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## Computers in the Courtroom: Using Computer Diagnosis as Expert Opinion, 5 *Computer L.J.* 217 (1984)

Keith H. Averill Jr.

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## NOTES

### COMPUTERS IN THE COURTROOM: USING COMPUTER DIAGNOSIS AS EXPERT OPINION

Significant breakthroughs are being made today in the field of computer medicine. The 1970's saw a dramatic increase in the use of computer systems in the medical field, and today such systems are used to perform a wide variety of health care related functions.<sup>1</sup> For years, computers have been used in the health care industry for information collection, storage, and retrieval in connection with administrative and bookkeeping activities.<sup>2</sup> Computers have regularly been used to analyze the results of routine laboratory tests<sup>3</sup> and to monitor vital functions of intensive care patients.<sup>4</sup> Computers are generally recognized as superior to humans in performing these functions, since they cannot become bored or inattentive, thus minimizing the likelihood of mistake, and since they can process and retrieve information faster.<sup>5</sup>

Recent advances have yielded the prospect of an entirely new use for computers in the health care field—computer-assisted medical diagnosis. At the University of Pittsburgh School of Medicine, researchers are testing a prototype diagnostic computer, appropri-

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1. Brannigan & Dayhoff, *Liability for Personal Injuries Caused by Defective Medical Computer Programs*, 7 AM. J.L. & MED. 123 (1981).

2. Friedrich, Moritz, Nash, and Stoler, *The Computer Moves In*, TIME, Jan. 3, 1983, at 14, 21; Schnabel, *Computer Use in Office and Ambulatory Practice and for Clinical Consultation Systems*, 1981 SYMP. ON COMPUTER APPLICATIONS IN MED. CARE 4; Brannigan & Dayhoff, *supra* note 1, at 126; McCarn & Moriarty, *Computers in Medicine: Few Computer Applications Have Become a Routine Part of the Delivery of Health Care Services to the Ill*, 45 HOSP. 37, 38 (1971).

3. Schnabel, *supra* note 2; Dayhoff, *Computer Applications in Laboratory Medicine*, 1981 SYMP. ON COMPUTER APPLICATIONS IN MED. CARE 497; Hermann, *Impact of Computers on Medical Malpractice*, 1969 A.B.A. SEC. INS. NEGL. & COMPENSATION L. 278, 286.

4. Schnabel, *supra* note 2; Brannigan & Dayhoff, *supra* note 1, at 127; Hermann, *supra* note 3, at 291.

5. Brannigan & Dayhoff, *supra* note 1, at 126-27; Freed, *Legal Aspects of Computer Use in Medicine*, 32 LAW & CONTEMP. PROBS. 674, 676 (1967).

ately named "INTERNIST-I."<sup>6</sup> To greatly oversimplify, patient information and symptoms are fed into the computer and the computer reaches a diagnosis based on information stored in its data banks.<sup>7</sup> As research in this area continues,<sup>8</sup> it seems likely that computer-based and computer-assisted diagnoses<sup>9</sup> will become an increasingly important tool for the physician in the diagnosis of disease.<sup>10</sup> In fact, "medicine is . . . now on the threshold of a new era in which computers play a key role in diagnosis . . ." <sup>11</sup> As computerized diagnostic systems become increasingly important to the practice of medicine, new problems of legal liability will arise in the field of medical malpractice.

This Note discusses the possible effect the development of computerized diagnostic systems could have on physician liability in medical malpractice cases.<sup>12</sup> Once diagnostic computers are ready

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6. Parachini, *How Computers Can Diagnose Diseases*, L.A. Times, Sept. 14, 1982, § V, at 1.

7. For a detailed discussion of the computer's diagnostic process, see Special Article, *INTERNIST-I, An Experimental Computer-Based Diagnostic Consultant for General Internal Medicine*, 307 NEW ENG. J. MED. 468 (1982).

8. In 1982, the federal government's National Institute of Health put \$3.3 million into computer-assisted diagnosis research. See Parachini, *supra* note 6, at 4, col. 1.

9. Many applications of computer-based diagnosis have already proven effective in clinical use, and many more are currently in the experimental stage. See, e.g., Myers, Pople & Miller, *CADUCEUS: A Computerized Diagnostic Consultation System in Internal Medicine*, 1982 SYMP. ON COMPUTER APPLICATIONS IN MED. CARE 44; Special Article, *A Computer-Derived Protocol to Aid in the Diagnosis of Emergency Room Patients with Acute Chest Pain*, 307 NEW ENG. J. MED. 588 (1982); Ludwig, *INFERNET—A Computer-Based System for Modeling Medical Knowledge and Clinical Inference*, 1981 SYMP. ON COMPUTER APPLICATIONS IN MED. CARE 243 (discusses the INFERNET system which provides a vehicle for making clinical inferences concerning the diagnosis of special patients); Lindberg, Gaston, Kingsland & Vanker, *AI/COAG, A Knowledge-Based System for Consultation About Human Hemostasis Disorders: Progress Report*, 1981 SYMP. ON COMPUTER APPLICATIONS IN MED. CARE 253 (computer system will be able to reason expertly about differential diagnosis and several specific diagnoses of hemostatic disorders); Blois, Tuttle & Sheretz, *RECONSIDER: A Program for Generating Differential Diagnoses*, 1981 SYMP. ON COMPUTER APPLICATIONS IN MED. CARE 263 (computer program furnishes differential diagnosis given list of patient attributes).

