MARKETWATCH

Disclosure Of Medical Injury To Patients: An Improbable Risk Management Strategy

Movement toward full disclosure should proceed with a realistic expectation of the financial implications and prudent planning to meet them.

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ABSTRACT: Pressure mounts on physicians and hospitals to disclose adverse outcomes of care to patients. Although such transparency diverges from traditional risk management strategy, recent commentary has suggested that disclosure will actually reduce providers' liability exposure. We tested this theory by modeling the litigation consequences of disclosure. We found that forecasts of reduced litigation volume or cost do not withstand close scrutiny. A policy question more pressing than whether moving toward routine disclosure will expand litigation is the question of how large such an expansion might be. [*Health Affairs 26,* no. 1 (2007): 215–226; 10.1377/hlthaff.26.1.215]

ONE OF THE MOST intriguing aspects of the modern patient safety movement is the mounting pressure on physicians and hospitals to be more open and honest with patients when things go wrong in care.[1] There is broad consensus that disclosure of unanticipated outcomes is desirable. Regulators have begun to require it.[2] The rationale is clear: The experience of other industries, such as aviation and nuclear power, suggests that openness about error is critical to development of effective prevention strategies. There are also compelling ethical reasons for telling patients the truth about all aspects of their care.[3]

However, forthrightness about injuries and errors is at odds with the traditional approach to risk management in health care, which emphasizes caution, minimal comment, and even cover-up. Will more disclosure therefore mean more litigation? An emerging view in policy discussions asserts just the opposite: namely, that the bunker mentality of traditional risk management is flawed, it stokes rather than staves off litigation, and an ancillary benefit of disclosure will be its salutary impact on providers' liability exposure. Much recent commentary has propounded this view.[4]

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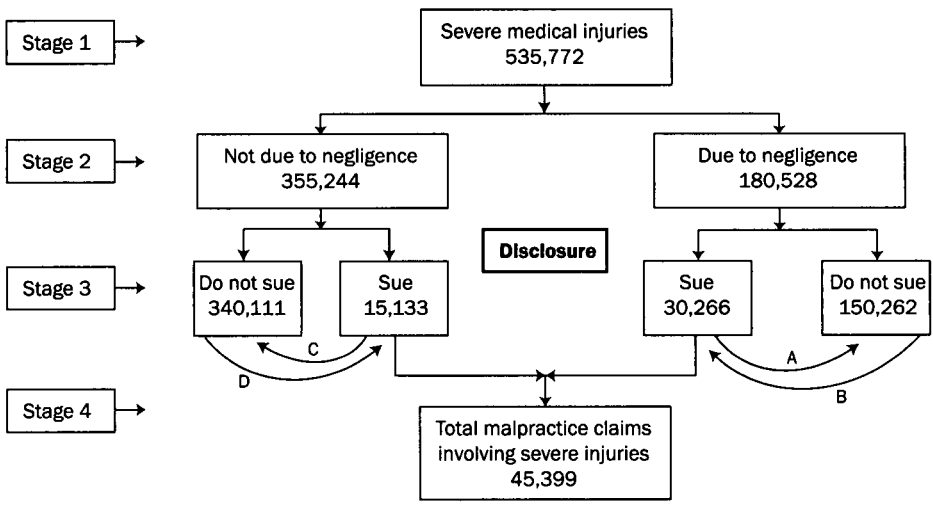
The notion of disclosure as an effective risk management tool is grounded in the belief that some patients who would have sued will not if early and candid disclosure occurs, because they will come to understand that their injury was not attributable to negligence, or will feel less anger toward a provider who deals with them honestly, or both. It is also sometimes posited that providers' candor will induce patients who do sue to settle their claims for less money. However, the opposite consequence also warrants careful consideration: After being confronted with information about their injury and its cause, some patients who would not otherwise have sued might be moved to do so. No research to date has evaluated disclosure's impact in terms of the balance between "deterred" and "prompted" claims.

We hypothesized that the number and cost of prompted claims would negate—and possibly even trounce—any deterrent effect of disclosure on litigation. Our skepticism stems from two empirical insights gained in previous research. First, the vast majority of patients who sustain medical injury never sue, which creates a huge reservoir of potential claims.[5] Second, socio-legal researchers have identified the failure of aggrieved people to recognize their condition or attribute it to an external cause as important factors in explaining why they do not seek legal redress.[6] To test the hypothesis, we modeled the litigation consequences of disclosure by combining existing data on the epidemiology of medical injuries and malpractice claims with expert opinion about patients' likely reactions to disclosure.

Study Data And Methods

■ **Conceptual model.** Exhibit 1 conceptualizes the impact of disclosure on the volume of malpractice claims. The pool of medical injuries (Stage 1) splits into two groups: those attributable to negligent care and those due to nonnegligent causes (Stage 2). Some injured patients from each group sue, and some do not (Stage 3), with the total number of suers ultimately defining the number of claims (Stage 4). Disclosure's impact occurs at Stage 3. Transitions A and C represent deterred claims; transitions B and D are prompted claims. The net impact of disclosure on claims volume depends on the relative size of these four transi-

EXHIBIT 1
Conceptual Model Of Impact Of Disclosure On The Litigation Behavior Of Patients Who Experience Severe Medical Injuries



SOURCE: Data derived from various sources, as described in the online Technical Appendix: http://content.healthaffairs.org/cgi/content/full/26/1/215/DC1.

tions.

