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Criminal Law - Inconclusive DNA Test Results Admitted as Relevant Evidence Despite Absence of Random Match Probability Analysis - Commonwealth v. Mattei, 892 N.E.2D 826 (Mass. App. Ct. 2008)

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**CRIMINAL LAW – INCONCLUSIVE DNA TEST
RESULTS ADMITTED AS RELEVANT EVIDENCE
DESPITE ABSENCE OF RANDOM MATCH
PROBABILITY ANALYSIS – *COMMONWEALTH V.
MATTEI*, 892 N.E.2D 826 (MASS. APP. CT. 2008)**

The Commonwealth of Massachusetts's current standard for admissibility of scientific evidence at trial is based on relevancy and reliability.¹ The first successful evidentiary use of deoxyribonucleic acid ("DNA") test results in a criminal trial in the United States occurred in 1987, but the Supreme Judicial Court of Massachusetts ("SJC") did not address the issue until 1991.² In *Commonwealth v. Mattei*,³ the Massachusetts Court of Appeals considered the admissibility of inconclusive DNA test results in a criminal trial.⁴ The court improperly

¹ See *Commonwealth v. Lanigan (Lanigan II)*, 641 N.E.2d 1342, 1349 (Mass. 1994) (adopting standard for admissibility established in *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993)); see also *Daubert*, 509 U.S. at 597 (concluding "general acceptance" not exclusive standard for admission of scientific evidence). In *Lanigan II*, the Supreme Judicial Court of Massachusetts ("SJC") accepted the United States Supreme Court's reasoning in *Daubert* regarding the admissibility of scientific evidence. *Lanigan II*, 641 N.E.2d at 1349. The previous standard of admissibility for scientific evidence in Massachusetts courts was based solely on the "general acceptance" standard established in *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923). *Lanigan II*, 641 N.E.2d at 1348. The SJC noted that under the general acceptance standard, there was an inherent risk that reliable scientific evidence could be withheld from the fact finder. *Id.* Under the standard in *Lanigan II* and *Daubert*, a party seeking to introduce scientific evidence may either demonstrate that the scientific process has received general acceptance in the relevant scientific community or establish that the evidence is both relevant and reliable. See *Daubert*, 509 U.S. at 589, 594-95; *Lanigan II*, 641 N.E.2d at 1348-49.

² See *Commonwealth v. Curmin*, 565 N.E.2d 440, 441 (Mass. 1991) (addressing admissibility of DNA test results as issue of first impression); see also *Lanigan II*, 641 N.E.2d at 1344 (validating admission of DNA test results in Massachusetts for first time). The first successful admission of DNA test results in a criminal trial in the United States occurred in Florida. See *Andrews v. State*, 533 So. 2d 841, 849-51 (Fla. Dist. Ct. App. 1988) (upholding admission of DNA test results based on reliability of testing process); see also 8 AM. JUR. PROOF OF FACTS 3D 749 *Foundation for DNA Fingerprint Evidence* §§ 1-2 (1990) (discussing history of DNA testing and its use in legal proceedings).

³ 892 N.E.2d 826 (Mass. App. Ct. 2008).

⁴ *Id.* at 830-31 (presenting issue before court). The SJC had previously highlighted this issue, but did not provide a ruling because the particular issue was not before the court. See *Commonwealth v. Mathews*, 882 N.E.2d 833, 845 n.15 (Mass. 2008). In contrast to *Mattei*, the defendant in *Mathews* only challenged the adequacy of the state's evidence and investigatory methods, but did not object to the admissibility of the inconclusive DNA test results at trial. See *id.* at 841-42. Nonetheless, the SJC described the issue as one of mere relevance. *Id.* at 845 n.15. This same scenario presented itself again in *Commonwealth v. Nesbitt*, 892 N.E.2d 299, 313-14

concluded that the inconclusive DNA test results were admissible as relevant evidence despite the lack of a statistical probability analysis of the likelihood that a match occurred by chance.⁵

Following a jury trial, Defendant Alexander Mattei was convicted of numerous crimes, including assault with intent to rape.⁶ At trial, the Commonwealth of Massachusetts (“Commonwealth”) produced evidence of DNA samples that were recovered during the police investigation of the crimes.⁷ The Commonwealth’s expert testified that neither Mattei nor the victim could be definitively identified or excluded as a source of the DNA because some of the samples contained mixtures of DNA from more than one person.⁸ At no time did the Commonwealth’s expert provide any information of the statistical probability that either Mattei’s or the victim’s DNA was a random match to the samples taken from the crime scene.⁹

Despite the inconclusive test results and lack of accompanying statistical analysis, the trial judge admitted the DNA samples and expert

(Mass. 2008) (noting Nesbitt’s failure to object altered basis of judicial review, but DNA admission held harmless).

⁵ See *Mattei*, 892 N.E.2d at 831 (upholding trial judge’s admission of inconclusive DNA test results as relevant evidence). But see *Lanigan II*, 641 N.E.2d at 1346 (requiring statistical probability analysis for DNA match testimony). Mattei’s DNA profile matched only some alleles from the DNA evidence found at the crime scene and therefore Mattei could not definitively be identified as the source. *Mattei*, 892 N.E.2d at 830. In his dissenting opinion, the Honorable Peter J. Rubin suggested that the case should be decided on the established precedent in Massachusetts with respect to DNA-match test results and admissibility thereof. *Id.* at 833 (Rubin, J., dissenting) (citing *Curnin*, 565 N.E.2d at 442 n.7 as governing authority).

⁶ *Mattei*, 892 N.E.2d at 827 (listing Mattei’s convictions). Mattei also was found guilty of home invasion, breaking and entering with intent to commit a felony, assault and battery, indecent assault and battery on a person over fourteen years old, and assault by means of a dangerous weapon. *Id.* These crimes took place inside the victim’s apartment unit. *Id.* at 827-28 (providing details of attack).

