Medical Malpractice: Do Physicians Have Knowledge of Legal Standards and Assess Cases as Juries Do?

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Traditionally, physician malpractice has been adjudicated under a negligence rule in tort. The negligence rule can be described as imposing liability for patient injury upon a physician if the physician’s level of care was less than that specified by the courts ("due care"). The due care level generally

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1. "[T]he plaintiff's cause of action in the standard negligence action [must satisfy four factors]: duty, breach, causation, and damages.
   First, the defendant owed the plaintiff a duty or obligation to conform his conduct to a standard necessary to prevent the unreasonable risk of harm to others.
   Second, the defendant did not meet the appropriate standard of care.
   Third, the defendant's failure to meet the appropriate standard of care was causally connected to the plaintiff's harm.

2. Judge Learned Hand articulated a definition of negligence which was consistent with a law and economics formulation of due care. Hand qualitatively described a simple cost/benefit analysis for the determination of whether an injurer should take a certain level of care: if the injurer can spend some amount (B) that is less than the expected harm to the victim (as calculated through multiplying the probability of harm (P) times the loss
required in medical malpractice cases is that level of care “ordinarily possessed and employed by members of the profession in good standing.” From a law and economics perspective, if the due care level chosen by the courts is socially optimal, then theoretically physicians will be induced to provide socially optimal due care, resulting in a system in which the provision of medical care is socially optimal.

Hence, from a law and economics perspective, the judicial system can theoretically create an encompassing incentive structure that results in physicians providing nonnegligent care so as to avoid malpractice liability at a level that is socially optimal. Indeed, this incentive effect is a well recognized potential benefit of the tort system and is used as a theoretical justification for the current malpractice adjudicatory structure. In addition to providing an overall incentive structure for physician behavior, the system can function dynamically and specify its particular standards through its “teaching” role as communicated through the case law. The case law can thus provide physicians with rules of conduct as to what care is socially acceptable (nonnegligent) and socially unacceptable (negligent).

suffered (L) when injury does occur), then the injurer should take care (in other words, when \( B < P^*L \)). See United States v Carroll Towing Co., 159 F2d 169, 173 (2d Cir 1947).


4. As long as the expected costs of the malpractice judgment exceed the benefit that the physician receives for rendering negligent care—a reasonable presumption.

5. “The ‘prophylactic’ factor of preventing future harm has been quite important in the field of torts. . . . When the decisions of the courts become known, and [potential] defendants realize that they may be held liable, there is of course a strong incentive to prevent the occurrence of the harm. Not infrequently one reason for imposing liability is the deliberate purpose of providing that incentive.” Prosser and Keeton § 4 at 25 (cited in note 1) (emphasis added).

6. Consistent with these theoretical foundations, some researchers engaged in empirical study of medical malpractice have concluded that the negligence system for medical malpractice has fulfilled its theoretical goals and sends providers a clear signal that they should avoid providing substandard care. See Michelle J. White, The Value of Liability in Medical Malpractice, 13 Health Affairs 75 (1994). See also Ann G. Lawthers, et al, Physicians’ Perceptions of the Risk of Being Sued, 17 J Health Pol, Policy & L 463, 479 (1992) (finding that as a response to potential tort liability, physicians take actions to reduce patient injuries). Other studies have also reported the positive relationship between negligent care and jury-awarded compensation. See, for example, Mark I. Taragin, et al, The Influence of Standard of Care and Severity of Injury on the Resolution of Medical Malpractice Claims, 117 Ann Int Med 780 (1992); and Frederick W. Cheney, et al, Standard of Care and Anesthesia Liability, 261 JAMA 1599 (1989). However, the determination of negligence in these studies was based on physician assessments through chart reviews and insurance company records analysis. These methods may be weak for three reasons. First, the determination of negligence after the fact may be biased due to knowledge of the end result. See, for example, Kim A. Kamin and Jeffery J. Rachlinski, Ex Post ≠ Ex Ante: Determining Liability in Hindsight, 19 L & Human Beh 89 (Feb 1995). Second, because there appear to be different standards as to what care is deemed negligent and nonnegligent as found in this study (in other words, interphysician disagreement), using a single negligence standard of the reviewing physicians reflects only their
To determine whether the theoretical benefits of the medical malpractice tort system incentive structure actually accrue to society, a reasonable starting point is to empirically examine whether fundamental assumptions regarding the system are true. First, physicians are assumed to be knowledgeable about the legal system such that they respond appropriately to the incentive structure provided by it: presumably, actors must know about incentives in order to be affected by them. Second, negligence assessments of physician action by juries

own perspectives of negligent care. See Appendix B, Table B. And third, hospital and insurance company records may be incomplete.

7. Other law and economics researchers who study the negligence system also try to adjust their analyses to take into account the actual social system's departures from basic economic models. See, for example, John E. Calfee and Richard Craswell, Some Effects of Uncertainty on Compliance with Legal Standards, 70 Va L Rev 965 (1984) (analyzing the effect of uncertainty about legal standards on economic incentives); and Howard A. Latin, Problem-Solving Behavior and Theories of Tort Liability, 73 Cal L Rev 677 (1985) (formulating a legal analysis of tort law that corresponds to the actual knowledge and behavior of actors in the system).

8. In the past, empirical studies have asserted that the common law standard of negligence is well known to physicians and other providers. Many of these studies have centered on two well known cases, Tarasoff v Regents of the U. of Cal., 17 Cal3d 425, 551 P2d 334 (1976) (holding that a mental health therapist had a duty to exercise reasonable care to protect those third parties whose physical well-being was threatened by a patient) and Helling v Carey, 83 Wash2d 514, 519 P2d 981 (1974) (holding that a court could change a medical standard of practice even though the customary standard was established and indisputably followed). See, for example, Daniel J. Givelber, et al, Tarasoff, Myth and Reality: An Empirical Study of Private Law in Action, 1984 Wis L Rev 443, 458-59; and Jerry Wiley, The Impact of Judicial Decisions on Professional Conduct: An Empirical Study, 55 S Cal L Rev 345 (1981).

With respect to Tarasoff, some researchers have concluded that “the court and its critics were justified in believing that the Tarasoff decision would be well known [to providers] and therefore might have a significant influence on therapeutic practice.” Givelber, et al, 1984 Wis L Rev at 458-59. Yet, a finding that a specific case, Tarasoff, is well known to providers does not support the conclusion that providers are therefore familiar with the common law in general. Since the case was such a significant, controversial and publicized decision affecting mental health providers, it is reasonable, and unsurprising, that therapists were acquainted with it. In fact, Givelber, et al themselves noted that the primary source of information regarding the Tarasoff case was professional sources, not the common law. Id at 460 (“If we combine professional sources, i.e., professional organizations and literature, colleagues and administrators, we see that more than eight out of ten psychiatrists and psychologists and more than seven out of ten social workers learned most about Tarasoff from professional sources.”). Thus, the Tarasoff study does not provide any general guidance as to the relative effectiveness of general common law “teaching.”

A similar critique applies to any studies that attempt to generalize the impact of Helling, 519 P2d 918, to general physician knowledge of the common law. For instance, based on physician surveys, one researcher found that the “[Helling decision] had some impact upon the behavior of [physicians] in the State of Washington.” See Wiley, 55 S Cal L Rev at 383. However, the proposed generalizability of these findings is limited. First, like Tarasoff, 551 P2d 334, Helling, 519 P2d 918, was uniquely well known in the medical community because it changed the traditional negligence standard in medical malpractice. This is evidenced by the medical press attention that followed the decision.
and physicians are assumed to be based on a single standard of medical appropriateness that is commonly understood by both groups. This implies that, on a theoretical level, physicians should have knowledge of negligent and nonnegligent care through their own professional training and thus should similarly assess negligent versus nonnegligent care as defined by juries.

This study represents the first empirical assessment of the validity of these key assumptions. It attempts to answer two questions. First, do physicians have knowledge of the medical malpractice system through an understanding of the legal concept of negligence (the standard by which their actions are judged) and the relevant case law (the formal communication method between the medical malpractice system and society at large, including physicians)? Second, to what extent are physician assessments of actual malpractice cases in relative concordance with jury verdicts, therefore reflecting an application of the same standard of medical appropriateness?

The answers to these questions may be relevant in determining how the tort system functions and, if necessary, methods to improve it. In other words, assessing physician knowledge of the law may help determine how the tort system can impact and alter the behavior of the actors that are purportedly deterred or encouraged by it. Further, physician assessment of actual malpractice cases may shed light onto whether a legal definition of medical appropriateness can be viewed and applied similarly by physicians and lay agents of the legal system itself. In short, once empirical data is obtained, models can then be constructed to describe the effect of the tort system on physician behavior.

See, for example, David S. Rubsamen, A Precedent with Big Implications, Med World News 33 (May 24, 1974); and William J. Curran, Glaucoma and Streptococcal Pharyngitis: Diagnostic Practices and Malpractice Liability, 291 New Eng J Med 508 (1974). Second, as Wiley himself noted, “[t]he data generated by [this] study, however, indicate that the impact of court decisions may be seriously overestimated.” Wiley, 55 S Cal L Rev at 386.

Moreover, these empirical studies suffer not only from methodological problems (including the use of closed-ended multiple choice survey questions that identified the relevant cases as possible reasons for changing practice patterns, thus signaling the participating providers), but they also did not address the general effects of (less celebrated) tort law decisions on physician practice. Overall, the deterrence effect of the malpractice tort system on physician behavior is not well understood, as underscored by a recent Office of Technology Assessment report: “[t]he role of the malpractice system as a deterrent against too little or poor-quality care—one of its intended purposes—has not been carefully studied.” Office of Technology Assessment, Defensive Medicine and Medical Malpractice, OTA-H-602, at 2 (GPO, July 1994) (“OTA Report”).

9. As defined by the medical profession itself. See text accompanying note 3.

10. However, if physicians and juries are using different standards in determining liability, it is reasonable to suppose that the malpractice system will not exhibit an appropriate incentive effect.

11. To the author’s knowledge, this study represents the first attempt to assess the validity of these basic assumptions of the general medical malpractice system, instead of assessing the impacts of individual cases as discussed in note 8.
Section I describes the data collection methods and reports the results of the study. Section II discusses these results and their implications. Section III presents proposed models of physician behavior that take into account the data discussed in the preceding sections. Finally, Section IV summarizes the Article's findings and offers some concluding remarks.

I. Methods and Results

A. METHODS

Twenty radiologists at a single academic medical center were surveyed. A single academic center was chosen in order to maximize the homogeneity of sampled physicians with respect to their medical practice and because it was thought this would provide the greatest potential for detection of qualitative differences between physician and jury assessments of what constitutes negligent and nonnegligent treatment. The survey was administered personally by the author to all participating radiologists in order to maintain continuity and consistency. All participants were guaranteed anonymity. Each radiologist was asked demographic questions regarding the number of years since completion of residency or fellowship, academic title, and board certification. Further, each radiologist was asked questions regarding whether the facility had any formal program concerning medical malpractice and/or law and medicine, the number of times the physician had served as an expert witness or consulted on a malpractice case, the source of the physician's knowledge regarding medical malpractice, the legal definition of negligence, and any legal background that the physician might have (e.g., a degree in law, previous study of law, or a spouse/relative in law). An open-ended question format was used to guard against any signaling effect that a set of supplied potential answers might induce.

Next, each radiologist was given a set of eleven cases in which a radiologist was a defendant and that had been decided by jury. The radiologists were asked to assess on a Likert scale whether the care rendered by the defendant radiologist was “negligent” (Likert value 5), “most likely negligent” (Likert value 4), “can’t tell” (Likert value 3), “most likely not negligent” (Likert value 2), or “not negligent” (Likert value 1). The radiologists were explicitly told not to predict

12. See note 1. The physicians were not asked to literally list what factors are considered in a negligence action. For example, they did not need to use words such as “pre-existing duty,” “breach,” etc. Instead, the content of their responses was assessed to determine if they included components of each of the standard tort liability factors. Hence, a response of “not providing the right care” was interpreted as an identification of the breach of duty factor. Of course, while there are alternative definitions of negligence, and other factors about the legal system that are relevant to a medical malpractice action (e.g., personal jurisdiction and choice of law questions), this study did not focus on these less relevant issues and instead attempted to use standard negligence definitions.

13. Open-ended questions are those questions that have no choice of answer, as contrasted with the multiple choice questions used in the Givelber, et al and Wiley studies discussed in note 8.
what they thought the juries might have concluded as to the negligence or nonnegligence of the defendant. They were asked only to evaluate the radiologist's care in each case on the basis of their professional knowledge of medically appropriate care.\textsuperscript{14} Finally, twelve nonphysicians ("NPs") were also given the same eleven cases for their lay determination of whether the care rendered by the radiologists was negligent.\textsuperscript{15} The survey instrument and the actual jury verdicts are reproduced in Appendix A.

