



CSU
College of Law Library

Cleveland State Law Review

Volume 39 | Issue 3

Note

1991

Genetically Altered Admissibility: Legislative Notice of DNA Typing

Jayne L. Jakubaitis

Follow this and additional works at: <https://engagedscholarship.csuohio.edu/clevstlrev>



Part of the [Criminal Law Commons](#), and the [Evidence Commons](#)

How does access to this work benefit you? Let us know!

Recommended Citation

Note, Genetically Altered Admissibility: Legislative Notice of DNA Typing, 39 Clev. St. L. Rev. 415 (1991)

This Note is brought to you for free and open access by the Journals at EngagedScholarship@CSU. It has been accepted for inclusion in Cleveland State Law Review by an authorized editor of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.

‘GENETICALLY’ ALTERED ADMISSIBILITY: LEGISLATIVE NOTICE OF DNA TYPING*

I. INTRODUCTION	415
II. DNA EVIDENCE AND THE COURTS.....	416
A. <i>DNA: Novel Scientific Evidence</i>	416
B. <i>Judicial Response to DNA Evidence</i>	421
C. <i>Summary</i>	425
III. LEGISLATIVE NOTICE OF DNA TYPING: THE STATUTES	426
A. <i>An Overview</i>	426
B. <i>Louisiana</i>	427
C. <i>Minnesota</i>	428
D. <i>Indiana</i>	431
E. <i>Maryland</i>	432
F. <i>Virginia</i>	434
G. <i>Tennessee</i>	435
H. <i>Summary</i>	435
IV. CONSEQUENCES OF LEGISLATIVE ACCEPTANCE	436
V. PROPOSED AREAS OF LEGISLATIVE INTERVENTION	441
A. <i>The DNA Typing Standards Board</i>	441
B. <i>Conclusion</i>	444

I. INTRODUCTION

In November, 1987, Tommie Lee Andrews became the first person in the United States to be convicted at a trial in which DNA evidence was presented.¹ Since that time debate has ensued in courtrooms and professional journals as to whether DNA typing is ready for widespread adoption in criminal trials.² While courts and scholars debate the issue, several legislatures have attempted to have the final word by enacting legislation making DNA evidence admissible.

* The author gratefully acknowledges the assistance of Professor Stephan Landsman, Cleveland-Marshall College of Law, Cleveland State University.

¹ Edward G. Burley, Note, *A Study in Scarlet: Criminal DNA Typing Reaches the Courts and Legislatures*, VI JOURNAL OF LAW AND POLITICS 755, 788 (1990). DNA typing had been used previously in the United Kingdom. *Id.* at 785-87.

² DNA typing is also used in paternity cases although its use in establishing paternity is far less disputed. Paternity testing involves fresh samples of blood with the opportunity to retest unlike the circumstances of most criminal cases. The analysis of the DNA prints is subject to less error since the comparison is between a limited number of persons as opposed to an unknown number of potential matches as in a criminal case. Peter J. Neufeld and Barry C. Scheck, *No: Less Than Meets the Eye*, A.B.A. J., 35 (Sept. 1990).

This note examines the conflict over acceptance of DNA evidence. Part I discusses the process of DNA typing as a form of scientific evidence and the courts' responses to this novel technique. Part II examines the legislative responses to DNA typing. Part III explores the potential impact of the admissibility statutes both on the courts and on the accused. Finally, Part IV suggests areas of legislative regulation which may aid in resolving the current difficulties of DNA typing.

II. DNA EVIDENCE AND THE COURTS

A. DNA: Novel Scientific Evidence

DNA typing, as a form of scientific evidence, allows the jury to draw inferences of guilt or innocence based on minute amounts of physical evidence found at a crime scene.³ The most common process⁴ of preparing a forensic sample for admission at trial consists of seven steps:⁵

1. Extraction: the forensic sample, usually blood or semen, is treated with enzymes and chemicals to extract the DNA from the cells.⁶ If not enough DNA is extracted, the analysis cannot proceed.⁷ The DNA must be purified to remove common contaminants⁸ which may interfere with later steps in the process.⁹

³ DNA testing requires smaller amounts of sample tissue than do other tests. Peter J. Neufeld and Neville Colman, *When Science Takes the Witness Stand*, SCI. AM., 50 (May, 1990); Janet C. Hoeffel, Note, *The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant*, 42 STAN. L. REV. 465, 468-69 (1990); Laurel Beeler & William R. Wiebe, Note, *DNA Identification Tests and the Courts*, 63 WASH. L. REV. 903, 918-19 nn.72-78 (1988) (description of sample sizes necessary for DNA profiling).

⁴ The process used by two of the private testing laboratories, Cellmark Diagnostics Corporation and Lifecodes Corporation, and the FBI testing facilities is known as restriction fragment length polymorphism (RFLP) analysis. The third private company, Cetus, uses a different method, polymerase chain reaction (PCR) which is not widely used at this time. Hoeffel, *supra* note 3, at 471-75.

⁵ The descriptions that follow are presented in a most basic form. More detailed descriptions are readily available. See Magistrate's Report, *United States v. Yee*, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990). *United States v. Jakobetz*, 747 F. Supp. 250 (D. Vt. 1990); *People v. Castro*, 545 N.Y.S.2d 985 (Supp. 1989); William C. Thompson and Simon F. Ford, *DNA Typing: Acceptance and Weight of the New Genetic Identification Tests*, 75 VA. L. REV. 45, 64-76 (1989); Stephen C. Petrovich, Note, *DNA Typing: A Rush to Judgment*, 24 GA. L. REV. 669, 673-79 (1990); Burley, *supra* note 1, at 766-74; Beeler & Wiebe, *supra* note 3, at 909-17.

⁶ Thompson & Ford, *supra* note 5, at 65-67.

⁷ DNA must be of sufficient molecular weight to give accurate results. If the sample is too old or is poorly preserved, the DNA begins to break apart into pieces of low molecular weight. Beeler & Wiebe, *supra* note 3, at 919-21.

⁸ The DNA sample may be contaminated with bacteria, detergents or cleaning fluids from the surrounding environment. Thompson & Ford, *supra* note 5, at 66.

⁹ Contamination may result in extra or obscured banding which would interfere with analysis, possibly resulting in a false positive. Hoeffel, *supra* note 3, at 481-84; Beeler & Wiebe, *supra* note 3, at 921.

2. Restriction Digestion:¹⁰ The purified DNA is mixed with enzymes which cut the DNA into fragments of varying lengths.¹¹ The action of these enzymes can be altered by contaminants if not cleaned properly during the extraction phase.¹²
3. Gel electrophoresis:¹³ The fragmented DNA is placed in a gel across which electric current is passed. The fragments will move across the gel at different speeds; the smaller fragments will move faster than the larger fragments. At the end of this step, the fragments are separated according to size through the gel block.
4. Southern Transfer:¹⁴ The separated fragments are attached to a nylon membrane and are treated with a chemical which causes the double strands of DNA to separate into single strands.
5. Hybridization:¹⁵ Genetic probes which contain radioactive markers pair with specific DNA sequences on the single strands.¹⁶
6. Autoradiography:¹⁷ The radioactively marked probes are used to expose x-ray film resulting in the band pattern often compared to a UPC bar code.¹⁸ Each band represents the area of the DNA containing the probed sequence. The bands appear at different areas along the film due to the differing segment lengths of the DNA.
7. Interpretation of the print:¹⁹ The print of the unknown sample is then compared to other prints of known samples. The conclusion of this step is interpreting whether the prints correspond in enough areas to be declared a match.²⁰ Ideally, the two prints would be identical, but realist-

¹⁰ Thompson & Ford, *supra* note 5, at 67-69.

¹¹ The enzymes are known as restriction enzymes. They divide the DNA at specific sites according to genetic composition. While every individual would contain the same basic building blocks, the sequencing of the blocks is different in every person (except identical twins). Thus, the site specific enzyme creates fragments of different lengths. *Id.* at 67-68.

¹² Knowledge of contaminants' effects on DNA typing is no longer limited to lab personnel. Criminals have "used liquids to clean the bodies and destroy evidence that could be used for DNA testing." *Psychological Evaluation Ordered for Suspect in Serial Killings*, UPI, Jan. 25, 1991, available in LEXIS, Nexis Library UPI file.

¹³ Thompson & Ford, *supra* note 5, at 69-70.

¹⁴ *Id.* at 70-71.

¹⁵ *Id.* at 71-74.

¹⁶ The probes are designed to attach to areas of the DNA which show great variability across populations. Developing new probes is a thriving business. PR NEWswire, Feb. 21, 1989, available in LEXIS, Nexis Library, PR News File.

¹⁷ Thompson & Ford, *supra* note 5, at 74.

¹⁸ This description is inaccurate because the bands of a DNA print are often blurry. Rorie Sherman, *Lawyers Attacking Test Reliability*, NAT'L L. J., July 3, 1989, at 4.

¹⁹ Thompson & Ford, *supra* note 5, at 74-76.

²⁰ The FBI currently declares a match between two bands if they are located within $\pm 2.5\%$ in base pairs from each other (the "match window"). Further analysis refers to an arbitrarily defined range of base pairs called a bin. Bands are located within the bins and the frequencies of occurrence within each bin as compared to the database are multiplied to give the frequency of the banding pattern in the targeted population. Magistrate's Report, *United States v. Yee*, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990). *United States v. Jakobetz*, 747 F. Supp. 250 (D. Vt. 1990).

ically some margin for error must be added in. The question still exists as to how much margin of error should be allowed.²¹

Because this procedure is outside the experience of most laypersons, DNA evidence requires a reliance on external validation.²² Unlike the testimony of an eyewitness or easily identifiable physical evidence which allow the juror to rely on common experience,²³ DNA evidence must create the connection between the defendant and the evidence through expert opinion.

The reliance on expert opinion is a common theme for scientific evidence, but there is reason to treat DNA evidence with more care.²⁴ While DNA evidence is similar to other scientific evidence, it has the potential for far greater effects. Proponents of DNA evidence have heralded it as a radically different identification technique characterized by extremely high degrees of accuracy²⁵ and by resultant statistics nearly conclusive of guilt.²⁶ DNA typing appears to be potent evidence²⁷ as jurors have

²¹ Neufeld & Scheck, *supra* note 2, at 35.

²² DNA testing "is highly technical, incapable of observation and requires the jury to either accept or reject the scientists' conclusion that it can be done." Andrews v. State, 533 So. 2d 841, 850 (Fla. Dist. Ct. App. 1988).

²³ Jurors, for better or worse, are more comfortable with testimony that relates to their own perceptions; thus the emphasis that is generally placed on the often unreliable eyewitness account. Edward J. Imwinkelried, *The Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology*, 28 VILL. L. REV. 554, 565-66 (1982-83).