■ **Injury and claim estimates.** We used previous research and publicly available data sources to derive annual national estimates for each cell in Exhibit 1. Estimates of injury prevalence and type came from the New York Medical Practice Study (NYMPS) and the Utah-Colorado Medical Practice Study (UTCOMPS), the leading population-based studies of medical injury in the United States.[7] Claims estimates were drawn primarily from the National Practitioner Data Bank.[8]

The estimates and our analyses focus on severe injuries, defined as injuries with a score of 4 (major-temporary disability) or higher on the National Association of Insurance Commissioners (NAIC) severity scale.[9] Two considerations led us to narrow the analysis in this way. First, there are no strong systemwide prevalence estimates for minor injury.[10] Second, minor injuries are rarely the basis of claims.[11] They are poor candidates for lawsuits because attorneys, who are generally paid on a contingent fee basis, have little economic incentive to bring them. Therefore, there is limited scope for disclosure to affect litigation over minor injuries.

■ **Estimates of compensation costs.** We used average compensation costs of $141,469 and $33,683 per claim for severe injury claims with and without negligence, respectively.[12] These are unconditional averages, not averages among paid claims only.

Aside from its impact on claims volume, commentators have suggested that disclosure might reduce average payments.[13] To examine this effect, we projected the impacts of disclosure separately under two cost assumptions. In the first analysis, we used the full average-cost figures for severe injury claims with and without negligence, as noted above; in the second analysis, we reduced these figures by 40 percent.

The reduction we applied was based on available data on the composition of medical malpractice payments.[14] Although they are limited, these data suggest that noneconomic ("pain and suffering") damages constitute approximately 40 percent of total payments. Patients negotiating with hospitals for compensation following a disclosure are unlikely to be willing to forgo reimbursement for economic losses but might be willing to accept greatly reduced pain-and-suffering compensation as part of an expeditious settlement.[15] Hence, 40 percent approximates the upper limit of privately and socially acceptable reductions in compensation costs.

■ **Transition parameters and survey of experts.** Transitions A, B, C, and D in Exhibit 1 jointly determine the net impact of disclosure on litigation. Their respective magnitudes are unknown. To obtain expected ranges for them, we surveyed medico-legal experts in September 2005.

The experts were a convenience sample of seventy-eight people whom we recognized from their publications or professional experience as having relevant expertise. They came from fourteen states and the following professional categories: senior patient safety (31) and/or legal researchers (17); hospital-based risk managers or quality assurance directors (25); senior staff from malpractice liability insurers (12); plaintiffs' attorneys (8); and hospital executives or general counsels (7). (These categories are not mutually exclusive.) The sample contained seventeen practicing physicians and eleven practicing attorneys.

A written survey presented four hypothetical scenarios designed to elicit percentage estimates for each of the transitions (Exhibit 2). After each hypothetical, the survey asked, "If 100 patients experienced this sequence of events, how many would react to the disclosure in the way that [this patient] did?" Respondents were directed to mark their best guess, lowest reasonable number, and highest reasonable number on a rating scale, with response options running from 0 to 100 in five-unit increments.

The survey instructions defined *serious injury* as "injury that leaves the patient with either permanent disability, or with temporary disability that is very severe while it lasts." The survey did not specify the circumstances of the disclosure, such as whether an apology or compensation was offered, patients were

EXHIBIT 2
Four Hypothetical Scenarios Regarding Patient Injury, Disclosure, And Suing Behavior From A Survey Of Experts

Transition represented*	Scenario
A	Patient A sustains a serious injury. The injury occurs as a result of negligent medical care. Patient A plans to sue. A timely disclosure then occurs wherein the patient is told that an injury has occurred. A full explanation of how and why the injury occurred is given. After the disclosure, Patient A changes his mind about litigation and decides not to sue.
B	Patient B patient sustains a serious injury. The injury occurs as a result of negligent medical care. Patient B has no plans to sue. A timely disclosure then occurs wherein the patient is told that an injury has occurred. A full explanation of how and why the injury occurred is given. After the disclosure, Patient B changes her mind about litigation and decides to sue.
C	Patient C sustains a serious injury. The injury is caused by nonnegligent medical care. Patient C plans to sue. A timely disclosure then occurs wherein the patient is told that an injury has occurred. A full explanation of how and why the injury occurred is given. After the disclosure, patient C changes her mind about litigation and decides not to sue.
D	Patient D sustains a serious injury. The injury is caused by nonnegligent medical care. Patient D has no plans to sue. A timely disclosure then occurs wherein the patient is told that an injury has occurred. A full explanation of how and why the injury occurred is given. After the disclosure, patient D changes her mind about litigation and decides to sue.

