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The New PCAST Report to the President of the United States on Forensic Science

BY ROBERT SANGER¹

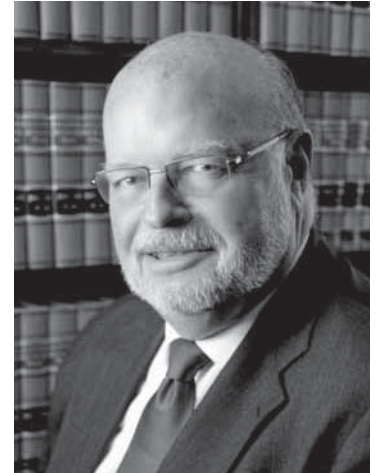
The President of the United States requested an in-depth report from the President's Council of Advisors on Science and Technology (known as PCAST) in 2015 to "consider whether there are additional steps that could usefully be taken on the scientific side to strengthen the forensic science disciplines and ensure the validity of forensic evidence used in the Nation's legal system."² The PCAST Report was issued September 20, 2016, specifically referring to criminal court applications of forensic science. However, as with all of the forensic studies that have come out in recent years, this report has implications for civil litigators as well as criminal. It also has implications for judges, particularly those at the trial level.

In this month's *Criminal Justice* column, we will review the thrust of the PCAST Report, making reference to the six areas of forensic science (seven evaluations) that it features in particular. One of those, Firearms and Toolmarks, is a forensic area that is the subject of independent review by the Academy Standards Board (ASB) of which the author is the Chair. This ASB will not meet in full until mid-November after the publication of this article and, in any event, the opinions and observations in this article are those of the author only. Nevertheless, it can be reported that there has been some considerable reaction to the PCAST Report in the general scientific, forensic and law enforcement communities, including some regarding the individual areas of forensic testimony mentioned in the Report.

The main reason for writing at this time is to give our readers a "heads up" as to the controversies ahead and to remind everyone that, ever since the NAS Report in 2009,³ forensics is a new ballgame. There are emerging new rules, new standards, new bases for pretrial litigation and new grounds for proffers, objections and cross-examination. In all cases, civil or criminal, where there is potential expert testimony, the PCAST Report as well as several other studies should be taken into account in formulating pre-trial and trial strategy. So, here is a preview of the latest.

Why PCAST?

The Department of Justice (DOJ), headed by the Attorney General of the United States, is a part of the Executive Branch and includes, of course, the Federal Bureau of Investigation (FBI), the Bureau of Alcohol Tobacco, Firearms and Explosives (ATF), and numerous other federal agencies with laboratories and agents available to testify as experts. The FBI and the Attorney General



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were well aware of shortcomings in the forensic sciences and expert testimony which had largely been exposed by DNA results and re-tests in the 1990s. This led to the FBI's extensive re-examination of hair comparison microscopy in 2002, an unfavorable report on the FBI's bullet comparisons based on lead composition in 2004, and an FBI commissioned report critical of latent fingerprint analysis in 2005 as a result of the Brandon Mayfield debacle. Furthermore, in the 2000s, Scientific Working Groups (SWGs) were instituted by the DOJ and the FBI to study all of the areas of forensic testimony. Thus, the Executive Branch has been well aware of the failings of forensic science and expert testimony for some time.

In the midst of all this, President George W. Bush commissioned the now landmark study by the National Academy of Sciences. After extensive hearings, the Academy issued its report in 2009 which represented an assessment of the general lack of scientific standards in expert testimony across the board. They made an exception for testimony regarding single source, non-contaminated, non-degraded DNA which they held out as the "gold standard." So, once again, the Executive Branch – and everyone else involved with expert testimony – obtained a candid assessment which was consistent with the findings that were emerging from the DOJ and FBI studies and from the reforms recommended by the SWGs.