10. As one particularly prescient author noted 15 years ago: "It is only a question of time until the average medical practitioner will be relying upon computers in the practice of medicine." Hermann, *supra* note 3, at 293.

11. Parachini, *supra* note 6, at 4, col. 1.

12. This Note will not consider the possibility that the computer programmer, the software manufacturer, the hardware manufacturer, or the hospital where the computer is located could be held liable for negligence. These should, however, be recognized as possible sources of recovery where a patient suffers harm due to a misdiagnosis where a diagnostic computer was involved. See Freed, *supra* note 5, at 685-90.

for clinical use, courts might impose an affirmative duty on physicians to consult such computers. The Note then proposes a new evidentiary rule to be applied once such computers are developed. Where the physician has used a diagnostic computer but the patient suffers harm, the computer diagnosis should be admitted into evidence as expert opinion. Regardless of whether or not courts require physicians to consult diagnostic computers, allowing the computer's diagnosis into evidence as expert opinion provides an incentive for the physician to consult such a computer. At the same time, allowing the plaintiff to introduce contrary expert testimony or evidence attacking the credibility of the computer expert preserves the plaintiff's right to just compensation for harm suffered due to negligent misdiagnosis. Physician liability is extremely important in this context, since physicians will be the instrumental force behind any proliferation of computerized diagnostic systems.<sup>13</sup>

#### I. LIABILITY FOR NEGLIGENCE BASED ON FAILURE TO USE A COMPUTERIZED DIAGNOSTIC SYSTEM

A physician will not be held liable simply because he has made an incorrect diagnosis.<sup>14</sup> Since the liability theory traditionally applied in medical malpractice cases is based on professional negligence,<sup>15</sup> it must be shown that the diagnosis was made negligently before liability will attach for any resulting harm.<sup>16</sup> The precise standard of professional negligence used in medical malpractice cases, however, has varied, and the law is still changing in this area. Under the modern view, a physician is negligent if he or she failed to use that degree of care and skill commonly exercised by the average competent physician engaged in similar practice under the same or similar circumstances.<sup>17</sup> This test reflects the recent trend toward

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13. Petras & Scarpelli, *Computers, Medical Malpractice, and the Ghost of The T.J. Hooper*, 5 RUTGERS J. COMPUTER TECH. & L. 15, 47 (1975) (citing Freed, *supra* note 5, at 680). *But see* Norris & Szabo, *Removing Some Impediments to Development of America's Third-and Fourth-Generation Health Care Delivery Systems: Legal Aspects of Computer Medicine*, 7 AM. J.L. & MED. iii, vi (1981) (stressing primacy of economic considerations).

14. *See, e.g.*, Voegeli v. Lewis, 568 F.2d 89, 94 (8th Cir. 1977); Borne v. Brumfield, 363 So. 2d 79, 83 (La. Ct. App. 1978); W. PROSSER, LAW OF TORTS 226-27 (4th ed. 1971).

15. W. PROSSER, *supra* note 14, at 161; McCoid, *The Care Required of Medical Practitioners*, 12 VAND. L. REV. 549, 551 (1959).

16. *See, e.g.*, Brown v. United States, 419 F.2d 337, 341 (8th Cir. 1969).

17. Brown, 419 F.2d at 341; Blair v. Eblen, 461 S.W.2d 370, 372-73 (Ky. 1970); Shilkret v. Annapolis Emergency Hosp. Ass'n, 276 Md. 187, 200, 349 A.2d 245, 253 (1975); Douglas v. Bussabarger, 73 Wash. 2d 476, 488-91, 438 P.2d 829, 837-38 (1968); Pederson v. Dumouchel, 72 Wash. 2d 73, 79-80, 431 P.2d 973, 978 (1967); Shier v. Freedman, 58 Wis. 2d 269, 283-84, 206 N.W.2d 166, 174 (1973).

a national standard of care.<sup>18</sup> While a minority of states still apply the older "strict locality rule," under which a physician is considered negligent if he or she fails to use that degree of care and skill normally exercised by the average competent physician engaged in similar practice *in the same locality*,<sup>19</sup> a larger number of states now apply the "similar locality rule." Under the "similar locality rule," a physician is negligent if he or she fails to use that degree of care and skill normally exercised by the average competent physician engaged in similar practice in the same *or a similar locality*.<sup>20</sup> Since the current trend is toward a national standard, such a standard will be assumed for the purposes of this Note. Further, if the physician meets the required standard of care, but nevertheless reaches an incorrect diagnosis through an honest error of judgment, he or she will not be held negligent, and thus will incur no liability for the error of judgment.<sup>21</sup> The physician must fall below the required standard of care before he or she will be adjudged negligent.