⁷ *Id.* at 830 (describing DNA samples produced at trial). The Commonwealth produced three articles that contained DNA: the sweatpants worn by Mattei on the day in question, the interior doorknob on the victim’s apartment door, and a blood-stained sweatshirt that was found near the crime scene and allegedly worn by Mattei on the day the victim was attacked. *Id.* DNA testing performed on the sweatshirt provided a positive match of both Mattei’s and the victim’s DNA. *Id.* The testing and testimony of the positive match were admitted into evidence without objection. *Id.* Mattei’s counsel, however, objected to the DNA sample and expert testimony with respect to the sweatpants and doorknob. *Id.*

⁸ *Id.* (noting some DNA evidence was inconclusive). Mattei and the victim could not be identified or excluded as a source of the DNA on the sweatpants and doorknob, respectively. *Id.* The DNA mixture on the doorknob contained alleles that matched Mattei’s DNA profile and alleles that did not match. *Id.* The expert also testified that the victim was a potential contributor to some of the DNA mixture on the sweatpants. *Id.* at 834-35 (Rubin, J., dissenting) (discussing expert’s testimony concerning DNA mixtures found on doorknob and sweatpants).

⁹ *Id.* at 831 (majority opinion) (noting statistical analysis not provided by Commonwealth’s expert). In his dissent, Justice Rubin took exception to the expert’s lack of a statistical analysis of the probability that the DNA match occurred randomly. *Id.* at 835 (Rubin, J., dissenting).

testimony into evidence over the objection of Mattei's counsel.¹⁰ On appeal, Mattei argued that the inconclusive DNA test results were inadmissible absent a statistical analysis of the likelihood of a potential random match.¹¹ The appeals court nonetheless upheld the trial judge's admission of the inconclusive DNA test results, concluding that such evidence was relevant.¹²

Relevant evidence is admissible in the courts of the Commonwealth unless its probative value is substantially outweighed by its prejudicial effect, it confuses the issues, or it has the potential to mislead the jury.¹³ The standard for relevancy is extremely broad and trial judges

¹⁰ *Mattei*, 892 N.E.2d at 830 (reviewing trial judge's admission of inconclusive DNA test results and expert's testimony). In objecting to the testimony of the Commonwealth's expert, Mattei's counsel argued that admission of the inconclusive test results would confuse the jury because the failure to definitely exclude could be impliedly used as inculpatory evidence. *Id.* at 830 n.4 (quoting counselor's objection on record).

¹¹ *Id.* at 830 (presenting Mattei's argument on appeal). Mattei relied on *Lanigan II*, 641 N.E.2d 1342, 1346 (Mass. 1994) as precedent for this argument. *Id.* In addition to the admission of inconclusive DNA evidence, Mattei appealed issues concerning hearsay, improper limitation on the cross-examination of a witness, and ineffective assistance of trial counsel. *Id.* at 829, 831 (detailing other issues addressed by the appeals court).

¹² *Mattei*, 892 N.E.2d at 831 (finding no error in trial judge's admission of inconclusive DNA test results). The majority briefly addressed Mattei's statistical analysis argument in a footnote, but did not provide an in-depth analysis of the argument. *Id.* at 831 n.6. Justice Rubin dissented on the grounds that the lack of a statistical probability analysis of a DNA match occurring by chance should have been fatal to the admissibility of the inconclusive DNA evidence. *Id.* at 835-36 (Rubin, J., dissenting). On January 29, 2009, the SJC allowed Mattei's application for further appellate review. *Commonwealth v. Mattei*, 892 N.E.2d 826 (Mass. App. Ct. 2008), *appeal granted*, 901 N.E.2d 137 (Mass. Jan. 29, 2009) (No. SJC-10390), *available at* http://www.ma-appellatecourts.org/display_docket.php?dno=FAR-17433. As of this publication, the SJC has not yet heard oral arguments on this matter. *Commonwealth v. Mattei*, No. SJC-10390 (Mass. Feb. 10, 2009).

¹³ *See* MASS. G. EVID. §§ 402, 403 (2008-2009) (providing guidelines for judges in determining admissibility of relevant evidence). Evidence is relevant if it "sheds light" upon or has a "rational tendency" to prove or disprove a fact that is material to an issue in the case, or it makes an inference in the case more probable than it would be if that evidence was not admitted. *See Commonwealth v. Fayerweather*, 546 N.E.2d 345, 347 (Mass. 1989); MASS. G. EVID. § 401 (2008-2009) (defining relevant evidence); 19 HON. WILLIAM G. YOUNG ET AL., EVIDENCE § 401.1, at 158-59 (Massachusetts Practice Series, 2d ed. 1998) (discussing relevancy standard for evidence). Evidence that is not relevant is not admissible. MASS. G. EVID. § 402 (2008-2009). Nevertheless, relevant evidence may be excluded if its admission will have a prejudicial effect on the jury's emotions thereby creating an unfair advantage for the proponent of the evidence. *See YOUNG ET AL., supra*, § 403.1, at 189-90 (explaining grounds for exclusion of otherwise relevant evidence): *see also* 1 BARBARA E. BERGMAN & NANCY HOLLANDER, WHARTON'S CRIMINAL EVIDENCE § 4:13, at 325 (15th ed. 1997) (stating relevant evidence must be "unfairly" prejudicial to be excluded). Presumably, all relevant evidence is "prejudicial," therefore exclusion occurs only when the probative value of the evidence is *substantially* outweighed by its unfair prejudicial effect, such as by evoking strong emotion or over-reaction by the fact finder. *See BERGMAN & HOLLANDER, supra*, § 4:13, at 324-25. All objections to exclude otherwise relevant evidence require balancing the probative value of the evidence against the basis for the objection. *Id.* §

are afforded substantial discretion in their rulings.¹⁴ Undoubtedly, DNA test results are relevant evidence in criminal cases, but courts historically restricted their admissibility on other grounds.¹⁵ In addition to relevancy, a trial judge's ruling on the admissibility of DNA test results is based on the reliability of the underlying testing process.¹⁶ The intricate nature of DNA profiles allows the proponent of DNA evidence to call an expert witness to testify at trial to assist the trier of fact in interpreting DNA test results.¹⁷

In 1994, the SJC established the valid admission of expert

4:11, at 322.

