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Who Pays? The Incidence of High Malpractice Premiums

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Abstract

This paper uses data from physician group practice to examine the relationship between malpractice premium levels and physician net incomes for the years 1994, 1998, and 2002, a period in which malpractice premiums rose rapidly. We find, as did work covering earlier periods of premium growth, that physician net incomes were not reduced by high or rising premiums, and that gross practice revenues were higher when premiums were higher. There is evidence that this forward shifting of costs was associated more with higher quantities of services than with higher unit fees.

KEYWORDS: malpractice insurance, incidence, physician behavior

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INTRODUCTION

Malpractice premiums are higher in some states than in others for apparently similar physician practices. They are rising, and they are rising at different rates. Someone clearly is paying more into the health care or health insurance system, but who is doing so? In the first instance, obviously physician practices pay the malpractice premium, but they may be able to shift some or all of high or growing premiums onto insurers and patients. The question of the "incidence" of premiums is an important part of understanding how the system behaves and has been behaving over time. An answer to this question would also help in judging the distribution of gains and losses from efforts to constrain malpractice premiums or damage awards. If all the gain from lower premiums goes to physicians, public attitudes may be different than if it is shared with patients. This paper reports on a study of premium incidence over the period 1994-2002, a period when the malpractice insurance system again went into "crisis" as premiums rose significantly in some geographic areas and for some kinds of physicians.

PRIOR WORK AND PRIOR HISTORY

Earlier work on the incidence of premiums used data from the last major malpractice crisis, that of the early 1980s. The evidence from that time period suggested that physician practices were able to pass through all (or even more than all) of the cost of malpractice insurance to patients and insurers (Danzon et al. 1990). Much of this pass through was accomplished through higher fee levels (Thurston 2001). There was no study of the effect of higher premiums on the total quantity of all physician services in that time period, but studies of individual components (e.g., follow-up visits, lab tests) show that they moved in mixed directions (Danzon 2000), with quantities of some services increasing as premiums increased and others falling. There was no obvious "defensive medicine" pattern in this mix.

The period from the mid-1980s to the mid-1990s was one of flat or even declining malpractice premiums (in inflation adjusted terms), largely because of the high level of interest earnings on reserves held by insurers. To our knowledge, there has been no study of incidence for this time period—to see if reductions in premiums were associated with declines in physician revenues—but the relatively modest movements in premiums across the board would have made it hard to detect any impact.

Beginning in the 1990s the overall health insurance market changed with the marked shift to managed care plans in the private sector, and the greater use of explicit bargaining by insurers with physicians, rather than the former passive

reimbursement insurance. There has been obvious speculation that the old pass through results might not be replicated in this later period, but up to the present there has been no definitive study. This paper is intended to look at the effect of premiums on physician incomes for the period 1994 to 2002, when premium growth spiked upward in a large number of states. It will also explore the impact of managed care on the incidence of premiums.

MODELING CONCEPTS

We first set out a simple model to specify physician net income and how it might respond to changes in malpractice premiums and any subsequent impacts of premiums on insurance reimbursements.

We assume that all patients are fully insured, with no out of pocket payments, and that there is no excess supply of physician services (i.e., either quantity demanded equals or exceeds quantity supplied). Net money income per physician Y can be defined as:

$$Y = PQ - wL - M$$

where Q is the volume of services per physician in the practice, P is the unit price received, L is the amount of non-physician labor per physician, w is the wage rate for non-physician labor, and M is the malpractice premium per physician. Output is produced according to the production function Q = Q(H,L) where H is hours of physician work per physician. Physician utility is assumed to depend positively on money income and negatively on work: U = U(Y, H).

If we simplify the production function to depend only on the physician input, the first order condition for utility maximization is:

$$P = -Q_H * U'_H / U'_Y$$

where Q_H is the marginal product of H, and the U′ variables are the marginal utilities of work and income respectively. This latter ratio represents the physician's marginal rate of substitution between work and money income (or the amount of money income needed to compensate the physician for one more hour of work).

The direct effect of an increase in M is to reduce net income if no other variable in the model changes. Might there be reasons to expect other changes?

If P is not at all affected by changes in M, any effect of changed M on Q will be caused by income effects on the marginal rate of substitution. While such effects seem empirically to be small (McGuire and Pauly 1991), they would cause an increase in M to lead to an increase in Q (if leisure is a normal good), and

moderate any negative impact of premiums on net income. If in contrast an increase in M directly increased reimbursement P, as is the policy of Medicare and some Blue plans, this higher level of P will cause the level of Q at which the first order condition is satisfied to increase (as long as any income effects on work are small). Thus both P and Q would generally be expected to increase if M increases.

