. The authors of a study on familial searches noted that "the racial implications of this technique, and, in fact, the technique itself, would disappear if a population-wide DNA identification database existed."[249] Others have suggested that the current various criminal, health, genealogical, and research DNA databases are in effect creating a haphazard universal database and propose that it would be preferable to consciously create a universal database so as "to manage and regulate the pace and shape of developments."[250] Law professors D.H. Kaye and Michael E. Smith advocate for a universal DNA database, arguing that it would be "a limited intrusion on individual freedom and privacy while advancing both public safety and racial evenhandedness in the criminal justice system" as well as "serving as a firewall against far greater intrusions on privacy by law enforcement authorities pawing through medical and other records looking for a 'match' to DNA found at the scenes of notorious crimes."[251]

247 *Id.* at 283.

248 *Id.*

249 Greely et al., *supra* note 96, at 260. Under such a system, partial match or familial searches would be unnecessary. *Id.* Although a universal DNA database would involve other policy arguments, it has been suggested that a universal database, however flawed, might be better than a large but racially biased database, which could be the result of familial searching. *Id.* R

250 Haimes, *supra* note 163, at 274. Increased collections of DNA for nonlaw enforcement purposes have caused even those against noncriminal databases to suggest that, if universal databases are inevitable, "it would be far better to have that discussion now, rather than cascading blindly into it." Simoncelli & Steinhardt, *supra* note 39, at 290. R R

251 D.H. Kaye & Michael E. Smith, *DNA Identification Databases: Legality, Legitimacy, and the Case for Population-Wide Coverage*, 2003 WIS. L. REV. 413, 440. These authors analyze various points of opposition to a population-wide database (including public acceptance, constitutionality, a nation of suspects, loss of anonymity, and expense),

Professor Akhil Amar of Yale Law School has advocated for a national, universal DNA database.[252] Amar maintains that such a database would assist innocent suspects in their exoneration, assist law enforcement in identifying perpetrators, and could be used to audit for dishonest cops and bad police procedures.[253] To minimize risks and concerns over privacy, Amar suggests ways to curb abuse of DNA profiling, including limiting DNA testing to "junk DNA" to prevent exposure of individual medical information, requiring the government to request searches from a special DNA court, and legislating for severe penalties for misuse of DNA.[254]

Remarkably, the United Arab Emirates (UAE) is set to begin establishing a national DNA database by the end of 2010 that will eventually include the DNA profiles of all its citizens.[255] Alec Jeffreys, the discoverer of DNA fingerprinting, has expressed concern over such a universal database but also noted that the success or failure of the UAE database could be a sign for other countries to follow in the UAE's footsteps—or not.[256] Similar to how states may view the success or failure of the California DNA database system, other countries may view the UAE as a prototype for a universal DNA database.

CONCLUSION

A few conclusions arise from this analysis of the implications of familial DNA searches, especially considering recent growth in the size and function of criminal DNA databases. First, it is apparent that the constitutional and legal objections to such expansions in the size and function of DNA databases, particularly familial searching, are conflicting and not well defined. Important policy considerations, such as racial disparity, may argue against such expansions and may provide stronger public support for objecting to familial searches than legal action.

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compare them to advantages of such a database (including efficacy, racial justice and the legitimacy of law), and conclude that a universal database is the best compromise. *Id.* at 440–59.

252 Akhil Reed Amar, *A Search for Justice in Our Genes*, N.Y. TIMES, May 7, 2002, at A31, *available at* http://www.nytimes.com/2002/05/07/opinion/a-search-for-justice-in-our-genes.html.

253 *Id.*

254 *Id.*

255 Marten Youssef, *DNA Database Set to Start in a Year*, NATIONAL, http://www.thenational.ae/apps/pbcs.dll/article?AID=/20091007/NATIONAL/710069853/1133 (last updated Oct. 7, 2009).

256 *Id.*

Moreover, California is a likely prototype for a national system of expanded DNA databases, leading the way in collecting samples from arrestees and performing partial match familial searches. If backlash over California DNA database expansion and familial searches is minimal, and if the efficacy of familial searches is enough to justify their cost, then it is likely that other states and the federal government will follow in California's footsteps.

What is most clear is that there should be greater discussion of not only the expansion in the size of DNA databases but also changes in their use, as with familial DNA searches. It is important to note that a universal DNA database is beginning to be recognized as a serious possibility and a potential solution to disparities in non-universal, expanded DNA databases. The American public must seriously ask itself if this is a viable option or whether we must instead search for alternative solutions to balance the advantages and disadvantages of DNA profiling.