

*Evidence suggests that the malpractice crisis has more complex effects than are commonly assumed.*

# Defensive Medicine and Disappearing Doctors?

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**I**NCREASES IN MEDICAL MALPRACTICE PREMIUMS and malpractice awards to plaintiffs have received considerable attention in recent years. Noting the substantial growth in medical malpractice premiums in certain states, the American Medical Association has declared 19 states to be in “full-blown medical liability crisis” and advocates tort reform to limit medical malpractice damages. Congressional leaders and the Bush administration have echoed those concerns in calls for federal limits on malpractice awards.

The growth of medical malpractice liability costs has the potential to affect the delivery of health care in the United States in several ways. First, if growth in malpractice payments results in higher malpractice insurance premiums for physicians, those premiums, along with the costs of litigation, may affect the size and composition of the physician workforce (through their location, retirement, specialization, and initial career choices). Second, the growth of potential losses from malpractice liability might encourage physicians to practice “defensive medicine,” ordering more tests and performing more procedures in order to reduce their malpractice exposure. Defensive medicine could also cause a

reduction in care: rising malpractice liability could discourage physicians from accepting certain high-risk or uninsured patients. Physicians may believe that the compensation for treating such patients is insufficient to offset the potentially much larger costs of being sued for malpractice. Third, to the extent that the growth of malpractice premium costs is passed on to patients through higher health insurance premiums, increases in malpractice liability could affect health insurance coverage and employment. Because most Americans receive health insurance through their employer, an increase in an employer’s health care bill may result in a decline in other forms of compensation (such as wages or benefits) or a reduction in employment for those workers for whom compensation adjustments are infeasible (such as those near the minimum wage).

## EVALUATING THE EFFECTS

Those concerns prompt us to ask four questions:

- Are increases in medical malpractice payments responsible for increases in physicians’ malpractice premiums?
- Do increases in malpractice liability drive physicians to close their practices?
- Do increases in malpractice liability change the way medicine is practiced by increasing the use of certain procedures?
- Do increases affect access to health insurance?

We seek to answer those questions by examining differences between states and over time in malpractice payments

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TABLE 1

## Summary Statistics

1993-2001, in 2000 dollars

	Level in 2001	% Growth 1993-2001
<b>Medical Malpractice Premiums</b>		
Average	\$28,374	10.7
Surgery	\$34,360	17.3
Ob-Gyn	\$52,374	2.3
<b>Medical Malpractice Payments (dollars per capita)</b>		
All	13.5	27.5
Surgery	3.4	36.0
Ob-Gyn	1.9	34.5
<b>MDs (per 10,000 pop.)</b>		
Total	25.3	14.2
Rural	1.3	0.0
Surgery	5.4	1.8
Ob-Gyn	1.3	5.8
<b>Medicare Expenditures (per enrollee)</b>		
Total	\$6,533	34.7
Physician (allowed Part B charges)	\$2,168	30.8
Imaging	\$261	64.2
Major Procedures	\$67	-12.0

Notes: Summary statistics are weighted by population in 2001. Observations are at the state-year level, with percent growth calculated for 1993-2001. Payment data are three-year averages for 1992-1994 and 2000-2002. Premium data are two-year averages for 1992-1993 and 2001-2002. Physician data for 1993 are interpolated using 1989 and 1995 observations. Treatments are calculated from 1992-1993 data and 1998-2001 data. Physician data come from the Area Resource File based on the AMA Master file. Premiums come from the Medical Liability Monitor. Payments come from the National Practitioner Data Bank. Covariates come from the Area Resource File. Treatment rates and Medicare expenditures come from the *Dartmouth Atlas of Health Care*.

and premiums, the physician workforce, the use of and spending on various medical procedures, and health insurance premiums. Our analysis suggests that indirect and anecdotal evidence on the size of the effects may be quite misleading.

We use data from several different sources in this analysis, including two underutilized sources of detailed information about medical malpractice liability. Table 1 shows summary statistics.

**PAYMENTS** Under the Health Care Quality Improvement Act of 1986, all malpractice payments made in the United States by or on behalf of a licensed health care provider must be reported to the National Practitioner Data Bank (NPDB) within 30 days. We examine payments that resulted from either a court judgment against the provider or a settlement made outside of the courts for 1993-2001. We calculate the size and number of payments resulting from medical treatments (including diagnosis, medication, and other medical treatment), surgical treatments (including surgery and anesthesia), obstetrical treatment,

and other treatments (including monitoring, equipment, intravenous and blood, and all others), all at the state-year level, converted to year 2000 dollars using the Consumer Price Index.

