

Chapter 71

Utilization of Forensic Science in the Civil and Criminal Justice Systems: Forensic Use of Medical Information

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Forensic medicine is the area of medicine concerned with the testimony and information presented in judicial or quasi-judicial settings. For example, medical information and testimony presented before hearings and trials, as well as formal legal investigations, would be considered forensic.

Forensic pathology concentrates on autopsies to be reported in legal settings. Other areas of forensic medicine, such as forensic toxicology, forensic surgery, forensic pediatrics, and other health sciences, involve presenting information in a legal forum.

BRIEF HISTORY OF FORENSIC MEDICINE

Medicine as a curiosity, superstition, science, and ultimately a form of self-preservation appears to have originated long before humans organized into communities capable of governing conduct by a legal system consisting of accepted norms. Unfortunately, historical knowledge of the interaction between law and medicine is limited by the slow development of an effective recording system. Thus the origin of forensic medicine can be traced back only 5000 or 6000 years. At that time, Imhotep, the grand vizier, chief justice, chief magician, and chief physician to King Zozer, was regarded as the god of the Egyptians. He was also the first man known to apply both medicine and law to his surroundings.¹

In ancient Egypt, legal restrictions concerning the practice of medicine were codified and recorded on papyrus. Because medicine was shrouded with mysticism, its practice was regarded as a privilege of class.² Despite the strong influence of superstition, definite surgical procedures and substantial information regarding the interaction of drugs indicate an awareness that humans, as opposed to gods or demons, could regulate various bodily responses.

Apparently the Code of Hammurabi (2200 B.C.) was the first formal code of medical law, setting forth the organization, control, duties, and liabilities of the medical profession.³ Malpractice sanctions included monetary

compensation for the victim and forcible removal of the surgeon's hand.⁴ Medicolegal principles also can be found in early Jewish laws, which distinguished mortal from non-mortal wounds and investigated questions of virginity.

Later, in the midst of substantial jurisprudential evolution, Hippocrates and his followers studied the average duration of pregnancy, the viability of children born prematurely, malingering, the possibility of superfetation, and the relative fatality of wounds in different parts of the body. Particularly noteworthy is the continuation of an interest in poisons. The Hippocratic Oath includes a promise not to use or advise the use of poisons.⁵

As in Egypt, the practice of medicine in India was restricted to members of select castes. Medical education also was regulated. Physicians formally concluded that the duration of pregnancy should be between 9 and 12 lunar months. Again, the study of poisons and their antidotes was given high priority.⁶

Although little medicolegal development occurred during the Roman era, investigations were conducted regarding the causes of suspicious deaths. This process was sufficiently sophisticated to lead one physician to report that only one of the 23 wounds sustained by Julius Caesar was fatal.⁷ In addition, between A.D. 529 and 564 the Justinian code was enacted, regulating the practice of medicine, surgery, and midwifery. Malpractice standards, medical expert responsibilities, and the number of physicians limited to each town were clearly established. Interestingly, although it was recognized that a fair determination of the truth often necessitated the submission of expert medical testimony, such testimony was restricted to the impartial specialized knowledge of the expert.⁸ Obviously this evidence was intended to aid the fact-finder, not to replace the fact-finder's independent conclusion.

Throughout the Middle Ages, issues of impotence, sterility, pregnancy, abortion, sexual deviation, poisoning, and divorce provided the backdrop for much medicolegal development. Investigatory procedures advanced as more homicide and personal injury judgments were rendered. In 925 the English established the office of coroner. This office

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much later assumed the responsibility of the investigation of suspicious deaths.

China's contribution to forensic medicine did not surface until the first half of the thirteenth century. Apparently, medicolegal knowledge had quietly passed from one generation to another; the *Hsi Yuan Lu* ("the washing away of wrongs") was so comprehensive that its influence can be noted until fairly recently. It was a treatise detailing procedures for cause-of-death determinations and emphasized the importance of performing each step in the investigation with precision. In addition, the book noted the difficulties posed by decomposition, counterfeit wounds, and antemortem and postmortem wounds and distinguished bodies of drowned persons from those thrown into the water after death. Examination of bodies in all cases was mandatory, regardless of the unpleasant condition of the body.⁹

