

SPECIAL ARTICLE

Claims, Errors, and Compensation Payments in Medical Malpractice Litigation

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ABSTRACT

BACKGROUND

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In the current debate over tort reform, critics of the medical malpractice system charge that frivolous litigation — claims that lack evidence of injury, substandard care, or both — is common and costly.

METHODS

Trained physicians reviewed a random sample of 1452 closed malpractice claims from five liability insurers to determine whether a medical injury had occurred and, if so, whether it was due to medical error. We analyzed the prevalence, characteristics, litigation outcomes, and costs of claims that lacked evidence of error.

RESULTS

For 3 percent of the claims, there were no verifiable medical injuries, and 37 percent did not involve errors. Most of the claims that were not associated with errors (370 of 515 [72 percent]) or injuries (31 of 37 [84 percent]) did not result in compensation; most that involved injuries due to error did (653 of 889 [73 percent]). Payment of claims not involving errors occurred less frequently than did the converse form of inaccuracy — nonpayment of claims associated with errors. When claims not involving errors were compensated, payments were significantly lower on average than were payments for claims involving errors (\$313,205 vs. \$521,560, $P=0.004$). Overall, claims not involving errors accounted for 13 to 16 percent of the system's total monetary costs. For every dollar spent on compensation, 54 cents went to administrative expenses (including those involving lawyers, experts, and courts). Claims involving errors accounted for 78 percent of total administrative costs.

CONCLUSIONS

Claims that lack evidence of error are not uncommon, but most are denied compensation. The vast majority of expenditures go toward litigation over errors and payment of them. The overhead costs of malpractice litigation are exorbitant.

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THE DEBATE OVER MEDICAL MALPRACTICE litigation continues unabated in the United States¹ and other countries.²⁻⁴ Advocates of tort reform, including members of the Bush administration, lament the burden of “frivolous” malpractice lawsuits and cite them as a driving force behind rising health care costs.^{5,6} (A frivolous claim is one that “present[s] no rational argument based upon the evidence or law in support of the claim.”⁷) Plaintiffs’ attorneys refute this charge, countering that contingency fees and the prevalence of medical errors make the pursuit of meritless lawsuits bad business and unnecessary.^{8,9}

Previous research has established that the great majority of patients who sustain a medical injury as a result of negligence do not sue.^{10,11} However, the merit of claims that are brought, and the ability of the malpractice system to resolve them appropriately, remain much more controversial.^{1,12-14} If frivolous claims are common and costly, they may be a substantial source of waste in the health care and legal systems.

We investigated the merits and outcomes of malpractice litigation using structured retrospective reviews of 1452 closed claims. The reviews included independent assessments of whether the claim involved injury due to medical error. Our aim was to measure the prevalence, costs, outcomes, and distinguishing characteristics of claims that did not involve identifiable error.

METHODS

STUDY SITES

Five malpractice insurance companies in four regions of the United States (the Northeast, Mid-Atlantic, Southwest, and West) participated in the study. Collectively they covered approximately 33,000 physicians, 61 acute care hospitals (35 of them academic and 26 nonacademic), and 428 outpatient facilities. The study was approved by ethics review boards at the investigators’ institutions and at each review site (i.e., the insurer or insured entity).

CLAIMS SAMPLE

Data were extracted from random samples of closed-claim files at each insurance company. The claim file is the repository of information accumulated by the insurer during the life of a claim

(see the Supplementary Appendix, available with the full text of this article at www.nejm.org). We also obtained the relevant medical records from insured institutions for all claims included in the sample.

Following the methods used in previous studies, we defined a claim as a written demand for compensation for medical injury.^{15,16} Anticipated claims or queries that fell short of actual demands did not qualify. We focused on four clinical categories — obstetrics, surgery, missed or delayed diagnosis, and medication — and applied a uniform definition of each at all sites. These are key clinical areas of concern in research on patient safety; they are also areas of paramount importance to risk managers and liability insurers, accounting for approximately 80 percent of all claims in the United States and an even larger proportion of total indemnity costs.¹⁷⁻¹⁹

Insurers contributed claims to the study sample in proportion to their annual volume of claims. The number of claims by site varied from 84 to 662 (median, 294). One site contributed obstetrics claims only; another site had claims in all categories except obstetrics; and the remaining three contributed claims from all four categories.