²⁴ "[A] different approach is required in this complex area of DNA identification . . . given the complexity of the DNA multi-system identification tests and the powerful impact they may have on a jury . . ." People v. Castro, 545 N.Y.S.2d 985, 987 (Supp. 1989).

²⁵ Cellmark stated "the chance that any two people will have the same DNA print is one in 30 billion." Neufeld & Colman, *supra* note 3, at 50. See United States v. Jakobetz, 747 F. Supp. 250 (D. Vt. 1990) (potential rate of false positive is "at worst remote and at best inconceivable"); People v. Shi Fu Huang, 546 N.Y.S.2d 920 (1989) (impossible to get a false positive); Magistrate's Report, United States v. Yee, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908, at *26 (N.D. Ohio Oct. 26, 1990); ("[n]ever heard of an instance of a 'false positive.'"); Kelly v. State, 792 S.W.2d 579, 583 (Tex. Ct. App. 1990) (No possibility of false match); Spencer v. Commonwealth, 384 S.E.2d 775, 782-83 (Va. 1989) (no false positives).

²⁶ Statistics are represented as the chance of a random match in a designated population but all are characterized by "one-in-a-million" odds. See Andrews v. State, 792 S.W.2d 579, 583 (Tex. Ct. App. 1990) (no possibility of false match); Spencer v. Commonwealth, 384 S.E.2d 775, 782-83 (Va. 1989) (no false positives).

²⁶ Statistics are represented as the chance of a random match in a designated population but all are characterized by "one-in-a-million" odds. See Andrews v. State, 533 So. 2d 841, 843 (Fla. Dist. Ct. App. 1988) (one in 839,914,540); State v. Horsley, 792 P.2d 945 (Idaho 1990) (one in 12,678,667); People v. Shi Fu Huang, 546 N.Y.S.2d 920 (1989) (one in 20 billion); State v. Pennington, 393 S.E.2d 847, 851 (N.C. 1990) (one in 24 million); State v. Ford, 392 S.E.2d 781, 783 (S.C. 1990) (one in 28 million North American black males); Mandujano v. State, 799 S.W.2d 318, 320 (Tex. Ct. App. 1990) (one in 2.4 billion); Kelly v. State, 792 S.W.2d 579, 582 (Tex. Ct. App. 1990) (one in 13.5 million); Glover v. State, 787 S.W.2d 544, 547 (Tex. Ct. App. 1990) (one in 18 billion); Spencer v. Commonwealth, 384 S.E.2d 775, 782 (Va. 1989) (one in 135 million as compared to a population of 10 million black males in the United States).

²⁷ Stephen Labaton, *DNA Fingerprinting Showdown Expected in Ohio*, N.Y. TIMES, June 22, 1990, § 9, at 5 (stating that DNA evidence was relied on as the primary basis for death row convictions in several states); Leslie Aun, *Cellmark*

shown substantial reliance on it²⁸ and defendants often plea bargain rather than face trial by DNA.²⁹

DNA evidence was pioneered by predominantly private organizations.³⁰ The earliest criminal trials using DNA evidence utilized scientists from the corporations which developed forensic genetic testing to testify as to the reliability and accuracy of DNA typing. However, the experts employed by these businesses are not unbiased witnesses.³¹ They have an interest in presenting testimony that will lead to judicial acceptance. The companies stand to reap financial gains³² through further testing and sales of equipment³³ as the tests become more commonly used and ac-

Cracks Cases, Markets With DNA Tests, WASH. BUS. J., vol. 9, no. 13, § 1 at 13 (quoting Montgomery County, Maryland prosecutor Robert Dean, "We've had a number of cases where DNA testing was absolutely everything in the case"); Jerry Hicks, *Torture Verdicts Set Two Precedents*, L.A. TIMES, July 4, 1991, part B, at 1 (quoting a juror, "The DNA evidence was difficult to follow, but once we understood it, it was very overwhelming evidence.")

²⁸ Hoeffel, *supra* note 3, at 515 (quoting sources reporting a death penalty verdict in 12 minutes, DNA being the "sealer" because "you can't really argue with science" and DNA was "the whole case.")

Imwinkelried presents an argument for admitting scientific evidence based on its relative reliability as compared to the commonly heard and often unreliable eyewitness accounts. He summarizes studies which show that jurors do not tend to over-emphasize scientific evidence. Imwinkelried, *supra* note 23, at 566-70.

As the impact of DNA evidence on jurors can only be deduced by relying on anecdotal records, further research is needed. The reliance on DNA testing may be an indication of juror misunderstanding. It has been proposed that jurors are more likely to be awed by evidence when they do not understand it. Steven M. Egesdal, Note, *The Frye Doctrine and Relevancy Approach Controversy: An Empirical Evaluation*, 74 GEO. L. J. 1769, 1783 (1986).

Jurors may profess comprehension of the evidence when interviewed after a trial. Hicks, *supra* note 27. Statements of this type should not forestall further inquiry into objectively measured knowledge, for the depth of jurors' understanding can only be measured against the information and presentation offered to them. Oversimplification by the prosecution coupled with superficial cross-examination by an ill-prepared defense counsel could lead to a stilted perception of comprehension.

²⁹ Aun, *supra* note 27; Neufeld & Colman, *supra* note 3, at 47; Hicks, *supra* note 27.

³⁰ See Hoeffel, *supra* note 3, at 465, 477; Burley, *supra* note 1, at 765. The FBI began to investigate DNA typing in 1984 and increased its efforts in response to private sector developments. The FBI laboratory began operation in December, 1988. Prepared statement of John W. Hicks, Deputy Assistant Director, Laboratory Division, FBI, at 3-4 [hereinafter Hicks Statement] (presented at Annapolis, Maryland, March 2, 1989) (available from Maryland Department of Legislative Reference).

³¹ Hoeffel, *supra* note 3, at 477.

³² Aun, *supra* note 27 (Cellmark charges \$490 for each forensic test); Rorie Sherman, *DNA Tests Unravel?*, NAT'L L. J., Dec. 18, 1989, at 1 (Cellmark charges \$1,000 per day for expert testimony while Lifecodes charges \$325 per sample and \$750 per day for testimony); Michael Unger, *Court Challenge Casts Pall Over DNA Testing: Genetic firms are poised for growth, but lax standards hurt progress*, NEWSDAY, July 30, 1989, at 47 (Lifecodes could be a \$100 million company by 1994 while Cetus projects to be a \$60 million company by 1992).

³³ The FBI buys DNA probes from Lifecodes and other sources. The market for sales of lab equipment, chemicals and probes is estimated at \$40 million annually. Unger, *supra* note 32.

cepted. Further, these private corporations have bypassed the extensive, but necessary, scientific research safeguards of publication and verification.³⁴ The corporations resisted disclosure of their methods to protect their trade secrets.³⁵ Later attacks on their testimony revealed inconsistencies between their claims and the claims of independent analysts.³⁶

The most troubling aspect of DNA typing is the lack of uniform standards for test procedure and analysis. Dr. Eric Lander, a leading molecular geneticist, noted that forensic labs are "virtually unregulated — with the paradoxical result that clinical laboratories must meet a higher standard to be allowed to diagnose strep throat than forensic labs must meet to put a defendant on death row."³⁷ Each of the private labs has its own standards³⁸ while the FBI, which began testing in December, 1988,³⁹ developed yet another system of lab standards.⁴⁰ These procedures are passed on to state labs that the organizations help to establish.⁴¹

The primary difficulty with private lab standards lies in the lack of external scientific validation.⁴² The companies have erred in the past in favor of painting a perfect picture over deficient test protocol.⁴³ The inconsistency of private lab recording compels that their procedures should be viewed with skepticism.

The FBI has adopted standards and published them as a model for use across the country.⁴⁴ The FBI was relatively cautious in its approach to implementing DNA testing, preferring to take time to develop standards before rushing ahead to test.⁴⁵ Nonetheless, the FBI standards have been challenged extensively by independent experts,⁴⁶ and the FBI has resisted independent review of its procedures by maintaining that "no outsider is

³⁴ *DNA forensic tests validated in court, need lab accreditation*, 10 BIOTECHNOLOGY NEWSWATCH, May 7, 1990; *State v. Schwartz*, 447 N.W.2d 422, 426-28 (Minn. 1989).

³⁵ *State v. Schwartz*, 447 N.W.2d at 427; Roger Parloff, *How Barry Scheck and Peter Neufeld Tripped Up the DNA Experts*, AM. LAWYER, Dec. 1989, at 50; Thompson and Ford, *supra* note 5, at 59.

³⁶ See generally Parloff, *supra* note 35.

³⁷ Sherman, *supra* note 32.

³⁸ Charles L. Williams, *DNA Fingerprinting: A Revolutionary Technique in Forensic Science and Its Probable Effects on Criminal Evidentiary Law*, 37 DRAKE L. REV. 1, 8 (1987-88); Clare M. Tande, Note, *DNA Typing, A New Investigatory Tool*, 1989 DUKE L.J. 474, 480; Anthony Pearsall, *DNA Printing: The Unexamined "Witness" in Criminal Trials*, 77 CALIF. L. REV. 665, 668 (1989); Burley, *supra* note 1, at 770.

³⁹ Hicks Statement, *supra* note 30, at 3-4.

⁴⁰ Magistrate's Report, *United States v. Yee*, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908, at 4-19 (N.D. Ohio Oct. 26, 1990).

⁴¹ Pearsall, *supra* note 38, at 675.

⁴² *Id.* at 670-71.

⁴³ See generally Parloff, *supra* note 35.

⁴⁴ See generally Hicks Statement, *supra* note 30.

⁴⁵ *Id.*; Williams, *supra* note 38, at 16.

⁴⁶ Magistrate's Report, *United States v. Yee*, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990) (defense attacks on FBI standards).

qualified to evaluate the bureau's performance."⁴⁷ For these reasons, the FBI methodology should remain under review.

Several scientific organizations have studied DNA typing in order to develop appropriate standards.⁴⁸ The difficulty has been the lack of a coordinating force to integrate the efforts. A national unifying voice is needed to avoid continued duplication of efforts. The most logical source of this leadership is Congress, which took its first step when its Office of Technology Assessment (OTA) returned a qualified endorsement of DNA testing on August 5, 1990.⁴⁹ The OTA report notes that the tests are only "reliable and valid when properly performed and analyzed by skilled personnel."⁵⁰

The OTA also stressed that there was no scientifically endorsed method of presenting the results of DNA analysis due to the ongoing debate over the population statistics used to generate the probabilities.⁵¹ Yet, DNA typing and its statistics have been introduced in criminal trials leaving the courts to determine whether the novel evidence should be admitted.