¹⁴ See *Commonwealth v. Arroyo*, 810 N.E.2d 1201, 1210 (Mass. 2004) (noting relevancy threshold easily met); *YOUNG ET AL.*, *supra* note 13, § 401.1, at 159-60 (discussing broad concept of relevancy); see also *Commonwealth v. Mathews*, 882 N.E.2d 833, 844 n.15 (Mass. 2008) (stating trial judge has substantial discretion on determination of relevancy). On appellate review, a trial judge's determination of the relevancy of evidence is accorded substantial deference and will be upheld unless "palpably" erroneous. *Id.* (articulating standard of appellate review); *Arroyo*, 810 N.E.2d at 1210 (noting exclusion permissible when prejudicial effect outweighs probative value).

¹⁵ See, e.g., *Lanigan II*, 641 N.E.2d at 1344 (validating admission of underlying testing process and expert's statistical probability analysis); *Commonwealth v. Lanigan (Lanigan I)*, 596 N.E.2d 311, 314-17 (Mass. 1992) (implying statistical analysis relevant, but denying admission thereof because testing process not generally accepted); *Commonwealth v. Curmin*, 565 N.E.2d 440, 441-42, 445 (Mass. 1991) (finding admission of DNA evidence prejudicial error because theory lacked general acceptance); see also *Mathews*, 882 N.E.2d at 843 (noting although relevant, issue behind DNA testing in early 1990s was reliability). The SJC has since altered the focus of admissibility from mere general acceptance to reliability of the testing process and credibility of the testifying expert. See *Commonwealth v. Gaynor*, 820 N.E.2d 233, 250 (Mass. 2005); *Lanigan II*, 641 N.E.2d at 1349 (rejecting "general acceptance" as sole admissibility standard). For obvious reasons, DNA test results are relevant evidence in criminal cases because such evidence provides a significant means for identifying the source of a DNA sample found at a crime scene. See *Curmin*, 565 N.E.2d at 442 (noting modern use of DNA testing in early 1990s); 54 AM. JUR. PROOF OF FACTS 3D 381 *Proof of Identification of Substance by Instrumental Analysis* § 19 (1999) [hereinafter *Proof of Identification*] (explaining judicial relevance of DNA evidence).

¹⁶ See *Lanigan II*, 641 N.E.2d at 1348-49 (adopting relevancy and reliability standard for admission of scientific evidence). A trial judge's determination on the admissibility of DNA evidence must focus on the reliability of the methodology or testing process used by the expert and not on the conclusions reached. See *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 595 (1993); *Lanigan II*, 641 N.E.2d at 1349. Abuse of discretion is the appropriate standard of appellate review of a trial judge's determination on the admissibility of DNA evidence. See *Theresa Canavan's Case*, 733 N.E.2d 1042, 1048-49 (Mass. 2000) (abrogating previous de novo standard of appellate review for admissibility of scientific evidence). Once a trial judge has admitted scientific evidence as relevant and reliable, it is the fact finder's duty to determine the probative weight to afford such evidence. See *YOUNG ET AL.*, *supra* note 13, § 702, at 471; see also *Commonwealth v. O'Laughlin*, 843 N.E.2d 617, 633 (Mass. 2006) (stating jury determines probative value of scientific evidence).

¹⁷ See *Commonwealth v. Miranda*, 809 N.E.2d 487, 495 (Mass. 2004) (stating qualified expert testimony admissible if subject not lay knowledge and will assist fact finder); MASS. G. EVID. § 702 (2008-2009) (allowing expert testimony if it provides meaning to "assist the trier of fact"); see also *YOUNG ET AL.*, *supra* note 13, § 702.6, at 486-89 (explaining permissible use and purpose of expert testimony at trial in Commonwealth).

testimony regarding the statistical probability of a “match” obtained from DNA testing.¹⁸ The SJC has repeatedly and unequivocally held that testimony of a DNA “match” must be accompanied by a statistical analysis of the probability of a random match.¹⁹ Evidence of a non-match, however, is admissible without any statistical support.²⁰ The admissibility of DNA test results as evidence in the courts of the Commonwealth is considered on a case-by-case basis via a voir dire hearing.²¹ Employing this approach in recent decisions, the SJC has upheld the admission of otherwise inconclusive DNA test results as relevant evidence.²² Nevertheless, in

¹⁸ See *Lanigan II*, 641 N.E.2d at 1350 (establishing admission of DNA-match probability testimony); cf. *Commonwealth v. Daggett*, 622 N.E.2d 272, 275-76 (Mass. 1993) (upholding erroneous admission of DNA evidence as harmless and not prejudicial). In *Lanigan II*, the SJC held that the underlying testing process employed by the expert was a reliable methodology for determining the statistical probability of a random DNA match. See *Lanigan II*, 641 N.E.2d at 1346, 1349-50; see also 4 DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE, THE LAW AND SCIENCE OF EXPERT TESTIMONY §§ 30:46-47, at 183-87 (2007) (discussing well-established testing processes for determining random match probability). Since *Lanigan II*, the SJC has established that various DNA testing processes and statistical analyses are scientifically reliable. See *Commonwealth v. Fowler*, 685 N.E.2d 746, 747-49 (Mass. 1997) (providing synopsis of admissible DNA testing processes in Commonwealth).

¹⁹ See, e.g., *Lanigan II*, 641 N.E.2d at 1346 (establishing statistical analysis requirement for DNA-match testimony); *Daggett*, 622 N.E.2d at 275 & nn.2, 4 (opining non-numerical expression of probability is insufficient); *Lanigan I*, 596 N.E.2d at 314 (noting need for appropriate statistical support as condition for admitting DNA match); *Curnin*, 565 N.E.2d at 443 n.7 (suggesting statistical analysis of random match probability as threshold for admission); see also *Commonwealth v. Nesbitt*, 892 N.E.2d 299, 313-14 (Mass. 2008) (noting expert’s testimony of statistical probability of DNA match); *Commonwealth v. Gaynor*, 820 N.E.2d 233, 253-54 (Mass. 2005) (discussing expert’s use of product rule to determine probability of match occurring by chance); *Commonwealth v. Thad T.*, 796 N.E.2d 869, 877 (Mass. App. Ct. 2003) (stating *Lanigan II* requires statistical analysis for DNA-match testimony).