REVIEW OF CLAIM FILES

Reviews were conducted at insurers’ offices or insured facilities by board-certified physicians, fellows, or final-year residents in surgery (for surgery claims), obstetrics (for obstetrics claims), and internal medicine (for diagnosis and medication claims). Physician investigators from the relevant specialties trained the reviewers, in one-day sessions at each site, with regard to the content of claims files, use of the study instruments, and confidentiality procedures. Reviewers were also given a detailed manual. Reviews lasted 1.6 hours per file on average and were conducted by one reviewer. To test the reliability of the process, 10 percent of the files were reviewed again by a second reviewer who was unaware of the first review.

Staff members at the insurance companies recorded administrative details of each claim, and clinical reviewers recorded details of the patient’s adverse outcome, if any. Physician reviewers then scored adverse outcomes on a severity scale that ranged from emotional injury to death.²⁰ If there was no identifiable adverse outcome, the review

was terminated. For all other claims, reviewers considered the potential contributory role of 17 “human factors” in causing the adverse outcome.

Next, in the light of all available information and their decisions about contributing factors, reviewers judged whether the adverse outcome was due to medical error. We used the definition of error of the Institute of Medicine: “the failure of a planned action to be completed as intended (i.e., error of execution) or the use of a wrong plan to achieve an aim (i.e., error of planning).”²¹ Reviewers recorded their judgments using a 6-point confidence scale in which a score of 1 indicated little or no evidence that an adverse outcome resulted from one or more errors and a score of 6 indicated virtually certain evidence that an adverse outcome resulted from one or more errors. Claims that received a score of 4 (“more likely than not that adverse outcome resulted from error or errors; more than 50–50 but a close call”) or higher were classified as involving an error.

Reviewers were not blinded to the outcome of litigation because it was logistically impossible to censor this information in the files. However, they were instructed to ignore this outcome and exercise independent clinical judgment in rendering determinations with regard to injury and error. Training sessions stressed both that the study definition of error is not synonymous with the legal definition of negligence and that a mix of factors extrinsic to merit influences whether claims are paid during litigation.

STATISTICAL ANALYSIS

The data forms, which had been filled out by hand, were electronically entered into a database and verified by a professional data-entry vendor and then sent to the Harvard School of Public Health in Boston for analysis. Analyses were conducted with the use of the SAS 8.2 and Stata SE 8.0 statistical software packages. To compare characteristics of claims with and claims without errors, we used Fisher’s exact tests (for analyses involving the sex of the plaintiff, specialty of the defendant, severity of injury, type of claim, and litigation outcomes), t-tests (for analyses involving the age of the plaintiff and filing and closure periods), and Wilcoxon rank-sum tests (for analyses involving indemnity and defense costs). All reported P values are two-sided.

The total cost of claims in the sample was cal-

culated and apportioned between claims with and those without errors. The analysis addressed the direct costs of the litigation, not the indirect costs, such as those associated with the practice of defensive medicine.²² We refer to the patient who allegedly sustained injury as the plaintiff, even though some claims were brought by third parties. We used kappa scores to measure the reliability of the determinations of injury and error.²³

RESULTS

CHARACTERISTICS OF THE PLAINTIFFS

Sixty percent of the plaintiffs were female (Table 1). The median age of the plaintiffs was 38 years; 19 percent were newborns, and 12 percent were 65 years of age or older. Obstetrician-gynecologists were the most frequently sued physicians in the sample (19 percent), followed by general surgeons (17 percent) and primary care physicians (16 percent).

In 37 of the claims (3 percent), no adverse outcome from medical care was evident. For example, one claim alleged that substandard care had caused the plaintiff to acquire methicillin-resistant *Staphylococcus aureus*, but there was no evidence of infection in the medical record or claim file. An additional 52 claims (4 percent) involved psychological or emotional injury, and 9 (<1 percent) contained only allegations of breaches of informed consent. The remaining claims involved physical injury, which was typically severe. Eighty percent of claims involved injuries that caused significant or major disability (39 percent and 15 percent, respectively) or death (26 percent).

Eighty-three percent of the claims were closed between 1995 and 2004; 62 percent were closed in 1998 or later. The average length of time between the occurrence of the injury and the closure of the claim was five years.

Fifty-six percent of the claims received compensation, at an average of \$485,348 (median, \$206,400) per paid claim. Fifteen percent of the claims were decided by trial verdict. The awards in verdicts for the plaintiff on average were nearly twice the size of payments made outside of court (\$799,365 vs. \$462,099). However, plaintiffs rarely won damages at trial, prevailing in only 21 percent of verdicts as compared with 61 percent of claims resolved out of court. Administrative (or overhead) costs associated with defending the

Table 1. Characteristics of Litigants, Injuries, and 1452 Claims.

