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"The Incidence of the Costs of Medical Malpractice Litigation: Do Costs Fall on Patients or Physicians?

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THE INCIDENCE OF THE COSTS OF MEDICAL MALPRACTICE LITIGATION: DO COSTS FALL ON PATIENTS OR PHYSICIANS?

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Do Not Cite, Comments Welcome

THE INCIDENCE OF THE COSTS OF MEDICAL MALPRACTICE LITIGATION: DO COSTS FALL ON PATIENTS OR PHYSICIANS?[1]

Introduction

For many years physicians and other medical providers in the United States have been subject to a negligence rule of liability. Under a negligence rule, patients who suffer an adverse outcome are entitled to compensation if they can show that they incurred an injury that was caused by the physician's failure to take due care, defined as departure from the customary standard of care of physicians in good standing in the profession. The traditional tort standard of damages is full compensation for monetary and non-monetary loss.

There have been no major doctrinal shifts in law regarding medical malpractice over the last decade -- indeed, many states have enacted tort reforms designed to reduce claim frequency and severity. Nevertheless, from 1975 to 1984 claims per physician rose at an average rate of 10 percent a year; between 1982 and 1986 claim frequency per 100 physicians rose from 13.5 to 17.2 a year.[2] Claim severity (average amount per paid claim) increased at roughly twice the rate of the CPI from 1975 to 1984. In 1984, the median and mean payment were $18,000 and $80,741, respectively. There remain large differences among states and among specialties in claim frequency and severity (see Table 1).

This steady upward trend in claims has been roughly paralleled by a less steady increase in costs of insurance. Following the malpractice "crisis" of

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[2]Danzon (1988) and sources cited therein.

the mid-1970s, when rates increased by over 300 percent in a single year in some states, rates remained stable or actually fell in the late 1970s, but resumed an upward trend in the 1980s. Table 2 shows trends between 1978 and 1984 in rates for basic limits of coverage ($100,000 per claim and up to $300,000 aggregate).[3] For the period 1977-1984 as a whole, the increase is 109 percent for the lowest-risk specialists, such as GPs doing no surgery, 180 percent for obstetricians and 189 percent for the highest risk surgical specialists. During the same period, the CPI increased 82.5 percent and the medical component increased 125 percent. Trends in the cost of basic limits coverage understate the increase in cost of a constant level of real protection, since the mark-up for excess limits of coverage has increased, as has the percentage of physicians buying higher limits.[4]

Although malpractice insurance is still less than 2 percent of total health care expenditures, many observers argue that medical malpractice is a major factor contributing to rising health care costs. For example, Reynolds et al. (1987) estimate the total cost of physicians' professional liability at between $12.1 and $13.7 billion in 1984 -- or approximately 15 percent of total expenditures on physicians' services. Of this, roughly $3.0 billion is the cost of premiums paid by physicians, $10.6 billion is the estimated cost of practice changes such as increased record keeping, prescription of more

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[3]Between 1985 and 1987, rate increases averaged 25-40 percent per year, with sharper increases in certain states and in the highest risk surgical specialties, such as neurosurgery and obstetrics.

[4]The St. Paul Fire and Marine Insurance Company increased- limit factor for $1m.-$1m. coverage for surgeons rose from 1.7 in 1980 to 2.26 in 1986. (Private communication). The percentage of physicians carrying at least $1 million in coverage increased from 21 percent in 1976 to 41 percent in 1983. Benson L. Dutton, Jr., "Trends in Medical Malpractice," Working Paper 86-18 Health Care Financing Administration, September 1986, p.6.

tests and procedures and increased time spent with patients, and $0.1 billion is other costs of incurring claims.[5] Although they do not estimate effects on physicians' net income directly, one implication of their estimates is that virtually all the cost is borne by patients. This seems at odds with arguments made by others, that a significant fraction of physicians are giving up practice, or at least high risk procedures, because of liability.

In theory, a negligence rule of liability can create incentives for physicians to take optimal care, defined as the amount of care the patient would want if he or she had the information available to the physician. In markets with asymmetric information, if consumers systematically underestimate risk, market forces alone with a liability rule of caveat emptor create suboptimal incentives for risk reduction (Spence, 1977; Shavell, 1978; Danzon, 1985). In principle, these distortions can be corrected by a negligence rule of liability that holds physicians liable for damages caused by suboptimal care and unnecessary procedures. With a shift from no liability to a perfect negligence system we should observe an increase in preventive measures by physicians. But even with a perfectly functioning negligence system, the incidence of the costs would be partly on physicians. The costs of the additional care would be fully passed on in higher fees only if patients perceive the improvement in quality -- but in that case the liability system is not necessary.[6]

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[5]They estimate that professional liability accounts for roughly 60 percent of the increase in expenditures between 1983 and 1984.

[6]If patients perceive the average quality of care but not the care of individual physicians, then full pass-through of the costs of additional care under a perfect negligence rule may be possible, even though market forces alone would create suboptimal incentives for care.

The negligence system is unlikely to operate perfectly in practice because changing the liability rule does not automatically correct the imperfections in information that lead to failure of caveat emptor. With imperfect information, courts may make errors in findings of negligence and damages, insurers practice imperfect experience rating, patients may not accurately perceive either the quality of care or the expected benefits of tort compensation, and transactions costs of operating the system are high. The incentive effects of the tort system and the incidence of costs are then uncertain a priori and become an empirical question.

In this paper we outline a theoretical model of the effects of malpractice litigation on physician decision making and the incidence of costs. We then present preliminary empirical estimates of the effects of malpractice litigation on physician fees, hours of work, time spent with patients, and incomes, using data from the 1983 Physicians' Practice Costs and Income survey.

