

Use of Forensic DNA Evidence in Prosecutors' Offices

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I. Overview

DNA evidence has rapidly become a significant and routine feature of modern criminal prosecutions. The first introduction of DNA evidence in a U.S. Court occurred in 1987. By 1994, 42 percent of local prosecutors reported that they had used DNA evidence in a felony case at least once.¹ By 2001 that number had increased to 68 percent.² Moreover, from a technical point of view, the potential benefits of DNA testing are substantial.³ Early hurdles to admissibility during trial have been overcome by the adoption of rigorous standards for DNA analysis.⁴ Rapid development of identification technology, fueled in significant part by the Human Genome Project, and the resultant development and expansion of national forensic DNA databases, has increased the potential of DNA to play a major role in crime solving.⁵ Indeed, over three million offender profiles, collected by state and federal authorities, now reside in the National DNA Index System (NDIS). This number is likely to increase as more states and the federal government are expanding compelled DNA collections to individuals arrested for certain crimes.⁶

Prosecutors report seeing DNA as a powerful prosecutorial tool.⁷ At the same time there appears to be a consensus among practitioners and informed observ-

ers that the full promise of DNA within the criminal justice system has yet to be realized.⁸ Thus, given the role of the prosecutor in developing patterns of DNA testing and its use in charging, trying, and convicting alleged criminals, it behooves us to learn more about how this technology has been integrated into the daily activities of the nation's 2,800 prosecutors' offices. Because little information exists on the nature or pattern of ordinary practice, we carried out a survey-based study of the DNA-related practices and procedures within District Attorneys' (DA) offices to obtain a "snapshot" of preliminary information about actual prosecutorial practices. The data obtained is preliminary in nature, but in our estimation, it is supportive of further study of areas targeted by the survey.

II. Research Methods

Sample Issues

The American Prosecutors Research Institute (APRI) conducted the data collection for the survey through a faxed questionnaire. In collecting data, the APRI selected a sample of approximately 253 local prosecutors' offices based on the Bureau of Justice Statistics' (BJS) nationally representative sample. The sample was drawn based on crime rates, which resulted in an over-sample of the largest jurisdictions in the country (i.e., serving populations of more than 500,000). We received a total of 110 usable surveys for a response rate of 43.9 percent.

The sample was drawn in several ways and intentionally over-sampled large jurisdictions. All jurisdictions serving a population over a half million were sent a questionnaire. Small jurisdictions under a quarter million were randomly sampled, and intermediate size jurisdictions were sampled based on crime rates, for the purpose of focusing on offices with large case loads. In

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a small, exploratory survey of this sort, a representative sample would have included large numbers of small offices whose volume of cases was small and whose experience with DNA testing might be limited. By over-sampling large offices, we could get data on a much larger number of actual felony cases and, thus, a better idea of how many prosecutions are actually affected by DNA evidence. Among the survey respondents, nearly 50 percent were offices in populations of 500,000 or more; a quarter served a population between 100,000 and 500,000; and only a quarter served jurisdictions under 100,000. Seventy-five percent of the nation's approximately 2,300 prosecutor offices can be found in jurisdictions with a population under 100,000.

Table 1

Profile of Survey Sample and Respondents

Strata	Bureau of Justice Statistics Sample of Prosecutors' Offices	Percentage of Offices in Survey Sample	Respondent Distribution
0-20,000	34.3% (n=804)	9.9% (n=25)	5.5% (n=6)
20,001-50,000	25.0% (n=585)	9.9% (n=25)	6.4% (n=7)
50,001-100,000	16.1% (n=377)	9.9% (n=25)	12.8% (n=14)
100,001-250,000	14.8% (n=347)	9.9% (n=25)	13.8% (n=15)
250,001-500,000	4.9% (n=114)	16.6% (n=42)*	11.0% (n=12)
500,001 +	4.9% (n=114)	43.9% (n=111)	50.5% (n=55)
Total	100% (n=2,341)	100.1% (n=253)	100% (n=109)**

*Please note: One office in this strata asked not to participate in the study. As a result, the office was removed from the sample.

**The total number of respondents is n=110; however, one office responding to the survey neglected to include population size.

Despite the advantages of focusing on larger jurisdictions, this over-sampling does make generalizations to the nation as a whole more difficult. It is likely that it resulted in a focus on those offices most likely already making use of DNA testing, and so presents an exaggerated picture of its use. This shortcoming should be rectified in future work. Below we will report on some analytical approaches we used to minimize this problem.