Characteristic		Characteristic	
Plaintiffs		Injuries (continued)	
Female — no. (%) [*]	844 (60)	Location — no. (%)	
Age — no. (%)		Inpatient	827 (57)
<1 yr	271 (19)	Outpatient	625 (43)
1–17 yr	82 (6)	Claims	
18–34 yr	267 (18)	Closure date — no. (%)	
35–49 yr	383 (26)	1984–1989	57 (4)
50–64 yr	281 (19)	1990–1994	190 (13)
≥65 yr	168 (12)	1995–1999	542 (37)
Health insurance — no. (%) [*]		2000–2004	663 (46)
Private	592 (68)	Type — no. (%)	
Medicaid	88 (10)	Surgery	444 (31)
Uninsured	81 (9)	Obstetrics	335 (23)
Medicare	73 (8)	Missed or delayed diagnosis	429 (30)
Other	31 (4)	Medication	244 (17)
Defendants		Claims resolved by trial verdict — no. (%) [‡]	215 (15)
Physicians per specialty — no. (%)		Claims with compensation paid — no. (%)	811 (56)
Obstetrics-gynecology	276 (19)	Out of court	766 (61) [¶]
General surgery	242 (17)	Verdicts for plaintiffs	45 (21) [¶]
Primary care	236 (16)	Amount of compensation paid — \$ [§]	
Orthopedic surgery	110 (8)	Mean	485,348
Neurosurgery	71 (5)	Median	206,400
Radiology	66 (5)	Out of court	
Anesthesiology	65 (4)	Mean	462,099
Emergency medicine	55 (4)	Median	196,688
Pediatrics	51 (4)	Verdicts for plaintiffs	
Nurses — no. (%) [†]	124 (9)	Mean	799,365
Trainees — no. (%)	430 (30)	Median	290,000
Residents	391 (27)	Defense costs — \$ [§]	
Fellows	55 (4)	Mean	52,521
Interns	27 (2)	Median	27,954
Facility codefendants — no. (%)	933 (64)	Out of court	
Hospital	712 (49)	Mean	42,015
Office or practice	328 (23)	Median	22,994
Outpatient clinic	69 (5)	Verdicts for patients	
Ambulatory surgical department	24 (2)	Mean	112,968
Injuries		Median	89,484
Severity — no. (%)		Time from injury to closure — yr	
No injury	37 (3)	Mean	5
Breach of informed consent	9 (<1)	Median	4
Psychological or emotional injury	52 (4)	Injury to filing of claim	
Minor physical injury	187 (13)	Mean	2
Significant physical injury	573 (39)	Median	1
Major physical injury	220 (15)	Opening to closure of claim	
Death	374 (26)	Mean	3
		Median	3

* Percentages were calculated with the number of available observations used as the denominator. Data regarding sex were missing in 35 claims (2 percent), 25 of which involved injuries to infants. Data regarding the type of health insurance were missing in 587 claims (40 percent).

For patients with multiple sources of health insurance, reviewers were asked to select a primary insurer.

† Nurses included 89 registered nurses, 39 advanced-practice nurses, and 4 licensed practical nurses. Some claims involved more than one type of nurse.

‡ The verdict was for the plaintiff or the defendant.

§ Values are given in 2004 dollars.