I. A MODEL OF PHYSICIAN DECISION-MAKING WITH MALPRACTICE COSTS Although the basic rules governing malpractice liability have been stable over the last decade and are reasonably uniform across states, there has been a steady increase in claim frequency and severity and, at any point in time, there are great differences across states. We assume that these cross-sectional and time series differences reflect in part differences in the legal regime that make it easier to establish proof of negligence or permit higher recoveries.[7] We

[7]For an analysis of the effects of legal, medical and demographic factors on the frequency and severity of malpractice claims by state, see Danzon (1984, 1986). California data for 1974 indicate that at most one in ten injuries due to negligence led to a claim and one in 25 received compensation. Thus some increase in claim frequency is possible without assuming a change in the rate

characterize the "generosity" of the legal regime by an index J.[8]

Malpractice litigation creates two types of cost for physicians: the cost of claims and legal defense, which can be covered by insurance, and the cost of time, loss of reputation, anxiety etc., that are uninsurable. Under current methods of rating malpractice insurance, the cost of insurance depends on the physician's specialty, limits of coverage, whether or not certain high risk procedures are performed at all (for example, any surgery by GPs, obstetrics by OB/GYNs) and the decision to practice full or part time. Given those choices, the premium is a fixed cost, independent of number of patient contacts.[9] The uninsured costs can be characterized as a marginal per-patient cost equal to the probability of being sued times the dollar equivalent of the expected cost if sued.

Physicians can reduce the expected costs of litigation by taking precautions to reduce the probability of injury or the probability of successful suit, if an injury occurs. In order to analyse the distorting effects of imperfect information by the courts, in the theoretical model we make the simplifying assumption that courts cannot observe true care; instead, they use observable proxies. This creates an incentive for physicians to engage in "defensive" practices, which we define as measures taken to reduce

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of negligence or a pro-plaintiff shift in the law.

[8] In the empirical work we distinguish effects of claim frequency and severity.

[9] This is an oversimplification. Although experience rating is not widely practiced, physicians with very poor claims records may face restrictions on their practice or be denied coverage by more selective insurers.

the probability of successful suit, as opposed to the probability of injury.[10] We adopt the simplifying assumption that spending more time with patients reduces the probability of injury but not the probability of suit, given an injury, whereas ordering tests reduces the probability of successful suit but does not affect the probability of injury.

A change in liability regime may also affect patients' demand care. The demand for care will increase if patients perceive and value any risk-reducing measures taken by physicians, or if they perceive and value any increase in the probability of recovery or amount of compensation in the event of an injury. However a shift in demand may not be immediately reflected in an increase in reimbursement levels paid by third party payers, if there are lags in adjustment of maximum allowable charges and capitation rates. This is particularly true in the case of the public programs. Medicare fees were frozen from 1983 to 1986. Medicaid fee schedules vary by state but are notoriously sticky. Even if balance billing is permitted, optimal billed charges depend on maximum allowable charges, since the elasticity of demand is greater at prices above the maximum paid by insurance.

Assume that consumers have a demand for treatments or episodes of care, Q. A treatment typically includes an initial office visit and some lab tests, t.[11] Demand for treatments depends on the expected full price P, which

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[10]More generally, defensive medicine could be defined to include preventive measures if carried beyond the level that would prevail in the absence of liability. Distortions induced by third-party payment for medical care should not be counted as defensive medicine. Defensive practices could also be defined to include avoiding high risk patients or procedures.

[11]More realistically, an episode of care may include follow up visits, special procedures and other ancillary services. These become important in estimating the total effect of malpractice litigation on costs of care to patients.

includes the fee for the initial office visit and the expected cost of lab tests.

$$P = P_v + P_t\ t$$

Demand also depends on the perceived quality of care K, which may differ from the true quality of care. K depends on the perceived risk of injury p', which may differ from the true risk of injury p, and on the number of lab tests. p depends on the amount of time the physician spends with the patient h, with $p_h < 0$. Thus $K = K(p(h),t)$, $K_h > 0$, $K_t \geq 0$.

If an injury occurs, the patient may file suit and receive an award A through the tort system. Let s denote the probability of an award, conditional on the occurrence of an injury. s depends on the legal environment J and on the number of lab tests. We assume that courts cannot observe the true quality of care but are influenced by observable proxies such as tests. Thus $s = s(t, J)$ with $s_t < 0$ and $s_J > 0$.

We assume that the market for physicians' services is monopolistically competitive. The demand for treatments facing physician i depends on own price and perceived quality, and on other idiosyncratic characteristics of his practice F_i. Demand also depends on a vector of area-specific demographic factors Y that influence the overall demand for medical care, such as per capita income, insurance coverage, percent of the population over 65, etc., and on the number of physicians per capita which determines each physician's share of market demand:

$$Q^d_i = Q[P_i, h_i, ti, F_i; MDPC, J, Y]$$

We assume that all physicians face the same production function, except for a vector of shift parameters Z reflecting specialty and age (a proxy for experience and skill). Total number of treatments produced is a function of

total hours in medical care H, hours per treatment h, auxiliary personnel and other inputs X, and lab tests T:

$$Q^s_i = Q[h, H, X, T, Z]$$

Cost per treatment has two components: an input cost component and a component that reflects the expected uninsured costs if sued:

$$C = Q[c(hw, t, w^a x) + p(h)[s(t)fA + d]$$

where w is the physician's opportunity cost of time, w^a is the wage rate of auxiliary personnel, f is the fraction of the monetary costs of litigation not covered by the physician's liability insurance, and d is dollar-equivalent of other uninsurable costs of suit, including time, loss of reputation, anxiety etc.