B. RESULTS

The demographic information and answers to the open-ended questions are reported in Appendix B, Table A. As expected of physicians at an academic center, all radiologists survey were board certified and had academic titles. Interestingly, there was no formal medical malpractice program in radiology at the academic center. Also somewhat surprising, most of the participating physicians had not been expert witnesses, even though it would seem that those on the cutting-edge of medical knowledge would be the most reasonable choice to be "experts" in medical malpractice cases. Upon additional questioning, this finding was explained by the fact that while most of the physicians had been requested to serve as expert witnesses at one time or another, most radiologists surveyed chose not to serve as expert witnesses because of their aversions to the legal system.

The survey results clearly suggest that most of the participating radiologists did not have a fundamental understanding of the legal definition of negligence. Of the four factors of legal negligence, only a mean of 1.45 (standard deviation 1.05) were correctly identified by this sample. No physician identified all four factors. This is somewhat surprising since within this sample, one physician (AR 1)\textsuperscript{16} had co-authored a chapter on law and radiology for a major medical

\textsuperscript{14} Cases were selected in consultation with a physician radiologist in order to ensure that the cases provided enough clinical information so that the physicians could evaluate the appropriate standard of care. Moreover, the Likert scale, as indicated above, included a "can't tell" option for all cases. Thus, if physicians felt that they did not have adequate information regarding a case, they did not have to evaluate it. None of the cases contained a question of a preexisting duty (there was an established physician–patient relationship) or damages (each case was related to some patient injury). Thus, the major considerations were limited to breach of duty and causation; hence, the physicians were only required to use their knowledge of medical appropriateness when they assessed the cases. Note that because the physicians were only required to evaluate the cases based on medical expertise, their assessments should match the assessments of the juries. See, for example, \textit{Amsler v Verrilli}, 119 AD2d 786, 501 NYS2d 411 (1986) (malpractice verdict finding liability can be sustained only if departure from the standard of care is the proximate cause of injuries as indicated through proof from plaintiffs medical expert testimony or affidavit).

\textsuperscript{15} The NPs were given cases to determine their tabula rasa perceptions regarding physician actions in order to compare their assessments with informed assessments of the actual juries and the evaluating physicians.

\textsuperscript{16} "AR" is defined as Academic Radiologist.
textbook, and one physician (AR 19) had previously practiced medicine in a state that requires ten hours per year of malpractice "risk management" continuing medical education credit to maintain his/her medical license; yet both still failed to correctly identify the four factors of legal negligence.  

17. Except for physician AR 19, most physicians obtained information on malpractice from the medical or lay press. Importantly, no physician reported reading the common law on malpractice cases, or even knowing what the common law was. Overall, the survey suggests that the participating physicians spent little or no time learning the mores of the legal system.  

Moreover, in addition to having incomplete information regarding the legal definition of negligence, it also appears that some surveyed radiologists had incorrect information. For example, the surveyed radiologists seemed unsure as to what type of act results in a jury finding of negligence. The following is a sampling of "requirements" of legally negligent care as cited by the surveyed physicians: a willful, deliberate act; an unintentional act; an act of commission rather than omission; treatment resulting in a long term, permanent injury; and treatment that does not comport with local standards, or does not follow the majority school of accepted medical practice even if there is an accepted minority school. Finally, many physicians also believed that treatment that had a poor outcome was enough for a finding of negligence.  

Appendix B, Table B summarizes the results of radiologist agreement with jury verdicts. There was a wide range of individual physician agreement with jury verdicts (range 0.17 - 0.70) in the cases that were assessed by the physicians as either negligent or nonnegligent. Moreover, there was also significant agreement results do not include the "can't tell" responses. Agreement with jury verdicts was defined as follows: if a jury verdict was rendered for the plaintiff patient, a physician response of "negligent" or "most likely negligent" was deemed
interphysician variation for each individual case assessment (range 0.05 - 0.79). This significant variation in what the physicians viewed as medically appropriate care in radiology potentially reflects a lack of a single standard of appropriate care as assumed by the medical malpractice tort system. Overall, for all cases that were evaluated as negligent or nonnegligent, the mean agreement of physician responses (Total MD Agreement Average, Table B) with the actual jury verdicts was only 44 percent. There was no correlation between the number of negligence factors identified and the relative concordance with jury verdicts at the 0.05 level of significance.

Appendix B, Table C summarizes NP responses to the cases presented to the radiologists. Similar to physicians, there was a wide range of individual NP agreement with jury verdicts (range 0.27 - 0.73) over all cases that were assigned negligence or nonnegligence values. There was also inter-NP variation (range 0.09 - 0.82). Yet the NPs agreed with the jury verdicts more often than the physicians (52 percent versus 44 percent). This difference was significant at a high statistical level.

In addition, when comparing average Likert values between physicians and NPs across cases, physicians and NPs gave statistically different average values in seven of the eleven cases. Of the five plaintiff verdict cases, four of the five were given statistically different values by physicians and NPs. Interestingly, in each of these plaintiff verdict cases, NPs gave statistically higher Likert values as compared with physicians. Further, in the three significantly different cases that were defendant verdicts, NPs again reported statistically higher Likert values than the physicians. Moreover, in three of the four defendant verdict cases that did not result in statistically different values between physicians and NPs, NPs still assigned higher average values than physicians. Since higher values represent progressively more negligence, it appears that NPs may be exhibiting a prima facie propensity to assign negligence to physician actions. Agreement and assigned a value of one; if a physician response for the case was “most likely not negligent” or “nonnegligent,” then the response was deemed not in agreement and assigned a value of zero. Similar considerations are applicable for jury verdicts for defendant physicians. Thus, the closer the number is to one, the greater the agreement between physician and jury.

22. This result was determined using a two-tailed T-test with a significance level set at \( p < 0.05 \). In fact, for the difference in means for physician and nonphysician jury agreement, \( p \) was less than 0.009.

23. Cases three, five, nine, and eleven were statistically different; case eight was not. The level of significance was tested using a two-tailed T-test at a significance level of 0.05.

24. Cases two, four, and seven were defendant verdict cases whose Likert values were found to be statistically different between physicians and nonphysicians. Cases two, six, and ten were not. Significance levels were determined as discussed in note 23.

25. Of course, an alternative explanation is that physicians categorically low-ball negligence values so that their resulting mean negligence values are lower; or that both “high-balling” by NPs and low-balling by physicians are occurring. It is difficult to parse out the two effects, but the possibility that physicians deem care relatively nonnegligent while NPs deem care relatively negligent may provide physicians with an additional impetus to assume that the tort system, perceived correctly or incorrectly, will result in greater negli-

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II. Discussion

A. DO PHYSICIANS KNOW AND UNDERSTAND THE MEDICAL MALPRACTICE SYSTEM THROUGH KNOWLEDGE OF THE DEFINITION OF NEGLIGENCE AND EXISTENCE OF THE CASE LAW?

At a fundamental level, in order to be affected by an economic incentive, an actor must know of that incentive. And in order for the incentive to have its theoretical optimal effect, that knowledge must be complete and correct. The results of this study indicate that the assumption that physicians have knowledge of the medical malpractice system, at least for this sample of physicians, is of questionable validity. Thus the medical malpractice system may not be providing the appropriate incentives for physicians to provide optimal medical care.

First, the legal definition of negligence was clearly not apparent to the physicians sampled in this study. That is, the actors (physicians) within the incentive structure (the medical malpractice system) did not know the standards that the legal system uses to adjudge their actions. Further, the high degree of incorrect perceptions regarding the legal definition of negligence points toward not only a potentially ineffective incentive structure but also a theoretically inappropriate one.

Second, the surveyed physicians did not appear to know about the malpractice system's specification role as to what care constitutes appropriate care. In other words, these physicians were ignorant of the common law and its assumed role in "teaching" physicians what constitutes socially acceptable and unacceptable care (i.e., what is medically appropriate). This is not surprising; since the level and volume of information from medical sources that physicians must continually assimilate in order to maintain clinical competence is significant, physicians would seem to have little time to actively obtain knowledge of what is medically appropriate according to the legal system. This is exacerbated by

gence determinations against them.

26. This is describing how the legal system and its knowledge can provide potential incentives for optimal physician behavior. It is, of course, possible that physicians may have totally incorrect and/or incomplete knowledge of the legal system but still respond optimally (for example, if physicians can accurately predict jury verdicts and their damage awards). However, the focus of this part of the study is to determine the existence and the effect of legal system knowledge on the potential for optimal behavior rather than other events or circumstances that could lead to such behavior.

27. It can also be argued that physicians have a vested interest in learning about the negligence system because it represents the single greatest risk of pecuniary loss in medical practice. A response to this may be that physicians do not seek to maximize wealth or that the marginal return from learning about the tort system is not worth its cost. At least one article has explored whether any psychiatric or psychological theory of human behavior is consistent with the premise that tort law is a deterrence mechanism. See Daniel W. Shuman, The Psychology of Deterrence in Tort Law, 42 U Kan L Rev 115 (1993). However, the study did not report any empirical data, nor did it specifically study
the fact that case law on medical malpractice is difficult to obtain, especially for the nonlawyer. For example, fact-specific malpractice cases are not as a rule published; jury verdicts are simply rendered and then entered by the court clerk for enforcement. Indeed, malpractice cases are only published if they have some precedential value and/or independent legal significance on appeal and therefore are generally of little direct relevance to physicians. This lack of publication tends to make it difficult for physicians to access and learn from malpractice decisions. Thus, it appears that the surveyed physicians did not obtain any medical practice “learning” from the legal system’s common law “teaching,” and that significant access barriers keep the common law “lessons” from reaching their intended students.

Overall, physicians in this study exhibited an incomplete and, in many cases, inaccurate definition of negligence; this fact, coupled with a lack of knowledge of the legal system’s “teaching,” illustrates an incentive structure that significantly departs from a model that assumes tort injurers have complete knowledge physicians, so, in this context, its utility is somewhat limited.

It may simply be that physicians are limited in terms of capacity, time, and attention span in their efforts (or potential efforts) to learn about the legal system, and thus additional information may not result in any systematic changes. See generally, Herbert A. Simon, Theories of Bounded Rationality, in C.B. McGuire and Roy Radner, eds, Decisions and Organization 161 (N-Holland, 1972).

Further, it is not clear that physicians should spend their time learning about the legal system. For example, social benefits may be highest if physicians maximize their efforts to learn clinical information in their medical specialty. However in contrast to potential explanations of physician ignorance of the malpractice incentives structure, if physicians are assumed to in fact have knowledge of the medical malpractice system and the system acts on the basis of that assumption, there may be untoward effects on resource allocation in the medical care delivery system (e.g., the practice of defensive medicine). See examples 1, 1A, and 2, below, and text accompanying notes 56-67.

28. Consistent with this lack of malpractice case publication, it was difficult for the author, who is trained in the law, to obtain information on jury malpractice verdicts for this study: several legal databases and publications needed to be identified and then scrutinized to find the cases used. These cases were obtained from LEXIS, Verdict Library, ALLVER File; WESTLAW, LRP-JV database (Jury Verdict and Settlement Summaries); and the National Jury Verdict Review and Analysis, a monthly review of state and federal civil jury verdicts (Jury Verdict Review Pub, Inc., Newark, NJ).

29. See, for example, Harding v Noble Taxi Corp., 182 AD2d 365, 582 NYS2d 1003 (NY Sup 1992) (error for trial court to advise jury at length of its reasons for dismissing claims against two of the defendants in multi-party malpractice suit); Foflygen v Zemel, 420 Pa Super 18, 615 A2d 1345 (1992) (unfair trade practices and consumer protection laws do not apply to medical care providers in informed consent cases); Sondergard v Miles, Inc., 985 F2d 1389 (8th Cir 1993) (patient who suffered stroke in Utah allegedly from taking an over-the-counter medication could sue manufacturer in federal district court in South Dakota).

30. Further, even if physicians were affected by malpractice decisions through their knowledge of them, the vast majority of malpractice cases are settled and thus do not serve the purported “teaching” function. However, this does not exclude physicians from learning from non-legal sources, such as insurance company records review, colleagues, etc.

31. Of course there are many theoretical models of physician action in the context of
and thus the incentive to act optimally. An important implication of this medical malpractice. For example, a model might ignore physician assessment of negligence and only ask if physicians can predict the outcomes of the malpractice system. Here, the focus is on the common model (often implicitly assumed by some researchers) of an actor who has complete knowledge of the costs of certain types of care through his or her knowledge of past legal decisions. This work thus points to adjustments that may need to be made to this type of theoretical model as informed by empirical results. By incorporating an understanding of how actors actually respond in the “real world,” there may be a greater opportunity to improve the functioning of the legal system.

