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Symposium: What We Know and Do Not Know About the Impact of Civil Justice on
the American Economy and Polity
Article

***1595** DETERRENCE OF MEDICAL ERRORS: THEORY AND EVIDENCE FOR MALPRACTICE
REFORM

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I. Introduction

After a decade and a half of quiet slumber, medical malpractice litigation is once again becoming an area of significant interest in health policy. This is a result of two larger themes in health care policy--the "medical market" and the patient safety movement--intersecting at a somewhat curious location. The perceived need to provide care that is both cost-effective and safe has health care managers and policymakers grappling with how to build a "business case for quality." [FN1] This struggle, in turn, has generated interest in the possible role of medical malpractice litigation in deterring costly medical errors.

The theme of the medical market is not a new one in health care. Many observers of health policy, led (somewhat surprisingly) by legal academics, [FN2] have long argued that the only way to counter professional control over supply and demand in health care is to institute market incentives. These commentators believe that professional dominance has minimized the role of educated consumers and competitive market choices. [FN3] This control has allowed physicians and hospitals to thrive while insulated from efficiency demands.

In the vanguard of the marketplace movement has been managed care, with its integration of market themes into the doctor-patient relationship. Unlike traditional fee-for-service providers, capitated providers do not have a financial incentive to supply health services of marginal necessity or benefit. Managed care, unfortunately, has foundered due to consumer dissatisfaction and, in particular, the ongoing litigation brought by patients who have been denied care. [FN4]

***1596** Eclipsing managed care in the medical marketplace are emerging models of financing care that are described somewhat inappropriately and ironically as "getting the patient's skin in the game." These models attempt to place the patient's fiscal interest directly in the way of the physician's tendency to maximize income by oversupplying services. This can be accomplished through careful design of insurance programs based on high copayments for services or by borrowing concepts from the financial industry and selling health insurance that simulates a defined contribution plan. In the latter arrangement, the employee must pay out of pocket for care costs that surpass the employer's fixed contribution. Facing copayments or shortfalls, it is believed, will make the patient more of a hard-nosed shopper for health care. [FN5]

Under these market themes, a new business case for cost-effective health care arises. The "business case" is shorthand for the existence of economic incentives to drive producer behavior toward a desired outcome. With regard to cost-effective care, the business case argument is that consumers (whether employers or individual patients)

will shop for health care services based on both quality and cost. Physicians and hospitals must offer cost-effective care or they will lose market share.

The second major stream of innovative thought in health care today is the patient safety movement. Ignited by the Institute of Medicine's (IOM) 2000 report on hospital errors and adverse events, which suggested that between 44,000 and 98,000 hospital deaths in the U.S. each year are attributable to medical management, [FN6] regulators, insurers and employers are now demanding that quality and safety be improved. [FN7] Hospitals, too, are showing a heightened commitment to safety-oriented quality improvement. Increasingly they are focusing their efforts on using systems or processes of care which reduce the likelihood that human errors will be made or, once made, that the errors will go unchecked and result in injury to patients.

***1597** At the intersection of market activism and patient safety concerns is the evolving business case for quality. Market advocates believe that providers of health care will have to improve quality simply because the market demands it. [FN8] Informed consumers, tethered by restricted funds for health insurance and no longer believing that health care quality is uniform, will now be looking for evidence that an individual physician provides high-quality care and that the organization with which she works is safe. Therefore, the argument goes, providers will invest in new technologies and systems to reassure customers that they will be protected from iatrogenic injury. [FN9] If providers fail to do so, consumers will go elsewhere.

The business case argument is good theory, but little evidence exists to support it, largely because the appropriate incentives presently are not in place. The available data suggest that there is not much elasticity of demand associated with perceptions of quality in health care. In fact, the evidence seems to suggest the opposite. For example, the State of Pennsylvania has spent millions of dollars to gather relatively sophisticated evidence on outcomes from cardiac interventions, including cardiac surgery. This information is available to the public generally and certainly to individual citizens in Pennsylvania. [FN10] Yet a recent study found that very few cardiac surgery patients in Pennsylvania are aware of or use this information in any significant fashion. [FN11] Other analyses, too, suggest that consumers do not use quality information to shop for providers. [FN12] For better or for worse, people still seem to pick their hospitals and physicians as a matter of individual recommendation or convenience. [FN13] The business case for quality depends on patients acting as more informed and discriminating consumers than they presently appear to be.

There may, however, be a way to resuscitate the business case through a different set of incentives. Hospitals insure for medical malpractice, and the costs of that insurance are in many circumstances related to the number of ***1598** claims being brought and settled against hospitals. A low-quality institution can be expected to make more medical errors, resulting in more medical injuries. These injuries are actionable under the tort system and over time translate into the costs associated with experience-rated malpractice premiums. Higher premium costs theoretically will create a financial incentive to improve quality and safety in order to reduce the number of injuries. Physicians, the other main target of malpractice suits, are not generally experience-rated, but premiums rise for all physicians as the level and intensity of litigation increase. [FN14] The deterrent effect of malpractice litigation on medical errors therefore could be a significant part of the business case for quality for hospitals and physicians. But this possibility poses a critical question: Is there evidence that deterrence works in the medical malpractice realm?

In this Article, we examine in detail the various forces in health policy that are raising the profile of deterrence. We also examine the information available at this point on the deterrent effect of tort litigation and of malpractice litigation in particular, including evidence from studies that we have completed of medical injury and malpractice litigation in New York, Utah, and Colorado. We do find some limited evidence of deterrence, but conclude that overall the evidence is thin. We review possible explanations for the weakness of the deterrent signal and suggest a series of tort reforms that could focus deterrence so that it actually does create incentives sturdy

enough to improve quality. We conclude that a reformed liability system of litigation could play an important role in making a business case for quality in health care.

II. Policy Context: The IOM Uproar and Dénouement

While there is a strong focus in health care today on quality indicators-- centering on patient safety, but also including patient satisfaction, health functioning, and a host of other outcomes [FN15]--little discussion of medical malpractice arises in most of the literature and rhetoric about quality improvement. This is ironic because much of the renewed emphasis on quality is the result of the 2000 IOM report on medical errors, which was in turn based on a series of reports motivated by interest in reform of medical malpractice litigation.

***1599** A bit of history is helpful to understand this phenomenon. [FN16] In the mid-1970s, at the height of the tort crisis in California, the California Medical Association sponsored a study of the costs of medical injuries. [FN17] The investigators asked nurses and then physicians to review nearly 21,000 medical records in twenty-three California hospitals and to identify patients who had suffered an iatrogenic injury. Raters also evaluated the likelihood of a jury finding of liability. [FN18] They determined that 4.65% of people hospitalized suffered an adverse event and that 0.79% suffered an adverse event for which the provider would likely be found liable [FN19]--levels of injury that stunned the sponsors.

Because it was interested primarily in reducing the amount of tort litigation, the California Medical Association quietly killed the study. There was very little publicity about it and almost no publication. The study was largely lost until another group of investigators, based at the Harvard School of Public Health and the Harvard Law School, began a similar investigation in the late 1980s. [FN20]

The Harvard Medical Practice Study was modeled after the California study but also involved a thorough review of malpractice claims. [FN21] Working with Dr. David Axelrod, the head of the New York State Department of Health, the Harvard Medical Practice Study investigators undertook a review of 30,000 medical records while concurrently evaluating over 67,000 litigation records. [FN22] We estimated that 3.7% of New Yorkers suffered ***1600** adverse events and 1% suffered adverse events due to negligence. [FN23] Since this was a random sample of hospitals and a random sample of patients, we were able to upweight these sample statistics to population estimates for the entire state. The news was sobering. Nearly 7,000 New Yorkers were estimated to have died as a result of negligent injury in 1984. [FN24] These results attracted a reasonable amount of publicity and discussion in the early 1990s. [FN25]

Subsequently, a subgroup of the investigators undertook a validation study in Utah and Colorado. Using data from the early 1990s, the study found rates of adverse events and negligence that were quite similar to the New York findings, although there were many fewer deaths due to the negligent injuries. [FN26] This work was published and widely discussed in academic circles, [FN27] but little was communicated to the general public until the IOM Report cited these studies. The investigators, however, continued to write about these issues-- particularly Dr. Lucian Leape, who linked prevention of medical injuries to aviation safety issues and energized the field of "patient safety." [FN28]

All of these studies were intended to help bring about tort reform, albeit with varying motivations. The Californians wanted to reduce the amount of malpractice litigation and submerged their study for fear that that it would instead encourage more malpractice litigation. [FN29] The Harvard investigators were much more interested in sweeping reform: moving to a no-fault system that would involve more claims. Indeed, the Utah/Colorado study was undertaken in those states explicitly because well-placed parties suggested that sweeping malpractice reform might be possible. [FN30] However, those efforts crumbled against the strength of the lobby of the American Trial ***1601** Lawyers Association (ATLA) and the general lack of interest on the part of malpractice insurance companies. Throughout the 1990s, there was little perceived need for malpractice reform, largely because claims rates were not increasing significantly. Also, insurance companies could readily deal with the steady increases in claim severity by

making moderate increases in premiums. Thus, key individuals in the safety movement were beginning to grow pessimistic that any interest in patient safety could be generated in the health care community.

In light of these issues, IOM decided that new tactics were necessary. Led by a number of prominent figures in health care quality, many of whom had been frustrated by the widespread inattention to improving quality, the IOM Roundtable on Quality adopted a strategic approach. First, the Roundtable focused on the estimates of data from the Utah, Colorado, and New York studies. Extrapolating to the entire U.S. population, IOM was able to publicize eye-catching numbers of deaths in American hospitals. [FN31] Second, IOM explicitly decided to bypass the medical profession and the hospitals and go "direct to public," employing public relations techniques to reach the press and promote the study. Third, the group dropped any discussion of medical malpractice. Having seen that medical malpractice reform was difficult and contentious, they hoped to keep the patient safety movement out of that quagmire.

This direct campaign, it was thought, could succeed along two different pathways. The first was regulatory. Policymakers upset by the public's re-action to the lack of safety in American hospitals could institute legislative or regulatory reforms to motivate providers to bring about higher quality care. [FN32] Second, if regulation failed, IOM hoped that a business case for quality could be made. As noted above, many believed that consumers would choose health care organizations that had demonstrated a commitment to improving the safety of health care, whether through stronger professional oversight (e.g., providing round-the-clock coverage of intensive care units by intensivists) or systems-based approaches to error reduction (such as special computerized provider order entry systems for drug prescriptions). [FN33]

Nearly three years later, neither approach is proceeding smoothly. IOM has spurred regulators' interest in gathering quality data from hospitals [FN34] and state public health authorities' interest in using formal reporting systems to *1602 track adverse events. [FN35] However, broad reporting mandates have not been instituted, largely because of fears that such reports are not insulated from legal discovery by peer review protections. [FN36] Thus, while new and more burdensome requirements for hospitals to report on quality processes and outcomes are being discussed, it is not clear that that hospitals will comply.

IOM's other pathway, the hope that the business case would motivate providers to improve patient safety, is equally circumspect. As we noted above, little evidence exists that patients are ready to become quality shoppers at this point. Moreover, most providers remain skeptical that the usual quality measures actually indicate high-quality care. [FN37] As a result, there is ongoing hesitance by providers (likely supported by the professionalism and monopolistic tendencies of organized medicine) to pursue quality improvement for business reasons.

In light of these obstacles, the true gains from the firestorm of the IOM report are few. A recent development in Massachusetts is illustrative. Having been asked by one of the largest insurers in the state, as well as the architect of the insurance-purchasing cooperative for state employees, to report their compliance with the so-called Leapfrog criteria, [FN38] Massachusetts hospitals have simply refused. [FN39] This relatively high-handed behavior is the norm rather than the exception and casts real doubt on the notion that health care institutions have recognized a business case for quality. The IOM uproar is thus decreasing, perhaps to fade away, without bringing real change.

One way to resurrect the business case may be to invoke the role of the tort system. The theory of tort deterrence, simply put, is that providers can save money by avoiding the injurious errors that give rise to costly *1603 malpractice litigation. This theory is based on two key assumptions. The first is the law-and-economics notion that providers alter their clinical behavior in response to perceived malpractice risk. The second is that providers actually do internalize a large proportion of the costs of errors through the malpractice system--enough, anyway, to trigger the improvement of hospital care. We consider the empirical evidence for each of these assumptions in turn, beginning with

general evidence of tort deterrence and proceeding to a more specific discussion of the deterrent effect of malpractice litigation.

III. Malpractice and Deterrence: What Do We Know?

A. General Evidence of Tort Deterrence

For law-and-economics scholars, deterrence is the primary rationale for torts, easily outstripping corrective justice and compensation. [FN40] The costs of litigation create an incentive to take safety precautions. [FN41] Yet deterrence theory has its skeptics. As Gary Schwartz points out, scholars from a variety of different points of view, including Richard Abel, John Fleming, Jeffrey O'Connell, Richard Pearson, and William Rogers, all have raised significant questions about the strength of the theory underlying deterrence. [FN42] Some have argued that while morality itself should provide a sufficient reason for avoidance of dangerous activities, the tort system fails as a vehicle for expressing moral judgment. [FN43] Other critics of deterrence theory accept the general assumptions of the law-and-economics school, but suggest that insurance tends to insulate reasonable economic actors from taking appropriate precautionary steps. [FN44] This point is quite applicable in health care, where liability insurance is nearly universal.

