

Scientific Evidence

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7.1 CHAPTER OVERVIEW

This chapter provides a general overview of various scientific issues that commonly arise in sexual assault cases and the interplay of Pennsylvania law. Following a general discussion in section 7.2 on the presentation of expert testimony in sexual assault cases, the chapter focuses on the following:

- DNA, section 7.3;
- Bite Mark Evidence, section 7.4;
- Hair Sample Analysis, section 7.5;
- Blood Typing Evidence, section 7.6; and
- Evidence Obtained from a “Rape Kit” Exam, section 7.7.

7.2 EXPERT TESTIMONY IN SEXUAL ASSAULT CASES

A. General Requirements for Admissibility of Expert Testimony

In deciding whether expert testimony is admissible, the trial court must determine:

- 1) whether the subject matter is appropriate for expert testimony;
- 2) whether the testimony will assist the trier of fact to understand the evidence or to determine a fact in issue; and
- 3) whether the proffered expert is qualified to offer an expert opinion.

The standard for the admissibility of expert testimony at trial in Pennsylvania is stated in Pennsylvania Rule of Evidence 702.¹

If scientific, technical or other specialized knowledge beyond that possessed by a layperson will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise.

P.A.R.E. 702.

¹ In general, the admission of expert testimony is a matter left largely to the discretion of the trial court, and its rulings thereon will not be reversed absent an abuse of discretion. *Palmer v. Lapp*, 572 A.2d 12, 15 (Pa.Super. 1990). See also *Commonwealth v. Brown*, 596 A.2d 840 (Pa.Super. 1991), *appeal denied*, 532 Pa. 660, 616 A.2d 982 (1992).

1. The *Frye* Standard

In determining whether the subject matter is appropriate for expert testimony in criminal trials, Pennsylvania courts apply the test set forth in *Frye v. United States*, 293 F. 1013 (D.C.Cir. 1923). See *Commonwealth v. Topa*, 471 Pa. 223, 231, 369 A.2d 1277, 1282 (1977) (adopting the *Frye* test in Pennsylvania).

Under *Frye*, novel scientific evidence is admissible if the methodology that underlies the evidence has general acceptance in the relevant scientific community.²

See *Grady v. Frito-Lay, Inc.*, 576 Pa. 546, 555, 839 A.2d 1038, 1044-1045 (2003). While the United States Supreme Court has since found that the *Frye* test has been superseded by the more permissive Federal Rules of Evidence, see *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), Pennsylvania courts are not bound by the Federal Rules of Evidence, and continue to apply the *Frye* standard. See *Commonwealth v. Einhorn*, 911 A.2d 960, 974-975 (Pa.Super. 2006), *appeal denied*, ___ Pa. ___, ___ A.2d ___ (2007).

As stated above, the Pennsylvania Supreme Court has utilized the *Frye* standard in criminal cases. *Commonwealth v. Topa*, 471 Pa. 223, 369 A.2d 1277 (1977). In *Topa*, the Supreme Court described an adequate foundation for the admission of scientific evidence:

Admissibility of the evidence depends upon the *general* acceptance of its validity by those scientists active in the field to which the evidence belongs[.]

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.*

Id. at 232, 369 A.2d at 1282, quoting *Frye v. United States*, 293 F. at 1014 (emphasis in original). The Supreme Court went further to note that strict application of the *Frye* standard is necessary when scientific proof is offered in a criminal trial to ensure that the defendant is to receive a fair and just trial. *Commonwealth v. Topa*, 471 Pa. at 232, 369 A.2d at 1282. See also, *Commonwealth v. Apollo*, 603 A.2d 1023, 1025 (Pa.Super. 1992), *appeal denied*, 531 Pa. 650, 613 A.2d 556 (1992).³

² See also, *Commonwealth v. Hall*, 867 A.2d 619, 633 (Pa.Super. 2005), *appeal denied*, 586 Pa. 756, 895 A.2d 549 (Pa. Mar 07, 2006).

³ As a general rule, the standard of review on appeal of a trial court's evidentiary ruling, including a

It should be noted, though, that the *Frye* standard does not apply every time science enters the courtroom. *Folger ex rel. Folger v. Dugan*, 876 A.2d 1049, 1058 (Pa.Super. 2005), *appeal denied*, 587 Pa. 695, 897 A.2d 458 (2006). *Frye* does apply, however, where an expert witness employs a novel scientific methodology in reaching his or her conclusion. *Trach v. Fellin*, 817 A.2d 1102, 1110 (Pa.Super. 2003)(*en banc.*), *appeal denied*, 577 Pa. 725, 847 A.2d 1288 (2004); *see also*, *Grady v. Frito Lay*, 576 Pa. 546, 554-555, 839 A.2d 1038, 1043-1044 (Pa.Super. 2003).

2. Qualifications of Experts

Whether an expert is qualified to offer an expert opinion is governed by Rule 702 of the Pennsylvania Rules of Evidence. An expert may be qualified to offer an opinion by knowledge, skill, experience, training or education. PA.R.EVID. 702.

“The test to be applied when qualifying a witness to testify as an expert witness is whether the witness has any reasonable pretension to specialized knowledge on the subject under investigation. If he does, he may testify and the weight to be given to such testimony is for the trier of fact to determine.”