32. Note that it could be argued that physicians have no rational incentive to learn about the legal system due to the existence of malpractice insurance. Because physicians may bear little or no pecuniary exposure to malpractice judgments, they may be theoretically indifferent to legal adjudications against them. However, physicians, at least in this study, do not appear to be so indifferent.

First, since malpractice judgments are not necessarily limited to malpractice coverage amounts, physicians may be exposed to some pecuniary loss beyond their insurance coverage. Second, insurance premiums will rise if malpractice judgments or settlements are made against physicians. Third, this sample of physicians displayed an extremely high disutility associated with being sued. Physicians in this study reported that reputational effects, emotional costs, and opportunity costs were all factors that made malpractice an event that “would make me stop practicing [radiology]” (AR 4); “drive me to doing insurance physicals” (AR 11); and “[would make me] get an MBA” (AR 2). Similar effects were also reported in the OTA Report: “[a]lthough the financial and professional costs of malpractice liability are real, the primary impact on physicians may be psychological . . . [including] losses of self-esteem, . . . clinical depression, anger, fatigue, or irritability[,] . . . behavioral or personality changes, or physical illness.” OTA Report at 29 (cited in note 8) (citations omitted). See also F. Patrick Hubbard, The Physicians’ Point of View Concerning Medical Malpractice: A Sociological Perspective on the Symbolic Importance of “Tort Reform”, 23 Ga L Rev 295, 329-49 (1989) (describing the changes in the medical profession that explain physician support for malpractice reform); and Sara C. Charles and Eugene Kennedy, Defendant: A Psychiatrist on Trial for Medical Malpractice (MacMillan, 1985) (describing a physician’s personal account of the emotional trauma associated with malpractice litigation).

Finally, in addition to potential pecuniary losses and nonpecuniary effects, a settlement by or adjudication against a physician in a malpractice suit requires a report to the National Practitioner Data Bank (“NPDB”). 45 CFR § 60 et seq (1994). As a federally created national database, the NPDB requires hospitals and providers to report any adverse malpractice action against physicians. Id at § 60.7. This database must be used by hospitals when hiring new physicians as well as every two years for reviewing current staff. Id § 60.10. Further, HMOs and other medical care groups, as well as state licensing boards, use the NPDB when determining whether to grant a physician clinical privileges or a medical license. Bryan A. Liang, Beyond the Malpractice Suit: The National Practitioner Data Bank, 31 Hospital Physician 11 (1995). Thus, a malpractice suit can clearly impact physicians above and beyond the pecuniary loss covered by malpractice insurance.

It might also be the case that physicians under managed care arrangements may not have incentives to learn about malpractice due to transference (or sharing) of liability under a respondeat superior or ostensible agency theory with the HMO or insurance company. However, the majority rule in malpractice suits against physicians who are associated with managed care organizations is that physicians are generally considered independent contractors of the managed care organization and thus the managed care organization is not liable for physician actions; only if the physician is an employee (or
incomplete and inaccurate knowledge may be that a socially inoptimal level of care can be delivered by these physicians; for example, undertreatment decisions in patient care can be made:

Example 1: Assume that a physician is deciding whether a specific patient requires additional radiologic workup following a questionable chest x-ray screening for lung cancer. The relevant tradeoffs between levels of care, costs of care, nondetection of cancer probabilities, expected nondetection costs, and total nondetection costs of this clinical scenario are given below, with nondetection causing losses of 100,000:

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care</th>
<th>Nondetection Probability</th>
<th>Expected Nondetection Costs</th>
<th>Total Nondetection Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-Ray Alone</td>
<td>1,000</td>
<td>15%</td>
<td>15,000</td>
<td>16,000</td>
</tr>
<tr>
<td>Chest X-Ray and Follow Up in 6 Months</td>
<td>2,000</td>
<td>10%</td>
<td>10,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Immediate CT Scan</td>
<td>6,500</td>
<td>5%</td>
<td>5,000</td>
<td>11,500</td>
</tr>
<tr>
<td>Open Lung Biopsy</td>
<td>10,000</td>
<td>2%</td>
<td>2,000</td>
<td>12,000</td>
</tr>
</tbody>
</table>

Here, the optimal level of care is to immediately obtain the CT scan. Since the CT scan’s marginal cost is only 4,500 but reduces expected nondetection costs by 5,000 and minimizes total nondetection costs, it is optimal to engage in this level of care. Open lung biopsy is not indicated because it costs an additional 3,500 but only results in a reduction of expected nondetection costs of 3,000. Assuming that the court system has adjudicated the above levels of care such that the legal standard of negligence has been defined (in other words, due care), a close approximation) of the managed care group will it shoulder liability. See, for example, *Raglin v HMO Ill, Inc.*, 230 Ill App 3d 642, 595 NE2d 153 (1992) (health insurer and its HMO subsidiary were not vicariously liable for negligence of doctors under contract with them to provide medical services); *Chase v Independent Practice Ass'n, Inc.*, 31 Mass App 661, 583 NE2d 251 (1991) (company that arranged health services for an HMO was not vicariously liable for alleged negligence of a physician who rendered health services to an HMO member). But see, *Boyd v Albert Einstein Medical Center*, 377 Pa Super 609, 547 A2d 1229 (1988) (One test to determine if a physician is an ostensible agent of an HMO or an employee of the HMO is whether the HMO “holds out” the physician as an employee.).
physician would be negligent if he or she did not obtain the immediate CT scan.

However, assume the physician is ignorant of the common law's pronouncement of acceptable relative percentages and decisions in this area (a scenario fully consistent with the results of this study). If the cost of the CT scan is high and the relative reduction in the physician's estimation based on his or her medical knowledge of the expected nondetection costs is close to the cost of the immediate CT scan, he or she may not obtain the CT scan and decide only to follow up after a chest x-ray. Thus, a physician's potential "incorrect" (as defined by the malpractice system) assessment of the probabilities of nondetection due to lack of knowledge regarding the legally defined standard could lead to liability. For example, if the physician believes that the decrease from follow up to immediate CT scan is 10 percent to 5.51 percent (rather than 5 percent as defined through the tort system), then he or she would determine that the appropriate level of care would be follow up. Similarly, if the physician believed that open lung biopsy reduced the nondetection of lung cancer from 5 percent to 1.49 percent (rather than 2 percent as defined through the tort system), then biopsy would be the appropriate care. Thus, without knowing the case law that defines the relevant negligence standards for physicians, there is a potential for the physician to be adjudged negligent even though he or she comported with accepted medical practice.

In addition, if physicians believe (incorrectly), for example, that a verdict of negligence requires only a poor outcome, then there may be a significant incentive to overtreat:

Example 1A: Assume that physicians face the scenario described in Example 1. Given the well-quoted estimate that physicians overestimate the incidence of individual patient malpractice claims by a factor of three, and that some physicians believe that a finding of negligence only requires a poor outcome, then physicians may add expected malpractice liability costs (three times patient expected nondetection costs) to their costs of care and thus perceive the scenario of Example 1 as follows:

33. Recall that in this area of medical practice, there may be more than one definition of appropriate care, and to that extent more than one school of thought on the necessity of an immediate CT scan. Thus, this decision could be fully consistent with accepted professional care judgments but not consistent with jury-defined care judgments.

34. Further, when reporting results of clinical studies, medical researchers usually indicate a range of possible percentages. Thus, single values, as may be defined (or relied upon) by juries, may not be similarly interpreted by physicians who may treat them as representing a range. This substantive difference may result in "incorrect" ex ante estimated probabilities by physicians and subsequent assignment of negligence by juries. See Kamin and Rachlinski, 19 L & Human Beh 89 (cited in note 6).

35. See Paul C. Weiler, et al, A Measure of Malpractice: Medical Injury, Malpractice Litigation, and Patient Compensation 124 (Harvard, 1993). Note that here the cost increase associated with the levels of care does not refer to physicians overestimating the number of patients who will suffer injury (this would be an error of medical, not legal, knowledge). The incorrect overestimation is the overestimation of the potential for suit by the individual patient.


### Table 2

**Example 1A: Physician Overestimation of Patient Malpractice Claims**

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care Plus 3 X Expected Nondetection Costs</th>
<th>Nondetection Probability</th>
<th>Expected Nondetection Costs</th>
<th>Total Nondetection Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-Ray Alone</td>
<td>46,000</td>
<td>15%</td>
<td>15,000</td>
<td>61,000</td>
</tr>
<tr>
<td>Chest X-Ray and Follow Up in 6 Months</td>
<td>32,000</td>
<td>10%</td>
<td>10,000</td>
<td>42,000</td>
</tr>
<tr>
<td>Immediate CT Scan</td>
<td>21,500</td>
<td>5%</td>
<td>5,000</td>
<td>26,500</td>
</tr>
<tr>
<td>Open Lung Biopsy</td>
<td>16,000</td>
<td>2%</td>
<td>2,000</td>
<td>18,000</td>
</tr>
</tbody>
</table>

Here the "optimal" level of care is the open lung biopsy instead of the immediate CT scan in Example 1. This increase in care illustrates the practice of defensive medicine.

In addition to providing more care than is socially optimal, the higher level of care (i.e., the biopsy) may concomitantly increase patient risk of injury. For instance, in this example, an open lung biopsy represents a surgical procedure, with associated risks of complication from scalpels, needles, intravenous fluids (including the possibility of blood containing a hepatitis virus and/or HIV), and anesthesia, compared to a noninvasive and relatively brief CT scan. However, the physician may accept these increases in patient risk if the probability and cost of complications from the biopsy do not raise the total nondection costs above the costs of the immediate CT scan.

---

36. The results of these and the other examples herein were determined on the assumption that physicians are perfectly risk-neutral. If physicians are considered risk-averse, their incentive to provide excess care will generally be even stronger.

Thus, ignorance of the tort system case law and misperceptions regarding negligence may significantly affect the frequency of adjudged liability and the level of care rendered by physicians. With respect to the later, ignorance and misperception may be associated with a level of care that is not socially optimal (i.e., defensive medicine) that paradoxically also exposes patients to additional, inoptimal risks of iatrogenic injury.

B. IS PHYSICIAN ASSESSMENT OF ACTUAL JURY VERDICT CASES CONSISTENT WITH THE USE OF A SINGLE STANDARD OF NEGLIGENCE BY BOTH PHYSICIANS AND JURIES?

In theory, if two groups are given the same set of facts, and told to utilize the same standard to evaluate an actor's conduct, both groups should, on balance, assess the conduct in a similar fashion. Hence, the significant discordance found between the negligence assessments of the same defendant radiologists by physicians and juries suggests that these groups may not be applying a single uniform standard.38

Yet, if both groups are assumed to use a standard of negligence that presumes that medically inappropriate care supports a finding of negligence, and medically appropriate care supports a finding of nonnegligence, and their assessments diverge, it presents an important question: what explains the divergence? After all, the medical profession itself defines the proper standards of medical care, and, at least in theory, the ability to differentiate negligent care should thus be straightforward to informed physicians. Perhaps the discrepancy in negligence assessments between physicians and juries can be explained by the sample of radiologists in this study. It may be that these radiologists were categorically uninformed regarding the standard of care in the specialty of radiology. However, this explanation strains credulity. Since all these radiologists were both board certified and in an academic setting, it would seem more reasonable to infer that they would therefore be more informed regarding the standards of radiology care, not less.39

38. Again, the purpose of the comparisons between physician and jury verdicts (and the discordance thereof) is to assess the validity of the assumption that a group, which understands the standard of care through its extensive training, will comport with the determinations of another group, which has not had extensive training but that must apply the equivalent standard of medical appropriateness. This study did not examine whether physicians could accurately predict (correctly or incorrectly) jury verdicts, but only the relative validity of the single medical appropriateness standard for this sample of physicians and cases.

If it were possible to further parse observed divergences between physicians and juries and/or NPs, it would be interesting to attempt to construct a theory of why there are divergent viewpoints on some cases but not others. This effort would require further data, including a study of a broader array of clinical scenarios and physician knowledge and actions with respect to malpractice.

39. Further, recall that disagreement with jury verdicts was both intraphysician and interphysician. Hence, some physician negligence assessments in fact agreed with jury negligence assessments. This result would not be consistent with a conclusion that these
Alternatively, consistent with this study’s finding that few of the surveyed radiologists participated as expert witnesses, juries may only be exposed to expert testimony from a certain biased radiological viewpoint that is not represented by this sample of radiologists. However, this explanation is also unlikely because it does not explain the interphysician disagreement per case, with some of the radiologists in fact agreeing with the jury verdict.  