Table 1 shows the growth of per-capita malpractice payments at the state level between 1993 and 2001. There is substantial variability of payments and payment growth between states. For example, over the 2001-03 period, per-capita payments were highest in the states of New York, Pennsylvania, New Jersey, Connecticut, West Virginia, and Delaware. In those states, the burden of malpractice liability was almost twice the U.S. average of \$13.50 per person. Judgments awarded by juries are a tiny fraction of total payments, with the bulk of payments comprised of settlements. Changes in large jury awards do not seem to have directly caused any increase in total payments.

**PREMIUMS** We use data on malpractice insurance premiums from an annual survey conducted by the Medical Liability Monitor (MLM). Every year since 1991, the MLM has conducted a nationwide survey of physician malpractice insurance premiums for policies offering \$1 million in coverage for a claim, \$3 million in total coverage for a year. The MLM provides premium data for internal medicine, general surgery, and obstetrics-gynecology by state. Here too, we calculate average premiums by specialty and state for 1993 and 2001, again deflated to real 2000 dollars using the CPI.

**PHYSICIAN WORKFORCE** Data on the number of physicians by specialty and age come from the 2003 Area Resource File (ARF) published by the National Center for Health Workforce Analysis. The ARF gathers information from the AMA Physician Master File and the County Hospital File, and is reported at the county level. Data from the county level are summed into state measures. For each state, per-capita work-

TABLE 2

## Effect of Malpractice Payments on Premiums

All measures represent difference of logs, 1993-2001

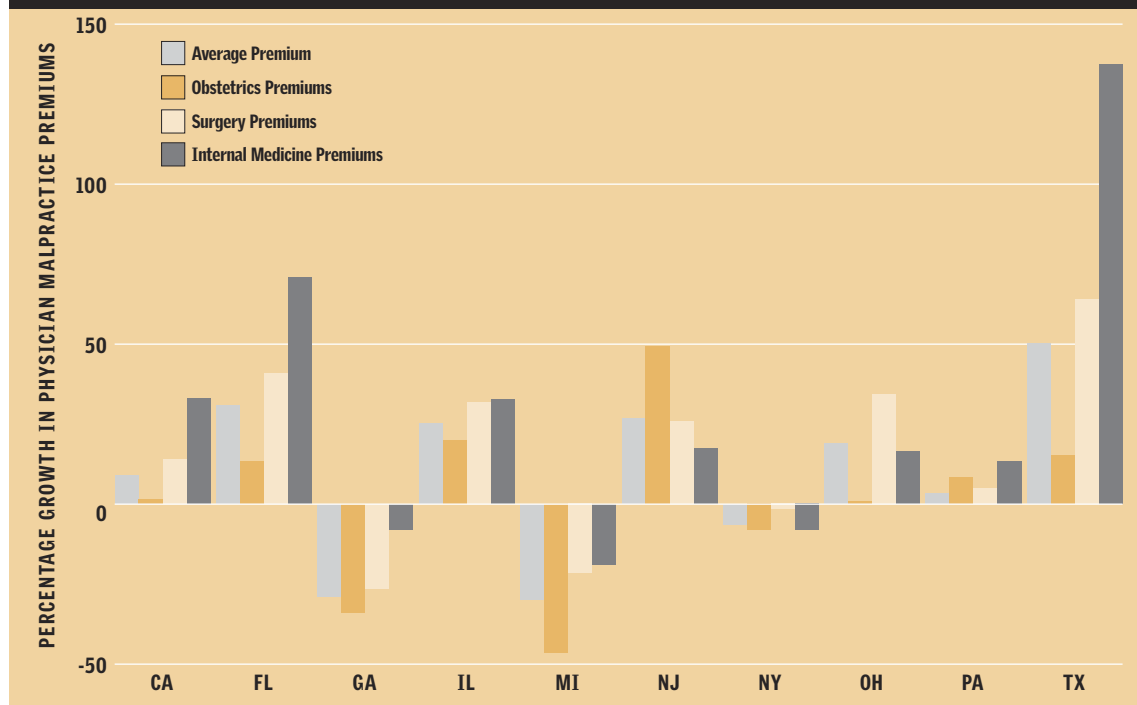
Difference of Logs of Specialty-Specific Malpractice Payments (lagged)	Premiums					
	Average		Ob-Gyn		Surgery	
Payments per MD	0.16	--	0.04	--	0.19	--
	(0.26)	--	(0.10)	--	(0.19)	--
Number of Payments	--	0.16	--	0.05	--	0.23
	--	(0.29)	--	(0.12)	--	(0.27)
Average Size Payment	--	0.21	--	0.04	--	0.16
	--	(0.34)	--	(0.15)	--	(0.23)
R-squared	0.06	0.06	0.02	0.02	0.10	0.10
Observations	41	41	41	41	41	41