B. Judicial Response to DNA Evidence

When confronted by novel scientific evidence, courts usually apply one of two tests to determine whether it should be admissible. The most widely used test for admissibility, the *Frye* test,⁵² is based on the general acceptance of a scientific technique in the appropriate field of study.⁵³ General acceptance is viewed as a way to ensure reliability and validity of the test and to ensure the availability of a substantial pool of experts

⁴⁷ Neufeld & Colman, *supra* note 3, at 53.

⁴⁸ Burley, *supra* note 1, at 814-18; Hoeffel, *supra* note 3, at 494-95; Labaton, *supra* note 27.

⁴⁹ Rorie Sherman, *Study Endorses DNA Evidence; Congress Enters the Fray*, NAT'L L. J., August 13, 1990, at 3.

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923); PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, *SCIENTIFIC EVIDENCE*, § 1-5 (1986).

⁵³ Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.

Frye v. United States, 293 F. at 1014.

Courts have had difficulty determining which aspects of DNA typing should be the focus of the 'general acceptance' inquiry. See Thompson & Ford, *supra* note 5, at 55-60. The court's decision regarding the appropriate field of study may affect the evidence supporting general acceptance. *Id.*

able to testify.⁵⁴ Underlying the *Frye* test is the goal of preventing jury exposure to potentially overwhelming evidence.⁵⁵

Critics of *Frye* claim that it is too conservative because it causes an excessive delay in accepting evidence.⁵⁶ *Frye* has also been criticized for circumventing the judicial decision making process by empowering scientists to "vote" on judicial acceptance.⁵⁷ Despite these criticisms, DNA evidence was admitted using the *Frye* test before scientific consensus was reached.

DNA evidence was admitted under *Frye* because the underlying theories and techniques of the test have been well accepted by the scientific community for years.⁵⁸ Since forensic application of DNA testing rested on private development, few qualified experts were available to testify for the defense about the application of DNA analysis to criminal identification.⁵⁹ Defense experts tended to be scientists engaged in research who were forced to speculate on the inherent dangers of the test when used as a forensic tool.⁶⁰ Often no defense experts at all appeared at trial.⁶¹ In fact, the first trial in which the defense presented a well supported attack based on expert testimony resulted in a consensus of scientists that the test, as performed in that instance, was not reliable.⁶²

⁵⁴ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-5(A); see generally Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197 (1980).

⁵⁵ "Frye doctrine: The nature of scientific evidence prevents jurors from evaluating it in a manner substantially similar to other evidence because jurors are in awe of scientific testimony and tend to overestimate its probative value." Egesdal, *supra* note 28, at 1772.

⁵⁶ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-5(E); Giannelli, *supra* note 54, at 1223.

⁵⁷ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-5(E).

⁵⁸ There is nothing controversial about the theory underlying DNA typing. Indeed, this theory is so well accepted that its accuracy is unlikely even to be raised as an issue in hearings on the admissibility of the new tests . . . the theory has repeatedly been put to the test and has successfully predicted subsequent observations.

People v. Castro, 545 N.Y.S.2d 985, 989 (Supp. 1989) (citing Thompson & Ford, *supra* note 5, at 60-61.)

⁵⁹ *Id.* "The defense counsel in one case explained that he had asked dozens of molecular biologists to testify but all had refused." Neufeld & Colman, *supra* note 3, at 52.

⁶⁰ See generally *Castro*, 545 N.Y.S.2d at 985.

⁶¹ *Andrews v. State*, 533 So. 2d 841, 849 (Fla. Dist. Ct. App. 1988) (no expert witness testified for the defense); *Cobey v. State*, 559 A.2d 391, 398 (Md. App. 1989) (no expert testimony for the defense); *Spencer v. Commonwealth*, 384 S.E.2d 775, 783 (Va. 1989) (defendant "was unable to find or produce one qualified expert to debunk either the theory of DNA printing or the statistics generated therefrom.")

⁶² "By the end [of the trial], all nine independent experts, including three originally called by the prosecution would agree that no one could tell from the tests Lifecodes performed in this case whether there was a match." Parloff, *supra* note 35, at 52 (referring to *People v. Castro*, 545 N.Y.S.2d 985 (1989)).

The relevancy standard, the alternative to *Frye*, has gained increased acceptance since it was adopted into the Federal Rules of Evidence.⁶³ The relevancy test requires the court to balance the probative value of the evidence against the possibility that the evidence will be prejudicial or misleading to the jury.⁶⁴ The evidence must be substantially prejudicial or misleading before it will be excluded.⁶⁵

This rule reflects the general trend in courts over the past twenty years to lower the barriers to the admission of scientific evidence.⁶⁶ Proponents of this view maintain that probative evidence should be admitted with contrary opinions expressed through the adversary process to attack the weight of the evidence.⁶⁷ DNA typing has been accepted as evidence in several courts which applied the relevancy standard.⁶⁸ DNA evidence does not appear to substantially prejudice or mislead the jury if the claims of highly probative and accurate identification are believed. The lack of available experts hindered the defense from showing unreliability sufficient to warrant exclusion of the evidence under the relevancy test.

However, some courts have followed the premise that "a scientist may have no trouble accepting the general proposition that DNA typing can be done reliably, yet still have doubts about the reliability of the test being performed by a particular laboratory."⁶⁹ This altered approach appears in *People v. Castro*,⁷⁰ the first case to seriously challenge the reliability of DNA typing.

In *Castro*, counsel for the defense, Barry Scheck and Peter Neufeld, contacted several scientists to learn enough about DNA typing to mount a defense against its admission.⁷¹ Several experts contributed many hours free of charge to educate and assist Scheck and Neufeld in their efforts to question the reliability of the evidence.⁷² Their testimony challenging the lab's analysis of a spot of blood found on the defendant's watchband led experts for the prosecution to admit that procedures were not yet ready to generate admissible evidence.⁷³

⁶³ The relevancy test extends from the interaction of several rules of evidence. FED. R. EVID. 401; FED. R. EVID. 402; FED. R. EVID. 403; FED. R. EVID. 702.

⁶⁴ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-6(B).

⁶⁵ *Id.* at § 1-6(C).

⁶⁶ Giannelli, *supra* note 54, at 1199; Imwinkelried, *supra* note 23, at 555-56.

⁶⁷ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-6(D); Gianelli, *supra* note 54, at 1239. "Relevancy approach: The adversary process allows jurors to evaluate novel scientific evidence in a manner substantially similar to other evidence." Egesdal, *supra* note 28, at 1772.

⁶⁸ *United States v. Jakobetz*, 747 F. Supp. 250 (D. Vt. 1990); *Andrews v. State*, 533 So. 2d 841 (Fla. Dist. Ct. App. 1988); *Caldwell v. State*, 393 S.E.2d 436 (Ga. 1990); *State v. Pennington*, 393 S.E.2d 847 (N.C. 1990); *Spencer v. Commonwealth*, 385 S.E.2d 850 (Va. 1989); *State v. Woodall*, 385 S.E.2d 253 (W.Va. 1989).

⁶⁹ Thompson & Ford, *supra* note 5, at 57-58.

⁷⁰ *People v. Castro*, 545 N.Y.S.2d 985, 987 (Supp. 1989).

⁷¹ Parloff, *supra* note 35, at 53.

⁷² *Id.*

⁷³ See *supra* note 62.

The judge in *Castro*, Gerald Scheindlin, in deciding to exclude the inculpatory evidence, applied a three-pronged variation of the *Frye* test.⁷⁴ The first two prongs are the traditional *Frye* test. The third prong expands *Frye* to include an examination of the lab procedures in a particular case, ordinarily a question of weight of the evidence, not admissibility.⁷⁵ The court in *Castro* stated that "where the results are so unreliable . . . [they] are inadmissible as a matter of law."⁷⁶

Cases decided soon after *Castro* did not apply the three-pronged admissibility test;⁷⁷ *Castro* failed to set a uniform admissibility procedure that state and federal courts would consistently follow. Legal experts anticipated that the precedent setting decision would occur in *United States v. Yee*.⁷⁸ In *Yee*, Magistrate James E. Carr conducted a six-week pre-trial hearing so extensive that it has been called a "scorched earth review" of the field.⁷⁹ After hearing testimony from thirteen leading scientists, Magistrate Carr recommended admissibility.⁸⁰ The controversy over DNA evidence appeared to be nearing an end.

Cases subsequently decided indicate, however, that judicial acceptance is not universal. In *United States v. Two Bulls*,⁸¹ the court held that a *Castro* hearing was necessary before admissibility whether the court follows the Federal Rules of Evidence or the *Frye* test.⁸² The Alabama Supreme Court in *Ex parte Perry v. State* chose to adopt the three-pronged *Castro* test for determining admissibility.⁸³ *Perry* reiterates the concern "that there can be errors in both the performance of the tests and the interpretation, both of which can lead to an improper 'match.'"⁸⁴ The court in *Perry* recommended that prior to admission a hearing outside the presence of the jury should be held to ensure proper performance of the test in each case involving a challenge to the evidence.⁸⁵

The strongest rejection of DNA evidence to date occurred on January 24, 1991, when the Supreme Judicial Court of Massachusetts decided

⁷⁴ *Castro*, 545 N.Y.S.2d 985 (1989).

⁷⁵ *Id.* (citing *People v. Wesley*, 533 N.Y.S.2d 643 (Albany County Ct. 1988)).

⁷⁶ *Id.* at 997-98.

⁷⁷ *State v. Pennington*, 393 S.E.2d 847 (N.C. 1990); Magistrate's Report, *United States v. Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990); *State v. Ford*, 392 S.E.2d 781 (S.C. 1990).

⁷⁸ E. Donald Shapiro & Michelle L. Weinberg, *DNA Data Banking: The Dangerous Erosion of Privacy*, 38 CLEV. ST. L. REV. 455, 462 (1990) (reference to Magistrate's Report, *United States v. Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990)).

⁷⁹ *Id.*

⁸⁰ Magistrate Carr's recommendation was adopted by the court in *United States v. Yee*, 134 F.R.D. 161 (1991).

⁸¹ 918 F.2d 56 (8th Cir. 1990).

⁸² *Id.* at 60.

⁸³ *Ex Parte Perry v. State*, No. 89-1534, 1991 Ala. LEXIS 323 (Ala. Apr. 19, 1991).

⁸⁴ *Id.* at *25, n.1.