By the end of the fifteenth century the Justinian code was a lost relic. A new era of European forensic medicine began with the adoption of two codes of German law: the Bamberger code (*Coda Bambergensis*) in 1507 and the Caroline code (*Constitutio Criminalis Carolina*) in 1553.¹⁰ The Caroline code, based on the Bamberger code, required that expert medical testimony be obtained for the guidance of judges in cases of murder, poisoning, wounding, hanging, drowning, infanticide, abortion, and other circumstances involving injury to the person.¹¹

These works led surrounding countries to question earlier superstitious systems of legal judgment, such as trial by ordeal.¹² Legislative changes followed, particularly in France, and medicolegal volumes began to be published throughout Europe. Most noteworthy among them was Ambroise Paré's book (1575) discussing monstrous births, simulated diseases, and methods to be adopted in preparing medicolegal reports.¹³ In 1602 the extent of medical information had grown such that Fortunato Fidele published four extensive volumes. Even more important, between 1621 and 1635, Paul Zacchia, physician to the Pope, contributed his extensive collection, *Questiones Medico Legales*, discussing such issues as death during delivery, feigned diseases, poisoning, resemblance of children to their parents, miracles, virginity, rape, age, impotence, superfetation, and moles.¹⁴ Limited in accuracy by ignorance of physiology and anatomy, the book still served as an influential authority of medicolegal decisions of that time.

In 1650, Michaelis delivered the first lectures on legal medicine at Leipzig, Germany.¹⁵ The teacher who replaced him compiled *De Officio Medici Duplici, Clinici Mimirum ac Forensis*, published in 1704.¹⁶ This text was followed by the extraordinary *Corpus Juris Medico-Legale* by Valenti in 1722.¹⁷ Germany significantly stimulated the spread of forensic medicine, but particularly after the French Revolution, France's system of medical education and appointment of medical experts further defined the parameters of the field.¹⁸

Despite these remarkable accomplishments, "witchmania," which originated in 1484 by papal edict, was still widely accepted throughout much of the eighteenth century. Thus with the blessing of the medicolegal community, thousands branded as witches were burned at the stake. Despite the repeal of British witch laws in 1736, alleged witches were murdered by mobs as late as 1760, and "witch

doctors" practiced as late as 1838. France is known to have held a witch trial in 1818.¹⁹ As Chaillé accurately stated:²⁰

[W]ith the impotence of science to aid the law, it adopted miracles as explanations, suspicion as proof, confession as evidence of guilt, and torture as the chief witness, summoning the medical expert to sustain the accused until the rack forced confession.

Nevertheless, in England, medical jurisprudence pushed forward, laying the foundation for the current depth of information. In 1788 the first known book on legal medicine was published in English.²¹ The following year, Professor Andrew Duncan of Edinburgh gave the first systematic instruction in medical jurisprudence in any English-speaking university. Recognition by the British Crown was evidenced in 1807, when the first Regius Chair in forensic medicine was established at the University of Edinburgh.²² Eighty years later, the Coroner's Act defined the duties and jurisdiction of the coroner. As amended in 1926, these obligations included (1) investigation of all sudden, violent, or unnatural deaths and (2) investigation of all prisoners' deaths by inquest.²³ The 1926 amendment also set forth minimum qualifications for the position of coroner and carefully outlined its jurisdiction in criminal matters.²⁴ It was not until 1953 that the coroner's jurisdiction in civil matters was defined.²⁵

Early American colonists brought the coroner's system, intact, to the United States in 1607.²⁶ Because the position was held by political appointees, most of whom lacked medical training, cause-of-death determinations could be based on little more than personal opinion. Not surprisingly, controversy concerning the validity of death investigations led Massachusetts (in 1877) to replace the coroner with a medical examiner whose jurisdiction was limited to "dead bodies of such persons only as are supposed to have come to their death by violence."²⁷ Eventually, New York City and other jurisdictions followed suit in an attempt to establish a profession of trained experts qualified to unravel the mysteries behind the violent deaths that increased in number each year as the population expanded. To this end, the medical examiner was given the authority to order autopsies.²⁸

During the last half of the twentieth century, considerable advances were made in the area of forensic medicine. Scientific and technological improvements have provided new fabric and groundwork for jurisprudential development. The question at this point, however, is whether such development will proceed. Medicolegal teaching programs are now being offered at many universities, medical schools, and law schools, but they provide only a theoretical foundation. The forum of discussion must now proceed from the world of academia to the practitioner's realm.

