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The Effect of Malpractice Reform on Emergency Department Care

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ABSTRACT

BACKGROUND

Many believe that fear of malpractice lawsuits drives physicians to order otherwise unnecessary care and that legal reforms could reduce such wasteful spending. Emergency physicians practice in an information-poor, resource-rich environment that may lend itself to costly defensive practice. Three states, Texas (in 2003), Georgia (in 2005), and South Carolina (in 2005), enacted legislation that changed the malpractice standard for emergency care to gross negligence. We investigated whether these substantial reforms changed practice.

METHODS

Using a 5% random sample of Medicare fee-for-service beneficiaries, we identified all emergency department visits to hospitals in the three reform states and in neighboring (control) states from 1997 through 2011. Using a quasi-experimental design, we compared patient-level outcomes, before and after legislation, in reform states and control states. We controlled for characteristics of the patients, time-invariant hospital characteristics, and temporal trends. Outcomes were policy-attributable changes in the use of computed tomography (CT) or magnetic resonance imaging (MRI), per-visit emergency department charges, and the rate of hospital admissions.

RESULTS

For eight of the nine state–outcome combinations tested, no policy-attributable reduction in the intensity of care was detected. We found no reduction in the rates of CT or MRI utilization or hospital admission in any of the three reform states and no reduction in charges in Texas or South Carolina. In Georgia, reform was associated with a 3.6% reduction (95% confidence interval, 0.9 to 6.2) in per-visit emergency department charges.

CONCLUSIONS

Legislation that substantially changed the malpractice standard for emergency physicians in three states had little effect on the intensity of practice, as measured by imaging rates, average charges, or hospital admission rates. (Funded by the Veterans Affairs Office of Academic Affiliations and others.)

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DEFENSIVE MEDICINE IS CONSIDERED BY many to be a major source of wasteful medical spending in the United States. A widely cited report estimates that $210 billion is spent annually on needless care motivated by fear of malpractice litigation.[1] Although this estimate may be high,[2] many agree that malpractice reform belongs on the short list of policy options for reducing health care costs.[3-6]

Physicians themselves report that they are strongly influenced by fear of lawsuits.[7-9] There are few data, however, to show whether physicians would practice differently if the risk of legal action were appreciably lowered. To the extent that the effect of legislation on defensive medicine has been studied, the weight of evidence and opinion suggests that the effect is limited.[3,5,10-12] However, it has been argued that most laws enacted so far (which are aimed primarily at limiting the size of lawsuit awards) fail to address a fundamental problem. Because malpractice is usually defined as a deviation from the standard of customary practice, physicians feel compelled to practice maximally intensive medicine according to what they believe their peers are doing.[5,13]

One venue in which the costs of defensive practice might be particularly high is the hospital emergency department. Emergency physicians practice in an information-poor, high-risk, technology-rich environment, a setting that may lend itself to defensive practice and magnify the costs. For example, an emergency physician's decision to admit a patient to the hospital triggers inpatient costs that may be 10 times as high as the cost associated with the emergency department visit itself.[14]

Emergency department care has been a particular focus of a new generation of malpractice reform laws. Approximately a decade ago, the states of Texas (in 2003), Georgia (in 2005), and South Carolina (in 2005) changed their malpractice standard for emergency care to "willful and wanton negligence" (in Texas) and "gross negligence" (in Georgia and South Carolina). From a legal standpoint, these two standards are considered to be synonymous and are widely considered to be a very high bar for plaintiffs.[15-19] Under typical interpretations of this standard, a plaintiff must show that a physician had "actual, subjective awareness" of "the likelihood of serious injury" but nevertheless proceeded with "conscious indifference."[19]

The Texas, Georgia, and South Carolina laws are intended to protect physicians who are practicing with incomplete information in high-intensity care settings. The enactment of these laws offers an unusual circumstantial experiment with which to evaluate a type of reform that is qualitatively different from what has been studied previously.

METHODS

STUDY DESIGN

We used a quasi-experimental analytic approach that was designed to evaluate the effect of legal reform on the treatment of Medicare patients in the emergency department; we attempted to isolate the effect of the law from temporal trends and from characteristics of patients and hospitals (i.e., to evaluate changes that could be attributable to the new policy).