Miller v. Brass Rail Tavern, 541 Pa. 474, 480-481, 664 A.2d 525, 528 (1995).

3. Form of Expert Testimony

According to Rule 702, an expert may testify in the form of an opinion or otherwise. “Much of the literature assumes that experts testify only in the form of an opinion. The language ‘or otherwise’ reflects the fact that experts frequently are called upon to educate the trier of fact about the scientific or technical principles relevant to the case.” *McManamon v. Washko*, 906 A.2d 1259, 1274 (Pa.Super. 2006).

4. Underlying Basis of Expert Opinion

Pennsylvania Rule of Evidence 703 states:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

Clearly, PA.R.E. 703 permits an expert to base an opinion or inference on otherwise inadmissible evidence so long as the evidence “is of a type reasonably relied upon by experts in the particular field” In accordance

ruling whether expert scientific evidence is admissible against a *Frye* challenge, is limited to determining whether the trial court abused its discretion. *Commonwealth v. Dengler*, 586 Pa. 54, 65, 890 A.2d 372, 379 (2005).

with the plain language of Rule 703, experts are not limited to basing their opinions on firsthand knowledge or on trial records. Pennsylvania courts have long permitted experts to base their opinions on records or reports not in evidence. *See Commonwealth v. Thomas*, 444 Pa. 436, 445, 282 A.2d 693, 698-699 (1971) (Pennsylvania Supreme Court adopts rule that medical experts may base opinions on reports of others not in evidence); *Commonwealth v. Mitchell*, 570 A.2d 532 (Pa.Super. 1990), *appeal denied*, 527 Pa. 599, 589 A.2d 689 (1990) (Experts may offer testimony based on the reports of others - in homicide cases, pathologists may base their opinions on facts from autopsy reports prepared by others). Later case law expanded the evidential ruling in the *Thomas* case to various non-medical expert witnesses. *See* P.A.R.E. 703, comment.

“[T]he applicability of the rule permitting experts to express opinions relying on extrajudicial data depends on the circumstances of the particular case and demands the exercise, like the admission of all expert testimony, of the sound discretion of the trial court.” *Commonwealth v. Leddington*, 75 Pa. D. & C.4th 294, 305 (Bucks 2005).

(a) **Jury Instruction**

When an expert testifies about the underlying facts and data that support the expert’s opinion and the evidence would be otherwise inadmissible, the trial judge, upon request shall or on his own initiative may instruct the jury to consider the facts and data only to explain the basis for the expert’s opinion, and not as substantive evidence. P.A.R.E. 703, comment.

5. Expert Opinion Regarding Ultimate Issue

In *Commonwealth v. Johnson*, 517 A.2d 1311 (Pa.Super. 1986), the Superior Court stated that a police officer, who had qualified as an expert witness, could give opinion evidence that a defendant possessed drugs with the intent to deliver, regardless of whether the defendant was charged with that particular crime. The Court further stated:

The opinion of the witness [] possessing such knowledge is permitted as an aid to the jury. This is true even when the expert expresses an opinion on the ultimate issue before the jury. When opinion evidence is properly admitted, as in the instant [situation], it is then for the jury [or the trial court] to determine its credibility. The jury is free to reject it, accept it, or give it some weight between the two.

Id. at 1316. However, a witness may testify to an ultimate issue only in those instances where the admission will not cause confusion or prejudice. *Commonwealth v. Brown* 596 A.2d 840, 842 (Pa.Super. 1991), *appeal denied*, 532 Pa. 660, 616 A.2d 982 (1992).

Pennsylvania Rule of Evidence 704 provides:

Testimony in the form of an opinion or inference otherwise admissible is not objectionable because it embraces an ultimate issue to be decided by the trier of fact.

The trial judge must balance the helpfulness of the testimony against its potential to cause confusion or prejudice.⁴

6. Disclosure of Facts or Data Underlying Expert Opinion

Pennsylvania Rule of Evidence 705 provides:

The expert may testify in terms of opinion or inference and give reasons therefore; however, the expert must testify as to the facts or data on which the opinion or inference is based.

The facts relied on as a basis of expert opinion must be in the record so the jury can evaluate the testimony:

It is clear . . . that expert opinion testimony is proper if the facts upon which it is based are of record. This requirement for admissibility of opinion testimony is crucial. The purpose of expert testimony is to assist the factfinder in understanding issues which are complex or go beyond common knowledge. An expert's function is to assist the jury in understanding the problem so that the jury can make the ultimate determination. If a jury disbelieves the facts upon which the opinion is based, the jury undoubtedly will disregard the expert's opinion. Likewise, if a jury accepts the veracity of the facts which the expert relies upon, it is more likely that the jury will accept the expert's opinion.

Commonwealth v. Rounds, 518 Pa. 204, 209, 542 A.2d 997, 999 (1988).

B. Expert Medical Testimony

Expert medical testimony is governed by the standards articulated in section A. See Section 7.7 for information regarding the collection of forensic sexual assault evidence.

A growing trend across the United States is the use of Sexual Assault Nurse Examiners (SANEs) to conduct forensic medical sexual assault examinations.