There have been no reported cases holding a physician negligent for failure to use a diagnostic computer, since such computers are still in the testing stage and further research and development will be needed before they are ready for clinical use. Given the rapid rate of modern technological advance, however, it is not unreasonable to posit that a computerized diagnostic system will be ready for clinical application within the next few years. Dr. Jack Myers, who is developing the INTERNIST-I system at the University of

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18. 3 C. KRAMER, *MEDICAL MALPRACTICE* ¶ 29.03[4] (1980).

19. The landmark case of *Small v. Howard*, 128 Mass. 131 (1880) is generally cited as one of the earliest applications of the so-called "strict locality rule." The "locality rule" actually represents an unwarranted departure from traditional negligence rules in the field of medical malpractice. Under the locality rule, a majority of the physicians in any particular geographical community can actually legitimize a clearly negligent practice simply by following it. Further, the rule is not needed to protect the rural or small-town physician since the concept of the average reasonable practitioner takes into account the circumstances under which he is practicing, e.g., whether the physician has access to sophisticated, modern equipment (which the local practitioner might not.) See generally Note, *An Evaluation of Changes in the Medical Standard of Care*, 23 VAND. L. REV. 729, 729-41 (1970).

20. For a general discussion see Shilkret, 276 Md. at 192. See also Note, *supra* note 19, at 731-32.

21. For cases involving the so-called "error of judgment rule," see *Brown*, 419 F.2d at 341; *Hendry v. United States*, 418 F.2d 774, 784 (2d Cir. 1969); *Kubrick v. United States*, 435 F. Supp. 166, 188 (E.D. Pa. 1977) (error in treatment); *Riddlesperger v. United States*, 406 F. Supp. 617, 620 (N.D. Ala. 1976); *Cooper v. United States*, 313 F. Supp. 1207, 1209 (D. Neb. 1970); *Steeves v. United States*, 294 F. Supp. 446, 453 (D.S.C. 1968); *Stottlemire v. Cawood*, 213 F. Supp. 897, 898 (D.D.C. 1963) (error in prescribing drug); *Phelps v. Vanderbilt Univ.*, 520 S.W.2d 353 (Tenn. 1974); *Dettman v. Flanary*, 86 Wis. 2d 728, 273 N.W.2d 348 (1979).

Pittsburgh School of Medicine, hopes that the system will be in routine clinical use by 1987.<sup>22</sup> Assuming that INTERNIST-I is ready for clinical use in the near future, physicians will soon be faced with the possibility that the courts would find practitioners negligent for failing to consult such a diagnostic computer.

In medical malpractice cases it has long been widely accepted that the standard of due care that must be met by the physician is conclusively evidenced by custom.<sup>23</sup> "Where malpractice claims are concerned, custom *is* the measure of due care."<sup>24</sup> Thus if this rule were followed absolutely, as long as it was not the custom in the medical profession to use diagnostic computers, a physician would never be liable for failure to use a diagnostic computer. However, while custom is the standard of care generally applied in medical malpractice cases, courts might hold a physician liable for failure to consult a diagnostic computer under an analysis similar to that used in *The T.J. Hooper*<sup>25</sup> and *Helling v. Carey*.<sup>26</sup>

In *The T.J. Hooper* the Second Circuit rejected custom as the only means by which due care could be determined. There, the court found the owner of two tugboats negligent for failing to equip the tugs with radio sets, even though only one other tugboat company so equipped its tugs. Judge Learned Hand wrote,

Indeed in most cases reasonable prudence is in fact common prudence; but strictly it is never its measure; a whole calling may have unduly lagged in the adoption of new and available devices. It never may set its own tests, however persuasive be its usages. Courts must in the end say what is required; there are precautions so imperative that even their universal disregard will not excuse their omission.<sup>27</sup>

The *T.J. Hooper* court based its decision on an informal cost/benefit analysis. The cost of the radio sets was small, while the protection they afforded was great.<sup>28</sup> Applying this analysis, a court deciding

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22. Parachini, *supra* note 6, at 4, col. 1.

23. W. PROSSER, *supra* note 14, at 165 (citing L. REGAN, DOCTOR AND PATIENT AND THE LAW 30 (3d ed. 1956); Gray v. McDermott, 188 Ark. 1, 64 S.W.2d 94 (1933); Trindle v. Wheeler, 133 P.2d 425 (Cal. Dist. Ct. App.), *rev'd on other grounds*, 23 Cal.2d 330, 143 P.2d 932 (1943); Ferrell v. Ellis, 129 Iowa 614, 105 N.W. 993 (1906); Mason v. Geddes, 258 Mass. 40, 154 N.E. 519 (1926)). Custom, however, is not dispositive of the issue of the standard of due care where the issue is informed consent. *See, e.g., Canterbury v. Spence*, 464 F.2d 772 (D.C. Cir. 1972).