*1604 Schwartz has attempted to bolster deterrence theory by suggesting that there are distinct arguments for strong and weak deterrence. [FN45] The strong argument is that tort law deters unsafe behavior in a comprehensive and systematic way, such as that suggested by Steven Shavell's economic models. [FN46] The weak argument is that tort law does not bring about complete deterrence, but does have some deterrent effect. [FN47] Schwartz, a believer in the weak theory, traces out the evidence available from surveys of physicians and executives, interviews with risk managers, and institutional case studies. [FN48] While he marshals an impressive catalogue of actions that have been taken to avoid litigation, the evidence is largely anecdotal. The reader comes away with the impression that the real distinction between strong and weak deterrence is that strong deterrence should be empirically demonstrable through economic models, while weak deterrence defies such demonstration but must nonetheless be occurring based on what people say about their actions and motivations.

Hard empirical evidence of deterrence is indeed difficult to come by. Several authors in the mid-1980s attempted to catalogue evidence of the strong theory of tort deterrence with little success. As part of the American Law Institute's effort to reform tort law in the early 1990s, Professors Dewees and Trebilcock reviewed available studies in motor vehicle safety, malpractice litigation, product liability law, workplace accidents, and environmental injury. They found mixed evidence of deterrence. [FN49]

Perhaps the best summary is Schwartz's own survey of several areas of tort law. In the field of workers' compensation, he acknowledged that Michael Moore and Kip Viscusi had demonstrated worker fatality rates are influenced by experience-rated workers' compensation premiums. [FN50] This relationship does not directly prove the deterrent effect of tort litigation, but it does demonstrate that forcing organizations to shoulder more of the costs of legally redressing injuries can bring about deterrence.

In the area of motorist liability, Schwartz cited the familiar studies of American no-fault laws. [FN51] All of these studies hypothesize that moving from a fault-based tort system to a no-fault system should lead to an increase in automobile accidents, and perhaps fatalities, due to the loss of tort *1605 deterrence. [FN52] However, the majority of studies found no increased fatality rate or accident rate, although Sloan's study (arguably the best done to date) did find an 18% increase in fatalities. [FN53] It should be noted that the data from these studies are quite mixed and subject to a variety of methodological problems. [FN54]

In the area of product liability, the evidence is also mixed. Schwartz reviewed several major product liability class actions, including the Oraflex arthritis drug, Shiley heart valve, and Bard catheter cases, and found that product liability did not play a significant safety-inducing role in manufacturer decisionmaking. [FN55] The manufacturers continued to produce unsafe products even after they became aware of the defect and

their tort exposure. The fact that manufacturer negligence continues to be so widespread, Schwartz argued, is proof that the strong theory of deterrence does not hold water in the area of product liability. However, Schwartz found enough evidence to be persuaded of the applicability of the weak theory. [FN56] He related evidence from a series of surveys conducted in 1987 and 1988, at the height of the mid-1980s tort crisis, in which executives reported that their companies had made changes in procedures or product designs as a result of product liability and litigation experience. [FN57] But he acknowledged that the evidence varies from industry to industry, and clearly his evidence base is again primarily anecdotal. In an ALI study, Dewees and Trebilcock, reviewing the various empirical studies and dismissing most as simply case studies, drew a more succinct conclusion: "It is not clear that anything useful can be deduced from these data about the impact of the tort system on product related accident rates involving defective products." [FN58]

Schwartz's weaker theory is not really a theory at all, just an (unsuccessful) effort to shape a series of anecdotes into a persuasive argument for deterrence. [FN59] Case-study evidence is no substitute for a *1606 rigorous econometric analysis of firm behavior--for example, studies that compare behavior in geographic areas with different levels of tort risk, studies of behavior before and after liability reforms are introduced in a given area, or studies of safety records of firms with varying levels of past experience with litigation. Overall, outside of studies of medical malpractice, there does not exist much hard empirical evidence that tort law creates economic incentives for increasing safety that are sufficient to influence behavior.

B. Malpractice Liability and Defensive Medicine

Analyses of the deterrent effect of tort liability in health care historically have focused on the phenomenon of defensive medicine. Defensive medicine is care provided solely (or mostly) to reduce the probability of litigation. [FN60] Because some of the increase in intensity of health services attributable to defensive medicine is thought to be medically inappropriate, [FN61] a defensive-medicine response to perceived malpractice risk is really a measure of overdeterrence or excessive precaution-taking, rather than true deterrence of substandard care.

Defensive medicine has long been invoked by chronic defendants (physicians and insurance companies) as a rationale for enacting tort reform. [FN62] However, the overdeterrence rhetoric has not been firmly grounded in fact. Most defensive-medicine studies have failed to demonstrate any real impacts on medical practice arising from higher malpractice premiums. [FN63] The now-defunct Office of Technology Assessment of the U.S. Congress (OTA) comprehensively reviewed existing studies in 1994 and found nothing convincing. [FN64] In addition to this literature review, it also examined studies of changes in obstetrics access related to malpractice premium charges. [FN65] Finally, OTA surveyed several thousand physicians using clinical scenarios to elicit their perceptions of defensive medicine. It found some evidence that *1607 malpractice concerns spurred defensive practices, but the effect was weaker than previously believed. [FN66]

Later studies of obstetric care (an area in which defensive medicine is widely believed to be especially significant) have produced mixed findings. Some have found that higher malpractice risk increased the probability of delivery by cesarean section, [FN67] others have found the opposite, [FN68] and still others have found no association. [FN69] One group of researchers has identified defensive-medicine effects in other clinical settings, but their methods are somewhat peculiar. [FN70]

It is likely that defensive medicine, to the extent that it ever took place, has diminished over time in response to the growing presence of managed care. In a fee-for-service system, the economic incentive structure encourages defensive medicine, but physicians in capitated practices lose money with each additional service ordered. [FN71] Even if physicians ignore the economic incentives, their ability to order tests and procedures of questionable medical necessity is increasingly circumscribed by the oversight of cost-conscious managed care payers.

C. Malpractice Experience and Error Deterrence

1. Published Study Findings. --There is little evidence of true error deterrence stemming from medical malpractice liability. Studies of obstetric care have failed to identify any differences in the quality of care rendered by obstetricians with varying histories of malpractice claims. A review of obstetric-care medical records for sentinel markers of errors and other indicators of substandard care found no relationship between the provider ***1608** having been "punished" by the malpractice system and having fewer future deviations from the standard of care. [FN72] Another study examined the effect of malpractice threat on a range of birth outcomes and found no systematic improvement in any of the outcomes associated with a physician's prior claims experience. [FN73]

Studies have also been conducted on the relationship between physicians' past malpractice claims experience and their chances of being sued again. [FN74] It is tempting to view these as deterrence studies because a positive finding would suggest that the experience of being punished for negligence reduces the likelihood of further negligence. [FN75] However, the deterrence question cannot be answered by these studies for two reasons. First, an absence of lawsuits against a physician does not imply an absence of negligence, since only a tiny fraction of patients injured due to negligence file a claim. [FN76] Second, it might be the case that physicians' perceived malpractice risk exerts a stronger influence on their practice behavior than their actual claims experience. If so, then studies that focus on the actual claims experience rather than perceived litigation risk as the variable of interest may miss the mark.

Perhaps the most thorough deterrence analysis to date is that performed as part of the Harvard Medical Practice Study. Two study findings prompted the HMPS investigators to undertake an econometric analysis of deterrence. First, the HMPS data showed a fivefold variation among New York hospitals in the risk of suit per patient admission, and we wondered whether hospitals in higher-risk areas had fewer medical injuries than those in lower-risk areas. [FN77] The wide intrastate variations in malpractice risk created an opportunity to study this relationship. [FN78]

***1609** Second, Ann Lawthers and colleagues surveyed 739 New York physicians about their attitudes towards malpractice risk and found evidence that it could be exerting a deterrent effect. Lawthers found that physicians were extremely concerned about malpractice litigation and that they systematically overestimated the risk of being sued. [FN79] While HMPS data showed that only 13% of negligent injuries, and only 4% of all medical injuries, resulted in malpractice claims, the physicians surveyed estimated that 60% of negligent injuries and 45% of all injuries led to claims. [FN80] Further, the physicians estimated the annual rate of suit per 100 physicians in New York at nearly three times the true rate (19.5% versus 6.6%). [FN81]

The deterrence question was investigated further in an econometric analysis of the HMPS data on claims and adverse events. [FN82] Multivariate regression models were constructed using a special technique known as simultaneous equations. Simultaneous equations are used to control for possible two-way causality, or endogeneity, between two variables--here, between rates of malpractice claims and rates of negligent adverse events. [FN83] The investigators jointly estimated two regression equations. First, hospitals' malpractice risk, defined as the proportion of negligent injuries resulting in malpractice claims, was modeled as a function of patient characteristics (age, race, insurance, DRG risk group), hospital characteristics (ownership type, teaching status), and geographic area characteristics (location, urbanization, population density, county per capita income). A deterrence model was then estimated to test the effect of the malpractice risk variable on three different outcome variables: per-patient hospital costs, the proportion of all hospitalizations that resulted in a medical injury, and the proportion of all medical injuries that were due to negligence. [FN84] By incorporating predicted values of the malpractice risk variable from the first-stage regression into the second-stage models, the investigators hoped to avoid the statistical problems that occur when single-equation methods are used in the presence of endogeneity. [FN85]

These analyses determined that hospitals facing the highest tort risk had higher-than-statewide-average costs per patient, while hospitals with the lowest tort risk had significantly lower per-patient costs, [FN86] suggesting a deterrent effect due to tort risk. However, when other measures of the impact of tort risk on medical practice were tried, the result proved unstable. [FN87] *1610 Although the malpractice risk variable was negatively associated with the proportion of hospitalizations involving adverse events and the proportion of adverse events involving negligence, the association did not achieve statistical significance at the conventional level. [FN88] The HMPS investigators struggled with how to interpret these results and ultimately settled on this conclusion: "Although we did observe the hypothesized relationship in our sample--the more tort claims, the fewer negligent injuries--we cannot exclude the possibility that this relationship was coincidental rather than causal." [FN89]

The lack of robustness of the estimates of deterrence is a critical issue. The one HMPS model that did show a pronounced deterrent effect used measures of the intensity of services provided as the dependent variable. This choice is common among researchers modeling the impacts of the tort liability system on medical practice. [FN90] However, increased per capita quantity or cost of services does not necessarily reflect better quality care or lower error rates. Increased quantity or cost may reflect several different phenomena: (1) increased ordering of services that are not medically necessary (defensive medicine); (2) ordering of services that are medically indicated and improve the overall quality of care, but do not effect a reduction in the number of adverse events; (3) ordering of services that do reduce the number of adverse events (deterrence); or (4) ordering of services necessitated by an adverse event. Of these, only the third possibility is an indicator of deterrence. The fourth illustrates that higher per-capita costs may actually reflect increased rates of adverse events. Thus, models of quantity or costs of services may be useful for analyzing the defensive-medicine effect, but they offer limited information about the deterrence effect.

Unfortunately, it is difficult to infer much about the deterrent effect from the other HMPS models either. Arguably, one should not cling too tightly to the idea that significance levels of 0.05 or better must be demonstrated in order to draw an inference that an association exists between two variables. There is an element of arbitrariness to the choice of that level, and in many areas of health care research where sample sizes are inevitably small, researchers are content to speak of a "trend toward significance" where p-values of 0.10 or slightly larger are obtained. This level of evidence has proven sufficient to induce some changes in medical practice, especially where clinicians have feared that waiting for an ironclad scientific determination before acting might result in harm to patients. The HMPS investigators made an argument of this kind, noting that because collecting adverse event and malpractice claims data from a large nationwide sample *1611 would be extremely arduous, policymakers would have to be content with more tentative statistical conclusions about deterrence. [FN91] There is much merit to this argument, yet it cannot be ignored that in the HMPS analysis, the significance levels in most models (for example, $p=0.19$ in the proportion of negligent adverse events model) did not even admit much talk of "trend."

2. Re-analysis of the Harvard Medical Practice Study Data. --Recognizing the limitations of the initial HMPS analysis, a different subgroup of the investigators later took a second stab at modeling deterrence. One of the investigators had done some additional work on constructing measures of deterrence, [FN92] and we hoped that a more sophisticated model might yield more conclusive findings than the initial models had. Over a three-year period in the mid-1990s, several researchers in a variety of disciplines debated the proper specification of these models, often clashing over suggested approaches. The number of different models proliferated; by the conclusion of the project, the team had run models with four different measures of malpractice risk, two different outcome measures, and two different estimation strategies. In the end, we were unable to agree that any one model was correctly specified, and also could not agree on how to interpret the group of findings as a whole. As a result, we did not submit our findings for publication. However, our experience helps explain why an epistemological gap persists

concerning deterrence.

The investigators tried modeling risk alternatively as (1) the number of claims brought against the hospital per 1000 discharges; (2) the number of claims against hospital-affiliated physicians per 100 physicians; (3) the average perceived malpractice risk reported in physician survey responses; and (4) the "relative premium," an index incorporating both claims frequency and average severity (payoff). We used the same outcome variables as in the earlier HMPS analysis: the proportion of hospitalizations involving adverse events and the proportion of adverse events involving negligence. We loaded the models with a range of explanatory variables to control for potential confounding, including hospital ownership, teaching status, disproportionate share status, proportion of self-pay and Medicaid patients, operating costs, and location as well as patient risk factors such as age, sex, DRG weight, and clinical specialty. All models were run twice, once under the assumption that there was no endogeneity between malpractice claims and adverse events and once using simultaneous-equations methods on the assumption that endogeneity did exist.