SANEs are registered nurses who receive specialized education and fulfill clinical requirements to perform these exams. Some nurses have been certified as SANEs – Adult and Adolescent (SANE-A) through the International Association of Forensic Nurses (IAFN). Others are specially educated and fulfill clinical

⁴ See *Commonwealth v. Brown*, 596 A.2d 840, 842 (Pa.Super. 1991), *appeal denied*, 532 Pa. 660, 616 A.2d 982 (1992).

requirements as Forensic Nurse Examiners (FNEs), enabling them to collect forensic evidence for a variety of crimes.⁵

As of this Benchbook's publication, no published Pennsylvania appellate opinion has addressed the admissibility of SANE testimony; however, a number of trial courts have allowed it. Cases in which other jurisdictions have permitted SANEs to testify include: *United States v. Withorn*, 204 F.3d 790 (8th Cir. 2000); *Franklin v. State*, 869 A.2d 327, 2005 WL 528674 (Del. 2005); *Page v. State*, 610 S.E.2d 171 (Ga.App. 2005); *State v. Humphrey*, 36 P.3d 844 (Kan. App. 2001); *State v. Simmons*, 848 So.2d 58 (La. App. 2003), *appeal denied*, 872 So.2d 508 (La. 2004); *People v. Mourelo*, 2005 WL 1459505, Mich.App., 2005; *State v. Sanders*, 697 N.W.2d (Neb. 2005); *People v. Rogers*, N.Y.S.2d 393 (N.Y.App.Div. 2004); *State v. Fuller*, 603 S.E.2d 569 (N.C.App. 2004); *State v. Keeton*, 2004 WL 1549421 Ohio App. 2004; *Gregory v. State*, 56 S.W.3d 164 (Tex.App. 2001), *cert. denied*, *Gregory v. Texas*, 538 U.S. 978 (2003); *Hussen v. Commonwealth*, 511 S.E.2d 106 (Va. 1999), *cert. denied*, *Hussen v. Virginia*, 526 U.S. 1137 (1999).

C. Expert Mental Health Testimony

Expert psychological or psychiatric testimony is governed by the standards articulated in section A.

1. Conduct or Behavior of Victims

Generally, testimony regarding conduct or behavior of victims of sexual assault is not admissible since it tends to invade the jury's function of evaluating the witness' credibility. *Commonwealth v. Johnson*, 690 A.2d 274, 276 (Pa.Super. 1997)(en banc). In *Commonwealth v. Miner*, 562 Pa. 46, 753 A.2d 225 (2002), the Pennsylvania Supreme Court stated:

Expert testimony generally is admissible to aid the jury when the subject matter is distinctly related to a science, skill or occupation which is beyond the knowledge or experience of an average lay person. *Commonwealth v. Counterman*, 553 Pa. 370, 719 A.2d 284, 302-03 (*citing Commonwealth v. O'Searo*, 466 Pa. 224, 352 A.2d 30, 33 (Pa. 1976)), *cert. denied*, 145 L. Ed. 2d 82, 120 S. Ct. 97 (1999). Conversely, expert testimony is not admissible where the issue involves a matter of common knowledge. *Id.* at 303. In assessing the credibility of a witness, jurors must rely on their ordinary experiences of life, common knowledge of the tendencies of human behavior, and observations of the witness' character and demeanor. *Id.* Because the truthfulness of a witness is solely within the province of the jury, expert testimony cannot be used to bolster the credibility of witnesses.

562 Pa. at 55, 753 A.2d at 230.

⁵ U.S. Department of Justice, Department of Violence Against Women, National Protocol for Sexual Assault Medical Forensic Examinations for Adults and Adolescents (Sept. 2004), p. 64

Therefore, expert testimony regarding the impact of a sexual assault cannot be used to bolster the credibility of a victim.

- ***Commonwealth v. Dunkle***, 529 Pa. 168, 173-174, 602 A.2d 830, 832 (Pa. 1992): expert testimony that the victim displayed behavior patterns consistent with those typically displayed by sexually abused children inadmissible.
- ***Commonwealth v. Gallagher***, 519 Pa. 291, 294-295, 547 A.2d 355, 357 (Pa. 1988): expert testimony was inadmissible because it enhanced the victim's credibility. The expert had opined that the victim suffered from "rape trauma syndrome" which explained her failure to identify the assailant two weeks after the attack, but was able to make an identification over four years later because of a flashback.
- ***Commonwealth v. Rounds***, 518 Pa. 204, 207-208, 542 A.2d 997, 998 (Pa. 1988): expert testimony that expert believed the victim was not lying when she told expert of sexual abuse inadmissible.
- ***Commonwealth v. Davis***, 518 Pa. 77, 82-83, 541 A.2d 315, 317 (Pa. 1988): expert testimony by child psychologist that "children who have not been involved in sexual experiences typically do not fantasize about sexual experiences" inadmissible because it classified as truthful a class of individuals.
- ***Commonwealth v. Seese***, 512 Pa. 439, 441-442, 517 A.2d 920, 921 (Pa. 1986): expert testimony of pediatrician that, as summarized by the court, "young children usually do not fabricate stories of sexual abuse because they do not have sexual knowledge sufficient to supply details regarding sexual encounters" was inadmissible because constituted expert opinion as to the veracity of the class of potential witnesses of which the victim was a member.