The physician's expected net revenue from practice is:

$$R = Q (P - C) - I$$

where I is the malpractice insurance premium. Malpractice insurance is typically rated on the basis of specialty, limits of coverage and mean loss costs in the area but not individually rated on the basis of either volume or prior claim experience. Then

$$I = I(f, J)$$

with $I_f > 0$, $I_{J > 0}$.

The physician chooses P, h, t, x and I to maximize expected utility, U. In the simplest model, physician utility depends only on own income and leisure: $U = E[U (R, H)]$. A more general model can incorporate professional or ethical concerns of the physician, either by including the true quality of care as an argument in the physician's utility function or postulating that the physician's utility is a weighted average of his or her own direct utility U^d and the utility of the patient U^p. The patient's utility depends on the

monetary costs of treatment, the risk of injury and expected compensation in injured:[12]

$$U = mU^d(R, H) + (1 - m)U^p(P, p, s, A)$$

where $0 < m < 1$ is the weight attached to the physician's utility.

Given the level of MDPC, Y, J and w^a, and specification of the physician's maximand, we can solve for values of P, h, t, and either f or I. H and Q are then implied.[13]

Another possible short run response not explicitly modelled here is the decision to refer rather than treat cases requiring risky procedures. In the longer run, physicians may choose to change specialty, retire from practice or relocate. Thus MDPC is endogenous and depends on J.

Effects of an increase in liability

Consider the effect of a shift in J from J_0 to J_1 that increases the probability of successful suit -- for example, a shift from a local to a national standard of care, an expansion of the concept of informed consent or an increase in the expertise of the plaintiff's bar. The increased frequency of successful claims -- which may also induce an increase in total claims filed -- leads to an increase in the cost per dollar of insurance coverage and an increase in d, the expected per-patient uninsured costs of litigation.

Physicians' optimal adjustment of P, I, h and t depends on $p_h(h)$, the productivity of h in reducing p, and $s_t(t)$. Optimal adjustment also depends on the effect of the change in liability regime and quality of care on patient demand. The shift in demand depends on the extent to which patients are aware

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[12]See Farley (1986) for a specification of the physician's maximand that incorporates the patient's utility into the physician's utility function.

[13]x is also chosen but we do not analyse that choice explicitly.

of and value the reduction in risk of injury and the increase in expected compensation if injured. If at J_0 both h and A were suboptimal, and the shift to J_1 induces a movement toward the optimal h and A, and if patients perceive these changes, then by the definition of the optimum it follows that the demand shift will exceed the increase in costs to physicians. P would increase and Q and R per physician will increase in the short run until number of physicians adjusts. But if patients accurately perceived h and valued additional compensation, then physicians would presumably have chosen this h and provided for A by voluntary contract.

Thus there is a presumption that if a shift in J induces a change in physician behavior, the demand shift will be less than the cost increase. In that case the increase in liability from J_0 to J_1 operates like a tax on medical care that is equal to the difference between the increase in costs to physicians, after optimal adjustment of insurance and practice patterns, and the increase in the value to patients of medical care plus expected value of tort compensation if injured (see Figure 1). This tax is likely to be positive for several reasons. First, patients may underestimate the true reduction in risk of injury, $p_h' < p_h$. Second, d reflects uninsured costs to physicians that have no corresponding value to patients. Third, the value of tort awards as compensation is almost certainly less than their cost. Only 40 cents of the malpractice insurance premium dollar reaches patients as compensation. The other 60 cents goes to litigation and overhead costs that presumably have little value to patients. The utility value of the expected compensation may be even less than its cost because the actual amount is highly uncertain, received after long delay and may duplicate compensation from other private

and social insurance programs.[14]

If physicians are homogeneous in their costs of adjusting to increased liability and patients are homogeneous in their preferences for safety and compensation, then the incidence of the malpractice tax could be analysed using standard tax incidence analysis, and would depend on market-wide demand and supply elasticities of physician services.

More realistically, heterogeneity of physicians and patients implies that the effective tax differs across physicians. Since malpractice premium costs are a fixed cost per year, regardless of volume of patient contacts, the insurance component of the tax varies inversely with number of patient contacts. The uninsured cost component of the tax varies inversely with the physician's skill in reducing risk of injury or successful suit. For example, if courts systematically commit Type 2 errors, confusing unavoidable bad outcomes with negligently caused injury, physicians that tend to treat more difficult cases face a disproportionate effective tax.

The physician-specific component of the tax also depends on the preferences of the physician's patients. If market equilibrium involves a non-random matching of patients with low demand for quality to physicians with high cost of supplying quality, low quality physicians would be less able to pass through cost increases and hence face a relatively high effective tax, compared to physicians whose patients perceive and value any increase in quality. If fee levels change to reflect common changes in costs and changes in the perceived mean level of quality, then physicians who have above-average cost increases bear excise effects.

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[14]See Danzon (1989).

Previous estimates of the incidence of malpractice costs

Greenwald and Mueller (1978) analyse the impact of malpractice premiums on physician fee levels and an index of complexity of care (proxy for defensive medicine) and other variables. They use state-wide average data for 1970 and estimate a system of simultaneous equations, using 2SLS.