²⁰ *Lanigan I*, 596 N.E.2d at 314 (quoting *Curnin*, 565 N.E.2d at 443 n.7); see also FAIGMAN ET AL., *supra* note 18, § 30:41, at 174 & n.1 (noting negative, non-match results may be exclusionary, but not necessarily exculpatory). When DNA taken from a crime scene is properly collected, tested and analyzed, but does not match the DNA of a suspect, that suspect may be excluded as a contributor to the crime scene DNA. See *id.* § 30:41, at 174.

²¹ See *Commonwealth v. Mathews*, 882 N.E.2d 833, 844 (Mass. 2008) (asserting admissibility of DNA evidence determined on case-by-case basis); *Curnin*, 565 N.E.2d at 442 (stating admissibility of DNA test results determined in voir dire hearing). In the event an objection to erroneously admitted DNA evidence is not raised on the record, the proper standard on appellate review is whether the admission created a substantial likelihood of a miscarriage of justice. See *Nesbitt*, 892 N.E.2d at 312 (citing *Mathews*, 882 N.E.2d at 845 as authority for standard of appellate review).

²² See *Nesbitt*, 892 N.E.2d at 313-14 (upholding erroneous admission of inconclusive DNA evidence because any potential error was harmless); *Mathews*, 882 N.E.2d at 845 (concluding admission of inconclusive DNA evidence not a miscarriage of justice); *Commonwealth v. O’Laughlin*, 843 N.E.2d 617, 632-33 (Mass. 2006) (holding inconclusive nature of DNA evidence does not render it prejudicial or inadmissible); cf. *Commonwealth v. McNickles*, 753 N.E.2d 131, 142-43 (Mass. 2001) (admitting DNA evidence not definitively identifying defendant, but providing high likelihood of match). In *McNickles*, the SJC held that although inconclusive DNA evidence may not definitively identify a defendant, such evidence is not

order to be admissible at trial, inconclusive DNA evidence must be probative of an issue in the case.²³

The law in most states concerning the admissibility of DNA statistical probability evidence is in unison with that of the Commonwealth.²⁴ In contrast, some jurisdictions, under particular circumstances, permit an expert to testify to a DNA match without providing a numerical statistical analysis of the probability that the match occurred randomly.²⁵ The admission of both qualitative and quantitative

consequently rendered unreliable, irrelevant or inadmissible. *McNickles*, 753 N.E.2d at 143 (noting general admissibility of physical descriptive traits not unique to a defendant). The DNA evidence in *McNickles* was offered as mere general descriptive information of the perpetrator and not presented as a “match.” *Id.* at 138. Nonetheless, the Commonwealth’s expert used a “likelihood ratio” to determine the statistical probability that McNickles contributed to the DNA sample. *Id.* Approximately seven years later, the SJC again called attention to the admissibility of inconclusive DNA evidence, but did not provide a definitive ruling on the issue of a statistical analysis requirement because the execution of such, or lack thereof, was never challenged. *See Mathews*, 882 N.E.2d at 839-45 (demonstrating statistical analysis not at issue in case).

²³ *See Nesbitt*, 892 N.E.2d at 313 (discussing inconclusive DNA evidence lacking probative value). Inconclusive DNA evidence is not admissible if the probative value is substantially outweighed by its prejudicial effect and misleading nature. *See id.* at 314. In *Nesbitt*, the probability of a random match was one-in-one; therefore, not a single person could be excluded as a potential match. *Id.* at 313-14. Although objection to the admission of the evidence was not raised at trial, the SJC suggested that its probative value was substantially outweighed by its prejudicial effect. *Id.* The SJC, however, upheld the admission of the DNA evidence because it did not create a substantial likelihood of a miscarriage of justice. *Id.*

²⁴ *See, e.g., Peters v. State*, 18 P.3d 1224, 1226-28 (Alaska 2001) (requiring statistical probability analysis to interpret DNA “match” evidence); *People v. Barney*, 10 Cal. Rptr. 2d. 731, 742 (Cal. Ct. App. 1992) (noting DNA match meaningless without statistical information demonstrating its significance); *Armstead v. State*, 673 A.2d 221, 241 (Md. 1996) (requiring supporting statistical analysis accompany DNA match testimony); *People v. Coy*, 620 N.W.2d 888, 897-99 (Mich. Ct. App. 2000) (stating evidence of DNA match meaningless without supporting interpretative evidence); *State v. Bloom*, 516 N.W.2d 159, 168-69 (Minn. 1994) (permitting statistical probability evidence); *see also Daggett*, 622 N.E.2d at 275 n.2 (citing other states’ opinions confirming importance of statistical analysis); John J. Lovejoy, Recent Decisions, 65 MD. L. REV. 1085, 1094 (2006) (discussing use of statistical analysis). There may be many reasons why a person’s DNA matches a sample found at a crime, including error committed by the lab testing the DNA or mere coincidence. *See FAIGMAN ET AL., supra* note 18, § 30:42-45, at 177-83 (providing various hypotheses for why a DNA match may occur). For these reasons, some scientists urge that DNA match evidence be accompanied by probability statistics. *Id.* at 178; *cf. State v. Best*, 467 S.E.2d 45, 52-53 (N.C. 1996) (noting relevancy of a ninety-four out of one hundred exclusion probability).