Then, in 2013, the federal government appointed the old Bureau of Standards within the Department of Commerce, renamed the National Institute of Standards and Technology (NIST), to take over the evaluation of forensic sciences in light of the NAS Report. NIST, also an Executive Branch agency but not one under the direction of the Department of Justice, was a compromise choice in light of the fact that the NAS Report recommended that oversight of forensic

standards not be a part of the prosecutor's office or overseen by law enforcement officials. Nevertheless, the DOJ (the federal law prosecutorial and law enforcement agency) established the National Commission on Forensic Science (NCFS, chaired by Deputy Attorney General Sally Q. Yates) "in partnership" with NIST to oversee the work that the NAS Report had recommended not be under prosecutorial or law enforcement supervision. In turn, NCFS and NIST created the Organization of Scientific Area Committees (OSACs) for Forensic Science to study individual areas of forensic expertise. These governmental OSACS started to work in 2014 and are continuing to work on recommendations at this time.

Despite the criticism of prosecutorial oversight, the OSAC boards and staffs have enlisted the talents of some impressive non-governmental, as well as governmental, experts in the various fields. The resulting recommendations should be substantial. Nevertheless, a non-governmental organization, American National Standards Institute (ANSI) designated the American Academy of Forensic Sciences as a Standards Development Organization (SDO) leading to the creation of Academy Standards Boards, such as the one the author chairs, to develop a consensus among the stakeholders in forensic sciences. As reported in this column previously, that work is going on and involves liaisons with the OSACs, governmental agencies and others.

So, why PCAST? It certainly seems redundant to other Executive Branch efforts. On the other hand, the fact is that forensic science is at a critical stage of transformation. The word is filtering down to trial lawyers and trial judges. There are substantial defects and substantial revisions in the way that judges will regard their jobs as "gatekeepers." There are also substantial policy decisions that will be required by the Executive Branch, headed by the President of the United States, which may involve direction to the Attorney General and other Executive agencies. So, understanding that, the Chief Executive does have a legitimate need for direct expert information in the way he or she does the job. And, that is what the Chief Executive received: a candid report from the experts on forensic science and whether the current state of forensics does or does not promote scientific validity.

The PCAST Methodology

First, the PCAST Report focused on criminal cases concerning six areas of forensic concern: comparing DNA samples, bite marks, latent fingerprints, firearm marks, footwear, and hair. Second, these areas specifically relate to forensic "feature comparison" methods. Nevertheless, to the extent that there are issues regarding foundational

requirements for a proffer, objections to be made or cross-examination to be conducted, the concerns contained in this report would be applicable to all matters, civil and criminal. Either directly or indirectly, all of these concerns relate to *Daubert/Kumho Tire* requirements and to the defensibility, either from a proponent or opponent's perspective, of all forensic and expert opinions.

The Report studied these six areas of forensic concern with regard to "foundational validity" and "validity as applied." This is the same thing we have discussed in this column previously and would correlate to the four-stage rule of admissibility argued for in these pages and summarized in "A Scientific Approach to Scientific Evidence: A Four-Stage Rule for Admissibility and Scope."⁴ In the terms of the four-stage rule: 1) Is it a science; and, if so, 2-4) Is the witness a scientist, who analyzes valid data and comes to a valid opinion?

PCAST basically advised the President that:

"Foundational validity" for a forensic science method requires that it be shown, based on empirical studies, to be repeatable, reproducible, and accurate, at levels that have been measured and are appropriate to the intended application. Foundational validity, then, means that a method can, in principle, be reliable. It is the scientific concept we mean to correspond to the legal requirement, in Rule 702(c), of "reliable principles and methods."

"Validity as applied" means that the method has been reliably applied in practice. It is the scientific concept we mean to correspond to the legal requirement, in Rule 702(d), that an expert "has reliably applied the principles and methods to the facts of the case."

PCAST went on to say that "foundational validity" requires:

(1) That a method has been subjected to empirical testing by multiple groups, under conditions appropriate to its intended use. The studies must (a) demonstrate that the method is repeatable and reproducible and (b) provide valid estimates of the method's accuracy (that is, how often the method reaches an incorrect conclusion) that indicate the method is appropriate to the intended application.

(2) For objective methods, that the method can be established by measuring the accuracy, reproducibility, and consistency of each of its individual steps.