THE ADVERSARIAL PROCESS

The legal system in the United States is based on the concept that there is value in the presentation of opposing points of view. The legal process is designed to provide for presentation of opposing points of view and a contest of persuasion. *Forensic medicine* is the study of all the medically related sciences in a way that concentrates on the persuasiveness

of information to be presented in the adversarial process that the law applies to the determination of truth. Legal scholars and practitioners believe in the value of the process and support the concept that truth can be found best in a legal setting by allowing the parties to present conflicts regarding the facts and the law.

The concept of reasonable medical certainty is difficult for physicians to understand, but it is a purely legal concept. *Reasonable medical certainty* is a catchphrase meaning “more likely than not in a medical sense.” In other words, if the likelihood of an event is more probable than not given the facts, the physician can testify with a reasonable medical certainty. Most physicians believe that “certainty” is misleading, but the legal system has no problem with the word. If a physician understands that the legal system weighs and balances the probity and veracity in terms of “more likely than not,” the use of the *certainty* is more easily understood.

Methods and practice in law and medicine are widely divergent. Practitioners in law attempt to apply general principles to specific fact situations, whereas medicine is a highly individualistic and flexible application of general scientific information. Most physicians would not consider themselves empiric scientists operating within a structured environment. Medicine requires great flexibility and artistry.

In the case of law the persuasiveness of an argument always returns to generally accepted principles; therefore there is always an attempt to eliminate the uncertain and mold arguments to fall foursquare on previously accepted legal principles. As a result, when lawyers and physicians attempt to resolve conflicts, they invariably start from different places and sometimes collide before they cooperate.²⁹

EXPERT WITNESSES

The layperson, judge, or jury member needs help to establish the truth. As a result, experts are allowed to provide testimony to help the fact-finder. The expert is a person who by reason of training, education, skill, experience, or observation is able to enlighten and assist the fact-finder in resolving factual issues. Experts are allowed to provide specialized information to laypersons only if the court has accepted them as experts in the first place. To be accepted properly as an expert, the court must establish that an individual fits the qualifications as stated. One can be qualified by education or experience, but one must ultimately have enough knowledge to enlighten a layperson. A judge usually makes the determination of whether an individual is an expert, and that determination sometimes is balanced against the potential for prejudice in the presentation of testimony. For example, even if a general practitioner qualifies as an expert on a neurosurgical procedure, his or her expertise must be recognizably less than the expertise of a neurosurgeon. If the judge thinks that the jury will not be able to make that distinction, the court may exclude the testimony and not qualify the expert.^{30,31}

The believability and credibility of a forensic scientist are tested in the courtroom and in other legal proceedings. It is no coincidence that the term *examination* is used to describe the process of presenting testimony in a trial or hearing. Direct examination and cross-examination are

ultimately a true test of an individual’s knowledge of the materials presented. A good cross-examination attempts to test and disprove the assertions that are brought out in the direct examination. The effective and well-prepared attorney is more than qualified to adduce the information that will be relevant and material to the factual issues at hand. The forensic scientist must prepare adequately to present the information clearly in the most persuasive manner possible. Ultimately a forensic scientist in a legal setting is an *advocate*. The individual is tested for professional expertise, thoroughness, accuracy, and honesty.^{32,33}

Opinion Testimony and Hypotheticals

After experts are qualified by the court and accepted to give expert testimony, they can give opinion testimony and answer hypothetical questions. Experts are allowed to give opinion testimony based on facts that are normally used by experts in forming their opinions. Such facts include text and journal information, as well as the evaluation of the facts and the gathering of evidence that is a part of the information used by experts in the field. Frequently, for example, experts can use hearsay evidence in the formation of their opinion.

In court an attorney might present a *hypothetical question* (a question based on stated assumptions) to establish an expert’s opinion given certain assumed facts. If an expert is allowed to give an answer to a hypothetical question, it can be used as persuasive testimony by the opposing parties, since factual disputes often cannot be completely resolved. For example, an attorney will ask the expert to assume certain facts that are in dispute and then draw a conclusion. This kind of opinion testimony allows attorneys to advance the version of the facts that their clients offer.