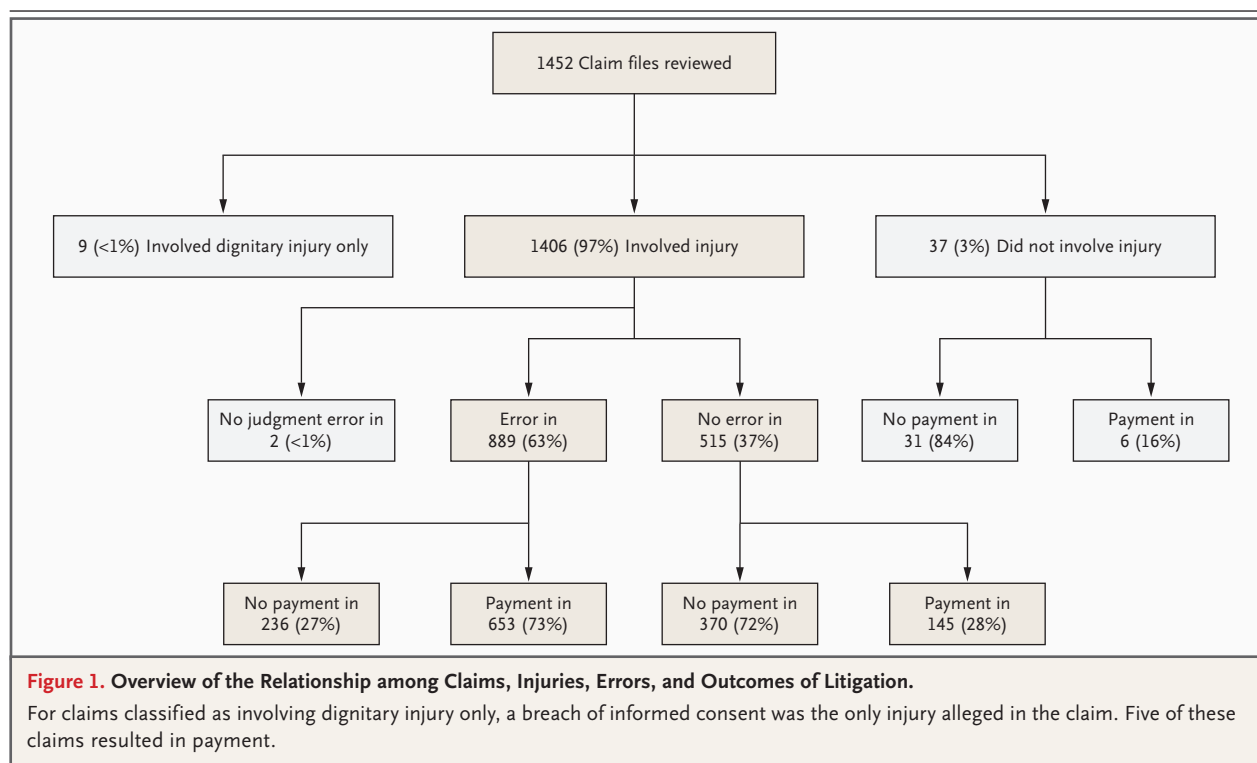
¶ Percentages were calculated within subcategories (out-of-court resolutions and verdicts, respectively).

|| Compensation amounts were calculated on the basis of paid claims only.

claims averaged \$52,521 per claim, with the mean administrative costs for claims that were resolved by trial (\$112,968) nearly three times those for claims resolved out of court (\$42,015).

RELATIONSHIP BETWEEN ERROR AND COMPENSATION

Sixty-three percent of the injuries were judged to be the result of error (Fig. 1). Most claims involv-



ing injuries due to error received compensation (653 of 889 [73 percent]), and most claims that did not involve errors (370 of 515 [72 percent]) or injuries (31 of 37 [84 percent]) did not. Overall, 73 percent (1054 of 1441) of all claims for which determinations of merit were made had outcomes concordant with their merit. Discordant outcomes in the remaining 27 percent of claims consisted of three types: payment in the absence of documented injury (6 of 1441 [0.4 percent of all claims]), payment in the absence of error (10 percent), and no payment in the presence of error (16 percent). Thus, nonpayment of claims with merit occurred more frequently than did payment of claims that were not associated with errors or injuries. All results hereafter relate to the subsample of 1404 claims that involved injuries and for which determinations of error were made.

CONFIDENCE IN JUDGMENTS REGARDING ERROR

Reviewers had a high level of confidence in the determination of error in 44 percent of claims (those receiving scores of 1 or 6) and a moderate level of confidence in 30 percent (those receiving scores of 2 or 5); the remaining 23 percent were deemed “close calls” (Fig. 2). More than half the claims that were classified as not involving error had little

or no evidence of error. The probability of payment increased monotonically with reviewers’ confidence that an error had occurred.

CHARACTERISTICS OF CLAIMS NOT INVOLVING ERROR

With respect to characteristics of the litigant, severity of the injury, and type of claim, there were few differences between claims that did not involve error and those that did (Table 2). However, the outcomes of litigation among claims not associated with error (non-error claims) and those associated with error (error claims) differed significantly. Non-error claims were more likely to reach trial than were error claims (23 percent vs. 10 percent, $P<0.001$). Non-error claims were also much less likely to result in compensation, whether they were resolved out of court (34 percent vs. 77 percent, $P<0.001$) or by verdict (9 percent vs. 43 percent, $P<0.001$). In addition, when non-error claims were paid, compensation was significantly lower on average (\$313,205 vs. \$521,560, $P=0.004$).

TOTAL EXPENDITURES

The claims in the study sample cost more than \$449 million, with total indemnity costs of more than \$376 million and defense costs of almost

\$73 million (Table 3). Non-error claims accounted for 16 percent of total system costs, 12 percent of indemnity costs, and 21 percent of administrative costs. With the exclusion of the 85 claims in which the reviewers' judgment that the claim did not involve error was a close call, non-error claims accounted for 13 percent of total expenditures.