SOURCE: Data derived from survey responses and the authors' own analyses.

NOTES: Experts were asked to place three check marks on the scale provided beneath each scenario: their best guess at the number of patients (out of 100) who would change their plans to sue or not sue; their estimate of the lowest reasonable number; and their estimate of the highest reasonable number. For further details of the scenarios and instructions in the survey, see the online Technical Appendix: http://content.healthaffairs.org/cgi/content/full/26/1/215/DC1.

*The letters correspond to the transitions shown in Exhibit 1.

aware of their injury prior to the disclosure, or animosities surrounded the event. Rather, the survey directed respondents to consider their practical experience with disclosure and litigation, acknowledged that some of these factors might be present some of the time, and asked respondents to contemplate a typical series of disclosures at their institution (or institutions with which they had experience).[16]

■ **Monte Carlo simulations.** When the inputs of a prediction model are uncertain, the model's outputs should take account of and reflect that uncertainty. Monte Carlo simulations extend scientific judgment beyond deterministic point estimates by calculating the likelihood of various outcome scenarios, based on the degree of uncertainty around the inputs.[17] The approach has been embraced by the Environmental Protection Agency and the National Academies, and its use in policy research is increasing, with applications ranging from evaluations of care delivery options to the influence of financial conflicts of interest.[18]

In this study we used a Monte Carlo approach to incorporate uncertainty associated with the four transition parameters, as detected in the experts' responses. Thus, rather than estimating single values for the impact of routine disclosure on the volume and cost of claims, our model generated probability distributions of these outcomes.

Specifically, we fit a beta distribution based on each expert's judgments (lowest reasonable estimate, best guess, highest reasonable estimate) for each transition (A, B, C, and D).[19] This probability distribution represented the expert's uncertainty regarding the parameter in question and was bounded by the upper and

lower estimates.[20] The model then sampled probabilistically from the four transition distributions and applied the transition percentages selected to the relevant injury counts to calculate a projected number of claims. We repeated this sampling procedure 1,000 times for each expert and then combined all experts' predictions into a single probability distribution of the expected number of claims and associated costs. This approach, a modified form of the method proposed by Peter Doubilet and colleagues, gives each expert equal weight and accounts for potential within-subject correlation.[21]

We calculated means and medians of the final probability distributions. We also examined the probabilities of changes in volume and cost in relation to the status quo. All analyses were conducted using SAS version 9.2.

Study Results

■ **Expert survey.** Sixty-five experts completed the survey (response rate: 83 percent). The experts predicted that among patients who experienced severe injury as a result of negligence, disclosure would on average deter 32 percent from suing and prompt claims by 31 percent of patients who would not otherwise have sued (Exhibit 3). Among patients whose injuries were not due to negligence, the deterrent impact was perceived to be greater: Disclosure would deter an average of 57 percent of suers and prompt 17 percent of nonsuers.

■ **Impact on claim volume.** Based on the experts' predictions about injured patients' responses to disclosure, the model computed a 5 percent chance that total claim volume would decrease or remain unchanged and a 95 percent chance that it would increase (Exhibit 4). These probabilities correspond to the cumulative size of the bars shown in the distribution. For example, the bars to the left of the status quo, in aggregate, account for approximately 5 percent of the total area of the distribution, and the bars to the right account for approximately 95 percent. The distribution also indicates a 60 percent chance that comprehensive disclosure of severe injuries would at least double the annual number of claims nationwide and a 33 percent chance that volume would increase by threefold or more. The median of the distribution is an increase of 70,974 claims (to 127,723 claims in total), which represents a 125 percent increase over the current level.

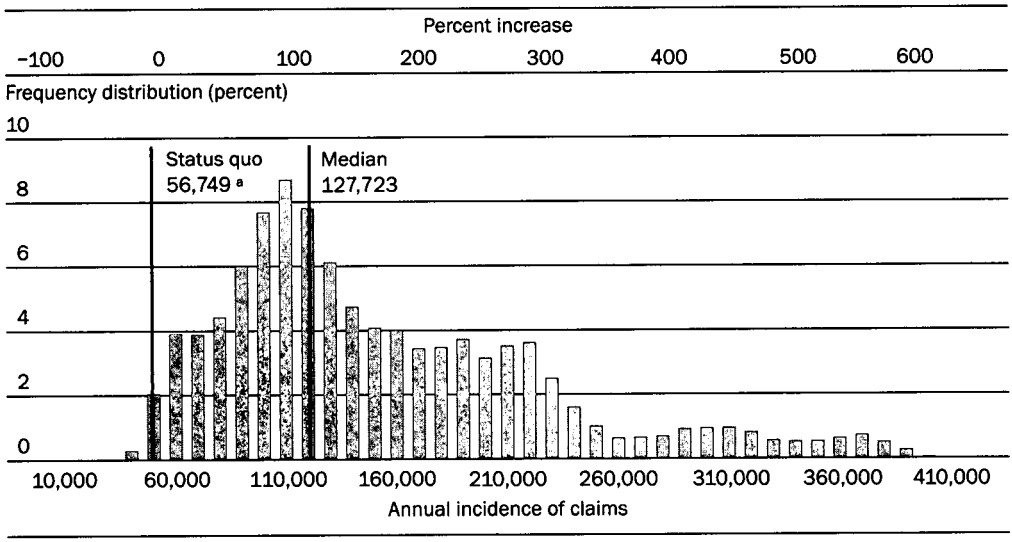
■ **Impact on compensation costs.** Under the assumption that average payments do not change, the model predicted a 6 percent chance that total direct costs of compensation would decrease or remain unchanged under