7.3 DNA

This section discusses DNA (deoxyribonucleic acid) testing and its potential application in sexual assault cases. It has been often stated that DNA evidence catapulted the criminal justice system into a new era.⁶ There are an increasing number of states which require the taking of DNA samples from convicted felons; as a result, forensic DNA testing has been thoroughly scrutinized and validated.⁷

⁶ American Prosecutors Research Institute (APRI), [DNA Evidence Policy Considerations for the Prosecutor](#), p.1.

⁷ Hogan, S. and Swinton, S. "Meeting Defense Challenges to DNA Evidence," APRI *Silent Witness* 15(1)(2003).

The use of DNA evidence in Pennsylvania has followed a steady path.⁸ In *Commonwealth v. Crews*, 536 Pa. 508, 640 A.2d 395 (1994), a rape and murder case, the Pennsylvania Supreme Court upheld the admission of DNA evidence found at the crime scene which “strongly associated” the DNA with the defendant. Although the Supreme Court acknowledged that DNA evidence can never provide absolute proof of identity, the Supreme Court concluded that the evidence was relevant and that its weight and persuasiveness was for the finder of fact:

The factual evidence of the physical testing of the DNA samples and the matching alleles, even without statistical conclusions, tended to make appellant’s presence more likely than it would have been without the evidence, and was therefore relevant.

Id., 536 Pa. at 522, 640 A.2d at 402.

The Pennsylvania Supreme Court, in *Commonwealth v. Blasioli*, 552 Pa. 149, 713 A.2d 1117 (1998), recognized that DNA evidence is relevant, and provided the following description of the scientific principles and procedures applied in DNA analysis.

DNA is genetic material found in most types of cells of the human body, including white blood cells and cells contained in semen and hair follicles. DNA constitutes the primary element of an organism’s total genetic information, known as its genome. In the process of cellular division, DNA functions essentially as a template, providing a blueprint for resulting cells. DNA also directs the construction of specific proteins that comprise the structural component of cells and tissues, as well as the production of enzymes necessary for essential biochemical reactions. As such, DNA determines an organism’s unique physical composition.

552 Pa. at 154-155, 713 A.2d at 1119-1120.

In *Commonwealth v. Koehler*, 558 Pa. 334, 357, 737 A.2d 225, 237 (1999), cert. denied, 531 U.S. 829 (2000), the Supreme Court applied *Crews* and determined that DNA evidence was relevant and had probative value as to the question of whether a defendant had had sexual intercourse with a victim. In that case, the expert testified that a DNA analysis indicated that two other men were excluded from being the source of the semen, but that the appellant was not excluded.

A. Background Information Regarding DNA

Identification through the use of DNA testing is also referred to as DNA identity testing, profiling, fingerprinting, typing or genotyping. *Id.* DNA testing focuses on the differences in human DNA segments.

⁸ See *Commonwealth v. Alderman*, 811 A.2d 592, 595-596, (Pa.Super. 2002), *appeal denied*, 573 Pa. 694, 825 A.2d 1259 (2003).

Large segments of human DNA are the same from person to person, accounting for human characteristics that are generally shared. Indeed, from the sequence of the 3 billion base pairs, only about 3 million differ from one individual to another (except in the case of identical twins, who have identical DNA)... It is the existence of such differences in the sequencing of base pairs, known as “polymorphisms,” that provides the basis for DNA identification.

The length of each polymorphism is determined by the number times a particular base pair sequence is repeated along the chromosome. Stretches of DNA along which a short nucleotide sequence is repeated are known as “variable number tandem repeats” or “VNTRS.” Because of their length, such discrete portions of a DNA sample’s patterned chemical structure are most easily capable of identification, and much of DNA forensic analysis relies upon loci containing these polymorphisms.

Commonwealth v. Blasioli, 552 Pa. 149, 156, 713 A.2d 1117, 1121 (1998) (citations omitted).

There are several methods for performing DNA analysis but the two most common are *restriction fragment length polymorphisms* (RFLP) and *polymerase chain reaction* (PCR).⁹

The PCR method is the principal method of analyzing DNA evidence in laboratories across the world.¹⁰

“Historically, scientists needed large evidence samples to enable them to extract DNA.”¹¹ The earliest method of forensic DNA testing, RFLP, involved a comparison of lengths of specific DNA fragments.¹² RFLP testing can be explained as follows:

DNA forensic analysis begins with the preparation of a DNA profile, which entails the creation of a picture of multiple VNTRS. One of several techniques is used, among which is the restriction fragment length polymorphism method (the “RFLP method”), which was used by the State Police laboratory in this case and which is commonly used by the FBI and law enforcement laboratories across the country. The method isolates VNTRS known as restriction fragments by the use of

⁹ Hazelwood, Robert R. and Ann Wolbert Burgess. Practical Aspects of Rape Investigation: A Multidisciplinary Approach, (Third edition) (2001), p. 311.