Survey Content and Collection

The survey consisted of six sections:

- Office Descriptives;
- Experience with DNA Evidence in the Courtroom;

- Experience with Post-Conviction DNA Testing;
- Experience with DNA-Database Generated Evidence;
- Experience with Biological Crime Scene Evidence;
- Experience Using DNA Evidence in Unsolved Cases and the Use of DNA and “John Doe” Warrants.

The survey was administered to the chief or elected prosecutor in each of the 253 offices via facsimile. Follow-up to non-respondents consisted of two additional contacts requesting completion. Data were scanned into an electronic database for initial cleaning and then exported to a statistical analysis software program. Data were cleaned to address issues around missing data that included the following: (1) logic checks to

verify that questions were skipped appropriately as compared to questions that were simply not answered and (2) an examination of responses that were not in the valid response range and that showed contradictory responses. In some instances, as noted in the text below, outliers were excluded.

Respondents

Our respondents do not reflect the make-up of prosecutors' offices nation-wide in terms of location, size of jurisdiction, etc. However, in a survey of complex and diverse agencies, as in prosecutors' offices, the question of representativeness is inherently problematic. What contextual factors actually relate to prosecutors' use of forensic evidence is not well established. There may be state variations based on law and court practice, variations based on crime patterns, demographics of the jurisdiction, expenditures on laboratories, and even history. These questions would require empirical exploration with a much larger and more inclusive study than the exploratory work reported here.

At the same time, certain steps can increase our confidence that these data reasonably reflect prosecutors' practices. One method is to see if different sub-sets of our respondents answered our questions in the same way. One fact that might lead to differences across jurisdictions is office size. Given the costs and expertise required to use DNA data, it seems plausible that the size of the prosecutor's office might affect how it manages DNA data; our sampling reflected this assumption. Additionally, responses regarding office size seem a trustworthy, reasonable, and manageable proxy for

jurisdiction size, and thus the size and make-up of caseloads. For this reason, we segmented our sample by office size and examined many of the responses separately for offices with different numbers of attorneys, which allowed us to see if our over-sampling of large offices distorted responses in any systematic way. An additional hypothesis examined how each attorney's caseload in the office might impact the use of complex and time-consuming evidentiary approaches. To examine this, we computed the number of felony cases handled by each office on a per attorney basis. Because caseload was defined in several different ways, we limited this comparison to the largest group of respondents: those who defined a case as a defendant.

With very few exceptions, the answers across subgroups were not statistically different. That is, large, medium, and small offices tended to respond to our questions in similar ways. The same was also true of offices that asked their attorneys to handle a smaller or larger number of cases. This finding strengthens our hope that, despite different response rates across office types, the data does reasonably reflect nation-wide patterns. Nevertheless, these data must be treated as preliminary, as much for the small size of the sample as for limitations on its representative nature.

III. Respondent Profile

On average, respondent offices had 40 attorneys assigned to handle felony cases. However, this average masked large variations in office size, which ranged from one to 225 attorneys. For this reason, we segmented the sample by size in two ways. About half of the sample (49.5 percent) had fewer than 21 attorneys handling felony cases, one quarter of the sample had between 22 and 49, and the final quarter had over 50. To improve the statistical strength we also dichotomized the sample into offices with more or less than 21 attorneys. We segmented the sample in this way to see if offices of varying sizes handled DNA evidence in different ways.

In 2004, the average office handled 7,505 felony cases, but again, the range was very wide – the smallest handling only 32 and the largest over 23,000, even after eliminating two extreme outliers. Just as the scale of a prosecutor's office might affect access and use of technical DNA evidence, we considered that the workload of an office might have a similar impact. Therefore, we computed the number of felony cases handled per attorney. The range was also great: 24 to 630 cases per attorney. When this number was computed by office size, however, no significant differences were found. Smaller offices (by number of attorneys) had smaller caseloads per attorney, but the differences

were not statistically significant. This comparison was only made across 64 percent of the sample because different offices define "cases" in different ways. While 64 percent of offices defined a case as being a single defendant, 17 percent defined a case as an incident and 10 percent by individual charge. The last two groups could have, obviously, multiple "cases" per defendant. (Numbers do not total 100 percent because some offices seem to use several methods at once.) For purpose of this "per attorney" analysis, only offices using the defendant definition were considered. Here we tried several approaches and decided that the strongest approach statistically was to dichotomize the sample into two approximately equal groups: offices that had 150 cases or less per attorney and those with over 150.