From the fee equation they conclude:

> "the coefficients on malpractice premiums .. suggest that physicians are more than just passing on their fixed costs (the coefficient is greater than the respective percentage of the average physician's practice costs) ... In the case of malpractice premiums (which in 1970 amounted to 2 to 4 percent of costs), the deterioration in doctor-patient relationships accompanying an increased incidence of suits may lessen the social restraints helping to keep down doctors' fees. Thus the cost passed on to the public may well exceed the total cost of premiums"

They also argue that

> "we have an unambiguous test of the hypothesis that doctors are motivated only by concern for their own income and leisure: if fees increase when fixed costs increase (and decrease when patient loads decrease) then physicians cannot be motivated solely by a concern for their own income and leisure".

From the positive association between premiums and fees they conclude that "the evidence indicates strongly that doctors are not selfish utility maximizers".

However a more detailed model suggests that these conclusions are not

warranted. Once we allow for uninsurable costs of litigation that are positively correlated with malpractice insurance costs, adjustments in h in response to an increase in J, and shifts in demand in response to shifts in J, h, and t, then an increase in J may be associated with a more than proportionate increase in P, even in a pure profit maximizing model.

II. PRELIMINARY EMPIRICAL ESTIMATES

The data used here are from the 1983 Physicians' Practice Costs Study. The information in this survey does not permit estimation based on the episode of care as the unit of analysis. In these initial estimates we therefore estimate separate reduced form equations for usual fee for an intermediate office visit and a hospital follow-up visit; physician time per office and hospital visit; number of patient visits; total hours worked; and net income. Separate equations are reported for primary care specialties (general and family practice, internal medicine, pediatrics), surgical specialties (general surgery, orthopedics, urology) and obstetrics and gynecology.

Our measure of the cost of malpractice insurance is the price for basic limits claims-made coverage, from the HCFA survey of malpractice insurers. Separate measures of claim frequency per physician and claim severity are also included.[15] Both should be proxies for real exposure and hence the demand for excess limits coverage. In addition, claim frequency is intended to measure the expected uninsured risk.

In order to isolate the net effect of malpractice litigation on practice

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[15]Malpractice rates are mostly state-wide variables; for a few large states, county-specific rates were available. The frequency and severity measures are state-level averages for 1975-1978 from the National Association of Insurance Commissioners (1980).

patterns, it is essential to control for other factors which may lead to cross-sectional differences in physician fee levels, net incomes, hours of work, and time per visit. For fee levels, one possibility is to include an index of actual Medicare prevailing charges. However this would lead to a downward-biased estimate of the impact of malpractice litigation, since the costs of malpractice insurance are one component of the Medicare cost index that is used to update prevailing charges. Our approach is therefore to include a predicted value of prevailing charge levels, using as instruments county-specific determinants of fee levels other than malpractice litigation, from the Area Resource File. As instruments in the equation for predicting (log) prevailing charges we include: per capita income (log), percent of the population below poverty, median years of schooling of the over-25 population, percent of the population in manufacturing and percent of the population employed (proxies for private insurance coverage), Medicare inpatient days per capita (proxy for demand by the elderly population), percent of the population in HMOs, office-based physicians per capita, and residents and interns per capita (a proxy for complexity associated with academic medical centers).

The only available measures of physician skill or experience are specialty and age, which is included as a nonlinear function (AGE and AGESQUAR). Measures of the insurance coverage of the physician's patients (percent prepaid, percent with Medicaid, part B Medicare, and other private insurance as primary payer, and percent uninsured) are included to control for possible differences in rate of adjustment of levels of reimbursement; these measures may also pick up differences in patient demand for quality.

In an attempt to distinguish the effects of malpractice insurance costs from the uninsured time costs of suit and other factors which may influence

practice patterns, we initially estimated three equations for each dependent variable. The first equation included the rate for basic limits of coverage (LRATE). The second added measures of the frequency and severity of malpractice claims. The third equation adds measures of urbanisation (PERURBX) and the average wage of non-physician personnel (LAVGWAGE) employed in the physicians' practice, and is reported here.[16] Urbanisation has been found to be highly correlated with both frequency and severity of malpractice claims. We include it separately rather than as an instrument in the first stage equation, to test whether inferences drawn in other studies about the effects of malpractice on fees are in fact due to failure to control for urbanisation in the fee equations. In general, controlling for urbanisation does not greatly reduce the estimated effects of the malpractice variables.

Table 3 reports the results for primary care care specialists ("GPs"). Net income varies predictably with characteristics of the physician and practice. Income increases non-monotonically with age. Although fees do not vary systematically with age, younger physicians spend less time per visit, work longer hours and see more patients. This is consistent with a human capital model of accumulation of skill in the early years of practice and depreciation in later years. Expenditures on malpractice insurance follow a similar pattern, increasing at a decreasing rate with age. Female GPs have 31 percent lower incomes than males, primarily due to working shorter hours and seeing fewer patients. Females also spend more time per visit for hospital visits; length of office visits is not significantly different than for males.

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[16]LAVGWAGE reflects both exogenous wage levels and the physician's choice of quality of personnel, so should strictly be treated as endogenous and potentially influenced by malpractice concerns.

The point estimate implies that females spend 21 percent less than males on malpractice insurance, but this difference is only marginally significant.

For GPs, practice patterns, fees and incomes are not greatly affected by the insurance coverage of the physicians' patients, with a few exceptions. Physicians that see a relatively large percentage of Medicaid patients charge lower fees and have lower incomes. They spend slightly more time per hospital visit, but length of office visits is not significantly different. There is weak evidence that physicians with a larger percentage of prepaid patients tend to spend less time per visit and have more visits. They do spend significantly more on malpractice insurance. A tentative interpretation of this pattern is that physicians in prepaid plans can more readily pass on the costs of malpractice insurance than additional time spent per patient. This would encourage the substitution of insurance for prevention.