²⁵ *See State v. Boles*, 933 P.2d 1197, 1200 (Ariz. 1997) (allowing “match testimony” without statistical support when based on personal experience of random match probability); *Young v. State*, 879 A.2d 44, 47-48 (Md. 2005) (permitting testimony of “match” without supporting statistical analysis where probability of random match infinitesimal); *see also State v. Hummert*, 933 P.2d 1187, 1197 (Ariz. 1997) (Martone, J., concurring) (permitting expert to testify qualitatively regarding possibility of random match); *Bloom*, 516 N.W.2d at 168-69 (recognizing qualitative analysis). Both *Boles* and *Young* involved situations where the expert was permitted to testify to a match that was overwhelmingly supported by the DNA analysis. *Boles*, 933 P.2d at 1200 (noting “significance of a match at several loci.”) (emphasis added); *Young*, 879 A.2d at 48.

statistical probability testimony undoubtedly creates the possibility of unfair prejudice and misleading of the jury.²⁶ This prejudicial and misleading effect, however, is exacerbated if DNA match evidence is admitted without any supporting statistical analysis of a random match probability.²⁷

In *Commonwealth v. Mattei*,²⁸ the Massachusetts Appeals Court considered whether inconclusive DNA evidence is admissible in a criminal trial without any accompanying statistical analysis of the likelihood of a random match.²⁹ In deciding the issue, the court drew a comparison to blood type tests commonly used to include or exclude a defendant as a contributor to a blood sample.³⁰ Consequently, the court opined that an inclusion/exclusion presentation for inconclusive DNA evidence is more appropriate and beneficial to all defendants, as opposed to conditioning admissibility on a statistical probability analysis.³¹ Based on this newfound

57-58 (stating DNA test resulted in infinitesimal random match probability).

²⁶ See *Bloom*, 516 N.W.2d at 164-66, 169 (cautioning against misinterpretation of statistical probability evidence by jury). In *Bloom*, Justice Alan C. Page provided cautionary guidelines for instructing juries on statistical probability evidence, including making jurors aware that: a random probability statistic does not reflect the likelihood the defendant committed the crime; more than one person can share a DNA profile; the random match probability statistic is the likelihood a random person, including the defendant, matches the DNA sample at issue; a DNA match does not necessarily mean the defendant is the source of the sample; and, the jury is charged with evaluating the probative value to afford such evidence. *Id.* at 171 (Page, J., concurring); cf. *Stanley v. State*, 657 S.E.2d 305, 306 (Ga. Ct. App. 2008) (noting parties' duty to give jury factual evidence necessary to evaluate probative weight of evidence); *Hodges v. Commonwealth*, 492 S.E.2d 846, 853 (Va. Ct. App. 1997) (holding expert testimony of psychological impact from statistical analysis invades jury's role).

²⁷ See *Peters*, 18 P.3d at 1226-28 (discussing potential misinterpretation of DNA match without statistical random match analysis); Tom R. Tyler, *Viewing CSI and the Threshold of Guilt: Managing Truth and Justice in Reality and Fiction*, 115 YALE L.J. 1050, 1068-72 (2006) (hypothesizing juror over-belief in scientific evidence by affording more probative value than deserved); Lovejoy, *supra* note 24, at 1090 (suggesting DNA match meaningless without calculation of random match probability). In *Peters*, the court distinguished physical descriptive traits from DNA profiles. *Peters*, 18 P.3d at 1227-28. Physical characteristics such as hair color, height, and weight are readily observable, thus providing jurors with a presumption of their frequency within the general population. *Id.* at 1228. In contrast, jurors do not have an innate sense of the frequency that a particular DNA profile occurs in society because DNA cannot be observed by the human eye. *Id.* But cf. *Commonwealth v. McNickles*, 753 N.E.2d 131, 143 (Mass. 2001) (opining general descriptive information, including inconclusive DNA evidence, is routinely admissible despite trait's prevalence).

²⁸ 892 N.E.2d 826 (Mass. App. Ct. 2008).

²⁹ *Id.* at 830-31 (presenting issue before court).

³⁰ *Id.* at 830 n.5. The court contrasted this situation with one in which a defendant may be excluded as a contributor to the DNA sample when no matching alleles are found. *Id.* The court noted that when alleles from a defendant's DNA do not match any from the crime scene sample, the defendant may be definitively excluded as a contributor. *Id.* This same definitiveness, however, is absent when the DNA test results are inconclusive. See *id.* at 830 & n.5.

³¹ *Id.* at 831 nn.6-7. In essentially establishing a new standard for admitting inconclusive

standard, the court upheld the admission of the inconclusive DNA evidence noting that it was not presented to the jury as a “match.”³² Although the DNA evidence could not definitively identify or exclude Mattei or the victim as contributors, the court held that it was nevertheless admissible because it provided general descriptive information about the perpetrator.³³ Relying on two recent SJC decisions that upheld the admission of inconclusive DNA evidence, the court opined that the issue before it was one of relevancy and, therefore, afforded the trial judge’s decision substantial deference.³⁴

Taking exception to the failure of the Commonwealth’s expert to provide a statistical analysis, the dissenting opinion impliedly criticized the majority’s summary dismissal of nearly two decades of precedent.³⁵ While

DNA evidence, the court stated:

Requiring statistical, or probability, evidence as a condition of the admissibility of an allele match or a genotype match (between the sample and the defendant’s exemplar) at a single site deemed too insignificant to support a positive identification could prove highly damaging to defendants as a class, as contrasted with the usual “consistent with” or “could not be excluded” type of evidence.

Id. at 831 n.6 (relying on *McNickles*, 753 N.E.2d at 143 n.26 as authority). The only reasoning the court provided was that such a presentation would allow the jury to focus on more serious issues in the case, rather than fixating on mathematical probability odds. *Id.* at 831 n.7.

³² *Id.* at 831 (citing *McNickles*, 753 N.E.2d at 142-43). According to the court, it was not error to allow the jury to hear that neither Mattei nor the victim could be excluded as contributors to the DNA samples. *Id.* The court, however, neglected to address the fact that a “cannot be excluded” presentation necessarily implies a “match,” regardless of the strength of that match. See *id.* at 835 (Rubin, J., dissenting).

