

THE CQ Researcher

PUBLISHED BY CONGRESSIONAL QUARTERLY INC.

DNA Databases

Does expanding them threaten civil liberties?

DNA identification has moved from an experimental technique to an established crime-solving tool for police and prosecutors in the United States, as well as other nations. Now, law enforcement agencies are creating DNA databases of criminal offenders that can be used to link criminals or suspects to unsolved crimes. All 50 states have laws requiring DNA profiling of some offenders, and some law enforcement officials want to compile DNA profiles of arrestees as well. Defense lawyers are also using DNA analysis to challenge old convictions; more than 60 prisoners — some on death row — have been exonerated by DNA testing. But civil liberties and privacy advocates say expanding government DNA databases will lead to misuse of sensitive personal information that can be gleaned from DNA analysis.



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CQ

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May 28, 1999
Volume 9, No. 20

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The CQ Researcher (ISSN 1056-2036). Published weekly, except Jan. 1, April 2, July 2, Dec. 3, Dec. 31, by Congressional Quarterly Inc., 1414 22nd St., N.W., Washington, D.C. 20037. Annual subscription rate for libraries, businesses and government is \$396. Single issues are available for \$10 (subscribers) or \$20 (non-subscribers). Quantity discounts apply to orders over 10. Binders are available for \$18. Additional rates furnished upon request. Periodicals postage paid at Washington, D.C., and additional mailing offices. POSTMASTER: Send address changes to The CQ Researcher, 1414 22nd St., N.W., Washington, D.C. 20037.

Cover: Jenifer A.L. Smith, chief of the FBI's DNA Analysis Unit I, explains how DNA samples helped convict a rapist in Milwaukee. (Reuters/Rick Wilking, Nov. 12, 1997)

DNA Databases

BY KENNETH JOST

THE ISSUES

New York City police arrested Isaac Jones in April outside a pawnshop in the Bronx. He was waiting in a car while his girlfriend redeemed a diamond pendant that had been taken from a rape victim.¹

At first, Jones denied any knowledge of the attack, according to police. When detectives threatened to charge his girlfriend, however, Jones reportedly admitted that he was the man police had been hunting in a string of rapes dating back to 1993.

Jones, who had previous convictions for sodomy and unlawful imprisonment of a woman, could not recall details of the other attacks, police said, so they charged him in only four assaults. But an analysis of the DNA contained in a sample of Jones' blood showed a likely match with DNA samples obtained in many other rapes.* "We have 17 positive hits of DNA evidence leading back to Isaac Jones as the rapist," First Deputy Police Commissioner Patrick Kelleher told reporters.

Acquaintances from Jones' Bronx apartment house and the New York office building where he worked as a floor polisher described Jones as polite and friendly and voiced surprise at his arrest. "The DNA evidence speaks for itself as to what kind of individual he really is," Kelleher responded. "We got a very, very dangerous individual off the streets of New York."

Introduced in U.S. and British

* DNA — deoxyribonucleic acid — is the basic genetic substance of all living cells. Embedded in the giant DNA molecules — identical throughout the body — is the hereditary information that determines everything from eye color to predisposition to some diseases. In addition, a DNA molecule contains stretches of chemical building blocks with repetitive patterns that vary from individual to individual.



courtrooms in 1987, DNA profiling, or so-called genetic fingerprinting, has evolved from a controversial forensic novelty to a powerful and widely accepted tool for identification in criminal investigations and prosecutions.² DNA identification has also been used in some 60 cases in the United States to exonerate defendants wrongfully convicted years ago — freeing inmates from death rows or long prison sentences. (See story, p. 455.)

"It's the most significant advancement in investigative tools at least in this century," says Christopher Asplen, a federal prosecutor who is currently serving as executive director of the Justice Department's National Commission on the Future of DNA Evidence. "It's one of the most accurate technologies we have. It has an incredible ability not just to convict the guilty but also to exonerate the innocent."

Walter Rowe, a leading academic forensic scientist, says that DNA typing, in fact, is going beyond the identification technique introduced at the turn of the century: fingerprinting. "Now we're probably more likely to recover usable DNA from a scene than a fingerprint," says Rowe, a professor at George Washington University in Washington, D.C. "We're now starting to do DNA work from animals and plants. It may be the greatest advance in forensic science in history."

Most of the early controversies

about the science of DNA identification have faded away. But some civil liberties and privacy advocates are assailing moves by law enforcement agencies to construct a nationwide computer database of DNA profiles of criminal offenders. Law enforcement officials say police and prosecutors can use the databases to link suspects and offenders to crimes that otherwise would either go unsolved or require substantial amounts of time and money to solve.

Critics, however, fear the databases will be abused. "There is a frightening potential for a brave new world where genetic information is routinely collected and its use results in abuse and discrimination," says Barry Steinhardt, associate director of the American Civil Liberties Union (ACLU). Employers and insurers, for example, could uncover a worker's predisposition to disease and use the information to exclude him from employment or insurance coverage.

The same biological sample used for DNA identification "can also be used for a full biological dissection of that person," says geneticist Paul Billings, who edited a collection of critical essays about DNA identification several years ago.³

Law enforcement officials note, however, that the DNA used for identification purposes actually does not contain genes and thus provides no genetic information about a person: "junk DNA," they call it. But critics emphasize that law enforcement agencies retain the original samples collected from criminal offenders — usually blood or saliva — making it possible to use the samples for other purposes. "Whoever holds those samples has full access to all the genetic information about that person," Billings says.

Steinhardt also warns against what he calls the "creeping expansion" of

databases. The earliest databases were limited to sex offenders, but over time they have been expanded in some states to include people convicted of other crimes. "We've gone very quickly from data banks for persons convicted of sex offenses to data banks for most felonies to proposals to test all arrestees and even to test all newborns," says Steinhardt (*See story, p. 466.*)

So far, the criticisms of DNA databanking are having little effect. All 50 states have passed laws providing for DNA databases on convicted sexual offenders. Four of those states collect samples from anyone convicted of a felony (*see p. 462.*)

The FBI, which established its own database in 1990, is now working to create a national database comparable to its national criminal fingerprint file. Twelve states have connected to the FBI's system — known as CODIS for Combined DNA Identification System — since it was officially announced in October; FBI officials hope to have all 50 states connected within a year or so.

But the states face significant funding and logistical problems — including a backlog of nearly a half-million DNA samples that have been collected but not analyzed. And some states have yet to set up their databases — including Louisiana, the only state with a law on the books for collecting DNA samples from people who simply have been arrested for felonies, as well as those who have been convicted.

Despite those difficulties, lawmakers and law enforcement officials in many states are actively debating expansion of DNA databases. New York City Police Commissioner Howard Safir stirred the controversy in December by proposing that DNA samples be collected from all arrestees in the city, saying it would help reduce crime. He coupled the proposal with some safeguards, such

as expunging the DNA identification of anyone who was not convicted. Even so, civil liberties advocates fiercely denounced the idea, while even some DNA database advocates said practical considerations weighed against the idea for the time being. (*See "At Issue," p. 465.*)

The issue is one of many questions concerning the use of DNA evidence being considered by the national DNA commission, which is expected to complete its work by August. As the commission, appointed by Attorney General Janet Reno, sifts through a variety of issues, here are some of the major questions being debated:

Should the use of DNA databases be expanded?

Carolyn and Tony Sievers, of Virginia Beach, Va., have no doubts about the value of DNA databases. Virginia's database helped solve the murder of their 22-year-old daughter, Hope Hall, more than two years after she was raped and killed in her suburban Richmond, Va., apartment. Her killer, Shermaine Johnson, was identified after he had begun serving a long prison sentence for rape and abduction in southeastern Virginia. Johnson was identified when the DNA sample he had provided after his conviction — as required under Virginia law — was matched in August 1996 in a computerized "cold hit" to DNA collected at the scene of the 1994 crime. Johnson was convicted in July 1998 of Hall's murder and sentenced to death.

The Sievers have created the "Hope Denise Hall Action Memorial" Web site to advocate more funding for national and international DNA databases to identify and prosecute criminal offenders. "Instead of convicting a criminal of one crime," the Sievers write, "we can identify him for all the crimes he committed, and then he goes to prison for the rest of his life or is properly executed if warranted."⁴

Such cases explain why law enforcement officials view DNA databases as an important tool in fully realizing the benefits of DNA evidence. "It's not just crimes that occur today," says Steve Niezgoda, program manager for the FBI's DNA database. "It's crimes that occurred in the past: women raped five or six years ago."

Niezgoda says there have been more than 600 cold hits through the FBI's DNA database since it was established in 1990. The database also produces benefits that are less susceptible to quantifying, he says. "A database hit saves a lot of police resources," Niezgoda says. "And it might lead to longer sentences, or less cost with the trial, because the evidence is of higher quality."

Critics of DNA databases are hard-pressed to dispute the benefits to law enforcement. "Of course, there would be benefits for the criminal justice system," says Philip Bereano, a professor of technology and public policy at the University of Washington in Seattle. "There would be benefits if we let police knock down doors at random in search of criminal activity. I'm sure they would find some, but the Fourth Amendment wouldn't permit it."

"Law enforcement is always looking for new tools to investigate crime," says the ACLU's Steinhardt. "We still have problems with the notion of mass testing of individuals based not on reasonable cause that they are a suspect in the crime but just on their status" as a convicted offender or arrestee.

