



SCIENCE AND THE LAW

Forensic Science Needs a Major Overhaul, Panel Says

In 1928, the National Academy of Sciences issued a report saying coroners' offices should be abolished in the United States as an "anachronistic institution"; it called for replacing coroners with medical examiners.

Now, 80 years later, more than half the states still have county coroners, an office for which no medical training is necessary. Last week, the National Academies' National Research Council (NRC) reiterated its message, this time in the context of a sweeping overhaul of all forensic sciences in the United States, which it says almost uniformly lack rigorous underpinnings. It is calling for top-down change, starting with a new National Institute for Forensic Science.

The 255-page report,* requested by Congress in 2005, also calls for removing crime labs from the direct control of law-enforcement agencies, mandatory accreditation for labs, certification and a code of ethics for forensic professionals, and a push for standardized procedures.

The country is "plagued by fractionated and inconsistent practices" in the way crimes and suspicious deaths are investigated, said study co-chair Harry T. Edwards, a former judge in the Washington, D.C., Court of Appeals, at a press conference last week in Washington, D.C. For example, Donald Murray of the National Association of Counties noted that there are

**Strengthening Forensic Science in the United States: A Path Forward.*

only about 500 trained forensic pathologists in the nation's more than 3000 counties. In Minnesota, he said, "most autopsies are flown to two counties that happen to have forensic pathologists."

The committee's top priority is the establishment of an independent federal institute to put a scientific footing under myriad crime-fighting disciplines covering toxicology and analysis of fiber, hair, blood, coatings such as paint, shoeprints, tool marks, tooth marks, guns, fires, and fingerprints. The Justice Department is not the appropriate venue, says the report, and no other existing federal agency has "the capacity or appropriate mission" to do the job.

Reactions to the report have been largely positive. "I think this agency would be welcomed nearly universally," says Max Houck, director of the Forensic Science Initiative at West Virginia University, Morgantown. But how the Justice Department, which issued a terse statement saying it would evaluate the report, feels about it is not clear. Former *Science* editor-in-chief Donald Kennedy of Stanford University in Palo Alto, California, who co-chairs the NRC Committee on Science, Technology, and Law, says the Justice Department's research arm, the National Institute of Justice (NIJ), was leery of the study and declined to provide funding for it. NIJ officials did not return phone calls.

The report is hard on unnamed "members

of the forensic science community [who] will not concede that there could be less than perfect accuracy either in given laboratories or in specific disciplines." It concludes: "With the exception of nuclear DNA analysis, no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source."

Fingerprints are Exhibit A. Committee member Sargur Srihari of the State University of New York, University at Buffalo, points out that DNA is available in only 5% to 10% of cases. That leaves fingerprints as the main way to nail a specific perpetrator, but recent cases have undermined the confidence of the courts. Most notable was that involving Brandon Mayfield, accused of being involved in the 2004 terrorist attacks on commuter trains in Madrid. The FBI ran digital images of prints sent from Spain through the Integrated Automated Fingerprint Identification System, which came up with several possible matches. Four experts both from within and outside the FBI narrowed the field to Mayfield. Subsequently, two FBI examiners changed their minds after going to Madrid to look at the original fingerprint images.

Srihari, a computer scientist, says he and others are working to boost the statistical reliability of fingerprint analysis with calculations of "random match probabilities." As with DNA analysis, he points out that matching a print to one in a database wouldn't be a problem if criminals left perfect prints. But authorities usually have to deal with partial prints, which, unlike DNA, have multiple variables—such as loops, whorls, ridges, and bifurcations—that are not clearly defined.

Authors of the NRC report emphasize that they do not intend to provide fodder for lawyers seeking to overturn convictions. But as lawyer Michael Saks of Arizona State University, Tempe, notes, defense attorneys could try to use the report to cast doubt on forensic evidence: "A capable lawyer will consider any and all information that might advance a client's case."

—CONSTANCE HOLDEN



Loops and whorls. Fingerprint analysis is still more art than science.