⁸⁵ *Id.*

Commonwealth v. Curnin.⁸⁶ The court held that, "we conclude that there is no demonstrated general acceptance or inherent rationality of the process by which Cellmark arrived at its conclusion"⁸⁷ The court further stated that, "a jury should not be given the evidence and allowed to determine the validity and soundness of the process because evidence of this character has too great a potential for affecting a jury's judgment."⁸⁸ The court in *Curnin* did not rely on the *Castro* test of proper performance; instead, the court ruled DNA evidence inadmissible under the traditional *Frye* test. The court grounded its decision on the belief that:

Evidence of this nature, based on the scientific principle that every human has unique genetic characteristics and having an aura of infallibility, must have a strong impact on a jury. The erroneous admission of such evidence would undoubtedly be prejudicial in any case where, as here, the identification of the person who committed the crime is in serious dispute.⁸⁹

The decision in *Curnin* reflects the paradoxical result that the *Frye* test, a supposedly conservative admissibility standard, prematurely admitted evidence as generally accepted. DNA evidence was rejected in *Curnin* because the prosecution did not show that the forensic application of the technology was generally accepted by the scientific community.⁹⁰ The opposing arguments did not differ significantly from prior DNA cases; the difference was the court's position that "[t]he party offering the evidence 'has the burden of showing the general acceptance by experts in the field of the reliability.'"⁹¹ The court determined that the prosecution had not met its burden.⁹²

It is possible to reconcile *Yee* and *Curnin*. The lengthy pre-trial hearing which resulted in admissibility in *Yee* might satisfy the prosecution's burden of showing general acceptance under *Curnin*. However, the extensive hearings are not likely to be repeated in every case with DNA evidence.⁹³ Thus, despite the predictions of *Yee's* impact, a lack of judicial consensus on DNA admissibility persists.

C. Summary

The courts' inability to agree on admissibility should not mean the decision to admit evidence should be removed from the judiciary. The

⁸⁶ 565 N.E.2d 440 (1991).

⁸⁷ *Id.* at 442.

⁸⁸ *Id.* at 442, n.7 (emphasis added).

⁸⁹ *Id.* at 441.

⁹⁰ *Id.*

⁹¹ *Commonwealth v. Curnin*, 565 N.E.2d 440, 443 (1991) (citing *Commonwealth v. Kater*, 447 N.E.2d 1190 (Mass. 1983)).

⁹² In addition to the two cases presented in the text, a Superior Court Judge in California ruled that prosecutors "had failed to show the preliminary hearing judge that the DNA analysis was valid." Jerry Hicks, *Rape Suspect's Case is Dismissed: Improper DNA Procedure Cited*, L.A. TIMES, Jan. 23, 1991, part B, pg. 5. Since the DNA was the primary evidence, the case was dismissed. *Id.*

⁹³ Shapiro & Weinberg, *supra* note 78, at 462.

impact of the judicial decisions is not limited to the legal system. The adversarial challenges, when they occur, goad the labs into improving their methodology in order to withstand scrutiny. DNA evidence is often withdrawn when a serious challenge to admissibility is anticipated,⁹⁴ indicating an unwillingness to withstand the court's inquiry into the typing process. More stringent protocols and procedures have been instituted by the testing labs in response to weaknesses exposed by the judicial process.⁹⁵

With the current lack of uniform standards and controls, the courts have been filling the gap by examining the procedures through scientific debate in the courtroom. The admissibility hearings provide, at this time, the only independent control over lab standards. Without judicial scrutiny, DNA testing labs will lose a primary source of impetus to improve the reliability of their procedures.

III. LEGISLATIVE NOTICE OF DNA TYPING: THE STATUTES

A. *An Overview*

Judicial influence on the unregulated labs may have been eliminated as several legislatures have implemented statutory measures making DNA evidence admissible *per se*. Legislative notice of scientific evidence is not unheard-of, but it is unusual for a still novel procedure to be legislatively endorsed.

Legislative notice applies to several types of scientific evidence such as radar,⁹⁶ traditional blood analysis⁹⁷ and intoxication testing.⁹⁸ All of these forms of evidence may be distinguished from DNA typing. Radar is used to enforce regulatory statutes⁹⁹ which do not involve extensive deprivations of life and/or liberty as do the sentences for rape and homicide most commonly associated with DNA evidence. Intoxication testing involves criminal sanctions,¹⁰⁰ but to a lesser degree than those imposed for rape and homicide. Measurement of intoxication also requires immediate action since it is a condition which changes rapidly,¹⁰¹ unlike DNA which permanently remains in the body.

⁹⁴ Labaton, *supra* note 27.

⁹⁵ Compare *People v. Castro*, 545 N.Y.S.2d 985 (Supp. 1989) with Magistrate's Report, *United States v. Yee*, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990).

⁹⁶ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-3; Giannelli, *supra* note 54, at 1203.

⁹⁷ GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-3.

⁹⁸ *Id.*; Giannelli, *supra* note 54, at 1203.

⁹⁹ Giannelli, *supra* note 54, at 1203, n.34.

¹⁰⁰ *Id.*

¹⁰¹ The need for immediate action may allow an intoxication test without a warrant due to exigent circumstances. *Schmerber v. California*, 384 U.S. 757, 770-71 (1966).

Blood analysis is closely analogous to DNA profiling. A blood sample must be taken from the person to perform blood analysis; a blood sample is commonly required for DNA testing. This intrusion into the body differs from a procedure such as fingerprinting which is wholly external. The Supreme Court held in *Schmerber v. California*¹⁰² that the intrusion of taking a blood sample was not so extreme, unusual or unsafe as to be violative of Fourth Amendment rights.¹⁰³ Nonetheless, the intrusive nature of obtaining a blood sample, considered with the immutability of one's blood type (or DNA), underscores the need for probable cause before a warrant may be obtained for the search. The stability of the sample distinguishes both blood analysis and DNA typing from intoxication testing.

Blood analysis and DNA typing may be distinguished by the information the tests generate. Blood typing statistical information estimates the probability of a random match into the one-in-hundreds as opposed to the one-in-millions of DNA typing results.¹⁰⁴ While statistics of one-in-one hundred certainly favor the probability of suspect identification, the DNA statistics virtually single out an individual. In this capacity, the DNA statistics weigh heavily in the outcome of a trial. If the laboratory statistics are believed, little room remains for reasonable doubt.

DNA evidence also lacks a solid background in scientific publication, replication and validation, unlike previously accepted forms of scientific evidence.¹⁰⁵ Radar, blood analysis and intoxication testing generally had a long history of judicial acceptance by judicial notice before their acceptance by the legislature.¹⁰⁶ Only a few courts have extended judicial notice to DNA typing.¹⁰⁷

Six states (Louisiana, Minnesota, Indiana, Maryland, Virginia and Tennessee) have chosen to take the unprecedented course of legislative acceptance of a still novel scientific technique. The states have taken similar approaches in admitting the evidence, but the statutes vary in their scope.

B. Louisiana

The statute adopted by the Louisiana legislature states that evidence of DNA profiles offered to establish the identity of the offender of any crime is relevant evidence.¹⁰⁸ Use of the term "relevant evidence" is con-

¹⁰² *Id.* at 771.

¹⁰³ *Id.*

¹⁰⁴ Traditional blood typing results are stated as one in 100 probability of a random match. Hoeffel, *supra* note 3, at 469, n.18. Compare with cases cited *supra* note 25.

¹⁰⁵ See *supra* notes 30-36 & accompanying text.

¹⁰⁶ *Id.*

¹⁰⁷ DNA has been judicially noticed by the courts in two states. See *State v. Ford*, 392 S.E.2d 781, 784 (S.C. 1990); *State v. Woodall*, 385 S.E.2d 253, 260 (W.Va. 1989).

¹⁰⁸ "Evidence of deoxyribonucleic acid profiles . . . offered to establish the identity of the offender of any crime is relevant as proof in conformity with the Louisiana Code of Evidence." LA. REV. STAT. ANN. § 441.1 (West 1989).

sistent with Louisiana's adoption of the relevancy standard in *State v. Calanese*.¹⁰⁹ It may be inferred from the statute's language that the legislature sought to establish a rule which holds the probative value of the DNA is not outweighed by the likelihood that it could prejudice, mislead or distract the jury from a fair ruling on the issues.¹¹⁰ In so doing, the legislature entered an area in which the trial judges have generally operated with much leeway.¹¹¹ Ordinarily, it is the role of the judge to weigh factors of probative value to admit or exclude the evidence.¹¹²

When it is the trial judge who weighs the value of the evidence, a basis for appeal lies in abuse of discretion. Appellate courts generally defer to the trial judge unless there has been a showing of clear abuse by an arbitrary and irrational decision.¹¹³ Since no challenges to the Louisiana statute have yet arisen, it is not clear whether the appellate courts will view the legislative discretion in the same manner as judicial discretion.

C. Minnesota

In Minnesota, the legislature adopted several provisions for DNA testing as part of an omnibus crime bill.¹¹⁴ While the inclusion of DNA testing with other crime related topics may be logical, the volume of issues reduces the likelihood of exploratory debate on any one section. The floor reports of the bill exhibit no material changes in the DNA language between committee drafts¹¹⁵ which may indicate little consideration of this important issue.

The legislature now requires¹¹⁶ the Bureau of Criminal Apprehension (BCA) to develop uniform procedures and protocols for the collection, preservation and analysis of DNA specimens and to establish a central-

¹⁰⁹ 368 So. 2d 975, 980 (La. 1979).

¹¹⁰ See *supra* notes 63-67 & accompanying text.

¹¹¹ MCCORMICK ON EVIDENCE § 185 (E. Cleary 3d ed. 1984).

¹¹² *Id.*

¹¹³ *Id.* See also *Ohio v. Blair*, No. 2659, 1990 Ohio App. LEXIS 5812 (Ohio App. Dec. 24, 1990) (court overrules assignments of error based on court's discretion to admit DNA testimony). But see *United States v. Two Bulls*, 918 F.2d 56 (8th Cir. 1990) (court finds reversible error when lower court did not conduct *Castro*-type hearing).

¹¹⁴ H.B. 59, authored by Reps. Kelly and Vellenga (available from Minnesota Legislative Reference).

¹¹⁵ *Id.*

¹¹⁶ The statute states in relevant part:

Subdivision 2. Uniform evidence collection. The bureau shall develop uniform procedures and protocols for collecting evidence . . . including procedures and protocols for the collection and preservation of human biological specimens for DNA analysis.

Subdivision 3. DNA analysis and data bank. The bureau shall adopt uniform procedures and protocols to maintain, preserve, and analyze human biological specimens for DNA.

MINN. STAT. § 299C.155 (1990).

ized data base¹¹⁷ for the information obtained from analysis. The data is to be available to law enforcement officials, prosecutors and the individual subjects of the data upon request.¹¹⁸ A second statute¹¹⁹ requires the courts to order persons convicted of sexual offenses to provide a specimen for DNA analysis to be included in the DNA data bank.

The statutes do not specify what type of information will be available to the defendant. Errors which may occur during the testing process would not be apparent from the final lab report.¹²⁰ Requirements of procedural data are not included in the statute making it likely that only the final statement would be given to the defendant. The lack of copious documentation seriously impairs the ability to present an adequate defense to this evidence.