RELIABILITY AND SENSITIVITY ANALYSES

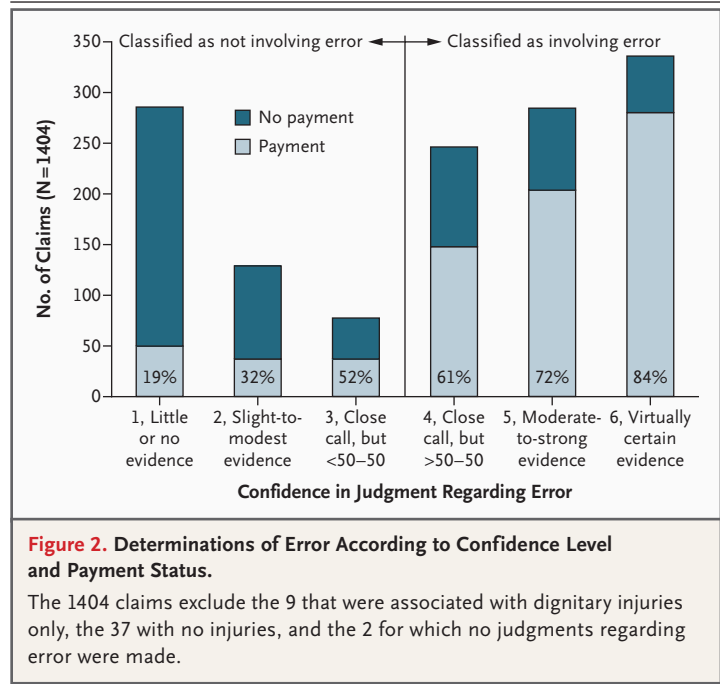
Reliability testing was performed on the basis of 148 pairs of reviews. Kappa scores were 0.78 (95 percent confidence interval, 0.65 to 0.90) for the determination of injury and 0.63 (95 percent confidence interval, 0.12 to 0.74) for the judgment that error occurred, but scores for the latter varied across the clinical categories (surgery, 0.80; medication, 0.76; obstetrics, 0.56; and diagnosis, 0.42).

The exclusion of claims in which the primary reviewer classified the determination of error as a close call substantially boosted the overall reliability (kappa score, 0.80; 95 percent confidence interval, 0.32 to 0.88) and category-specific reliability (surgery, 0.94; medication, 0.90; obstetrics, 0.67; diagnosis, 0.63) of the error judgments. In this smaller sample of claims, the proportion that did not involve error increased slightly, to 40 percent (430 of 1065), and changes with regard to the magnitude and significance of the various differences between the two types of claims (as shown in Table 2) were trivial. Our main findings were also robust when a sensitivity analysis was performed that excluded the obstetrics claims and diagnosis claims, the two clinical categories with the lowest levels of reliability.

DISCUSSION

We found that only a small fraction of claims lacked documented injuries. However, approximately one third of claims were without merit in the sense that the alleged adverse outcomes were not attributable to error. Claims without merit were generally resolved appropriately: only one in four resulted in payment. When close calls were excluded, claims without evidence of injury or error accounted for 13 percent of total litigation costs.

Several previous studies have investigated the relationship between the merits and outcomes of malpractice claims.²⁴⁻³⁰ The findings vary widely, with 40 to 80 percent of claims judged to lack merit and 16 to 59 percent of claims without



merit receiving payment. Each of the studies also has important weaknesses: they involved the use of small numbers of claims^{27,29}; they focused on a single hospital,²⁸ insurer,²⁵ specialty,^{24,30} or type of injury²⁷; they involved the use of very limited information in the determination of merit²⁶; or they relied on the insurer's view of the defensibility of the claim as a proxy for merit rather than on independent expert judgments.^{25,28,30} Our study was designed to avoid these limitations. Cheney and colleagues analyzed 1004 claims involving the use of anesthesia that were closed at 17 insurers in the 1970s and 1980s and found that approximately 40 percent of the claims did not involve substandard care, of which 42 percent received payment.²⁴ We detected a similar proportion of claims that did not involve error, but much fewer of them resulted in compensation.