If insurance coverage is less than complete, any insurer-imposed increase in P would also increase patient cost sharing, which in itself would tend to dampen any increase in Q. Patient cost sharing might also inhibit the practice's ability to increase Q in response to income effects.

A change in the malpractice environment might also affect P or Q if it affects other components of marginal cost. A possible story here is that an increase in M associated with an increase in malpractice claims frequency might be associated with an increase in the expected value of H per unit of Q because the physician will expect to bear additional time cost associated with higher litigation risk. If P is not fully determined by dominant insurers but rather is partially under the practice's control, this reduction in marginal productivity might be associated with an increase in P. In addition to these influences, changes in M may also influence Q directly if physicians engage in defensive medicine or demand inducement. While these influences complicate formal models, and while they are speculative, they should be considered in interpreting the results.

In summary, forward shifting would occur if higher premiums changed insurer reimbursement levels, changed the price the practice could charge, or the quantity it supplies at a given price. Insurer reimbursement policies, possible income effects on the volume of outputs, and the impact of increases in expected time cost associated with higher claims frequency are all possible reasons for forward shifting.

In what follows we therefore examine the relationship between M and both physician net income and gross practice revenue. We also check for any effects of the state level malpractice claims rate.

DATA

The American Medical Association stopped gathering data of the type used in our earlier analysis for much of this crucial time period. As an alternative, we therefore obtained data from the Medical Group Management Association's (MGMA) annual survey data of a large set of single specialty group practices for the years 1994, 1998, and 2002.[1] As indicated in Table 1, the data each year

[1] The MGMA members represent about 250,000 of the 800,000 patient-care physicians practicing in the United States in this period. The MGMA membership is about 70 percent of all group practice physicians and about 58 percent of office-based physicians (physicians not employed by

furnishes information on approximately 600-800 single-specialty practices. It provides information on the specialty type and on the number of full-time-equivalent physicians in the practice, both owners and employees. While many of the reporting practices repeat each year, some groups drop out and some new ones enter. The specialty mix in the sample was roughly constant over this time period, with only the share of primary care practices increasing slightly.

The dependent variable of primary interest is practice net physician income (revenues minus all costs except physician salary) per full time equivalent physician. This measures money net income both for owner and salaried physicians at the practice; the data does not distinguish between these two types of physicians. Other measures include net revenues per physician and non-physician practice costs (excluding malpractice premiums) per physician.

Explanatory variables at the practice level include the practice size (measured by number of FTE physicians), wages per FTE non-physician employee, binary variables for specialty, proportions of practice revenues from managed care insurers, Medicare, Medicaid, and, of course, malpractice premiums per physician in the practice. Appendix Table A shows the mean value of malpractice premiums per FTE physician by year for the two data sets we use, the full sample of all single specialty physician groups and a subsample of practices specializing in general surgery and obstetrics and gynecology. We split the sample as well by the American Medical Association's classification (constructed in 2002) of states as ones with or without a malpractice threat "crisis." The average sample premiums are all higher in crisis states than in non-crisis states, and the difference grows considerably larger over the 1998-2002 period than in the previous four years. Finally, we obtained a measure of the number of malpractice claims at the state level from the National Practice Data Base.

We undertook two forms of analysis. First, as in the earlier work with Danzon et al., we estimated cross sectional analyses of the effects of variations in malpractice premiums for each of the three years for which we have data. This is appropriate because a Chow test indicated that it was inappropriate to pool the data across years. A question of interest is whether any estimates of the impact of premiums on income are changing over time as technology, insurance markets, and the national legal climate changes. To explore this, we compare the results of successive cross-sections. Second, for those approximately 400 practices which responded to the survey in both 1998 and 2002, when premiums jumped most rapidly, we estimate first difference regressions, in which the dependent variable is the change in net income. Over this four year period there was a substantial

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or contracted with hospitals and health plans). Group practice physician members of this organization might be expected to have a higher degree of professionalism in their management than other office-based physicians. We might speculate that this characteristic would make them more responsive to variations or changes in malpractice premiums than other physicians.

increase in sample-wide malpractice premiums; we want to see whether those practices that experienced the larger increases in premiums also experienced larger changes in net income per physician, compared to those practices experiencing relatively smaller increases in premiums per physician. (We did not perform this analysis for the period 1994-1998 because the average change in premiums was much smaller.)

We primarily discuss the single-equation cross sectional OLS results. Then, because a practice's premium level is to some extent endogenous and because total premiums are an imperfect measure of the price of a given level of coverage, we show first differences estimates. We also report briefly on the results of an attempt to implement an instrumental variables strategy.