The three laws differ somewhat in wording, and each contains provisions that apply outside emergency department settings. However, they are similar in most respects (Table 1).

To evaluate policy-attributable changes in practice, we selected three encounter-level end points on the basis of emergency physicians' self-reports of defensive practices[7,8]: whether the emergency department physician ordered one or more advanced imaging studies (computed tomography [CT] or magnetic resonance imaging [MRI]), whether the emergency department visit resulted in hospital admission, and the total charges for the emergency department visit. Advanced imaging and hospital admission were chosen because they are the two most common defensive maneuvers identified by emergency physicians and because they are among the costliest.[14] Per-visit charges are a proxy for practice intensity, are not dependent on payer type, and are directly meaningful as the starting point for payment negotiations and calculations of bad debt.

DATA SOURCES AND POPULATION

We identified all claims for visits to acute-care hospital emergency departments in Texas, Georgia, and South Carolina and neighboring control states among a 5% random sample of Medicare claims for the period from 1997 through 2011. Control states were chosen to include the five nearest neighbors to each reform state, after excluding states with other important malpractice reform during the study period; for Texas, the

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Table 1. **Summary of Malpractice Reforms.**

Variable	Texas	Georgia	South Carolina
Name of law	House Bill 4 and Proposition 12	Senate Bill 3	Senate Bill 83
Effective date	September 1, 2003	February 15, 2005	July 1, 2005
Emergency care malpractice standard (statute citation)	Ordinary negligence → willful and wanton negligence (VTCA, Civil Practice and Remedies Code §74.153)	Ordinary negligence → gross negligence (OCGA §51-1-29.5)	Ordinary negligence → gross negligence (SCCA §15-32-230)
Emergency care burden of proof	Unchanged	Preponderance of the evidence → clear and convincing evidence	Unchanged
Emergency care context	Care in a hospital ED or obstetrical unit	Care in a hospital ED or in an obstetrical unit or surgical suite immediately after the evaluation or treatment of a patient in a hospital ED	Claim arising from care rendered in a genuine emergency situation involving an immediate threat of death or serious bodily injury to the patient receiving care in an ED or obstetrical or surgical suite
Other key provisions not specific to emergency care	$250,000 cap on noneconomic damages	$350,000 cap on noneconomic damages, which was overturned as unconstitutional by the Supreme Court of Georgia in 2010	$350,000 cap on noneconomic damages

* ED denotes emergency department, OCGA Official Code of Georgia Annotated, SCCA South Carolina Code of Laws Annotated, and VTCA Vernon's Texas Statutes and Code Annotated.

control states were Arizona, Arkansas, Louisiana, New Mexico, and Oklahoma, and for Georgia and South Carolina, the control states were Alabama, Kentucky, North Carolina, Tennessee, and Virginia.[20] When nonadjacent states were included as controls, they were chosen on the basis of large populations and cultural similarity. The selection of control states was finalized before the data were analyzed.

Emergency department visits for patients ultimately admitted to the hospital or discharged directly from the emergency department were identified by claims (revenue center codes 450, 451, and 981) in the inpatient and outpatient files, respectively.[21] Patients admitted to observation units were identified by revenue center code 760 or 762 in the claims for the emergency department visit.[22] Since the choice between observation-unit admission and inpatient admission might be administrative and might not be made by (or even known to) the emergency physician, we considered both dispositions to be a hospital admission.[23] Charges found in the carrier file were matched to emergency department facility records according to the date of service. CT and MRI scans were identified by a carrier-file claim for Healthcare Common Procedure Coding System codes corresponding to the Berenson–Eggers Type of Service category I2 (advanced imaging).

We excluded patients who were seen at hospitals that did not have inpatient admissions during the periods both before and after reform. This left 3,868,110 records for analysis (96% of the original sample).