We found stark differences in the outcomes of litigation for claims that did and those that did not involve errors: non-error claims were more than twice as likely as error claims to go to trial; they were nearly one third as likely to result in compensation; and when the plaintiffs received compensation, payments averaged 60 percent of the amount paid for error claims. Otherwise, non-error claims had few distinguishing characteristics. Economic theories regarding litigants' behavior³¹ suggest that two characteristics will

Characteristic	Claim		P Value
	Error (N=889)	No Error (N=515)	
Litigants			
Female plaintiff — no. (%) [*]	526 (61)	295 (58)	0.39
Mean age of plaintiff — yr	35.4	36.4	0.43
Physician specialty — no. (%) [†]			
Ophthalmology	7 (1)	13 (3)	0.02
Neurosurgery	50 (6)	16 (3)	0.04
Urology	15 (2)	25 (5)	0.001
Nurse — no. (%) [‡]	89 (10)	35 (7)	0.04
Facility codefendant — no. (%)	590 (66)	313 (61)	0.04
Severity of injury — no. (%)			
Psychological or emotional	25 (3)	26 (5)	0.04
Minor physical	106 (12)	81 (16)	0.05
Significant physical	372 (42)	201 (39)	0.31
Major physical	147 (17)	72 (14)	0.22
Death	239 (27)	135 (26)	0.80
Type of claim — no. (%)			
Surgery	258 (29)	163 (32)	0.30
Obstetrics	209 (24)	123 (24)	0.90
Missed or delayed diagnosis	259 (29)	155 (30)	0.72
Medication	163 (18)	74 (14)	0.06
Outcome of litigation			
Resolved by verdict — no. (%)	91 (10)	117 (23)	<0.001
Indemnity paid — no. (%)	653 (73)	145 (28)	<0.001
Out of court — no. (%) [§]	614 (77)	134 (34)	<0.001
By verdict — no. (%) [§]	39 (43)	11 (9)	<0.001
Mean payment levels — \$			
All payments [§]	521,560	313,205	0.004
Verdicts for plaintiffs [§]	765,486	326,009	0.24
Other			
Mean defense costs (all claims) — \$	50,966	55,233	0.50
Mean time from injury to filing of claim — yr	1.6	2.2	<0.001

* Percentages were calculated with the use of available data (507 claims not involving error and 869 involving error).

[†] Only significant subcategories are shown.

[‡] This category includes registered nurses, advanced-practice nurses, and licensed practical nurses.

[§] Percentages were calculated within subcategories.

mark such claims: close calls in terms of whether an error has occurred and relatively serious injury. Neither characteristic was borne out in our analyses. The profile of non-error claims we observed does not square with the notion of opportunistic trial lawyers pursuing questionable lawsuits in circumstances in which their chances of

winning are reasonable and prospective returns in the event of a win are high. Rather, our findings underscore how difficult it may be for plaintiffs and their attorneys to discern what has happened before the initiation of a claim and the acquisition of knowledge that comes from the investigations, consultation with experts, and shar-

Table 3. Apportionment of Total Expenditures between Claims Involving Error and Those Not Involving Error.

Costs	All Claims (N=1441)*	Claims Involving Error	Claims Involving No Error	Claims Involving No Error, Excluding Close Calls†
	\$		percent	
Total system‡	449,090,663	84	16	13
Indemnity	376,473,069	88	12	9
Administrative	204,383,168	78	21	20
Defense	72,617,594	61	39	48
Plaintiff§	131,765,574	88	12	9

* The total number of claims excludes 11 for which judgments regarding neither injury nor error were available.

† The 85 excluded claims were those for which the reviewer recorded a confidence score of 3 ("less likely than not that adverse outcome resulted from error or errors; more than 50–50 but a close call").

‡ Total system costs are the sum of indemnity costs and defense administrative costs. Including plaintiff administrative costs in the sum would result in double counting because these form a percentage of indemnity costs.

§ Plaintiff administrative costs are estimated on the basis of a contingency fee of 35 percent on indemnity payments.

ing of information that litigation triggers. Previous research has described tort litigation as a process in which information is cumulatively acquired.³²

Our findings point toward two general conclusions. One is that portraits of a malpractice system that is stricken with frivolous litigation are overblown. Although one third of the claims we examined did not involve errors, most of these went unpaid. The costs of defending against them were not trivial. Nevertheless, eliminating the claims that did not involve errors would have decreased the direct system costs by no more than 13 percent (excluding close calls) to 16 percent (including close calls). In other words, disputing and paying for errors account for the lion's share of malpractice costs. A second conclusion is that the malpractice system performs reasonably well in its function of separating claims without merit from those with merit and compensating the latter. In a sense, our findings lend support to this view: three quarters of the litigation outcomes were concordant with the merits of the claim.