So far, however, civil liberties challenges to creating DNA databases of convicted offenders have failed in state and federal courts. Three federal appeals courts have upheld state laws allowing the collection of DNA samples from inmates and parolees, and the only state court ruling to bar the practice — by a lower court judge

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DNA Testing Frees Many Convicted Offenders

At least 62 convicted offenders have been freed from prison in the United States after DNA testing of evidence established their innocence or cast sufficient doubt on their guilt to warrant their release. A Justice Department report published in 1996 analyzed the 28 cases known at that time. All but one of the defendants were convicted by juries; the one guilty plea involved a defendant with a mental disability. All of the cases involved some form of sexual assault. The inmates served an average of seven years before their release. Three of the freed inmates had been sentenced to death, and six others received life terms. Here are synopses of those cases:

Case Name/ Location	Primary Charges/ Date of Conviction/ Sentence	Selected Evidence at Trial	Result of DNA Testing; Time Served
Bloodsworth, Kirk Baltimore, Md.	Murder, rape (1985); death, reduced to life	Five witness IDs; self-incriminating statements	Excluded by test of panties; 9 yrs.
Cotton, Ronald Burlington, N.C.	Rape, 2 counts (1985, '87); life + 54 yrs.	Victim ID; similarity of shoes, flashlight	Excluded by test of panties, vaginal swabs; 10-1/2 yrs.
Cruz, Rolando Chicago, Ill.	Murder, kidnapping, rape (1985); death	Witness statements; "dream visions" of murder	Excluded by test of semen-stained underwear; 11 yrs.
Daye, Frederick Rene San Diego, Calif.	Rape, 2 counts; kidnapping (1984); life	Victim, witness ID; blood analysis	Excluded by test of semen-stained jeans; 10 yrs.
Hernandez, Alejandro Chicago, Ill.	Murder, kidnapping, rape (1985); death	Witness statements; self-incriminating statements	Excluded by test of semen-stained underwear; 11 yrs.
Honaker, Edward Nelson County, Va.	Rape, sexual assault, sodomy (1985); 3 life terms + 34 yrs.	Victim, witness IDs; hair analysis	Excluded by test of vaginal swab; 10 yrs.
Jones, Joe C. Topeka, Kan.	Rape, kidnapping (1986); life + 10-25 yrs.	Victim, witness IDs; proximity to crime scene	Excluded by test of vaginal swab; 6-1/2 yrs.
Nelson, Bruce Allegheny Co., Pa.	Murder, rape (1982); life	Codefendant testimony; inculpatory statements	Excluded by test of crime- scene evidence; 9 yrs.
Woodall, Glen Huntington, W.Va.	Sexual assault, kidnapping (1987); 2 life terms + 203-335 yrs.	Blood, hair analysis; victim ID	Excluded by tests of vaginal swabs, clothing; 4 yrs. + 1yr. electronic confinement

Source: U.S. Department of Justice, Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial (1996).

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in Boston — was overturned by Massachusetts' highest court in April.

The successes in matching convicted offenders to unsolved crimes, combined with the favorable court rulings, lead some DNA advocates to call for expanding the databases. "We need to have the databases as comprehensive as possible to get the maximum benefit," says George Washington's Rowe.

Civil libertarians naturally oppose any further expansion of the databases. But many law enforcement officials and other DNA database advocates also oppose the idea of collecting samples from arrestees — at least for the time being — for pragmatic reasons.

"On the face of it, it sounds good, but it does present some problems," says Rowe. "Right now, you just don't have the capability to do anything with it. And if [a suspect] is acquitted, there's some case law that would say he would have the right to have the sample destroyed and the record expunged."

"If we get to the point where our DNA labs can start turning these [samples] around in a month, and we start collecting all the samples owed and analyzing all the samples from crime scenes, once that happens, come back and talk to us about typing all arrestees," says Barry Scheck, a defense lawyer, member of the national commission and director of the Innocence Project at Yeshiva University's Cardozo Law School in New York. Scheck, who came to national prominence as the DNA evidence expert on the defense team in O.J. Simpson's 1995 murder trial, is a DNA database advocate.

Still, some law enforcement officials who oppose including arrestees for now also say there would be benefits in the future. "If we took samples from suspects at arrest and searched a database of samples from crime scenes, the advantages to public safety

are going to be tremendous," says Paul B. Ferrara, director of Virginia's Forensic Science Division.

Critics, however, say that collecting samples from arrestees is just one more step down a slippery slope that could lead someday to universal genetic registration — a system that they say is fraught with privacy implications.

"This is a technology that powerful groups will want to use eventually to monitor all of us, not just the bad people, but the rest of us," Bereano says. "That's what this technology is about."

Do DNA databases pose a danger for individual rights?

"Danny," a 7-year-old California boy, was diagnosed several years ago with a gene that predisposes him to a heart disorder. The family's doctor prescribed medication to lower the risk of a heart attack. But when Danny's father changed health insurers, the company refused to insure the boy, saying the genetic trait amounted to a "pre-existing condition" that disqualified him from coverage.

The Council on Responsible Genetics, a bioethics advocacy group in Cambridge, Mass., cites Danny's case as one of 200 instances of what it labels genetic discrimination.⁵ Critics of DNA databases say the risk of genetic discrimination will necessarily increase with the increasing number of DNA profiles being collected in both private and government computers that can readily be interconnected.

"We have a forensic, data-banking system based in the states, some more developed than others, but completely designed so that they will share information and cross state lines for doing searches of the sort we're talking about," says geneticist Billings, who reported Danny's case and others several years ago. "What's the reason for thinking that you won't be able to cross agencies?"

"The government is increasingly

collecting biological samples that contain DNA, and there are no real controls over how that information can be used and for what purposes," says Steinhardt of the ACLU. "We believe that inexorably databases created for one purpose wind up being used for other purposes."

Advocates of using DNA evidence in court have acknowledged potential risks to privacy since the early days of the technology. "When data banks are established in such a way that state and federal law-enforcement authorities can gain access to DNA profiles, not only of persons convicted of violent crimes but of others as well, there is a serious potential for abuse of confidential information," the National Academy of Sciences concluded in its first report on DNA profiling, in 1992.⁶

Law enforcement officials today, however, insist that the state and FBI DNA databases pose no real risk to privacy rights. They insist that the DNA profiles are strictly safeguarded and, in any event, are nothing more than "junk DNA" that contains no sensitive information about a person's health or background.

"These aren't genes," Ferrara says. "They don't tell us anything about medical conditions."

Steinhardt and other critics acknowledge that the DNA profiles themselves are useful only for identification not for other genetic information. But they note that law enforcement agencies retain the blood samples used to obtain the DNA used in profiling and that those samples could be used — or misused — at a later time to find out more personal information. "If the states and FBI were serious about limiting the use of these samples to law enforcement purposes, they would be destroying these samples rather than retaining them indefinitely," Steinhardt says.

"There are real and valid reasons

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DNA Testing Helps Free Inmates After Years in Prison

DNA profiling was too new to be of use when Ronald Williamson and Dennis Fritz were tried in 1988 for the rape-murder of a waitress in Ada, Okla. Prosecutors did have some scientific evidence, though. An expert from the state's crime laboratory testified that the 17 hairs found on the victim were an exact match to either Fritz or Williamson. In addition, the expert said that semen found on the victim could have come from the two men.¹

The scientific evidence, combined with testimony from two jailhouse informers and a convicted felon, satisfied the jury of the two defendants' guilt. Williamson, a local sports hero and former professional baseball player, was sentenced to death. Fritz, a junior high school science teacher and coach, received a life prison sentence.

In April, the two men were both freed from prison after DNA tests showed that the semen found on the victim's body could not have come from either Williamson or Fritz. Instead, the tests showed a match with one of the witnesses against the two men: Glen Gore, who was serving three 40-year prison sentences on kidnapping charges at the time of the original trial.

When they walked to freedom after a decade behind bars, Williamson, 46, and Fritz, 49, became the 61st and 62nd inmates known to have been freed from prison in the United States because of post-conviction DNA testing. Defense lawyers say many more inmates could show they were wrongfully convicted if evidence used in their own trials was subjected to DNA analysis.

"We will get thousands of people out," Barry Scheck, a lawyer for Fritz and professor at Yeshiva University's Benjamin Cardozo School of Law in New York, told *The New York Times* after the two men were released. Scheck, the DNA expert on O.J. Simpson's defense team, directs a legal clinic at the law school — known as the Innocence Project — that has used DNA testing to challenge convictions in scores of cases.

Fritz had been asking for DNA testing since as early as 1989, but officials turned him down. The DNA tests that exonerated the two men resulted instead from a federal court's decision in 1995 ordering a new trial for Williamson because of ineffective legal assistance in the 1988 trial. Williamson's new lawyers — Mark Barrett and Sara Bonnell of the Oklahoma Indigent Defense System — requested the DNA test as part of the preparation for the new trial.

Law enforcement officials acknowledge the importance of DNA testing in examining the validity of convictions

obtained before widespread use of the technology. "DNA aids the search for truth by exonerating the innocent," Attorney General Janet Reno wrote three years ago in the introduction to a Justice Department report that examined 28 such cases.² The report showed that the 28 inmates — most of them convicted in the mid-to-late 1980s — served a total of 197 years in prison, or an average of seven years each, before being released. Reno cited the report earlier this year as one of the reasons for creating the National Commission on the Future of DNA Evidence.

Now the commission is working on recommendations that would ease the way for post-conviction DNA testing for some defendants. Meeting May 7 and 8 in Santa Fe, N.M., the commission approved a recommendation that prosecutors, defense attorneys and judges should allow DNA testing of evidence in old criminal cases if the results could conclusively establish the defendant's innocence.

"If everyone agrees that an exclusion would, in fact, exclude someone, everyone should agree to do the testing," says Christopher Asplen, the commission's executive director.

The recommendations — due to be prepared in final form within the next two months — also include model state legislation to waive statutory deadlines that might block inmates'

requests for DNA tests. Williamson's lawyer, Barrett, calls the recommendations "excellent" but said he would go further. "I think it would be worthwhile to have the DNA evidence automatically considered significant if the prosecution considered it significant when they were getting a conviction," Barrett says.

Scheck, who serves on the DNA commission, says the group's recommendations will help inmates get DNA testing to challenge their convictions. But Asplen, a federal prosecutor, cautions against allowing such testing too freely. "We cannot open cases for victims and prosecutors where it would be frivolous to do so," he says.

In its draft recommendation, the commission concludes, "The need for post-conviction DNA testing will wane over time. Within the decade, DNA testing with highly discriminatory results will be performed in all cases in which biological evidence is relevant, and advanced technologies will become commonplace in all laboratories."



AP Photo/J. Pat Carter

Dennis Fritz, left, and Ronald Williamson

¹ Background from *The New York Times*, April 19, 1999, p. A12.

² U.S. Department of Justice, "Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial," 1996.

All States Provide for DNA Databases

All the states have passed laws to establish databases containing DNA profiles of convicted offenders. All the laws at least cover sexual offenders. In addition, a majority of the states maintain DNA profiles for offenses against children or murder. Four states — Alabama, New Mexico, Virginia and Wyoming — require DNA profiles of all convicted felons. One state, Louisiana, has a law requiring DNA profiling of arrestees as well as convicted offenders, but the law has not been put into effect.