Another statute specifically addresses admissibility. The statute states that DNA test results are admissible as evidence in court without antecedent expert testimony as to their reliability and trustworthiness.¹²¹ Defense counsel is precluded from engaging *in limine* hearings to determine the reliability of the individual test. The defense is left to rely solely on cross-examination to refute the evidence.

While the legislature has made the effective challenging of evidence through cross-examination quite difficult by not providing for extensive lab documentation, a more serious obstacle may await the defendant in yet another admissibility statute. A statute was later added which allows DNA evidence to be admitted even if it was obtained outside of the state.¹²²

¹¹⁷ One of the strengths of DNA testing is its adaptability to digitalization. Tande, *supra* note 38, at 481. Statewide data bases are created using the methodology of the lab. Differences in lab techniques between states will prevent an exchange of information between data bases. Parloff, *supra* note 35, at 56; PR NEWswire, *supra* note 16 (DNA technology will not realize its full potential until national standards allow all facilities to work together).

DNA data bases raise privacy concerns for all individuals. Controls on access to the information may not adequately prevent misuse of genetic data. See Shapiro & Weinberg, *supra* note 78; Susan Katz Miller, *Genetic Privacy Makes Strange Bedfellows*, 249 SCIENCE 1368 (1990).

¹¹⁸ A total of \$1.5 million was appropriated to the BCA to create the DNA tracing system. Joe Tougas, *State Soon to Use DNA Tracking*, MANKOTA FREE PRESS, July 3, 1989, at 9 (available from Minnesota Legislative Reference).

¹¹⁹ MINN. STAT. § 609.3461 (1989).

¹²⁰ Neufeld & Colman describe the lack of written explanation in final reports by suggesting that: "it would be unthinkable for a diagnostic laboratory to deliver to the obstetrician of a pregnant woman an unsigned report with only the word 'abort' appearing on the page." Neufeld & Coleman, *supra* note 3, at 53. See also *Ohio v. Blair*, No. 2659, 1990 Ohio App. LEXIS 5812 (Ohio App. Dec. 24, 1990) (defense expert unable to form an opinion as to test validity due to lack of information in the final report).

¹²¹ In a civil or criminal trial or hearing, the results of DNA analysis . . . are admissible in evidence without antecedent expert testimony that DNA analysis provides a trustworthy and reliable method of identifying characteristics in an individual's genetic material upon a showing that the offered testimony meets the standards for admissibility set forth in the Rules of Evidence.

MINN. STAT. 634.25 (1989).

¹²² "Relevant evidence shall not be excluded in any criminal trial or hearing . . . on the ground that it existed or was obtained outside of this state." MINN. STAT. § 634.30 (1990).

This statute partially negates the standards the legislature imposed upon the BCA's laboratories. The statutes taken collectively would seem to allow *any* DNA evidence from *any* lab to be admitted as reliable and trustworthy evidence.

It is likely that all chain of custody witnesses necessary to discover possible lab errors would be difficult to obtain from out-of-state facilities. An out-of-state lab may not comply with Minnesota's statutory lab standards, yet the presumption of reliability would still exist. If the reliability of the test is presumed, the court may choose to allow minimal verification of procedures.¹²³ These permissive conditions leave the defendant with virtually no confrontational ability despite an opportunity to cross-examine available witnesses.

Problems also exist between the legislative determination of admissibility and portions of the Minnesota Rules of Evidence. Rule of Evidence 104 states: "Preliminary questions concerning . . . the admissibility of evidence shall be determined by the court . . ." ¹²⁴ The Comment to this section states "Rule 104 sets out the relative function of the judge and jury in the trial process."¹²⁵ It should be noted that the role of the legislature in the trial process is conspicuously absent. While the Rules of Evidence empower the court to determine admissibility, the legislature has claimed this power for itself when DNA typing is at issue.

Judicial confrontation of legislative intervention into evidentiary matters has already occurred in Minnesota. The legislature adopted a statute that makes statistical population frequency evidence derived from the DNA testing admissible.¹²⁶ A statute specifically addressing statistical information would generally not be included in most state statutory schemes because statistical evidence is treated as any other form of evidence in most states. The Minnesota Supreme Court, however, limited the use of population frequency statistics due to the potentially exaggerated impact they may have on a jury.¹²⁷ The legislature directly precluded

¹²³ An Ohio court recently overruled an assignment of error based on failure to establish proper chain of custody. The court found the testimony of a lab technician was sufficient. *Ohio v. Blair*, No. 2659, 1990 Ohio App. LEXIS 5812.

The same result could occur under the Federal Rules of Evidence which allow technicians to verify lab tests. FED. R. EVID. 901 (a), (b)(9). *But see Hicks, supra* note 27 (lack of foundation for DNA testimony results in exclusion of the evidence.)

¹²⁴ MINN. R. EVID. 104 (amended December 28, 1989, effective January 1, 1990.)

¹²⁵ Committee Comment to Rule 104 (1977).

¹²⁶ MINN. STAT. § 634.26 (1989).

¹²⁷ *State v. Schwartz*, 447 N.W.2d 422, 428 n.5 (Minn. 1989). The court's decision in *Schwartz* followed precedent. *State v. Joon Kyu Kim*, 398 N.W.2d 544 (Minn. 1987); *State v. Boyd*, 331 N.W.2d 480 (Minn. 1983); *State v. Carlson*, 267 N.W.2d 170 (Minn. 1978). Other states have no such limitation and have not followed Minnesota. *State v. Schwartz*, 447 N.W.2d at 429. *But see United States v. Two Bulls*, 918 F.2d 56, 61 (8th Cir. 1990) (citing to *Joon Kyu Kim* and *Schwartz* in requiring courts to weigh probative value and prejudicial effect on DNA statistics before admitting as evidence).

this holding by making statistical evidence admissible by statute.¹²⁸ The Hennepin County Court declared this statutory provision unconstitutional "because it violates the separation of powers clause of the Minnesota Constitution by invading an essentially judicial function — the power to determine admissibility of evidence."¹²⁹ The court did not, however, rule against the statute admitting evidence of the test itself. Yet, the decision effectively limited the impact of the legislative actions by excluding the powerful statistical inferences without extending any further than needed for the specific case.

The Minnesota Supreme Court later commented: "we also remind the bench and bar that we have not addressed or decided whether Minn. Stat. 634.26 (Supp. 1989), providing for the admission of statistical probability evidence relating to DNA test results, has the effect of legislatively creating an exception for DNA evidence . . .".¹³⁰ After this caveat of non-decision, the court continued with a strong indication of its view of the statute by citing a discussion "of the separation of powers doctrine and the recognition therein that this court, not the legislature, has the primary responsibility for adopting rules relating to the admission of evidence in trials."¹³¹

The separation of powers argument offered by the Minnesota courts may be adopted by other courts to strike general admissibility statutes. If the defense can show flaws so egregious that a court could not reasonably admit the evidence, the statute presuming reliability would be ripe for attack. The court may be moved by such a miscarriage of justice to exclude the evidence as part of its powers, thereby necessitating comment on the admissibility statute.

D. Indiana

Challenges to the constitutionality of DNA statutes are also likely to occur in Indiana. Governor Evan Bayh signed House Bill 1357 into law despite his publicized concerns that the DNA provisions were unconstitutional.¹³² The lengthy bill contained authorization for the development of a DNA data bank¹³³ as well as a provision almost identical to the

¹²⁸ Michele Cook, *High-tech genetic test will be used in trial*, ST. PAUL PIONEER DISPATCH, July 19, 1989, at 1C (available from Minnesota Legislative Service) (quoting Assistant Attorney General Bill Klumpp who helped draft H.B. 59 as saying "In essence, what the Legislature did is overrule the Supreme Court.")

¹²⁹ UPI, Sept. 7, 1990, available in LEXIS, Nexis Library, UPI file. Judge Michael Davis is quoted as saying that the statute "directly interferes with the inherent power of the courts to establish rules of evidence and must be declared unconstitutional." *Id.*

¹³⁰ State v. Nielsen, 467 N.W.2d 615, 620 (Minn. 1991).

¹³¹ *Id.*

¹³² James Grass, *Bayh OK's Bill on Taping of Child-Abuse Testimony*, Gannett News Service, March 27, 1990, available in LEXIS, Nexis Library (expressing concern about ongoing scientific debate over DNA testing and the intrusion into the court's power to weigh evidence.)

¹³³ IND. CODE § 20-12-34.5 (1990).

Minnesota law admitting DNA evidence in criminal trials.¹³⁴ However, the bulk of the legislation concerned child abuse and child pornography, issues which prompted Governor Bayh's signature.¹³⁵

This bill, weighted with many diverse issues, is even more cluttered than Minnesota's omnibus crime bill. The bill was virtually ensured passage due to sections addressing child abuse and pornography, as is evidenced by the Governor's reluctant endorsement. Press releases concerning the bill's passage centered on the child welfare issues with little comment on the ramifications of DNA acceptance.¹³⁶ This dearth of press coverage may indicate lack of debate in the legislature over passage of the admissibility statute.

The bill also provided that DNA population statistics will be made available to persons who have paid a required fee.¹³⁷ This issue raises questions of access to information for the indigent defendant. The statistics are vital for defense examination of the final DNA testing results.¹³⁸ Denial of the information to the indigent results in impermissible procedural differences based solely on ability to pay.¹³⁹ Refusal to grant the information to an indigent defendant should be considered a violation of the Fourteenth Amendment due process and equal protection rights.

Criminal defendants in Indiana may also have another objection unique to the circumstances. Due to a printing error, the bill was not sent to the Governor before the legislature adjourned, as is required by Indiana law.¹⁴⁰ Whether or not the bill properly cleared the legislature remains to date an issue for adjudication.¹⁴¹

E. Maryland

The Maryland statute differs from others in that it provides for notice to the defendant of the intent to use DNA evidence and provides for the

¹³⁴ IND. CODE § 35-37-4-13 (1991) reads in part: "In a criminal trial or hearing, the results of forensic DNA analysis are admissible in evidence without antecedent expert testimony that forensic DNA analysis provides a trustworthy and reliable method of identifying characteristics in an individual's genetic material."

¹³⁵ Grass, *supra* note 132.

¹³⁶ *Id.*

¹³⁷ IND. CODE 20-12-34.5 § 5 (1990).

¹³⁸ See *supra* note 120.