However, both of these general conclusions obscure several troubling aspects of the system's performance. Although the number of claims without merit that resulted in compensation was fairly small, the converse form of inaccuracy — claims associated with error and injury that did not result in compensation — was substantially more common. One in six claims involved errors and received no payment. The plaintiffs behind such unrequited claims must shoulder the substantial economic and noneconomic burdens that flow

from preventable injury.^{33,34} Moreover, failure to pay claims involving error adds to a larger phenomenon of underpayment generated by the vast number of negligent injuries that never surface as claims.^{10,11}

In addition, enthusiasm about the precision of the malpractice system must be tempered by recognition of its costs. Among the claims we examined, the average time between injury and resolution was five years, and one in three claims took six years or more to resolve. These are long periods for plaintiffs to await decisions about compensation and for defendants to endure the uncertainty, acrimony, and time away from patient care that litigation entails.

In monetary terms, the system's overhead costs are exorbitant. The combination of defense costs and standard contingency fees charged by plaintiffs' attorneys (35 percent of the indemnity payment) brought the total costs of litigating the claims in our sample to 54 percent of the compensation paid to plaintiffs. The fact that nearly 80 percent of these administrative expenses were absorbed in the resolution of claims that involved harmful errors suggests that moves to combat frivolous litigation will have a limited effect on total costs. Substantial savings depend on reforms that improve the system's efficiency in the handling of reasonable claims for compensation.

Our study has four main limitations. First, the sample was drawn from insurers and involved clinical categories that are not representative of malpractice claims nationwide. Academic institutions and the physicians who staff them were over-

represented, as were claims that fell within our clinical categories of interest. Although it is difficult to make comparisons with other samples of closed claims, both the proportion of claims receiving payments and the average amount of the payments appear to be high according to national standards, which probably reflects the preponderance of severe injuries in our sample.

Second, the reliability of judgments that error had occurred was moderate overall; agreement was especially difficult to obtain among claims involving missed or delayed diagnoses. Third, whether claims had merit was determined by reference to error, which is not identical to the legal concept of negligence, although the two cleave so closely that experts in both medicine and law have trouble explaining the difference. Fourth, reviewers' awareness of the litigation outcome may have biased them toward finding errors in claims that resulted in compensation, and vice versa.^{35,36} To the extent that such hindsight bias was a factor, its likely effect would be to pull the rate of non-error claims (37 percent) toward the payment rate (56 percent), resulting in an overestimate of the prevalence and costs of claims not associated with error.

Frivolous litigation is in the bull's-eye of the current tort-reform efforts of state and federal legislators. The need to constrain the number and costs of frivolous lawsuits is touted as one of the primary justifications for such popular reforms as limits on attorneys' fees, caps on damages, panels for screening claims, and expert precertification requirements. Our findings suggest that moves to curb frivolous litigation, if successful, will have a relatively limited effect on the caseload and costs of litigation. The vast majority of resources go toward resolving and paying claims that involve errors. A higher-value target for reform than discouraging claims that do not belong in the system would be streamlining the processing of claims that do belong.