	Date	Sex Offenses	Murder	Assault	Offenses Against Children	Robbery	Burglary	Kidnapping	Juveniles	Felonies Only	Stalking
Alabama	1994	X	X	X	X	X	X	X		X	X
Alaska	1996	X	X	X	X	X		X	X	X	
Arizona	1989	X			X						
Arkansas	1995	X			X						
California	1989	X	X	X	X				X	X	
Colorado	1988	X			X						
Connecticut	1994	X									
Delaware	1994	X			X						
Florida	1990	X	X								
Georgia	1992	X			X						
Hawaii	1992	X	X		X						
Idaho	1997	X	X	X	X	X		X	X		
Illinois	1990	X			X						
Indiana	1996	X	X	X	X	X	X	X		X	
Iowa	1989	X	X	X			X	X			
Kansas	1991	X	X		X				X		
Kentucky	1992	X								X	
Louisiana	1997	X	X	X	X	X		X		X	
Maine	1995	X	X	X	X	X	X	X	X	X	
Maryland	1994	X			X						
Massachusetts	1997	X	X	X	X	X	X	X			
Michigan	1990	X		X							
Minnesota	1989	X							X		
Mississippi	1995	X									
Missouri	1991	X								X	

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for keeping those samples,” counters the FBI’s Niezgoda. First, he notes that the technology used in DNA typing changed in the 1990s, requiring the retesting of old samples. “Without those samples in the freezer,” he says, “they’d have to collect [new] samples if the technology changes again.”

In addition, Niezgoda says that holding onto the samples would allow retesting if a DNA profile were challenged. “No one’s made a mistake yet on a hit that I know of,” he says. But two states — California and Florida — do reanalyze samples after a match is made, just to double-check.

Ferrara has made similar arguments in the past about keeping samples, but today he is prepared to change his position. “The forensic science community has now settled on a standardized [procedure] in DNA profiling,” Ferrara remarked in an interview in his office earlier this month. “If I got rid of the samples,

	Date	Sex Offenses	Murder	Assault	Offenses Against Children	Robbery	Burglary	Kidnapping	Juveniles	Felonies Only	Stalking
Montana	1995	X	X	X	X	X		X	X		
Nebraska	1997	X	X		X			X		X	X
Nevada	1989	X			X						
New Hampshire	1996	X							X	X	
New Jersey	1994	X									
New Mexico	1997	X	X	X	X	X	X	X	X	X	
New York	1994	X	X	X						X	
North Carolina	1993	X	X	X	X	X		X			X
North Dakota	1995	X			X						
Ohio	1995	X	X		X		X	X	X		
Oklahoma	1991	X	X	X	X			X			
Oregon	1991	X	X		X		X		X		
Pennsylvania	1995	X	X		X				X		X
Rhode Island	1998	X	X							X	
South Carolina	1995	X		X					X		
South Dakota	1990	X			X						
Tennessee	1991	X							X		
Texas	1995	X			X		X	X			
Utah	1994	X	X		X		X				
Vermont	1998	X	X	X	X	X	X	X			
Virginia	1990	X	X	X	X	X	X	X		X	X
Washington	1990	X	X	X	X	X		X	X		
West Virginia	1995	X	X	X	X	X		X			X
Wisconsin	1993	X	X	X	X		X	X			
Wyoming	1997	X	X	X	X	X	X	X		X	
TOTALS		50	29	22	36	15	13	20	16	14	6

Note: Congress has not passed a law requiring DNA profiling for federal offenders, including those in the District of Columbia.

Source: FBI Laboratory Division, June 1998

I could live with it today because I know it's all right."

Steinhardt says destruction of samples would allay some of his concerns, but he still worries about the "creeping expansion" of DNA databases. And he predicts that the public's attitude toward DNA databases will change as a result.

"Once you take it outside the criminal context, there will be substantial opposition to government databanking," Steinhardt continues. "Criminals don't have much of a lobby, but

newborns do. Average individuals do."

Law enforcement officials acknowledge the public concerns about privacy issues. "When you say government and computers and DNA, people's hair raises," the FBI's Niezgodna says.

"You've got to decide how much of your personal freedom you're willing to give up in return for security," Niezgodna adds. "I can tell you that from what I hear people are in favor of the data bank, even in favor of testing all arrestees." ■

BACKGROUND

The Power of DNA

The first use of DNA as a tool for identification came more than a century after the substance was discovered by the German biochemist Friedrich Miescher in 1869 and some three decades after its molecular

structure — the famous “double helix” of complementary strands of nucleotides — was accurately described in 1953 by the American biochemist James D. Watson and the British molecular biologist Francis Crick.⁷

The development of DNA typing resulted from genetic research by scientists in the United States and England: Roy White of the Howard Hughes Medical Institute at the University of Utah and a British geneticist, Alec Jeffreys, at the University of Leicester.

White developed a technique in 1980 that “revolutionized modern biology,” according to Harlan Levy, a former federal prosecutor who traced the development of DNA identification in his book *And the Blood Cried Out*.⁸

White discovered that when a DNA molecule was cut, certain repetitive patterns could be identified. These strands of DNA had no known purpose, but they could be used to help locate specific genes. As Levy explains, the technique was called restriction fragment length polymorphism (RFLP) because a restrictive enzyme was used to cut DNA into various fragment lengths and the differences, or polymorphisms, were then analyzed.

Four years later, in 1984, Jeffreys discovered that some of those repetitive patterns at particular locations on the DNA “ladder” showed great variability between different people and thus could be used for purposes of identification. He published his findings the next year in the British journal, *Nature*, describing the results as a “genetic fingerprint.” He listed several potential medical applications of the technique but also added that it could be useful for paternity or maternity testing and in forensic sciences.

Within three years, the technique in fact did move from the laboratory into

an English courtroom in an episode that DNA advocates like Levy today cite as evidence of the unique power of DNA typing both to convict the guilty and exonerate the innocent.⁹

The small village of Narborough had been shaken by the rape-murders of two teenage girls — in 1983 and 1986. Police identified a teenage suspect in the second killing, who initially confessed, then recanted and then confessed again. The suspect’s father recalled later that he had heard of Jeffreys’ work and asked his son’s lawyer to “look into it.” Police claimed they turned to Jeffreys on their own.

In any event, DNA analysis of semen from both crimes showed that the offenses were committed by the same person — but not by the suspect in custody. Police then decided to gather DNA samples — “voluntarily” — from thousands of men in the area: 4,582 in all. None of the samples matched, but one villager reported to police that he had heard a man in a pub saying that he had paid someone else to provide a sample for him.

When police went to question the man, he confessed to both crimes. In Colin Pitchfork’s 1987 trial, the judge gave credit to DNA typing for the arrest. “If it wasn’t for DNA, you might still be at large today,” the judge said. Today, law enforcement experts are also quick to note that the technique cleared someone who was innocent. “The first use was just as important for its exonerative ability as its ability to convict people,” says the DNA commission’s Asplen.

Civil liberties advocates, on the other hand, see the story as a harbinger of DNA dragnets: mass collection of DNA samples from people without any need for police to show probable cause or even reasonable suspicion on an individual basis. “There are DNA dragnets, they’ve already occurred and it’s only going to increase,” says Benjamin Keehn, a Massachusetts public defender. He

notes that police investigating a recent rape at a Massachusetts nursing home asked all male workers at the facility to “cooperate, quote-unquote,” and provide a DNA sample.

In the United States, DNA typing made its debut more as courtroom evidence than as an investigative tool, according to Asplen. The first conviction using DNA evidence appears to have come in January 1987, when a Florida teenager was found guilty of sexual battery after prosecutors used DNA analysis of semen taken from a rape victim, along with traditional blood and hair tests, to link him to the crime.¹⁰

Prosecutors scored at least two other convictions with DNA evidence in 1987, but also failed to win a conviction in an Oklahoma murder case despite a DNA match between blood found in the hose of the defendant’s vacuum cleaner and the blood of a presumed murder victim.

By 1989, experts were estimating that DNA evidence had been introduced in at least 80 murder or rape cases in 27 states. Prosecutors were enamored of the technique, judges and juries seemingly impressed. But some doubts were being raised — doubts that would be aired and argued in courtrooms and elsewhere over the next several years.

Fighting for Acceptance

The infatuation with DNA was still fresh in January 1988 when California’s attorney general, John Van de Kamp, sounded a cautionary note. “We can botch a golden opportunity by rushing too quickly into court,” Van de Kamp said.¹¹ Over the next few years, police and prosecutors worked to develop expertise in DNA technology, while defense

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Chronology

1950s *Molecular structure of DNA — deoxyribonucleic acid, the basic genetic material of all living cells — is discovered.*

1953

J.D. Watson and Francis Crick demonstrate “double helix” structure of DNA. Discovery lays basis for development of modern genetics.

1980s *DNA typing is discovered and first applied in criminal cases.*

1980

U.S. researcher Roy White discovers technique for cutting repetitive patterns of DNA: restriction fragment length polymorphism or RFLP.

1984

British geneticist Alec Jeffreys discovers RFLP technique can be applied for identification purposes; labels the DNA profile “genetic fingerprinting.”

1985

U.S. geneticist Kary Mullis and others publish first paper describing “polymerase chain reaction” (PCR) to amplify small quantities of DNA for analysis.

1986-1987

DNA profiling exonerates suspect in rape-murder case in England; police use mass DNA screening of villagers to locate perpetrator.

1987

DNA identification is introduced in criminal cases in the U.S.

1988

Colorado passes law requiring genetic samples from convicted sex offenders before parole.

1990s *All 50 states establish DNA databases for some criminal offenders.*

1990

Twelve states pass legislation requiring DNA samples from some offenders; Virginia is first to require samples from all felons.

1991

Scientists debate whether DNA experts are exaggerating significance of DNA matches within ethnic or racial groups.

1992

National Academy of Sciences’ report endorses general reliability of DNA evidence, but calls for higher standards for laboratories and more cautious approach in describing the frequency of occurrence of a particular DNA profile in some instances.

1994

DNA Identification Act establishes guidelines for national DNA database, authorizes \$25 million over five years in grants to states for setting up databases.

