

SPECIAL ARTICLE

Prevalence and Characteristics of Physicians Prone to Malpractice Claims

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 ABSTRACT

BACKGROUND

The distribution of malpractice claims among physicians is not well understood. If claim-prone physicians account for a substantial share of all claims, the ability to reliably identify them at an early stage could guide efforts to improve care.

METHODS

Using data from the National Practitioner Data Bank, we analyzed 66,426 claims paid against 54,099 physicians from 2005 through 2014. We calculated concentrations of claims among physicians. We used multivariable recurrent-event survival analysis to identify characteristics of physicians at high risk for recurrent claims and to quantify risk levels over time.

RESULTS

Approximately 1% of all physicians accounted for 32% of paid claims. Among physicians with paid claims, 84% incurred only one during the study period (accounting for 68% of all paid claims), 16% had at least two paid claims (accounting for 32% of the claims), and 4% had at least three paid claims (accounting for 12% of the claims). In adjusted analyses, the risk of recurrence increased with the number of previous paid claims. For example, as compared with physicians who had one previous paid claim, the 2160 physicians who had three paid claims had three times the risk of incurring another (hazard ratio, 3.11; 95% confidence interval [CI], 2.84 to 3.41); this corresponded in absolute terms to a 24% chance (95% CI, 22 to 26) of another paid claim within 2 years. Risks of recurrence also varied widely according to specialty — for example, the risk among neurosurgeons was four times as great as the risk among psychiatrists.

CONCLUSIONS

Over a recent 10-year period, a small number of physicians with distinctive characteristics accounted for a disproportionately large number of paid malpractice claims.

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N Engl J Med 2016;374:354-62.

DOI: 10.1056/NEJMsa1506137

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THERE ARE LONG-STANDING CONCERNS about claim-prone and complaint-prone physicians.¹⁻⁵ Many studies have compared physicians who have multiple claims against them with colleagues who have few or no claims against them and have identified systematic differences in their age,⁶ sex,⁶⁻⁸ specialty,^{6,9-11} training and certification,^{8,9,12,13} claim and complaint histories,^{12,14,15} and quality of care.¹⁶⁻¹⁸ However, only a few published studies^{6,9,12,19,20} have analyzed the nature of the maldistribution itself; these studies generally have been limited to claims data from a single insurer or state and date back to the 1970s and 1980s.

If claim-prone physicians account for a substantial share of all claims, the ability to reliably identify them before they accumulate troubling track records would be valuable. Attempts to predict malpractice claims^{14,15,21-26} have had mixed success and suggest that prospective identification is not feasible. This helps to explain why the medical malpractice system remains largely a reactive enterprise, focused on the aftermath of care that has gone wrong. The chief contribution of the system to the prevention of harm lies in its intended role as a deterrent to substandard care — a function that evidence suggests it performs poorly.^{27,28}

We sought to characterize the distribution of paid malpractice claims among physicians nationwide and physician characteristics associated with incurring multiple paid claims. We expected to find high concentrations of claims. Drawing on methods that were recently developed to analyze patient complaints in Australia,²⁹ we also anticipated that it would be feasible to identify factors associated with recurrent claims at the physician level.

METHODS

DATA AND VARIABLES

The National Practitioner Data Bank (NPDB) is a confidential data repository created by Congress in 1986 to improve health care quality. We obtained information on all payments reported to the NPDB against doctors of medicine (M.D.s) and doctors of osteopathic medicine (D.O.s) in the United States between January 1, 2005, and December 31, 2014. We also obtained data on the total number of active physicians in the United States — according to specialty and year

— from the American Medical Association (AMA) Physician Masterfile.³⁰

Most of the study variables were available in the NPDB public-use data file. We obtained several additional variables (e.g., physician specialty and sex and payment year and month) by special application to the Health Resources and Services Administration (HRSA). Further details regarding the data sources and variables are provided in the Supplementary Appendix, available with the full text of this article at NEJM.org.