Admission of evidence requires a foundation. Through the use of the witness’s testimony, the validity of the physical evidence can be established. For example, a photograph must be a true and accurate representation of the situation of which the witness has knowledge. Retouched photographs and photographs that misrepresent a scene must be tested by laying the foundation so that the information can be accepted into evidence. The typical process involves the labeling of an item as an exhibit, then the foundation being laid by a witness, often the expert witness, or through a process of verification so that the exhibit can be accepted as evidence. Photographs, diagrams, demonstrations, models, slides, films, and tapes can be accepted into evidence, provided that the court finds no attempt to misrepresent or deceive.³⁴

Courts generally have a problem with accepting books, texts, journals, and treatises as evidence. The problem is that written material can be so easily abused that the courts generally recognize that in-court testimony by a witness is more easily tested and verified. On the other hand, an effective argument can be made that a journal or book, if considered authoritative, can be used because it is written in a nonadversarial context that makes it more likely to be more believable. Arguments can be made on both sides because, taken out of context, a book can be misleading. In most trial courts, written materials can be used if the expert witness accepts them as authoritative. Textbooks can

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be used to contradict the testimony of the expert and to support that testimony.³⁵

Court-Appointed Experts

Trial courts have the authority and in some cases have exercised the authority to appoint their own experts. Court-appointed psychiatrists, social workers, and other experts are frequently used in complex cases. This does not rule out the use of experts by opposing parties, but it does allow the court to place more weight on the testimony and evidence presented by the court-appointed expert. The credibility question ultimately still lies in the areas of persuasiveness. For example, an ineffective court-appointed expert can be overcome by an effective, believable expert for the plaintiff or defendant or for the prosecution or the defense. The forensic scientist who is appointed by the court must ultimately stand the test of the courtroom and the direct examination and cross-examination process.³⁶

FORENSIC PSYCHIATRY AND PSYCHOLOGY

Psychiatric problems are frequently fraught with legal implications. Forensic psychiatry is critical to determine competence in contract actions, responsibility for torts and crimes, competence to testify, ability to give informed consent to treatment, and particularly competence to stand trial. A related area is *testamentary capacity*, which is the ability of the testator to comprehend that he or she is writing a will, is aware of the property involved and the objects of bounty, and understands to whom the property will descend at death.

The defense to a criminal charge is predicated at times on insanity. Whether the state recognizes the M'Naughten rule, the ALI rule, or the Durham or New Hampshire rule, and whether the defense is diminished responsibility or irresistible impulse, the fundamental questions are whether a mental disease or illness is present and whether it affected the accused person's behavior.

At times the granting of a divorce or annulment and the award of custody, placement, or adoption are based on the presence or absence of a psychiatric problem.

Similarly, in reproduction situations the performance of an abortion or a sterilization procedure is conditioned on the psychiatric state of the patient. Artificial insemination mandates an absence of psychiatric problems in the donor or perhaps in his or her family.

Personal injury and malpractice claims may turn on the presence of traumatic psychoneurosis. In recent years, psychiatric problems related to employment have been the basis for workers' compensation settlements. Strict product liability also has been imposed for psychiatric injury.

Inherent in the etiology and effects of alcoholism and drug habituation and abuse are psychiatric factors; physicians have been held liable for addicting patients to drugs.

Psychiatric problems are often treated along with mental retardation, juvenile delinquency, autism, and hyperactive children. Psychosurgery (i.e., prefrontal lobotomy, brain

ablation, electrode implantation) and electroconvulsive therapy may be used only in indicated circumstances with proper consent.

Forensic psychiatry is critical in determining malingering, sociopathy, sexual psychopathy (rape), and other sex-related problems, such as homosexuality, transvestitism, transsexual surgery, pedophilia, and fetishism.

Suicide contemplated because of depression, if recognized, can be prevented. Depression, which can be prevented if anticipated and recognized, often is seen postoperatively, particularly after cardiac surgery, postpartum, in intensive unit care, after transplantation, and incident to dialysis.

Psychiatric malpractice claims frequently involve treatment with medications, usually undertreatment or overtreatment, and toxic reactions (e.g., tardive dyskinesia). Infrequently, misdiagnosis and delayed or erroneous treatment are alleged. Intimate therapy has only recently become a cause célèbre and cause of action.