Table 2

Respondent Profile

	Mean
Attorneys in Office	40
Felony Cases Handled in 2004	7,505
Felony Per Attorney	154
	Percentage
Define Case As:	
Defendant	64
Incident	17
Charge	10
Conviction Rate	90

IV. DNA Evidence in the Courtroom

The Uses of DNA in Prosecution

The respondents reported that DNA evidence is most often used in sexual assault cases. It appears to play a role in a significant minority of murder cases and is rarely employed otherwise. However, many factors may be playing a role here. Clearly, the availability of such evidence is a factor, but the adequacy for prosecution purposes of other evidence must also play a role. The cost of collection and processing DNA evidence may be a factor in explaining the large difference between crimes against people and property. The existence of a significant backlog of evidence waiting to be tested has been well documented.⁹ Little is known, however, about how priority is assigned to backlogged cases or evidence. A more detailed inquiry is needed to interpret these data, and no significant variations were found across offices by size or caseload.

Table 3

DNA Evidence Use by Crime Category

	% of Cases Employing DNA Evidence				
	0%	25%	50%	75%	100%
Murder (n=101)	22	52	15	6	4
Sexual Assault (n=102)	13	45	29	13	0
Burglary (n=96)	72	27	0	1	0
Other (n=81)	67	32	0	1	0

Knowledgeability Regarding DNA Evidence

We examined the degree to which legal professionals themselves are knowledgeable regarding DNA evidence. We found that in most offices only a minority of attorneys received specialized training regarding DNA evidence. This was equally true of all respondents across office size and workload.

Table 4

Attorneys in Office with Specialized Training

% of Attorneys in Office with Specialized Training	% of Offices
<25	66
25-75	25
>75	9

At the same time, conviction rates of 90 percent were found across all prosecutors' offices (see Table 2) and all levels of DNA training provided for prosecutors. This finding suggests that lack of such training did not impede prosecution, perhaps because attorney knowledge is adequate without such training or because cases involving DNA evidence are handled by those attorneys with such training. More detailed data would be needed to answer this question.

We also surveyed the knowledgeability of judges as perceived by our respondents. In general, respondents found that judges were somewhat knowledgeable regarding DNA evidence: 72 percent of respondents responded in this way. However, a large minority reported that the judges they deal with were not very knowledgeable (23 percent), and a little less than five percent found their judges very knowledgeable. There were no variations by office size or caseload. Whether these data indicate a need to educate judges on an emerging evidentiary technology or simply

reflect general levels of perceived judicial familiarity with forensics overall is not clear. In fact, as these data report prosecutor perceptions, it is possible that they say more about the relationship or communication between judges and prosecutors than about DNA knowledge of either group.

Trends in DNA's Use

Prosecutors do not all agree on the trends in the use of DNA evidence. Common wisdom and past surveys would suggest that the use of this kind of evidence would be increasing.¹⁰ However, between 2001 and 2004, a significant part of respondents saw no pattern of change at all. In burglaries and other cases (where the use of DNA evidence is not common) about two-thirds of respondents saw no trend over time at all. In murder and sexual assault cases, about 40 percent saw no pattern of change; the rest, however, did see an increase in the use of DNA evidence. Here, too, more information about what kinds of offices see a trend and what sorts do not would clearly be of use. The question of how perceived trends track changes in DNA database statutes would also be another area to explore.

Challenges to the Use of DNA Evidence

Respondents reported few defense challenges to the use of DNA evidence. Respondents reported that they face an admissibility challenge on DNA cases in only 8.5 percent of cases, and 60 percent of prosecutors' offices actually had no such challenges in the year prior to the survey. There was considerable variation among offices that did receive a challenge (i.e., among the 8.5 percent reporting at least one challenge), with almost a third receiving more than 20 challenges. Nevertheless, two-thirds received ten or fewer. The same pattern was found regarding defense attorneys who brought in their own experts to examine DNA evidence, which occurred in only six percent of cases. Here again, 54 percent of offices had no such instances in the prior year.

The grounds for the rare defense challenge seemed to follow predictable patterns of defense challenges to any forensic evidence. More than half of the respondents reported that the evidence for handling procedures was called into question. A third reported challenges to more specific aspects of DNA testing, such as questions about DNA lab protocols or the statistical analysis of the findings.

Even with regard to DNA database evidence, challenges were unknown to 64 percent of respondents, meaning that they faced no such challenge at all in the prior year. The 36 percent who had had such a challenge reported that the vast majority, over 80 percent, were unsuccessful. On the whole, prosecutors did not

experience frequent challenges to the use of DNA evidence, suggesting that the validity of the technology itself is not now contentious.

