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Summary Overview

Forensic Familial and Moderate Stringency DNA Searches: Policies and Practices in the U.S., England, and Wales

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Purpose

Forensic DNA testing has been one of the great success stories of law enforcement over the past 30 years. The national network of forensic DNA databases has helped law enforcement solve many crimes, often long after the investigative trail has gone cold. In theory, familial DNA searching and moderate stringency search protocols could be a productive extension of this tool for cases in which there is no exact DNA match. Yet, despite anecdotal reports of its use and efficacy, we know little about these search policies or practices.

A number of regulatory and resource constraints may limit its application and/or adversely impact other avenues of investigation. Where policies have been codified, regulatory constraints have arisen largely as a response to ethical and legal concerns surrounding the use of this method. In yet other jurisdictions, no formal policies are in place to regulate the practice. The lack of a consistent set of policies governing the use of familial searching may reflect lawmakers' uncertainty about the effectiveness of the procedure, as well as uncertainty about its unintended implications. In order to aid policymakers, we conducted a study of practices on familial DNA and moderate stringency DNA testing and discuss their effects.

Project Design and Methods

We conducted four related study tasks: (1) a literature review on familial and moderate stringency DNA searching, (2) a survey of varying familial and moderate stringency DNA policies and data from state and local forensic laboratories, (3) interviews from representatives of two states (California and Texas) that have used this technique in different ways, and (4)

interviews with English and Welsh stakeholders. This combination of study tasks provided valuable guidance to policymakers considering policies on familial and moderate stringency DNA searches.

Review of the Literature

We reviewed the existing literature on familial and moderate stringency DNA searches.

SDIS and LDIS Laboratory Survey Participants

We administered a survey to State DNA Index System (SDIS) and Local DNA Index System (LDIS) administrators. The survey sample was defined by all state and local forensic facilities that listed DNA testing as one of their services in the 2014 Census of Publicly Funded Crime Laboratories.¹ There were 195 laboratories in the sample. We administered the survey both online and by sending a hard copy.²

Statistical Analysis of Outcomes

Familial and moderate stringency searches offer a mechanism for reducing the number of case-to-case database matches for which the suspect remains unidentified, which makes this a potentially useful indicator of familial search efficacy. Among the states that responded, we determined whether familial search policies affected the number of serial offenders for which no suspect is identified.

¹ United States Department of Justice. Office of Justice Programs. Bureau of Justice Statistics. Census of Publicly Funded Forensic Crime Laboratories, 2014. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2017. <https://doi.org/10.3886/ICPSR36759.v1>

² While multi-mode survey approach can be problematic if there is reason to believe that responses might vary by mode, such concerns are minimal in this context. Our survey asked exclusively questions of a factual nature, which are less subject to measurement error arising from modal response variation.

Other indices of the effectiveness of a state database's use of familial and moderate stringency searches are the number and fraction of forensic partial DNA profiles and mixture profiles in the database that ultimately yield matches or that are successfully linked to a relative of someone in the database. These indices convey the degree to which moderate stringency searching, coupled with partial match candidate selection criteria, aids investigations. Note that because partial profiles and mixtures with genotypic ambiguity are ineligible for familial searching, these indices apply only to moderate stringency searching.

Qualitative US Stakeholder Interviews

We conducted semi-structured interviews with administrators in two states with familial DNA testing policies to develop a more in-depth understanding of the effect of familial and moderate stringency DNA testing. One case study examined a state where familiar searching and moderate stringency match reporting is explicitly permitted. Our second focused on a state that allows reporting of moderate stringency matches suggestive of kinship in certain circumstances to understand the implications of this policy option.