STUDY DATA SET

Every practitioner who is the subject of an NDPB report is assigned a unique identifier. This identifier allowed us to link multiple reports against the same physician. HRSA checks for and eliminates duplicate reports, except that payment contributions from patient-compensation funds (in the states that have them) are logged as separate reports. We included the state-fund payments in calculations of mean and median payment levels but excluded them from all other analyses, to ensure that each report in our sample related to a separate claim.

We excluded paid claims against physicians 65 years of age or older because retirement was a rival explanation for the absence of further paid claims against those physicians. In addition, when a physician had multiple paid claims in the same month, we considered only one, chosen at random, and excluded any others (1959 claims were excluded). The rationale for these exclusions was related to the multivariable analysis and is described in the Supplementary Appendix.

STATISTICAL ANALYSIS

Distributional Analysis

We calculated the cumulative distribution of paid claims in two populations of physicians: those with one or more paid claims during the study period and all active physicians in the United States. The count used for the second population was the AMA estimate³⁰ of the number of active physicians at the median time point in our study period. We tested the sensitivity of our results to this denominator by recalculating the distributional statistics using AMA counts for 2005 and 2014 — the years with the lowest and the highest number of active physicians, respectively; there was virtually no difference in the results. Additional information on the method used to

count physicians according to specialty is available in the Supplementary Appendix.

Analysis of Recurrent Claims

We used multivariable survival analysis to identify characteristics of physicians at risk for recurrent paid claims. Specifically, we used an Anderson–Gill model,³¹ which allowed each physician in the sample to accrue multiple claims over the study period. The underlying distribution for time was modeled with the use of a flexible parametric survival model.³² Time at risk was defined as the time from the physician's first paid claim to the month of the physician's 65th birthday or to the end of the study, whichever came first.

The analysis was at the claim level. The outcome variable in the model was a paid claim against a physician, conditional on the physician having had an earlier paid claim during the study period. The covariates were the number of previous paid claims that the physician had had during the study period, the payment year, and the physician's qualification (M.D. vs. D.O.), specialty, age, sex, trainee status (resident vs. nonresident), practice location (state and rurality³³), and medical school location (United States vs. other). In addition, we adjusted for the physician's exposure to the specialty-specific risk of a claim by including a variable indicating the incidence of paid claims per 1000 physicians in each specialty and year.

We calculated cluster-adjusted robust standard errors to account for correlations among physicians who had multiple claims over time. The number of previous paid claims was specified as a time-varying covariate. Age, trainee status, and practice location were also time-varying in the sense that we allowed physicians to move into different categories of these variables, commensurate with their profile at the time of a payment. To test the robustness of our estimates, we reran the multivariate analysis within specialties and specialty groups.

Finally, to estimate physicians' absolute risks of having paid claims over time, we plotted adjusted failure curves (1 minus the survivor function).³⁴ Values for these curves were computed with the use of coefficients from the main multivariable model. Further details of the modeling approach, the stratified analyses according to specialty, and the technique used to plot the

failure curves are provided in the Supplementary Appendix. All analyses were performed with the use of Stata software, version 13.1 (StataCorp).

RESULTS

SAMPLE CHARACTERISTICS

The study sample consisted of 66,426 paid claims against 54,099 physicians. A total of 82% of the physicians were men (Table 1). More than half the claims were accounted for by physicians in four specialty groups — internal medicine (15%), obstetrics and gynecology (13%), general surgery (12%), and general practice or family medicine (11%). A total of 92% of the physicians were M.D.s, 87% practiced in metropolitan areas, and 77% were trained in the United States.

Almost one third of the claims related to patient deaths, and 54% related to “major” or “significant” physical injury defined according to the scale developed by the National Association of Insurance Commissioners (see Table S1 in the Supplementary Appendix). Only 3% of the claims were paid to satisfy court verdicts for the plaintiff; the rest were out-of-court settlements. The mean payment amount was \$371,054, and the median was \$204,750 (in 2014 dollars).