24. Petras & Scarpelli, *supra* note 13, at 29 (citing Morris, *Custom and Negligence*, 42 COLUM. L. REV. 1147, 1163 (1942)).

25. 60 F.2d 737 (2d Cir. 1932). For an in-depth discussion of how a court might apply such an analysis, see Petras & Scarpelli, *supra* note 13.

26. 83 Wash. 2d 514, 519 P.2d 981 (1974).

27. 60 F.2d at 740.

28. *Id.* at 739. The so-called "Hand formula" defines negligence as a calculus of

whether a physician's failure to consult a diagnostic computer constituted negligence would take the following factors into account: (1) the availability of the diagnostic computer; (2) the degree of additional protection against misdiagnosis that the computer would afford; and (3) its cost.<sup>29</sup> Thus, if a court were to determine that such a computerized diagnostic system was available, that such a system would indeed have minimized the risk of misdiagnosis, and that its cost was not large compared to the additional degree of protection it afforded, the court would find the physician's failure to use the computer to constitute negligent omission.

While custom is generally the standard of due care applied in medical malpractice cases, the Washington Supreme Court in *Helling v. Carey*<sup>30</sup> applied the *T.J. Hooper* analysis in a medical malpractice case. The court found two ophthalmologists negligent for failure to conduct a pressure test on a patient under forty years of age, despite the fact that it was the custom of virtually all ophthalmologists in the United States not to test for glaucoma in patients under forty.<sup>31</sup> The court quoted language from *The T.J. Hooper* in support of its decision to reject custom as dispositive of the issue of the standard of due care required. Thus, following the *T.J. Hooper* analysis as applied in *Helling*, even though it was not the custom in the medical field for physicians to use computers to assist in diagnosis, courts might find such an omission to be negligent, and thus impose liability for the failure if the patient suffered harm due to misdiagnosis.

Due to the initial high cost of diagnostic computers, the first systems will almost certainly be located in large urban hospitals or university medical centers.<sup>32</sup> Consequently, one would expect physicians associated with urban hospitals and university medical centers to be the first to feel any effect which the introduction of these systems might have on malpractice liability. With the trend toward abrogation of the "locality rule," however, physicians will

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risk, reducible to the equation  $B < P \times L$ , where B=burden, P=probability, and L=injury (magnitude of loss). Thus, if the cost of the preventive measure (burden) were less than the magnitude of the injury, discounted by its probability of occurrence, then the failure to utilize the preventive measure would constitute negligence. See also *Moisan v. Loftus*, 178 F.2d 148 (2d Cir. 1949).

29. See Petras & Scarpelli, *supra* note 13, at 22 & nn.33-34.

30. 83 Wash. 2d 514, 519 P.2d 981 (1974).

31. Expert testimony established that it was the universal practice not to routinely test for glaucoma in patients under forty. For an article disputing the empirical validity of this testimony, see Wiley, *The Impact of Judicial Decisions on Professional Conduct: An Empirical Study*, 55 S. CAL. L. REV. 345, 383 (1982).

32. See Freed, *supra* note 5, at 680.

likely be judged by a national standard of care.<sup>33</sup> The fact that it is not the custom in the particular locality where a physician practices to use diagnostic computers may be irrelevant once such computers are available in large urban areas. Thus, the rural or small-town physician will probably not be shielded from liability by the antiquated "locality rule."<sup>34</sup>

It might, however, be argued that rural or small-town physicians are still shielded from liability by the "same or similar circumstances" prong of the standard of care test, since areas in which they practice will not have hospitals equipped with diagnostic computers as soon as large urban areas will. But with modern communication technology, rural and small-town physicians are no longer cut off from large urban areas and thus from the most recent advances in medical science.<sup>35</sup> Hence, since a rural or small-town physician could use a telecommunications hook-up to consult a diagnostic computer located in a large hospital,<sup>36</sup> he or she might be found negligent for failing to use a diagnostic computer. Of course, using the first factor of the *T.J. Hooper* test discussed above,<sup>37</sup> if the computer is not readily available to the rural or small-town physician, due, for example, to time-sharing or staff privilege problems, he or she would probably not be held negligent. Nonetheless, the possibility that such a physician would be held liable under this scenario still exists.