(3) For subjective feature-comparison methods, because the individual steps are not objectively specified, that the method must be evaluated as if it were a "black box" in the examiner's head. Evaluations of validity and reliability must therefore be based on "black-box studies," in which many examiners render decisions about many independent tests (typically, involving "questioned" samples and one or

more “known” samples) and the error rates are determined.

(4) Without appropriate estimates of accuracy, that an examiner’s statement that two samples are similar—or even indistinguishable—is scientifically meaningless: it has no probative value, and considerable potential for prejudicial impact.

“Validity as applied” requires meeting two tests:

(1) That the forensic examiner must have been shown to be capable of reliably applying the method and must actually have done so. Demonstrating that an expert is capable of reliably applying the method is crucial—especially for subjective methods, in which human judgment plays a central role. From a scientific standpoint, the ability to apply a method reliably can be demonstrated only through empirical testing that measures how often the expert reaches the correct answer. Determining whether an examiner has actually reliably applied the method requires that the procedures actually used in the case, the results obtained, and the laboratory notes be made available for scientific review by others.

(2) That the practitioner’s assertions about the probative value of proposed identifications must be scientifically valid. The expert should report the overall false-positive rate and sensitivity for the method established in the studies of foundational validity and should demonstrate that the samples used in the foundational studies are relevant to the facts of the case. Where applicable, the expert should report the probative value of the observed match based on the specific features observed in the case. And the expert should not make claims or implications that go beyond the empirical evidence and the applications of valid statistical principles to that evidence.

PCAST also reported to the President that “an expert’s expression of *confidence* based on personal professional experience or expressions of consensus among practitioners about the accuracy of their field is no substitute for error rate estimated from relevant studies.” This and the preceding criteria put the PCAST Report in accord with the emerging premises of modern forensic evidence. There are nuanced differences that can be explored at another time – perhaps in subsequent *Criminal Justice* columns – and there will probably be significant disputes about how these principles were applied in the particular six forensic areas analyzed by PCAST in the Report.

The PCAST Conclusions

The short version is that PCAST found that DNA analysis of single-source and simple-mixture samples remains the gold standard, although there is a need to improve proficiency testing. However, DNA analysis of complex mixture

samples require substantially more evidence to establish foundational validity. The current state of expertise is subjective and the foundational validity of the methodology has not been established as reliable.

Analysis of bite mark evidence did not fare nearly as well. It was found to be far from meeting the scientific standards for foundational validity, and the prospects for developing bite mark analysis into a scientifically valid method is low; so low, in fact, that they advised against devoting significant resources to the effort.

Fingerprint analysis was still found to be subjective. There was hope held out that the additional data bases and analysis could lead to a more objective basis for comparison. The same was said of firearms and toolmark analysis. However, footwear analysis, other than objectively evaluating class characteristics, was not supported to determine individual characteristics. Finally, hair analysis was not found to meet the requirements of foundational validity or reliability.

Following this, PCAST made recommendations to NIST and to the President’s own Office of Science and Technology Policy (OSTP), to the Attorney General and to the Judiciary. It is beyond the scope here to analyze these recommendations in detail but they are quite cautionary about the use of overblown claims in testimony and recommend that the various agencies do a lot more than PCAST perceived them to be doing. The recommendations are strong in requiring objective empirical support to establish both foundational and as-applied validity. And, as is the trend in forensic science today, PCAST emphasized the need for metrics in the support for and expression of opinions.

The Immediate Reaction

Just as when the 2009 NAS Report came out, the various forensic expert groups have become defensive. We will be seeing formal responses from these groups, and interest groups associated with them in the near future. Experts, just like all people, are averse to being told that they are not doing a good job or that they need to do a better job. Time will tell what specific criticisms will be leveled against PCAST and what will be taken to heart by working forensic experts. Nevertheless, the thrust of the Report is consistent with the direction that the highest level of forensic science has been taking over the last few years. One would hope that this criticism contribute to the efforts already underway to enhance the scientific status of forensics.