Net income for GPs is not significantly affected by the cost of malpractice insurance or by claim frequency and severity. In part this appears to reflect the passing through of insurance costs in higher fees, despite the fact that insurance costs are not a marginal cost in the short run. Although office visit fees are not significantly related to the rate for basic limits insurance, claim frequency and severity both have significant positive effects on fees. The elasticity of fees with respect to claim severity is roughly 0.1, i.e. an increase of $100 in average size of awards is associated with a $10 increase in office visit fees. A one point increase in claim frequency is associated with a 3 percent increase in fees. This may reflect the cost of purchasing higher limits of coverage in states with high claim frequency and severity: the elasticity of malpractice premium with respect to claim severity is 0.09, and a one point increase in claim frequency is associated with a 6

percent increase in premiums.

However high claim frequency and severity are also associated with spending more time per patient visit, for both hospital and office visits. This suggests that the increase in fees reflects not only the costs of insurance but also some increase in physician time per visit. Total time spent in medical care does not increase -- if anything, it decreases. Total number of patient visits decrease.

Table 4 reports estimates for surgical specialists and obstetricians. Conclusions are much more tentative for these specialties because of very small sample size, particularly for OBs.[17] As in the case of primary care physicians, there is no systematic evidence of strong negative effects of malpractice insurance costs on net incomes. The one exception is that for OBs, net income is significantly negatively related to claim severity, with an elasticity of -0.33 which seems implausibly large as a mean effect. This negative effect of claim severity on income does not appear to be due simply to purchasing higher limits of coverage: expenditures on malpractice insurance are significantly related to the cost of basic limits but not to claim severity. Thus it is possible that one response to very high awards is to avoid remunerative but risky procedures, rather than simply insure against the greater exposure.

Fees charged by OBs are significantly higher in states with high insurance costs. The estimated elasticity is 0.3 for office visit fees, 0.7 for hospital visit fees (or 0.6 if we subtract the estimated negative effect of claim frequency). This pattern is consistent with hospital services having

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[17]The sample size differs across equations because non-response rates differ for different questions.

a higher implicit cost of uninsured risk; it is also consistent with demand for hospital services being less elastic than for office visits. Part of the large fee increase for hospital visits appears to reflect spending more time per visit: time per hospital visit is positively related to the cost of malpractice insurance and claim severity. The estimated effects for time per office visit are not significant.

For other surgical specialties, office visit fees are significantly higher in states with high insurance costs, with an elasticity of 0.16. There appears to be no significant effect on hospital visit fees, but the sample size is much smaller. The estimated effects of malpractice costs on time per office visit and hospital visit for surgeons are generally positive but not highly significant (equations not reported).

In equations not reported here, we found no consistently significant effects of the malpractice variables on total number of hours worked, number of patient visits, in the office or in the operating room, for OBs or surgeons. Larger effects on fees and smaller effects on hours worked and number of patient visits for OBs and surgeons than for GPs is consistent with demand for surgical care being less elastic than for primary care, possibly due to less extensive insurance coverage of primary care.

Concluding Comments

For GPs, the overall pattern of effects on hours, fees and income tells a reasonably consistent story. An increase in malpractice litigation is associated with an increase in insurance coverage but also increased time per patient encounter. This is consistent with increased effort at injury prevention but this type of data cannot distinguish whether the additional time spent is worth its cost in terms of injuries prevented. Moreover since

time per visit increases but number of visits decreases, the net effect on physician time input per episode of care remains uncertain.

Fees are significantly higher and the number of patient visits per physician is reduced. This is consistent with a negative demand elasticity and an upward shift in the cost curve that dominates any upward shift in the demand curve in response to higher expected compensation and increased physician time per visit. The increase in fees is roughly sufficient to offset the effects of increased costs per visit and increased number of visits on net income.

However the true measure of the incidence of costs on physicians is not simply the effect on net income. The percentage change in net income can be decomposed into the effect on hours worked and the effect on net revenue per hour:

$$d\ln R/dJ = d\ln H/dJ + d\ln w/dJ$$

If $d\ln R/dJ = 0$, then $d\ln w/dJ = -d\ln H/dJ > 0$. Thus the estimates of decreased hours in medical care but no effect on net income imply an increase in net revenue per hour. This is not implausible. If the threat of malpractice litigation increases the disutility of work, an increase in monetary compensation per hour would be required in order to maintain the same level of effort.

Malpractice costs also appear to be have a significant effect on fees for surgeons and for OBs. The estimated effects are larger, which is consistent with malpractice premiums constituting a larger fraction of gross income for these specialties. There is not strong evidence of negative effects on net income, with the possible exception of OBs in states with high awards.

Quite aside from small samples, however, the estimates of mean effects for these specialties may be quite misleading. If malpractice risk is concentrated on risky procedures for the surgical specialties including OB, then a plausible response to increased risk of suit is greater specialisation. Less skilled physicians may refer more of the highest risk procedures to the more skilled physicians who become more specialised and possibly more skilled, and are able to spread the fixed cost of malpractice insurance over more patients. This is particularly plausible in OB, where there are very significant premium differentials depending on whether or not the physician does OB. The analysis reported here is designed to measure mean effects rather than distributional effects. Thus the finding of no strong negative effects on net income at the mean does not rule out the possibility of significant negative effects for some physicians, and possibly gains for others. Such excise effects would be entirely consistent with predictions from the theory. We plan to explore this hypothesis of increased specialisation and differential effects across physicians with another dataset that has more detailed information on physicians' allocation of time to different procedures. We also plan to use this dataset to test for effects on fees for other procedures and hence to move towards estimating costs to patients.