¹³⁹ The argument to provide information would be based on *Griffin v. Illinois*, 351 U.S. 12 (1956) (criminal trial procedures should not be discriminatory on the basis of wealth) and *Ake v. Oklahoma*, 470 U.S. 68 (1983) (determine necessity of assistance by examining the fundamental fairness of the proceedings). The argument is supported by court decisions mandating expanded discovery to provide necessary information. Magistrate's Report, *United States v. Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908 (N.D. Ohio Oct. 26, 1990) (defense entitled to extensive discovery of FBI information); *People v. Castro*, 545 N.Y.S.2d 985, 999 (Supp. 1989) (list of items the court would include in discovery).

¹⁴⁰ Grass, *supra* note 132.

¹⁴¹ *Id.*

presence of any person in the chain of custody as a witness.¹⁴² This language reinforces the relevancy approach by allowing evidence to be evaluated through the adversary process.¹⁴³ The presence of chain of custody witnesses provides the opportunity for extensive cross-examination concerning lab procedure. The statute is similar to other DNA statutes in that it proclaims DNA admissible *per se*.

The floor report of House Bill 711¹⁴⁴ contains a clear statement of legislative intent: "The intent of the bill is to eliminate the necessity of holding a 'Frye-Reed' hearing to prove that the technique has gained general acceptance in the relevant scientific community."¹⁴⁵ It further states that it has been "scientifically established"¹⁴⁶ that techniques have been developed which "can be performed with a level of scientific accuracy that approaches near certainty."¹⁴⁷

The Maryland legislature reached these conclusions after hearings and committee reports. The speakers included prominent members of the DNA typing community, the legal community and persons familiar with blood testing.¹⁴⁸ No speaker addressed the legislature from a public defender's office or civil liberties organization.¹⁴⁹ The lack of defense-oriented witnesses indicates an imbalance of interests presented at the proceedings. While scientists may debate fair lab procedures, defense advocates should be present to debate fair trial procedures.

The prepared statement of John W. Hicks, Deputy Assistant Director of the FBI Laboratory Division,¹⁵⁰ provides insight into the testimony that led the legislature to its conclusions. Mr. Hicks proactively addressed issues which had been DNA's Achilles heel: lack of publication,¹⁵¹ scant research,¹⁵² lack of standards,¹⁵³ and lack of proficiency testing.¹⁵⁴ His position was buttressed by reference to crime laboratories across the country which were beginning DNA testing.¹⁵⁵ Mr. Hicks characterized some DNA tests as having "the discriminating power . . . to the point that the tests virtually identify a single individual."¹⁵⁶ Like early expert testimony

¹⁴² MD. CTS. & JUD. PROC. CODE ANN. § 10-915 (1989).

¹⁴³ The Maryland courts, however, follow the more conservative *Frye* doctrine. See *Cobey v. State*, 559 A.2d 391 (Md. Ct. Spec. App. 1989).

¹⁴⁴ Available from Maryland Department of Legislative Reference.

¹⁴⁵ Floor Report, HB 711 [hereinafter Floor Report] (available from Maryland Department of Legislative Reference).

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ The House Judiciary Committee List of Speakers and Interested Parties (available from Maryland Department of Legislative Reference) lists speakers and their affiliations as: John W. Huss, Cellmark Diagnostics; John W. Hicks, FBI; Teresa M. Gronert, Maryland State Police Crime Laboratory; Francis A. Chiafari and Terry D. Houtz, Baltimore Rh Typing Lab.

¹⁴⁹ *Id.*

¹⁵⁰ Hicks Statement, *supra* note 30.

¹⁵¹ *Id.* at 1, 6-7.

¹⁵² *Id.* at 3-4.

¹⁵³ *Id.* at 9.

¹⁵⁴ Hicks Statement, *supra* note 30, at 4.

¹⁵⁵ *Id.* at 5, 7.

¹⁵⁶ *Id.* at 6.

in the courts, the accuracy and reliability of DNA testing was once again presented as a nearly infallible form of criminal identification. The legislature was also addressed by a representative of Cellmark Diagnostics, Inc., a Maryland-based genetic testing laboratory.¹⁵⁷ While this local influence may have played a role in the bill's passage, it is more likely that the bill passed without many changes¹⁵⁸ in much the same way as early DNA typing was admitted into the courts: through lack of a strong adversarial viewpoint at the legislative hearings.

F. Virginia

Virginia passed its admissibility statute as it created a DNA testing laboratory.¹⁵⁹ While its predominant function appears to be law enforcement support, the creation of the lab would have aided suspect identification in and of itself. Perhaps the admissibility statute serves to insure the state's sizable investment in DNA technology by guaranteeing that the fruits of the labs will be used with a minimum of restraint.

The Virginia statute states that DNA testing shall be deemed a reliable scientific technique and that evidence of a DNA profile may be admitted to prove or disprove the identity of any person.¹⁶⁰ The opponent must be notified and be given access to profiles, reports and statements at least 21 days prior to the commencement of the proceedings.¹⁶¹ The statute also provides that, if the opponent wishes to object to admissibility, he must do so at least ten days prior to trial.¹⁶² These provisions promote judicial economy by deeming DNA evidence admissible should the opponent not object,¹⁶³ and by providing procedural safeguards for notice and discovery in excess of other statutes.¹⁶⁴ Not only is the time for notice more generous, but the statute explicitly provides for the disclosure of the profiles themselves and not just the final report or statement. Possession of the profiles would assist the defense in obtaining an independent analysis to assist in confrontation of the evidence at trial.

A second statute outlines standards to be utilized by the Bureau of Forensic Sciences in performing the test and in maintaining confiden-

¹⁵⁷ Cellmark Diagnostics Corporation is located at 20271 Goldenrod Lane, Germantown, Maryland 20874.

¹⁵⁸ The Senate Judicial Proceedings Committee recommended an amendment to the title and the addition of the chain of custody witness provision while the House Judiciary Committee was mostly concerned with technical requirements of analysis, a change which was not made to the final bill. Floor Report, *supra* note 145.

¹⁵⁹ VA. CODE ANN. § 19.2-270.5 (1990); VA. CODE ANN. § 19.2-310.4 (1990).

¹⁶⁰ VA. CODE ANN. § 19.2-270.5 (1990).

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ *See Id.*

¹⁶⁴ *Cf. supra* notes 105, 108, 116, 121-22, 134 & accompanying text.

tiality of the records.¹⁶⁵ The statutes also make at least a cursory attempt at regulating the standards of the test environment similar to those in the Minnesota statute.¹⁶⁶

G. Tennessee

The most recent state to adopt DNA admissibility statutes is Tennessee. Its statutes are clearly patterned after the other states', most closely resembling those of Minnesota. Section 1 of the Tennessee Act addresses the administrative aspects of creating a testing laboratory with procedures for collecting, preserving and analyzing specimens.¹⁶⁷ Section 2 authorizes the creation of a data bank for sex offenders' DNA prints.¹⁶⁸ Both of these sections offer little change from previously discussed statutory provisions in other states.

Section 3 sets forth DNA admissibility in the almost boilerplate language: "reliable and trustworthy without antecedent testimony to such."¹⁶⁹ Tennessee then diverged from other statutory schemes by including a provision that the statute is not intended to preclude challenges to expert testimony or to the reliability of the DNA evidence itself.¹⁷⁰ It appears that the statute would allow only unchallenged evidence to be admitted without a foundation establishing reliability while it arguably leaves the door open to *in limine* proceedings should the defense so move.

A potential problem exists in the overly optimistic timeline for implementation of the statute as provided by the legislature. Section 5 of the Act states that the lab shall begin section 1 operations (collection, preservation and analysis) on June 4, 1991, "the public welfare requiring it."¹⁷¹ The remaining provisions (data base and admissibility) were delayed until July 1, 1991.¹⁷² This allowed the lab very little time to perfect the DNA typing to levels warranting automatic admissibility.

H. Summary

The DNA admissibility statutes as a whole repudiate the trend of the courts to require a pre-trial hearing on the reliability of DNA testing¹⁷³ and to undergo a "case- and fact-specific"¹⁷⁴ analysis of the potentially

¹⁶⁵ VA. CODE ANN. § 19.2-310.4 (1990).

¹⁶⁶ Cf. *supra* note 116 & accompanying text.

¹⁶⁷ 1991 Tenn. Pub. Acts 480.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ 1991 Tenn. Pub. Acts 480.

¹⁷² *Id.*

¹⁷³ See generally *People v. Castro*, 545 N.Y.S.2d 985 (Supp. 1989).

¹⁷⁴ Magistrate's Report, *United States v. Yee*, No. 3:89CRO720, 1990 U.S. Dist. LEXIS 15908, at *157-58 (N.D. Ohio Oct. 26, 1990).

prejudicial effect of the evidence. These statutes which impinge on the court's discretion to determine admissibility may lead other legislatures to enact similar provisions thereby constricting judicial discretion in evidentiary matters.

Despite their ability to conduct extensive hearings on DNA testing, the legislatures reached conclusions inconsistent with the majority of courts and Congress' Office of Technology Assessment. While the judiciary and the national legislature recommend careful examination of DNA typing, state legislatures have determined that DNA testing need not undergo scrutiny prior to presentation at trial. These findings will offer the labs little incentive to improve, or to even maintain, their current questionable level of reliability.

IV. CONSEQUENCES OF LEGISLATIVE ACCEPTANCE

The legislatures have, in general, abolished pre-trial hearings to determine the admissibility of DNA evidence. In spite of legislative action to admit the evidence, the courts still retain the power to interpret the statutes. In those states where higher court decisions have upheld the use of DNA evidence,¹⁷⁵ it is likely that the courts will routinely admit the evidence although the decision may not be based on the statute. Since case law in the jurisdiction would have already set precedent in accepting the DNA evidence, the courts may choose to follow precedent without reference to the statute.¹⁷⁶ This action would be of little assistance to the defendant since the result would be inclusion of potentially unreliable evidence. The distinction would be academic: the courts would resist legislative interference with judicial proceedings.

A statute admitting DNA may, however, conflict with existing judicial opinion as is true in Minnesota where the legislature has expressly confronted the judiciary in statutorily admitting statistical results of DNA testing over judicial precedent.¹⁷⁷ The Minnesota courts have indicated a strong inclination to resist this enactment.¹⁷⁸ Although no case has reached the Minnesota Supreme Court directly challenging the statute, it is apparent that the court will favor its prior rulings to the recent statutory provision. Under similar circumstances in other states, it is equally likely that statutes admitting DNA evidence would be subjected to the same close, possibly hostile, scrutiny.

¹⁷⁵ For example, Virginia courts have admitted DNA evidence. *Spencer v. Commonwealth*, 384 S.E.2d 775 (Va. 1989), *cert. denied*, 110 S. Ct. 759 (1990); *Spencer v. Commonwealth*, 384 S.E.2d 785 (Va. 1989), *cert. denied*, 110 S. Ct. 1171 (1990); *Spencer v. Commonwealth*, 385 S.E.2d 850 (Va. 1989), *cert. denied*, 110 S. Ct. 1171 (1990).