1995

O.J. Simpson is acquitted in sensational murder trial after defense lawyers attack prosecutors’ DNA evidence.

1996

National Academy of Sciences’ second report says reliability of

DNA evidence is “not in doubt”; softens stance on laboratory standards, racial and ethnic identification.

1997

Louisiana passes law requiring DNA testing of arrestees, but implementation is delayed by financial and logistical issues. Attorney General Janet Reno creates national commission to study future of DNA evidence.

April 1998

Trial judge in Boston rules Massachusetts’ law requiring DNA sampling of non-violent offenders unconstitutional.

December 1998

New York City Police Commissioner Howard Safir calls for taking DNA samples from all arrestees; proposal is criticized by civil liberties advocates.

April 13, 1999

Massachusetts’ highest court upholds DNA sampling of all convicted felons, reversing trial court decision that had ruled the practice unconstitutional.

May 8, 1999

National DNA commission endorses recommendations to ease inmates’ use of DNA evidence to challenge convictions; panel also decides to oppose DNA profiling of arrestees.

September 1, 1999

Louisiana law requiring DNA samples from all arrestees due to take effect, but likely to be delayed because of funding, technical difficulties.

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lawyers often tried to discredit DNA evidence in court. Some scientific experts supported some of the critiques — in particular, over the issue of the degree of certainty that could be given to a DNA match within a particular racial or ethnic grouping. In the face of some scientific uncertainty, some courts initially were slow to accept the evidence. By the middle of the 1990s, however, the legal doubts were largely suppressed and the admissibility of DNA typing in court firmly established.

The debate over racial and ethnic groupings was densely statistical, but fiercely fought and critical to courtroom use of DNA typing. The issue was publicly aired in the scientific community in a pair of articles in the journal *Science* in December 1991. A prominent Harvard geneticist, Richard Lewontin, and a colleague from Washington University in St. Louis, Daniel Hartl, argued that DNA advocates were ignoring genetic similarities within specific ethnic subgroups and consequently overstating the significance of a DNA match. Without subpopulation studies, they wrote, the high probabilities of identification being testified to in court were “unjustified and generally unreliable.”

In an unusual step, the journal published a simultaneous rebuttal by two other geneticists: Ranajit Chakraborty of the University of Texas and Yale’s Kenneth Kidd. They insisted that genetic differences were great even within population subgroups and that what they called “conservative” estimates of a match provided “overwhelming evidence that cannot be coincidental.”¹²

A National Academy of Sciences committee on DNA technology gave further airing to the issue in April 1992 in a comprehensive report on the use of DNA evidence in court.¹³ The report opened by describing DNA typing as a “powerful tool for criminal

investigation and justice,” but cautioned that the technology was “vulnerable to error” and interpretation of results required “an appreciation of the principles of population genetics.”

On the racial grouping issue, the report recommended a conservative approach — known as “the ceiling principle” — that limited the statistical significance to be given to a DNA match in comparison to the so-called product rule favored by more enthusiastic DNA advocates. The report noted that varying approaches had produced wild variations in courtroom testimony about the possibility of a coincidental match — ranging from one in 500 to one in 739 billion in one case cited. The more conservative approach, the report concluded, represented “the most prudent course for the future.”

The report also recommended a series of safeguards for laboratories performing DNA analyses. The issue reflected a concern about quality assurance at the private laboratories that were the first to offer DNA typing — and that had a financial incentive in promoting use of the technology. The report’s recommendations appeared to be so restrictive that *The New York Times* initially described them as amounting to a “moratorium” on DNA evidence. When the report was actually released, the committee’s chairman, Victor McKusick of Johns Hopkins University, said the Times report was wrong — and the newspaper ran a corrected story the next day under a headline that admitted the previous story was “in error.”

Even with that high-level correction, the report still attracted strong criticism from many scientists and law enforcement advocates of DNA evidence. The result, according to Levy’s account, was “an extraordinary victory” for the scientific critics of the report. The academy itself agreed to create a new committee to re-examine the issues of race and ethnicity in

DNA identifications, and courts did not require expert witnesses to comply with the committee’s methodology in giving their testimony.¹⁴

Today, the issue has diminished in importance because DNA profiles are based on an examination of a larger number of “loci,” or sites, on the DNA molecule: The FBI standard of 13 loci is now in more or less universal use. With each additional site, the likelihood of a coincidental match is diminished and the resulting “identification” can be stated with greater statistical certainty. “The forensic community has more or less all agreed that this is the way we’ll calculate these numbers,” Ferrara says. “When you have a declared match, for all intents and purposes that’s an identification.”

Gaining Acceptance

By the middle of the 1990s, DNA evidence was no longer a scientific curiosity but an established forensic technique. Police and prosecutors used it in investigations and criminal trials, while defense lawyers discovered the technology sometimes could produce powerful evidence to exonerate a defendant years after his conviction. Courts accepted the evidence in trials and sometimes even in post-conviction challenges. And the public, too, came to regard DNA evidence as valid and reliable.

Levy cites one especially telling demonstration of the power of DNA evidence: a Baltimore rape case in which the victim identified the wrong person as the perpetrator.¹⁵ The victim in the 1990 assault told police that she had been attacked by her estranged boyfriend. After the boyfriend’s arrest, however, a DNA analysis showed that semen recovered from the woman came from somebody

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Databases and DNA Dragnets Aid Police in England

England is far ahead of the United States in building a DNA database of criminal offenders and using DNA profiling in criminal investigations. But Americans would rebel at some of the tactics that English police use, according to U.S. law enforcement officials and civil liberties advocates.

The United States is still working to establish a nationwide DNA database, four years after the Forensic Science Service for England and Wales established the world's first such computer-linked file of DNA profiles of criminal offenders in 1995. Today, the British database includes profiles of more than 360,000 offenders and about 27,000 crime scene samples. That's much bigger than the FBI's data bank, which currently has about 150,000 offenders and 7,000 crime scene samples despite the United States' greater population and higher crime rate. Only 12 states are hooked up to the FBI's database so far.

Police in England and Wales say the DNA database is a valuable crime-fighting tool on a daily basis. "We've solved a large number of cases that were originally based solely on DNA profiles," says Peter Gammon, president of the Police Superintendents Association. As of last fall, the independent forensic service said the DNA database had matched 28,000 individuals to crime scenes — roughly, an average of 700 a month over the life of the data bank — and made 6,000 links between crime scenes. By comparison, the FBI counted only 182 "offender hits" and 233 crime-scene hits from its DNA database through July 1998.

The starkest contrast between the two countries, though, is the use of mass DNA screening — in effect, DNA dragnets — to investigate crimes in Britain. In several high-profile cases, police in England or Wales have collected DNA samples from hundreds or even thousands of people from the area where the crime occurred in an effort to identify a suspect. Theoretically, cooperation with the investigation is "voluntary," though police sometimes make clear that anyone who refuses to provide a DNA sample may face more intensive investigation as a result.

In fact, the first application of DNA profiling in a criminal case entailed the use of mass DNA screening of more than 4,000 people to try to flush out a suspect in a pair of rape-murders in a small village in the English Midlands in 1986. The apprehension of the suspect and his subsequent conviction were the subject of a best-selling book, *The Blooding*, written by the American crime author, Joseph Wambaugh. More recently, police in South Wales took DNA samples from about 2,000 men in a Cardiff neighborhood in 1995 to solve another rape-murder of a teenage girl.¹ And Gammon recalled that police in Bristol, England, solved a 1997 rape-murder case with mass DNA

screening. In that case, police discovered that a suspect had fled to South Africa without providing a sample, but South African police obtained a DNA sample from the man and sent it back to England for profiling.

Police in the United States have not used such tactics and would not be able to force anyone to provide a DNA sample without a search warrant based on specific information implicating the individual. By contrast, Gammon says Britons appear to have no problem with the technique. "People in this country, thankfully, still are shocked by heinous crimes, and they want to help the police in any way they can," he says.

U.S. law enforcement officials acknowledge that the United States lags behind Britain on working with DNA profiling. "It was really [Britain] that took the lead," says Christopher Asplen, executive director of the Justice Department's National Commission on the Future of DNA Evidence. But Asplen and others also acknowledge that civil liberties and privacy concerns are stronger in the United States than in Britain. "In the United States we have a different perspective on privacy and on the extent to which we would be willing to depend on a database," he says.

Civil liberties advocates say more directly that Britain's experience has little relevance to the United States. "They don't have a Bill of Rights. They have different views of civil liberties than we do," says Barry Steinhardt, associate director of the American Civil Liberties Union. "We fought a revolution against England because of our opposition to the kind of general searches that were conducted by the British colonial powers. That's why we have the Fourth Amendment. It was a direct reaction to standardless searches conducted by the British, and that's what these DNA searches are."

Gammon, however, did draw opposition in England last year when he called for establishing a universal DNA database — with profiles from the entire population. "It would save a lot of time and money," Gammon says. But he acknowledges the plan "has some real ramifications in terms of civil liberties."

The police group shelved the idea after it was criticized both on both privacy grounds and on practical considerations: the cost of establishing the database was put at 20 million pounds (about \$32 million). Instead, police are now talking about a voluntary database of DNA profiles. Gammon says the broader database could still help police even if it did not include everyone. "It's an interesting development, and it hasn't been written off," he says.

¹ See *The Washington Post*, Feb. 2, 1996, p. A21; April 14, 1995, p. A1.

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else. The stunned prosecutors arranged for the man's release and pressed police to investigate further.

Finally, police came upon a second man, a friend of the original defendant and a former boyfriend of the victim's roommate. The two men resembled each other enough to explain the misidentification. The victim clung to her original identification, however, even after a DNA analysis showed the semen was the friend's. Prosecutors decided to accept a guilty plea with a 40-year prison sentence. Without the DNA evidence, the prosecutor in the case told Levy, the wrong man "would have been sent to prison."

The use of DNA evidence was also boosted by application of a different technology that made it possible to analyze samples containing minute amounts of blood or semen. The technique — known as polymerase chain reactions or PCR — had been developed in the 1980s by American biochemist Kary Mullis, then working with the Cetus Corp., a California biogenetics firm.¹⁶ Mullis, who was researching the genetics of sickle cell anemia, figured out a way to get around the recurrent problem of having too little DNA to work with. By introducing a DNA sample in a biological substance (known as a polymerase), Mullis produced a chain reaction in which the original DNA was repeatedly replicated. The technique allowed a minute trace of DNA to be "amplified" a millionfold or more.