It may also be possible that the cases chosen for this study represent the residual of an effective incentive structure. Since most malpractice cases settle, this may indicate that the judicial system simply does not provide either side of the dispute any incentive to try the average negligence case. In other words, the standard under which the relevant action will be adjudged has already been set, thus the results predetermined, and both sides know this. If this is true, then the cases that actually go to trial are perhaps unique and require a due care standard to be established. Yet, this explanation has weaknesses as well. First, the trial cases selected for this study are similar to those that have been settled. Second, radiologists were categorically uniformed on the appropriate standard of care in radiology.  

40. Similarly, it might also be thought that because all radiologists surveyed were from the same academic medical center, a possible bias to a single representative viewpoint could result regarding the appropriate standard of care. Indeed, it was expected that academic physicians would be the most informed regarding the practice of their specialty and thus the most current on the (single) medically appropriate standard for each individual case. In fact, the choice of a single academic site reflects this consideration—the goal was to obtain relatively clear comparisons between jury and physician assessments of negligence. 

However, this potential bias towards a single standard of medical care was not borne out by the results, again indicating the possibility of multiple standards of medically appropriate care. Other physicians and specialties as well as other practice environments would need to be studied in order to verify these interesting results and to determine if other medical specialties experience multiple standards of medically appropriate care.  

this explanation presupposes that the tort system has already defined the relevant standard for medical appropriateness, and that physicians have ex ante knowledge of this standard in order for a physician to act in accordance with the purported malpractice incentive system. These assumptions are not supported by the results of this study. Specifically, the study’s results indicate that sample physicians simply did not have any ex ante knowledge of case law, malpractice or otherwise. Moreover, recall that trial court malpractice judgments are not usually published. This increases the likelihood that physician ex ante knowledge of the court-established due care standard, and thus an effective incentive structure, does not exist.42

Another explanation for the variance between physician and jury assessments of what is negligent care posits that juries either misunderstand the standard of care, or that they base their assessments of negligence on something other than a prevailing radiological standard of care. In other words, the mechanism that juries use to determine negligence or nonnegligence may not be solely based upon medical appropriateness. This is suggested by two findings in this study. First, recall that overall, NP agreement with jury verdicts was significantly higher than physician agreement with jury verdicts. If physicians only use the criterion of medical appropriateness to assess care and NPs do not, then the NPs’ greater predictive ability may be based on some other characteristic(s) that NPs share with juries. This characteristic, or these characteristics, may be more salient with respect to a finding of physician negligence than simply the medical appropriateness standard.43 Second, recall that seven of eleven cases were assigned signifi-


42. A response might be that, realistically, attorneys act as physicians’ agents, and thus they inform physicians as to their negligence (or lack thereof) based on their superior knowledge of the relevant case law. However, this argument also supports the contention that the medical malpractice system does not represent an “effective incentive structure.” After all, the physician will only learn how the tort system adjudicates due care after the physician has performed the medical care in question, and after he or she is named in a suit. Thus, under this scenario the tort system provides no ex ante deterrence incentive for physicians to avoid providing jury-defined negligent care.

43. For example, researchers have reported that as the severity of an injury increases, there is an increased possibility of malpractice litigation. See White, The Negligence Rule in Medical Malpractice (cited in note 6). However, this has also been taken to mean that providers have an incentive to render nonnegligent and high “quality of care”: “liability is strongly related to quality of care both because patients are more likely to receive a damage payment if care was negligent and because, when payments are made, they are higher if care was negligent . . . [T]he probability of the patient receiving a payment is higher . . . for all severity levels.” Id at 5-6 tbl 2, citing H. S. Farber and M. J. White, A Comparison of Formal vs. Informal Dispute Resolution in Medical Malpractice (Oct 26, 1993) (National Bureau of Economics Research Working Paper) (on file at Harvard Law School). But at the outset it bears emphasizing that, in fact, there were plaintiff jury verdicts in cases where the care was not negligent (as defined by White) and this “nonnegligent” care also resulted in increasing damage awards as injury severity levels
cantly higher Likert values (i.e., more negligent) by NPs as compared with physicians, indicating that NPs may have a \textit{prima facie} propensity to assign negligence to physician actions. Together, these results may indicate that juries simply do not apply the medical appropriateness standard in as neutral a fashion as is generally assumed.\footnote{Previous articles have considered juries to not be totally neutral in their malpractice adjudications. See, for example, M. Roy Schwarz, \textit{Liability Crisis: The Physician's Viewpoint}, in James Hamner and B.R. Jennings, eds, \textit{Medical Malpractice-Tort Reform} 16, 24 (Tenn, 1987) (Juries "are seemingly incapable of separating their personal feelings from the evidence in the cases and instinctively wish to help the plaintiffs as they would want others to help them if they were in a similar situation."). Further, juries may also award malpractice plaintiffs greater amounts compared with other plaintiffs with similar injuries. See Randall R. Bovbjerg, et al, \textit{Juries and Justice: Are Malpractice and Other Personal Injuries Created Equal?} 54 L & Contemp Probs 5, 24-28, 36 (1991).}

Although the medical profession may favor this explanation, and physician disagreement with juries (at least in this study) supports it, the level of interphysician disagreement per case may cut against it. Moreover, the fact that some physicians \textit{agreed} with the jury verdicts suggests that juries may have based their findings of negligence (or nonnegligence) on the basis of some appropriate standard of care. Even so, if juries use other factors in their negligence determinations, then jury decisions that are consistent with a physician definition of appropriate care may only be coincidental to the standard of care itself.

This significant discordance between juries and physicians has broad implica-
tions. If physicians have *ex ante* knowledge that there are substantive differences between themselves and physicians who could later provide expert testimony in litigation with respect to negligent care, physicians may not be able to determine what care will be considered legally negligent and what care will not. Further, if juries respond to other factors so that under the same set of facts an indeterminate percentage will return a negligent verdict, and an indeterminate percentage will return a nonnegligent verdict, then the tort system will accomplish little potential "teaching." It is more likely that a wholly unclear incentive structure will result.

Indeed, instead of providing "clear" incentives regarding what is socially optimal (i.e., due care) in this environment, the tort system will induce physicians to provide socially inoptimal care.

45. This variability phenomena has been noted in other contexts. For example, community-based physician radiologists may be more aggressive in their recommendations for follow up of suspicious mammograms than academic-teaching hospital radiologists. See Jack E. Meyer, et al, *Biopsy of Occult Breast Lesions: Analysis of 1261 Abnormalities*, 263 JAMA 2341 (1990). Further, for breast mammograms, it has been reported that radiologists can differ substantially in their interpretations and subsequent management recommendations. See Joann G. Elmore, et al, *Variability in Radiologists’ Interpretations of Mammograms*, 331 New Eng J Med 1493 (1994). Finally, it has been found that radiologists also differ significantly in their estimates of radiologic procedure intraservice work as a function of practice site (community versus academic hospitals). See Bryan A. Liang, et al, *Analysis of the Resource-based Relative Value Scale for Medicare Reimbursements to Academic and Community Hospital Radiology Departments*, 179 Radiology 751 (1991).

Of course, it is possible that the physician assessments of these case studies differed from the jury verdicts because the case summaries failed to give physicians enough information to make an informed assessment. But this seems unlikely because the case scenarios were reviewed by a radiologist, and in any event, a "can't tell" response was always available. See note 14. Further, the amount of information in the case summaries matches the amount of information that would be available to any physicians who attempted to inform themselves about malpractice judgments. Finally, even if the cases did not contain enough information for a comparison between physician assessments and jury verdicts, the assumption of a single standard of medically appropriate care is still called into question by the finding that physicians disagreed among themselves with respect to what constitutes appropriate care.

46. Other studies advocate continued scrutiny of the current medical malpractice system because of the significant and complex role the jury plays. See Thomas B. Metzloff, *Resolving Medical Malpractice Disputes: Imaging the Jury's Shadow*, 54 L & Contemp Probs 43 (1991).

47. Shavell postulated that systems based on the degree of care alone (i.e., process-oriented) compared with the negligence rule (which has both process-oriented and outcome-oriented characteristics) would have significant limitations:

There are, however, important qualifications to be made about the case for a process-oriented incentive system. . . . [I]nformation may be inaccurate. If information about care is not precise, a physician who in fact takes the optimal level of care is subject to the risk of penalty since his observed level may appear too low. . . . [T]he standard of care . . . may not be correctly chosen or consistently applied under a process-oriented incentive system. . . . Therefore, the opportunities for error and for inconsistent application of standards by the agents of the incentive system [i.e., juries] are probably substantial.
nations of negligence, physicians will have an incentive to attempt to provide treatment that would be considered nonnegligent all of the time so as to escape liability. Thus, like the situation of incomplete and inaccurate perceptions of negligence, physicians may be induced to provide care in excess of what is defined as due care.

**Example 2:** Assume that a female patient has a questionable lump on her breast and has obtained a mammogram which is equivocal for malignant microcalcifications. The radiologist is considering what additional level of care, if any, is required. The following table represents the tradeoffs between level of care, cost of care, expected nondetection costs, and total nondetection costs according to physician medical knowledge and as defined through adjudication, with a nondetection event causing a loss of 100,000:

---

Shavell, *Theoretical Issues in Medical Malpractice* at 47-48 (cited in note 37). This study confirms these qualifications about at least the process-oriented aspects of the negligence system.

48. Assuming, of course, that the relevant costs associated with providing nonnegligent care are less than the benefits generated. Shavell has indicated that uncertainty over the finding of negligence by the legal system would lead to an excess level of care:

The disadvantage to a party of being found negligent by mistake [courts may err in assessing a party's true level of care] is that he will have to pay the victim's losses. This disadvantage will often dominate in importance the savings in the cost of care that the party could obtain by reducing his level of care somewhat and hoping that he would erroneously escape liability if an accident occurred.

The reader should not be surprised, then, to learn that a general consequence of uncertainty over the assessment of true levels of care is that parties will tend to be led to take more than due care—and thus to take socially excessive levels of care (presuming that due care is set at socially optimal levels).

Table 3
Example 2: Initial Conditions—Jury Error in Imposing Liability

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care</th>
<th>Nondetection of Cancer Probability</th>
<th>Expected Nondetection Costs</th>
<th>Total Nondetection Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammogram Alone</td>
<td>800</td>
<td>9%</td>
<td>9,000</td>
<td>9,800</td>
</tr>
<tr>
<td>Mammogram Plus Follow Up Mammogram in 1 Year</td>
<td>2,100</td>
<td>7%</td>
<td>7,000</td>
<td>9,100</td>
</tr>
<tr>
<td>Ultrasound of the Mass</td>
<td>3,000</td>
<td>4%</td>
<td>4,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Biopsy</td>
<td>4,900</td>
<td>3%</td>
<td>3,000</td>
<td>7,900</td>
</tr>
</tbody>
</table>

Here, the optimal level of care (defined as due care) is to obtain an ultrasound of the patient’s suspicious lump. The marginal cost of obtaining the ultrasound is only 900, compared with a reduction of expected nondetection costs of 3,000, hence total nondetection costs are minimized. Biopsy is not optimal because the reduction in expected nondetection costs is 1,000 at a marginal cost of 1,900.

However, suppose that juries impose liability 50 percent of the time, even if the physician performs an ultrasound of the mass. In other words, the physician will be deemed negligent even if he or she exercised due care. Under this scenario, the expected cost to the physician for performing only the level of care of ultrasound becomes:

\[
\text{Cost}_{\text{ultrasound}} = \text{cost of care} + (\% \text{ time jury finds liability})(\text{expected nondetection costs});
\]
\[
\text{Cost}_{\text{ultrasound}} = 3,000 + (0.50)(4,000) = 5,000.
\]

The relevant tradeoffs become:

49. Others have found on review of insurance company records that more than 40% of medical malpractice claims categorizable as not due to negligent care resulted in claims payment. See Cheney, Standard of Care and Anesthesia Liability at 1601 (cited in note 6).

50. Here, the assumption is that physicians perceive a rough estimate of jury error. See notes 59, 63, and 65. Note, however, that physicians under this assumption only assess a relative error rate, not which particular case will be adjudged incorrectly from their perspective.
Thus, if the jury finds liability 50 percent of the time, even when due care is performed, the physician will have an incentive to perform the highest level of care (biopsy) because it reduces the chance of being found negligent and minimizes the cost of care to the physician and the total nondetection costs. Therefore, if the physician perceives this error factor, there may be an incentive to provide an excessive level of care due to the uncertainty of jury determinations of negligence. This potential (in combination with physician ignorance and misperception of the definition of negligence as identified above) thus provides an additional impetus for physicians to practice defensive medicine. Note again that each additional level of care is not costless: additional care is associated with additional risks of harm to the patient. However, these risks and expected procedure losses may not be large enough to counter the incentives to overtreat, particularly when the primary potential disorder (for example, cancer) has a nondetection loss value much greater than a relatively minor procedure loss value and the expected procedure loss cost. Thus, the incentive to expose patients to additional, non-optimal risks of harm due to negligence misperception is exacerbated by the uncertainty (and/or perceived uncertainty) of jury verdict determinations of negligence.