Notes: Dependent variables are all measured as differences in logs between 1993 and 2002 at the state level. Independent variables are differences in logs between 1992 and 2001. Premiums and payments both measured per MD. Premiums come from Medical Liability Monitor. Payments come from the National Practitioner Data Bank. Covariates come from the Area Resource File. Regressions are weighted by population in 2001. Robust standard errors in parentheses. Covariates include growth in unemployment rate, per-capita income, and deaths from malignant neoplasms and flu.

FIGURE 1

## Change in Malpractice Insurance Premiums in Various States

1993-2001



force measures are computed by dividing state physician workforce counts by population counts from the Bureau of the Census. Data on the physician workforce by specialty and age are only available for 1989, 1995, 2000, and 2001. Intervening years are linearly interpolated.

We also examine the effect of malpractice liability on the subset of rural physicians. The U.S. Department of Agriculture's Economic Research Service categorizes counties based on the size of their urban population and their proximity to metro areas. We classify as "rural" all counties with urban populations of fewer than 20,000 people, and create a subset of doctors (by age and specialty) practicing in such rural counties.

**SPENDING AND UTILIZATION** We gather information on the rates of usage for other procedures from the *Dartmouth Atlas of Health Care*, based on Medicare claims data. We have information on the use of several specific procedures at the state level for Medicare fee-for-service enrollees over age 65 for 1993 and 2001, including surgical procedures (such as coronary artery bypass graft, back surgery, and hip replacement) and diagnostic procedures (such as CT scans, MRIs, and echocardiograms). We also have data on Medicare expenditures by state for several different types of services, including payments to physicians broken down by type of service (evaluation and management, diagnostic tests and imaging, major and minor procedures) as well as total spending. All of those measures are adjusted for the age, race, and sex (where appropriate) composition of the state population.

Expenditures are measured in real 2000 dollars.

**ADDITIONAL DATA** Covariates, including per-capita income, the unemployment rate, and the mortality rate from flu and malignant neoplasms, come from the ARF, with county-level measures aggregated to the state level. When data are only available for some years, values for intervening years are linearly interpolated.

We also use labor market data from the 1996–2002 annual Current Population Surveys (CPS). The March (Annual Demographic Survey) files of the CPS contain information on demographics (such as age, gender, race, marital status, family size, and education), labor market variables (such as wage and salary, employment status, firm size, and hours worked), and health insurance coverage (such as source of coverage). We couple this information with annual state-level data on health insurance premiums by type of policy (family or single) and employer size from the Medical Expenditure Panel Survey for 1996–2002.

### RESULTS

We first ask whether the observed increase in physician premiums seems to be driven by malpractice payments made by insurers on their behalf. Figure 1 shows the changes in premiums by specialty for the 10 largest states. By and large, premiums for different specialties moved together (and up) in each state. This suggests that they were driven by system-wide factors within each state (such as the legal environment or the underwriting cycle), rather than by specific techno-

logical changes in certain specialties. Table 2 explores this more formally. We estimate multivariate regressions of the effect of malpractice payments on malpractice premiums by physician specialty overall and broken down into the number of payments per physician and the average size of those payments. We use data on the changes in payments and premiums within each state between 1993 and 2001, and control for economic factors (such as income and unemployment) and for demographic factors (such as the age, gender, and illness of the population). All dollar figures are adjusted for inflation and we measure the malpractice payments in logs so that each coefficient shows the percent change in premiums that we would expect to see when there is a percent change in payments. Our analyses account for economic and demographic factors, as well as any other fixed factors that affect each particular state.

We find that when the number or size of malpractice payments rises, there is very little accompanying increase in the malpractice premiums paid by physicians. For example, the first column of Table 2 shows that a 10 percent increase in payments is associated with a 1.6 percent increase in premiums, but that result is not significantly different from 0. Neither the number of payments nor the average size of payments consistently predicts malpractice premiums, and the overall fraction of the variation in premiums that can be explained by payments is low (especially considering that we

are also controlling for the effects of unemployment, income, and overall health of the population).