This multi-pronged assault on the elusive deterrence phenomenon, which could be lauded as a careful sensitivity analysis or derided as a ***1612** statistical fishing expedition, failed to achieve the clarity regarding the deterrent effect that the investigators sought. We were unable to determine conclusively whether an endogeneity problem in fact existed that necessitated the more complex estimation method, or whether we had been able to satisfy the statistical assumptions necessary to make the more complex estimation valid. [FN93] Additionally, even among the models estimated using one of the two methods, the results varied depending on the measures of outcome and malpractice risk used. A statistically significant negative association (i.e., a deterrent effect) was found for the model with the number of claims against the hospital per 1000 discharges as the malpractice-risk measure and the number of adverse events per 100 hospitalizations as the outcome variable. However, none of the other models evinced a statistically significant deterrent effect.

Other problems also plagued this analysis. Some of the investigators worried that, notwithstanding the many explanatory variables included in the regressions, the models had failed to control for other variables that might affect rates of adverse events and negligent adverse events. In particular, there was concern that unrepresented hospital case-mix variables may have caused a problem of confounding--that is, the models omitted important patient-risk factors that might lead some hospitals to have higher rates of adverse events than others, even if they were similarly prone to negligence. Another issue pertains to the way in which the negligent adverse events variable was constructed. In an attempt to control for baseline differences in adverse events rates across hospitals, we chose to construct the outcome variable as the percentage of all adverse events that were attributable to negligence, rather than the absolute number of negligent adverse events per 1000 hospitalizations. While there was a good reason for this choice, it does limit the inferences that can be drawn about deterrence. If the malpractice risk variable was statistically significant in this model (which it was not), one would be able to make the conditional claim that the probability of being injured due to negligence was lower in hospitals with higher malpractice risk than in hospitals with lower malpractice risk, given that some adverse event occurred. This is not the same as the (more interesting) unconditional claim that a patient in a hospital with higher malpractice risk had a lower probability of being a victim of a negligent adverse event than a patient in a hospital with lower malpractice risk. [FN94]

***1613** The overall picture that emerges from the existing studies of the relationship between malpractice claims experience and medical errors is that evidence of a deterrent effect is (a) limited and (b) vulnerable to method-ological criticism. It is worth pausing for a moment to consider some of the broader issues involved in conducting studies of this kind that have made it so difficult to nail down empirical proof of deterrence and build a business case for quality.

3. Why Don't We Know More About Deterrence? --Empirical research regarding malpractice deterrence of adverse events and errors has proceeded slowly due to

several practical difficulties. As a threshold matter, the extraction of data on adverse events and negligence from thousands of medical records and claims files involves a massive organizational effort. Scores of physician reviewers at multiple sites must be recruited, trained, and compensated to perform this work, and the associated expense can be prohibitive. [FN95]

Even if funding can be obtained for data collection, [FN96] the analysis of the data poses a number of methodological challenges. First, a review of the existing deterrence studies makes clear that the choice of measures of deterrence and outcomes matters a great deal. Among the choices for measures of deterrence are number of claims per 1000 hospital discharges, number of claims per 100 hospital-affiliated MDs, perceived malpractice risk, and "relative premiums" (the product of litigation frequency and size of the typical indemnity payment per defendant). As noted above, these four comprised the four alternative risk measures in the HMPS re-analysis. Among the choices of outcome measures are number of adverse events per 100 hospitalizations, number of negligent adverse events per 100 hospitalizations, and percentage of adverse events involving negligence. In the HMPS analyses, the results regarding the deterrence effect were not robust to variations in these choices. Thus, choices of measures must be made carefully. Unfortunately, it is not obvious what the best choices are.

A second methodological issue is how to control for confounding variables, particularly hospital case-mix, in models of adverse events. If important variables that drive adverse event rates are omitted from the ***1614** regression model, the estimation may give misleading conclusions about the statistical significance of the included variables. The bias is typically toward overstating their significance. The HMPS deterrence analysis showed that it is possible to observe, measure, and include in a regression model many control variables that are likely to affect adverse event rates. However, it is likely that there remain unobservable factors which drive adverse event rates (such as dynamics of particular care processes). If so, then models of the deterrence effect will not generate estimates that closely reflect the true effect.

Finally, analyses of claims experience and error rates are thought to involve a problem of endogeneity. It is believed that claims experience may affect error rates (the deterrence effect), but also that the number of errors that a hospital experiences may affect the number of malpractice claims that will be filed against it. [FN97] If this is true, then running multiple regression models of error rates using the usual and simple technique of ordinary least squares (OLS) regression will produce misleading results. In the following regression equation, the error term u represents the effects of variables omitted from the model--factors that affect medical error rates but cannot be observed in a data collection effort.

Medical errors = f (malpractice claims, hospital characteristics, patient characteristics, u)
When endogeneity is present, there are likely to be omitted variables that affect both medical errors rates and malpractice claims rates. This violates a key assumption of OLS regression: that the explanatory variables and the error term are uncorrelated. [FN98] Estimating this equation in the usual way would generate estimates that are biased and inconsistent. [FN99]

There are two possible ways around this problem. One is to use simultaneous equations methods such as instrumental variables estimation to estimate not one but two regression equations:

Malpractice claims = f (hospital characteristics, patient characteristics, u_1) (1)

Medical errors = f (malpractice claims, hospital characteristics, patient characteristics, u_2) (2)

In the second equation, predicted values from the first equation are used for the malpractice claims variable. This approach assumes that the error terms u_1 and u_2 are correlated with one another (i.e., there are unobserved variables that affect both medical errors and malpractice claims). Because this method takes the correlated-error problem into account, the resulting ***1615** estimates of the deterrence effect will be consistent and may also be unbiased (depending on the specific estimation method employed). [FN100]

The problem with this approach is that it requires that the system be "identified," which means that some variable must be found that is appropriate for inclusion in the first equation but not in the second. [FN101] In other words, it is necessary to find a variable that affects malpractice claims rates but does not affect medical error rates. This has proven difficult to do. The HMPS investigators used urbanization and population density as identifying variables, [FN102] but they, as well as other commentators, have questioned the validity of these instruments. [FN103]

A more straightforward approach to dealing with the endogeneity problem is to use lagged data. The medical errors equation can be estimated using single-equation methods with medical errors data from year t and malpractice claims data from some previous year(s):

Medical errors $_t$ = f (malpractice claims $_{t-k}$, hospital characteristics $_t$, patient characteristics $_t$, u_2).

In this model, it is no longer conceptually possible for the causality between medical errors and malpractice claims to run both ways, because medical errors this year cannot be said to have influenced malpractice claims rates in previous years. However, this model requires a decision about which previous year(s) of malpractice claims data to use, which, in turn, requires accurate information about the timeframe of the deterrent effect. Is it the past five years of claims experience that acts as a deterrent? Or only the past year? Consider the yearly fluctuation in the number of claims filed against a hospital or physician. Would including several years of data dilute the deterrent effect potentially visible from a single high-claims year? Guessing wrong on this issue could result in a biased estimate of the true deterrent effect of prior claims experience. This brief methodological tour gives some impression of the mammoth task that empirical researchers have faced in trying to study the deterrence effect. As a result of these issues, the existing studies are few in number and subject to methodological criticism. The most reasonable inference from these studies is that there is limited evidence of a deterrent effect due to malpractice litigation. The study findings, while far from solid, are pro-vocative enough to suggest that further empirical study would be appropriate. The findings also raise a question as to why the existing evidence does not provide stronger support for deterrence theory. The remainder of this Article examines why the deterrent signal may be so weak in health care, and what might be done to strengthen it.

*1616 IV. Factors Clouding the Deterrent Signal

A. Insurance Effects

An important factor enervating deterrence is that physicians are nearly universally insured against medical malpractice. [FN104] The existence of insurance always dampens incentives for taking safety precautions, especially where insurance premiums are not structured to be responsive to the insured's claims experience. [FN105] The malpractice premiums for individual physicians are generally not experience-rated, except to the extent that premiums vary across clinical specialties and geographic areas according to known differences in claims risk. As a result, the deterrent effect of malpractice litigation is greatly blunted. [FN106]

The possibility of experience-rating individual physicians has received considerable attention and has been experimented with by a few states and many major insurers. [FN107] However, it is generally thought to be unworkable. [FN108] Malpractice claims against physicians are simply too stochastic to lend them much credence as an indicator of physician quality or risk. [FN109] Paul Weiler usefully has noted that in order for the experience-rating mechanism to be effective for deterrence, the following three conditions must be met: the rating formula must yield actuarially credible estimates of the true malpractice risk of each physician, the premium "tax" on physicians with relatively high claims experience must be large enough to exert a deterrent effect, and physician behavior must be responsive to such economic incentives. [FN110] There is reason to question whether all of these are likely to be true.

With respect to the actuarial issue, it is probably impossible to come up with a highly predictive rating formula for individual physicians. The statistical correlation between instances of negligent care and instances of lawsuits is poor. More importantly, the degree of autocorrelation in most physicians' claims experience over time is low. Arguments for experience rating find support in statistics showing that most physicians have very little ***1617** experience of being sued, while a small number of "bad apples" experience a large number of claims. [FN111] The distribution of actual losses (payouts to plaintiffs) is even more sharply skewed. [FN112] However, most physicians' claim experience fluctuates dramatically from year to year, so the number of claims (or total losses) from one year, or even a five-year period, is not a reliable predictor of their claims in years to come. [FN113]

With respect to the second point, insurers who have implemented experience rating have never made the tax on high-risk physicians more than 200% of the standard premium, and frequently it has been much lower than that. [FN114] Despite the relatively mild nature of this tax, the insurers found that instead of being chastened by the imposition of higher premiums, physicians tended to simply switch to another carrier. [FN115] Thus, the existence of competition among insurers on the open market undermines the possible deterrent effect of experience rating.

Finally, the general proposition that physicians are rational economic actors will always be controversial. All of these problems, as well as political difficulties and physicians' mass resistance to the concept of risk rating, have prevented insurers from adopting experience rating on a broad scale. This is no doubt a major factor weakening the deterrent value of malpractice litigation.

The situation for hospitals is somewhat different. After the tort crisis of the mid-1970s, many hospitals found it difficult to obtain insurance and therefore turned to self-insurance. Many aggregated to form their own mutual companies (the so-called bedpan mutuals). Others eventually purchased insurance from physician-based companies, which began to market hospital insurance in the 1990s that was quite similar to the mutual model.

The nature of arrangements within these mutual companies varies a great deal but generally follows parameters outlined by major actuarial firms and benefit consultants. [FN116] Premiums typically are experience-rated to at ***1618** least some degree. The Controlled Risk Insurance Company of the Harvard Medical Institutions (CRICO) is a good example. Hospitals pay a flat fee based on the number of beds they own and operate. The insurer annually calculates the number of claims and develops a five-year rolling average of claims exposure. This gives rise to an experience rating that results in a surcharge or a deduction. The experience rating is not insignificant: in a given year it can range from a surcharge of 20% to a deduction of 25%. Because experience rating does occur on a widespread basis for hospitals, the incentive-dampening effect of insurance is a less serious problem than for individual physicians. [FN117]

B. The Problem of Poor Fit

Even in a world of perfect experience rating, the deterrent signal would still be blunted by a second problem: the poor fit between instances of negligence and suing. Research has found that most instances of medical negligence never give rise to a malpractice claim, and that many malpractice lawsuits are brought and won by patients even though expert reviewers can identify no evidence of negligent care.

Early evidence of the problem of poor fit came out of Patricia Danzon's analysis of the California adverse event data. [FN118] Danzon matched the California Hospital Association data on adverse events with malpractice claims data from the National Association of Insurance Commissioners' survey of claims closed by private insurers from July 1975 to December 1978. The expert raters in this study estimated that about 1 in 20 hospitalizations involved an adverse event and about 1 in 126 hospitalizations involved an adverse event for which a jury would probably hold the provider liable (we will refer to these as negligent adverse events, even though the liability determination turned on more than a negligence finding). However, only about 10% of the victims of

negligent adverse events filed a malpractice claim. Further, of these claims, only 40% resulted in a payment to the plaintiff. Thus, the overall ratio of paid claims to injuries in the Danzon study was 0.039. [FN119] In other words, in this sample, a physician who committed an error leading to injury had only a 4% chance of having to compensate the patient.

A similarly poor fit between negligent injuries and claims was found in the HMPS sample. The total number of malpractice claims filed was about ***1619** 14% of the total number of negligent injuries. [FN120] However, this figure masks the incredibly small overlap between the group of patients injured by negligence and the group who brought suit. Less than 2% of those who were actually injured due to negligence filed a claim, and only about a sixth of the claims that were filed involved both negligence and an injury. [FN121]

When the HMPS investigators tracked the disposition of the 46 claims closed within a ten-year period, the results were dispiriting: 10 of the 24 cases that expert reviewers judged to have no evidence of an adverse event resulted in a payoff to the plaintiff (mean payment \$28,760), as did 6 of 13 cases judged to involve an adverse event but not negligence (mean payment \$98,132). Conversely, 4 of the 9 cases judged to involve negligent injuries resulted in no payoff to the plaintiff. In a multivariate analysis, the presence of negligence was not a statistically significant predictor of the outcome. Rather, the most important driver of damages was the severity of the plaintiff's injury, whether due to negligence or not. [FN122]

Researchers in the Utah/Colorado study returned to the fit question once again, using more recent (1992) adverse event data from 28 hospitals. We determined that adverse events occurred in about 3% of all hospitalizations, and that about 33% and 27% of adverse events were due to negligence in Utah and Colorado, respectively. [FN123] Thus, about 1% of hospitalizations involved a negligent injury. [FN124] When these data were matched against records of malpractice claims filed through 1996 relating to incidents from 1992, it showed that only 2.5% of the patients who were injured due to negligence filed a malpractice claim. [FN125] In total, the group of patients represented in the sample of medical records reviewed for adverse events filed 18 malpractice claims. The investigators determined that 14 of these claims involved no negligence and 10 involved no adverse event. [FN126] Only 4 claims (22%) actually involved a negligent injury. [FN127] The Utah/Colorado study did not examine payoff amounts and their correlation with negligence.