## II. LIABILITY OF A PHYSICIAN WHO HAS USED A COMPUTERIZED DIAGNOSTIC SYSTEM

Thus far this Note has explored the possibility of liability based on negligent omission. Such liability might arise where a physician fails to use a diagnostic computer and subsequently makes an incorrect diagnosis that results in harm to the patient. A court might use a *T.J. Hooper* analysis to impose a duty to consult a diagnostic computer, and might extend that duty to rural and small-town physicians following the demise of the locality rule. If a physician does use a diagnostic computer, but the diagnosis is still incorrect and

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33. See *supra* notes 17-18 and accompanying text. For an article supporting the retention of the locality rule see Karlson & Erwin *Medical Malpractice: Informed Consent to the Locality Rule*, 12 IND. L. REV. 653 (1979). The author argues that by shielding physicians from malpractice liability, the rule provides some incentive for physicians to practice in rural areas which have a shortage of physicians.

34. See *supra* note 19.

35. In fact, this very argument is used in support of abolishing the locality rule. See Shilkret, 276 Md. 187 at 194 (quoting Note, *supra* note 19, at 732).

36. Freed, *supra* note 5, at 682.

37. See *supra* notes 25-29 and accompanying text.



the patient suffers harm as a result, a second issue arises—whether the physician should be found negligent. Once again, it is important to note that a physician does not necessarily incur liability merely because he or she has reached an incorrect diagnosis. To hold the physician liable, the plaintiff must prove the physician made the diagnosis negligently.<sup>38</sup>

In medical malpractice cases, the plaintiff bears two distinct evidentiary burdens. First, evidence must be presented to establish the standard of care against which the physician is to be judged. Second, it must be shown that the physician negligently departed from that standard.<sup>39</sup> As a general rule,<sup>40</sup> both the applicable standard of care and the physician's deviation from it must be established by expert testimony.<sup>41</sup> Expert testimony is required because the standard of care is generally held to be conclusively evidenced by prevailing medical custom, and only an "expert," that is, another physician, would know what the prevailing medical custom was at any given point in time. The plaintiff is also required to present expert testimony because a lay jury, lacking the requisite scientific and medical expertise, would not be able to adequately comprehend the significance of the physician's actions and omissions without such testimony.<sup>42</sup>

The legal system, through the imposition of malpractice liability, should not discourage the physician from utilizing new medical technology for the benefit of the patient. Thus, a physician's legal accountability with regard to an incorrect computer-assisted diagnosis should not be structured in a way that would discourage the physician from consulting a diagnostic computer. On the contrary, the legal system should encourage physicians to provide the best possible medical care<sup>43</sup> to their patients, including the use of new and potentially very beneficial computer technology. If, however, the

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38. See *supra* notes 14-16 and accompanying text.

39. *Davis v. Virginian Ry. Co.*, 361 U.S. 354, 357 (1960).

40. One notable exception to this rule is the "common knowledge doctrine." See, e.g., *Hardy v. South Pacific Employees Ass'n*, 10 Ariz. App. 464, 459 P.2d 743 (1969); *Compte v. O'Neil*, 125 Ill. App. 2d 450, 454, 261 N.E.2d 21, 22 (1970).

41. *Jones v. Wike*, 654 F.2d 1129, 1130 (5th Cir. 1981); *Voegeli v. Lewis*, 568 F.2d 89, 93 (8th Cir. 1977); *Speer v. United States*, 512 F. Supp. 670, 675 (N.D. Tex. 1981); *Foskey v. United States*, 490 F. Supp. 1047, 1057 (D.R.I. 1980); *Rogers v. Okin*, 478 F. Supp. 1342, 1385 (D. Mass. 1979).

42. *Baoust v. Kraut*, 377 A.2d 4 (Del. 1977); *Sims v. Helms*, 345 So. 2d 721, 723 (Fla. 1977).

43. To provide the "best possible medical care" for each and every patient would simply cost too much—people would not and could not pay that cost. Thus the term "best possible medical care" means the best medical care it is practical to provide, taking into account its cost.

patient does suffer harm due to a physician's negligence, the patient should, of course, be compensated.

#### A. EXPERT OPINION BY DIAGNOSTIC COMPUTERS

To provide the physician incentive to consult a diagnostic computer as part of the normal diagnostic procedure, and thereby to provide better and more complete health care to the patient,<sup>44</sup> computer diagnosis should be admissible at trial as expert opinion.<sup>45</sup> Before discussing the ways in which this proposal would affect evidentiary considerations in a typical medical malpractice trial, two potential problems will be considered: the problem of qualifying the computer as an "expert," and the hearsay problem.

##### 1. *Qualification as an Expert*

Qualifying the computer as an "expert" is not as far-fetched as it may seem. Generally, a witness may be qualified as an expert if he or she possesses special knowledge of the subject of his or her testimony, and if such testimony can aid the jury in deciding issues where its own knowledge is inadequate.<sup>46</sup>

Under the Federal Rules of Evidence, the only thing a court should be concerned with in determining the qualifications of an expert is whether the expert's knowledge of the subject matter is such that his opinion will likely assist the trier of fact in arriving at the truth.