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REFERENCES

- Studdert DM, Mello MM, Brennan TA. Medical malpractice. *N Engl J Med* 2004; 350:283-92.
- Chief Medical Officer, National Health Service. Making amends: a consultation paper setting out proposals for reforming the approach to clinical negligence in the NHS. Leeds, United Kingdom: Department of Health, June 2003. (Accessed April 14, 2006, at <http://www.dh.gov.uk/assetRoot/04/06/09/45/04060945.pdf>.)
- Hagihara A, Nishi M, Nobutomo K. Standard of care and liability in medical malpractice litigation in Japan. *Health Policy* 2003;65:119-27.
- Ipp DA, Cane P, Sheldon D, Macintosh I. Review of the law of negligence: final report. Canberra, Australia: Minister for Revenue and Assistant Treasurer, September, 2002. (Accessed April 14, 2006, at <http://revofneg.treasury.gov.au/content/review2.asp>.)
- Dao J. A push in states to curb malpractice costs. *New York Times*. January 14, 2005:A1.
- Baker P. Bush campaigns to curb lawsuits. *Washington Post*. January 6, 2005: A6.
- Black's law dictionary: definitions of the terms and phrases of American and English jurisprudence, ancient and modern. 6th ed. St. Paul, Minn.: West Publishing, 1990.
- Boyle LV. The truth about medical malpractice. *Trial*, April 2002. (Accessed April 14, 2006, at <http://www.atla.org/medmal/prez.aspx>.)
- Baker T. The medical malpractice myth. Chicago: University of Chicago Press, 2005.
- Localio AR, Lawthers AG, Brennan TA, et al. Relation between malpractice claims and adverse events due to negligence: results of the Harvard Medical Practice Study III. *N Engl J Med* 1991; 325:245-51.
- Studdert DM, Thomas EJ, Burstin HR, Zbar BI, Orav EJ, Brennan TA. Negligent care and malpractice claiming behavior in Utah and Colorado. *Med Care* 2000;38:250-60.
- Weiler PC. Medical malpractice on trial. Cambridge, Mass.: Harvard University Press, 1991.
- Vidmar N. Medical malpractice and the American jury: confronting the myths about jury incompetence, deep pockets, and outrageous damage awards. Ann Arbor: University of Michigan Press, 1995.
- Baker T. Reconsidering the Harvard Medical Practice Study conclusions about the validity of medical malpractice claims. *J Law Med Ethics* 2005;33:501-14.
- Weiler PC, Hiatt HH, Newhouse JP, Johnson WG, Brennan T, Leape LL. A measure of malpractice: medical injury, malpractice litigation, and patient compensation. Cambridge, Mass.: Harvard University Press, 1993.
- Studdert DM, Brennan TA, Thomas EJ. Beyond dead reckoning: measures of medical injury burden, malpractice litigation, and alternative compensation models from Utah and Colorado. *Indiana Law Rev* 2000;33:1643-86.
- Data sharing report, 2000. Rockville, Md.: Physician Insurers' Association of America, 2000.
- Chandra A, Nundy S, Seabury SA. The growth of physician medical malpractice payments: evidence from the National Practitioner Data Bank. *Health Aff (Millwood)* 2005;Suppl Web Exclusives:W5-240-W5-249.
- National Practitioner Data Bank. Public use data files. (Accessed April 14, 2006, at <http://www.npdb-hipdb.com/publicdata.html>.)
- Sowka M, ed. National Association of Insurance Commissioners, malpractice claims: final compilation. Brookfield, Wis.: National Association of Insurance Commissioners, 1980.
- Kohn LT, Corrigan JM, Donaldson MS, eds. To err is human: building a safer health system. Washington, D.C.: National Academy Press, 2000.
- Studdert DM, Mello MM, Sage WM, et al. Defensive medicine among high-risk specialist physicians in a volatile malprac-

- tice environment. *JAMA* 2005;293:2609-17.
23. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977;33:159-74.
24. Cheney FW, Posner K, Caplan RA, Ward RJ. Standard of care and anesthesia liability. *JAMA* 1989;261:1599-603.
25. Taragin MI, Willett LR, Wilczek AP, Trout R, Carson JL. The influence of standard of care and severity of injury on the resolution of medical malpractice claims. *Ann Intern Med* 1992;117:780-4.
26. Sloan FA, Hsieh CR. The variability in medical malpractice payments: is the compensation fair? *Law Soc Rev* 1990;24:997-1039.
27. Sloan FA, Githens PB, Clayton EW, Hickson GB, Gentile DA, Partlett DF. *Suing for medical malpractice*. Chicago: University of Chicago Press, 1993.
28. Farber HS, White MJ. A comparison of formal and informal dispute resolution in medical malpractice. *J Legal Studies* 1994;23:777-806.
29. Brennan TA, Sox CA, Burstin HR. Relation between negligent adverse events and the outcomes of medical malpractice litigation. *N Engl J Med* 1996;335:1963-7.
30. Phillips RL Jr, Bartholomew LA, Dovey SM, Fryer GE Jr, Miyoshi TJ, Green LA. Learning from malpractice claims about negligent, adverse events in primary care in the United States. *Qual Saf Health Care* 2004;13:121-6.
31. Landes WM, Posner RA. *The economic structure of tort law*. Cambridge, Mass.: Harvard University Press, 1987.
32. Sieg H. Estimating a bargaining model with asymmetric information: evidence from medical malpractice disputes. *J Polit Econ* 2000;108:1006-21.
33. Johnson WG, Brennan TA, Newhouse JP, et al. The economic consequences of medical injuries: implications for a no-fault insurance plan. *JAMA* 1992;267:2487-92.
34. Thomas EJ, Studdert DM, Newhouse JP, et al. Costs of medical injuries in Utah and Colorado. *Inquiry* 1999;36:255-64.
35. LaBine SJ, LaBine G. Determinations of negligence and the hindsight bias. *Law Hum Behav* 1996;20:501-16.
36. Guthrie CP, Rachlinski JJ, Wistrich AJ. Inside the judicial mind. *Cornell Law Rev* 2001;86:777-830.

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