In a previous paper, we explore the timing of these potential effects more fully and find that, even allowing for a more drawn-out process (wherein premiums today are allowed to be influenced by the entire history of past payments, as well as rational expectations of future payments), there seems to be only a weak relationship between payments and premiums. This finding suggests that other factors (such as the underwriting insurance cycle, competitiveness in insurance markets, or insurer losses on other investments) play a larger role in driving changes in premiums than malpractice payments. It is also possible that administrative costs associated with processing claims have contributed to the increase in malpractice premiums, but this is a starkly different mechanism from the direct connection between payments and premiums that is commonly believed to be the

principal driver of recent premium increases. Unfortunately, the NPDB data (which contain information on payments and not on claims) do not allow us to examine this hypothesis.

**PHYSICIAN WORKFORCE**  
The malpractice liability environment may affect patient access to care in three ways. First, physicians may leave areas with greater exposure to malpractice, leaving patients with reduced access to physician services.

TABLE 3

## Effect of Malpractice Payments on Physician Workforce

All measures represent difference of logs, 1993-2001

	All MDs		Ob-Gyn		Surgery	
	All Ages	Over 55	All Ages	Over 55	All Ages	Over 55
	MDs in All Locations					
Premium Per Doctor	0.000 (.034)	-0.050 (.032)	0.016 (.037)	0.022 (.046)	-0.013 (.027)	-0.031 (.041)
	Rural MDs					
Premium Per Doctor	-0.104 (.046)	-0.193 (.091)	-0.167 (.155)	-0.231 (.210)	-0.009 (.085)	-0.287 (.142)

Notes: Dependent and independent variables are all measured as differences of logs between 1993 and 2001 at the state level. Regressions are weighted by population in 2001. Robust standard errors in parentheses. Covariates include growth in unemployment rate, per capita income, and deaths from malignant neoplasms and flu. Physician data come from the Area Resource File based on the AMA Master file. Premiums come from Medical Liability Monitor. Payments come from the National Practitioner Data Bank. Covariates come from the Area Resource File.

TABLE 4

## Effect of Malpractice Liability on Medicare Expenditures

2001

Medicare Expenditures (per enrollee)	Average Spending per Medicare Beneficiary					Effect of Number of Malpractice Payments per MD on Spending	
	Overall	States with cap on non-economic damages of \$250,000	States with cap on non-economic damages of \$250,000-\$500,000	States with cap on total damages of \$500,000 or more	States with less restrictive limit	Percent increase in spending associated with a 10% increase in the number of payments	
						Percent increase	P-value
Total	\$6,533	\$7,000	\$6,539	\$6,445	\$6,408	1.27	0.00
Physician (allowed Part B charges)	\$2,168	\$2,384	\$2,012	\$2,179	\$2,043	1.81	0.00
Imaging	\$261	\$274	\$239	\$270	\$230	2.93	0.00
Major Procedures	\$67	\$66	\$71	\$67	\$65	0.77	0.15

Notes: Procedures are classified using BETOS codes. Expenditure data for 2001 from *Dartmouth Atlas of Health Care* data base, adjusted for age-race-sex composition. Malpractice payments from National Practitioner Data Bank. Malpractice premiums from Medical Liability Monitor. Regressions at state level, weighted by state population. Covariates include per-capita income, unemployment rate, percent white, percent with high school degree, HMO penetration, hospital beds per capita, deaths from heart disease and malignant neoplasms, and presence of tort reforms.