¹⁰ Michigan Sexual Assault Benchbook, p 422.

¹¹ American Prosecutors Research Institute (APRI), Forensic DNA Fundamentals for the Prosecutor: Be not Afraid, p.10.

¹² American Prosecutors Research Institute (APRI), Forensic DNA Fundamentals for the Prosecutor: Be not Afraid, p.10.

restriction enzymes, chemical “scissors” that recognize short base pair sequences and cut DNA molecules at those specific sites ... Once the restriction fragments are chemically sorted according to size, x-ray pictures are created known as autorads, using the process of autoradiography. The autorad displays a discernible pattern of dark bands resembling an electronic bar code, each band representing a fragment of DNA.

Commonwealth v. Blasioli, 552 Pa. at 156, 713 A.2d at 1121 (citations omitted).

After DNA profiles are created for both the crime scene and suspect samples, the autorad patterns are measured and compared according to their length. If the similarities are such that they fall within a narrow margin, known as a match window, the samples are declared a match.

Id., 552 Pa. at 158, 713 A.2d at 1122 (citations omitted).

In ***Commonwealth v. Crews***, 536 Pa. 508, 640 A.2d 395 (1994), the Pennsylvania Supreme Court held that evidence of DNA testing was admissible in a criminal trial, after finding that DNA analysis using the RFLP method of testing was generally accepted in the scientific community.

The second type of testing is PCR testing. PCR technology is capable of using minute amounts of DNA that are too small for RFLP analysis and chemically amplifying the DNA sequences until enough is obtained for analysis.¹³ PCR testing is a technique that allows “specific regions of DNA to be copied millions of times so that those regions can be typed and compared to the same regions in the DNA of a known individual.” ***Commonwealth v. Jones***, 811 A.2d 1057, 1061 (Pa.Super. 2002), *appeal denied*, 574 Pa. 765, 832 A.2d 435 (2003). PCR testing is an amplification/ replication process that allows laboratories to develop DNA profiles from extremely small samples of biological evidence.¹⁴

PCR is a three step process: First the DNA strand is denatured, which means the strand is pulled apart by heating. Annealing is the second step in the process where the sample is cooled and the primers bind to the primer sequence of the DNA molecule. (A primer is synthetic or manufactured DNA.) Lastly, the DNA strand is heated again activating a polymerase (enzyme) that will produce a mate to the single strand to form a complete copy. Each time the PCR process is done, the number of DNA strands doubles, theoretically generally a billion copies after 30 cycles. The development of PCR was crucial to forensic

¹³ Hazelwood, Robert R. and Ann Wolbert Burgess. Practical Aspects of Rape Investigation: A Multidisciplinary Approach, (Third edition) (2001), p. 311.

¹⁴ American Prosecutors Research Institute (APRI), Forensic DNA Fundamentals for the Prosecutor: Be not Afraid, p.10.

identification made with DNA because it frequently enables both the prosecution and the defense to analyze the evidence. It also allows for sample retention if retesting is later deemed necessary.¹⁵

B. Admissibility of DNA Evidence

“The DNA testing process has been acknowledged by the courts as well as the national scientific community for its extraordinary degree of accuracy in matching cellular material to individuals.” *Commonwealth v. Brison*, 618 A.2d 420, 425 (Pa.Super. 1992). Pursuant to *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), to be admissible, scientific evidence must have gained general acceptance in the relevant scientific community. As stated by the Pennsylvania Supreme Court, theories and methods of DNA analysis are generally accepted within the scientific community. *Commonwealth v. Crews*, 536 Pa. 508, 640 A.2d 395 (1992).

- *Commonwealth v. Jones*, 2002 Pa. Super. 368, 811 A.2d 1057 (2002), the Superior Court found that counsel was not ineffective for failing to object to DNA testimony on the grounds that the scientific community has not generally accepted it as a means of identifying a specific individual.

DNA evidence need only be relevant and not unduly prejudicial in order to be admissible.

- *Commonwealth v. Jones*, 811 A.2d 1057 (Pa.Super. 2002), *appeal denied*, 574 Pa. 765, 832 A.2d 435 (2003): counsel was not ineffective for failing to object to the testimony of the Commonwealth’s DNA expert who testified to a reasonable degree of medical certainty that defendant was the source of DNA in the samples she studied.
- *Commonwealth v. Alderman*, 811 A.2d 592 (Pa.Super. 2002), *appeal denied*, 573 Pa. 694, 825 A.2d 1259 (2003): DNA need not establish conclusively that semen belonged to appellant in order to be considered relevant and not unduly prejudicial. Rather, it was sufficient that the DNA evidence supported a reasonable inference that appellant had sexual intercourse with the young victim.
- *Commonwealth v. Koehler*, 558 Pa. 334, 737 A.2d 225 (1999), *cert. denied*, 531 U.S. 829 (2000): the Supreme Court applied *Crews* and determined that DNA evidence was relevant and had probative value as to whether a defendant had had sexual intercourse with a victim. In this case, the expert testified that a DNA analysis indicated that two other men were excluded from being the source of the semen, but that the appellant had not been excluded.

¹⁵ American Prosecutors Research Institute (APRI), Forensic DNA Fundamentals for the Prosecutor: Be not Afraid, p.11.