STATISTICAL ANALYSIS

We performed three separate sets of analyses, one for each of the three reform states (Texas, Georgia, and South Carolina). For each set, we modeled three outcomes using encounter-level data and a differences-in-differences research design. Outcomes were modeled as a function of whether the emergency department visit occurred in a hospital after the passage of the malpractice reform (i.e., a hospital in a state with reform and a visit during the period after reform), as compared with a control hospital (i.e., the same hospital in the period before reform or a hospital in one of the surrounding states), after correcting for potential confounders, including characteristics of the patients, temporal trends, and fixed characteristics of the hospital.[24]

We controlled for patients' age (in 5-year increments), sex, race, and principal discharge diagnosis (aggregated into 38 exclusive and exhaustive categories relevant to the emergency department).[25] Other control variables included calendar-year indicators, state-specific time trends, the state- and year-specific proportions

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Table 2. **Population Characteristics.***

Variable	Texas		Georgia		South Carolina	
	Reform State	Control States	Reform State	Control States	Reform State	Control States
Patients (no.)	787,352	757,916	362,470	1,704,456	235,592	1,704,456
Hospitals (no.)	276	295	104	439	52	439
Age of the patient (yr)	70.0±15.2	69.2±15.8	68.0±15.8	68.1±16.0	67.9±15.6	68.1±16.0
Female sex (%)	60	58	60	59	59	59
Black race (%)†	15	15	30	20	33	20
Medicare patients in Medicare Advantage (%)	13	16	09	09	06	09
Patients with imaging (%)	23	21	22	23	21	23
Patients admitted to the hospital (%)	43	41	38	40	37	40

* Plus–minus values are means ±SD. For each set of analyses (Texas, Georgia, and South Carolina), the population totals or averages across all time periods are shown for the reform and control states. For Texas, the control states were Arizona, Arkansas, Louisiana, New Mexico, and Oklahoma; for Georgia and South Carolina, the control states were Alabama, Kentucky, North Carolina, Tennessee, and Virginia.

† Race was determined according to information in Medicare records.

of Medicare Advantage beneficiaries (because their emergency department visits are excluded from the data), and hospital fixed effects. Hospital fixed effects control for hospital-specific and state-specific factors, not explicitly modeled, that are stable over time, such as teaching status or certain features of state tort law. In sensitivity analyses, we tested the effect of omitting the diagnosis covariates, since diagnosis might be affected by the physician's decision regarding admission, and the effect of truncating the Texas analysis at September 30, 2009, since one of the control states (Arizona) enacted a modest reform on that date (see the Supplementary Appendix, available with the full text of this article at NEJM.org). Neither analysis yielded qualitatively different results.

For all the models, the coefficient of interest was the coefficient on an interaction between dummy variables for the visit date (i.e., before or after the state-specific reform date) and a dummy variable for the location of a hospital (i.e., in a reform or control state). Hospital-admission and imaging outcomes were modeled with the use of conditional logistic regression, with hospital as the grouping variable. Results are reported as odds ratios and as average policy-attributable effects (average marginal probability).[24] The latter is the incremental probability of the outcome if the law were to be applied to the entire study population.

Log-transformed emergency department charges were modeled with the use of an absorbing regression, which is equivalent to linear regression with an indicator variable for each hospital. In this formulation, the coefficient of interest can be readily converted to the policy-attributable percentage change in charges. Charges that are reported in absolute terms have been adjusted for inflation to 2011 levels.[26]

Standard errors were clustered at the hospital level. Reported results were generated with the use of Stata software, version 13 (StataCorp). Some models were also analyzed with the use of SAS software, version 9.2 (SAS Institute); the results were equivalent. All reported P values are two-sided.

RESULTS

EMERGENCY DEPARTMENT VISITS

We identified 3,868,110 emergency department visits among 1166 eligible hospitals. The distribution of these visits across states and the characteristics of the population are summarized in Table 2.

TEMPORAL TRENDS

Unadjusted trends for each of the three outcomes in each of the three reform states are shown in Figure 1. The proportion of all the patients in the emergency department who underwent CT or MRI increased each year in the reform states as well as in the control states, as did the inflation-