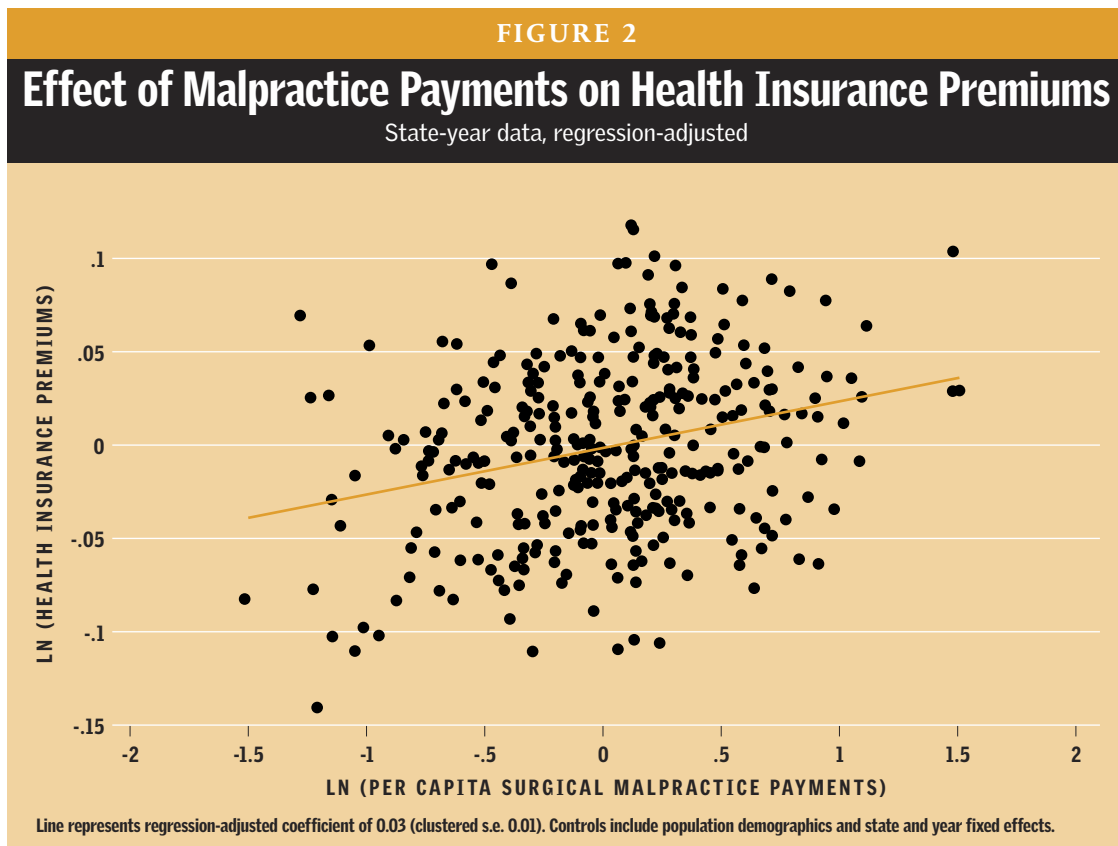
This effect may be particularly true for rural physicians who have fewer patients over whom to spread their increased costs of malpractice premiums, for young physicians deciding where to set up practice, and for older physicians deciding when to retire. Table 3 estimates the relationship between malpractice premiums and the number of physicians per capita (overall or in rural areas), broken down by the age and specialty of the physician. Again, we perform analysis of changes between 1993 and 2001 at the state level and control for economic factors such as income and unemployment as well as for demographic factors such as the age, gender, and illness of the population.

Here, too, we see very little effect; increases in premiums do not seem to have an effect on the total number of physicians in each state. There are, however, some subgroups of physicians who appear to be more sensitive to changes in their malpractice premiums. One such subgroup is comprised of older physicians in rural areas (surgeons in particular) who may leave practice when premiums rise, but they comprise a small enough subset of the physician population that overall size of the physician workforce per capita does not seem to be affected. We can also look at the separate effects of the subcomponents of premiums increases: the number of payments per physician, the average size of those payments, and the “load factor” (the part of premiums not explained by payments). We find that physicians are particularly sensitive to the number of payments made. This is consistent with the idea that malpractice lawsuits are costly to physicians not just because of the dollar size of payments, but because of the time and psychic costs associated with

each case. That said, there is little evidence of a mass exodus of physicians in response to increases in malpractice liability. Our results are consistent with a recent JAMA study by Daniel Kessler and coauthors who examined the effect of the passage of tort reforms on physician supply. Since most states experimented with such reforms in the 1980s, their analysis emphasizes an earlier time period than our study. They find that the passage of direct tort reform increases physician supply in the short run by 2.4 percent. This effect was found to operate through entry and retirement more than physician exodus.

**DEFENSIVE MEDICINE** Malpractice may also affect the care patients receive, once they do see doctors, by increasing the use of “defensive medicine.” We examine spending and the use of different surgical and diagnostic procedures in the same analytical framework, examining the effect of changes over time in medical malpractice liability at the state level. Table 4 first shows spending on Medicare beneficiaries in states with different tort laws in place. There is no clear pattern of spending across these states; states with more restrictive caps in place do not seem to have lower overall spending, so the overall legal environment does not have a clear impact on health care practice patterns. Note, however, that this finding does not allow us to reject the hypothesis that the passage of such reforms reduced the growth of spending. Indeed, research on this topic by Daniel Kessler and Mark McClellan notes that direct tort reform reduces the growth of expenditures by approximately 5.3 percent.