However, even a level of care that exceeds due care can also be found to be negligent. If the biopsy level of care in Example 2 is deemed negligent 50 percent of the time, then the relative cost of care at the biopsy level is the following:

\[
\text{Cost}_{\text{biopsy}} = \text{cost of care} + (\% \text{ time jury finds liability})(\text{expected nondetection costs})
\]

\[
\text{Cost}_{\text{biopsy}} = 4,900 + (0.50)(3000) = 6,400.
\]
And the relevant tradeoffs become:

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care</th>
<th>Nondetection of Cancer Probability</th>
<th>Expected Nondetection Costs</th>
<th>Total Nondetection Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammogram Alone</td>
<td>800</td>
<td>9%</td>
<td>9,000</td>
<td>9,800</td>
</tr>
<tr>
<td>Mammogram Plus Follow Up Mammogram in 1 Year</td>
<td>2,100</td>
<td>7%</td>
<td>7,000</td>
<td>9,100</td>
</tr>
<tr>
<td>Ultrasound of the Mass</td>
<td>5,000</td>
<td>4%</td>
<td>4,000</td>
<td>9,000</td>
</tr>
<tr>
<td>Biopsy</td>
<td>6,400</td>
<td>3%</td>
<td>3,000</td>
<td>9,400</td>
</tr>
</tbody>
</table>

Thus, under these assumptions, if the physician both faces and perceives a 50 percent chance of liability when taking due care (ultrasound) and when taking more than due care (biopsy), he or she will choose due care (ultrasound) because the cost of care to the physician at ultrasound and total nondetection costs are minimized at this level.\(^{51}\)

\(^{51}\) Of course, with different probabilities, these results may change. For example, if the probability of being found liable when performing a biopsy is reduced to only 1%, then the expected cost would be:

\[ \text{Cost}_{\text{Biopsy}} = 4,900 + (0.01)(3000) = 4,930. \]

And the resulting tradeoffs would become:

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care</th>
<th>Nondetection of Cancer Probability</th>
<th>Expected Nondetection Costs</th>
<th>Total Nondetection Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammogram Alone</td>
<td>800</td>
<td>9%</td>
<td>9,000</td>
<td>9,800</td>
</tr>
<tr>
<td>Mammogram Plus Follow Up Mammogram in 1 Year</td>
<td>2,100</td>
<td>7%</td>
<td>7,000</td>
<td>9,100</td>
</tr>
<tr>
<td>Ultrasound of the Mass</td>
<td>5,000</td>
<td>4%</td>
<td>4,000</td>
<td>9,000</td>
</tr>
<tr>
<td>Biopsy</td>
<td>4,930</td>
<td>3%</td>
<td>3,000</td>
<td>7,930</td>
</tr>
</tbody>
</table>

Since the cost of care and total nondetection costs of biopsy with 1% jury error is less
III. Formal Models

Based on the empirical findings regarding physician misperceptions and divergence of physician/jury determinations of negligence, several formal models can now be described.

A. MODELING THE INCORRECT NEGLIGENCE KNOWLEDGE OF PHYSICIANS

In formal terms, the incomplete and inaccurate formulations of negligence offered by physicians can be modeled and the resultant effects on taking care described. Let the following be the relevant levels of care, costs of care, probability of disease, expected disease costs, and total disease costs of a patient incurring costs of $L$ for the disease:

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care</th>
<th>Probability of Disease</th>
<th>Expected Disease Costs</th>
<th>Total Disease Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some Care</td>
<td>$a$</td>
<td>$r$</td>
<td>$rL$</td>
<td>$a + rL$</td>
</tr>
<tr>
<td>Due Care</td>
<td>$a + b$</td>
<td>$r - s$</td>
<td>$(r - s)L$</td>
<td>$(a + b) + (r - s)L$</td>
</tr>
</tbody>
</table>

Assume that due care as defined by the courts is socially optimal, that this level is defined by professional standards of care which the physician knows, and that providing this due care results in no negligence liability for the physician.

Under basic determinations of negligence, the physician will take due care if the total disease costs of due care are less than some care:

\[ (a + b) + (r - s)L < a + rL; \]
\[ (a + b) - a < rL - (r - s)L; \]
\[ b < rL - rL + sL; \text{ simplifying:} \]
\[ b < sL. \]

Equation 1 demonstrates that if the marginal cost of performing due care ($b$) is less than the decrease in expected disease cost losses from due care ($sL$), the physician will take due care.

If, however, we define $N$ as the increase or decrease in liability due to physicians' incomplete or incorrect information regarding the tort system, the relevant scenario becomes:

than that of ultrasound with a 50% chance of jury error, when a physician faces and perceives a 1% jury error if he or she performs a biopsy, performing the biopsy will be "optimal" for the physician. See also text accompanying notes 56-67 for a formal discussion of jury error.
Physicians will then take due care if:

\[
(a + b) + (r - s)L < (a + N) + rL; \\
(a + b) - (a + N) < rL - (r - s)L; \\
b - N < sL; \\
b < sL + N.^{52}
\]

When comparing Equation 2 with Equation 1, it is apparent that if physicians’ misperceptions regarding the negligence system are deemed to increase liability (a positive N value), then the cost of taking due care is decreased by N. Similarly, if physicians’ misperceptions regarding the negligence system are taken to decrease liability (a negative N value), the cost of taking due care is increased by N. However, it is most likely that physician incomplete and incorrect perceptions will be deemed to increase liability (as evidenced by some of the empirical data reported here). Therefore, in most situations, a misperception of negligence reduces the cost to physicians of taking due care.

Assume that there are three levels of care: some care; due care; and excess care. If providing some care is always deemed negligent while due care and excess care are always deemed not negligent, how will misperceptions regarding the negligence system affect the decision on whether to increase care? First, assuming appropriate medical knowledge, court adjudications defining due care, and no jury error, the physician will encounter the following scenario where \(c\) represents the marginal cost of providing excess care and \(t\) is the marginal reduction in the probability of disease:

---

52. Thus, if \(b > sL + N\), a physician would have an incentive to provide only some care.
Physicians will only provide due care if the total disease costs associated with due care are less than the costs associated with excess care:

\[
(a + b) + (r - s)L < (a + b + c) + (r - s - t)L; \text{ or } 0 < c - tL.
\]

However, if physicians have misperceptions regarding the negligence system (N), the physicians will be presented with the following situation when deciding on the level of care:

Here, physicians will only take due care if the costs of doing so minimize total disease costs:

\[
(a + b + N) + (r - s)L < (a + b + c) + (r - s - t)L; \text{ or } N < c - tL; \text{ or } 0 < c - tL - N.33
\]

Equation 4 represents the determination of taking care when negligence

---

53. This may also be expressed as the following: if \(c > tL + N\), then physicians will take only due care; or, if \(c < tL + N\), physicians will take excess care. Thus, as the negligence factor \(N\) increases, there will be an increasing tendency for physicians to take excess care.
misperceptions exist. Comparing this equation with Equation 3, there is a decrease in the cost to physicians of taking excess care by N, assuming N represents physician misperceptions that the negligence system will increase liability.

B. MODELING THE DIVERGENCE OF JURY AND PHYSICIAN PERCEPTIONS OF NEGLIGENCE

When actors consider at what level of activity to engage, the uncertainty of legal liability may induce socially inoptimal levels of care.  In health care, this uncertainty (whether jury verdict uncertainty and/or physician uncertainty of jury application of the correct medical standard) can lead to the practice of defensive medicine.

Assume the following scenario with a disease cost of L:

<table>
<thead>
<tr>
<th>Level of Care</th>
<th>Cost of Care</th>
<th>Probability of Disease</th>
<th>Expected Disease Costs</th>
<th>Total Disease Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some Care</td>
<td>a</td>
<td>r</td>
<td>rL</td>
<td>a + rL</td>
</tr>
<tr>
<td>Due Care</td>
<td>a + b</td>
<td>r - s</td>
<td>(r - s)L</td>
<td>(a + b) + (r - s)L</td>
</tr>
<tr>
<td>Excess Care</td>
<td>a + b + c</td>
<td>r - s - t</td>
<td>(r - s - t)L</td>
<td>(a + b + c) + (r - s - t)L</td>
</tr>
</tbody>
</table>

Further assume that taking some care always results in negligence liability, that juries consider socially optimal due care to be some care with a probability of E, that physicians perceive this uncertainty, and that excess care does not result in liability. Under these assumptions, the cost of due care (taking jury error into account) is:

\[
\text{Cost}_{\text{due care with error}} = \text{Cost of Due Care} + (\text{jury error } \%)(\text{expected disease loss at due care})
\]

\[
= a + b + E[(r - s)L].
\]

54. This is true even in the most favorable case for liability in the legal system—when uncertainty probability centers around the socially optimal level of care. Even "when uncertainties have been centered around the socially optimal level of behavior, potential defendants will still have incentives to behave suboptimally," and the mere presence of uncertainty about legal outcomes can cause even risk-neutral defendants to take excess or suboptimal care. Calfee and Craswell, 70 Va L Rev at 974 (cited in note 7).

55. Note that physician assessments of jury error can be expressed simply as rough estimates or impressions. For example, the statement that "juries are wrong half the time when the right care is given" is equivalent to an error rate of 50% at due care.
Thus, total disease costs with jury error would be:

\[
\text{Total Disease Cost}_{\text{due care with error}} = \text{Cost}_{\text{due care with error}} + \text{expected disease loss at due care};
\]

\[
= a + b + \mathbb{E}(r - s)L + (r - s)L.^{56}
\]

In this situation, the physician will take due care only if the total disease cost of due care with error is less than the total disease cost of excess care:

\[
\begin{align*}
(a + b) (r - s) L + \mathbb{E}(r - s)L &< a + b + c + (r - s - t)L; \\
(r - s)L + \mathbb{E}(r - s)L &< c + rL - sL - tL; \\
(r - s)L + \mathbb{E}(r - s)L &< c + (r - s)L - tL; \text{ or } \\
\mathbb{E}(r - s)L &< c - tL; \text{ or } \\
0 &< c - tL - \mathbb{E}(r - s)L.^{57}
\end{align*}
\]

Equation 5 thus indicates that the decision to take due or excess care is a function of three calculations: jury error (the \(E(r - s)L\) term); the expected due care costs; and the net marginal benefit of taking excess care. Comparing Equation 5 with Equation 3,\(^58\) it is apparent that since by assumption, \(c - tL\) is greater than zero (otherwise, excess care would be due care), by introducing jury error there is a concomitant decrease of Equation 3 (by \(E(r - s)L\))\(^99\) which brings the value of the right hand side of Equation 3 closer to zero and thus closer to a point of taking excess care. Thus, jury error at the due care level reduces the cost of taking excess care.

However, if we extend this analysis and relax the assumption that excess care does not result in liability, instead imposing liability for excess care with a probability of \(E\) (i.e., a jury will view excess care as some care with probability \(E\)), and we continue to assume that a jury will view due care as some care (and will therefore find liability with a probability of \(E\)), and physicians have the above described perception of error frequency,\(^60\) then physicians will only take due care if the total costs associated with due care with error are less than the
costs associated with excess care with error. The cost of excess care with jury
error E taken into account is:

\[ \text{Cost}_{\text{excess care with error}} = \text{Cost of Excess Care} + (\text{jury error %}) \times (\text{expected disease loss at excess care}) \]

\[ = a + b + c + E[(r - s - t)L] \]

Thus, total disease costs with error would be:

\[ \text{Total Disease Costs}_{\text{excess care with error}} = \text{Cost}_{\text{excess care with error}} + \text{expected disease loss at excess care} \]

\[ = a + b + c + E[(r - s - t)L] + (r - s - t)L \]

Here, the physician will only take due care if the total disease cost of due
care with error is less than the total disease cost of excess care with error:

\[ (a + b) + (r - s)L + E[(r - s)L] < a + b + c + E[(r - s - t)L] + (r - s - t)L \]

\[ (r - s)L + E[(r - s)L] < c + (r - s)L - tL + E[(r - s)L] - EtL \]

\[ 0 < c - tL - EtL \]

When comparing this result with Equation 3,\(^61\) note that the introduction of
jury error at the excess care level reduces the cost of taking excess care by the
factor EtL. Also note that this result is independent of due care expected disease
costs and relies only on marginal values of excess care. Recall from Equation
5\(^62\) that under situations of jury error only under due care, the decision to
provide excess care relied heavily on expected disease costs of due care. Howev-
er, under these assumptions, due care factors defining the social optimum
disappear when juries find negligence equally under due care and excess care and
depend only on excess care values. Since physicians need only look to the highest
level of care variables, there may be a rough incentive to simply perform the
highest level of care, particularly if they know or perceive of NP predilection
toward negligence verdicts and thus high E values.\(^63\) This may be an additional
explanation for both the extent of defensive medical practice and the tendency
of many United States physicians to render the most advanced treatments even
when these treatments provide only a marginal benefit.