DISTRIBUTION OF CLAIMS

When the analysis was performed with all 915,564 active physicians in the United States as a denominator, the distribution of paid claims over the 10-year study period was extremely concentrated. Only 6% of physicians had a paid claim. Approximately 1% of physicians (those with ≥ 2 paid claims) accounted for 32% of all paid claims, and 0.2% of physicians (those with ≥ 3 paid claims) accounted for 12% of all paid claims.

Restricting the background population to physicians with at least one paid claim resulted in a more moderate concentration. A total of 84% of these physicians had only one paid claim over the study period; they accounted for 68% of all claims. However, 16% of physicians with at least one paid claim (8846 physicians) had at least two paid claims and accounted for 32% of all claims, 4% of them (2160 physicians) had at least three paid claims and accounted for 12% of all claims, and 1% of them (722 physicians) had at least four paid claims and accounted for 5% of all claims (Fig. 1).

Variable	Value
Physicians — no. (%)	54,099 (100)
Male sex	44,350 (82)
Age	
25–34 yr	738 (1)
35–44 yr	13,518 (25)
45–54 yr	21,133 (39)
55–64 yr	18,710 (35)
Specialty	
Internal medicine	8,377 (15)
Obstetrics and gynecology	6,977 (13)
General surgery	6,357 (12)
General practice or family medicine	6,013 (11)
Orthopedics	3,723 (7)
Radiology	3,174 (6)
Emergency medicine	2,630 (5)
Anesthesiology	2,413 (4)
Cardiology	2,134 (4)
Pediatrics	1,812 (3)
Ophthalmology	1,242 (2)
Urology	1,121 (2)
Plastic surgery	1,067 (2)
Neurosurgery	1,066 (2)
Otolaryngology	976 (2)
Neurology	804 (1)
Psychiatry	758 (1)
Other specialties	3,410 (6)
Qualification	
M.D.	49,969 (92)
D.O.	4,130 (8)
Practice location	
Metropolitan area	46,937 (87)
Large rural city	4,565 (8)
Small town or rural area	2,123 (4)
Trained in the United States	41,849 (77)
Paid claims — no. (%)	66,426 (100)
Severity of injury — no. (%) [†]	
Death	21,509 (32)
Major physical injury	10,130 (15)
Significant physical injury	25,447 (38)
Minor physical injury	7,798 (12)
Emotional injury only	999 (2)

Variable	Value
Disposition — no. (%)	
Settlement	64,640 (97)
Verdict	1,786 (3)
Total payment — dollars [‡]	
Mean	371,054
Median	204,750

* Data on practice location were missing for 474 physicians (1%), and data on the severity of injury were missing for 543 claims (1%). The other variables had either no missing values or a very small number. All percentages were calculated with the total number of physicians (54,099) or the total number of claims (66,426) as the denominator. D.O. denotes doctor of osteopathic medicine, and M.D. doctor of medicine.

[†] Severity of injury was defined according to the scale developed by the National Association of Insurance Commissioners (see Table S1 in the Supplementary Appendix).

[‡] Payments were adjusted to 2014 dollars.

FACTORS ASSOCIATED WITH RECURRENT CLAIMS

In multivariable analysis, physicians' risk of future paid claims increased monotonically with their number of previous paid claims (Table 2). As compared with physicians who had one previous paid claim, physicians who had two paid claims had almost twice the risk of having another one (hazard ratio, 1.97; 95% confidence interval [CI], 1.86 to 2.07), physicians with three paid claims had three times the risk of recurrence (hazard ratio, 3.11; 95% CI, 2.84 to 3.41), and physicians with six or more paid claims had more than 12 times the risk of recurrence (hazard ratio, 12.39; 95% CI, 8.69 to 17.65). Repeating the multivariable analyses within specialties and specialty groups produced similar estimates of the effect of previous paid claims on the risk of recurrence (see Table S2 in the Supplementary Appendix).