Mullis was awarded the Nobel Prize in chemistry in 1993 for his discovery. Despite its obvious applications to crime scene investigations, however, the technique did not gain immediate acceptance in police forensics — in part because the FBI was slow in developing guidelines for its use. Gradually, though, the technology became more common and its value recognized. The tech-

nique was also refined by the use of additional, easier-to-locate stretches of DNA for analysis — known as "short-tandem repeats" or STRs.

One dramatic application of PCR analyses came in the case of one of the suspects in the Feb. 26, 1993, bombing of the World Trade Center in New York City. Three days after the bombing, *The New York Times* received an anonymous letter claiming responsibility for the blast. Police recovered saliva from the envelope flap and had a PCR analysis performed, which showed a possible match with a suspect, Nidal Ayyad, who had previously been implicated by circumstantial evidence. The DNA "identification" was weak: the possibility of a coincidental match was one in 50. But it combined with the other evidence to satisfy the jury. Ayyad was convicted.

The most visible use of DNA evidence — less auspicious for DNA advocates — came in 1995, with the sensational murder trial of O.J. Simpson, the former football star, for the stabbing deaths of his former wife, Nicole Brown Simpson, and a friend of hers, Ronald Goldman.¹⁷ The prosecutors had DNA evidence to show that blood with DNA matching Simpson's was found at Brown's house and that blood spots in Simpson's car and at Simpson's house contained DNA matching Nicole Simpson's and Goldman's.

Against such seemingly powerful evidence, a defense team led by Scheck mounted a determined attack to show that the DNA evidence was either tainted by laboratory contamination or planted by corrupt police officers. The strategy worked. To the vast surprise of the worldwide audience for the trial, the Los Angeles jury on Oct. 3, 1995, found Simpson not guilty.

DNA advocates worried that the Simpson verdict could be a setback for the technique, but the fears proved to be unfounded. Within a year, the

National Research Council decisively reaffirmed the validity of DNA typing and softened some of the recommendations of its first report on the issue four years earlier. "The admissibility of properly collected and analyzed DNA should not be in doubt," stated the report — which came to be known as NRC II.¹⁸ The report backed away from some of the recommended safeguards in the earlier report and, most significantly, endorsed the less restrictive methodology for characterizing the significance of a DNA match. Levy says the report — without mentioning the Simpson case by name — "seemed to limit some key avenues of attack" that his attorneys had used in the trial.¹⁹

Creating Databases

The idea of creating DNA databases emerged quickly after the technology was introduced into courtrooms and police laboratories, both in England and in the United States. States began passing laws requiring genetic samples from some convicted offenders as early as 1988. Congress gave its support to the idea in 1994 by authorizing grants to the states and establishing guidelines for a national database. Defense lawyers and civil liberties advocates criticized many of the moves along the way and argued in court against the most expansive database proposals. So far, federal and state courts have uniformly upheld DNA sampling from convicted offenders, but the issue of testing arrestees or others has yet to be squarely joined in court.

FBI officials were predicting as early as 1988 that DNA typing would become as routine as fingerprinting and were talking about the possibility of linking state databases to a national system comparable to the

bureau's national fingerprint files.²⁰ Colorado passed a law in 1988 requiring genetic sampling of convicted sex offenders before they could be paroled. California began considering the creation of a statewide database the next year. Virginia became the first state to require DNA samples from all convicted felons in 1990 — one of 12 states to pass some form of DNA sampling legislation that year. By 1994, 29 states had passed such laws; by 1998, all had done so.²¹

Congress threw its support behind the creation of DNA databases in 1994. The DNA Identification Act, part of the omnibus Violent Crime Control and Law Enforcement Act, specifically authorized the FBI to establish a national index of DNA identification records of "persons convicted of crimes" and analyses of DNA samples recovered from crime scenes and samples recovered from "unidentified human remains." Disclosure of the information was permitted only to criminal-justice agencies "for law enforcement purposes," in judicial proceedings, and for limited research or quality-control purposes after removal of personally identifiable genetic information. The act also authorized \$25 million over a five-year period in grants to the states to help set up similar databases; states seeking grants had to abide by the same safeguards on disclosure.

Court cases challenging the DNA databases began soon after their creation. The federal appeals court in Richmond, Va., ruling in 1992 in a suit brought by six Virginia inmates, upheld the state's law enacted two years earlier requiring DNA sampling of all convicted felons. The majority opinion called DNA testing "a dramatic new tool for the law enforcement effort to match suspects and criminal conduct" and called the collection of samples a "minimal" intrusion comparable to fingerprinting all arrestees at the time of booking.

But in a dissenting opinion, Judge Francis Murnaghan discounted the usefulness of taking DNA samples from non-violent offenders and warned that Virginia was "taking significant strides toward the establishment of a future police state." Three years later, a federal appeals court upheld, in another split opinion, a narrower Oregon law requiring DNA sampling only of violent and sexual offenders. Inmates in each case asked the U.S. Supreme Court to review the decisions, but the justices declined to take up the issue.²²

State court cases challenging DNA databases were similarly unsuccessful, allowing the expansion of the databases to proceed without legal obstacles. Even as some states were beginning to set up DNA databases, other states that initially collected samples only from certain groups of criminals — most commonly, sex offenders — were changing their laws to take samples from all felons. But states did face practical constraints in expanding the databases: money, time and expertise. Hundreds of thousands of DNA samples were collected but went unanalyzed. Today, the backlog is estimated at 480,000 and is continuing to grow. In addition, states have failed to collect samples from tens of thousands of offenders who are required by law to provide them. "There are a tremendous number of people who should be in the system but aren't in the system," Asplen says.

After an uninterrupted string of courtroom victories, advocates of DNA databases suffered their first legal defeat last August when a lower court judge in Boston invalidated the Massachusetts law requiring sampling from violent and sexual offenders. The judge agreed with the inmates' claim that the 1997 law — not yet put into effect at the time — amounted to an unreasonable search under both the federal and state constitutions. In

April, however, the state's highest court reversed the decision in a unanimous opinion. "The state has an established and indisputable interest in preserving a permanent record of convicted persons for resolving past and future crimes," the court declared, "and now will use DNA identification for these purposes."²³ ■

CURRENT SITUATION

Expanding Databases

Gov. George E. Pataki, R-N.Y., was flanked by police, prosecutors and his own criminal justice chief when he unveiled details last month of a legislative proposal to dramatically enlarge the state's DNA data bank. Pataki's plan, announced at a news conference on April 13, calls for expanding the database to include anyone convicted in the state of a felony or attempted felony. In addition, Pataki also wants the director of his criminal justice service to study the possibility of including arrestees in the data bank.²⁴

The proposal — if enacted and fully implemented — would take samples from about 50,000 offenders a year and would expand the database more than tenfold. It currently includes samples from about 6,000 people convicted since 1994 of any of 21 crimes, including sex offenses, homicide or felony assault. "The untapped potential for advancing public safety is enormous," Pataki told reporters.

The governor failed to acknowledge, however, that even the present value of the state's existing database

is itself untapped. When Pataki first called for expanding the database in his annual state of the state speech in January, the newspaper *Newsday* reported that only 1,500 of the 6,000 samples had actually been analyzed. In addition, the library of profiles was not being used because guidelines had yet to be drawn up for its operation — nearly five years after enactment of the law creating the database and three years after the first samples were drawn. Officials were hoping to complete the guidelines by the end of the year, the newspaper reported.²⁵

New York's example is typical. All 50 states have DNA database laws, but many of the databases are on paper rather than on-line. The FBI's national database was announced with fanfare in October, but only 12 states have hooked up so far, according to Niezgoda. The database includes about 150,000 offenders — a tiny fraction of the 33 million individuals in the FBI's criminal fingerprint files — and about 7,000 DNA profiles from crime-scene evidence.

Louisiana, the only state with a law on the books to collect DNA samples from arrestees, has no state-wide database yet — two years after the law was passed. The law is theoretically due to take effect on Sept. 1, but Louisiana officials say funding and implementation problems will likely result in another delay. "We would like to see it get through," says Pat Wojtkiewicz, who runs a regional forensic science laboratory in Shreveport that serves northern Louisiana. "We think we could solve a lot of cases that way."

Nationwide, a daunting backlog of DNA samples has been collected but not analyzed. Virginia, which has been taking DNA samples from all felons since 1990, has the biggest individual backlog: about 180,000 samples collected but awaiting analysis. To try to whittle that number

down, Ferrara has contracted with a private laboratory in Northern Virginia, Bode Technology, which is processing some 2,000 samples a week. If no new samples were added, it would still take two years to eliminate the backlog.

Ferrara also joined with other members of the DNA commission in calling for federal funds to help states do the work. "This would be the one area where it would be useful to throw money at the problem and see some results," Ferrara explains. The commission asked for \$22.5 million in the coming fiscal year; the Clinton administration included \$15 million in its proposed budget.

Even more worrisome, Niezgoda says, is the backlog of unanalyzed crime-scene evidence. "We've got thousands of rape kits that are just sitting in lockers," Niezgoda says. "It's like having a database of fingerprint cards but never dusting for fingerprints."

"It's more than just money," Niezgoda adds. "The crime-scene side needs people and needs training, both in the forensic science and in the courtroom."

Despite the implementation problems, lawmakers in many states are taking up proposals this legislative season to expand the coverage of their state database laws. There is also a bill pending in Congress to require DNA sampling of federal offenders, including offenders in the District of Columbia. The bill, introduced by Sens. Mike DeWine, R-Ohio, and Herb Kohl, D-Wis., would fill a seemingly inadvertent gap; it would require sampling of offenders convicted of murder, armed robbery and burglary, among other crimes.²⁶

Civil liberties advocates concede that expansion of DNA databases to cover more convicted offenders is difficult, if not impossible, to stop. Steinhardt concedes the federal bill is likely to be passed if it gets to the floor, and observers in New York

predict the legislature will approve some expansion of the state's database. But financial and logistical considerations may weigh against covering all convicted felons.