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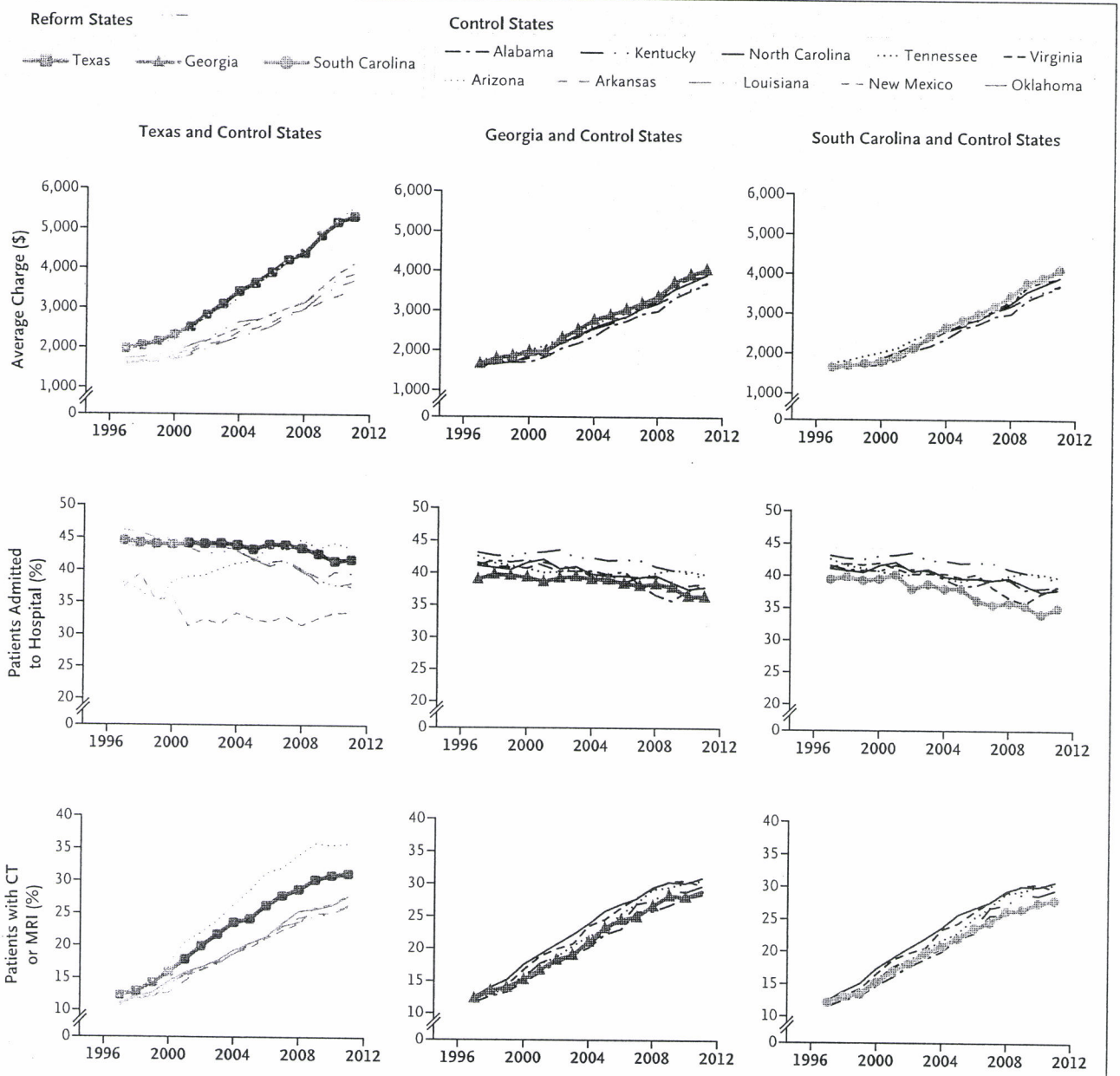

Figure 1. **Unadjusted Averages, According to Year, for Three Outcomes, in Three Reform States and in Control States That Did Not Pass Reforms.**

Unadjusted averages (according to state and year) are shown for three study outcomes in three states that changed the emergency care malpractice standard from ordinary negligence to gross negligence. Outcomes in control states without malpractice reform are also shown. For Texas, the control states were Arizona, Arkansas, Louisiana, New Mexico, and Oklahoma; for Georgia and South Carolina, the control states were Alabama, Kentucky, North Carolina, Tennessee, and Virginia. For each outcome–state combination, the average outcome for each calendar year is plotted against the midpoint of that year.