V. Post-Conviction DNA testing

Laws and Policies

As of this writing, 41 states have a post-conviction testing statute, and 72 percent of our respondents came from those 41 States. Only a very small proportion of prosecutors' offices (12 percent) actually had formal, written policies regarding retrospective review of cases for post-conviction testing. The remainder either had no policy at all or an "unwritten" one. Over 93 percent had no immediate plans to develop a formal written policy.

Frequency of Post-Conviction Testing and Reasons

Re-opening cases and doing post-conviction testing was a rare event among our respondents. Less than 10 percent of the offices had ever re-opened a case on their own initiative. And those few who did had done so for very few cases.

Defendants request testing more frequently, but only 53 percent of the respondent offices actually received any request for post-conviction DNA testing in the year prior to the survey. Those who received requests appeared to have received only a few, with none reporting more than 20 of such. (This was the lowest category offered by the survey, which could just as easily mean that an office received one request as 20.) Fifty-five percent of respondents reported that requests from convicts themselves were most frequent, while 27 percent of respondents reported that innocence projects were the most common source of testing requests, and 14 percent reported that public defenders were the source of the largest number of requests. Very few (4 percent) of such requests came from private attorneys.

Unfortunately, detailed, accurate information is not available beyond this survey, in part because only about a quarter of the respondent offices kept records of such requests. (The remainder presumably provided their best recollection.) As expected, those that reported receiving a request also reported that they were invariably related to murder or sexual assault cases.

Responding to Requests

No discernable pattern exists for regarding the procedures that prosecutors use to evaluate requests for post-conviction testing. Respondent offices had relatively the same percentage of staff evaluating these requests: a specially designated person (19 percent) or group (10 percent), senior staff (14 percent), departmental leaders (24 percent), or the original prosecu-

tors (17 percent). Perhaps due to the rarity of such requests, a common practice is not discernible from these responses.

There is more unanimity on the criteria to be used to decide the appropriate course of action. On the technical side, the state of preservation of the evidence is clearly paramount and two-thirds of the respondents considered that criteria. Legally, the probative value of the DNA exclusion was referenced by 63 percent of the respondents. The only other factor playing a major role was the convict's claim of innocence (44 percent). Respondents were almost unanimous in saying that funding issues did not play a role in testing decisions, with less than two percent reporting ever denying a request due to lack of funds.

Outcomes

Not only are requests for testing rare, they are hardly ever efficacious, but the number of successes is not trivial. Offices that conducted testing asserted that in seven percent of cases, such re-testing led to an exoneration and in almost five percent, to a new trial. Moreover, in 15 percent of cases, an additional suspect was identified. However, these numbers must be treated with caution given poor or nonexistent record keeping and the very low number of total cases involved. On this critical issue, our data is simply too weak for clear conclusions. A more focused inquiry into outcomes is needed to evaluate the important issue of the impact of post-conviction petitions.

VI. DNA Evidence Preservation

The use of DNA evidence poses new challenges for the preservation of biological evidence, particularly in the era of testing backlogs and of post-conviction DNA testing.¹¹ As in the case of policies for reviewing post-conviction DNA testing, only a minority of prosecutors (41 percent) had written policies regarding collection and preservation of biological evidence. Even fewer (33 percent) had formal written policies regarding the retention of material post-conviction. This finding does not mean that the other jurisdictions did not have standard practices, but only that those practices had not been formalized at the time of survey.

Twenty-eight percent of respondents did not know if they had written procedures for the management of crime-scene biologicals, and 44 percent were not sure if they had written policies regarding post-conviction preservation of evidence. These responses may reflect the complex organizational responsibility for storing biological evidence. Forty-one percent of respondents asserted that multiple agencies shared the responsibility, while 35 percent assigned it to the police/sheriff's department and 19 percent directly to the crime lab.

Answers around written policies may therefore partially reflect the fact that prosecutors were being asked to report on policies of multiple other agencies as well. Here, too, it appears that no common organizational practice has emerged.

Irrespective of knowledge regarding the presence of formal policies, prosecutors felt they could describe the actual practice of evidence retention. The largest group (44 percent) reported that evidence was retained "indefinitely," while almost as large of a group (38 percent) reported that their policy was to retain evidence only until the end of the appeals process. The remainder reported a variety of time frames. The dichotomy between indefinite retention and one ending with the end of appeals is difficult to interpret and warrants further study.