Risks also varied widely according to specialty. As compared with the risk of recurrence among internal medicine physicians, the risk of recurrence was approximately double among neurosurgeons (hazard ratio, 2.32; 95% CI, 1.77 to 3.03), orthopedic surgeons (hazard ratio, 2.02; 95% CI, 1.70 to 2.40), general surgeons (hazard ratio, 2.01; 95% CI, 1.65 to 2.46), plastic surgeons (hazard ratio, 1.95; 95% CI, 1.60 to 2.37), and obstetrician-gynecologists (hazard ratio,

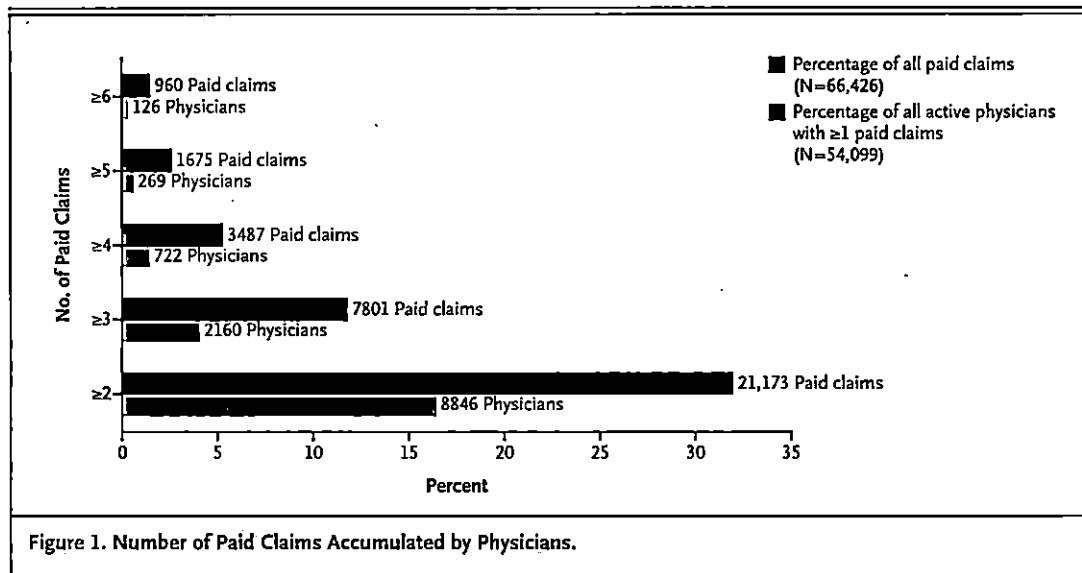


Figure 1. Number of Paid Claims Accumulated by Physicians.

1.89; 95% CI, 1.58 to 2.25) (Table 2). The lowest risks of recurrence were seen among psychiatrists (hazard ratio, 0.60; 95% CI, 0.43 to 0.82) and pediatricians (hazard ratio, 0.71; 95% CI, 0.59 to 0.85).

Male physicians had a 38% higher risk of recurrence than female physicians (hazard ratio, 1.38; 95% CI, 1.30 to 1.46). The risk of recurrence among physicians younger than 35 years of age was approximately one third the risk among their older colleagues. Residents had a lower risk of recurrence than nonresidents, and M.D.s had a lower risk than D.O.s.

RISKS OF RECURRENCE OVER TIME

Figure 2A shows the cumulative risk of recurrent paid claims over a 5-year period, according to the number of paid claims that a physician had already accumulated during the study period. The 2160 physicians who reached a third paid claim had a 24% chance (95% CI, 22 to 26) of another paid claim within 2 years and a 37% chance (95% CI, 35 to 40) of another within 4 years. The 126 physicians who reached a sixth paid claim had a 62% chance (95% CI, 51 to 74) of another within 2 years and a 79% chance (95% CI, 69 to 88) of another within 4 years. The steep rise and plateauing of the failure curves for physicians with three or more previous paid claims indicate that physicians' instantaneous risk of incurring additional claims was highest in the year after a payment was made and declined gradually thereafter.