¹⁷⁶ The courts tend to preserve the power of case law when interpreting new statutes. Earl Maltz, *The Nature of Precedent*, 66 N.C.L. REV. 367, 387 (1988).

¹⁷⁷ See *supra* notes 127-30 & accompanying text.

¹⁷⁸ See *State v. Nielsen*, 467 N.W.2d 615, 620 (Minn. 1991); *State v. Schwartz*, 447 N.W.2d 422, 428 n.5 (Minn. 1989).

Even without expressly negating the statutes, the court may attempt to counteract undue legislative influence through cautionary instructions to the jury.¹⁷⁹ The legislature has conclusively decided a narrow issue of fact - that DNA tests are reliable and trustworthy - but the legislature cannot interfere with the jury's independent weighing of the evidence. Legislative determination of a fact so crucial to identification would effectively deny the right to trial by jury.¹⁸⁰

When the court takes judicial notice in a criminal case, Federal Rule of Evidence 201 requires that cautionary instructions be given to the jury.¹⁸¹ Applied by analogy to legislatively noticed DNA evidence, the judge should instruct the jury that "it may, but is not required to, accept as conclusive" the reliability of the test.¹⁸² Under Federal Rule 201, the court must allow for dispute by counsel of a judicially noticed fact.¹⁸³ The courts may extend this provision to allow dispute of the legislatively noticed fact of reliability, thus resurrecting the *in limine* proceeding.

Pre-trial admissibility hearings may be possible on other grounds as well. As Justice Blackmun stated in his dissent in *Barefoot v. Estelle*:¹⁸⁴

Indeed, unreliable scientific evidence is widely acknowledged to be prejudicial. The reasons for this are manifest. "The major danger of scientific evidence is its potential to mislead the jury; an aura of scientific infallibility may shroud the evidence and thus lead the jury to accept it without critical scrutiny."¹⁸⁵

A well-founded claim of potential prejudicial impact may require the courts to conduct an admissibility hearing to determine if the relevance of the DNA is substantially outweighed by its possible negative impact. At the very least, this tactic will preserve the issue for appeal.

While the statutes admitting DNA evidence treat it as a unique form of evidence necessitating specific statutory approval, they routinely neglect issues of obtaining the sample. Several states are beginning to create DNA data banks whereby DNA samples are digitally encoded into a computer database.¹⁸⁶ Theoretically, the data bank could produce the

¹⁷⁹ Giannelli, *supra* note 54, at 1238. Cautionary instructions are appropriate when a fact has been judicially noticed in order to instruct the jury not to substitute the judgment of the court for their own assessment of the evidence. This is necessary to preserve the right to a jury trial. GIANNELLI & IMWINKELRIED, *supra* note 52, at § 1-2.

¹⁸⁰ HOUSE COMM. ON JUDICIARY, FED. R. EVID., H.R. REP. NO. 650, 93d Cong., 1st Sess. 6 (1973), reprinted in 1974 U.S.C.C.A.N. 7075, 7080.

¹⁸¹ FED. R. EVID. 201(g).

¹⁸² *Id.*

¹⁸³ FED. R. EVID. 201(e).

¹⁸⁴ 463 U.S. 880 (1983).

¹⁸⁵ *Id.* at 926 (citing Giannelli, *supra* note 54, at 1237.)

¹⁸⁶ See e.g. ARIZ. REV. STAT. ANN. § 31-281 (1989); CAL. PEN. CODE § 290.2 (Deering, 1990); COLO. REV. STAT. § 17-2-201 (1989); FLA. STAT. § 943.325 (1989); 1190 IOWA ADVANCE LEGIS. SERV. 2413, 1990 IA. SF 2413, 73rd General Assembly (1990); WASH. REV. CODE ANN. § 43.43.758 (West 1990); WASH. REV. CODE ANN. § 43.43.754 (West 1990); See also, Shapiro & Weinberg, *supra* note 78, at 473-74.

name of one individual whose DNA best matches the DNA left at a crime scene. Without questioning the underlying validity or reliability of the test yielding the initial information, the courts may have to decide if a computer match constitutes cause enough to compel a new sample.¹⁸⁷ Legislative acceptance of DNA typing as reliable evidence may be sufficient to provide probable cause should a match occur. The legislative endorsement of reliability may encourage wide-scale testing and preliminary identification based predominantly on a DNA print.

A search and seizure to obtain genetic information for a DNA data bank pursuant to a Virginia statute has been challenged as unreasonable.¹⁸⁸ Plaintiffs argued that since the search is conducted to store information for future criminal investigations, the requisite probable cause for a search has not yet arisen because no crime has occurred at the time of the search. The court held that the countervailing state interests in detecting suspects and deterring crime constituted a special need which outweighed both the necessity for probable cause and the individual's right to privacy.¹⁸⁹ It is important to note that the plaintiffs were convicted felons whose right to privacy is not commensurate with that of the population at large.¹⁹⁰

Nonetheless, the danger exists that the proliferation of DNA testing could lead to an expansion of warrantless searches based on the state's special need to detect suspects. Since DNA testing is closely analogous to blood typing, it should be governed by the same procedures protecting constitutional rights against unreasonable search and seizure.¹⁹¹ Accordingly, it may be assumed that in the routine case probable cause is necessary to obtain a DNA specimen.¹⁹² Since DNA neither changes nor vanishes from a person's body, a lesser standard for obtaining a warrant should not be used.

The ease with which the State may admit DNA evidence under the statutes will offer incentive to use it more frequently.¹⁹³ In Britain, voluntary testing of an entire population occurred in conjunction with a homicide investigation.¹⁹⁴ It is unlikely that this would occur in the

¹⁸⁷ Thompson & Ford propose that:

where a suspect is initially identified by searching a large data base of DNA prints for individuals who match the DNA print of a forensic sample, the existence of the match is much weaker evidence of guilt than where the suspect was initially identified due to factors having nothing to do with genetics . . . the evidence that his DNA type matches that of a forensic sample may be insufficiently probative to be admissible in evidence against him.

Thompson & Ford, *supra* note 5, at 100.

¹⁸⁸ Jones v. Murray, 59 U.S.L.W. 2699 (D.Va. March 4, 1991).

¹⁸⁹ *Id.*

¹⁹⁰ *Id.*

¹⁹¹ Schmerber v. California, 384 U.S. 757, 770-71 (1966).

¹⁹² Cobey v. State, 559 A.2d 391, 398-99 (Md. App. 1989) (judicial comment on lack of search warrant for blood test but issue not preserved for review).

¹⁹³ Pearsall, *supra* note 38, at 675 (projects hundreds of thousands, perhaps millions, of tests per year).

¹⁹⁴ Shapiro & Weinberg, *supra* note 78, at 464-65.

United States since social pressure to be tested would probably be viewed as more coercive than voluntary.¹⁹⁵

However, the FBI's Deputy Assistant Director, Laboratory Division, suggested that "as suspects are developed by investigators, they may be exonerated through DNA tests and investigators may redirect and narrow their search for the perpetrator."¹⁹⁶ This position does not vary greatly with the wide-scale testing conducted in Britain. When viewed in conjunction with the trend toward lowering the requisite standard of cause before a search,¹⁹⁷ there is a strong possibility that the courts may be asked to clarify probable cause necessary for compelling a sample.

Statutory provisions for notice of intent to test may be deficient. Since there would usually not be any emergency conditions necessitating immediate DNA sampling¹⁹⁸ a notice of intent to test should accompany the warrant to obtain a sample. Early notice of intent to test will protect the right to confront the evidence and to prepare a defense by allowing early access to the procedure.¹⁹⁹

The right to retest²⁰⁰ would be the optimal benefit to early notice of testing; however, the forensic setting rarely provides samples large enough to survive the initial test.²⁰¹ Theoretically, early notice would provide the defendant opportunity to retain an independent expert to oversee the testing procedure, a kind of concurrent testing. In this scenario, the expert would be able to help the defense prepare its case by offering extensive information of lab procedure. In reality, independent forensic DNA specialists are not yet widely available. The defendant must rely on independent analysis of the test results.²⁰² Prompt notice would allow the defense ample time to locate experts to conduct post-test analysis.

¹⁹⁵ Tande, *supra* note 38, at 475.

¹⁹⁶ Hicks Statement, *supra* note 30, at 8.

¹⁹⁷ See *Jones v. Murray*, 59 U.S.L.W. 2699 (1991); Hoeftel, *supra* note 3, at 527-33.

¹⁹⁸ Williams, *supra* note 38, at 26.

¹⁹⁹ *People v. Castro*, 545 N.Y.S.2d 985 (Supp. 1989) (supports early notice of defendant).

²⁰⁰ *Barnard v. Henderson*, 574 F.2d 744, 746 (5th Cir. 1975); *United States v. Stifel*, 433 F.2d 431, 441 (6th Cir. 1970). However, consumption of the sample is usually not a violation if it is consumed during a necessary test. *GIANNELLI & IMWINKELRIED*, *supra* note 52, at § 3-6.

²⁰¹ Sherman, *supra* note 32.

²⁰² A DNA consulting firm, Forensic and Scientific Consultations, Inc., of Albany, New York is available to assist defendants at a fee of \$200 per hour. Court testimony is limited to no more than \$900 per day plus expenses and transportation. *Expert on DNA is Appointed to Assist Indigent Defendant*, N.Y.L.J., July 4, 1991, at 21.

Defense experts are necessary to prepare an adequate defense and to afford effective counsel.²⁰³ Analysis of the procedures requires a greater understanding of lab protocol than the average attorney possesses.²⁰⁴ In recognition of this fact, the FBI routinely provides assistance to the State in preparation for trial, and private laboratories have prepared primers to aid prosecuting attorneys in understanding the evidence.²⁰⁵ No such aids exist to assist defense attorneys. The statutes which virtually guarantee a confrontation over DNA do nothing to similarly guarantee access to necessary assistance. Automatic admissibility of DNA prints will increase the number of tests performed, most of which are performed to solve violent crimes. The defendants in these cases "come predominantly from the less affluent sectors of society" and they often rely on court-appointed attorneys.²⁰⁶ It is highly unlikely that forensic specialists could be retained with the funds available to such clients.

An argument may be made under *Ake v. Oklahoma*²⁰⁷ that defense experts are necessary to the "fundamental fairness" of the trial since expert assistance is needed to defend against DNA typing, evidence that will likely be integral to the prosecution's case. A New York court appointed expert assistance to an indigent defendant by relying on its discretionary powers rather than on a constitutional challenge.²⁰⁸ The discretionary power was based, nonetheless, upon the same argument that the lack of expert assistance would undermine the fundamental fairness of the trial. The court allowed the appointment of experts by finding that expert assistance was necessary to the defense to confront DNA evidence.²⁰⁹ However, reliance on court-appointed expert assistance can be a dubious venture. Recent cases in Oklahoma and Alabama show a refusal by the courts to authorize funds to retain defense experts.²¹⁰ Defense counsel must be sure to preserve a challenge to such a refusal for subsequent appeal purposes. A combination of factors discussed in this section would make a constitutionally mandated fair trial virtually

²⁰³ Labaton, *supra* note 27 (lack of funding available to defense); Giannelli, *supra* note 54, at 1243-45.