EXHIBIT 3
Expert Survey Responses: Deterred And Prompted Claims Following Disclosure Of Medical Injury

	Injuries due to negligence					
	Scenario A: percent of claims deterred			Scenario B: percent of claims prompted		
	Lower	Best guess	Upper	Lower	Best guess	Upper
Mean	18	32	48	19	31	49
Standard deviation	14	23	25	15	20	22
Median	10	25	40	10	25	45
	Injuries not due to negligence					
	Scenario C: percent of claims deterred			Scenario D: percent of claims prompted		
Mean	41	57	73	8	17	29
Standard deviation	21	23	21	6	13	13
Median	40	60	75	5	15	25

SOURCE: Data derived from survey responses and the authors' own analyses.

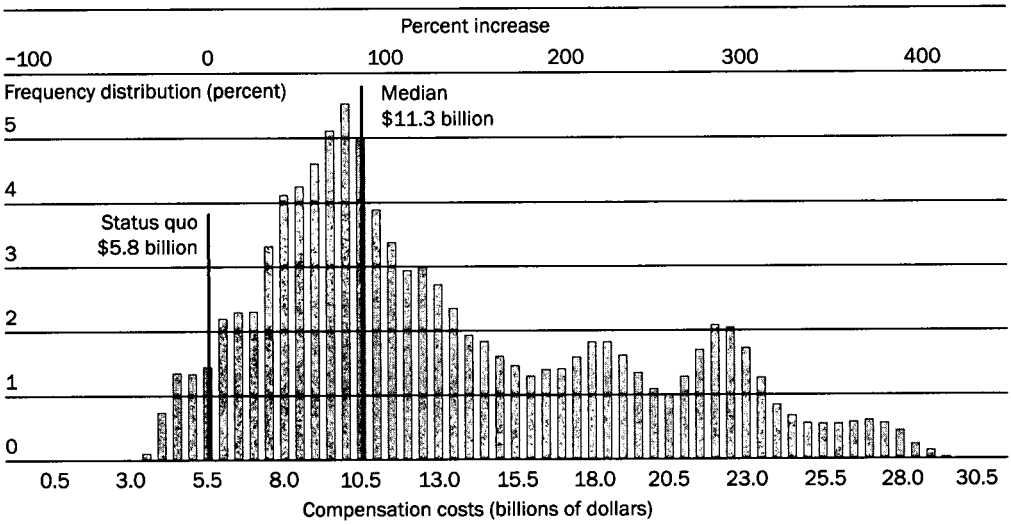
EXHIBIT 4
Monte Carlo Simulation Of Impact Of Disclosure Of Medical Injury On Volume Of Medical Malpractice Claims



SOURCE: Data derived from the authors' analyses.
[a] The simulations used the estimated total volume of all claims nationwide (56,749), not just the subset involving serious injury (45,399), as the status quo. Details of the basis of these estimates are provided in Part A of the online Technical Appendix: http://content.healthaffairs.org/cgi/content/full/26/1/215/DC1.

routine disclosure and a 94 percent chance that they would increase (Exhibit 5). There is a 45 percent chance that total costs would at least double and a 24 percent chance that they would increase by threefold or more. The median of the distribution is an increase of $5.5

EXHIBIT 5
Monte Carlo Simulation Of Impact Of Disclosure Of Medical Injury On Compensation Costs (Assuming That The Average Payment Size Is Unchanged)



SOURCE: Data derived from the authors' analyses.

billion (to $11.3 billion), a 95 percent increase over current compensation costs.

Under the assumption that disclosure reduced average payments by 40 percent, a net increase in costs remains more likely than a decrease or no change (72 percent versus 28 percent), and there is a 34 percent chance that total costs would at least double (Exhibit 6). The median of the distribution indicates an increase of $1.4 billion (to $7.0 billion), a 24 percent increase in total compensation costs.

■ **Sensitivity analyses.** *Reductions in incidence of injury.* Although there is little evidence that rates of adverse events and negligence have decreased appreciably over the past twenty years, with ongoing attention to error prevention and quality improvement, they might do so in the future. Indeed, widespread disclosure practices could help drive this result. How would reductions in the incidence of serious medical injury affect our projections?