- ***Commonwealth v. Crews***, 536 Pa. 508, 640 A.2d 395 (1994): the Pennsylvania Supreme Court upheld the admission of DNA evidence found at the crime scene which “strongly associated” the DNA with the defendant. The Supreme Court acknowledged that DNA evidence can never provide absolute proof of identity, but the Supreme Court concluded that the evidence was relevant and that its weight and persuasiveness was for the finder of fact.

Once DNA testing is performed, a statistical assessment called population frequency analysis is done. The Supreme Court in ***Commonwealth v. Blasioli***, 552 Pa. 149, 713 A.2d 1117 (1998) explained:

The statistical assessment performed after a match has been declared is called population frequency analysis. The object is to determine the overall likelihood that someone other than the suspect would possess DNA matching that in the sample obtained from the crime scene. The first step is to determine, for each matching allele, the likelihood that such an allele would appear in a randomly selected individual ... This determination is made through the application of theoretical models based upon population genetics. *Id.*

552 Pa. at 160, 713 A.2d 1123.

“As applied in DNA typing, the product rule states that the probability of a genetic profile occurring randomly is the product of the probabilities of each individual allele’s occurrence in the general population.” ***Blasioli***, 552 Pa. at 161, 713 A.2d at 1124. In ***Blasioli***, the defendant attacked the validity of the product rule. The Supreme Court explained that “the product rule has gained general acceptance across the disciplines of population genetics, human genetics and population demographics”. *Id.*, 552 Pa. at 168, 713 A.2d at 1128. “As such, any remaining dispute as to the validity of the product rule should not result in the exclusion of evidence based upon this statistical method in criminal trials in Pennsylvania.” *Id.* Accordingly, statistical evidence based upon the product rule was properly admitted at trial. *See also*, ***Commonwealth v. Robinson***, 581 Pa. 154, 214-215, 864 A.2d 460, 495-496 (2004).

Although DNA may be used to exculpate individuals, the lack of DNA does not always equate to innocence. “In DNA as in other areas, an absence of evidence is not evidence of absence.” ***Commonwealth v. Heilman***, 867 A.2d 542, 546 (Pa.Super. 2004), *appeal denied*, 583 Pa. 669, 876 A.2d 393 (2005). In ***Heilman***, the defendant sought DNA testing under the Post Conviction Relief Act. The Superior Court reviewed the items which defendant wanted to have tested and concluded that the absence of defendant’s DNA evidence at the crime scene was not equivalent to proof of the defendant’s absence from the crime scene.

- DNA testing may exculpate as well as inculpate an individual: **Commonwealth v. Brisson**, 618 A.2d 420, 425 (Pa.Super. 1992). Appellant alleged a due process violation based upon the Commonwealth's failure to have DNA testing performed on samples taken from the victim. The Superior Court vacated the conviction and remanded for testing, noting both the inculpatory and exculpatory capabilities of DNA testing.

7.4 BITE MARK EVIDENCE

Bite mark analysis is part of the field of forensic odontology.

In **Commonwealth v. Henry**, 524 Pa. 135, 569 A.2d 929 (1990), *habeas corpus granted on other grounds*, **Henry v. Horn**, 218 F.Supp.2d 671 (E.D.Pa. 2002), the Pennsylvania Supreme Court found that it was not error for a general practicing dentist who has specialized knowledge of bite mark identification to testify that bite marks were attacking or sadistic when the trial court instructed the jury that it was free to accept or reject his testimony.

In **Brooks v. State**, 748 So.2d 736, 746-747 (Miss. 1999), the Supreme Court of Mississippi exhaustively reviewed the states which have accepted bite mark evidence as scientific evidence:

- **Handley v. State**, 515 So.2d 121, 130 (Ala.Crim.App. 1987)(forensic odontologist testimony admissible as evidence is in the nature of physical comparisons as opposed to scientific tests or experiments);
- **State v. Richards**, 166 Ariz. 576, 804 P.2d 109, 111 (Ct.App.1990)(a Frye hearing is not required where bite-mark evidence is presented by a qualified expert);
- **Verdict v. State**, 315 Ark. 436, 868 S.W.2d 443, 447 (1993)(bite-mark evidence is not novel scientific evidence and was relevant and reliable);
- **People v. Marsh**, 177 Mich.App. 161, 441 N.W.2d 33, 36 (1989)(general reliability of bite-mark evidence as a means of positive identification is sufficiently established that a court is authorized to take judicial notice of reliability without conducting hearing on same);
- **State v. Armstrong**, 179 W.Va. 435, 369 S.E.2d 870, 877 (1988)(reliability of bite-mark evidence is sufficiently established that a court is authorized to take judicial notice of same);
- **State v. Stinson**, 134 Wis.2d 224, 397 N.W.2d 136, 140 (Ct.App.1986)(bite-mark identification evidence presented by an expert witness can be a valuable aid to a jury in understanding and interpreting evidence);
- **Chase v. State**, 678 P.2d 1347 (Alaska Ct.App.1984);
- **People v. Marx**, 54 Cal.App.3d 100, 126 Cal.Rptr. 350 (1975);
- **State v. Ortiz**, 198 Conn. 220, 502 A.2d 400 (1985);