***1620** Overall, these three studies demonstrate that the fit between who is negligently injured and who files a malpractice claim is poor. While there is evidence that those injured due to negligence are more likely than those injured by non-negligent treatment to file a claim, [FN128] overall the data do not provide support for the notion that the malpractice system sends a strong deterrent signal to providers. Providers who are negligent face only a small risk of being sued, and providers who have not acted negligently cannot feel secure that they will not be sued. To invoke Paul Weiler's analogy of a traffic cop who allows many motorists who run a red light to pass without giving them a ticket, but gives tickets to many who proceed lawfully through green lights, [FN129] this mismatch undermines the deterrent signal of the economic sanction.

C. The Problem of Externalized Costs

Insurance effects and the problem of poor fit combine to undercut deterrence by severely limiting the extent to which the tort system can force hospitals to pay the costs of negligent adverse events. There is no question that errors exact a profound societal toll: in addition to their human costs, preventable adverse events produce national economic costs in the range of \$17 billion to \$29 billion annually. [FN130] These costs take several forms, including additional acute-care costs, long-term care and maintenance of the disabled, lost income, and lost household production. [FN131] Researchers have attempted to spur cost-minded hospitals to pursue error reduction by disaggregating error costs to the hospital level and pushing the business case for quality. [FN132] However, such statistics mask the fact that hospitals do not internalize

all of these costs.

In fact, most of the costs of errors accrue to other payers, including private medical insurers, Medicare and Medicaid, state disability and income support programs, and injured patients and their families. There exist only two mechanisms through which hospitals internalize error costs. One is by absorbing the cost of additional medical care necessitated by adverse events. The other is through payments associated with malpractice claims. [FN133]

***1621** It is unlikely that these mechanisms either individually or jointly result in a high degree of cost internalization. Health care costs (including out-patient and long-term care costs) account for only about half of the total cost of errors. [FN134] Moreover, providers may be able to obtain reimbursement for many of these care costs from insurance payers. While physicians who are paid through capitated arrangements will be unable to obtain additional reimbursement (absent some mechanism for augmenting capitation payments in complex cases) physicians who are paid on a traditional fee-for-service basis will be able to bill third-party payers for extra care costs. Hospitals that are paid on a per-diem basis may recapture nearly all of the cost of lengthened hospital stays necessitated by iatrogenic injuries, and even hospitals that are paid on a diagnosis-related group (DRG) basis may be able to claim additional payment by moving injured patients to a more complex DRG or claiming them as an "outlier" patient within their initial DRG. [FN135]

Payments associated with malpractice claims also do not represent a large portion of the cost of errors. Only a tiny fraction of all adverse events due to medical negligence result in malpractice claims, and only a fraction of claims filed result in a payoff to the plaintiff. [FN136] Furthermore, malpractice insurance premiums are rarely experience rated. Thus, unlike motorists who fear getting into an accident because it is virtually certain to mean higher insurance premiums for years to come, health care providers do not feel the full economic consequences of their mistakes.

Surprisingly, no empirical study has yet quantified the degree to which hospitals do or do not internalize the costs of error. [FN137] This is a significant omission given the importance that the business case for quality may play in hospitals' decisions to pursue or not pursue error reduction strategies.

***1622** We would propose a simple economic model for studying externalized costs:

$$E = T - (P + M)$$

where T is the total societal cost of medical errors in the hospital, E is the fraction of the total costs that is externalized outside the hospital, P is the hospital's malpractice premium, and M is the hospital's absorbed costs of medical care necessitated by errors. The hospital's internalized costs I, of course, are simply $(1 - E)$. The amount of the premium P will vary depending on the structure of the insurance system--most notably, the extent to which premiums are experience rated. The care costs M will vary depending on the mechanism through which the hospital and its affiliated physicians are paid (per diem vs. DRG, fee-for-service vs. capitated or salaried).

This model can be used for both descriptive and predictive purposes. By bringing together existing data from a variety of sources, it is possible to generate descriptive statistics for E and I for a given hospital. Data from the large adverse events studies (HMPS and UCMPS) can be used to estimate T. These studies calculated the statewide costs of preventable adverse events for New York, Utah, and Colorado and bootstrapped a national estimate of T by upweighting these state-level estimates. The estimates could also be disaggregated to the hospital level by using the Utah-Colorado cost data to run a regression model like the one developed for the deterrence analysis in HMPS, predicting the expected number of preventable adverse events for a hospital with a given set of characteristics (ownership type, teaching status, disproportionate share status, proportion of self-pay/Medicaid patients, operating costs, geographic location, patient case-mix, and physician specialty mix).

Data on a given hospital's premium costs P are obtainable from the hospital's malpractice carrier. To calculate M, one would estimate the total costs of medical care related to errors that the hospital is able to recoup by claiming additional

reimbursement. This calculation involves consideration of the extent to which the hospital's patients are covered on a DRG as opposed to a per-diem basis. After this descriptive analysis has been performed, it would be possible to examine the potential impacts of various malpractice reforms on the strength of the deterrent signal by using the model in a predictive fashion. That is, one could perform sensitivity analyses for the estimate of I by altering the factors that affect P . [FN138] As is discussed in greater depth later, ***1623** reforms could expand the use of experience rating, shift financial responsibility for individual physicians' malpractice premiums to hospitals, or adjust premium levels to cover patient compensation in strict liability for certain classes of iatrogenic injuries that are deemed ex ante to be preventable. The greater the increase in P owing to a particular reform, the higher the internalized costs I . As I increases, so does the strength of the deterrent signal and the business case for error prevention. With this framework in mind, it is appropriate to proceed to a discussion of possible reforms.

V. Sharpening the Deterrent Signal

A. General Approach

An understanding of the theory of tort deterrence and the problems that enervate the deterrent effect of tort liability provides a foundation for designing a better set of institutional arrangements for improving patient safety. Three insights into how deterrence operates are important to illuminating a path for reform. First, the deterrent effect occurs primarily at the institutional level. Individual providers will always lack strong tort incentives to improve care because most are sued so infrequently. [FN139] In contrast, hospitals and other institutional providers are repeat players in the tort system. They learn from past litigation experience and recognize that they have a real chance of being hauled into court again. Additionally, only institutions can muster the resources to bring about systematic improvements in patient safety. Because a large proportion of medical injuries are believed to be attributable to breakdowns in systems, rather than failures of individual clinicians, significant injury reduction can occur only when structural changes are made in practice. [FN140] Such structural changes are possible only by aggregating providers into units, such as hospitals or health care systems, and developing a coordinated strategy. The proposition that deterrence occurs at the hospital level is also supported by the one positive model from the HMPS analyses of deterrence. [FN141] Second, the deterrent effect does not differentiate between negligent injury and non-negligent injury. That is, fear of tort litigation pushes providers to try to avoid both negligent and non-negligent adverse events. This argument is again supported by the HMPS, which found a deterrence effect for all adverse events but not an effect specific to negligent adverse events. Part of the reason for this may be providers' uncertainty about exactly what ***1624** constitutes medical negligence. Research has suggested that even expert physicians, whose judgments are used as the basis for determinations of negligence under the medical custom rule, [FN142] are unreliable in identifying negligence. [FN143] The fact that deterrence applies to both negligent and non-negligent injuries suggests that the large administrative costs associated with identifying negligence in the current malpractice system may be wasteful. Third, reforms designed to strengthen the deterrent signal must address the three factors we have identified as plaguing malpractice deterrence: insurance effects, the problem of poor fit, and externalized costs. Collectively these effects minimize both the likelihood that an economic sanction will be imposed on providers in response to an error and the severity of the sanction. Research in the criminal law context has revealed that the severity and especially the certainty of punishment strongly influence the likelihood that an actor will engage in proscribed conduct. [FN144] Applied to malpractice liability, [FN145] this research suggests that, in order to strengthen deterrence, reforms must heighten certainty, severity, or both. In the following Section, we describe a proposal that would achieve this objective.

B. Targeted Malpractice Reforms

We advocate a shift to a system emphasizing greater enterprise liability and characterized by three features: channeling, experience rating, and limited no-fault compensation. Channeling refers to the aggregation of individual physicians into larger enterprises--hospitals and hospital networks--by consolidating malpractice insurance coverage in a single carrier. The hospital would cover the cost of malpractice premiums for its affiliated physicians, and the insurer would mount a joint defense to claims brought against both the hospital and individual physicians. The hospital's malpractice premium would be experience rated. Finally, a limited no-fault compensation scheme would be implemented, such that claims that fall within a predefined class of avoidable adverse events would be automatically paid by the insurer without a formal finding of negligence.

1. Channeling. --We believe that the key to using malpractice claims as a tool for deterrence is to channel individuals into a larger enterprise and focus on the organization as the unit of liability and deterrence. Theories of enterprise liability have long been a dominant theme in the economic ***1625** analysis of tort law. [FN146] Though much discussed, enterprise liability has in some ways lost focus, at times standing in for a whole series of reforms in tort liability from an expansion of strict liability to changing foci of responsibility. [FN147]

For our purposes, we describe a specific form of enterprise liability-- shifting responsibility for torts from individual physicians to institutions. While this proposal has been discussed in detail by other authors, the early work missed the target on the appropriate institutional locus for deterrence. Perhaps because much of this work was completed in the cauldron of Clinton health care reform, these authors suggested that the key institution in health care would be the managed care organization, and that it was appropriate to use managed care organizations as the unit of enterprise liability. [FN148] In light of the consumer backlash against managed care, this focus for liability is no longer viable. [FN149]

A better focus for enterprise liability is the individual hospital or hospital system. Increasingly physicians are directly employed by or affiliated with their hospitals or larger health care systems. These organizations are well situated to develop systemic approaches to the prevention of medical errors and injuries. Because they are chronic defendants, hospitals also are much more likely than individual physicians to respond to the malpractice deterrent signal.

Full-fledged enterprise liability, involving elimination of individual physician liability, is not politically feasible. [FN150] However, enterprise liability through channeling programs, in which the same insurer writes policies for both the hospital and its affiliated physicians, is practicable. As noted above, many existing malpractice arrangements involve channeling, because there are clear efficiencies in malpractice defense in combining the institutions ***1626** with the individual physicians. Such arrangements are especially prevalent in university teaching hospitals, where faculty are closely linked to the hospital and health care systems. For example, the Harvard Medical Institutions in Boston and the Federation of Jewish Philanthropies in New York already have channeling arrangements in place based on a hospital self-insurance mechanism. [FN151] There is probably enough channeling in the existing health care system to allow certain organizations to undertake a trial of enterprise liability.

2. Experience Rating. --Experience rating forms the second key feature of our proposed system. The aggregation of providers into an enterprise is a crucial prerequisite to making experience rating an effective tool for deterrence. As noted earlier, experience rating for individual physicians has been tried and has failed, for very good reasons. [FN152] Only larger aggregations of providers have the potential to develop the kind of consistent risk profile that experience rating would require.

Our proposed system would be quite similar to that employed by leading hospital mutual companies. Claims against physicians and hospitals would be aggregated on an annual basis. The resulting experience rating for policyholders would be adjusted for hospital-

specific risk factors unrelated to provider performance, such as specialty mix, presence of intensive care units, and payer and case mix. After this adjustment, it would be possible to identify outliers from the mean and use standard actuarial techniques to calculate premium surcharges or premium returns.

In many mutual companies today, the degree of experience rating reaches that found in workers' compensation. Recall that workers' compensation law is the one area where we find adequate evidence of deterrence. [FN153] The workers' compensation evidence gives us good reason to believe that this increase in internalized costs would prompt behaviors which would effect improvement in patient safety.

3. No-Fault Compensation. --Building on the insight that deterrence operates on both negligent and non-negligent injuries, we would advocate a modified no-fault program. We believe it appropriate to compensate, and hence deter, a subset of iatrogenic injuries both broader and more easily identifiable than the subset deemed to involve negligence. [FN154] For reasons *1627 discussed elsewhere, [FN155] we would choose the Swedish approach, which compensates those adverse events that are avoidable. Essentially, an injury is compensable under the Swedish system if (1) it resulted from medical treatment, (2) the treatment was medically justified, and (3) the outcome was avoidable. These criteria are relatively explicit [FN156] and are accompanied by over twenty years of precedent directly exportable to the United States.

The difference between a negligent and an avoidable adverse event is critical. The term "avoidable" is generally used to refer to events caused by one or more errors, while "negligent" refers to a subset of avoidable adverse events that are the result of substandard care. These definitions do not capture the key distinction, however: the concept of avoidability invokes the idea of error reduction through changes in systems of care, whereas the concept of negligence suggests that errors can be reduced by greater precaution-taking and perseverance by individuals.

Writing almost twenty years ago, Mark F. Grady recognized in the legal context that negligence is not actually a simple matter of personal deficiency or inattentiveness. [FN157] Rather, as those in the field of engineering have long recognized, all human beings are prone to mistakes. The key is to put systems in place to prevent or mitigate these mistakes. Adopting a systems focus changes our view of the role of negligence. Because the system is designed to prevent or mitigate the effects of instances of individual negligence, the occurrence of an injury due to negligence reflects a systems failure as well as an individual failure.