Figure 2B shows the risk of recurrent paid

claims over a 5-year period for physicians in six specialties. The range of risk across the specialties is substantial. For example, psychiatrists with one or more paid claims had a 5% chance (95% CI, 3 to 6) of incurring another within 2 years and an 8% chance (95% CI, 5 to 10) of incurring another within 4 years. By contrast, neurosurgeons with one or more paid claims had a 16% chance (95% CI, 13 to 19) of incurring another within 2 years and a 26% chance (95% CI, 22 to 30) of incurring another within 4 years.

DISCUSSION

This study showed that over a recent 10-year period, a relatively small group of U.S. physicians accounted for a disproportionately large share of paid malpractice claims. Several physician characteristics, most notably the number of previous claims and the physician's specialty, were significantly associated with recurrence of claims. For example, the 2160 physicians in our sample who incurred their third paid claim had high risks of recurrence, in both relative terms (>3 times as high as physicians with one paid claim) and absolute terms (24% risk of recurrence within 2 years).

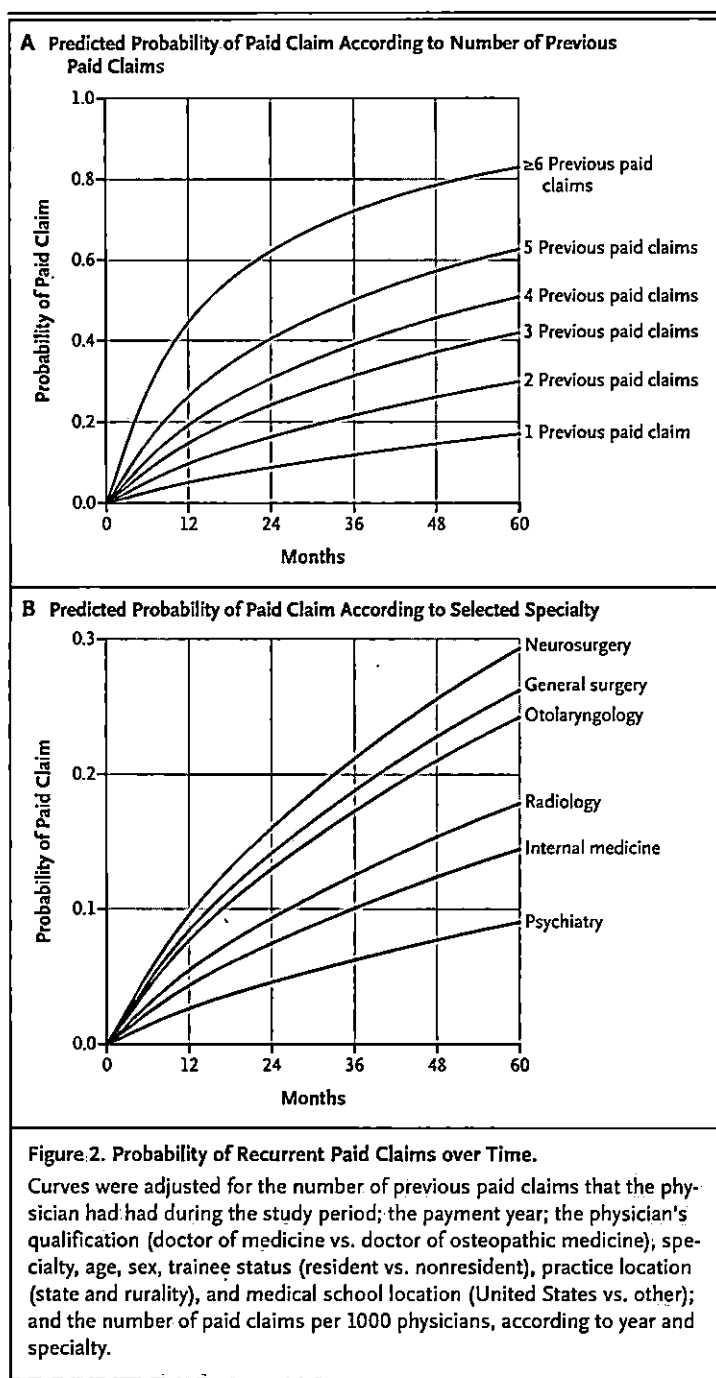
The claim concentrations that we estimated are larger than those previously reported. In part, this may be a function of our study window, which allowed claims to accrue over a longer period than most previous studies have. Concentrations detectable in single-insurer analyses^{6,12} may also be lower if physicians with multiple