- *Mitchell v. State*, 527 So.2d 179 (Fla.1988);
- *Bundy v. State*, 455 So.2d 330 (Fla.1984);
- *Smith v. State*, 253 Ga. 536, 322 S.E.2d 492 (1984);
- *People v. Shaw*, 278 Ill.App.3d 939, 215 Ill.Dec. 700, 664 N.E.2d 97 (1996);
- *People v. Milone*, 43 Ill.App.3d 385, 2 Ill.Dec. 63, 356 N.E.2d 1350 (1976);
- *Niehaus v. State*, 265 Ind. 655, 359 N.E.2d 513 (1977);
- *State v. Peoples*, 227 Kan. 127, 605 P.2d 135 (1980);
- *State v. Vital*, 505 So.2d 1006 (La.Ct.App.1987);
- *Commonwealth v. Cifizzari*, 397 Mass. 560, 492 N.E.2d 357 (1986);
- *State v. Hodgson*, 512 N.W.2d 95 (Minn.1994);
- *State v. Sager*, 600 S.W.2d 541 (Mo.Ct.App.1980);
- *Bludsworth v. State*, 98 Nev. 289, 646 P.2d 558 (1982);
- *People v. Bethune*, 105 A.D.2d 262, 484 N.Y.S.2d 577 (N.Y.App.Div.1984);
- *State v. Green*, 305 N.C. 463, 290 S.E.2d 625 (1982);
- *State v. Hill*, 64 Ohio St.3d 313, 595 N.E.2d 884 (1992);
- *State v. Routh*, 30 Or.App. 901, 568 P.2d 704 (1977);
- *Commonwealth v. Henry*, 524 Pa. 135, 569 A.2d 929 (1990);
- *State v. Adams*, 481 A.2d 718 (R.I.1984);
- *State v. Jones*, 273 S.C. 723, 259 S.E.2d 120 (1979);
- *State v. Cazes*, 875 S.W.2d 253 (Tenn.1994);
- *Spence v. State*, 795 S.W.2d 743 (Tex.Crim.App.1990);
- *Harward v. Commonwealth*, 5 Va.App. 468, 364 S.E.2d 511 (1988);
- *State v. Howe*, 136 Vt. 53, 386 A.2d 1125 (1978); and
- *State v. Warness*, 77 Wash.App. 636, 893 P.2d 665 (1995).

7.5 HAIR SAMPLE ANALYSIS

NOTE: DNA testing has generally replaced the scientific technique of hair analysis. Nevertheless, hair analysis continues to be admissible; therefore, it is discussed in this Benchbook.

Microscopic hair comparison evidence satisfies the **Frye** standard.

Commonwealth v. McCauley, 588 A.2d 941 (Pa.Super. 1991), *appeal denied*, 529 Pa. 656, 604 A.2d 248 (1992). In **McCauley**, the Superior Court held that microscopic hair comparison evidence satisfied was admissible as scientific expert evidence.

The court in *McCauley* held that the testimony of a forensic criminologist was legally relevant insofar as it was more probative than prejudicial and it gave the jury acceptable evidence of tying the defendant to the crime:

Various federal and state courts have held the same. *United States v. Cyphers*, 553 F.2d 1064 (7th Cir. 1977), *cert. denied* 434 U.S. 843, 98 S.Ct. 142, 54 L.Ed.2d 107 (1978) (armed robbery prosecution, expert opinion that human hairs found on items used in robbery could have come from defendants was admissible for whatever value jury might give it). *United States v. Haskins*, 536 F.2d 775 (8th Cir.1976), *cert. denied* 429 U.S. 898, 97 S.Ct. 263, 50 L.Ed.2d 182 (1977) (bank robbery, expert testimony identifying hair sample found in a silk stocking near bank as matching known sample of defendant's hair admissible; credibility of expert and weight given was for jury to determine and testimony was not invasion of jury's province). *People v. Columbo*, 118 Ill.App.3d 882, 74 Ill.Dec. 304, 455 N.E.2d 733 (1983), *cert. denied* 467 U.S. 1208, 104 S.Ct. 2394, 81 L.Ed.2d 351 (1984) (expert testimony that defendant's hair was similar in color and characteristics to hair found on murder victim's T-shirt had probative value, and although not conclusive, was properly considered by the jury, and neither exclusionary character of hair comparisons nor lack of absolute scientific certainty rendered hair expert's testimony inadmissible). *Paxton v. State*, 159 Ga.App. 175, 282 S.E.2d 912 (1981), *writ denied* 248 Ga. 231, 283 S.E.2d 235 (1982) (expert testimony pubic hairs found at scene of rape matching defendant's admissible). *State v. Pratt*, 306 N.C. 673, 295 S.E.2d 462 (1982); *State v. Kersting*, 292 Or. 350, 638 P.2d 1145 (1982); *State v. Melson*, 638 S.W.2d 342 (Tenn.1982), *cert. denied* 459 U.S. 1137, 103 S.Ct. 770, 74 L.Ed.2d 983 (1983); *State v. Clayton*, 646 P.2d 723 (Utah 1982).