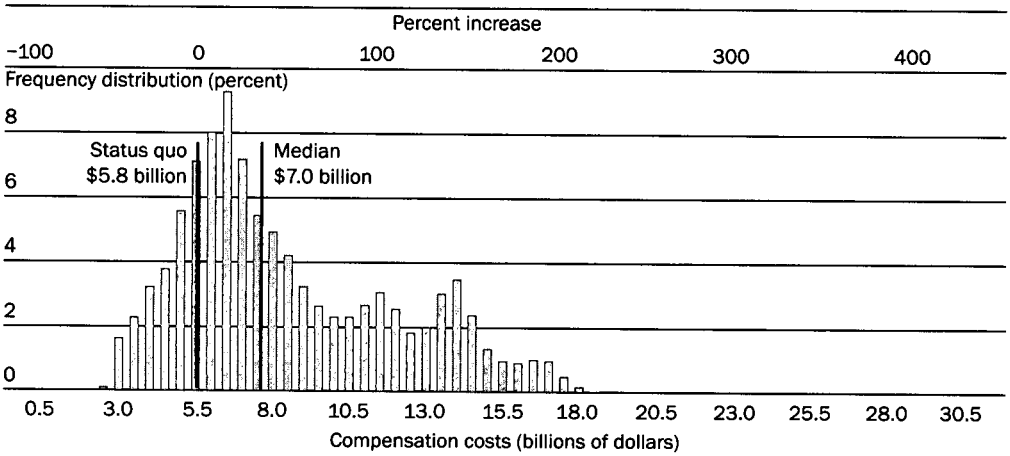
To explore this, we cut by one-third the number of serious injuries attributable to negligence and reran the simulations. The change modestly affected volume: There remained a high probability (90 percent) that claim volume would increase, and large increases were likely (median of the distribution was an increase of 50,376 claims). The likelihood of cost increases also remained high (84 percent); however, the expected size of those increases was about half (median value of the distribution was an increase of $2.7 billion) that predicted by the original model.

Underdisclosure. The above analyses assume that every severe injury will be followed by a disclosure and that the disclosure would generally be clear and comprehensible and would provide the essential elements of what happened and why. Although many would regard these as noble goals, they are obviously unrealistic. What impact would less than 100 percent disclosure have on the estimates?

If the degree of "underdisclosure" were the same for negligent and nonnegligent injuries, then the likelihood of increases and decreases from status quo would not change. The effect on the magnitude of the changes would correspond to the degree of underdisclosure. In other words, if only half of severe injuries were (properly) disclosed across the board, the magnitude of the changes predicted would halve. However, if the degree of underdisclosure differed by injury type—one previous survey of risk managers, for example, suggested a greater reluctance to disclose injuries caused by negligence—then this would alter

EXHIBIT 6

Monte Carlo Simulation Of Impact Of Disclosure Of Medical Injury On Compensation Costs (Assuming That The Average Payment Size Is Reduced By 40 Percent)



SOURCE: Data derived from the authors' analyses.

the litigation impacts we estimated, although the direction and extent of those changes would depend on the profile of the undisclosed events.[22]

Break-even analysis. To test the robustness of our predictions, we conducted a "break-even" analysis in which we fixed anchor points (best guesses and upper bounds) for the deterred claims (transitions A and C) and then calculated the levels to which prompted claims (transitions B and D) would need to descend to maintain the status quo.[23] Exhibit 7 shows the results.

Based on experts' best guesses about deterred claims, if more than 5.4 percent of negligently injured patients and 3.0 percent of nonnegligently injured patients were prompted to sue, overall claims volume would increase beyond current levels. Alternatively, anchoring deterred claims at the experts' upper-bound estimates, if more than 12.0 percent and 7.1 percent of negligently and nonnegligently injured patients, respectively, were moved to sue, the result would be more claims. (These break-even points fall below the experts' mean lower-bound estimates for prompted claims, as shown in Exhibit 3.) The break-even points for compensation costs are fractionally higher, although very similar.

Discussion

Through the analyses described in this paper, we found the chances that disclosure would decrease either the frequency or cost of malpractice litigation to be remote. On the contrary, an increase in litigation volume and costs was highly likely.

■ **The great unlitigated reservoir.** The key driver of the model's findings is the seminal and well-established insight that the number of serious injuries that do not lead to claims dwarfs the number that do.[24] ("Underclaiming" also appears to be widespread among injuries outside the health care sector.)[25] Approximately eight in ten serious injuries due to negligence and more than nine in ten other serious injuries never trigger litigation. This has important implications for disclosure. Because the stock of unlitigated injuries vastly outnumbers the stock of litigated ones, relatively small shifts from the former (prompted claims) will tend to overwhelm shifts from latter (deterred claims).

■ **Anatomy of prompted claims.** The potential for disclosure to stimulate litigation has received relatively little attention. The theoretical effect can be decomposed into sequential steps. It begins with the notion that the reason some injured patients do not sue is that they

EXHIBIT 7
Break-Even Analysis Of Claims Volume And Costs Following Disclosure Of Medical Injury, Based On Experts' Best Guesses And Upper Bounds

Transitions	Anchoring at experts' best guesses for deterred claims (32% and 57%)[a]	Anchoring at experts' upper bounds for deterred claims (48% and 73%)[a]
Break-even points for claims volume		
Prompted claims among severe injuries due to negligence (Transition B)	5.4%	12.0%
Prompted claims among severe injuries not due to negligence (Transition D)	3.0%	7.1%
Break-even points for compensation costs		
Prompted claims among severe injuries due to negligence (Transition B)	6.0%	13.9%
Prompted claims among severe injuries not due to negligence (Transition D)	3.3%	8.3%

SOURCE: Data derived from the authors' own analyses.