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Table 1a. *Claims Filed per 100 Physicians, Selected States, 1980, 1984*

State	All specialties			Obstetrics and gynecology			Neurosurgery		
	1980	1984	Percent change	1980	1984	Percent change	1980	1984	Percent change
Arkansas	6.6	8.6	30	20.3	28.4	40	15.6	12.3	−21[a]
California	20.4	26.0	27	33.9	51.1	51	40.2	53.5	33
Florida	20.8	26.1	25	51.6	44.0[b]	−15	48.2	88.6	84
Indiana	5.3	10.2	92	9.5	33.3	251	23.7	24.5	3
New York	27.1	35.7	32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
North Carolina	7.5[c]	8.9	19	10.8[c]	29.3	171	12.8	24.5	91
Countrywide	10.6	16.5	56	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Sources: U.S. General Accounting Office, *Medical Malpractice Case Studies* (GAO, 1986); countrywide data from St. Paul Fire and Marine Insurance Company.

n.a. Not available.

a. Approximately 6.5 in 1981 and 1983 but 39.7 in 1982.

b. Roughly constant from 1980 to 1983.

c. 1981.

Table 1b. *Average Indemnity per Paid Claim, Selected States, 1980, 1984*

Current dollars unless otherwise specified

State	All specialties			Obstetrics and gynecology			Neurosurgery		
	1980	1984	Percent change	1980	1984	Percent change	1980	1984	Percent change
Arkansas	31,619	51,685	63	n.a.	81,370	n.a.	n.a.	20,000	n.a.
California	32,963	61,774	87	50,973	92,628	82	41,667	91,619	120
Florida	80,556	140,594	75	65,081	86,465	33	3,000	98,250	3,175
New York	46,789	104,810	124	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
North Carolina	36,064[a]	62,043	72	22,438	97,483	334	n.a.	20,000	n.a.
Country-wide[b]	28,059	56,739	102	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Sources: See table

n.a. Not available.

a. 1981.

b. Maximum amount per claim: $1,000,000.

Table 2. *Premium Rates for a $100,000–$300,000 Policy, Mean Percentage Change Nationwide from Previous Year, 1978–84*[a]

Year	Specialty		
	Low-risk	High-risk	Obstetrics and gynecology
1978	−1.0	−2.0	−1.3
1979	5.9	8.4	5.8
1980	11.3	13.9	15.8
1981	22.7	32.7	26.6
1982	9.2	17.9	11.4
1983	15.6	19.1	29.5
1984	16.2	18.3	19.5
1977–84	109.0	189.0	179.9

Source: U.S. Department of Health and Human Services, Health Care Financing Administration, annual malpractice insurers' surveys.

a. Coverage of $100,000 per claim and up to $300,000 aggregate. Mean of state-specific rates of change. Unweighted average. Companies included in sample vary from year to year.

Table 3

EFFECTS OF MALPRACTICE COSTS ON PRIMARY CARE PHYSICIANS, 1983
N=487

Dependent Variable: Log Net Income

Variable	Parameter Estimate	t stat.	Definition
INTERCEP	9.83042	6.523	Intercept
IM	0.08020	1.504	Internists
PED	0.08521	1.143	Pediatricians
AGE	0.04010	2.985	Age
AGESQUAR	-0.00040	-3.118	Age (Squared)
%PRPD3	-0.00360	-0.072	% Pts Prepaid
%PTSMD3	-0.00423	-2.320	% Pts Medicaid
%PTSMR3	0.00123	0.821	% Pts Part B Medicare
%PTSPR3	0.00121	0.888	% Pts Other Private
%GENDR3	-0.31495	-3.100	Gender: 1 = Female
PREV.CHARGE1	-0.42791	-1.608	Predicted Value
PREV.CHARGE2	0.48967	1.524	Predicted Value
LRATE	-0.05841	-0.830	Log Malpractice Rate
LINJNDPV	0.02466	0.538	Log Avg Indemnity
INJTOTPV	-0.00519	-0.381	Claims Per 100 Physicians
PERURBX	-0.00012	-0.112	Percent Urban Pop
LAVGWAGE	0.00369	0.166	Log of Non-Doc Wage Rate

R^2 = 0.084

Dependent Variable: Log Intermediate Office Visit Fee

Variable	Parameter Estimate	t stat.	Variable Definition
INTERCEP	-1.96484	-2.504	Intercept
IM	0.17441	6.283	Internists
PED	-0.00878	- 0.226	Pediatricians
AGE	-0.00648	-0.928	Age
AGESQUAR	0.00004	0.624	Age (Squared)
%PRPD3	-0.00111	-0.043	Percentage Prepaid Patients
%PTSMD3	-0.00193	-2.039	% Pts Medicaid
%PTSMR3	-0.00050	-0.643	% Pts Part B Medicare
%PTSPR3	0.00085	1.199	% Pts Other Private
%GENDR3	-0.02883	-0.545	Gender: 1 = Female
PREV.CHARGE1	0.43428	3.135	Predicted Value
PREV.CHARGE2	0.12759	0.763	Predicted Value
LRATE	-0.02159	-0.590	Log Malpractice Rate
LINJNDPV	0.10182	4.264	Log Avg Indemnity
INJTOTPV	0.02923	4.112	Claim Frequency Per 100 Physicians
PERURBX	0.001621	2.790	Percent Urban Pop
LAVGWAGE	0.01128	0.973	Log of Non-Doc Wage Rate

R^2 = 0.432

Table 3 (cont)