Working the Cases

When sheriff's deputies in Maricopa County, Ariz., found Denise Johnson's body in a remote location outside Phoenix several years ago, one of the clues at the scene was a scar on a nearby tree that looked as though it might have resulted from a collision with a pickup truck. By a fortunate coincidence, the tree was an unusual type that grows wild and was susceptible to DNA identification. When deputies later arrested Mark Bogan for the killing, they found seedpods in the bed of his pickup truck — seedpods that a DNA analysis showed were a likely match for seedpods from the tree at the murder scene. The evidence convinced a jury that Bogan was lying when he denied being at the murder scene; he was convicted of first-degree murder and sentenced to life imprisonment.

Bogan's 1993 murder conviction — believed to be the first case in the United States based on plant DNA identification — gives one more indication of the variety of uses of DNA technology in the courtroom. "There is nothing comparable to that in the fingerprint area," says George Washington's Rowe. "We have this extremely powerful tool. We just don't know how far we'll be able to run with it. It's just a question of how imaginative we can be with the use of DNA."

Police and prosecutors are already using their imagination to use DNA technology in investigating and prosecuting more cases. When DNA typing was first developed, advocates

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At Issue:

Should DNA samples be collected from arrestees and included in law enforcement databases?

HOWARD SAFIR

New York City Police Commissioner

WRITTEN FOR *THE CQ RESEARCHER*, MAY 1999.

Expanding the use of DNA data-banking will greatly assist law enforcement in its crime-fighting efforts. The sooner in the process that this reliable and powerful technology is employed, the greater the benefits. That is why I am calling for the taking of DNA samples from all those arrested for a fingerprintable offense. By excluding suspects early in the process, valuable time and resources will be saved.

In addition to identifying the guilty, it will also quickly exonerate the innocent. Sixty people have been exonerated through post-conviction DNA analysis. Unfortunately, there may be others who have been wrongly convicted of crimes. Taking DNA samples from all arrestees will prevent such unfortunate mistakes from happening.

Data-banking arrestee profiles will also enhance our ability to solve crimes. We simply need to look at England's experience with DNA data-banking. There, DNA samples are taken from anyone arrested for a misdemeanor or felony. Since 1995, they have linked 36,000 suspects to crime scenes and 6,700 crime scenes to other scenes.

While the existing convicted-offender data banks are a good start, they do not go far enough. Only the FBI and 12 states participate in the national convicted-offender data-bank system; to date, only 450 matches have been made. England has at least that many hits in a week. Additionally, my staff reviewed 100 forcible sexual assault cases; only 18 offenders had previous convictions that would have included them in this state's data bank. Under the law I propose, 75 would have been included.

Using this technology, however, carries an obligation to protect individual rights and privacies. Safeguards should be put in place to control the operation of the data bank. If a person is acquitted or not prosecuted, their profile would be expunged from the data bank and the sample destroyed. The information contained in the data bank would be used for law enforcement identification purposes only. It would not be used for medical research or insurance purposes, and it would be a crime to misuse the information.

We need to responsibly use the technology available to solve crimes and prevent others from being victimized. My proposal to take DNA samples from arrestees offers the right balance between a person's privacy rights and the right of all citizens to live in a crime-free society. It will act as both a sword and a shield, identifying the guilty and exonerating the innocent.

BARRY STEINHARDT

Associate Director, American Civil Liberties Union

WRITTEN FOR *THE CQ RESEARCHER*, MAY 1999.

The proposed creation of wholesale DNA data banks of anyone who is arrested for any reason presents a frightening potential for a "brave new world" in which genetic information is routinely collected and used in ways that will result in abuse and discrimination.

Let's start with what should be the obvious. Arrest does not equal guilt and no one should suffer the consequences of guilt until after they have been convicted. Forcing arrestees to provide blood samples does not serve any legitimate security concern when there are ample other means of confirming identity. The only possible justification is investigatory, and if law enforcement has reason to suspect an individual then it can and should seek a warrant.

It also should be obvious that DNA is not analogous to a fingerprint. DNA samples can provide insights into the most intimate workings of the human body, including the likelihood of the occurrence of over 4,000 types of genetic conditions and diseases. Given the scope of information how can anyone justify forced testing of a person arrested for jaywalking or taking part in a political demonstration?

Our country has a long history of creating databases for one purpose that later assume additional functions. For example, census records created for general statistical purposes were used during World War II to round up innocent Japanese-Americans and to place them in internment camps.

Notwithstanding the constitutional impediments, the single greatest obstacle to the DNA database proposal now is the existing backlog of 450,000 unprocessed samples. With an estimated 15 million arrests last year, it makes no sense for law enforcement even to consider putting its dollars into collecting and processing samples from people who have never been convicted of a crime. Wouldn't it make more sense to put scarce resources into processing the overwhelming backlog of samples, not to mention those that will continue to be generated under the existing program?

For those who think otherwise, prepare for this modification of the Miranda warning: "You are under arrest. Anything in your DNA can and will be held against you and your family in a court of law . . . and by insurance companies, medical researchers and hackers who break into the system." By the time you call your lawyer, it may be too late.

DNA Testing of Newborns Stirs Privacy Debate

Imagine your worst nightmare as a parent: Your child is missing — perhaps abducted, maybe feared lost in a plane crash or some natural disaster. A body is recovered. It may be your child, but the normal forensic techniques cannot make a positive identification. What to do?

One answer being pushed by some law enforcement officials and missing-child advocacy groups is DNA profiling of children at birth. But some civil liberties advocates fear that an idea now being discussed as a voluntary option for parents could be expanded in the future to become mandatory registration of DNA identifications for everyone from birth.

In Florida, some 34 hospitals are participating in a program organized by the Florida Department of Law Enforcement to give parents the chance to have their newborns' DNA tested at birth. Parents take the DNA sample home with them on a specially treated card that can be stored for life. Officials stress that the program is voluntary and that neither the hospital nor the state agency keeps a sample.

"Well over 95 percent of the parents who we offered this agreed to have the DNA sample taken," says Warren Jones, vice president for public relations at Tallahassee Memorial Hospital. "Many parents seemed to take some comfort in knowing that that sample would be available if needed."

"We're very proud of it," says Jennifer McCord, spokesperson for the state agency. The program began as a pilot project with Tallahassee Memorial last year and grew quickly to the 34 hospitals participating today.

McCord says the department views the program as a success even though so far none of the DNA samples taken has been put to use in identifying a youngster. But Larry Spalding, legislative counsel for the Florida chapter of the American Civil Liberties Union (ACLU), says he is "nervous" about the idea. "I understand that that would give parents some closure and peace of mind," Spalding says. "But I can also foresee that [in the future] we could have a situation where we had a child who didn't have this identification and we come back and say had this been mandatory, we could have resolved this issue. And

then we're off on a path that we're concerned about."

The Florida House of Representatives passed a bill in March to require hospitals to offer DNA sampling for newborns, but the measure stalled in the state Senate after drawing opposition from the Florida Hospital Association. "We are very supportive of the concept of hospitals' voluntarily offering this," says Bill Bell, the association's lobbyist in Tallahassee. "The problem with this particular piece of legislation is that it mandated that hospitals offer this."

Issues surrounding DNA testing of newborns have flared elsewhere around the country. New York City Mayor Rudolph Giuliani drew sharp criticism in December when he said, in response to a reporter's question, that he would have "no problem" with DNA testing or fingerprinting of all children at birth. "There is absolutely no reason why people should be afraid of being identified," Giuliani said.¹

"This really does evoke the specter of *Brave New World*," responded Norman Siegel, executive director of the New York Civil Liberties Union. Giuliani's police commissioner, Howard Safir, who advocates expanding DNA testing of criminal offenders to include arrestees, quickly stepped in to stress that he had made no proposal for testing newborns as suggested by the reporter's question.

Meanwhile, more Florida hospitals are expected to join those that are already offering parents the option of DNA sampling for newborns. The cost is relatively nominal — about \$1.40, according to Jones.

Rep. Bob Starks, a six-term Republican lawmaker who sponsored the House bill, insists that privacy advocates have no cause for concern. "We have all the safeguards to make sure privacy is protected," he says.

But Spalding disagrees. "We're slowly eroding privacy as technology advances," he says. "The bad part about it is that when you voluntarily give up a right, it's much easier to expand it and say, 'We haven't had any problems so far, so why don't we go further?'"

¹ Quoted in *The New York Times*, Dec. 17, 1998, p. B4.

Continued from p. 464

cautioned that it would be useful only in a relatively few cases — mostly rapes and homicides — where the perpetrator's blood or semen could be obtained. Today, however, DNA typing can be performed on trace amounts of blood, sweat or saliva that a perpetrator might leave on a murder weapon or an object at a crime

scene. Prosecutors in Orange County, Calif., for example, have won murder convictions in three cases where DNA samples were obtained from a baseball bat, a hammer and a rope.

In New York City, detectives recently obtained a DNA sample from a murder suspect less directly — from the saliva he left behind on a coffee cup that he had been drinking from

while under interrogation.²⁷ The suspect, Ahron Kee, who had been arrested on a petty theft charge, was being questioned in connection with a June 1998 slaying. A DNA analysis on Kee's saliva linked him not only to the killing but also to two other homicides and two rapes of teenage girls.

Such deceptive practices concern some civil liberties advocates. "This

is a form of search that should be done only after the police have obtained a warrant," says the ACLU's Steinhardt. "It shows how arbitrarily police officers can act and why they should not be given the power to decide who will be DNA tested based on an arrest."

But Safir calls the police tactic "perfectly legal and certainly proper." "If a suspect leaves a coffee cup behind, it's abandoned property," Safir says. "We have every right to use that for investigative purposes."

Police and prosecutors in some places, such as Orange County, are also using DNA databases not only to link suspects to specific crimes but also to try to link crimes with common features. "If we had a crime with a rope that happened in a park, we would put park and rope in there and all the crimes that had a similar situation would automatically come on the screen," explains Tori Richards, a spokeswoman for the Orange County district attorney's office. "If we had somebody who was arrested for that, we could run that person's DNA through the system and link that person with these other offenses."

Meanwhile, a San Diego-based company is working to develop a device to allow police to perform DNA analyses right at a crime scene.²⁸ The device, about the size of a 3 x 5 index card, is equipped with a microchip in the center that can be connected to a portable computer. A DNA sample can be placed in the device, analyzed on the spot and computer-checked against profiles in a remote database.