[a]The percentages used in these anchor points are means, as shown in Exhibit 3.

are unaware they have been injured. Patients confuse their adverse outcome with their underlying disease or the expected effects of their treatment. Or they realize that they have suffered an adverse event but do not attribute it to substandard care. Previous research into litigation behavior has shown that such ignorance is quite common.[26]

In theory, thorough disclosure will rid such patients of their ignorance about both the existence of an injury and its connection to substandard care. A subset of the enlightened will react by suing. Some will seek to litigate but not be able to find an attorney; others will secure representation and sue. Severe medical injuries are more likely to progress through each of these stages. It is also logical that the overall transition probabilities predicted by experts were higher for patients whose injuries are due to negligence (mean of one in three patients) than for their nonnegligent counterparts (one in six patients).

■ **Problems underlying the risk management hypothesis.** In light of our findings, it is interesting to explore the roots of popular perceptions that disclosure will deter litigation. We attribute the perception to tendencies to both misread and overreach the available evidence.

The evidence base. To the best of our knowledge, only one study has sought to directly examine the disclosure-claims relationship. This widely cited article by Steve Kraman and Ginny Hamm reported on the experience of the Veterans Affairs (VA) Medical Center in Lexington, Kentucky, which adopted a "radical policy of full disclosure" in the late 1980s.[27] The analysis compared the number and cost of malpractice payments made by the facility with those of thirty-five other VA medical centers and found that liability payments were "moderate" and "comparable to those of similar facilities." The authors attributed the result to transparency about substandard care and timely compensation, although they noted that the analysis "suggests but does not prove the financial superiority of a full disclosure policy."

The authors concluded with additional caveats about drawing causal inferences. There has been an unfortunate tendency to overlook these caveats in subsequent references to the study. Allen Kachalia and colleagues recently elaborated several additional concerns.[28] Generalizability is particularly problematic because federal hospitals and clinicians working in them enjoy broad immunities from tort litigation.

Two survey studies pertaining to the disclosure-claims relationship paint a more uncertain picture. A 2002 survey found that risk managers at a nationally representative sample of hospitals were divided in their beliefs about the impact of disclosure on malpractice risk: 37 percent believed that it would increase risk, 33 percent believed that it would decrease risk, and 25 percent thought that risk would not change.[29] Kathleen Mazor and colleagues surveyed a group of health plan enrollees about their propensity to seek legal advice if harms were not disclosed and found that failure to disclose had no statistically significant effect in three of four injury scenarios presented.[30] In sum, the empirical evidence that disclosure will reduce litigation is weak.

Erroneous extrapolation from related literature. Although few empirical studies have examined the consequences of disclosure, there is an impressive literature on why patients sue. This research has frequently been cited in support of the view that disclosure will reduce litigation. Such extrapolations are problematic.

In general, studies analyzing motivations for litigation have done so retrospectively through surveys of plaintiffs, comparisons of characteristics of sued and nonsued physicians, claims file review, or combinations of these approaches.[31] Several studies have used vignettes to probe key considerations in patients' decisions about whether to sue.[32] A consistent finding in this research is that problems in the patient-physician relationship, particularly breakdowns in communication, influence litigation decisions. Several studies have even identified the quality of explanations given after injuries as a motivator.[33]

This research establishes that a mix of factors motivates litigation decisions. To infer,

however, that changes to any one factor, such as disclosure, would alone alter the claim decision is questionable. But the more serious flaw is extrapolation from this type of research to conclusions about disclosure's systemwide effects on litigation. Motivation-for-suit studies are explicitly geared toward addressing one side of the behavioral response: deterred claims. An understanding of prompted claims requires a different research approach, one that is focused on decision making immediately after the injury and that accounts carefully for the possibility that without a disclosure, the patient might never have known of the injury or its cause. This research has not been done.

"The spread of disclosure through health care systems is likely to amplify malpractice litigation."

■ **Study strengths and weaknesses.** The strength of our Monte Carlo approach to examining the impact of disclosure on litigation is that it can deal with multiple uncertainties simultaneously and incorporate consideration of "reasonable ranges" around those uncertainties. Weaknesses include the theoretical nature of the exercise and the fact that the results must be expressed as probability distributions, not simple, easily interpretable estimates. However, the approach is appropriate for modeling the impact of disclosure on litigation today: There is keen interest in the nature of the effect, but it is too early to test it empirically.

Other aspects of our methodology have limitations. First, the analysis was confined to severe injuries. The impact of disclosure on litigation decisions following temporary and minor injuries might differ. For example, the severity threshold that plaintiffs' attorneys have for taking cases might drop in a routine-disclosure environment if the disclosure decreases the effort and expense needed to investigate claims. The expected effect of such a change on our estimates would be to increase claim volume and slightly decrease the average value of paid claims.