Dependent Variable: Log Hospital Followup Visit Fee

Variable	Parameter Estimate	T stat.	Variable definition
INTERCEP	0.5360	0.946	Intercept
IM	0.1482	4.411	Internists
PED	0.1034	2.216	Pediatricians
AGE	-0.0056	-0.645	Age
AGESQUAR	0.0000	0.248	Age (Squared)
%PRPD3	-0.0228	-0.708	% Pts Prepaid
%PTSMD3	-0.0022	-1.901	% Pts Medicaid
%PTSMR3	-0.0000	-0.073	% Pts Part B Medicare
%PTSPR3	0.0012	1.322	% Pts Other Private
%GENDR3	0.0395	0.716	Gender: 1 = Female
PREV.CHARGE1	0.6141	4.403	Prev.Charg. Hosp.Visit (predicted)
PREV.CHARGE2	-0.0180	-0.091	Prev.Charg. Off. Visit (predicted)
LRATE	0.0254	0.573	Log Malpractice Rate
LINJNDPV	0.0935	3.275	Log Avg Indemnity
INJTOTPV	0.0124	1.367	Claims Per 100 Physicians
PERURBX	0.0022	3.755	Percent Urban Pop
LAVGWAGE	-0.0176	-1.317	Log of Non-Doc Wage Rate

R^2 = 0.3630

Dependent Variable: Log Malpractice Premium

Variable	Parameter Estimate	T stat.	Variable definition
INTERCEP	-2.63629	-1.221	Intercept
IM	-0.32624	-4.273	Internists
PED	-0.50851	-4.765	Pediatricians
AGE	0.03134	1.629	Age
AGESQUAR	-0.00026	-1.456	Age (Squared)
%PRPD3	0.18300	2.555	% Pts Prepaid
%PTSMD3	-0.00196	-0.752	% Pts Medicaid
%PTSMR3	-0.00387	-1.801	% Pts Part B Medicare
%PTSPR3	-0.00286	-1.460	% Pts Other Private
%GENDR3	-0.20887	-1.436	Gender: 1 = Female
PREV.CHARGE1	0.75539	1.982	Predicted Value
PREV.CHARGE2	-0.17996	-0.391	Predicted Value
LRATE	0.73251	7.270	Log Malpractice Rate
LINJNDPV	0.09371	1.427	Log Avg Indemnity
INJTOTPV	0.06030	3.084	Claims Per 100 Physicians
PERURBX	-0.00350	-2.193	Percent Urban Pop
LAVGWAGE	-0.01375	-0.432	Log of Non-Doc Wage Rate

R^2 = 0.250

Table 3: (cont)

Dependent Variable: Log Hours Per Office Visit

Variable	Parameter Estimate	T stat.	Variable definition
INTERCEP	-1.92718	-1.031	Intercept
IM	0.26211	3.966	Internists
PED	-0.06845	-0.741	Pediatricians
AGE	-0.02798	-1.681	Age
AGESQUAR	0.00028	1.767	Age (Squared)
%PRPD3	-0.06559	-1.058	% Pts. Prepaid
%PTSMD3	0.00054	0.241	% Pts Medicaid
%PTSMR3	0.00138	0.744	% Pts Part B Medicare
%PTSPR3	0.00196	1.157	% Pts Other Private
%GENDR3	0.05342	0.424	Gender: 1 = Female
PREV.CHARGE1	0.08880	0.269	Predicted Value
PREV.CHARGE2	-0.07539	-0.189	Predicted Value
LRATE	0.05958	0.683	Log Malpractice Rate
LINJNDPV	0.08644	1.520	Log Avg Indemnity
INJTOTPV	0.03210	1.897	Claims per 100 Physicians
PERURBX	0.00186	1.345	Percent Urban Pop
LAVGWAGE	-0.02978	-1.079	Log of Non-Doc Wage Rate

$R^2 = 0.108$

Dependent Variable: Log Hours Per Hospital Visit

Variable	Parameter Estimate	T stat.	Variable Definition
INTERCEP	-9.89150	-3.845	Intercept
IM	0.07439	0.817	Internists
PED	0.11800	0.928	Pediatricians
AGE	-0.03076	-1.341	Age
AGESQUAR	0.00039	1.791	Age (Squared)
%PRPD3	-0.12512	-1.465	% Pts. Prepaid
%PTSMD3	0.00754	2.420	% Pts Medicaid
%PTSMR3	0.00113	0.441	% Pts Part B Medicare
%PTSPR3	0.00372	1.590	% Pts Other Private
%GENDR3	0.45145	2.603	Gender: 1 = Female
PREV.CHARGE1	0.54639	1.203	Predicted Value
PREV.CHARGE2	0.35707	0.651	Predicted Value
LRATE	0.13314	1.109	Log Malpractice Rate
LINJNDPV	0.14806	1.891	Log Avg Indemnity
INJTOTPV	-0.00980	-0.421	Claims per 100 Physicians
PERURBX	0.00004	0.023	Percent Urban Pop
LAVGWAGE	0.01799	0.474	Log of Non-Doc Wage Rate

$R^2 = 0.134$

Table 3 (cont)

Dependent Variable: Hours/Week in Medical Care

Variable	Parameter Estimate	T stat.	Variable Definition
INTERCEP	75.54332	3.211	Intercept
IM	2.19334	1.551	Internists
PED	-1.75559	-0.892	Pediatricians
AGE	0.84705	2.339	Age
AGESQUAR	-0.01069	-3.070	Age (Squared)
%PRPD3	0.59504	0.441	% Pts Prepaid
%PTSMD3	-0.08527	-1.772	% Pts Medicaid
%PTSMR3	0.05750	1.504	% Pts Part B Medicare
%PTSPR3	0.06419	1.806	% Pts Other Private
%GENDR3	-4.72376	-2.036	Gender: 1 = Female
PREV.CHARGE1	-14.93726	-2.316	Predicted Value
PREV.CHARGE2	6.40743	0.755	Predicted Value
LRATE	-2.15615	-1.165	Log Malpractice Rate
LINJNDPV	0.12500	0.104	Log Avg Indemnity
INJTOTPV	-0.61291	-1.652	Claims per 100 Physicians
PERURBX	0.02315	0.974	Percent Urban Pop
LAVGWAGE	-0.16860	-0.306	Log of Non-Doc Wage Rate