³³ *Mattei*, 892 N.E.2d at 831 (stressing that general descriptive information short of a definitive match is routinely admissible). The court relied on *McNickles* as authority for the proposition that scientific evidence providing descriptive information about a perpetrator is equivalent to physical descriptive information and is therefore admissible as relevant evidence. *Id.* (citing *McNickles*, 753 N.E.2d at 143). The court once again compared DNA to another type of routinely admissible evidence—discernible physical traits, such as height, hair color, eye color, and weight. *Id.*

³⁴ *Id.* (upholding trial judge’s admission of the inconclusive DNA test results as relevant evidence). The appeals court relied on *Mathews* and *McNickles* in reaching its opinion that the issue before it should be determined by the relevancy standard. *Id.* at 831 (citing *Commonwealth v. Mathews*, 882 N.E.2d 833, 844 n.15 (Mass. 2008) and *McNickles*, 753 N.E.2d at 143); see also cases cited *supra* notes 4, 22 (discussing cases cited by majority).

³⁵ See *Mattei*, 892 N.E.2d at 833, 835-36 (Rubin, J., dissenting) (stating case governed by *Commonwealth v. Curmin*, 565 N.E.2d 440 (Mass. 1991)). In his dissent, Justice Rubin argued that although only some alleles matched, statistical probability information regarding the match is nevertheless required. *Id.* at 835-36. In criticizing the expert’s inclusion/exclusion testimony and subsequent failure to provide any understanding for said testimony, Justice Rubin remarked, “[d]oes this mean that half the people in the world could have left the DNA that was found in the mixture? Does it mean that only one in a billion could? We have no idea.” *Id.* at 835. Justice Rubin noted that because DNA match evidence has a potentially inflammatory effect on a juror’s judgment, *Curmin* requires that a jury be provided with statistical information of the likelihood

cautioning against the indiscriminate use of inconclusive DNA evidence without statistical support, the dissent stated that there is a substantial risk of misinterpreting such evidence as definitively inculpatory.³⁶ The dissent emphasized that the rule requiring statistical support for DNA “match” testimony is of the utmost importance in instances where the probability of a match is extremely low compared to cases in which DNA evidence definitively identifies the defendant as the source.³⁷ Accordingly, the dissent argued that inconclusive DNA test results are admissible only if accompanied by a statistical analysis of the likelihood that a match occurred by chance.³⁸

In *Commonwealth v. Mattei*, the Massachusetts Appeals Court incorrectly upheld the admission of DNA match testimony without requiring a statistical probability analysis.³⁹ The rationale behind the statistical analysis requirement is to regulate the use of DNA evidence at trial and provide the trier of fact with an understanding of a DNA match.⁴⁰ In reaching its decision, the court neglected to adhere to nearly two decades of established precedent and failed to provide any logical reasons for its

that the match occurred by chance. *Id.* at 833, 835; *see also Curnin*, 565 N.E.2d at 442 n.7 (requiring statistical analysis for admission of DNA match testimony).

³⁶ *Mattei*, 892 N.E.2d at 835 (Rubin, J., dissenting). Justice Rubin noted that this proposition is supported by the fact that the prosecution treated the DNA evidence as definitive, stating in its appellate brief that Mattei’s DNA was found at the crime scene. *Id.* Justice Rubin argued that the potential prejudicial effect DNA evidence has on a jury dictates the need for a statistical probability analysis to accompany DNA match evidence to provide the jury with an understanding of the significance of the match. *Id.*

³⁷ *Id.* at 836 (citing *Young v. Maryland*, 879 A.2d 44, 50-54, 56 (Md. 2005)). In *Young*, the Court of Appeals of Maryland permitted an expert to provide testimony of a match without providing a statistical analysis because the DNA evidence was so overwhelming that the probability of the match occurring by chance was miniscule. *Young*, 879 A.2d at 47-48.

³⁸ *Mattei*, 892 N.E.2d at 835 (Rubin, J., dissenting) (relying on *Curnin*, 565 N.E.2d at 443 n.7). Justice Rubin argued that *McNickles* does not relieve a proponent of inconclusive DNA evidence from providing a statistical analysis of the likelihood that the match occurred by chance. *See id.* at 835-36. In his dissent, Justice Rubin distinguished *McNickles* by stating that the expert in that case provided statistical probability testimony of how many individuals share the same genotype of the match at issue in the case. *Id.* at 835-36; *see also McNickles*, 753 N.E.2d at 138 (noting expert’s use of likelihood ratio).

³⁹ *See Mattei*, 892 N.E.2d at 831 (holding trial judge did not commit reversible error). In reaching its holding, the court stated that “[i]t was not error to let the jury learn that the mixed DNA samples . . . could not be excluded as having come from the defendant or victim . . .” *Id.* The expert’s testimony that neither Mattei nor the victim could be “excluded,” but were both “included” as possible sources, necessarily implied a DNA match. *See id.* at 830. Despite the inference of a DNA match, the court casually dismissed the prerequisite of a statistical analysis of a random match probability. *Id.* *But see Lanigan II*, 641 N.E.2d 1342, 1346 (Mass. 1994) (requiring statistical analysis accompany DNA match testimony).

⁴⁰ *See* cases cited *supra* note 19 (discussing established precedent regarding requirement of statistical probability analysis); *see also* sources cited *supra* note 17 and accompanying text (permitting expert testimony if it assists fact finder to ascertain meaning of scientific evidence).

divergence.⁴¹ The court's reliance on recent SJC decisions as support for its reasoning is misplaced, as these opinions merely suggest that inconclusive DNA test results are relevant evidence, not that such evidence is admissible without any supporting statistical analysis.⁴² As a result, the court misconstrued the issue before it as one of mere relevancy and failed to consider whether the probative value of the evidence outweighed the irrefutable and substantial unfair prejudice to Mattei.⁴³ Furthermore, by applying palpable error instead of abuse of discretion, the court failed to apply the correct legal standard on appellate review for admission of scientific evidence.⁴⁴

⁴¹ See *Lanigan II*, 641 N.E.2d at 1346 (stating DNA match evidence is meaningless without indicating significance of match). The court failed to provide substantial reasoning as to why a statistical analysis requirement is more harmful to defendants. See *Mattei*, 892 N.E.2d at 831 nn. 6-7 (indicating court's sole reason behind the standard it proffered). In fact, the court barely addressed the substance of Mattei's argument regarding a statistical probability analysis requirement. See *id.* at 831. Rather, the court believed that its rudimentary inclusion/exclusion standard would allow a jury to focus on "other serious questions." *Id.* at 831 n.7. This reasoning, however, fails to recognize that the DNA samples were the most incriminating evidence produced at trial because Mattei's DNA was not definitively linked to any articles in the victim's apartment. See *id.* at 834 (Rubin, J., dissenting).