Some examples help explain this critical concept. Prior to 1975, patients undergoing general anesthesia often suffered brain injury if their endotracheal tube kinked or became detached. Anesthesiologists were trained to monitor the tubes, but they sometimes forgot (i.e., were negligent). Beginning in the late 1970s, anesthesiologists began to use endotracheal carbon dioxide monitors and venous oximetry monitors attached to alarms. These alarms went off when the patient was receiving inadequate oxygen, often due to a kinked endotracheal tube. A systemic response prevented the adverse event from occurring. Moral blame was no longer affixed to an individual. As another example, consider the sleepy resident who has been working for thirty-six hours and prescribes the wrong dose of a medication. Considering the event from a negligence perspective, there is some moral culpability here. On the other hand, had there been a computerized order *1628 entry system that prohibited the wrong dose of medication through an algorithm, or a policy that no one could be on call for more than eighteen hours, a system "fix" likely would have prevented the error that led to the adverse event. In this way, extending the notion of systemic prevention tends to minimize the role of the individual in causing the adverse event. [FN158]

Using an insurer-based administrative system to identify and compensate the subset of adverse events that are avoidable would reduce the costs associated with the determination of compensable cases, which currently proceeds through a showing of breach of the standard of care in a malpractice suit. Additionally, a focus on avoidable adverse events would overcome the problematic connotations that the concept of negligence has taken on in the minds of health care providers. As many writers have

made clear over the course of the last twenty years, physicians tend to equate negligence with moral misbehavior. [FN159] Consequently, they view errors as something to be hidden when they occur. [FN160]

Other industries in which clients face hazards, such as aviation, have adopted the more constructive approach of considering avoidable adverse events as valuable information to be studied and learned from. Regrettably, in medicine such events are hidden under the cloaks of the peer review and attorney-client privileges. For this reason, a malpractice system that turns on a determination of negligence cannot function effectively as a quality-improvement system that rapidly identifies errors and promotes learning and prevention. Moving from a concept of negligence to a concept of avoidable adverse events overcomes the problem of moral condemnation and encourages an engineering approach to error prevention.

C. Anticipating Potential Criticisms

1. Feasibility of Voluntary Reform. --We recognize that a broad-based move to the type of system we described is politically infeasible. With ATLA a strong lobbying force at both the federal and state levels, it would be impossible to undertake wholesale reform, moving most or all providers to a no-fault/enterprise liability system based on Swedish avoidable events. A variety of concerns about implementation, reduced payments, and especially ***1629** elimination of individual attorney fees in an administrative compensation scheme would make for rough sailing in most legislatures.

However, major insurers, hospitals, and health networks could move to an enterprise liability system on a voluntary basis. We believe many would choose to do so, for two reasons. First, they likely would find that a no-fault/enterprise liability system more readily synchronizes with their efforts to improve patient safety. As noted above, the moral blame and resulting secrecy of the tort system are the antitheses of modern quality improvement. Moving to a system that does not penalize clinicians for reporting adverse events would result in increased reporting and thus increased institutional learning about how to avoid errors in the future. Hospitals will realize cost savings from successful error reduction.

Second, hospitals have a business reason to consider moving to a no-fault/enterprise liability system. They might find that their customers like the alternative to tort. Hospitals have two kinds of customers: patients and medical staff. They must actively recruit both. A health center could market itself as a responsible institution, committed to providing compensation for avoidable injuries that is prompt, fair, and integrated with a physician reporting system. Such an institution would likely be attractive to both physicians and patients.

Physicians deeply resent the moral, economic, and psychic implications of malpractice litigation, and they would respond positively to the opportunity to practice in an environment free of these concerns. The rational and honest approach--identifying avoidable adverse events and compensating patients appropriately--would also appeal to physicians, who are bound by ethical precepts to disclose errors to patients but face a conflict of interest under the current negligence-based system in doing so.

Patients likely will also find it attractive to be cared for by hospitals that are committed to speedy reporting of avoidable adverse events and rapid compensation. Most consumers strongly favor policies promoting transparency and disclosure concerning errors: 73% of those participating in a recent survey believed public reporting of serious errors should be required of hospitals, [FN161] and in another study, 98% of patients wanted or expected to be told about even minor errors. [FN162] The fact that consumers do not appear to shop for providers based on quality may appear to undercut the argument that they will respond to a hospital's commitment to disclosure and compensation ***1630** of avoidable adverse events. However, the spectre of being the victim of a medical error appears to be much more compelling to consumers than the more garden-variety indicia of the quality of care. Public opinion polls conducted after the release of the IOM Report found that 51% of Americans were closely following the stories about medical errors in the newspaper and 42% know that the report felt that

medical errors were a "serious problem" resulting in a large number of preventable deaths. [FN163] Further, 47% of Americans were "very concerned" that an error resulting in injury would happen to them or someone in their family when they went to a hospital for care, and 69% said that reports of medical errors at a hospital would tell them "a lot" about the quality of the hospital. [FN164] Such statistics suggest that Americans may indeed be ready to shop for hospitals based on safety records and the ease with which they will be able to obtain compensation in the event of an iatrogenic injury.

For these business reasons, we believe there is a reasonable chance hospitals will wish to participate in a no-fault/enterprise liability system. At the outset, they may have questions, as the liability premiums from the enterprise-based system will be greater than their current premiums. Those using channeling approaches, however, will realize that the premium increase will be addressed by cost shifts between the hospital and its integrated medical staff. Moreover, they should realize that the promise of more patients, along with the increased probability of being able to reduce experience-rated premiums through improved adverse event prevention, more than justify initial costs that may be higher. In fact, we suspect that it would be possible to inject greater deterrence into the system through enhanced experience rating once patient demand for the new system grows and hospitals realize that prevention efforts do reduce premiums. The experience of Kaiser Permanente in California suggests that a voluntary program could work. Since the decision in *Madden v. Kaiser Foundation Hospitals*, [FN165] Kaiser has been allowed to have patients contract for a mandatory arbitration system as an alternative to malpractice litigation. That decision in essence overcame the California Supreme Court's historical opposition to adhesive exculpatory clauses signed by patients, as enunciated in *Tunkl v. Regents of University of California*. [FN166] As Richard Epstein has suggested, the *Tunkl* decision never had a strong economic basis. [FN167] Instead, *1631 he argues that individuals searching the market for the best mix of quality and price should be able to decide what sort of liability rules to which they will subject their disputes. Building on that theme, we would envision hospitals being able to sign up large portions of their medical staff and enrolling primary care patients into the suggested programs in much the same way that Kaiser enrolls its insured patients into the binding arbitration system.

Clearly it is unrealistic to expect that all, or even most, hospitals would voluntarily move to our proposed system, especially in the early years when its impacts on costs and market share are unproven. In particular, smaller hospitals that do not find it economically feasible to self-insure for malpractice would be unlikely to move to our system. [FN168] We also acknowledge that channeling will not work for all physicians. Some solo practitioners who admit patients to several different hospitals will be difficult to tie into a single enterprise. [FN169]

While these issues are real, it is quite possible that circumstances will change over time. Market trends are tying formerly independent physicians more and more tightly into hospitals and health systems. [FN170] Market forces also continue to promote consolidation of hospitals and other provider institutions into larger organizations that are more capable of self-insurance and of absorbing a greater proportion of the costs of injuries. Additionally, as evidence regarding the efficacy of an enterprise liability/no-fault system in promoting quality gathers into a critical mass, providers' initial reluctance to move to such a system may be overcome.

2. Costs of Injury Compensation. --Commentators have identified a series of problems with no-fault compensation schemes for medical injuries, [FN171] generally focused on the types of payments allowed under existing no-fault systems, the feasibility of such programs, and the method of deterrence. [FN172] We find these arguments largely unpersuasive. The allowable *1632 compensation is a system design feature that can take on many forms and need not reflect existing systems. For example, the system could compensate only for economic injuries related to job loss and medical costs, or it could also compensate for pain and suffering and loss of household production. We have previously estimated the costs of such alternative schemes for hospitals in New York,

Utah, and Colorado. [FN173]

We have also estimated the national costs of compensating avoidable medical injuries using HMPS and Utah/Colorado data. New York differs significantly from Utah and Colorado in terms of average severity of medical injury as well as wages and health care costs, [FN174] and the methods used to estimate the costs for the two data sets also were different. Nonetheless we identified very similar nationwide costs. The total costs of medical injuries were \$132 per capita in the Utah/Colorado study and \$147 per capita in the HMPS (in 1996 dollars). These figures yield total national costs in the range of \$37.6 billion to \$50 billion. [FN175] This research suggests that it would be possible to compensate many more injuries than are compensable under the current negligence standard and provide a reasonable range of covered losses without increasing the total cost of the liability system relative to the status quo. [FN176] Our calculation assumes that the administrative costs of the system would decrease fairly dramatically by moving to a no-fault methodology.

With various definitions of compensable events and various elements of compensation, it is possible to dial up or dial down the costs that might be associated with a no-fault system. We have suggested that in order to best comport with notions of system prevention, it is desirable to define compensable adverse events in a no-fault system as those adverse events that are avoidable. However, within this framework, the designers of a compensation scheme could increase or decrease the costs of the systems by selecting from the various possible elements of compensation. By covering a wider range of losses (e.g., paying the full amount of lost earnings without a deductible, compensating for lost household production, or compensating for pain and suffering), the system could increase the costs to providers associated with the liability system and hence bring about greater deterrence. On the other hand, those fearing the political pressures concomitant with a significant expansion in liability costs could be more parsimonious in their choice of compensation elements.

***1633** Political and economic reality would suggest that we cannot expect providers to endorse a system with costs far beyond those of the current regime. Indeed, one would suspect that even if the total social cost of the new system were lower than that under the current system, hospitals would be unlikely to switch to a program which would end up costing them more. However, we would still argue that at least some hospitals would be willing to sign on to such a regime because of the advantages identified earlier. Our tripartite system is more consonant with hospitals' systems-oriented quality improvement efforts than the current tort system, and any short-term increase in costs relating to injury compensation may disappear in the long run due to gains in business volume and error prevention.

3. Impact on Deterrence. --Some may argue that moving to an enterprise liability/no-fault system would weaken rather than strengthen deterrence. No-fault is often considered synonymous with no-deterrence, as many recall the analyses of no-fault motor vehicle accident systems. [FN177] But in fact, most no-fault systems do integrate deterrence through experience-rated insurance premiums. Workers' compensation systems, for example, have successfully used this mechanism to deter injuries, using the employer as the unit of rating. [FN178] We believe similar premium structuring could work in medical injury compensation.

By aggregating claims at an institutional level and applying an experience rating, our proposed system addresses the insurance effects that presently obstruct deterrence. Although some experience rating is currently performed for hospitals, the advantage of our system lies in its use of channeling. Rolling the claims experience of a hospital's affiliated physicians into the hospital's own experience rating brings about a clearer picture of the total liability risk associated with care rendered at the hospital. It provides a mechanism for incorporating physician-risk information into insurance premiums despite the fact that risk-rating physicians individually is not feasible.

The proposal also addresses the problem of poor fit by introducing an administrative mechanism through which avoidable injuries can be compensated more swiftly and accurately than under the current tort system. By eliminating some of the current

barriers to bringing claims, such as the protracted and adversarial nature of litigation, the system increases the likelihood that victims of avoidable adverse events will seek compensation for their injuries. The system also increases the accuracy of the ***1634** compensation scheme-- that is, the match rate between cases of avoidable injury and cases in which a payout is made. The problematic notion of negligence is replaced by the more straightforward finding of whether or not the alleged injury fits within predetermined categories of avoidable adverse events. Many of the variables that can lead to inaccurate outcomes at trial, such as the use of hired experts and lay juries, are replaced by a simple administrative system.

The use of an avoidability standard and an administrative claims processing mechanism will result in a greater percentage of avoidable injuries being compensated than are compensated under the present system. Returning to the role that certainty of sanctions plays in deterring inadequate precaution-taking, it becomes clear that the proposed system thereby increases certainty, and thus deterrence. If certainty in this context is conceived of as the product of the percentage of injured individuals who seek redress and the percentage of those filing a claim who recover damages, or

$$\Pr(\text{legal sanctions}) = \Pr(\text{claim} < \text{injury}) * \Pr(\text{nonzero payoff} < \text{claim}),$$

then the proposed reforms heighten certainty by manipulating both terms on the right-hand side of this equation. Furthermore, the use of experience rating and channeling makes certain that these sanctions will actually be felt by the providers, rather than simply absorbed by their insurance carriers. In other words, these reforms attack the problem of externalized costs. Because our proposed system would effectively attack the present barriers to deterrence--insurance effects, the poor fit problem, and externalized costs--there is every reason to believe that the proposed system would be effective in strengthening deterrence.

One may counter that while a system centered on enterprise liability might increase the deterrent signal for hospitals, it would weaken the effect at the level of the individual physician, resulting in a net loss of deterrence. Several responses to this argument may be made. [FN179] First, as we have described, there is very little evidence that the current system has much of a deterrent effect on individual physicians. The lack of experience rating of individual malpractice policies coupled with the infrequent and stochastic nature of malpractice claims against physicians undermines this effect. So, it is unlikely that we can do much worse than the status quo with respect to individual deterrence. Second, the gains in deterrence at the enterprise level probably would outweigh the individual-level losses. Hospitals are inherently more attractive targets for deterrence because of their size and resources, their status as chronic defendants, and the feasibility of experience rating their insurance premiums. Finally, it is a mistake to view enterprise-level and individual-level deterrence as a zero-sum game. Rather than ***1635** shielding individual physicians from responsibility for errors, an enterprise liability system will strongly motivate hospitals and health systems to find ways to provide incentives for their affiliated physicians to improve the quality of care.