Second, our analyses focused on compensation costs. Administrative costs of malpractice litigation—which include expenses associated with lawyers, experts, courts, and liability insurers—are substantial but were not counted. Under any plausible scenario, their inclusion would have increased the size of the cost increases we projected.[34]

Third, our sample of experts represented a variety of backgrounds and perspectives, but it was not drawn randomly or designed to be geographically or professionally representative. Fourth, instead of detailing the content of the disclosure, the survey referred respondents to a "typical disclosure situation in your institution or experience." If the respondent's conception of a disclosure did not include apologies, offers of compensation, or some other element that reduces propensity to litigate, and disclosures elsewhere or in the future consistently encompass such elements, then the model might have underestimated deterred claims. Finally, experts might have overestimated new claimants' ability to secure legal counsel—the final step in the transition to prompted claims.

■ **Implications.** The spread of disclosure through health care systems is likely to amplify malpractice litigation. We believe that the pressing question is not whether an expansion will occur, but how large it will be. Laws that prohibit admission of disclosures into evidence will do little to alter the outcome; disclosure's primary impact will stem from the flagging function it serves for plaintiffs and their attorneys.

Two aspects of the way in which disclosure is executed could upset our general conclusion. The predictions might not hold if disclosure is practiced selectively. If incidents that are likely to trigger lawsuits, cost a lot, or both, are hidden—for example, those involving clear-cut negligence or the most serious harms—then the assumptions of our model break down. In addition, the cost picture changes if payments made to patients following disclosures fall well below the economic

losses that patients sustain as a result of their injuries. Although potentially disruptive to the results we have forecast, both of these features of disclosure are socially undesirable.

DISCLOSURE IS THE right thing to do; so is compensating patients who sustain injury as a result of substandard care. Continuing moves toward transparency about medical injuries will expose tensions between these two objectives. That severe injuries are prevalent and that most of them never trigger litigation are epidemiological facts that have long been evident. The affordability of the medical malpractice system rests on this fragile foundation, and routine disclosure threatens to shake it. Movement toward full disclosure should proceed with a realistic expectation of the financial implications and prudent planning to meet them.

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NOTES

1. T.H. Gallagher et al., "Patients' and Physicians' Attitudes regarding the Disclosure of Medical Errors," *Journal of the American Medical Association* 289, no. 8 (2003): 1001–1007; J. Banja, *Medical Errors and Medical Narcissism* (Sudbury: Jones and Bartlett, 2005); and R. Bovbjerg, "Patient Safety and Physician Silence," *Journal of Legal Medicine* 25, no. 4 (2004): 505–516.
2. Joint Commission on Accreditation of Healthcare Organizations, "Comprehensive Accreditation Manual for Hospitals: Standard RI 1.2.2" (Chicago: JCAHO, 2001); and National Academy for State Health Policy, "State Adverse Event Reporting Rules and Statutes," 5 December 2005, http://www.nashp.org/_docdisp_page.cfm?LID=2A789909-5310-11D6-BCF000A0CC558925 (accessed 20 December 2005).
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4. See, for example, D.N. Frenkel and C.B. Liebman, "Words That Heal," *Annals of Internal Medicine* 140, no. 6 (2004): 482–483; A.W. Wu, "Handling Hospital Errors: Is Disclosure the Best Defense?" *Annals of Internal Medicine* 131, no. 12 (1999): 970–972; and R. Zimmerman, "Doctors' New Tool to Fight Lawsuits: Saying 'I'm Sorry'," *Wall Street Journal*, 18 May 2004.
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7. T.A. Brennan et al., "Incidence of Adverse Events and Negligence in Hospitalized Patients: Results of the Harvard Medical Practice Study I," *New England Journal of Medicine* 324, no. 6 (1991): 370–376; and E.J. Thomas et al., "Incidence and Types of Adverse Events and Negligent Care in Utah and Colorado," *Medical Care* 38, no. 3 (2000): 261–271.
8. Part A of our Technical Appendix provides details of how the estimates shown in Exhibit 1 were derived. See http://content.healthaffairs.org/cgi/content/full/26/1/215/DC1.
9. M. Sowka, ed., *Malpractice Claims: Final Compilation* (Brookfield, Wis.: National Association of Insurance Commissioners, 1980).
10. The NYMPS and UTCOMPS involved reviews of inpatient medical records only. They nonetheless provide reasonable systemwide estimates of the prevalence of serious injuries because, in addition to injuries that arose from hospital care, they captured injuries that necessitated hospital care, wherever they occurred.
11. D.M. Studdert et al., "Claims, Errors, and Compensation Payments in Medical Malpractice Litigation," *New England Journal of Medicine* 354, no. 19 (2006): 2024–2033; and B. Black et al., "Stability, Not Crisis: Medical Malpractice Claim Outcomes in Texas, 1988–2002," *Journal of Empirical Legal Studies* 2, no. 2 (2005): 207–259.
12. Part B of the online Technical Appendix details the cost calculation methodology; see Note 8.
13. S.S. Kraman and G. Hamm, "Risk Management: Extreme Honesty May Be the Best Policy," *Annals of Internal Medicine* 131, no. 12 (1999): 963–967.
14. A compilation of the data sources used for this calculation appears in the online Technical Appendix; see Note 8.
15. Patients' willingness to accept this trade-off is the premise of so-called Early Offer programs.