adjusted per-visit charges. The proportion of patients in the emergency department who were admitted to the hospital showed a gradual downward temporal trend, which was consistent with a decline in hospitalization rates that has been shown previously.[27]

REGRESSION ANALYSIS

Selected regression coefficients and policy-attributable effects are shown in Table 3. Full results of the regression analysis are shown in the Supplementary Appendix. Malpractice reform was not associated with a significant decrease in

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Table 3. **Estimated Effects of Malpractice Reform on Three Outcomes in Three States.***

Outcome	Texas	Georgia	South Carolina
Total charge			
Policy-attributable effect — % (95% CI)†	1.2 (−1.4 to 3.8)	−3.6 (−6.2 to −0.9)	1.2 (−2.2 to 4.6)
P value	0.38	0.01	0.50
CT or MRI			
Odds ratio (95% CI)	1.0 (1.0 to 1.1)	1.0 (0.9 to 1.1)	1.0 (0.9 to 1.1)
Policy-attributable effect — percentage points (95% CI)‡	0.2 (−1.2 to 1.6)	0.6 (−3.3 to 4.5)	0.0 (−0.9 to 1.0)
P value	0.81	0.76	0.97
Hospital admission			
Odds ratio (95% CI)	1.0 (0.9 to 1.0)	1.0 (0.9 to 1.0)	0.9 (0.9 to 1.0)
Policy-attributable effect — percentage points (95% CI)‡	0.0 (−0.9 to 0.9)	−0.2 (−1.2 to 0.9)	−0.2 (−4.0 to 1.4)
P value	0.99	0.75	0.35

* Nine regressions are represented. For total charges, the transformed coefficient for a regression on log-transformed charges can be interpreted as the policy-attributable average percent change in charges (e.g., in Georgia, malpractice reform was associated with a 3.6% reduction in charges; P=0.01). For the dichotomous outcomes, both the odds ratios and the average marginal effects (absolute percent differences) are shown. The P values were calculated for the average marginal effect with the use of the delta method. CI denotes confidence interval.

† The policy-attributable effect was calculated as follows: 100× (exp[coefficient]−1) for the regression of log(charges).

‡ The policy-attributable effect is the average marginal probability (i.e., recycled prediction) for the interaction between the visit date (i.e., before or after the state-specific reform date) and the location of the hospital (i.e., in a reform or control state).

CT or MRI utilization in any of the three states. There was no significant reduction in per-visit emergency department charges in Texas or South Carolina. In Georgia, reform was associated with a 3.6% reduction (95% confidence interval [CI], 0.9 to 6.2; P=0.01) in charges. There was no reduction in the rate of hospital admissions in any of the three states. For South Carolina, the coefficient associated with hospital admission reached significance (adjusted odds ratio, 0.9; 95% CI, 0.9 to 1.0; P=0.03), but the estimate of the average policy-attributable effect, which is dependent on the patterns of the covariates, did not (reduction of 0.2 percentage points; 95% CI, −4.0 to 1.4; P=0.35).

DISCUSSION

Malpractice reforms in Texas, Georgia, and South Carolina, which changed the liability standard for emergency care from ordinary negligence to gross negligence, provide unusually broad protection for emergency physicians. We did not find evidence that these reforms decreased practice intensity, as measured by the rate of the use of advanced imaging, by the rate of hospital admission, or in two of three cases, by average charges. Although there was a small reduction in charges in one of the three states (Georgia), our results in aggregate suggest that these strongly protective laws caused little (if any) change in practice intensity among physicians caring for Medicare patients in emergency departments.

We chose study outcomes on the basis of defensive practices that have been identified by emergency physicians in surveys.[7,8] In one such survey,[7] 70% of the respondents said they often practiced defensively; of these, 63% cited ordering an imaging study as their most recent act of defensive practice, 14% mentioned recommending hospital admissions, and the remainder cited ordering other tests that would increase per-visit charges.

Overuse of advanced imaging is cited as a common defensive practice across many specialties.[7,8,28] In a Massachusetts survey, emergency physicians estimated that 30% of CT scans and 19% of MRIs ordered were for "defensive purposes."[8] Other specialists offered similar estimates.[8] Our results challenge the validity of these assertions, or at least suggest that the use of emergency department imaging is unlikely to be affected by malpractice reform alone.