Psychiatric implications affect patients with psychoneurosis and personality trait or character disorders, but particularly those with schizophrenia, manic-depressive psychosis, the various depressions, and paranoia. Organic brain disease can include epilepsy, cerebral arteriosclerosis, space-occupying lesions, Alzheimer's disease, and a variety of other disorders. These disorders must be distinguished from trauma, infectious metabolic chemical or electrolyte disorders, cortisone intoxication, dehydration and cerebral edema, liver and kidney failure, and other etiologies.

The credibility and qualifications of a psychiatric or psychological expert are subject to the same legal requirements as other expert testimony. Based on adequate and intense investigation and examination of the witness, the opinions of psychiatric experts are admissible for consideration by the fact-finder. There are frequently conflicting opinions about the psychological state of an individual.

The tests of admissibility for psychiatric and psychological evidence in testimony are the same as those applied to all forms of evidence. The credibility of the expert involved is one factor that complicates the admission of forensic psychiatric and psychological information. The opinions of the mental health expert about criminal and civil matters are subject to cross-examination and rebuttal by other experts.³⁷

ADMISSIBILITY OF EXPERT TESTIMONY

On the last day of the U.S. Supreme Court's 1992 to 1993 term, the justices' ruling in *Daubert v. Merrell Dow Pharmaceuticals* changed the rules for the admission of testimony by scientific experts in federal courts.³⁸

For nearly 70 years, most federal courts judged the admissibility of scientific expert testimony by the 1923 standard of *Frye v. United States* (i.e., are the principles underlying the testimony "sufficiently established to have general acceptance in the field to which it belongs?").³⁹

In *Daubert* the Supreme Court unanimously agreed that the *Frye* test was supplanted in 1975 when Congress adopted

the Federal Rules of Evidence, which included provisions on expert testimony.

In evaluating evidence of DNA identification, medical causation, voiceprints, lie detector tests, eyewitness identification, and a host of other scientific issues, litigants and courts must now reconsider admissibility questions under *Daubert*.

The Supreme Court did not reject the *Frye* test on grounds that it was a wrong or poor judicial policy. Rather, the court simply concluded that *Frye* “was superseded by the adoption of the Federal Rules of Evidence.”

Rule 702 allows opinion testimony by a qualified person concerning “scientific, technical, or other specialized knowledge that will assist the trier of fact to understand the evidence or to determine a fact in issue.”

To satisfy that requirement, a court must undertake “a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue,” according to Justice Blackmun, who wrote the majority opinion.

Blackmun identified the following four factors that a court should consider in determining whether the scientific methodology underlying an expert’s opinion is valid under Rule 702:

1. Whether the expert’s theory or technique “can be (and has been) tested.”
2. Whether the theory or technique has been “subjected to peer review and publication.”
3. What the known or potential “rate of error” is for any test or scientific technique that has been employed.
4. The *Frye* standard of whether the technique is generally accepted in the scientific community.

Blackmun emphasized that the inquiry under Rule 702 “is a flexible one” that focuses on whether an expert’s testimony “rests on a reliable foundation.”

The full impact of *Daubert* may not be clear for many years, as courts apply its four-factor test to a broad range of expert evidence.

Blackmun criticized *Frye* as being “at odds with the ‘liberal thrust’ of the Federal Rules and their ‘general approach’ of relaxing the traditional barriers to ‘opinion testimony.’” However, he also wrote that an expert’s testimony must be “scientifically valid,” which requires an independent judgment of validity by the court.

The potential impact of *Daubert* is vast, and courts will have to reconsider the admissibility of many types of scientific evidence.

The *Daubert* decision will eventually affect court rulings pertaining to such areas as polygraph testing, voiceprint analysis, questioned-documents examination, and so-called expert psychological testimony on such subjects as rape trauma syndrome and posttraumatic stress disorder.

Endnotes

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4. Oppenheimer, *Liability for Malpraxis in Ancient Law*, 7 Trans. Medical-Legal Soc. 98, 103–104 (1910).
5. *Supra* note 1, at 15.
6. *Supra* note 2, at 306.
7. *Id.* at 306–307.
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9. Wecht, *Legal Medicine: An Historical Review and Future Perspective*, 22 N.Y. Law School L. Rev. 4, 876 (1977).
10. *Supra* note 2, at 308.
11. *Supra* note 1, at 16.
12. *Supra* note 2, at 309.
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Additional Readings

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