The weight of the expert's testimony must be for the trier of fact.<sup>47</sup>

Even though a computer is not a physician, a computer's diagnosis,

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44. This of course presumes that computer-assisted diagnosis is more accurate than non-computer-assisted diagnosis. In a comparative test of diagnostic skills against two groups of physicians, INTERNIST-I reached 17 out of a possible 43 correct diagnoses, while one group of physicians reached 23 and the other reached 29. See Parachini, *supra* note 6, at 4. This early test matched the computer alone against physicians alone. Given the respectable accuracy rate of the computer alone as compared to the physicians, it does not seem too speculative to posit that physicians who were to consult the diagnostic computer would show a higher accuracy rate than physicians who reached a diagnosis without consulting the system at all. This proposition is strengthened by the fact that several diagnostic systems other than INTERNIST-I have in fact shown a higher accuracy rate than test groups of physicians. See, e.g., Special Article, *supra* note 9, at 594 (computer model alone showed 73% accuracy, physicians alone showed 71% accuracy, computer model integrated with physicians showed 79% accuracy); Schaffer, *Computers Play an Increasing Role in Diagnosing and Recommending Treatment of Medical Problems*, Wall St. J., July 9, 1973, at 24, col. 1 (computer accuracy rate of 91.8% compared to physician accuracy rate of 79.6%).

45. Such a rule has briefly been considered. See Freed, *supra* note 5, at 682; Freed, *A Lawyer's Guide through the Computer Maze*, PRAC. LAW., Nov., 1960, at 15, 29.

46. 3 C. KRAMER, *supra* note 18, at ¶ 29.02.

47. *Mannino v. International Mfg. Co.*, 650 F.2d 846, 851 (6th Cir. 1981).

or "opinion," would assist the jury to decide whether a defendant physician had arrived at a correct diagnosis. The weight to be given the computer's diagnostic opinion would be determined by the jury, depending on how "knowledgeable" the jury felt the computer was concerning diagnosis.

Furthermore, there is no single method by which an expert's knowledge of the subject must have been acquired:

It is sufficient if the court is satisfied that the expert has in some way gained such experience in the matter as would entitle his evidence to credit . . . . Anyone, for example, who is shown to have special knowledge and skill in diagnosing and treating ailments may be qualified to testify as an expert even though not a physician, if his learning and training show that he is qualified to give an opinion on the particular question at issue.<sup>48</sup>

Although the computer is not a physician, it could be said to have special "knowledge" and "skill" in diagnosing ailments. Its special knowledge is not, of course, due to its learning and training, but rather to its "programming." In seeking to qualify the computer as an expert, the computer's "programming" could be offered as proof of its competency in much the same way a physician's learning and training is offered as proof of competency as an expert. The programmer might be called to the stand to testify concerning the programming of the computer, as might the physician who originally supplied the information for the computer program. The hardware manufacturer might even be called to testify as to the mechanical functioning of the computer. If, due to the nature of a computer's "programming," it can be shown that the computer possesses skill in diagnosis, the jury would be aided by the computer's diagnostic "opinion" in deciding whether a physician had in fact arrived at a correct diagnosis. The computer would at least possess more "skill" and "knowledge" regarding diagnosis than the jury would. Thus, the computer should be qualified as an "expert," and the jury should then decide how much weight ought to be given to the computer's diagnosis.

## 2. *Hearsay Problem*

Assuming qualification of the computer as an expert, the hearsay problem remains. Computer diagnosis is clearly hearsay, since it is a "statement" made out of court which would be introduced for the truth of the matter asserted.<sup>49</sup> Thus, it denies opposing counsel the opportunity to cross-examine the declarant. Hearsay evidence is

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48. 3 C. KRAMER, *supra* note 18, at ¶ 29.02.

49. FED. R. EVID. 801(c); CAL. EVID. CODE § 1200(a) (West 1966).

generally inadmissible in court.<sup>50</sup> Therefore it might be argued that the computer diagnosis (in the form of a computer printout) would not even be admissible as evidence, much less as expert opinion, due to the operation of the hearsay rule.

However, due to the ever increasing importance of computers in business and the professions, and the concomitant importance of computer evidence in litigation, the law is in a state of flux regarding the admissibility of computer-generated evidence. "[T]he law is being required to adapt its thinking to a different kind of business practice and a different kind of evidence to find a workable exception to the general hearsay rules under the common law."<sup>51</sup> Computer-generated evidence in the form of a computer printout might be found admissible in one of three ways. First, the common law exceptions to the hearsay rule could simply be extended to include computer-generated evidence. Second, computer evidence might be held to fall under the provisions of the statutory exceptions concerning business records. Third, computer evidence might be viewed as such a new and different kind of evidence that an entirely new statutory solution would be necessary.<sup>52</sup>

Of these three potential ways of admitting computer-generated evidence, including such evidence under the "business records exception" to the hearsay rule seems particularly viable. This exception is referred to in the Federal Rules of Evidence as "Records of regularly conducted activity." The exception is defined as follows:

A memorandum, report, record, or data compilation, in any form, of acts, events, conditions, opinions, or diagnoses, made at or near the time by, or from information transmitted by, a person with knowledge, if kept in the course of a regularly conducted business activity, and if it was the regular practice of that business activity to make the memorandum, report, record, or data compilation, all as shown by the testimony of the custodian or other qualified witness, unless the source of information or the method or circumstances of preparation indicate lack of trustworthiness. The term "business" as used in this paragraph includes business, institution, association, profession, occupation, and calling of every kind, whether or not conducted for profit.<sup>53</sup>

Part of a physician's "business" is to make diagnoses. Should the physician regularly use a diagnostic computer as part of the diagnostic procedure, the computer printout containing the diagnosis would be made "in the course of a regularly conducted business ac-

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50. FED. R. EVID. 802; CAL. EVID. CODE § 1200(b) (West 1966).

51. E. HAYT, MEDICO-LEGAL ASPECTS OF HOSPITAL RECORDS 194 (2d ed. 1977).

52. *Id.*

53. FED. R. EVID. 803(6).

tivity."<sup>54</sup> Assuming the proper foundational requirements were otherwise met,<sup>55</sup> the printout could then be admitted under the "business records exception" to the hearsay rule.

The law that has developed regarding the admissibility of hospital records containing a physician's diagnostic opinion supports the admissibility of computer diagnoses under the business records exception. "Rule 803(6) [the business records exception of the Federal Rules of Evidence] in accord with the trend of state decisions and the conclusion of leading legal authorities rejects any attempt to exclude a particular class of hospital records. Diagnoses and opinions . . . are included as proper subjects of admissible entries."<sup>56</sup> Since a physician's diagnosis contained in a hospital report would be admissible under the business records exception, a strong argument can be made for admissibility of the computer's diagnosis under the same exception, assuming that the computer could be qualified as an expert and assuming that the proper foundational requirements were met with respect to the computer printout.

#### B. INCORRECT DIAGNOSES USING DIAGNOSTIC COMPUTERS

Assuming computer diagnosis is admissible, either under the business records exception or under some new statutory scheme, two potential situations require consideration. The first is where the physician uses a diagnostic computer and reaches an incorrect diagnosis before the courts have decided that failure to consult such a computer constitutes negligent omission, or before consulting a computerized diagnostic system has become the prevailing custom in the medical community. The second situation is where a physician uses a diagnostic computer and reaches an incorrect diagnosis either after the courts have imposed an affirmative duty on the physician to consult a diagnostic computer, or after consulting a diag-

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54. *Id.*

55. It should be noted that there may be a more comprehensive foundation requirement for computer printouts than for more "traditional" business records. The party seeking to introduce the printout into evidence may have a stricter burden with regard to providing the accuracy of information sources and computer procedures. See *United States v. Schulle*, 553 F.2d 1109 (8th Cir. 1977) (computer printout admissible in drug distribution case); *United States v. Russo*, 480 F.2d 1228, 1239-41 (6th Cir. 1973) (computer printout admissible in mail fraud case).

56. 4 J. WEINSTEIN & M. BERGER, *WEINSTEIN'S EVIDENCE* 803-197 to -203 (1979). For federal cases that hold diagnostic entries in hospital records to be admissible, see *Thomas v. Hogan*, 308 F.2d 355 (4th Cir. 1962); *Glawe v. Rulon*, 284 F.2d 495 (8th Cir. 1960); *Medina v. Erickson*, 226 F.2d 475 (9th Cir. 1955); *Buckminster's Estate v. Commissioner*, 147 F.2d 331 (2d Cir. 1944). For comparable state cases, see *Allen v. St. Louis Pub. Serv. Co.*, 365 Mo. 677, 285 S.W.2d 663 (1956); *People v. Kohlmeier*, 284 N.Y. 366, 31 N.E.2d 490 (1940); *Weis v. Weis*, 147 Ohio St. 416, 72 N.E.2d 245 (1947).

nostic computer has become the prevailing custom in the medical community.

1. *No Duty to Consult a Diagnostic Computer*

In the first situation above, admitting the computer diagnosis as expert opinion would allow the physician to use it in one of two ways. First, if the physician contends the diagnosis was correct, and the computer diagnosis supports this contention, the physician could introduce the computer diagnosis as expert opinion supporting the accuracy of the diagnosis. The plaintiff, of course, could introduce contrary expert testimony (that of another physician) in an effort to show that the diagnosis was incorrect. The plaintiff could also attack the credibility of the defendant physician's "expert computer." For example, the plaintiff could introduce evidence that such computers are not reliable or that their accuracy is still being tested. It would then be left to the jury to weigh the testimony of each expert. Since the physician could use the computer diagnosis to support his or her own diagnosis, admitting computer diagnosis as expert opinion would provide incentive for the physician to consult a diagnostic computer. At the same time, the plaintiff's right to just compensation for harm suffered due to negligent misdiagnosis is protected by allowing the plaintiff to introduce contrary expert testimony attacking the diagnosis as well as the credibility and reliability of the computer.