McCauley, 588 A.2d at 947.

7.6 BLOOD TYPING EVIDENCE

NOTE: DNA testing has generally replaced the scientific technique of blood typing analysis. Nevertheless, blood typing analysis continues to be admissible; therefore, it is discussed in this Benchbook.

Blood typing evidence is admissible, but may only be used to corroborate the defendant's presence at the crime scene.

- *Commonwealth v. Mussoline*, 429 Pa. 464, 240 A.2d 549 (1967): the defendant's blood type matched blood spots found at the crime scene and the defendant had a cut on his arm; however no other evidence existed to

corroborate defendant's presence at the crime scene. The Supreme Court held that the blood type evidence should not have been admitted.

- ***Commonwealth v. Statti***, 73 A. 2d 688 (Pa.Super. 1950): blood type evidence was used to corroborate the victim's testimony. The victim identified the defendant as her assailant and testified that she bit him during the rape.

7.7 FORENSIC SEXUAL ASSAULT EVIDENCE COLLECTION

The sexual assault medical forensic exam is an examination of a sexual assault victim by a health care provider, ideally one who has specialized education and clinical experience in the collection of forensic evidence and treatment of these types of patients/victims.

The forensic component includes gathering information from the patient for the medical forensic history, an examination, documentation of biological and physical findings, a collection of evidence from the patient and follow up as needed to document additional evidence. The medical component includes coordinating treatment of injuries, providing care for STD's, assessing pregnancy risk and discussing treatment options, including reproductive health services, and providing instructions and referrals for follow up medical care.

U.S. Department of Justice, Department of Violence Against Women, National Protocol for Sexual Assault Medical Forensic Examinations for Adults and Adolescents (Sept. 2004), p. 29

"A 'rape kit' is a product frequently used for the examination of sexual assault victims in which blood, hair, saliva, semen, fibers, and other substances are collected from the victim's body and clothing and retained for further forensic examination."¹⁶ ***Commonwealth v. Hawk***, 551 Pa. 71, 73 n.1, 709 A.2d 373, 374 n.1 (1998), *citing*, ***United States v. Boyles***, 57 F.3d 535, 538 n.2 (7th Cir. 1995). Positive results from sexual assault evidence collection are admissible when presented by the prosecution to corroborate a victim's testimony. *Id.*

- ***Commonwealth v. Campbell***, 368 A.2d 1299 (Pa.Super. 1976): the admission of sexual assault evidence collection kit evidence showing the presence of sperm in the victim's vagina to corroborate the victim's testimony that the defendant had raped her was proper even though the prosecution presented no scientific evidence identifying the sperm as that of the defendant.

¹⁶ Note that the more recent terms, "Sexual Assault Evidence Collection Kit" or "Rape Evidence Collection Kit" more accurately describe the evidence collection kit.

When a victim has suffered no physical injury in addition to the rape itself, the Commonwealth may use an expert to explain that victims are not always injured in other ways when a rape occurs. In other words, the absence of physical trauma is nevertheless not inconsistent with rape. Expert medical testimony regarding the absence of physical injury is admissible. ***Commonwealth v. Miner***, 562 Pa. 46, 753 A.2d 225 (2002). The Commonwealth may present such testimony in its case in chief and need not wait until rebuttal. *Id.*

- ***Commonwealth v. Hawk***, 551 Pa. 71, 73 n.1, 709 A.2d 373, 374 n.1 (1998): the results of rape kit tests which showed a lack of semen and foreign pubic hair were consistent with defendant's assertion that he did not engage in sexual intercourse with the victim even though the forensic scientist could not state conclusively that no intercourse had occurred. The scientist's testimony concerning the possibility of no intercourse was sufficient to support a reasonable inference that the defendant did not have sexual intercourse with the victim.
- ***Commonwealth v. Johnson***, 690 A.2d 274, 277 (Pa. Super. 1997) (en banc): a majority of an en banc panel held that the trial court erred in excluding expert testimony that "the absence of diagnostic injuries or scars is common and does not exclude the possibility of penile anal penetration or other forms of sexual contact."

The results of the rape kit, other than the presence of spermatozoa, are hearsay and cannot be admitted without the testimony of the criminalist who conducted the test.

- ***Commonwealth v. Hemingway***, 534 A.2d 1104, 1107-1108 (Pa. Super. 1987): the results of the "rape kit" exam were not admissible as business documents; the report contained opinions and conclusions beyond mere event of hospitalization and treatment prescribed, and were not admissible unless the doctor who prepared the report containing the information was available for in-court cross-examination regarding the accuracy, reliability and veracity of his opinion.
- ***Commonwealth v. Campbell***, 368 A.2d 1299, 1301 (Pa. Super. 1976): the presence of sperm is a factual and not a medical conclusion and is admissible hearsay.
- ***Commonwealth v. Xiong***, 630 A.2d 446, 452 (Pa. Super. 1993), *appeal denied*, 537 Pa. 609, 641 A.2d 309 (1994): notation stating, "no hymen" was a factual assertion rather than a diagnosis or opinion. It was not an opinion based statement, but rather was based on an observation made during the exam.