In any case, some jurisdictions see biological evidence preservation as problematic. Thirty-nine percent of respondents considered it a serious barrier or a moderate barrier to systematic case reviews, and more than 12 percent reported it had impacted case reviews in a significant number of their review efforts. This level of concern, combined with complex patterns of organizational responsibility and lack of prosecutorial knowledge about policies, suggests this is an arena for more inquiry.

VII. Cold Cases and John Doe Warrants

Lastly, we examined prosecutors' use of DNA evidence on unsolved cases, and the use of John Doe warrants as a means of tolling the statute of limitations. John Doe warrants, which identify an unknown defendant by a genetic profile, have been used in some jurisdictions to extend the statute of limitations.¹² Most jurisdictions (65 percent) have used DNA evidence to re-open cases, and more than three-quarters reported that cases were solved in this way. However, the data also suggests that the actual number of such cases is very low. This is a rare event within an office, even if many offices have experienced it. While most offices have used DNA data to re-open a cold case, the use of biological evidence to toll the statute of limitations is rarer, with about three-quarters of all respondents never having done so.

VIII. Conclusions and Next Steps

This study marks a first step in developing a "snap shot" of District Attorneys' office practices. The findings, while preliminary, indicate that further research informed by this pilot study should be undertaken. Although the DA's office is only part of the system through which DNA evidence travels, inefficiencies here will significantly impact the effectiveness of DNA

as a crime-fighting tool. Further research will play an important role in documenting practices and trends so that policies may be more accurately devised, such as the decision systems for DNA-related resource allocation; management of the DNA case queue; identification of areas where training is needed; and, in general, office practices, policies, and procedures that impact the use of DNA in investigating and in prosecuting cases. Ultimately, a set of best practices could be derived from these studies, and would be a valuable tool for maximizing the effectiveness of forensic DNA databases.

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References

1. C. J. DeFrances, "Prosecutors in State Courts, 2001," *Bureau of Justice Statistics Bulletin* (2002): at 8-9.
2. *Id.*
3. M. A. Jobling and P. Gill, "Encoded Evidence: DNA in Forensic Analysis," *Nature Reviews* 5, no. 5 (2004): 739-751.
4. P. Giannelli, "Forensic Science," *Journal of Law, Medicine & Ethics* 33, no. 3 (2005): 535-544, at 535-536.
5. F. R. Bieber, "Science and Technology of Forensic DNA Profiling: Current Use and Future Directions," in D. Lazer, ed., *DNA and the Criminal Justice System: The Technology of Justice* (Cambridge: MIT Press, 2004): 23-62; P. Gill, "DNA as Evidence: The Technology of Identification," *New England Journal of Medicine* 352, no. 26 (2005): 2669-2671.
6. S. Axelrad, "Survey of State DNA Database Statutes: Statutes Grid," available at <http://aslme.org/dna_04/grid/guide.pdf> (last visited March 29, 2007).
7. P. Reilly, "Legal and Public Policy Issues in DNA Forensics," *Nature Reviews* 2, no. 2 (2001): 313-317.
8. N. P. Lovrich et al., *National Forensic DNA Study Report: Final Report*, National Institute of Justice, Office of Justice Programs, U.S. Department of Justice, 2003; National Institute of Justice, *Report to the Attorney General on Delays in Forensic DNA Analysis*, National Institute of Justice, U.S. Department of Justice, 2003 [hereinafter cited as NIJ].
9. See Lovrich, *Id.*
10. *Id.*; see NIJ, *supra* note 8; E. Zedlewski and M. B. Murphy, "DNA Analysis for 'Minor' Crimes: A Major Benefit for Law Enforcement," *National Institute of Justice Journal* 253 (January, 2006): 2-5.
11. See Lovrich, *supra* note 8; International Association of Chiefs of Police, *DNA Evidence: Enhancing Law Enforcement's Impact from Crime Scene to Courtroom and Beyond*, Summit Final Report, vol. 1, U.S. Department of Justice, Philadelphia, PA, 2003.
12. For a description of the origin of the John Doe Warrant and related policy issues, see E. J. Imwinkelreid, "The Relative Priority That Should Be Assigned to Trial Stage DNA Issues," in Lazer, *supra* note 5, at 94-95; see also N. Gahn, "The Wisconsin John Doe Warrant," and "An Update on John Doe DNA Profile Arrest Warrants," available at <http://www.denverda.org/DNA_Documents/Gahn2.pdf> (last visited March 29, 2007).