Officials of Nanogen, the company working on the device under contract with the National Institute of Justice, the research arm of the Justice Department, say the device could be in police cars within two years. Bode Technology Group will be testing prototypes this summer. "The current processes are very, very labor-inten-

sive," says Thomas Bode, president of the Virginia company. "This will cut down on that labor intensity to a significant degree." The device would also cut the cost of DNA profiles perhaps to as low as \$10-\$20, less than half of the current cost.

Civil liberties advocates say they have no problems with the technology, but still worry about its application. "The underlying problem is not the technology," says Steinhardt. "It is the existence of large databases and collections of DNA that have great potential for misuse." ■

OUTLOOK

New Applications

Today, nearly five decades after Watson and Crick discovered the secrets of DNA, the study of genetics enables scientists and doctors to diagnose and treat diseases, develop new plants and vegetables and even to produce clones of adult sheep.

The applications of DNA technology in forensic science are at least as startling and, for many people, as wondrous. But DNA technology does not eliminate the need for old-fashioned police work. DNA evidence is not available in all criminal cases and in many cases is not determinative — for example, in a rape case where the defense is consent.

Beyond the criminal justice system, DNA identification has a host of other applications. It is now often being used in paternity disputes — providing results far more reliable than previous techniques, such as blood typing. Military officials turned to DNA analyses recently to identify a Vietnam-era soldier buried in the Tomb of the Unknowns. Historians

used DNA typing to try to determine whether Thomas Jefferson fathered a child by his African-American slave, Sally Hemmings. Human rights activists applied DNA technology to establish the identity of a young girl whose parents were killed by the Argentine military when she was an infant.

For many people, however, the creation of DNA databases raises concerns that the technology has a dark side, that it will be used to unlock personal genetic secrets. "It's a cost to some people, it's not a cost to others," says Asplen of the Justice Department's DNA evidence commission.

Some advocates of law-enforcement DNA databases acknowledge some dangers for privacy rights in the use of genetic information outside the criminal justice system. "If I have my child tested, who else is going to have access to that information?" Virginia's Ferrara asks. "We're going to have difficult questions to face about who has that information and who has access to that information."

But Ferrara and other law enforcement officials minimize the dangers from DNA databases on criminals. "It's hard for me to look at the convicted-offender databases and think that they're going to abuse those samples," Ferrara says.

Civil liberties advocates are less sanguine. "We are seeing an ever-widening circle of DNA surveillance," says the ACLU's Steinhardt. "Every expansion of data banks and every new use of those data banks increases the risk of abuse and discrimination," Steinhardt says.

Steinhardt says some concerns about criminal-offender databases could be eased if the DNA samples were destroyed after identification information was entered. For any databases that include arrestees, Steinhardt says, profiles should be expunged if no conviction is obtained. New York police Commis-

sioner Safir agrees on the need to expunge DNA profiles in dismissed cases, but sees no special concern in taking DNA samples as part of the normal police booking process. "We take fingerprints at the time of arrest," Safir says, "and there is no reason that we should not pass legislation to take DNA samples."

For its part, the Justice Department commission has now decided to oppose DNA testing of arrestees, at least for the time being, but primarily because of the urgency of dealing with the backlog of already-collected DNA samples awaiting analysis rather than because of civil liberties concerns. "Absent very substantial financial support, taking DNA from arrestees would do more harm than good," Asplen says. The commission will be advising Attorney General Reno of its position in a letter within the next two months.

Whatever law enforcement agencies do, however, one critic warns that the biological samples routinely collected in hospitals and university medical centers could pose an even greater danger to individual privacy.

"If they get analyzed and stored in ways that can be interchanged, then you have an enormously powerful system," Billings says. The result, he says, could be "a potential enhancement for government surveillance that is disproportionate to government control."

Despite those concerns, some public health experts and organizations are today advocating DNA testing of all newborns — a step they say can help in early diagnosis and treatment of genetic diseases. Meanwhile, the government of Iceland has approved a plan to compile a database of genetic, medical and genealogical information about the country's entire population of 270,000. The plan envisions selling the information to biotechnology companies that can use it to find new clues about the

nature of disease. Most Icelanders appear to favor the plan despite opposition from some privacy-minded critics.²⁹

Billings criticizes the idea, but credits Icelanders with giving the proposal more serious consideration than data-banking has received so far in the United States. "They had a very broad debate about the problem," Billings says. "Such a standard has not been met in the United States."

"The big issue is the balance on privacy," the FBI's Niezgodka acknowledges. "As the technology gets cheaper, and the privacy issues become less theoretical, then as a nation we have decisions to make." ■

Notes

¹ Background on the Jones case drawn from the *Daily News* (New York), April 8, 1999; April 9, 1999; The Associated Press, April 9, 1999.

² For background, see Robert K. Landers, "Solving Crimes With Genetic Fingerprinting," *Editorial Research Reports*, June 30, 1989, pp. 353-364.

³ See Paul R. Billings (ed.), *DNA on Trial: Genetic Identification and Criminal Justice* (1992). Billings is now the administrator for three veterans hospitals in Texas.

⁴ The Web site address is <http://www.hope-dna.com>.

⁵ Council for Responsible Genetics, "Position Paper on Genetic Discrimination," updated Aug. 18, 1997, www.genewatch.org/gendisc.html.

⁶ National Research Council, *DNA Technology in Forensic Science*, (1992).

⁷ For the early history of human genetics, see Robert Shapiro, *The Human Blueprint: The Race to Unlock the Secrets of Our Genetic Script* (1991).

⁸ Harlan Levy, *And the Blood Cried Out: A Prosecutor's Spellbinding Account of the Power of DNA* (1996). Much of the historical material is drawn from Levy's account.

⁹ The Narborough murders are recounted in Joseph Wambaugh, *The Blooding: The True Story of the Narborough Village Mur-*

ders (1989). Summaries are drawn from Levy, *op. cit.*, pp. 26-31, and Shapiro, *op. cit.*, pp. 302-303.

¹⁰ See Debra Cassens Moss, "DNA — The New Fingerprints," *ABA Journal*, May 1, 1988, pp. 66-70.

¹¹ Quoted in Moss, *ibid.*, p. 68.

¹² See R.C. Lewontin and Daniel J. Hartl, "Population Genetics in Forensic DNA Typing," *Science*, Dec. 20, 1991, pp. 1745-1750; Ranajit Chakraborty and Kenneth K. Kidd, "The Utility of DNA Typing in Forensic Work," *ibid.*, pp. 1739-1745. For a summary of the debate, see Levy, *op. cit.*, pp. 111-116.

¹³ National Research Council, *op. cit.*, See Levy, *op. cit.*, pp. 117-120.

¹⁴ *Ibid.*, p. 121.

¹⁵ Levy, *ibid.*, pp. 87-103.

¹⁶ *Ibid.*, pp. 138-141. See also Paul Rabinow, *Making PCR: A Story of Biotechnology* (1996).

¹⁷ See Levy, *op. cit.*, pp. 159-188.

¹⁸ National Research Council, *The Evaluation of Forensic DNA Evidence* (1996), p. 2.

¹⁹ Levy, *op. cit.*, p. 193.

²⁰ See Jean L. Marx, "DNA Fingerprinting Takes the Witness Stand," *Science*, June 17, 1988, pp. 1616-1618.

²¹ "1998 CODIS DNA Laboratory Survey," FBI Laboratory Forensic Science Systems Unit, January 1999, p. 10.

²² The cases are *Jones v. Murray*, 4th U.S. Circuit Court of Appeals, April 7, 1992; *Rise v. Oregon*, 9th U.S. Circuit Court of Appeals, July 18, 1995.

²³ The case is *Landry v. Attorney General*, April 12, 1999.

²⁴ Quotes and background drawn from *New York Law Journal*, April 14, 1999, p. 1.

²⁵ Matthew Cox, "As Debate Rages, DNA Unused: Guidelines Needed for Database on Criminals," *Newsday*, Jan. 18, 1999, p. A8.

²⁶ See *Legal Times*, May 10, 1999, p. 1.

²⁷ See *The New York Times*, March 9, 1999, p. B1.

²⁸ See *USA Today*, May 4, 1999, p. 4A.

²⁹ See *The Washington Post*, Jan. 12, 1999, p. A1.

Bibliography

Selected Sources Used

Books

Billings, Paul R. (ed.), *DNA on Trial: Genetic Identification and Criminal Justice*, Cold Spring Harbor Laboratory Press, 1992.

The book includes eight essays on a variety of scientific and legal issues, including DNA data-banking, mostly from a critical perspective. Each essay includes reference notes. Billings, a geneticist, is now chief medical officer for a system of three veterans hospitals in Texas.

Levy, Harlan, *And the Blood Cried Out: A Prosecutor's Spellbinding Account of the Power of DNA*, Basic Books, 1996.

Levy, now a criminal defense attorney in New York, wrote this account of the use of DNA evidence in criminal investigations and prosecutions based on nine years as a prosecutor in the Manhattan district attorney's office. The book traces the history of DNA sampling, its first application to criminal cases in the 1980s through the controversies over the practice in the United States and what he depicts as its nearly universal acceptance today. The book includes 12 pages of source notes.

Shapiro, Robert, *The Human Blueprint: The Race to Unlock the Secrets of Our Genetic Script*, St. Martin's Press, 1991.

Shapiro, a professor of chemistry at New York University, provides an accessible account of the scientific developments in human genetics, including a chapter on DNA identification. The book includes 24 pages of source notes and a three-page bibliography.

Wambaugh, Joseph, *The Blooding: The True Story of the Narborough Village Murders*, William Morrow, 1989.

Wambaugh, a former police detective turned author, gives a popular recounting of the use of DNA typing to solve the Narborough murders in England in the early 1980s — exonerating a suspect who had falsely confessed to the rape-murder of one young girl and then, after mass DNA sampling in the village, correctly identifying the man who committed that crime and another similar killing.

Articles

Landers, Robert K., "Solving Crimes With Genetic Fingerprinting," *Editorial Research Reports*, June

FOR MORE INFORMATION

American Academy of Forensic Sciences, 410 N. 21st St., Suite 203, Colorado Springs, Colo. 80901-0669; (719) 636-1100; <http://www.aafs.org>.