Table 2. Variables Associated with Recurrent Paid Malpractice Claims among Physicians with One or More Paid Claims.

Variable	Hazard Ratio (95% CI)*	P Value
No. of previous paid claims		<0.001
1	reference	
2	1.97 (1.86–2.07)	
3	3.11 (2.84–3.41)	
4	4.19 (3.62–4.85)	
5	6.09 (4.92–7.55)	
≥6	12.39 (8.69–17.65)	
Specialty		<0.001
Internal medicine	reference	
Neurosurgery	2.32 (1.77–3.03)	
Orthopedic surgery	2.02 (1.70–2.40)	
General surgery	2.01 (1.65–2.46)	
Plastic surgery	1.95 (1.60–2.37)	
Obstetrics and gynecology	1.89 (1.58–2.25)	
Otolaryngology	1.83 (1.59–2.10)	
Urology	1.59 (1.35–1.87)	
Ophthalmology	1.37 (1.18–1.59)	
Radiology	1.27 (1.13–1.44)	
Other specialties	1.18 (1.06–1.32)	
Emergency medicine	1.06 (0.94–1.19)	
Cardiology	1.05 (0.86–1.29)	
Anesthesiology	0.95 (0.82–1.10)	
General practice or family medicine	0.91 (0.83–1.01)	
Neurology	0.81 (0.65–1.01)	
Pediatrics	0.71 (0.59–0.85)	
Psychiatry	0.60 (0.43–0.82)	
Qualification		<0.001
D.O.	reference	
M.D.	0.80 (0.75–0.86)	
Sex		<0.001
Female	reference	
Male	1.38 (1.30–1.46)	
Age		<0.001
25–34 yr	0.33 (0.18–0.61)	
35–44 yr	0.92 (0.87–0.98)	
45–54 yr	0.99 (0.95–1.03)	
55–64 yr	reference	
Resident		0.003
No	reference	
Yes	0.68 (0.53–0.88)	
Trained in the United States		<0.001
Yes	reference	
No	1.12 (1.06–1.17)	
Rurality of practice location		0.89
Metropolitan	reference	
Large rural city	1.02 (0.95–1.09)	
Small town or rural area	0.99 (0.89–1.12)	
Baseline rate of paid claims†	1.02 (1.01–1.03)	0.004

* Variables for state and payment year were also included in the model, but hazard ratios for them are not shown.

† The variable was specified as the number of paid claims per 1000 physicians, according to year and specialty.



claims switched insurers or had their coverage terminated, because future claims against those physicians would not have been observed. (For the same reason, a liability insurer may not absorb the full costs of claim-prone physicians.) Another explanation for the high concentrations that we found is claim mix: most previous studies have analyzed all claims, and paid claims

may be more concentrated than unpaid ones. Finally, with the exception of a 2007 report by Public Citizen,²⁰ distributional statistics reported in the literature to date^{6,9,15,19,35} relate to litigation from more than 25 years ago, and the concentration of claims among physicians may have increased since then.