Even if the overall legal environment does not seem to be



clearly correlated with total spending, changes in payouts may still affect physician behavior. Table 4 shows the effects of increases in the number of payments per physician on the care that Medicare beneficiaries receive. We see that a 10 percent increase in malpractice cases increases total Medicare expenditures by 1.3 percent—but increases spending on imaging procedures by 2.9 percent while leaving spending on major procedures virtually unchanged. (Our cross-sectional results are quite similar to those from a longitudinal analysis examining changes in spending patterns within states over time in response to changes in malpractice payments or premiums. As we describe in a recent paper coauthored with Elliott Fisher, using malpractice premiums instead of payments also yields very similar results.) This pattern can also be seen in the use of individual procedures: a 10 percent increase in the number of malpractice payments significantly increases the use of procedures like CT scans and cardiac catheterization, while leaving bypass surgery and hip replacement statistically unchanged. This is consistent with a recent *JAMA* study of physicians in Pennsylvania that finds that they are particularly likely to order additional tests because of malpractice concerns.

We can compare those findings to Kessler and McClellan's estimates of the magnitude of defensive medicine. If we assume that physicians' treatment decisions for all patients respond in the same way to malpractice pressures as treat-

ment decisions in the Medicare Fee-for-Service program, then the 60 percent increase in average malpractice premiums between 2000 and 2003 is associated with an increase in spending of more than 5 percent, which is consistent with the Kessler and McClellan finding that the passage of tort reforms that directly influenced liability reduced expenditures by 5–9 percent. If the lessons learned in the Medicare program apply more generally, 5 percent of the \$1.5 trillion that the United States spends on healthcare may be attributed to defensive medicine. However, during that period, national health expenditures grew by about 30 percent. Thus, while physicians seem to increase spending and the utilization of certain services in response to increased liability exposure, this does not seem to be the driving force in increases in overall health care expenditures.

**HEALTH INSURANCE COVERAGE** To the extent that malpractice liability costs affect the cost of health insurance, either through changes in physician practice patterns or simply as the cost of payments is passed through to patients, those costs may increase the size of the uninsured population. When health insurance premiums rise, employers may stop offering their employees health insurance or the employees may stop taking up that insurance as the size of their required premium contributions increases. Furthermore, if it becomes costlier for employers to hire workers (because they are

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unable to offset the increased cost of employee health insurance by lowering wages), increases in health insurance premiums could lead to increased unemployment as well as increased uninsurance.

In a recent paper, we examine the extent to which malpractice-driven increases in health insurance premiums affect insurance coverage and employment patterns. Using state-level variation over time, Figure 2 shows that increases in malpractice payments are associated with significant increases in health insurance premiums. We find that the cost of rising premiums is borne primarily by workers in the form of decreased wages for employees with employer-sponsored health insurance. Also, as the costs of benefits rise, firms move workers from full-time jobs with benefits to part-time jobs without benefits. Some workers, particularly low-wage hourly workers whose wages cannot be reduced, face even greater risk of becoming uninsured and unemployed as the cost of health insurance increases.

### CONCLUSION

There is a great deal of public debate about potential reforms of the malpractice system. A closer look at available data suggests that some of the rhetoric surrounding this debate may be misleading. First, increases in malpractice payments do not seem to be the driving force behind increases in premiums. Second, increases in malpractice costs do not seem to affect the overall size of the physician workforce, although they may affect some subsets of the physician population more severely. Furthermore, no research has linked the decline in physician supply to worse health outcomes or reduced patient satisfaction. Third, we find evidence that the strongest effect of greater malpractice pressure is in increased use of imaging services, with somewhat smaller effects on the use of other discretionary, generally low-risk services such as physician visits and consultations, use of diagnostic tests, and minor procedures. We find little evidence of increased utilization of major surgical procedures.

While our study does not speak directly to the effect of malpractice reforms, it does provide insight into the mechanisms through which those reforms are likely (and unlikely) to operate. Our analysis suggests that state-level tort reform is unlikely to affect the practice of medicine by averting local physician shortages. We also find no relationship between the level of malpractice premiums and the presence of traditional tort reform measures such as damage caps. This evidence does not imply that traditional tort reform measures are ineffective, for they may have reduced the growth of (perhaps unusually high) premiums in the states where they were enacted. However, our results do call into question the view that states with traditional tort reforms have lower levels of premiums or defensive medicine than states that have not implemented such reforms. Last, while increasing malpractice liability pressures do seem to substantially increase expenditures on diagnostic procedures, we find little evidence that malpractice payments are driving the dramatic increase in overall health care expenditures. 

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