OLS CROSS SECTIONS

Tables 2 and 3 show the results of estimating cross sectional OLS regressions to explain variations in net income and net revenues per physician. Standard errors for the one state-level variable, claims per physician, are adjusted for clustering. Table 2 shows the data for the full sample of practices submitting complete data; Table 3 shows it for a subsample of practices in the surgical specialties (for whom premiums are much higher in absolute value and moderately higher relative to total practice revenues). The empirical model shown in Table 2 and Table 3 will be the same one used in other results reported below.

In all three years, and both samples, there is no evidence that practices that pay higher premiums per physician report significantly lower physician net incomes. In regressions with net income per physician as the dependent variable, either the coefficient on the (log of) the premium per physician is not statistically significant, or it has a significant positive effect on net income. There is no consistent pattern of changes in the size of these effects over time, although it does appear that the positive impacts of premiums on both net income and revenues for the "all specialties" sample was somewhat larger in 1994 than in the two later years.

Other variables have relationships with physician net income that are expected. Compared to non-managed care private insurance, net incomes are lower in practices with high Medicare, Medicaid, and private managed care shares. Net incomes are higher for surgical specialties and, among surgical specialties, highest for OB-GYN. Higher wages per FTE non-physician workers are positively and significantly related to physician net income, probably reflecting cross-area differences in the cost of living.

We also explored whether there was an interaction between variation in the level of managed care penetration in the practice and the impact of premiums on net income (results not shown). One might have thought that the spread of

managed care would reduce the ability of practices to raise fees or increase the volume of services provided to patients. Whether we used a continuous measure or focused on practices in the highest quartile of managed care share, there were no significant interaction effects. Thus the conclusion from this analysis is that, in the last decade and a half, practices were still able to shift forward to consumers the differential cost of higher malpractice premiums, and that the ability to do so was not reduced by the relative spread of managed care. In short, somehow, these practices could make up for high malpractice premiums even when they are in areas with above-average managed care pressure.

There is also no statistically significant (at the 0.05 level) relationship between the number of claims per physician in the state and net physician incomes, controlling for the malpractice premiums. Doctors in general appear not to require higher money incomes when the chances of having to take time to deal with lawsuits rise. We do not know whether the physician time involved dealing with legal matters actually increased. For the surgical specialty subsample, there is no statistically significant effect on net incomes, although the relationship to physician income approaches statistical significance in one of the years.

The second part of Tables 2 and 3 use the same set of explanatory variables, but now uses net practice *revenues* per physician as the dependent variable. The hypothesis is that if premium costs are shifted forward so net *income* is unchanged, net *revenues* should be higher (or, less likely, non-physician costs should be lower) when premiums are higher. In all cases the coefficient on the level of malpractice premiums is positive and statistically significant. Thus the zero or positive effect on net income appears to have occurred primarily because more revenue was collected. The proportion of revenues that goes to pay malpractice premiums was approximately 4 percent for the surgical specialties subsample and 2 percent for the full sample of practices. The estimated elasticity of revenues per physician with respect to the premium is greater than or equal to the ratio of premiums to total practice revenues, as would be consistent with 100percent or more forward shifting. Here again there was no evidence that the magnitude of forward shifting changed appreciably over time or (in results not shown) was affected by the proportion of revenues from managed care.

We would ideally like to decompose the effects of higher premiums on revenues into effects on unit prices (for services of a given type and quality) and effects on the quantity and quality of services. However, with the rise of negotiated fees in this period, a measure of "price levels" is hard to conceptualize, and was not available for most of our data. (The best measure would be revenue per relative value unit, but RVU data was not available for most of the practices.) But we can get some insight into the decomposition issue if we assume that the volume of services per physician is approximately proportional to the level of FTE employment per physician, that is, there is approximately a "fixed

proportions" production function. This assumption is surely not perfectly accurate since some services are produced at the hospital, physician time can substitute for non-physician time (Reinhardt 1972), and perhaps capital can also substitute, but it may be reasonable if there was no effect of variations in revenues per se on the mix of labor and other inputs in producing output.

We therefore re-estimated the practice revenue and net income regressions substituting a measure of FTE workers per physician for the non-physician wage rate. That measure was also strongly related to revenue per physician, but the key finding is that the significant positive effect of malpractice premiums on revenues remained. Table 4 provides selected regression coefficients for OLS regressions for the three cross sections. The elasticity of revenues to premiums did decline into a range of 0.05 to 0.10, suggesting that some portion, perhaps a half to three quarters, of the response of revenues to premiums did reflect higher quantities, and the coefficients drew closer to the expense shares, exactly what one would expect if price effects were being reflected. Moreover, the elasticity is now in the range of 100 percent shifting into prices. The elasticity of revenues with respect to labor expense per doctor was always positive but always less than unity, consistent either with the absence of perfectly fixed proportions or there being price and other effects on revenues if the fixed proportions assumption is correct. We conclude that a sizeable and probably growing proportion of the forward shifting of premiums was accomplished by provision of larger volumes of non-physician-labor-using medical services. But there was still an important effect of premiums on revenues even with inputs (and outputs) held approximately constant, which we suspect is a result of increased prices.