⁴² See *Mattei*, 892 N.E.2d at 831 (relying on *McNickles*, 753 N.E.2d at 143, and *Commonwealth v. Mathews*, 882 N.E.2d 833, 844 n.15 (Mass. 2008), as support for holding). The court misinterpreted the scope and rationale of these opinions because although they uphold the admission of inconclusive DNA evidence, either a statistical analysis was performed or the issue of a statistical analysis was not before the court. See *McNickles*, 753 N.E.2d at 138 (noting statistical analysis performed); *Mathews*, 892 N.E.2d at 839-45 (demonstrating execution of statistical analysis was not before the court); see also *Mattei*, 892 N.E.2d at 835-36 (Rubin, J., dissenting) (distinguishing *McNickles* from case before appeals court).

⁴³ See *Mattei*, 892 N.E.2d at 834-35 (Rubin, J., dissenting) (suggesting DNA test results were most incriminating evidence introduced against Mattei); *Commonwealth v. Nesbitt*, 892 N.E.2d 299, 313-14 (Mass. 2008) (demonstrating high probability of random match not probative of an issue in case); see also sources cited *supra* note 13 and accompanying text (discussing exclusion of relevant evidence based on substantial unfair prejudice). When an objection is raised to otherwise relevant evidence, the court is obligated to balance the probative value of the evidence against the reason for its exclusion. See BERGMAN & HOLLANDER, *supra* note 13, § 4:11, at 322. The court, however, never performed an analysis of the probative value of the inconclusive DNA test results versus the prejudicial effect on Mattei. See *Mattei*, 892 N.E.2d at 830-31. The court neglected to consider that while DNA evidence may be relevant, it is only admissible if it is probative of an issue in the case. See *supra* note 23 and accompanying text (discussing admissibility of inconclusive DNA evidence based on probative value).

⁴⁴ Compare *Theresa Canavan's Case*, 733 N.E.2d 1042, 1048-49 (Mass. 2000) (applying abuse of discretion standard for scientific evidence on appellate review), with *Mathews*, 892 N.E.2d at 844 n.15 (noting "palpable error" standard for appellate review of admission of relevant evidence). Although the appeals court noted that a trial judge's ruling on relevancy is afforded substantial deference, the court failed to consider that the trial judge deviated from the established case law concerning the admission of DNA evidence and requirement of an accompanying statistical analysis. See *Mattei*, 892 N.E.2d at 831. The correct legal standard on appellate review for admission of DNA evidence is abuse of discretion. See *Canavan's Case*, 733 N.E.2d at 1048-49. Regardless of the applicable standard, the court should not have upheld the trial court's ruling because a statistical analysis was never performed. See *Lanigan II*, 641 N.E.2d at 1346 (requiring

By diminishing the prerequisites for admission of DNA “match” testimony, the court’s inclusion/exclusion standard carelessly broadens the scope of admissibility of DNA evidence in criminal trials in the Commonwealth.⁴⁵ More importantly, the court’s ruling ignores the overwhelming significance jurors inherently place on DNA evidence, resulting in unfair prejudice to a criminal defendant.⁴⁶ Moreover, this newfound standard unjustly burdens criminal defendants because the jury is deprived of any means for measuring the probative value to afford inconclusive DNA evidence.⁴⁷ The absence of a statistical analysis of the probability that a defendant contributed to a DNA sample inhibits jurors from determining the frequency of a particular DNA profile and the

supporting statistical analysis for admission of DNA match testimony).

⁴⁵ See cases cited *supra* note 19 (discussing Commonwealth’s requirement of statistical analysis for admission of DNA match evidence); see also sources cited *supra* note 24 (explaining importance of supporting statistical analysis for DNA “match” evidence in other jurisdictions).

⁴⁶ See *supra* notes 26-27 and accompanying text (discussing potential for unfair prejudice from misinterpretation of DNA evidence). Jurors tend to place more faith in scientific evidence and therefore assign it more probative value than the evidence actually merits. See Tyler, *supra* note 27, at 1068-70 (examining the “CSI effect” on jurors when assigning probative value to scientific evidence). Thus, the risk that jurors might misinterpret evidence of a DNA “match,” no matter how definitive, necessitates the requirement of a statistical probability analysis. See *Commonwealth v. Curnin*, 565 N.E.2d 440, 442 n.7 (Mass. 1991); see also sources cited *supra* notes 19, 24 (discussing requirement and importance of statistical analysis for DNA match testimony). The influence that DNA evidence has on a jury may impliedly require a defendant to carry the initial burden of proving innocence, rather than requiring the government to prove guilt. See *supra* notes 26-27 and accompanying text (noting potential for misinterpretation of DNA evidence and its influence on a jury). Instead of requiring the proponent of DNA evidence to provide statistical information establishing the validity of a match, it seemingly becomes a defendant’s burden to produce contrary evidence demonstrating why a match may have occurred by chance regardless of the sufficiency of the match. See FAIGMAN ET AL., *supra* note 18, § 30:42-45, at 177-83 (discussing scientific reasons behind DNA matches).