4. Incentives to Report Adverse Events. --We acknowledge that because we incorporate experience rating at the level of the enterprise into our proposed system, the system retains disincentives for individual clinicians to report medical errors and adverse events to state reporting systems or hospital peer review and risk management bodies that are in a position to learn from them. Arguably, in our system clinicians will still be reluctant to report errors for fear that their insurance premiums will be hiked up as a result.

We discount this potential impediment for several reasons. First, premiums are rated according to claims experience, not the number of reports made. This is because only a fraction of reported incidents will end up as malpractice claims. Second, the individual doctor as reporter will see only a very slight change in compensation as a result of any one report to the channeled enterprise. Third, while hospitals will see an increase in premiums associated with an increase in claims, arguably the benefits of knowledge about preventable events outweigh the costs associated with short-term premium increases. This knowledge can be used to design system improvements to prevent error

recurrences, which will lead to lower premiums in the long run. Finally, any enabling legislation would have to place additional damages on any no-fault settlement that was not reported by the medical staff (if they should have been aware of it).

5. The Role of Corrective Justice. --Finally, no-fault systems are often objected to on the basis that they fail to incorporate notions of corrective justice. We acknowledge that we have focused on the functions of deterrence and compensation rather than corrective justice. [FN180] However, we would note that the voluntary no-fault system we propose serves the function of corrective justice more faithfully than existing no-fault systems (such as Sweden's), which operate as a mandatory, national administrative scheme. In our proposal, payouts to injured patients would be made by individual insurers, which would pass along the costs to hospitals through experience rating. Thus, the link between the party who injures and the party who pays is much tighter than in national systems.

It may still be argued that the system does not furnish corrective justice where the culpable actor is the individual physician rather than the hospital. This is true, but there is a growing consensus among those working to *1636 improve patient safety that most errors occurring in the hospital are fundamentally systems problems rather than manifestations of pure individual negligence. [FN181] We believe that the potential gains associated with focusing on hospitals as the responsible agents for quality improvement and systems as the key factor contributing to errors far outweigh the psychic benefits that exacting a pound of flesh from individual physicians may have for injured patients.

VI. Conclusion

We have proposed liability-based deterrence as a way to build a foundation for a business case for quality. If we can reform those aspects of the tort system that presently interfere with the deterrent signal of malpractice litigation and move to a system in which hospitals internalize a greater portion of the costs of errors, we can make a persuasive case that pursuing systems-oriented error reduction initiatives is good for business. In effect, we are trying to reinject liability issues into the patient safety discussion after patient safety advocates have sedulously tried to exclude them.

Our argument is somewhat weakened by the relatively thin evidence that deterrence actually occurs in health care (for example, evidence that financial incentives arising out of the malpractice system can change provider behavior). While it is disheartening that, despite earnest attempts, strong empirical evidence of error deterrence has proven so elusive, the methodological complexity of this type of analysis should not be understated. Moreover, because none of the three large studies of adverse events and malpractice claims were designed with the intent of conducting a deterrence analysis, encountering data shortfalls on the deterrence issue was perhaps inevitable. Finally, the level of deterrence under the present system is, we believe, much lower than would be present under our proposed reforms. For these reasons, the fact that deterrence has not been proven in existing studies does not lead us to conclude that it cannot be proven. More importantly, it does not mean that the concept of deterrence has no place in health care policymaking. We have used the insights from our various analyses of deterrence, as well as our data on the overall performance of the medical malpractice system, to craft an approach that we believe will provide greater deterrence. By providing more accurate and expedient compensation, a system of no-fault compensation of avoidable adverse events by hospitals and their insurers should be more appealing to both patients and professionals. The proposed regime also better comports with the *1637 development of systems to prevent errors than does individualistic, moral culpability-driven, negligence-based litigation.

In summary, a business case for quality may crystallize around the notion of deterrence through the liability system. However, those systems need to evolve beyond negligence-based tort toward an enterprise-based arrangement that generates strong and rational deterrence. If such reforms are accomplished, both providers and patients might learn that reducing medical mistakes makes good business sense.

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[FN1]. See Molly Joel Coye, No Toyotas in Health Care: Why Medical Care Has Not Evolved to Meet Patients' Needs, 20 Health Aff. 44, 45 (2001); Robert S. Galvin, The Business Case for Quality, 20 Health Aff. 57, 57-58 (2001).

[FN2]. See generally Clark C. Havighurst, Health Care Choices: Private Contracts as Instruments of Health Care Reform (1985) (arguing for increased use of contracts that specify patients' legal rights).

[FN3]. See *id.* at 2 (contending that the current market fails to offer sufficient health care options).

[FN4]. See Alice A. Noble & Troyen A. Brennan, Managed Care in the New Era of "Systems-Think": The Implications for Managed Care Organizational Liability and Patient Safety, 29 J.L. Med. & Ethics 290, 290 (2001); Alice A. Noble & Troyen A. Brennan, The Stages of Managed Care Regulation: Developing Better Rules, 24 J. Health Pol. Pol'y & L. 1275, 1275 (1999) (claiming that the quality of care provided by managed care organizations is being questioned); Wendy K. Mariner, Slouching Toward Managed Care Liability: Reflections on Doctrinal Boundaries, Paradigm Shifts, and Incremental Reform, 29 J.L. Med. & Ethics 255 (2001) (noting a backlash against managed care due to its failure to slow the increase of medical costs and improve the quality of care).

[FN5]. See generally Williard G. Manning et al., A Controlled Trial of the Effect of a Prepaid Group Practice on Use of Services, 310 New Eng. J. Med. 1505 (1984) (presenting the results of a randomized controlled trial which found that copayments were associated with lower use of services).

[FN6]. Institute of Medicine, *To Err is Human: Building a Safer Health System* 1 (2000). But see Rodney A. Hayward & Timothy P. Hofer, Estimating Hospital Deaths Due to Medical Errors: Preventability Is in the Eye of the Reviewer, 286 JAMA 415, 419 (2001) (arguing that these figures are exaggerated).

[FN7]. See generally Institute of Medicine, *Crossing the Quality Chasm* (2001) (arguing for immediate action to improve health care).

[FN8]. See E.C. Schneider & T. Lieberman, Publicly Disclosed Information About the Quality of Health Care: Response of the US Public, 10 Quality & Safety in Health Care 96, 96 (2001) (restating the belief of proponents of market theory that hospitals, doctors, and health plans will respond to consumer demand by improving services).

[FN9]. See, e.g., *id.* at 101 (noting that public disclosure of quality may prompt hospital managers and surgeons to improve care).

[FN10]. Eric C. Schneider & Arnold M. Epstein, Use of Public Performance Reports: A Survey of Patients Undergoing Cardiac Surgery, 279 JAMA 1638, 1638 (1998) (noting the study--distributed to health professionals, libraries, the media, business groups, and legislators--is free to any individual who requests it).

[FN11]. See *id.* at 1639-40 (revealing study results that only 12% of patients knew about the information before their surgery and only one-third of those patients had seen a copy of the guide).

[FN12]. See Schneider & Lieberman, *supra* note 8, at 96.

[FN13]. See Elise C. Becher & Mark R. Chassin, *Improving the Quality of Health Care: Who Will Lead?*, 20 *Health Aff.* 164, 170 (2001) (stating that the large majority of patients rely on recommendations when choosing doctors or hospitals).

[FN14]. See Lori L. Darling, *The Applicability of Experience Rating to Medical Malpractice Insurance*, 38 *Case W. Res. L. Rev.* 255, 260, 265 (1987) (pointing out that malpractice insurance premiums have risen as the number of claims brought has increased and that experience-rating is not used by malpractice insurers). See also Frank A. Sloan, *Experience Rating: Does it Make Sense for Medical Malpractice Insurance?*, 80 *Am. Econ. Rev.* 128, 128 (1990).

[FN15]. See Troyen A. Brennan & Jennifer Daley, *Regulating Quality: An Interim Assessment 1* (Apr. 8, 2002) (unpublished manuscript, on file with authors).

[FN16]. For more background on this history, see Patricia M. Danzon, *Medical Malpractice: Theory, Evidence and Public Policy 18-20* (1985); Paul C. Weiler, *Medical Malpractice on Trial 12-14* (1991).

[FN17]. *Cal. Med. Ass'n & Cal. Hosp. Ass'n, Report on the Medical Insurance Feasibility Study* (Don H. Mills ed., 1977).

[FN18]. The liability determination was a function not just of negligence, but also of other predictors of verdicts favoring plaintiffs, including type and severity of injury, preventability under ordinary standards of care, decision-making rationales, and the state of the records. However, a liability determination can be considered a rough proxy for negligence. See Danzon, *supra* note 16, at 19.

[FN19]. *Id.* at 20.

[FN20]. One of us (Brennan) was among the investigators on the Harvard Medical Practice Study as well as the later study of Utah and Colorado.

[FN21]. The Harvard investigators were not creative in the choice of their name, nor were they creative in their choice of investigation methods. The methodology chosen was basically the same as that used by the California investigators, and the analyses of malpractice litigation had basically been set forth by Patricia Danzon. See Danzon, *supra* note 16, at 19-26.

[FN22]. See A. Russell Localio et al., *Relation Between Malpractice Claims and Adverse Events Due to Negligence: Results of the Harvard Medical Practice Study III*, 325 *New Eng. J. Med.* 245, 245-46 (1991). The results require a bit of attention to terminology. The California Study identified "injuries" and "potentially compensable events." These were very similar to the HMPS's "adverse events" and "negligent adverse events." "Adverse events" were defined in the HMPS as injuries that either prolonged the hospitalization or created disability at the time of discharge and that were caused by medical management as opposed to the disease process. A "negligent adverse event" is one in which the care failed to reach the standard of the average medical practitioner. See Troyen A. Brennan et al., *Incidence of Adverse Events and Negligence in Hospitalized Patients: Results of the Harvard Medical Practice Study I*, 324 *New Eng. J. Med.* 370, 370-76 (1991). The IOM Report referred to "errors," which were defined as the failure of a planned action to be completed as intended or use of the wrong plan to achieve an aim. IOM defined a "preventable adverse event" as an adverse event caused by one or more errors. See Institute of Medicine, *supra* note 6, at 25.

[FN23]. Brennan et al., *supra* note 22, at 371.

[FN24]. *Id.* at 373 .

[FN25]. *Id.* at 370-76.

[FN26]. See David M. Studdert et al., *Negligent Care and Malpractice Claiming Behavior in Utah and Colorado*, 38 *Med. Care* 250-60 (2000); Eric J. Thomas et al., *Incidence and Types of Adverse Events and Negligent Care in Utah and Colorado*, 38 *Med. Care* 261-71 (2000).

[FN27]. See, e.g., Eric J. Thomas et al., *How Many Medical Injuries? The Relationship Between Identification Criteria and Estimates of Adverse Events*, *Annals of Internal Med.* (forthcoming 2002) (unpublished manuscript, on file with the Texas Law Review).

[FN28]. Lucian L. Leape, *Error in Medicine*, 272 *JAMA* 1851, 1854-57 (1994).

[FN29]. They were probably right. See Richard L. Abel, *The Real Tort Crisis--Too Few Claims*, 48 *Ohio St. L.J.* 443, 461-67 (1987) (hypothesizing that if more tort victims were made aware of their right to file claims, more would do so).

[FN30]. David M. Studdert et al., *Beyond Dead Reckoning: Measures of Medical Injury Burden, Malpractice Litigation, and Alternative Compensation Models from Utah and Colorado*, 33 *Ind. L. Rev.* 1643, 1656 (2000). See David M. Studdert & Troyen A. Brennan, *No-Fault Compensation for Medical Injuries: The Prospect for Error Prevention*, 286 *JAMA* 217 (2001).

[FN31]. See Institute of Medicine, *supra* note 6, at 1 (attributing between 44,000 and 98,000 deaths annually to errors).

[FN32]. This is not an area that we will be able to discuss in much detail in this Article. For further information, see generally Troyen A. Brennan & Donald M. Berwick, *New Rules: Regulation, Markets, and the Quality of American Health Care* 348-53, 368-95 (1995) (offering suggestions for regulatory reforms).

[FN33]. See Joshua Lee et al., *Computer Physician Order Entry*, in *Leapfrog Patient Safety Standards* 5-17 (John D. Birkmeyer ed., 2001).

[FN34]. See Brennan & Daley, *supra* note 15, at 3-4.

[FN35]. See Michelle M. Mello & Troyen A. Brennan, *Potential Impacts of Patient Safety Initiatives on the Malpractice Environment* 7-8 (Jan. 31, 2002) (unpublished manuscript, on file with authors).

[FN36]. See generally Bryan A. Liang, *Risk of Reporting Sentinel Events*, 19 *Health Aff.* 112 (2000) (reviewing the available legal protections for incident reports and provider concerns about their adequacy). Federal legislation has been stymied, for instance, by the ATLA's insistence that broader peer review protection is not being granted and the industry's contention that without such protection, more significant efforts to improve safety (for example, reporting to larger facilities) is not going to occur. Interview with Ken Kizer, CEO, The National Patient Safety Forum (Sept. 2001).

[FN37]. See Jerome P. Kassirer, *The Quality of Care and the Quality of Measuring It*, 329 *New Eng. J. Med.* 1263 (1993).