It is important to recognize that claim concentrations over a given period of time are a function of two factors: an individual physician's propensity to attract claims and the baseline incidence of claims in the population. Our analysis focused on the former and sought to adjust for the latter, but the two phenomena are difficult to disentangle. Specialty is a particularly strong determinant of claim incidence. The consistency of our main results in within-specialty analyses was therefore reassuring.

Some of the physician characteristics associated with future claims that we identified — particularly, specialty,^{21,23,26} sex,^{23,26} and age²⁶ — were detected in earlier claims-prediction studies. However, the modeling approach that we used enhanced our ability to identify risk factors for recurrent claims. The approach developed by Rolph et al.^{22,26,35} and emulated by others^{19,23,24} relies on a snapshot of physicians' event histories at a particular moment in time. Recurrent-event survival analysis permits dynamic consideration of time-varying factors that may predict claims. As physicians' risk profiles evolve, those changes can be incorporated into estimations of future risk.

A related advantage of survival analysis is that it permits estimation of physicians' risk levels at future time points. The failure curves that we estimated suggest that the instantaneous risk of further paid claims was highest soon after a payment was made and then leveled off after a few years. Temporal clustering of claims warrants further examination.

Our study has several limitations. First, some malpractice payments do not reach the NPDB. The extent of underreporting is unknown; however, the most serious concerns about underreporting center on physicians whose names are "shielded" through settlements made in the name of an institutional codefendant.³⁶ Shielding is most likely in settings in which physicians and hospitals are covered by the same liability insurer, the delivery system is tightly integrated, or physicians exert substantial control. To the

extent that claims were underreported, we will have underestimated the number of physicians who have multiple claims. The effects on the proportion of all physicians with multiple claims and the estimates from the multivariable model are unknown; they depend on how underreported claims are distributed in the physician population.

Second, we used head counts of physicians rather than more sophisticated measures of their exposure to claim risk, such as hours worked, volume of patients treated, or patient case mix. Third, because we observed directly the occurrence of paid claims rather than a cohort of physicians, there will have been some unobserved censoring in our data. Some physicians may have ceased being “at risk” after a first or subsequent paid claim owing to a decision to no longer treat patients, early retirement, or license suspension or revocation. Such unobserved censoring probably biased our results toward underestimation of claim concentrations.

Finally, focusing on paid claims has advantages and disadvantages. Although payment does not necessarily indicate that a claim has merit, paid claims are much more likely than unpaid claims to involve substandard care.³⁷ On the other hand, approximately 70% of all claims do not result in payments,³⁸ and these events still vex defendants, are costly to bring and defend, and flag patient dissatisfaction (or worse). Future researchers should consider applying distributional and predictive analyses to both types of claims and to other types of medical-legal events (e.g., disciplinary actions and patient complaints).

All institutions that handle large numbers of patient complaints and claims should understand the distribution of these events within their own “at risk” populations. In our experience, few do. With notable exceptions,³⁹ fewer still systematically identify and intervene with practitioners who are at high risk for future claims. Rather, the risk-mitigation initiatives that are in place — such as the educational and premium-discount programs that some malpractice-insurance companies offer — are generally offered en masse. Otherwise, insurers tackle the problem of claim-prone physicians primarily by raising premiums or terminating coverage. These strategies do not directly address the underlying problems that lead to many claims.

In an environment in which a small minority of physicians with multiple claims accounts for a substantial share of all claims, an ability to reliably predict who is at high risk for further claims could be very useful. Our analysis suggests, but does not establish, the feasibility of such prediction. If reliable prediction proves to be feasible, our hope is that liability insurers and health care organizations would use the information constructively, by collaborating on interventions to address risks posed by claim-prone physicians (e.g., peer counseling, training, and supervision). It could present an exciting opportunity for the liability and risk-management enterprises to join the mainstream of efforts to improve quality.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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