Qualitative England and Wales Stakeholder Interviews

We conducted semi-structured interviews with 10 subject matter experts (SMEs) who are academics and practitioners with knowledge of familial searches. We asked about the history of the current policy regarding familial DNA searching and the perceived advantages and disadvantages of the present policy (or lack thereof). We also interviewed SMEs about implementation of the current policy. The qualitative interviews were thematically analyzed to examine how the issues of privacy, public safety, and budget consciousness have shaped the

familial searching policies in England and Wales. The topics discussed during the semi-structured interviews include the following:

- Processes, stakeholders, and institutions involved in authorizing, conducting, and overseeing these searches
- National and European Union regulations on the use of DNA for these searches, data retention, etc.; national forensics strategy
- Types of cases these searches are used for
- Technical processes, technology involved, advances in technology (e.g., increased sensitivity)
- Costs and how searches are funded, cost-effectiveness
- Number of searches run every year
- How searches form part of criminal investigations
- Ethical issues, e.g., privacy, government intrusion, proportionality, public vs. individual rights, consent, revealing personal relationships, civic responsibility to cooperate with police, etc.
- Attitudes of the public

Summary of Results

Review of the Relevant Literature: DNA Testing and Policies

Ram (2011)³ completed a national survey of familial and moderate stringency searching policies in 2010 that highlighted the variety and vagaries of the rules governing its use. Ram

³ Ram, N., “Fortuity and forensic Familial Identification,” *Stanford Law Review*, Vol. 63, 2011, pp. 751-812.

noted the conceptual similarity of familial searching and moderate stringency searches and argued that similar policies should govern their use.

SDIS and LDIS Survey Results

As a means of ensuring that our understanding of CODIS terminology was consistent with LDIS laboratories, our survey asked LDIS laboratories whether they agree or disagree with statements about partial matches and moderate stringency searches taken from the wording of the FBI webpage on Frequently Asked Questions on CODIS and NDIS.⁴ A majority of responding LDIS laboratories agreed with both statements. When respondents disagreed with the partial match statement, it was because they currently report partial matches as “no match.” One responding LDIS laboratory disagreed with the moderate stringency statement and specified that moderate stringency searches also account for typing discrepancies (null alleles) arising from different DNA testing kits.

Forty-two percent of responding LDIS laboratories are using probabilistic genotyping software to interpret DNA profiles derived from crime scene evidence, 23 percent were in the process of validating probabilistic genotyping software at the time they were surveyed (and if validation proceeds according to schedule, they are now online), while just over a third of responding LDIS laboratories reported no immediate plans to switch from their current evidence profile interpretation method.

We were also interested in whether probabilistic genotyping software, CODIS 20 STRs, and the growing use of DNA testing on trace DNA samples in property crimes had increased the

⁴ “Frequently Asked Questions on CODIS and NDIS, Questions 25 and 28,” online at <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/codis-and-ndis-fact-sheet>

fraction of forensic partials and forensic mixtures in LDIS and SDIS databases. LDIS laboratories were asked to report the number of forensic partial, forensic mixture, and forensic profiles they had uploaded to SDIS in the year 2010 and in current year (2018) to date. SDIS laboratories were asked to report the number of uploads in each category in each year. The mean number of uploads increased in all three categories.⁵ However, the increase was uneven, with forensic partials comprising a slightly smaller share of the total and the share of forensic mixtures more than doubling, from 11 percent to 27 percent. Between 2010 and 2018, the number of forensic partials increased by a higher percentage among LDIS laboratories who do not yet have probabilistic genotyping software in use, whereas the number of forensic mixtures increased by a higher percentage in LDIS who were using probabilistic genotyping software in 2018.

The final items on the LDIS and SDIS surveys solicited input from laboratories about what changes they would like to see for improving efficiency and efficacy of CODIS operations and whether they are aware of any policy changes on the horizon. Responses to the first question regarding desired changes included process streamlining through automated intra- and inter-laboratory correspondence because, as one respondent noted, “paperwork has become overwhelming as the number of matches has increased over the years.” Other respondents were interested in seeing improvements in CODIS software that would facilitate data queries and production of statistical reports. In response to the second question regarding knowledge of policy changes on the horizon, 10/16 of the responding LDIS laboratories replied “No.” The remainder mentioned changes to CODIS software including possible familial searching

⁵ These results were not driven by huge increases at one or two LDIS laboratories; the majority, though not all, responding LDIS laboratories reported increases in all three categories.

capability and the addition of a “Forensic Targeted” category for partial or mixture sample that does not meet SDIS/NDIS moderate match estimation thresholds but can meet match rarity estimate thresholds (MRE) if specific loci are search at moderate stringency. SDIS laboratories were focused on hiring additional personnel because current staff struggle to keep pace with DNA testing and database management responsibilities.