[FN38]. The Leapfrog criteria are products of the business case for quality. A coalition of employers (i.e., health insurance purchasers), appalled by the IOM death statistics and the seeming disinterest of providers, combed the medical literature and identified three process measures associated with safety and quality. These are computerized provider order entry, high volumes of sophisticated procedures, and 24-hour/seven-day-per-week intensivist coverage in intensive-care units. Leapfrog Patient Safety Standards, *supra* note 33, at 5, 17, 26. These purchasers seek to discriminate among hospitals, funneling their patients exclusively to hospitals that endorse the Leapfrog criteria. See Brennan & Daley, *supra* note 15, at 4-5.

[FN39]. See Jennifer Heldt Powell, Hospitals Thwart Ratings Plan, *Boston Herald*, Oct. 29, 2001, at 21 (reporting that "dozens of hospitals refuse to participate").

[FN40]. See, e.g., Gary T. Schwartz, Reality in the Economic Analysis of Tort Law: Does Tort Law Really Deter?, 42 *UCLA L. Rev.* 377, 377-78 (1994).

[FN41]. While physicians are nearly universally insured against financial loss from malpractice suits, they suffer economic losses due to the time and effort required to respond to litigation. The HMPS found that physicians being sued spent an average of six working days on the litigation, forgoing an estimated \$7,000 in income per claim. Paul C. Weiler et al., *A Measure of Malpractice: Medical Injury, Malpractice Litigation, and Patient Compensation* 126 (1993). Moreover, physicians may be motivated to take precautions to avoid other penalties associated with being sued (such as psychological stress and damage to reputation). *Id.*; Peter A. Bell, *Legislative Intrusions into the Common Law of Medical Malpractice: Thoughts About the Deterrent Effect of Tort Liability*, 35 *Syracuse L. Rev.* 939, 949-965, 973-990 (1984); Daniel P. Kessler & Mark B. McClellan, *The Effects of Malpractice Pressure and Liability Reforms on Physicians' Perceptions of Medical Care*, *Law & Contemp. Probs.*, Spring 1997, at 81, 82.

[FN42]. See Jeffrey O'Connell, *The Lawsuit Lottery* (1979); John G. Fleming, *Is There a Future for Torts?*, 44 *La. L. Rev.* 1193, 1197 (1984); Richard J. Pierce, *Encouraging Safety: The Limits of Tort Law and Government Regulation*, 33 *Vand. L. Rev.* 1281 (1980); Schwartz, *supra* note 40, at 381-82 (citing Richard L. Abel, *A Critique of Torts*, 37 *UCLA L. Rev.* 785 (1990)).

[FN43]. See Abel, *supra* note 42, at 791-95.

[FN44]. See Weiler et al., *supra* note 41, at 114.

[FN45]. See Schwartz, *supra* note 40, at 387-90.

[FN46]. *Id.* at 387.

[FN47]. *Id.*

[FN48]. *Id.* at 390-91.

[FN49]. See Don Dewees & Michael Trebilcock, *The Efficacy of the Tort System and its Alternatives: A Review of Empirical Evidence*, 30 *Osgoode Hall L.J.* 57, 131-34 (1992).

[FN50]. See Michael J. Moore & W. Kip Viscusi, *Compensation Mechanisms for Job Risks* 133 (1990).

[FN51]. See, e.g., Elisabeth M. Landes, *Insurance, Liability and Accidents: A Theoretical and Empirical Investigation of the Effect of No-Fault Accidents*, 25 *J.L. & Econ.* 49 (1982).

[FN52]. Id. at 59-65.

[FN53]. See Frank A. Sloan et al., Tort Liability Versus Other Approaches for Deterring Careless Driving, 14 Int'l Rev. L. & Econ. 53, 66-67 (1994).

[FN54]. The methodological concerns raised about this study have to do with other changes in the insurance structure that accompanied no-fault laws (such as changes in premium rates). See Paul Zador & Adrian Lund, Re-Analyses of the Effects of No-Fault Auto Insurance on Fatal Crashes, 53 J. Risk & Ins. 226 (1986).

[FN55]. See Schwartz, *supra* note 40, at 405-08.

[FN56]. See *id.* at 412 (finding that fear of liability had some deterrent effect).

[FN57]. See *id.* at 408-10.

[FN58]. See American Law Institute, Reporters' Study, Enterprise Responsibility for Personal Injury 402 (1991).

[FN59]. A more convincing foundation for rational deterrence is made by Mark Grady in his excellent analysis of durable precautions undertaken by organizations. See Mark F. Grady, Why Are People Negligent? Technology, Nondurable Precautions, and the Medical Malpractice Explosion, 82 Nw. U. L. Rev. 293 (1988). Grady argues that no one desires to be negligent, but that happenstance and lack of attention do lead to errors. He draws on the literature from engineering to indicate some of the cognitive and psychological bases for inattention and mistake-prone activity. He notes that engineers have identified systemic methods for creating failsafe mechanisms that prevent or catch oversights and mistakes. Negligence, Grady suggests, can be prevented by programs with specific costs that can be weighed against the cost of liability. This insight bridges both Schwartz's weak and strong theories but does not itself provide evidence of deterrence.

[FN60]. See Office of Technology Assessment, 103d Cong., Impact of Legal Reforms on Medical Malpractice Costs 6 (1993) [hereinafter Impact of Legal Reforms] (internal citation omitted).

[FN61]. See Office of Technology Assessment, 103d Cong., Defensive Medicine and Medical Malpractice 22 (1994) [hereinafter Defensive Medicine].

[FN62]. See Randall R. Bovbjerg et al., Defensive Medicine and Tort Reform: New Evidence in an Old Bottle, 21 J. Health Pol. Pol'y & L. 267, 268 (1996).

[FN63]. For a comprehensive review of these studies, see *id.* at 269-80; see also Defensive Medicine, *supra* note 61, at 43-74.

[FN64]. See *id.* at 17.

[FN65]. See *id.* at 17-18.

[FN66]. See David Klingman et al., Measuring Defensive Medicine Using Clinical Scenario Surveys, 21 J. Health Pol. Pol'y & L. 185, 193-201 (1996); see also Defensive Medicine, *supra* note 61, at 50-67.

[FN67]. See Lisa Dubay et al., The Impact of Malpractice Fears on Cesarean Section Rates, 18 J. Health Econ. 491, 514 (1999); A. Russell Localio et al., Relationship Between Malpractice Claims and Cesarean Delivery, 269 JAMA 366, 371 (1993). Cesarean deliveries are a practice believed to be particularly influenced by malpractice fears. See

Dubay et al., *supra*, at 492-93, 509, 519.

[FN68]. See A. Dale Tussing & Martha A. Wojtowycz, *The Cesarean Decision in New York State, 1986: Economic and Noneconomic Aspects*, 30 *Med. Care* 529, 539 (1992).

[FN69]. See Frank A. Sloan et al., *Effects of the Threat of Medical Malpractice Litigation and Other Factors on Birth Outcomes*, 33 *Med. Care* 700, 710-11 (1995); Laura-Mae Baldwin et al., *Defensive Medicine and Obstetrics*, 274 *JAMA* 1606, 1609 (1995).

[FN70]. See Daniel Kessler & Mark McClellan, *Do Doctors Practice Defensive Medicine?*, 111 *Q.J. Econ.* 353 (1996) (studying malpractice liability and its relation to heart disease procedures in the elderly); Kessler & McClellan, *supra* note 41 (using cross-sections of the American Medical Association Socioeconomic Monitoring System survey of physicians' experience). The peculiarity of these studies lies in the authors' decision to model self-reported changes in practice patterns as a function of state medical liability reforms rather than of physicians' perceived malpractice risk.

[FN71]. See Patricia M. Danzon, *Liability for Medical Malpractice*, in 1B *Handbook of Health Economics* 1368, 1370 (Anthony J. Culyer & Joseph P. Newhouse eds., 2000).

[FN72]. Stephen S. Entman et al., *The Relationship Between Malpractice Claims History and Subsequent Obstetric Care*, 272 *JAMA* 1588, 1591 (1994).

[FN73]. Sloan et al., *supra* note 69, at 710-11. The outcomes examined were fetal death, low Apgar score, death within five days of birth, infant death, and death or permanent impairment within five years of birth. See *id.* at 702. Sloan's results have been corroborated by other studies. See Dubay et al., *supra* note 67, at 514-15, 519.

[FN74]. See, e.g., Mark I. Taragin et al., *Physician Malpractice: Does the Past Predict the Future?*, 10 *J. Gen. Internal Med.* 550, 554 (1995).

[FN75]. In fact, these studies generally have failed to produce positive findings. See, e.g., *id.*

[FN76]. See *infra* notes 118-129 and accompanying text.

[FN77]. Harvard Medical Practice Study, *Patients, Doctors, and Lawyers: Medical Injury, Malpractice Litigation, and Patient Compensation in New York: The Report of the Harvard Medical Practice Study to the State of New York* (1990).

[FN78]. An ideal study of deterrence would either examine medical injury rates in states with varying tort liability regimes, or examine rates in the same state over time in response to changes in the liability regime. Unfortunately, neither the HMPS nor any other study has permitted such analyses. Analyzing cross-sectional variations within one state can be seen as the next-best approach but does not permit as strong an inference to be drawn about causality as the preferred designs. See Michael J. Saks, *Medical Malpractice: Facing Real Problems and Finding Real Solutions*, 35 *Wm. & Mary L. Rev.* 693, 718-19 (1994) (reviewing Weiler et al., *supra* note 41).

[FN79]. See Weiler et al., *supra* note 41, at 117-29.

[FN80]. *Id.* at 124-25.

[FN81]. *Id.* at 124.

[FN82]. *Id.* at 129-31.

[FN83]. Id. at 122-24.

[FN84]. Id. at 123.

[FN85]. These problems are discussed *infra* in notes 97-99 and accompanying text.

[FN86]. See Weiler, *supra* note 16, at 88-89.

[FN87]. Id. at 89.

[FN88]. Weiler et al., *supra* note 41, at 129-31.

[FN89]. Id. at 129.

[FN90]. For a general description of such models, see Danzon, *supra* note 71, at 1364-66.

[FN91]. See Weiler et al., *supra* note 41, at 131-32; Saks, *supra* note 78, at 720-21.

[FN92]. See Localio et al., *supra* note 67, at 366. The investigators involved in the re-analysis included Troy Brennan, Helen Burstin, Stuart Lipsitz, and Russell Localio.

[FN93]. There was a question as to whether the system of simultaneous equations had been validly identified. For an explanation of identification, see *infra* notes 101-103 and accompanying text.

[FN94]. This distinction is not just splitting hairs. Consider the following possible scenario: Hospital A experiences 4 adverse events in 2000 hospitalizations, with 75% of those adverse events due to negligence. Hospital B experiences 20 adverse events in the same number of hospitalizations, of which 50% are due to negligence. Using the conditional measure of deterrence (proportion of adverse events involving negligence), Hospital B appears to have been deterred more than Hospital A--50% is a lot lower than 75%. But patients in Hospital A face an unconditional probability of 3 in 2000 (0.0015%) of being the victim of a negligent injury in Hospital A, as compared to a 10 in 2000 (0.005%) chance in Hospital B. Using this measure, Hospital A appears to be the safer bet. So what conclusion does one draw about deterrence?

[FN95]. The total cost of the HMPS, for example, was approximately \$4.7 million. See Studdert et al., *supra* note 30, at 1647 n.20.

[FN96]. Funding for the HMPS and UCMPS was generously provided by the Robert Wood Johnson Foundation and the New York Department of Health. See *id.* at 1656. The Agency for Healthcare Quality and Research (AHRQ) also began a major initiative to support epidemiologic studies of hospital adverse events in 2000. See Agency for Healthcare Research and Quality, HHS Announces \$50 Million Investment to Improve Patient Safety, at <http://www.ahrq.gov/news/press/pr2001/patsafpr.htm> (last visited Oct. 11, 2001).

[FN97]. See Weiler, *supra* note 16, at 89 (stating that "the more negligent injuries that occur, the more tort claims there will likely be... the more claims there are, the fewer injuries that occur").

[FN98]. Damodar N. Gujarati, *Basic Econometrics* 65 (3d ed. 1995).

[FN99]. An unbiased estimate has an average or expected value that is equal to the true

value. A consistent estimate has an average or expected value that approaches the true value as the sample size gets larger. See *id.* at 779, 782-83.

[FN100]. See *id.* at 686.

[FN101]. For an in-depth discussion of identification, see *id.* at 657-64.

[FN102]. Weiler et al., *supra* note 41, at 123.

[FN103]. See Danzon, *supra* note 71, at 1370.

[FN104]. See David M. Studdert & Troyen A. Brennan, Deterrence in a Divided World: Emerging Problems for Malpractice Law in an Era of Managed Care, 15 *Behav. Sci. & L.* 21, 25 & n.20 (1997), citing Am. Med. Ass'n, Study of Liability Costs (1983) (stating that "nearly all defendants in medical malpractice actions are comprehensively insured").

[FN105]. See Steven Shavell, *Economic Analysis of Accident Law* 194-96 (1987) (discussing the problem of moral hazard).

[FN106]. See Frank A. Sloan & Mahmud Hassan, Equity and Accuracy in Medical Malpractice Insurance Pricing, 9 *J. Health Econ.* 289, 290 (1990).

[FN107]. See Frank A. Sloan et al., Insuring Medical Malpractice 171-76 (1991) (analyzing several case studies). For a general discussion of issues relating to experience rating, see *id.* at 165-82.