If we relax the assumption of equivalent percentages of negligence liability
under due care and excess care levels, assume due care is considered some care
with probability E, and assume excess care is considered some care with proba-
bility F,\(^64\) then this results in the following determination of when physicians

\[ 61. \text{See page 26.} \]
\[ 62. \text{See page 28.} \]
\[ 63. \text{See text accompanying note 25.} \]
\[ 64. \text{For example, physicians could perceive that "juries make errors E\% of the time when the right care is given but F\% of the time with excessive care."} \]
will exercise only due care:

\[ \text{(Equation 7)} \]

\[(a + b) + (r - s)L + E[(r - s)L] < a + b + c + (r - s - t)L + F[(r - s - t)L];\]
\[E(r - s)L < c - tL + F(r - s)L - FtL;\]
\[0 < c - tL - E(r - s)L + F(r - s)L - FtL; \text{ or}\]
\[0 < c - tL - FtL - (E - F)[(r - s)L].\]

Compared with Equation 6,\(^6^4\) Equation 7 shows that under different probabilities of jury error as a function of level of care, there is again a relative decrease in cost from taking due care to taking excess care. Since \(FtL\) in this situation equals \(EtL\) in Equation 4,\(^6^7\) the further decrease in cost to exercise care by adding different jury error probabilities is \((E - F)[(r - s)L]\). Thus, the greater \(E\) is relative to \(F\), the cheaper it becomes to exercise excess care. In other words, the more errors that juries make and/or that physicians perceive under the lower standard of due care, the less expensive it becomes for physicians to provide the highest level of excess care. Of course, if \(E\) and \(F\) are equal, then Equation 5 reduces to Equation 4, and again the function is independent of due care cost considerations.

C. COMBINING PHYSICIAN MISPERCEPTIONS OF NEGLIGENCE AND DIVERGENCE OF PHYSICIAN AND JURY DETERMINATIONS OF NEGLIGENCE

Assume that physicians have incomplete or incorrect information regarding the tort system (\(N\)) and that the expected loss from a disease is \(L\). Assume further that at some care, juries will always deem the physician negligent; at due care, juries will adjudge physician care as some care (and thus negligent) with a probability of \(E\) and that physicians perceive this; and at excess care juries will not adjudge physicians negligent. Thus, when the physician considers whether to increase care above due care (with jury error and negligence misperceptions) to excess care, he or she is presented with the following scenario:

---

65. Physicians will exercise excess care if \(0 > c - tL - FtL - (E - F)[(r - s)L]\). As above, we can rearrange the equation such that \(c < tL + FtL - (E - F)[(r - s)L]\).

Since \(E\) and \(F\) represent jury errors in assigning negligence to physicians who provide socially optimal due care and socially excessive care, increasing jury error decreases the cost of providing excess care.

66. See page 29.

Level of Care | Cost of Care | Probability of Disease | Expected Disease Costs | Total Disease Costs
---|---|---|---|---
Some Care | a | r | rL | a + rL
Due Care | a + b + N + E[(r - s)L] | r - s | (r - s)L | (a + b + N) + r[(r - s)L] + E[(r - s)L]
Excess Care | a + b + c | r - s - t | (r - s - t)L | (a + b + c) + r[(r - s - t)L]

The physician will only take due care if the total disease costs of due care with jury error and negligence are less than that of excess care:

**[Equation 8]**

\[(a + b + N) + r[(r - s)L] + E[(r - s)L] < (a + b + c) + r[(r - s - t)L]; N + r[(r - s)L] + E[(r - s)L] < c + r[(r - s)L] - tL; or 0 < c - tL - E[(r - s)L] - N.\]

Compared with Equation 5, Equation 8 shows that the addition of physician misperceptions (assuming physician misperception of increased liability) further decreases the cost of taking excess care by N. Thus, physician misperception of increased liability, combined with an increasing jury error rate under due care, may create a stronger incentive to provide excess care.

Similarly, if we relax the assumption that excess care has no probability of being deemed some care (and hence negligent), and assign the negligence probability of excess care the same probability as due care (E), then physicians will only take due care if the total cost of due care with jury error and negligence misperceptions is less than the total of excess care with jury error:

**[Equation 9]**

\[(a + b + N) + r[(r - s)L] + E[(r - s)L] < (a + b + c) + r[(r - s - t)L] + E[(r - s - t)L]; N + r[(r - s)L] + E[(r - s)L] < c + r[(r - s)L] - tL + E[(r - s)L] - EtL; or 0 < c - tL - EtL - N.\]

68. Thus, if \(0 > c - tL - E[(r - s)L] - N\), physicians will take excess care. Rearranging, if \(c < tL + E[(r - s)L] + N\), then the physician will take excess care. Note again, with increasing jury error and physician negligence misperception, there is a decrease in cost associated with taking excess care.

69. See page 28.

70. As above, if \(0 > c - tL - EtL - N\), then the physician will take excess care. Again, since \(c < tL + EtL + N\), any increase in E and/or N will decrease the cost to the physician of taking excess care.
Again, like Equation 8,71 Equation 9 shows that the decision to take excess care is independent of the expected disease costs of due care. Further, analogous to Equation 4,72 if physicians misperceive liability as increasing negligence determinations, the cost of excess care is decreased by N.

Likewise, if we relax the assumption of equal probabilities of negligence under due and excess care situations such that a jury continues to consider due care as some care with a probability of E, and excess care as some care with a probability of F, then physicians will take due care only if the total cost of due care with jury error and negligence misperceptions is less than the total cost of excess care with jury error:

\[
\begin{align*}
(a + b + N) + (r - s)L + E[(r - s)L] &< (a + b + c) + (r - s - t)L + F[(r - s - t)L]; \\
N + (r - s)L + E[(r - s)L] &< c + (r - s)L - tL + F(r - s)L - FtL; \\
0 &< c - tL - FtL - (E - F)[(r - s)L] - N.
\end{align*}
\]

Compared with Equation 7,73 and similar to the preceding analysis, Equation 10 indicates that when the factor of physician misperceptions is introduced, it further decreases the cost of taking excess care. Equation 10 also shows that an increase in the relative probability that juries will assign negligence at the lower due care level, as compared with the higher excess care level, will further decrease the cost of taking excess care.

**IV. Summary and Concluding Remarks**

Overall, when jurists and researchers consider the tort system’s incentive effects on injurers, they often implicitly assume that injurers know and understand the system’s (hoped-for) social incentive function and that there is a single, commonly understood judgment standard. However, as demonstrated by the physicians in this study, these assumptions may be questionable in medical malpractice cases. Here, the physicians were ignorant about the common law of tort, and their perceptions regarding the legal definition of negligence were clearly incomplete and incorrect. Further, the divergence of negligence assessments by juries and this study’s physicians of approximately 50 percent74 implies that the negligence system may not (or cannot75) be adjudicating medical malpractice cases solely on the basis of medical appropriateness. This contention is also consistent with the possible bias shown by NPs when they assigned physician actions as relatively more negligent—and their greater concordance with jury

71. See page 31.
72. See page 26.
73. See page 30.
74. In other words, physicians and juries agree approximately as frequently as would be predicted by chance.
75. Due to the multiple standards of care defined by the medical profession and demonstrated in this study.
verdicts in the absence of medical appropriateness and legal knowledge. Finally, the aforementioned difficulties are exacerbated by interphysician discordance of negligence determinations. This discordance may indicate that the medical appropriateness standard in certain cases may not represent a single, uniform professional standard as is generally assumed; that is, there may be significantly different perspectives of what is acceptable care (at least in the specialty of radiology).

The observation of multiple appropriate standards of medical care combined with the possibility that juries use alternative adjudicatory standards and are not strictly neutral would support the contention that some care adjudged negligent is not. Further, these factors, in addition to negligence misperceptions by physicians, may result in physician incentives to provide excess care (i.e., defensive medicine) that concomitantly increases patient risk. Thus, ironically, the “clear message[s]” that the accepted tort system model sends to physicians to “avoid [providing] substandard [i.e., negligent] care”\(^6\) may be significantly muddied by reality and lead to socially excessive levels of care and increased patient injury.

Building on this empirical data, models incorporating these factors show that physician misperceptions concerning the definition of negligence, physician perceptions of jury error, and/or actual erroneous jury assignment of negligence appear to decrease the cost of providing excess care. Indeed, the potential tendency for NPs to assign negligence to physician care illustrates that jury error may represent a particularly prominent factor in malpractice litigation and hence provides physicians with additional incentives to render excessive care. Again, it bears emphasizing that there is a concurrent increase in patient risk of injury associated with the excess care.

When the probability that a jury will assign negligence is equal under both due care and excess care, the decision to provide excess care is theoretically determined by excess care factors alone. If physicians only look to excess care variables when they determine what level of care to provide, a knowledge or perception that NPs or juries are significantly inclined to adjudge their actions as negligent may cause physicians to further inflate their estimates of \(E\)\(^7\) (i.e., closer to 1) and thus provide excess care even in situations where it would otherwise not be rational to do so. This tendency to overestimate jury error probability,\(^8\) in addition to misperceptions of negligence and physician-jury divergence in negligence determinations, may represent a significant source of defensive medicine. Of course, this result is not socially optimal because it causes the physician to inappropriately allocate risks and resources to the patient and decreases overall welfare due to the injury or potential injury inherent in excess care.

Researchers have presumed that the negligence system in tort law provides

76. White, 13 Health Affairs at 76-77 (cited in note 6).
77. Recall that \(E\) represents the probability that juries will classify due care as negligence.
78. Recall the overestimation by physicians of the incidence of malpractice claims by a factor of three. See text accompanying note 35.
clear incentives for providers to practice nonnegligent medicine. However, the implicit assumptions that physicians are knowledgeable regarding the tort law system and that there is a single common standard of medical appropriateness used by both juries and physicians to assess negligence seem to be of doubtful validity—at least for the physicians in this study.

Indeed, if the results of this inquiry extend to most physicians, ignorance of the tort system and its standards alone would suffice to question the effectiveness of the incentive structures assumed by legal researchers. But even if physicians knew of and had the time to study the common law of negligence (i.e., they knew both how to find case law and how to analyze it using strict negligence definitions), the finding that physicians do not assess negligent or nonnegligent care like juries (for whatever reason) undermines any “teaching” role that the tort system could independently provide. In fact, as was found here, the only “clear” incentive is to take excess care due to unclear jury determinations of negligence.

Similarly, even if physicians could be “taught” by the common law of tort to develop the ability to differentiate negligent versus nonnegligent care as defined by juries, their lack of knowledge regarding the existence of case law and standards of the malpractice system also undermines any “teaching” role of the tort system. However, without either knowledge or differentiation ability, it would appear that any chance of providing physicians with “clear” incentives to practice socially optimal medicine is dim indeed. Thus, if this study’s results apply to the general physician population, a fundamental reexamination of the tort system and its presumptive effects on physicians is necessary in order to determine how to actually encourage physicians to deliver efficient and appropriate levels of care and how to limit the provision of excessive care so that patients only incur a suitable amount of risk.

A system that could accomplish such goals cannot be adequately designed without additional information regarding the physicians who are affected by the malpractice system and negligence rule. If physicians are (or can be taught to be) responsive to incentive structures as defined by the legal system, then there is some role for the use of the traditional tort system to attempt to establish effective physician incentives to provide socially optimal care. In this case, a significant effort to educate physicians regarding the tort system, common law, defenses, and so on would be required. In addition, cross-professional communication channels for previously unpublished and settled cases would be necessary to provide physicians with information regarding the current standards that are deemed socially acceptable and thus optimal. However, the costs of such a system appear to be prohibitive.79

Alternatively, if physicians cannot be educated regarding the legal incentive

79. “[E]ven an uncertain rule can be adjusted, in theory, to produce the optimal level of compliance by those subject to the rule. However, the information needed to calculate and implement the proper adjustment appears to be at least as complex as that required to calculate the cost-effective level of care.” Calfee and Craswell, 70 Va L Rev at 1001 (cited in note 7).
structure, either because physicians are inherently averse to legal matters or because the practice of medicine does not lend itself to a single uniform standard,\textsuperscript{80} then it becomes important to attempt to design an incentive system that does not depend on determinations of negligence. However, it would then behoove the system designer to have a fundamental understanding of both the nature of physician behavior and reactions to proposed incentives in order to fashion an incentive structure that supports the provision of optimal medical care. Lamentably there is, at present, little information on these issues. Thus, if the results of this study are confirmed more broadly in the medical community, this may be a fruitful and important area for future studies to explore in order to provide potential alternatives to the current system.