$R^2 = 0.124$

Dependent Variable: Number of Visits

Variable	Parameter Estimate	T stat.	Variable Definition
INTERCEP	410.73322	3.751	Intercept
IM	-15.62942	-2.371	Internists
PED	-2.80555	-0.305	Pediatricians
AGE	7.73079	4.575	Age
AGESQUAR	-0.08154	-5.015	Age (Squared)
%PRPD3	8.18839	1.301	% Pts Prepaid
%PTSMD3	-0.23038	-1.014	% Pts Medicaid
%PTSMR3	-0.30557	-1.714	% Pts Part B Medicare
%PTSPR3	-0.07648	-0.461	% Pts Other Private
%GENDR3	-38.74203	-3.545	Gender: 1 = Female
PREV.CHARGE1	-73.02859	-2.426	Predicted Value
PREV.CHARGE2	-36.17903	-0.914	Predicted Value
LRATE	-5.87828	-0.681	Log Malpractice Rate
LINJNDPV	-9.37434	-1.664	Log Avg Indemnity
INJTOTPV	-3.08511	-1.779	Claims per 100 Physicians
PERURBX	-0.10750	-0.969	Percent Urban Pop
LAVGWAGE	6.83881	2.667	Log of Non-Doc Wage Rate

$R^2 = 0.196$

Table 4.
EFFECTS OF MALPRACTICE COSTS ON SURGEONS AND OBSTETRICIANS/GYNECOLOGISTS, 1983
(t statistics)

	SURGERY				OBSTETRICS/GYNECOLOGY			
Dependent Variable	Net Income (ln)	Office Visit Fee (ln)	Hosp. Visit Fee (ln)		Net Income (ln)	Office Visit Fee (ln)	Hosp. Visit Fee (ln)	Hours/Hosp. Visit (ln)
Intercept	11.09	0.68	0.09		13.47	-0.64	-5.04	-8.23
	(6.56)	(0.66)	(0.04)		(5.31)	(0.44)	(1.63)	(2.13)
General Surgery	0.03	-0.18	-0.00	Ob/Surg	-0.12	-0.02	0.54	-0.48
	(0.23)	(2.10)	(0.02)		(0.25)	(0.18)	(2.09)	(0.63)
Orthopedics	0.41	-0.01	-0.05	Female	-0.37	-0.07	-0.13	0.48
	(2.27)	(0.11)	(0.19)		(2.05)	(0.76)	(0.86)	(1.76)
Age	0.08	-0.03	-0.04		0.03	-0.05	-0.03	-0.17
	(2.34)	(1.30)	(0.72)		(0.49)	(1.69)	(0.46)	(1.99)
Age Square	-0.001	0.000	0.000		-0.000	0.00	0.00	0.00
	(2.44)	(1.60)	(0.89)		(0.59)	(1.48)	(0.39)	(2.10)
Percent Prepaid	-0.11	0.06	-0.14		0.01	-0.04	-0.20	0.26
	(1.07)	(0.93)	(1.08)		(0.09)	(0.63)	(1.34)	(1.48)
Percent Medicaid	-0.01	-0.01	-0.002		0.01	0.00	0.01	0.01
	(1.91)	(1.64)	(0.25)		(1.44)	(0.18)	(1.89)	(1.21)
Percent Medicare	-0.03	-0.001	0.01		-0.0	0.00	0.01	-0.00
	(0.92)	(0.58)	(1.24)		(0.67)	(0.56)	(1.37)	(0.01)
Percent Other Private	-0.005	-0.003	0.01		0.01	0.00	-0.00	0.00
	(1.57)	(1.80)	(1.97)		(2.08)	(0.69)	(0.89)	(0.25)
Prevailing Charge (ln)	-0.43	0.84	1.91		0.41	0.74	1.42	0.45
	(1.43)	(3.22)	(3.05)		(0.98)	(2.74)	(2.66)	(0.71)
Rate (ln)	-0.11	0.16	-0.03		-0.07	0.30	0.74	0.26
	(0.80)	(2.05)	(0.18)		(0.41)	(3.30)	(3.92)	(1.07)
Claim Severity (ln)	-0.00	0.07	0.07		-0.33	0.08	-0.02	0.69
	(0.01)	(1.28)	(0.62)		(2.03)	(0.87)	(0.11)	(2.82)
Claim Frequency	-0.01	-0.02	0.02		0.03	-0.02	-0.07	-0.02
	(0.29)	(0.93)	(0.48)		(0.81)	(0.90)	(1.54)	(0.26)
Percent Urban	-0.00	0.003	0.00		0.00	0.01	0.01	0.00
	(0.07)	(1.57)	(0.97)		(0.39)	(2.67)	(1.18)	(0.21)
Wage	0.03	-0.01	0.02		0.05	-0.02	-0.08	0.08
	(0.59)	(0.18)	(0.45)		(0.79)	(0.51)	(0.77)	(0.87)
R^2	.190	.259	.293		.298	.301	.723	.337
n	144	176	85		79	113	34	79