Second, even if the physician admits that the diagnosis was incorrect, the computer diagnosis could be used to support a contention that the incorrect diagnosis was not reached negligently. The plaintiff would still be able to attack the credibility and reliability of the "expert computer" and thus protect his or her right to compensation for negligent misdiagnosis. The plaintiff could also introduce expert testimony that the defendant physician did not meet the standard of care required in the diagnostic procedure, regardless of whether or not a computer had been used. Since in this situation it has been assumed that the courts have not yet decided that failure to consult a diagnostic computer constitutes negligent omission, and that it is not yet the prevailing practice in the medical profession to consult one, the plaintiff may well be able to cast doubt on whether consulting a diagnostic computer is evidence of due care.

The possibility that a jury would give less weight to a computer diagnosis than to testimony of a plaintiff's expert witness might prevent excessive reliance by physicians on diagnostic computers. Nevertheless, "[a]s the wizardry of computers continues to be discussed publicly, the confidence of laymen in them will in-

crease . . . ."<sup>57</sup> As lay juries have increasing confidence in computers in general, they may be more amenable to giving the weight to computer opinions that their reliability warrants. Consequently, physicians will have increasing incentive to consult computers if computer diagnosis is admissible as expert opinion.

Thus, by allowing computer diagnoses to be admissible as expert opinion, physicians will have an incentive to consult diagnostic computers since in the event of a malpractice action computer diagnoses could be used in court. Plaintiffs will not be prevented from proving a *prima facie* case if the diagnosis was indeed negligent, since an expert physician's opinion could be introduced to attack the credibility of the "expert computer." Finally, overreliance by physicians on diagnostic computers is discouraged since the reliability of such computers would remain subject to attack by the plaintiff in a malpractice suit.

## 2. *Affirmative Duty to Consult a Diagnostic Computer*

In the second situation considered—where the courts have imposed an affirmative duty on the physician to consult a diagnostic computer, or where the prevailing medical custom is to consult such a computer—the introduction of computer diagnosis as expert opinion can be used by the physician in three ways.

First, if the physician could show he or she had consulted a diagnostic computer as part of the diagnostic procedure, he or she could not be held liable for negligent omission. The very fact that the physician had consulted a diagnostic computer, which would be established if the diagnosis were admissible as expert opinion, would show the physician had at least satisfied that component of the standard of due care required in diagnosis, whether the standard was judicially determined or merely reflected the prevailing medical custom.

Second, if the physician felt the diagnosis was correct, the computer diagnosis could be used as expert opinion to support the accuracy of the physician's diagnosis. In this situation the jury might well give the computer diagnosis significant weight, since prevailing medical custom or a judicially established standard of care would have established the reliability of the diagnostic computer.

Third, if the physician admits the diagnosis was incorrect, the computer diagnosis could be used as evidence that the incorrect diagnosis had not been reached negligently. The mere fact that the physician's diagnosis and the computer diagnosis agreed would not

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57. Freed, *A Lawyer's Guide Through the Computer Maze*, 6 PRAC. LAW., Nov. 1960, at 15, 34.

be dispositive of the issue of negligence. The jury would still be required to determine whether the physician had met the applicable standard of care in diagnosis. Consulting the diagnostic computer would only be one component of that standard of care. In this situation, however, the computer diagnosis is stronger evidence that due care had in fact been exercised than in the first situation where the courts had not imposed an affirmative duty to consult a computer, nor was it the prevailing medical custom to consult a computer.

Where case law has established the use of diagnostic computers as some evidence of due care, or where the use of such computers has become the prevailing medical custom, juries ought to give significant weight to computer diagnoses as evidence of due care, since judicial authority or medical custom would have established the reliability of computers. If the judiciary or the medical profession requires the physician to consult a diagnostic computer as a regular part of the diagnostic procedure, fairness would seem to require that the physician be able to use the computer diagnosis as evidence that due care had been exercised.

#### CONCLUSION

Medical diagnostic computers may be ready for clinical use within a few years. Once they are enjoying success in clinical application, courts might use a *T.J. Hooper* analysis to impose an affirmative duty on physicians to consult such computers. By allowing computer diagnoses to be admissible as expert opinion, physicians will be provided with an incentive to consult such computers. At the same time, plaintiffs will be able to protect themselves from this damaging evidence by introducing contrary expert testimony attacking the correctness of the diagnosis or the credibility of the "computer expert." Since a jury can give the computer diagnosis more or less weight as evidence, depending on the reliability and accuracy of such computers at any given point in time, over reliance by physicians on computer diagnoses will be discouraged.

*Keith H. Averill, Jr.*