Although our current level of knowledge regarding the decisionmaking processes of physicians in their care determinations, and juries in their negligence determinations, is "rudimentary,"\textsuperscript{81} this study shows that, at least on a preliminary level, the assumed knowledge possessed by physicians regarding the malpractice system may be a considerable overestimation. Further, the study also shows that juries appear to deem physician care as negligent on some basis other than, or in addition to, their understanding of (one or more) professional, customary standards of care. Overall, as in many initial empirical studies of this type, the results raise more questions than they answer. Nevertheless, in order to effectively examine the tort system and to assess its impact on physician behavior, researchers must build on empirical determinations of how actors in the system actually perform—rather than assert as self-evident, or hope with childlike simplicity, that their fundamental assumptions regarding the medical malpractice system are true.

\textsuperscript{80} For example, binary (negligent versus nonnegligent) definitions of care are too crude to encompass the majority of medical practice.

\textsuperscript{81} "Even the most rudimentary facts about the legal system are unknown or misunderstood." Derek C. Bok, \textit{A Flawed System of Law Practice and Training}, 33 J Legal Educ 570, 581 (1983).
V. Appendix A: Survey Instrument and Actual Verdicts

The following are the eleven cases given to the surveyed radiologists and NPs. Following each case is the actual jury verdict, which was not given to the survey participants.

CASE 1

FACTS: On 10/21/87 plaintiff, a 37-year-old food service manager, presented to [medical group] for diagnosis of a left breast lump, approximately 2 x 2 cm and of 8 months duration. She had a prior history of TMJ, Xanax and Halcion ingestion, and psychiatric and psychological treatment. Plaintiff had a company physical earlier that day, given by her former family physician. Plaintiff was seen first by Defendant internist Dr. H, of [medical group], at which time Plaintiff was examined and the lump palpated. Dr. H ordered a mammogram for diagnostic purposes, which was automatically approved per the group policy. The mammogram films were returned to defendant [Hospital] on 10/26. Upon receipt of the films, the medical technician was to review the patient's chart and place on her pre-report any pertinent clinical information. The pre-report form and films were sent for interpretation to defendant radiologist Dr. R. The pre-report form, however, was devoid of any clinical information regarding the lump. Since there was no clinical information, the patient was only 37 years old and there were only 4 films, Dr. R interpreted the request as a screening mammogram and read the films as normal. This was conveyed to Dr. H by way of a report. She in turn told plaintiff at her follow-up visit that the mammogram was normal and that she should return at age 40. She was allegedly told by Dr. H that the lump was a milk duct which sometimes get larger and not to worry about it (disputed). Relying on this advice, plaintiff did nothing for 2 years, despite the fact that the lump continued to increase in size. During this period she had 2 company physicals and saw psychologists and psychiatrists for other problems. In 10/89, plaintiff presented at [medical group]; and on examination, was found to have a breast mass that palpated at 10 x 15 cm. She underwent a modified radical mastectomy and was diagnosed as Stage III cancer. Late in 1/90 a distant metastasis was discovered in the right axillary nodes and her staging was changed from III to IV. Even with a question of further distant metastasis, all physicians testified that plaintiff is terminal. Defendant radiologist Dr. R was sued.

PLAINTIFF contended that defendant radiologist Dr. R misread the mammogram; that he failed to obtain clinical information which would have disclosed the existence of a mass; that he failed to require the clinician to correlate the mammogram with her own findings; and that as a result of Dr. R's breaches of the standard of care, plaintiff's cancer progressed such that while she was in Stage I when she presented in 10/87, she was in Stage IV by the time of her mastectomy in 1989.

DEFENDANT contended that he did not misread the mammogram; that in any
event, 20% of negative mammograms are false; that he read the mammogram as a screening mammogram since there was no clinical information available, that 4 films were exposed, and the patient was only 37 years old; that his actions were within the standard of care; that if there was a mass, he would expect the clinician to call back, which she did not do; that he did not have to include in his report a caveat for the clinician to correlate the report with the clinical findings, as this was the clinician's job. Defendant radiologist further claimed that plaintiff was in Stage II and not Stage I at the time of her visit in 10/87; and thus the change in her survival rate was not significant; and that the plaintiff was contributorily negligent for waiting two years before seeking treatment despite seeing other health care providers.

CIRCLE ONE:

Negligent  Most Likely  Can't Tell*  Most Likely  Not Negligent

<table>
<thead>
<tr>
<th>Negligent</th>
<th>Most Likely</th>
<th>Can't Tell*</th>
<th>Most Likely</th>
<th>Not Negligent</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

*Please indicate why:

[DEFENDANT VERDICT: Walker v San Gabriel Valley Medical Group, No GC 000 224 (LA Co, Cal Nov 6, 1991), available in LEXIS, Verdict Library, ALLVER File]

CASE 2

FACTS: On 12/6/83, plaintiff (79) underwent a barium enema performed by defendant radiologist Dr. S at defendant [Hospital]. Following the test, the plaintiff returned to her hospital room. Upon complaints of severe abdominal pain, she was examined by her treating physician, Dr. M. A call was made to the Radiology Department to review the films. Upon review, extravasation of barium was found and a diagnosis of a tear in the rectum made. General surgeon, Dr. D, was called in for consultation. A decision was made not to operate but to let the perforation heal on its own if possible. The plaintiff was put on a large and continuous regimen of antibiotics, including Tobramycin. The plaintiff experienced rectal incontinence for three to four months and permanent urinary incontinence, which has required her to wear a diaper for the rest of her life. PLAINTIFF alleged that the insertion and inflation of the barium enema catheter with inflatable balloon was done improperly. Plaintiff's expert stated that the inflatable balloon was overinflated causing the rectum to rupture. Further, it was alleged that the insertion and inflation should have been performed by the defendant radiologist under fluoroscopic examination. Plaintiff further alleged insertion and inflation was done blindly by a technician and the radiologist came into the room thereafter. Plaintiff, almost totally deaf, testified that she felt agonizing pain upon insertion and inflation of the balloon; it was disputed that a female
Roundtable

technician was involved and plaintiff's claim that “some man” performed the entire test. Plaintiff also claimed deafness due to the use of Tobramycin. DEFENDANT contended there were 2 ways of performing this test one of which is recognized—the recognized method was performed therefore the defendant was not responsible. Defendant further contended that it was within the standard of care to allow a technologist to insert the tip and inflate the balloon without fluoroscopic evaluation by a physician. As well, it was alleged that overinflation of the balloon on the tip could not have been the cause of the laceration as there was no evidence of extravasation until late into the test. The defense denied that the balloon could seal such a laceration until deflation. Defendant claimed that the cause of the laceration of the rectum was due to diminished mucosal elasticity due to age and long term Prednisone use of the plaintiff for arthritis.

CIRCLE ONE:

<table>
<thead>
<tr>
<th>Negligent</th>
<th>Most Likely</th>
<th>Can't Tell*</th>
<th>Most Likely</th>
<th>Not Negligent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Please indicate why:


CASE 3

FACTS: A 36-year-old male car assembly plant worker died of a pulmonary embolism hours after being tested for an embolism. Following open reduction surgery to his leg the decedent experienced chest pains. The defendant internist ordered tests to check for pulmonary emboli. The defendant radiologist reported that there was ‘no good evidence for pulmonary embolism’ and the defendant internist therefore took no action. The decedent died a few hours after being tested.

PLAINTIFF claimed that the defendant radiologist provided the internist with an unclear report and the defendant internist failed to clarify the report. The plaintiff contended that given the decedent’s symptoms the defendant internist should have administered the anti-clotting drug Heparin.
DEFENDANT internist asserted that based on the defendant radiologist's report administering Heparin was not indicated. The defendants contended that Heparin would prevent the formation of new clots but the clot that killed the decedent was already formed at the time of the radiologist's testing.

CIRCLE ONE:

Negligent  Most Likely  Can't Tell*  Most Likely  Not Negligent
Negligent                                      Not Negligent

5   4   3   2   1

*Please indicate why:


CASE 4

FACTS: On 10/12/84, a 33-year-old part-time teacher's helper underwent a myelogram that left her partially paralyzed. For many years in her life, plaintiff experienced back pain. After two episodes in which she experienced sharp pains following physical activity, plaintiff, who was married to a member of the Air Force, sought treatment at [Hospital]. Plaintiff was admitted to the hospital on 10/2/84, with a diagnosis of a herniated disc. Lumbar spine x-rays and a CT-scan did not indicate a herniated disc. Plaintiff was given Valium as a muscle relaxer. On 10/6, the Valium was discontinued because plaintiff was not responding as expected. Robaxin, another muscle relaxer, was prescribed instead. On 10/8, plaintiff developed a rash on her abdomen, chest, back and upper arms. The origin of the rash was unknown. The physicians at the hospital recommended a myelogram; a diagnostic procedure in which part of the back is anesthetized, a needle is inserted into the spine and some fluid is withdrawn. The fluid is replaced by a dye, and the back is x-rayed. The dye used for plaintiff was Amipaque, a brand name of the contrast medium Metrizamide. On the night before the myelogram was scheduled to be performed, the defendant radiologist who performed the procedure testified that he met with the patient and explained the procedure to her in detail, including the common and unusual risks. Plaintiff denied that the defendant radiologist ever explained the procedure. On the morning of the next day, plaintiff signed an informed consent form and underwent the procedure. Plaintiff's back was anesthetized with a small needle, approximately 1.5 cm. in length. At some point after the Amipaque was injected into plaintiff's spine, plaintiff allegedly stated that she wondered if her legs were in the air, because she could not feel them. The defendant radiologist denied that plaintiff made this statement. In any case, the procedure was continued. After the procedure was completed, plaintiff experienced a weakness in both legs, a
tingling sensation in both feet and she was unable to stand or void. She remains partially paralyzed from the waist down.

PLAINTIFF alleged that the defendant radiologist never obtained plaintiff's informed consent because the risks of the procedure were never disclosed and plaintiff signed the form while she was on Valium. It was also alleged that the myelogram should not have been performed; that plaintiff had an allergic reaction to Valium that indicated a heightened sensitivity to Metrizamide, and that the doctors did not utilize tests that would have shown that an Amipaque myelogram was contraindicated. The plaintiff claimed that the positioning of the spinal needle during the procedure was improper. Plaintiff also contended that the procedure should have been stopped once the patient stated that she could not feel her legs, and that the defendant radiologist should have immediately withdrawn the Metrizamide from plaintiff's spine and given her massive doses of Decadron to reverse the adverse effects of Metrizamide. Finally, it was alleged that the follow-up care was inadequate.

DEFENDANT contended that the standard of care was met in all respects. Defendant argued that the cause of plaintiff's injuries was the contrast dye and not the needle inserted into the spinal column.

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*Please indicate why:

[DEFENDANT VERDICT: Avakian v United States, No 85 Civ 706 (N D NY June 12, 1990), available in LEXIS, Verdict Library, ALLVER File]

CASE 5

FACTS: Plaintiff, a 69-year-old school teacher, experienced a single episode of rectal bleeding. She was referred to defendant [imaging center] for an air contrast barium enema. Defendant radiologist ruptured plaintiff's transverse colon while performing the procedure. As a result, plaintiff required emergency surgery and had to wear a colostomy bag for eight months. She also required additional surgery for closure of the colostomy. Plaintiff had an excellent recovery.

PLAINTIFF alleged that defendant radiologist was negligent in inserting too much air into her colon, causing a rupture of an otherwise healthy colon.
DEFENDANTS contended that plaintiff had a pre-existing disease of the colon which weakened it or predisposed it to perforation or rupture during the barium enema procedure.