American Civil Liberties Union, 125 Broad St., New York, N.Y. 10004-2400; (212) 549-2500; www.aclu.org.

Council for Responsible Genetics, 5 Upland Road, Suite 3, Cambridge, Mass. 02140; (617) 868-0870; www.gene-watch.org.

National Commission on the Future of DNA Evidence, 810 7th St., N.W., Washington, D.C. 20531; (202) 307-5847; www.ojp.usdoj.gov/nij/dna.

30, 1989, pp. 353-364.

The article gives a good overview of the development of DNA typing and its early use by police and prosecutors in the United States.

Reports and Studies

National Research Council, *DNA Technology and Forensic Science*, National Academy Press, 1992.

This first report by the National Research Council endorsed the use of DNA typing as courtroom evidence but called for careful case-by-case evaluation and safeguards so strict that some experts initially viewed it — mistakenly — as urging a moratorium on its use. The report includes chapter notes and a six-page glossary.

National Research Council, *The Evaluation of Forensic DNA Evidence*, National Academy Press, 1996.

This report — sometimes called NRC II — endorsed a less restrictive statistical methodology for evaluating DNA evidence than that recommended by the previous National Academy of Sciences committee. The report includes a 14-page list of references, a five-page glossary and a listing of state court cases on the admissibility of DNA evidence.

U.S. Department of Justice, *Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial*, 1996.

The report summarizes 28 cases in which DNA evidence was used to exonerate defendants who had previously been convicted of crimes — rape or sexual assault and sometimes other offenses. It also includes a discussion of the policy implications of the case studies, commentaries by experts representing a range of views and a two-page glossary.

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DNA as Crime-Solving Tool

Cannizaro, Steve, "Chalmette Man is Arrested in Rapes; DNA Links Him to California Cases," *The New Orleans Times-Picayune*, March 2, 1999, p. A1.

A sample of blood that ex-criminal Daniel Metzler was required to give while in custody in California came back to haunt him when St. Bernard sheriff's deputies, working with California authorities, arrested him in connection with the rapes of four female joggers in a park in Mission Viejo, Calif., shortly after his release from prison in 1992.

Cole, Caroline Louise, "Ex-Nursing Aide Arraigned; Review Set for Lawrence Facility; Fired Worker Denies Rape Charge Resulting from DNA Test," *The Boston Globe*, Jan. 14, 1999, p. B3.

A fired employee was arraigned on rape charges, accused of impregnating a helpless and unconscious patient at the Town Manor Nursing and Rehabilitation Center, and a state investigator prepared to begin a detailed evaluation of the home's procedures and practices. Israel Moret, 37, a state-certified nurse's assistant, pleaded not guilty to counts of rape and abuse of a patient in a long-term care facility. Moret was arrested while on his regular day shift at the nursing home, after DNA testing identified him as the father of the unconscious woman's baby.

McMurry, Kelly, "Dog DNA Used to Take a Bite Out of Crime in Seattle," *Trial*, February 1999, pp. 104-106.

A jury in Seattle recently convicted two men of first-degree murder and animal cruelty. This was the first case in which canine DNA was used to obtain a criminal conviction in a homicide case.

Possley, Maurice, "Prisoner to Go Free as DNA Clears Him in Beauty Shop Rape," *Chicago Tribune*, Feb. 24, 1999, p. 2C1.

After spending more than eight years in prison for crimes he says he did not commit, a man convicted of two sexual assaults was ordered released on bond after DNA tests exonerated him in one of the attacks while implicating another man whom he closely resembled.

Robinson, Marilyn, "DNA Helps Find Rape Suspect; Database Points to Man Jailed in Separate Crime," *The Denver Post*, April 3, 1999, p. A1.

Authorities have used one of the newest weapons in their crime-fighting arsenal — a growing DNA database — to find a suspect in the 1995 rape of a 12-year-old girl. Colorado Bureau of Investigation forensic scientists ran

the DNA of a man in prison for a 1997 rape against samples from the 1995 case and came up with a match.

Ethical and Legal Issues

Donnelly, Peter, and Richard D. Friedman, "DNA Database Searchers and the Legal Consumption of Scientific Evidence," *Michigan Law Review*, February 1999, pp. 931-984.

DNA evidence has transformed the proof of identity in criminal litigation, but it has also introduced daunting problems of statistical analysis into the process. The problem of whether, and how, to present evidence identified through a DNA database search, is analyzed.

Kluger, Jeffrey, "DNA Detectives," *Time*, Jan. 11, 1999, pp. 62-63.

The use of DNA identification techniques raises several ethical and civil rights questions. The author discusses the use of genetic identification as used by the FBI and other law enforcement officials and considers the future of the technology.

Expanding DNA Testing

Argetsinger, Amy, and Craig Whitlock, "Md. Seeks The DNA Of Violent Criminals; Critics Cite Threat To Privacy Rights," *The Washington Post*, March 24, 1999, p. B1.

Maryland law enforcement officials want to collect the genetic fingerprints of almost every violent felon in the state for a database that could help identify suspects from traces of physical evidence found at crime scenes. A bill now under consideration by the state legislature would greatly expand the state's current database, which now contains the DNA records of a few hundred convicted sex offenders.

Pfeiffer, Sacha, "SJC Upholds Taking DNA from Convicts, Parolees," *The Boston Globe*, April 14, 1999, p. B1.

In a decision praised by law enforcement officials and harshly criticized by civil libertarians, the state's highest court ruled that blood samples may be forcibly taken from convicted criminals to create a statewide DNA database. The ruling overturned a decision by Superior Court Judge Isaac Borenstein, who said last summer that the state's 1997 DNA collection law was unconstitutional.

Tolley, Kim, "Attorney General's Request for DNA from Blacks Only Causes Uproar," *Call & Post*, Feb. 25, 1999, p. A1.

A request by the personnel director of the Ohio attorney

general's office that African-American employees of the department consider participating in a DNA Laboratory Population Database Information survey by providing tissue samples has created an uproar.

Willing, Richard, "Reno: Study Broad DNA Testing; Commission Would Consider Sampling Everyone Arrested," *USA Today*, March 1, 1999, p. A1.

Attorney General Janet Reno has asked a federal commission to study the legality of taking DNA samples from everyone arrested instead of just the convicted sex offenders and violent felons currently permitted by law. Such widespread testing would hugely expand government's reach by placing the genetic fingerprints of millions of Americans into state crime databases even if they never were convicted of a crime.

Willing, Richard, "With DNA Databases on Fast Track, Legal Questions Loom," *USA Today*, March 1, 1999, p. A5.

DNA databases designed to clear the innocent and catch the guilty more quickly are moving ahead at the speed of technology. Just last October, the FBI activated a national computer network that lets states match genetic material from crime scenes with the DNA of convicted murderers, child molesters and rapists.

Iceland's DNA Database

Lewontin, R. C., "People Are Not Commodities," *The New York Times*, Jan. 23, 1999, p. A19.

The author says that Iceland's recent parliamentary decision to create a DNA database controlled by a privately owned company further commodifies human bodies.

Lyll, Sarah, "A Country Unveils Its Gene Pool and Debate Flares," *The New York Times*, Feb. 16, 1999, p. F1.

In December, after a fierce public discussion that raged for months, Iceland's Parliament passed a law giving an Icelandic biotechnology concern the right to develop a giant database combining the health records, genealogical backgrounds and DNA profiles of every person in Iceland. The concern, Decode Genetics, which is to have exclusive rights to market the database abroad for 12 years, says the information will be used to answer a host of questions about the nature and origins of hundreds of diseases.

Weber, Lara, "DNA Project Raises Few Fears in Iceland," *Chicago Tribune*, Feb. 21, 1999, p. 14.

For many Americans, the idea of a DNA database raises fears of Big Brother snooping into their medical records. But in Iceland, such a project is viewed as an opportunity to cash in. After nine months of debate, Iceland's Parliament approved legislation that allows one company, Decode Genetics, to collect and analyze DNA samples and medical records from Iceland's strikingly homogenous population.

Jefferson-Hemings DNA Link

"DNA Tests Show Jefferson-Hemings Link," *American History*, April 1999, p. 6.

Recent DNA tests tend to corroborate that the nation's third president, Thomas Jefferson, fathered a child with one of his slaves, Sally Hemings.

Cain, Andrew, "Authors Admit Doubts Surround DNA Study," *Insight on the News*, Feb. 22, 1999, pp. 40-41.

The authors of the article in the journal *Nature* about Thomas Jefferson and his slave Sally Hemings — who still believe Jefferson fathered Hemings' last child — now admit there's much room for debate.

Cauchon, Dennis, "Group Flags Other Jefferson as Father, Says DNA Test Results Have Been Misinterpreted," *USA Today*, Jan. 7, 1999, p. A3.

A group of Thomas Jefferson's defenders say Jefferson's younger brother — not the president himself — is the man most likely to have fathered a child by the slave Sally Hemings. At a news conference in Washington, D.C., the group said the news media and many historians had misinterpreted the meaning of genetic tests released in November that showed Thomas Jefferson's DNA was consistent with that of Eston Hemings, born May 21, 1808, to slave Sally Hemings.

Wade, Nicholas, "Defenders of Jefferson Renew Attack on DNA Data Linking Him to Slave Child," *The New York Times*, Jan. 7, 1999, p. A20.

DNA evidence of Thomas Jefferson's presumed affair with his slave Sally Hemings continues to reverberate, with defenders of Jefferson arguing that others in his family could have fathered her children.

Testing Newborns' DNA

Lambert, Bruce, "Giuliani Backs DNA Testing Of Newborns for Identification," *The New York Times*, Dec. 17, 1998, p. B4.

Escalating his debate with civil liberties advocates, New York City Mayor Rudolph W. Giuliani said he had "no problem" with the DNA testing and fingerprinting of all newborns, although he did not propose actually gathering such records.

Shepardson, David, "Privacy Furor Hits Blood Tests: Engler Panel Argues to Save Newborn Samples; Others Want Them Destroyed," *Detroit News*, Jan. 25, 1999, p. A1.

There is a debate in Michigan over whether to keep for future use DNA samples taken from newborns to test them for rare disorders. The Michigan Commission on Genetic Privacy and Progress notes the samples have been used to match DNA a few times in cases involving abducted children.

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