⁴⁷ See *Commonwealth v. O’Laughlin*, 843 N.E.2d 617, 633 (Mass. 2006) (stating jury determines probative weight of scientific evidence); YOUNG ET AL., *supra* note 13, § 702, at 471 (noting jury’s role to assign probative weight to relevant scientific evidence); see also sources cited *supra* notes 23-24, 27 (discussing importance of statistical analysis for interpreting DNA match evidence and assigning probative value). An inclusion/exclusion standard prevents the defendant from ultimately protesting the admissibility of inconclusive DNA test results based on the lack of probative value. See *Neshitt*, 892 N.E.2d at 313-14 (suggesting one-in-one probability of random match not probative but prejudicial); cf. *State v. Best*, 467 S.E.2d 45, 52-53 (N.C. 1996) (upholding as relevant and probative, expert testimony of ninety-four out of one hundred exclusion ratio). In *Mattei*, neither the court nor the jury was provided with any means for measuring the probative value of the DNA evidence at issue. See *Mattei*, 892 N.E.2d at 831 (stating statistical support not provided by expert). The SJC has stated that in order to be admissible at trial, inconclusive DNA evidence must be probative of an issue in the case. See *Neshitt*, 892 N.E.2d at 313-14 (suggesting probative value of grossly inconclusive DNA evidence substantially outweighed by prejudicial effect). The utter lack of a statistical analysis leaves both the jury and court wondering what, if any, probative value inconclusive DNA evidence has with respect to an issue in the case. See *id.*; see also *Mattei*, 892 N.E.2d at 835 (Rubin, J. dissenting) (noting Commonwealth’s expert did not attempt statistical probability analysis).

meaning of the DNA sample at issue.⁴⁸ In suggesting that jurors are capable of evaluating scientific evidence like all forms of evidence, the court failed to recognize a fundamental difference between discernable physical characteristics and intangible scientific evidence.⁴⁹ If jurors had the capability that the appeals court impliedly suggests, then expert testimony would not be needed to assist jurors in their evaluation of DNA test results.⁵⁰

Adhering to precedent, the dissent recognized the prejudicial effect DNA evidence has on a jury and provided a logical resolution.⁵¹ Although courts in other jurisdictions have admitted DNA match evidence without statistical support, the statistical probability of a random match was miniscule in those cases.⁵² Assuming, *arguendo*, that an inclusion/exclusion standard is beneficial to defendants as a class, a concurrent requirement of a supporting statistical analysis is nevertheless necessary to combat any misinterpretation or undue weight that might be afforded to inconclusive DNA evidence.⁵³ Any requirement to the contrary fails to consider the multitude of reasons a DNA “match” may occur and

⁴⁸ See *Peters v. State*, 18 P.3d 1224, 1227-28 (Alaska 2001) (opining frequency of DNA profiles not innate to jurors); see also sources cited *supra* note 24 (identifying jurisdictions requiring supporting statistical analysis to provide meaning to DNA match evidence). The scientific nature of DNA profiles requires competent expert testimony to provide the jury with an understanding of DNA evidence introduced at trial. See sources cited *supra* note 17 and accompanying text (discussing use of expert testimony to provide meaning to scientific evidence).

⁴⁹ Compare *Peters*, 18 P.3d at 1227-28 (distinguishing familiarity with DNA profiles from inherent knowledge of frequency of general descriptive traits), with *Commonwealth v. McNickles*, 753 N.E.2d 131, 143 (Mass. 2001) (equating inconclusive DNA test results with general descriptive evidence and suggesting both equally admissible). The appeals court incorrectly reasoned that an individual’s DNA profile is equivalent to a physical descriptive trait that is routinely admitted as relevant evidence. See *Peters*, 18 P.3d at 1227-28. Physical traits are readily observable, thereby providing lay persons with an innate sense of the frequency of such traits. *Id.* at 1228. The same, however, cannot be said for DNA profiles, which are scientifically complex. *Id.*

⁵⁰ See sources cited *supra* note 17 and accompanying text (discussing permissible use of expert testimony to explain scientific evidence to fact finder).

⁵¹ See *Mattei*, 892 N.E.2d at 834 (Rubin, J., dissenting).

⁵² See cases cited *supra* note 25 and accompanying text (noting particular instances in which jurisdictions have permitted “match” evidence without statistical support). This reasoning is inapplicable to the issue before the court in *Mattei* because the jurisdictions that have permitted DNA “match” testimony without accompanying analytical support have done so in cases where the evidence is nearly conclusive of identification. See *State v. Boles*, 933 P.2d 1197, 1200 (Ariz. 1997); *Young v. State*, 879 A.2d 44, 47-48 (Md. 2005). In *Mattei*, neither the jury nor the court could determine whether the probability of a random match was infinitesimal because the expert never provided a scintilla of statistical evidence. *Mattei*, 892 N.E.2d at 835 (Rubin, J., dissenting).

⁵³ See sources cited *supra* notes 24, 27 (demonstrating the need for a statistical analysis threshold requirement).

the established precedent in the Commonwealth.⁵⁴ The appeals court's current rudimentary standard has the potential to reintroduce unreliable, "junk" science into the courtroom.⁵⁵

The issue before the Massachusetts Appeals Court in *Commonwealth v. Mattei* was the admissibility of inconclusive DNA test results in a criminal trial absent any supporting statistical probability analysis of a random match. In reaching its opinion, the majority misinterpreted recent case law and failed to follow established precedent. As a result, the appeals court has opened the door for a deluge of DNA evidence to be deemed admissible, despite its potential lack of probative value and substantial prejudice to a defendant. Upon reviewing this matter, the SJC would be justified in reversing the decision of the court of appeals. In the interim, the decision of the appeals court places certain criminal defendants in a precarious state.

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⁵⁴ See cases cited *supra* note 19 and accompanying text (discussing statistical analysis requirement in the Commonwealth); FAIGMAN ET AL., *supra* note 18, § 30:42, at 177-83 (explaining underlying hypotheses for DNA match and need for statistical probability analysis).

⁵⁵ See *Theresa Canavan's Case*, 733 N.E.2d 1042, 1053 (Mass. 2000) (Greaney, J., concurring) (noting objective behind reliability standard is to keep "junk" science from fact finder); see also *supra* notes 1, 16 and accompanying text (discussing reliability standard adopted by SJC). The standard proffered by the appeals court turns the reliability standard established in *Lanigan II* on its head. See *Lanigan II*, 641 N.E.2d 1342, 1348-49 (Mass. 1994) (adopting reliability standard established in *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993)).