One might argue that physicians in the re-

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form states do not believe that they are fully protected. This is true to some degree, but the critique may be applied to any other law. For example, some have advocated for "safe harbor" laws, which would provide specific protections to physicians who adhere to evidence-based guidelines. If physicians do not believe that they are adequately protected by a legal standard of gross negligence, then they also might not believe that they are protected by a statute that provides a safe harbor for evidence-based guidelines. Indeed, a recent study showed that evidence-based guidelines would be applicable to only a minority of malpractice claims.[29]

Typical interpretations of the gross negligence standard are that defendants are protected if they exercise "even a slight degree of care" or a "degree of care which every man of common sense, however inattentive he may be, exercises under the same or similar circumstances."[15] It seems likely that physicians would correctly perceive that any practice that could be defended as concordant with guidelines would also be defendable as not grossly negligent. Although data on the number of malpractice claims specifically related to emergency department care are unavailable, the 2003 Texas reforms (which included provisions that affected other specialties) were associated with a 60% overall reduction in malpractice claim filings and a 70% reduction in malpractice payments.[12] Substantial commentary (e.g., legal blogs and newspaper reports) supports the notion that the legal community in the reform states characterizes the gross negligence standard as providing "virtual immunity" to emergency physicians, although it is clear that some suits are still being filed.[15,16,30]

Our study was limited to the fee-for-service Medicare population and therefore applies mainly to the care of patients 65 years of age or older. However, it is known that temporal and geographic trends in emergency department care of Medicare fee-for-service patients parallel those in the broader population.[31] Furthermore, the Congressional Budget Office has estimated that the potential savings from reduced defensive practice is higher for fee-for-service Medicare patients than for an all-payer mix.[11] Still, the effect of state laws on defensive medicine in non-Medicare (primarily younger) patients may be different.

Previous attempts to estimate the effect of other types of malpractice reform such as caps on noneconomic damages (which arguably offer physicians less real or perceived protection) produced inconsistent results. Such studies typically used state-level rather than encounter-level data and did not choose study outcomes identified as defensive practices by physician self-reports.[12,32] Because we controlled for a wide range of potential confounders, the main risk of making an incorrect inference from the results of this study lies in the uncertainty of the counterfactual situation. To compare what happened in reform states with what would have happened without reform, we made two key assumptions: that any systematic change during the study period that affected hospitals in reform states but not hospitals in control states was a result of the reform itself and that there was no systematic change that affected hospitals in control states (on average) but not those in reform states. With regard to total charges, we cannot exclude the possibility that state-level differences in billing practices might have developed during the study period. For example, "up-coding" (the use of higher-intensity codes to maximize revenue) is thought to have increased during the study period,[33] and it is possible that this increase occurred more in some states than in others. Because hospital admission and advanced imaging are hard end points, they seem to be less susceptible than emergency department charges to confounding.

The specialty-specific nature of our study adds to the precision of the analysis but limits generalizability. Although available data suggest that emergency physicians face an average risk of being sued,[34] the resource-intensive nature of the emergency department may amplify the costs of defensive practice. For example, emergency physicians face far fewer barriers than primary care providers to ordering advanced imaging tests, and they play a gatekeeper role to costly hospital inpatient admission.[14] Other specialties might be more or less responsive to similar changes in the legal climate.

Cost reductions associated with defensive medicine represent only one of many reasons that a state might choose to enact malpractice reform. We do not address other possible positive or negative effects of reform (e.g., altered regional supply of physicians, improved physi-

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cian job satisfaction, or less compensation for injured patients). Also, we did not attempt to evaluate the effect of reform on rates of medical errors or health outcomes. Evidence regarding the effect of malpractice reform on the quality of care has been mixed.[10,13]

In the context of the existing literature, our findings suggest that physicians are less motivated by legal risk than they believe themselves to be. Although a practice culture of abundant caution clearly exists, it seems likely that an aversion to legal risk exists in parallel with a more general risk aversion and with other behavioral, cultural, and economic motivations that might affect decision making. When legal risk decreases, the "path of least resistance" may still favor resource-intensive care. Our results suggest that malpractice reform may have less effect on costs than has been projected.

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