US interviews

California and Texas, the two largest states by population, also have the two largest SDIS databanks.⁶ California has one of the nation’s most proactive DNA sampling regimes, mandating DNA collection from all felony arrestees, regardless of adjudication. DNA database laws in Texas are more restrictive; the state collects DNA from convicted felons only if they are sentenced to prison, and felony arrestees are not sampled unless and until they are arraigned. Texas DNA profiles from felony arrestees who are acquitted or not proceeded against are automatically expunged, whereas California requires individuals to petition for expungement. Consequently, as of September 2018, California’s DNA database had 2,007,874 convicted offender profiles and 760,395 arrestee profiles, while the Texas state databank holds 884,548 convicted offender profiles and roughly one tenth as many arrestee samples.⁷ There is some unknown number of duplicates in these databanks, as arrestees are not purged from the arrestee database upon conviction or subsequent felony arrests.

⁶ FBI NDIS Statistics, September 2018, online at: <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics>

⁷ Ibid.

England and Wales interviews: History and context of familial DNA testing

In England and Wales, the practice of familial DNA searching started without a legislative framework to cover it, and Interviewee 1 noted that it was only after it had been employed on a number of occasions that discussions around legislation emerged. The Protection of Freedom Act 2012 sets out the legal framework relating to the gathering, use, and retention of biometric samples, and this law governs the collection and utilization of DNA samples in England.

The interviews are difficult to summarize but touch on the volume of familial DNA testing in England and Wales, the development of familial DNA search policies and practices, the limitations of familial DNA searches, its associated costs, and the ethical concerns around familial DNA searches. In England and Wales, the use of familial DNA searches is more nationalized. When a law enforcement agency wishes to conduct a familial DNA search with a crime stain profile that is suitable for a database search, investigators must submit an application to the National DNA Database and meet a number of requirements. First, a regional representative of the National Crime Agency must have seen the request and be willing to provide their resources to support the search. In addition, the law enforcement agency applying will also require approval from the National Police Chief's Council (NPCC). In considering whether to approve the application, the NPCC will consider the nature and gravity of the crime and whether there is a need to explore every investigative avenue to identify the offender, as well as the availability of funding and resources to pursue the search. The law enforcement agency will also need approval from their senior forensics manager.

Interviewees who commented on the subject of partial and mixed profile searching drew a clear distinction between these types of searches and familial searches both in terms of the technologies involved and the ethical issues raised. One respondent, a policy lead within the

NPCC, reported that the number of mixed and partial profiles gathered has rapidly grown, describing the volume as “massive” and that where a partial profile has been gathered at a crime scene and a match is sought in the database, a threshold of 17 or 18 alleles matching is required for the profile to be of much utility as evidence to investigators. They also noted in practice, an extremely partial profile would be disregarded unless it related to a serious offense such as murder or sexual assault, for which every DNA result is scrutinized for its value and potential contribution to the investigation.

Implications for Criminal Justice Policy and Practice in the U.S.

While there are legitimate concerns about the privacy implications of the use of familial DNA testing, should that use become widespread, its use in the US is still quite rare. In fact, the considerable work backlogs for conventional DNA testing that have been reported suggests that expanded conventional capabilities are probably the best short-term strategy. While California and Texas have used different models, both have meaningfully restricted its use to situations where the public safety implications are most acute. The English and Welsh experience provides examples of polities with similar common-law backgrounds successfully but sparingly using the capabilities that it provides. Further research into the costs and benefits of familial DNA searching would help provide policymakers with useful data about the most efficient crime reduction expenditures.