²⁰⁴ Edward J. Imwinkelried, *A New Era in the Evolution of Scientific Evidence — A Primer on Evaluating the Weight of Scientific Evidence*, 23 WM. & MARY L. REV. 261, 272-73 (most attorneys receive little or no training in evaluating the weight of scientific evidence); Parloff, *supra* note 35, at 52 (defending DNA is beyond the scope of what one attorney can do); Labaton, *supra* note 27 (lack of resources available to defense often results in lunch-time pleas for help to Peter J. Neufeld, defense attorney in *Castro*).

²⁰⁵ BIOTECHNOLOGY NEWSWATCH, *supra* note 34.

²⁰⁶ Neufeld & Colman, *supra* note 3, at 53.

²⁰⁷ 470 U.S. 68 (1985) (psychiatric experts necessary to confront State's evidence when evidence was substantial to the case and the lack of experts would undermine the fundamental fairness of the trial).

²⁰⁸ *People v. Barnes*, N.Y.L.J., July 1, 1991, at 21 (N.Y. Sup. Ct. 1991, unreported).

²⁰⁹ *Id.*

²¹⁰ Neufeld & Colman, *supra* note 3, at 53.

impossible. If the evidence is admitted under the statutes without question of reliability and the defense has only a statement of test results but no expert to assist and testify, then the defendant may assert one or more violations of his constitutional rights.²¹¹ The potential violations include: the due process right to present a defense, the right to effective assistance of counsel, the right to obtain witnesses in his favor and the right to effectively cross-examine witnesses.²¹²

V. PROPOSED AREAS OF LEGISLATIVE INTERVENTION

A. *The DNA Typing Standards Board*

The potential for numerous constitutional violations draws into question the wisdom of legislative interference in DNA admissibility. However, this does not mean that the legislature should remain silent on the future of DNA typing. The legislature has regulatory powers which the court does not.²¹³ It is in the area of laboratory regulation that the legislature should direct its efforts rather than passing legislation which intrudes into the court's domain of deciding evidentiary issues.

National standards need to be adopted and implemented to assure both proper lab techniques and uniform application of the resulting information. As a result the current problem of questionable reliability may be eliminated and the promise of an accurate and effective forensic tool may be realized.

The OTA report cites the need for standard procedures but adds that there is no scientific agreement at this time for what constitutes proper performance.²¹⁴ It is highly unlikely that DNA testing will simply disappear until scientific agreement is reached on proper performance standards. A form of control is urgently needed in the meantime.

Many of the problems currently facing DNA typing could be addressed if Congress were to create a DNA Typing Standards Board (DTSB) comprised of independent research and forensic scientists. The DTSB could examine currently existing lab procedures and adopt one set of standards that incorporate the best measures currently available. Standards should be adopted to regulate the following aspects of DNA typing:

1. Collecting and preserving physical evidence from the crime scene so as to note possible sources of contamination and prevent future contamination and degradation.²¹⁵

²¹¹ Hoeffel, *supra* note 3, at 520, n.329.

²¹² *Id.* at 520 n.329 (1),(3),(4) & (5).

²¹³ Pearsall, *supra* note 38, at 697-98 (the courts have no power to mandate standards while the legislature may conduct hearings to discover pertinent information, fund programs and enforce controls).

²¹⁴ Sherman, *supra* note 49.

²¹⁵ Pearsall, *supra* note 38, at 668-69; Beeler & Wiebe, *supra* note 3, at 921-22; Tande, *supra* note 38, at 481.

2. Minimum sample size necessary to conduct adequate testing and controls.²¹⁶ A sample below the minimum size should not be tested. In an effort to get results, the lab may skimp on controls and generate unreliable results. The labs should err on the side of caution and report that no sample is available for testing under these circumstances.

3. Standardized probe use during hybridization.²¹⁷ No standards currently exist for the number or type of probes used to create the DNA print.²¹⁸ Research into the reliability of specific probes needs to be continued. As new probes enter the market, standards for their use should accompany them. Uniformity in the number and type of probes used for testing is necessary to ensure reliability from case to case. Consistent exposure to similar results will decrease the novelty of the evidence to all parties concerned and increase familiarity with the technique. Familiarity with standard results will aid the defense in adequate preparation and will demystify the process for the jury.

4. Standardized procedures including detailed control protocols.²¹⁹ The DTSB should study the variety of controls currently in use and recommend the type and number of controls necessary to detect lab aberrations.

5. Analytical parameters. DNA profiles are currently being declared "matches" by the FBI when the bands are within $\pm 2.5\%$ of each other.²²⁰ This standard allows a five percent total variation when deciding if two bands are the same. This "match window" is larger than those used by other labs, which means that the FBI will potentially call a match where other labs would find none.²²¹ The DTSB should determine and subsequently mandate a "match window" size which offers the most practical assurance of correct matching.

6. Statistical inference. Probabilities are currently calculated by using the product rule as applied to fixed bin analysis.²²² The probabilities of a band appearing within areas on the film called bins are multiplied together to produce the statistical probability of a similar pattern occurring by chance. The probabilities of a band occurrence within a bin are calculated from a data base of prints. The data bases are divided according to racial/ethnic classifications because likelihood of similar banding patterns increases within discrete subgroups.

²¹⁶ Williams, *supra* note 38, at 6-7.

²¹⁷ Beeler & Wiebe, *supra* note 3, at 925.

²¹⁸ Hoeffel, *supra* note 3, at 487-88.

²¹⁹ Lifecodes' controls were characterized by Dr. Lander, "I came away appalled at the lack of controls. With due respect, it's the sort of thing you don't let your graduate students get away with." Parloff, *supra* note 35, at 53. Courts have suggested controls. *People v. Castro*, 545 N.Y.S.2d 985 (Supp. 1989).

²²⁰ *United States v. Yee*, No. 3:89CR0720 (N.D. Ohio Oct. 26, 1990); *United States v. Jakobetz*, 747 F. Supp. 250 (D. Vt. 1990).

²²¹ The FBI acknowledges that "all but a small minority of casework matches fall within a smaller range (85% within a 1.75% range). Magistrate's Report, *Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908. Dr. Thomas Caskey adopted the FBI protocol "almost in its entirety" in his lab, but he chose to use a smaller match window. *Id.* at *122.

²²² See generally Magistrate's Report, *Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908; *United States v. Jakobetz*, 747 F. Supp. 250 (D. Vt. 1990).

Fixed bin analysis offers more protection to the defendant than did earlier analysis methods,²²³ but it is still widely contested as inherently unreliable due to its reliance on the uncertain area of population genetics.²²⁴ Recent studies have supported use of the statistics but have also pointed out the need for further research before concluding that such statistics are valid and reliable.²²⁵

7. Accreditation and certification. Standards for training and maintenance of proper lab conditions should be recommended. Forensic labs, in general, are notoriously unregulated and have been known to assert claims of scientific fact based on poorly performed tests.²²⁶ Instituting random checks on the labs will help to eliminate this problem. A system for blind proficiency testing should be developed to monitor the accuracy of the labs in order to maintain accreditation. Only one proficiency test has been conducted on the private labs as of this date,²²⁷ while the FBI claims to perform internal proficiency testing.²²⁸

The DTSB standards should be promulgated as example, not as statute. In this way, they would be flexible enough to adapt to technological changes without the pitfalls of legislative amendments. New methods and materials could be proposed to the DTSB which would then coordinate independent verification of the proposals, perhaps through colleges and universities. If the procedures were found to be substantial improvements, they could be implemented more quickly and consistently if documentation were disseminated from only one agency. Since the procedures would only be implemented after extensive testing, the changes should be worthwhile investments. Presumably the innovations would not be accepted in rapid succession due to the necessary verification process. This would help to avoid continual retooling of the labs.

Information concerning DNA procedures should be available at a nominal cost to all interested parties. Easier access to information will provide increased awareness of the techniques to both the public (our resource of future jurors) and to defense counsel.

²²³ The statistics presented in *Yee* were one in 35,000. Magistrate's Report, *Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908; compare with cases cited *supra* note 25.

²²⁴ See Magistrate's Report, *United States v. Yee*, No. 3:89CR0720, 1990 U.S. Dist. LEXIS 15908.

²²⁵ B. Devlin, et al., *No Excess of Homozygosity at Loci Used for DNA Fingerprinting*, 249 SCIENCE, 1416 (1990).

²²⁶ Imwinkelried, *supra* note 23, at 555.

²²⁷ The proficiency test was conducted by the California Association of Crime Laboratories. Fifty samples were analyzed by each of the three private labs. Cellmark and Cetus each misidentified one sample. It is important to note that while Lifecodes correctly identified all 50 samples, their researchers, not their technicians, performed the tests. Hoeffel, *supra* note 3, at 493.

²²⁸ Hicks Statement, *supra* note 30.

B. Conclusion

The creation of the DTSB would ultimately save the nation time and money. The costly and time consuming burden of developing and updating standards would be removed from the individual states. The DTSB standards would allow the individual state legislatures to direct their efforts toward implementing a system of laboratory licensing contingent on accreditation and proficiency test results.²²⁹ The legislature has the power to control appropriations to the forensic labs and could stop appropriations should a lab deviate from the national standards.

State statutes concerning licensing and accreditation are more appropriate to the legislative functions of regulation and appropriation than are the current admissibility statutes. If states were to enact regulatory statutes rather than admissibility statutes, they would be addressing the primary concern about DNA technology — the lack of reliable standards.

The legislative and judicial branches of government should work in a complementary fashion when faced with novel problems. Currently, the admissibility statutes create an unnecessary tension between the very bodies which must ultimately resolve the dilemmas presented by this new technology.

DNA testing holds the promise of becoming an invaluable tool. Only by a unified effort on the part of scientists, legislators and the legal community can the current difficulties be resolved. Now is not the time to divide and conquer; for those who will be conquered are the very ones our system purports to protect.

JAYNE L. JAKUBAITIS

²²⁹ The FBI as a federal agency would not be regulated by state requirements. Gary Spencer, *Cuomo Urged to Pass on DNA Legislation*, N.Y.L.J., July 30, 1990, at 1 (New York had difficulties with FBI regulation when it considered regulating DNA laboratories). Congress should enforce the FBI's adherence to the DTSB standards.