[FN108]. *Id.* at 176-78.

[FN109]. *Id.*

[FN110]. Weiler, *supra* note 16, at 77.

[FN111]. See Taragin et al., *supra* note 74, at 552 (finding that, in one sample of physicians, 55% experienced zero cases in a seven-year period, 79% had fewer than two cases, and less than 3% had five or more claims).

[FN112]. See Frank A. Sloan et al., Medical Malpractice Experience of Physicians: Predictable or Haphazard?, 262 *JAMA* 3291, 3293 (1989) (reporting that 6% of anesthesiologist and OB/GYN physicians in Florida were responsible for more than 87% of the losses for those specialties).

[FN113]. See Taragin et al., *supra* note 74, at 552-54 (finding that over a seven-year period, few physicians consistently remained in the high risk strata).

[FN114]. Sloan, *supra* note 14, at 128.

[FN115]. See *id.* at 129 (stating that physicians find lower premiums with competing insurance companies).

[FN116]. There is surprisingly little data on the subject of hospital experience rating and practice premiums. For example, Sloan, Bovbjerg, and Githen's book on malpractice insurance devotes a chapter to experience rating but barely mentions hospitals. See Sloan et al., *supra* note 107, at 165-82. Nonetheless, the practice of experience rating is well known among industry leaders. Interview with John McCarthy, President, Risk Management Foundation of the Harvard Medical Institutions, in Boston, Mass. (Jan. 3, 2002).

[FN117]. One other point should be made. The CRICO model is a "channeling" arrangement in which the physicians and the hospital have the same insurer. The costs of the premium for any one institution include the liability of physicians and the hospital. Thus, both groups are effectively subject to the experience rating (though no single physician is experience rated). Similar arrangements are widespread among self-insurers, largely because most self-insurers use the same set of malpractice actuarial reinsurance firms. Interview with John McCarthy, *supra* note 116.

[FN118]. See *supra* notes 16-19 and accompanying text.

[FN119]. Danzon, *supra* note 16, at 23-24.

[FN120]. See Localio et al., *supra* note 22, at 248 (stating that claims occur only 13 to 14% as often as injuries due to malpractice).

[FN121]. *Id.*

[FN122]. See Troyen A. Brennan et al., Relation Between Negligent Adverse Events and the Outcomes of Medical-Malpractice Litigation, 335 *New Eng. J. Med.* 1963, 1965 (1996). Another, smaller study has produced more encouraging conclusions, finding that claims involving negligence were significantly more likely to result in a payout to the plaintiff than claims not involving negligence (89% versus 24%) and that hospital liability was 25 times higher, on average, in cases involving negligence than in cases not involving negligence. See Henry S. Farber & Michelle J. White, Medical Malpractice: An Empirical Investigation of the Litigation Process, 22 *RAND J. Econ.* 199, 204-05, 216 (1991).

[FN123]. Thomas et al., *supra* note 26, at 261.

[FN124]. Studdert et al., *supra* note 26, at 253.

[FN125]. *Id.* at 254-55.

[FN126]. *Id.* at 253.

[FN127]. *Id.*

[FN128]. Michelle J. White, The Value of Liability in Medical Malpractice, 13 *Health Aff.* 75, 78 (1994) (reviewing data from several studies and concluding that 2.6% of negligent injuries result in claims, as compared to only 1.0% of non-negligent injuries and 0.1% of noninjuries).

[FN129]. Weiler et al., *supra* note 41, at 75.

[FN130]. See Institute of Medicine, *supra* note 6, at 1, 34-35.

[FN131]. *Id.*

[FN132]. See David W. Bates et al., The Costs of Adverse Drug Events in Hospitalized Patients: Adverse Drug Events Prevention Study Group, 277 *JAMA* 307, 307 (1997) (concluding that "[t]he substantial costs of ADEs to hospitals justify investment in efforts to prevent these events"); David C. Classen et al., Adverse Drug Events in Hospitalized Patients: Excess Length of Stay, Extra Costs, and Attributable Mortality, 277 *JAMA* 301, 301 (1997) (concluding that "[t]he attributable lengths of stay and costs of hospitalization for ADEs are substantial").

[FN133]. Hospitals internalize additional costs associated with the malpractice system in the form of defensive medicine costs and costs of maintaining risk management offices. These costs of averting and responding to malpractice litigation may vary with the actual or perceived malpractice claims frequency for the hospital, but they probably are fairly inelastic to changes in the underlying frequency of errors (which is poorly correlated with claims frequency). They therefore do not represent significant forms of error cost internalization.

[FN134]. See Eric J. Thomas et al., *Costs of Medical Injuries in Utah and Colorado*, 36 *Inquiry* 255, 259 (1999).

[FN135]. Under the DRG system, Medicare (and some private insurers) pays most hospitals for their inpatient services at a predetermined rate for each discharge. Each patient is classified into a DRG category, to which a fixed payment amount is attached based on diagnosis, associated medical procedures, and some patient characteristics such as age and sex. The base DRG payment rate may be adjusted upward if the patient proves to be an outlier in his or her DRG category by having an atypically long hospital stay. See generally Health Care Financing Administration, *Hospital Manual* § 415, available at http://www.hcfa.gov/pubforms/10_hospital/ho400.htm (last visited Apr. 8, 2002).

[FN136]. See *supra* notes 118-29 and accompanying text.

[FN137]. In February 2002, the Commonwealth Fund generously provided us with funding to conduct such a study.

[FN138]. The model could also be used to examine the impact of reforming health care reimbursement systems, as opposed to malpractice systems. One could vary the assumptions made about the hospital's ability to recoup care costs and thereby minimize M. For example, the impact of a proposal to use audits by federal regulators to detect and preclude attempts by hospitals to shift patients to more complex DRGs in order to recoup error-related care costs could be evaluated.

[FN139]. See *infra* Part IV.A.

[FN140]. See *infra* notes 158, 181.

[FN141]. See *supra* text accompanying note 91.

[FN142]. See generally Clark C. Havighurst et al., *Health Care Law and Policy* 992-1001 (1998).

[FN143]. See Thomas et al., *supra* note 27.

[FN144]. See Daniel W. Shuman, *The Psychology of Deterrence in Tort Law*, 42 *U. Kan. L. Rev.* 115, 121 (1993). The swiftness with which punishment is imposed is also an important factor in deterrence.

[FN145]. Professor Shuman notes that there are reasons to question the applicability of criminal law research to the civil context, but adopts this extension nonetheless. See *id.* at 121 & n.32.

[FN146]. See generally Virginia E. Nolan & Edmund Ursin, *Understanding Enterprise Liability: Rethinking Tort Reform in the 21st Century* (1995); George L. Priest, *The Invention of Enterprise Liability: A Critical History of the Intellectual Foundations of*

Modern Tort Law, 14 J. Legal Stud. 461 (1985); Robert L. Rabin, Some Thoughts on the Ideology of Enterprise Liability, 55 Md. L. Rev. 1190 (1996).

[FN147]. See Gregory C. Keating, The Idea of Fairness in the Law of Enterprise Liability, 95 Mich. L. Rev. 1266, 1266-72 (1997).

[FN148]. See John V. Jacobi & Nicole Huberfeld, Quality Control, Enterprise Liability, and Disintermediation in Managed Care, 29 J.L. Med. & Ethics 305, 308 (2001). But such suggestions were made even before Clinton's time. See, e.g., Sloan, *supra* note 14, at 131-32.

[FN149]. But see Jacobi & Huberfeld, *supra* note 148, at 312-14 (arguing for the continued viability of the idea); Clark C. Havighurst, Vicarious Liability: Relocating Responsibility for the Quality of Medical Care, 26 Am. J.L. & Med. 7, 17-20 (2000) (proposing to make managed care organizations vicariously liable for malpractice). Havighurst's proposal would only speed the demise of managed care, which has been brought about largely by ongoing market dissatisfaction with the product and suits against managed care organizations which fail to provide necessary services.

[FN150]. See Part III(c)(1) *infra* for a discussion of the impracticability of full enterprise liability with no-fault compensation.

[FN151]. See Studdert & Brennan, *supra* note 30, at 221.

[FN152]. See *supra* notes 107-115 and accompanying text.

[FN153]. See *supra* note 50 and accompanying text.

[FN154]. In this regard, we still maintain a link between deterrence and compensation. Professor Dauer has written an insightful piece questioning whether this connection should be abandoned completely. See Edward A. Dauer, When the Law Gets in the Way: The Dissonant Link of Deterrence and Compensation in the Law of Medical Malpractice, 28 Cap. U. L. Rev. 293 (2000).

[FN155]. See Studdert & Brennan, *supra* note 30, at 217-23.

[FN156]. For a detailed description of compensable events in the Swedish system, see David M. Studdert et al., Can the United States Afford a "No-Fault" System of Compensation for Medical Injury?, *Law & Contemp. Probs.*, Spring 1997, at 1.

[FN157]. Mark F. Grady, A New Positive Economic Theory of Negligence, 92 Yale L.J. 799, 806-09, 814 (1983).

[FN158]. In previous analyses, systems errors have comprised only 1-5% of all errors. See Brennan et al., *supra* note 22, at 371; Lucian L. Leape et al., The Nature of Adverse Events in Hospitalized Patients: Results of the Harvard Medical Practice Study II, 324 *New Eng. J. Med.* 377, 381 (1991). However, these definitions of systems errors were very specific and narrow. Indeed, almost any error can be classified as a systemic matter if the concept of system is widened.

[FN159]. See Leape, *supra* note 28, at 1851-52 (describing physicians' view of errors as failures of character).

[FN160]. See *id.* at 1852 (providing multiple reasons why physicians may conceal their mistakes from recovery).

[FN161]. See Kaiser Family Foundation/Agency for Healthcare Research and Quality, National Survey on Americans As Health Care Consumers: An Update on the Role of Quality Information 25 (2000), at <http://www.kff.org/content/2000/3093/AHRQToplines.pdf>. [hereinafter National Survey].

[FN162]. See Amy B. Witman et al., How Do Patients Want Physicians to Handle Mistakes? A Survey of Internal Medicine Patients in an Academic Setting, 156 *Archives Internal Med.* 2565, 2566 (1996).

[FN163]. What the Public Understands About Health Stories in the News: Medical Errors, The Kaiser/Harvard Health News Index (Kaiser Family Found., Menlo Park, CA/Harvard School of Public Health, Boston, MA), Nov./Dec. 1999, at 2, at <http://www.kff.org/content/2000/1565/HNI%20Nov-Dec1999.pdf>.

[FN164]. National Survey, *supra* note 161, at 19, 22.

[FN165]. 552 P.2d 1178 (Cal. 1976).

[FN166]. 383 P.2d 441 (Cal. 1963).

[FN167]. See Richard Epstein, Mortal Peril: Our Inalienable Right to Health Care 373-75 (1997).

[FN168]. See Studdert & Brennan, *supra* note 30, at 222.

[FN169]. *Id.*

[FN170]. See Peter P. Budetti et al., Physician and Health System Integration, 21 *Health Aff.* 203, 204-05 (2002) (listing competition, federal law, Medicare and Medicaid, changes in private-sector financial arrangements, and the patient safety movement as forces driving physician/health system integration). There remain, however, several barriers to the integrating forces. *Id.* at 208-09.

[FN171]. See Randall R. Bovbjerg et al., Administrative Performance of No-Fault Compensation for Medical Injury, *Law & Contemp. Probs.*, Spring 1997, at 71, 72-76 (cataloging the various obstacles).

[FN172]. Bovbjerg and his co-authors focus on the limited no-fault programs for neonatal neurological injuries that are currently in place in Florida and Virginia. See *id.* at 71 (analyzing seven years of administrative data from Virginia and Florida). We have written extensively on the same programs, focusing our empirical research on Florida. See Jill Horwitz & Troyen A. Brennan, No-Fault Compensation for Medical Injury: A Case Study, 14 *Health Aff.* 164-79 (1995) (using Florida's reform attempts as a case study to examine the results of adopting no-fault injury compensation); David M. Studdert et al., The Jury is Still In: Florida's Birth-Related Neurological Injury Compensation Plan After a Decade, 25 *J. Health Pol. Pol'y & L.* 499 (2000) (reporting flaws in Florida's Birth-Related Neurological Injury Compensation Plan and advocating changes to address the problem).

[FN173]. See Studdert et al., *supra* note 30, at 1668-77.

[FN174]. See Thomas et al., *supra* note 134, at 261.

[FN175]. See *id.* at 260-61. Some commentators have raised questions about the HMPS figures, but the estimates are as thorough as any available data in the empirical analysis of law and social policy. See Saks, *supra* note 78, at 709.

[FN176]. See Studdert & Brennan, *supra* note 30, at 220-21.

[FN177]. See, e.g., Sloan et al., *supra* note 53.

[FN178]. See Michael J. Moore & W. Kip Viscusi, Promoting Safety Through Workers' Compensation: The Efficacy and Net Wage Costs of Injury Insurance, 20 *Rand J. Econ.* 499, 501 (1989) (summarizing evidence that increases in workers' compensation benefits reduce fatality rates).

[FN179]. We have made these arguments elsewhere. See Studdert & Brennan, *supra* note 104, at 46-47.

[FN180]. Cf. Saks, *supra* note 78, at 723 (arguing correctly that the HMPS investigators essentially dismissed corrective justice as an old-fashioned notion).

[FN181]. The empirical research into this proposition is just beginning. AHRQ has funded several studies, including one we are leading, to investigate the root causes of error and the relative contributions of individual and system factors.

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