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[PLAINTIFF VERDICT: Lindquist v York X-Ray & Osteoporosis Center, Inc. and Sai B. Yoon, M.D., No 178998 (Cuyahoga Co, Ohio July 30, 1990), available in LEXIS, Verdict Library, ALLVER File]

CASE 6

FACTS: In 12/86, the plaintiff underwent a mammogram at the defendant [imaging center] which was interpreted as normal by the defendant radiologist. Approximately 13 months later, the plaintiff’s treating ob/gyn detected a lump in the plaintiff's right breast. The lump was biopsied and a diagnosis of advanced multifocal invasive carcinoma was made. The plaintiff’s mammography expert testified that the initial mammogram performed in 12/86 was misinterpreted by the defendant radiologist as normal. The plaintiff’s expert maintained that the mammogram depicted micro-calcifications indicative of breast cancer. The plaintiff’s expert maintained that had the microcalcifications been noted and a proper diagnosis been made at this early stage, the plaintiff would have had the opportunity to undergo a lumpectomy rather than the mastectomy procedure which she was required to undergo 13 months later. The defendant’s radiology expert testified that microcalcifications vary greatly in size from those which are clearly detectable to those which are so small as to be virtually undetectable. The defendant’s expert maintained that although microcalcifications were indisputably noted in the initial mammogram upon retrospective review of the film, the defendant’s failure to note the calcifications at the time of the initial interpretation was reasonable and did not constitute a deviation from the standard of care. The defendant’s expert oncologist testified that even if the defendant had interpreted the initial mammogram as positive for breast cancer, the outcome would have been the same due to the aggressive and invasive nature of the particular cancer from which the plaintiff suffered; further, a mastectomy would likely have been required even with early diagnosis. The defendant’s expert oncologist additionally testified that the location of the breast lump was different than the site of the microcalcifications depicted upon retrospective review of the mammogram, leading to his conclusion that the lump was not the advanced
progression of the cancer from the initial site, but cancer which developed from a completely separate site.

PLAINTIFF contended that as a result of the negligence of the defendant radiologist in failing to properly interpret a routine mammogram, breast cancer which was depicted on the mammogram was permitted to progress undiagnosed and untreated; that the defendant's alleged deviation caused a delay in treatment of 13 months which effectively deprived her of having the more conservative lumpectomy treatment.

DEFENDANT indicated that defendant's failure to note the calcifications at time of initial interpretation was reasonable and did not deviate from the standard of care.

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*Please indicate why:


CASE 7

FACTS: On 12/21/87, Plaintiff, who was 14 to 15 weeks pregnant, experienced mild vaginal bleeding. At that point she had not received any prenatal care for this pregnancy. Plaintiff called the [Clinic] where she had received prenatal care for two of her three prior pregnancies, notified them she was pregnant and had experienced bleeding. Plaintiff was told to lie down, elevate her legs, and rest. If the bleeding continued, she was instructed to go to [Medical Center] to be examined by a physician. Later that day plaintiff passed an additional clot of blood. Following the advice of [Clinic], she presented to the ER at [Medical Center] where she was seen by an ER physician who conducted a physical examination. The ER physician told her everything appeared fine but that she should return the following day for a pelvic sonogram which he would schedule for her. The following day, plaintiff returned to [Medical Center] where she was seen in the radiology department and a pelvic sonogram performed. The sonogram was interpreted by defendant radiologist Dr. W and interpreted as normal for a pregnancy of 14 to 15 weeks gestation. Later that day, Plaintiff presented at the [Clinic] where she registered for her prenatal care. She continued to be seen at the clinic periodically for prenatal checkups throughout the course of her pregnancy. In 5/88, an observation was made by one of the staff gy-
necologists at [Clinic] that plaintiff appeared to be larger than her gestational date would indicate. At that point a determination was made to refer her for a follow up sonogram to rule out the existence of twins. Plaintiff was referred to the High Risk Clinic because of the possibility of hydramnios (too much amniotic fluid). On 5/23/88, a follow up sonogram was done at [Medical Center] which revealed massive hydrocephalus. On 6/2/88, Plaintiff underwent a Cesarean section at [Medical Center] at which time a baby boy CG, was delivered. As allegedly demonstrated on the sonogram, the child was born with massive hydrocephalus. Since birth, CG has been hospitalized on numerous occasions for shunt revisions and replacements. CG was born with massive brain damage as a consequence of the hydrocephalus. As a consequence of the brain damage attributable to hydrocephalus, CG's physical impairments are considerable. He is unable to speak, walk, hold his head up, perform fine motor movement, feed himself, crawl, and requires the use of a child's seat in order to sit up. Given the profound nature of CG's physical and mental impairment his life expectancy is believed to be no more than a few years, at best.

PLAINTIFFS alleged defendant radiologist Dr. W failed to properly interpret the sonogram studies performed on 12/22/87 at [Medical Center]. Plaintiffs also alleged the sonogram films demonstrate: (1) the existence of hydrocephalus; and (2) the existence of polyhydramnios. Plaintiffs contend that based upon the information contained in the 12/87 sonogram, defendant radiologist Dr. W should have requested a repeat or follow up sonogram be performed within 4 to 6 weeks. Had this been done, hydrocephalus would have been diagnosed. Plaintiff testified that, if she had been made aware of the existence of congenital fetal defects prior to 26 weeks, she would have had an abortion.

DEFENDANT Dr. W denied liability and alleged that the 12/87 sonogram which he interpreted was normal and did not demonstrate either hydramnios or hydrocephalus.

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CASE 8

FACTS: Plaintiff, 61 year old male, consulted a general practitioner for complaints of intermittent claudication and history of syncope. Plaintiff was referred to a vascular surgeon who recommended arch and abdominal angiography, which was performed by defendant radiologist. There were no problems or complications during the procedure but approximately 5 hours following the procedure plaintiff complained of difficulty focusing. At the time of trial, plaintiff was blind and complained of brain damage and memory loss. Plaintiff could not remember the angiography or his hospitalization. Plaintiff claimed he would not have consented to the procedure had he understood what was being studied, as he had had cerebral angiography several years before and was told he had a narrowing of an artery in the brain and nothing could be done for that condition. On cross-examination, plaintiff’s expert acknowledged he could not say without speculating whether plaintiff’s damage was the result of vasospasm (a known complication of the procedure) or a drop in blood pressure.

PLAINTIFF contended defendant should have ordered prior studies and blood pressure monitoring during the procedure which could have been corrected had it been detected.

DEFENDANT radiologist claimed plaintiff never told his doctors about the prior procedure, and in any event the procedure was indicated given the symptoms. Defendant radiologist also claimed blood pressure monitoring with blood pressure cuff not required by the standard of care. There was not a fall in blood pressure during the procedure and any significant fall in blood pressure would have been apparent clinically; also defendant claimed he discussed the procedure thoroughly with the plaintiff who consented to have it done.

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FACTS: In 4/88, Plaintiff, a 40 year old female member of defendant [health group] through her employer, went to the [health group] clinic to be examined for a lump in her right breast. Plaintiff's initial diagnosis was fibrocystic changes and she was referred to defendant [imaging facility] for a mammogram. On 5/3/88, defendant radiologist Dr. S advised plaintiff that there was no suspicion of malignancy on the bilateral mammography and recommended an annual follow-up. In early 1989, Plaintiff returned to Defendant [health group] clinic with the same complaint of a lump in her right breast. Plaintiff was still diagnosed with fibrocystic disease. On 3/28/89, Plaintiff underwent a mammogram at defendant [imaging facility] which indicated a high probability of an infiltrating scirrhous carcinoma in the right breast. On 4/11/89, a biopsy was performed which indicated a moderately differentiated infiltrating duct with intraductal carcinoma in the right breast, and only fibrocystic changes in the left breast. Plaintiff had Stage II disease, with growth extending to the lymph nodes in the lower axillary nodes. On 4/19/89, Plaintiff underwent a modified radical mastectomy or removal of the right breast and had to undergo extensive chemotherapy and radiation therapy after surgery.

PLAINTIFF contended Defendants were negligent in failing to timely diagnose the breast cancer and in failing to perform a surgical biopsy on 5/3/88. Plaintiff also contended the diagnosis should have been made 11 months earlier than when the 4/11/89 biopsy was performed and that the delay has reduced her treatment options and survivability.

DEFENDANTS denied negligence and denied that any presumed delay altered the course and events of Plaintiff's condition.

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CASE 10

FACTS: Plaintiff decedent presented to [Hospital ER] complaining of a sore shoulder. An X-ray was taken of the shoulder. Plaintiff was told that it was a sprain and sent home. Later, the defendant radiologist reviewed the x-ray taken while plaintiff was in the hospital and sent a report to the hospital and emergency room advising that the plaintiff had a potential malignancy. No one ever notified the plaintiff, who later died of the malignancy.

PLAINTIFF contended that the defendant radiologist was negligent in failing to ensure that the decedent was notified of the fact that the x-ray depicted a possible malignancy, thereby causing a delay in treatment which deprived the decedent of the 5% chance of survival he otherwise would have had.

DEFENDANT radiologist contended that he fulfilled his obligations with regard to reporting the x-ray findings by notifying via report both the hospital and the emergency room that the x-ray depicted potential cancer.

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*Please indicate why:

[DEFENDANT VERDICT: McKain v Charles Moore, M.D., No 86-1219-NM (Kalamazoo, Mich Feb 22, 1990), available in LEXIS, Verdict Library, ALLVER File]

CASE 11

FACTS: Plaintiff female decedent presented to the defendant general practitioner in 12/86 with symptoms of a palpable lump in her breast. The defendant family practitioner sent her to the co-defendant radiologist for a mammogram which was read as negative by the co-defendant radiologist. There was a factual dispute as to whether the plaintiff was told to return for a follow-up exam and mammogram. The plaintiff's evidence indicated that the lump in the decedent's breast continued to progress in size and she developed a lump under her arm, eventually prompting her to seek another opinion. In 7/88, the decedent was diagnosed with breast cancer. Although she was immediately started on therapy including surgery and chemotherapy, she expired in 2/90. The plaintiff's expert radiologist contended that the co-defendant radiologist deviated from the standard of care in reading the 1986 mammogram as normal when, in fact, suspicious
microcalcifications were depicted. The plaintiff’s experts additionally maintained that both defendants were negligent in failing to ensure that the plaintiff return for a follow-up mammogram. The plaintiff’s expert oncologist opined that the decedent would have had a significant chance of cure had the breast cancer been diagnosed in 12/86 at the time of the initial mammogram. Defendants alleged that the plaintiff was told to return for follow-up care and did not. Defendants’ expert maintained the type of cancer from which the plaintiff suffered was not the type which would have responded to chemotherapy and radiation and that therefore the outcome would have been the same regardless of when the cancer was diagnosed.

PLAINTIFF contended that the defendant general practitioner and codefendant radiologist negligently failed to diagnose breast cancer at the time the plaintiff presented to the defendant.

DEFENDANTS denied that the mammogram was improperly read and asserted that the plaintiff was specifically advised to return for a mammogram after her next period and was overwhelmingly contributorily negligent in failing to return for follow-up testing.

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*Please indicate why:

VI. Appendix B: Tables

**Table A**

*Physician Demographics and Factors of Negligence Identified*

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Mean 12.05  2.85  1.45  
Standard Deviation 8.54  6.20  1.05
## Table B

### Agreement With Jury Verdicts by Physicians

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- 0.47
- 3.00
- 0.33
- 2.40
- 0.75
- 2.50
- 0.18
- 2.15
- 0.50

**Standard Deviation**
- 0.43
- 1.42
- 0.51
- 1.45
- 0.49
- 1.23
- 0.45
- 1.15
- 0.39
- 1.04
- 0.52

**AGREEMENT WITH JURY:** 0 = No, 1 = Yes  
**LIKERT VALUE:** 5 = Negligent, 4 = Most Likely Negligent, 3 = Can't Tell, 2 = Most Likely Not Negligent, 1 = Not Negligent
### Table B (continued)

**Agreement With Jury Verdicts by Physicians**

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**Std.**  
1.28  0.44  1.10  0.23  0.77  0.52  1.03  0.51  1.62  0.52  1.18  -

**Deviat.**

**AGREEMENT WITH JURY:** 0 = No, 1 = Yes  
**LIKERT VALUE:** 5 = Negligent, 4 = Most Likely Negligent, 3 = Can’t Tell, 2 = Most Likely Not Negligent, 1 = Not Negligent
**Table C**

*Agreement With Jury Verdicts by Nonphysicians*

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**AGREEMENT WITH JURY:** 0 = No, 1 = Yes
**LIKERT VALUE:** 5 = Negligent, 4 = Most Likely Negligent, 3 = Can't Tell, 2 = Most Likely Not Negligent, 1 = Not Negligent
**Table C (continued)**

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Mean 3.17 0.36 3.67 0.09 1.92 0.82 4.00 0.75 2.42 0.80 3.83 -

Std. 1.47 0.50 1.37 0.30 1.16 0.40 1.13 0.45 1.44 0.42 1.11 -

**AGREEMENT WITH JURY:** 0 = No, 1 = Yes

**LIKERT VALUE:** 5 = Negligent, 4 = Most Likely Negligent, 3 = Can’t Tell, 2 = Most Likely Not Negligent, 1 = Not Negligent
### Comparison of Physician and Nonphysician Agreement and Likert Values by Case

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### Agreement Averages

- Physicians: 0.44
- Nonphysicians: 0.52
CONFERENCE

Constitutions and ‘Survivor Stories’