Other commentators, such as Judge Kozinski of the Ninth Circuit, applauded the PCAST Report. He wrote an article for the *Wall Street Journal*, “Rejecting Voodoo Science in the Courtroom.”⁵ Another major force within the judiciary, Jed Rakoff, was actually on the Advisory Committee

for PCAST. But, with a swift rejection of the Report, the National Association of District Attorneys, in their own words, “slammed” the PCAST Report in a press release.⁶ And, the Attorney General Loretta Lynch stated that she felt that scientific evidence has a positive effect on juries and on the development of evidence. She said of PCAST that, while “we appreciate their contribution to the field of scientific inquiry, the department will not be adopting the recommendations related to the admissibility of forensic science evidence.”⁷

Conclusion

The President is now advised, and his President’s Council of Advisors on Science and Technology (PCAST) has been so presumptuous as to give advice to the Attorney General as well as NIST and the judiciary. It did not go over well with the prosecution side so far. We have yet to hear from the forensics industry and scientific groups, governmental and otherwise, that have been studying the same things. Much of what is recommended is not out of line with the views of other leaders in the advancement of forensics. However, we can expect that the Report will be dissected, evaluated and re-evaluated over the next few months.

Nevertheless, it would seem shortsighted for any lawyer, civil or criminal, to disregard this Report. It can certainly be the basis for support, opposition or cross-examination of individual experts in individual cases. The contents will have some sway with some judges. In the long run the Report may hold up well or it may be successfully criticized in part but, as a whole and as a resource, it is not something for lawyers and judges to ignore. ■

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ENDNOTES

1 ©Robert Sanger. The opinions expressed herein are those of the author alone and not of the Colleges of Law, the AAFS Standards board or the other organizations with which the author is associ-

ated.

- 2 President’s Council of Advisors on Science and Technology, “*REPORT TO THE PRESIDENT, Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods*,” Executive Office of the President (September 2016), (hereinafter, “PCAST Report”), at: https://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf.
- 3 Committee on Identifying the Needs of the Forensic Sciences Community, “*Strengthening Forensic Science in the United States – A Path Forward*,” National Research Council (2009) (hereinafter, “NAS Report”).
- 4 Robert Sanger, “*A Scientific Approach to Scientific Evidence: A Four-Stage Rule for Admissibility and Scope*,” (2013), Westlaw: 2013 WL 5757941 or: SSRN at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2706986.
- 5 Alex Kozinski, “*Rejecting Voodoo Science in the Courtroom*,” Wall Street Journal, (Sept. 19, 2016).
- 6 NDAA Press Release, (September 20, 2016) <http://www.ndaa.org/pdf/NDAA%20Press%20Release%20on%20PCAST%20Report.pdf>.
- 7 Gary Fields, “*White House Advisory Council Report Is Critical of Forensics Used in Criminal Trials*,” Wall Street Journal (September 20, 2016), <http://www.wsj.com/articles/white-house-advisory-council-releases-report-critical-of-forensics-used-in-criminal-trials-1474394743>.

SBCBA

Crandell Award, *continued from page 7*

Association President, with Sue McCollum also serving as President of the Santa Barbara Women Lawyers. When the Courthouse Legacy Foundation (CLF) launched its initiative a few years ago for much needed renovations to the courthouse, firm member Brad Ginder led the effort as President of CLF. Numerous Bar Association sections, initiatives and committees have been chaired by firm members.

Partners and associates in the firm are encouraged to select non-profit activities and organizations in which they have a personal interest and then to demonstrate that interest by committing time and effort to that endeavor. All members of the firm are involved in at least one such activity. Community service is encouraged for all attorneys at the firm and is considered as a part of the firm’s annual review process.

Firm members have served in officer, director and/or trustee positions in many local non-profit organizations, including the Trust for Historic Preservation, Hillside House, the Boys & Girls Club, Angels Foster Care, Garden Court, the YMCA, the Santa Barbara Botanic Garden and Santa Barbara Visiting Nurse & Hospice. At various times, a member of the firm has served as president of the Santa Barbara Zoo, the Santa Barbara Nautical Museum, the Downtown Organization and the United Boys and Girls Club of Santa Barbara County. ■