16. Part C of the online Technical Appendix provides further details of the survey scenarios and instructions to respondents; see Note 8.
17. K.M. Thompson and J.D. Graham, "Going Beyond the Single Number: Using Probabilistic Risk Assessment to Improve Risk Management," *Human and Ecological Risk Assessment* 2, no. 4 (1996): 1008–1034.
18. J.J. Kim, T.C. Wright, and S.J. Goldie, "Cost-Effectiveness of Alternative Triage Strategies for Atypical Squamous Cells of Undetermined Significance," *Journal of the American Medical Association* 287, no. 18 (2002): 2382–2390; and P. Lurie et al., "Financial Conflict of Interest Disclosure and Voting Patterns at Food and Drug Administration Drug Advisory Committee Meetings," *Journal of the American Medical Association* 295, no. 16 (2006): 1921–1928.
19. C.E. Clark, "The PERT Model for the Distribution of an Activity Time," *Operations Research* 10, no. 3 (1962): 405–406; and D.G. Malcolm et al., "Application of a Technique for Research and Development Program Evaluation," *Operations Research* 7, no. 5 (1959): 646–669.
20. Bounding the distribution in this way differs from the conventional approach to fitting a beta distribution, which uses bounds of 0 and 1.
21. P. Doubilet et al., "Probabilistic Sensitivity Analysis using Monte Carlo Simulation: A Practical Approach," *Medical Decision Making* 5, no. 2 (1985): 157–177. Part D of the online Technical Appendix describes in greater detail how the model worked; see Note 8.
22. R.M. Lamb et al., "Hospital Disclosure Practices: Results of a National Survey," *Health Affairs* 22, no. 2 (2003): 73–83.
23. To arrive at the break-even point, the percentages of prompted claims (transitions B and D) were reduced proportionally, beginning at the best guess.
24. P.M. Danzon, *Medical Malpractice: Theory, Evidence, and Public Policy* (Cambridge, Mass.: Harvard University Press, 1985); A.R. Localio et al., "Relation between Malpractice Claims and Adverse Events Due to Negligence: Results of the Harvard Medical Practice Study III," *New England Journal of Medicine* 325, no. 4 (1991): 245–251; and D.M. Studdert et al., "Negligent Care and Malpractice Claiming Behavior in Utah and Colorado," *Medical Care* 38, no. 3 (2000): 250–260;
25. Hensler, "Compensation."
26. Saks, "Do We Really Know Anything?"
27. Kraman and Hamm, "Risk Management."
28. A. Kachalia et al., "Does Full Disclosure of Medical Errors Affect Malpractice Liability? The Jury Is Still Out," *Joint Commission Journal on Quality and Safety* 29, no. 10 (2003): 503–511.
29. Lamb et al., "Hospital Disclosure Practices."
30. K.M. Mazor et al., "Health Plan Members' Views about Disclosure of Medical Errors," *Annals of Internal Medicine* 140, no. 6 (2004): 409–418.
31. See, for example, G.B. Hickson et al., "Factors That Prompted Families to File Medical Malpractice Claims following Perinatal Injuries," *Journal of the American Medical Association* 267, no. 10 (1992): 1359–1363; C. Vincent, M. Young, and A. Phillips, "Why Do People Sue Doctors? A Study of Patients and Relatives Taking Legal Action," *Lancet* 343, no. 8913 (1994): 1609–1613; W. Levinson et al., "Physician-Patient Communication: The Relationship with Malpractice Claims among Primary Care Physicians and Surgeons," *Journal of the American Medical Association* 277, no. 7 (1997): 553–559; and H.B. Beckman et al., "The Doctor-Patient Relationship and Malpractice: Lessons from Plaintiff Depositions," *Archives of Internal Medicine* 154, no. 12 (1994): 1365–1370.
32. A.B. Witman, D.M. Park, and S.B. Hardin, "How Do Patients Want Physicians to Handle Mistakes? A Survey of Internal Medicine Patients in an Academic Setting," *Archives of Internal Medicine* 156, no. 22 (1996): 2565–2569; and P.J. Moore, N.E. Adler, and P.A. Robertson, "Medical Malpractice: The Effect of Doctor-Patient Relations on Medical Patient Perceptions and Malpractice Intentions," *Western Journal of Medicine* 173, no. 4 (2000): 244–250.
33. Witman et al., "How Do Patients Want Physicians to Handle Mistakes?"; and Vincent et al., "Why Do People Sue Doctors?"
34. Part E of the online Technical Appendix explains why this is the case; see Note 8.