Table 5 shows similar net income and revenue regressions using first differences of the dependent variables net income and net revenues, and the continuous explanatory variables. The sample here was about 400 practices that reported in both 1998 and 2002, where premiums rose substantially in many (though by no means all) states. These first difference analyses should be less subject to endogeneity bias as long as unmeasured influences are approximately constant over time.

The results here are very similar to the cross section results. The change in net income and the change in net revenues were positively and significantly related to the change in premiums. Forward shifting appears to occur in a relatively short run time frame, suggesting that the increases in revenues per physician are not being affected by changes in the number of physicians in the market area. The point estimates for the elasticities of net income and revenues with respect to premiums are very close, in contrast to the cross section results where (as was expected) the revenue elasticity was larger than the income elasticity. However, the confidence intervals are relatively wide.

CONCLUSION

We find that in a large nationwide sample of group practices, higher malpractice premiums do not depress physician net incomes. Instead, by a combination of increasing prices and increasing quantity of (apparently) profitable outputs, the group practice physicians we studied appear able and willing to offset the effect of higher premiums on their incomes. The physicians' services consumer price index (CPI, which measures prices for people who pay some or all out of pocket) rose about 3.2 percent per year over this period, but the producer price index (PPI, which measures prices received) rose by only about 1 percent and did not rise at all toward the end of the period for some specialties. In contrast, measures in MGMA of trends in RVUs for those practices submitting such data from 1994 to 2002 are positive for most specialties and are of the order of 3-6 percent per year.

Regardless of the form, physicians appear able to shift premiums forward whether premiums are increased by an adverse legal climate or for other more practice-specific reasons. They were equally able to do so in different time periods or in practices with heavy managed care presence.

It is possible that these results were affected by endogeneity of malpractice premiums at the individual practice level; this might be an especially likely problem in the cross sectional results. We explored an instrumental variables approach in which the instruments were measures of the state level malpractice climate, such as state level average premiums or the Medicare malpractice component in the practice cost index. While either variable predicted the practice's malpractice premiums, the coefficients on predicted premiums in the second stage were never significant either for the net income or gross revenue regressions except for gross revenue in 1994. Had the instruments been more robust, we might have more confidence in these results but they are, nevertheless, consistent with the hypothesis of no effect of premiums on net income because of forward shifting.

It seems unlikely that this independence of physician net income from premium variation could be attributable to equilibrating flows of physicians from high premium to low premium states. Research attempting to link physician migration or location patterns to malpractice premiums or malpractice reforms finds small or zero effects (Bovbjerg and Berenson 2005; Kessler et al. 2005; Baicker and Chandra 2005). Changes in the malpractice climate have their primary effect on residents' location decisions (Mello and Kelly 2005), which will take time to affect the total stock of physicians. If the long run adjustments in physician stock were responsible for equalizing incomes in the cross section, one would also have expected the first differences effects, which should be less affected by necessarily slow changes in physician stock, to be larger, which they were not.

This result implies that claims that higher premiums and a more costly malpractice system cause practices to "lose money" may be overstated, and conclusions about consequent departures from the practice of medicine or large scale moves from high malpractice to low malpractice states caused by differences in net physician income may be overstated.

However, that net money incomes are unaffected on average does not necessarily mean that there are no effects. There may still be some practices that experience malpractice related decreases in incomes (offset by some who experience increases) and it may be complaints from the former that are most audible. Moreover, even if money net income is not reduced, adverse effects on physicians who may work longer hours producing low value or defensive medicine services, or whose scarce leisure is consumed meeting with lawyers, may mean that real utility from medical practice is reduced.

The key unanswered question is the nature of the additional services that appear to be associated with higher premiums. What precisely are they, and do they provide more benefit than cost (Kessler and McClellan 1996)? Some services to guard against adverse outcomes, even if labeled by physicians as "defensive medicine," still may be worthwhile.

What does seem to be the case, however, is that higher premiums generate levels of medical spending as high as or higher than the costs they entail. Patients (or their insurers) pay; doctors do not. While the orders of magnitude here are not enormous (and any spending reduction associated with lower premiums would be offset after several years' technological change), reform could still make a contribution to lower patient cost. If the lost health and financial protection benefits are zero or small, it could also make a contribution toward more efficient production of health care.

Table 1. Description of data

	number of practices			**mean number of physicians/practice**			**total number of FTE physicians**			**average percent malpractice costs of total revenue**		
practice type	***1994***	***1998***	***2002***	***1994***	***1998***	***2002***	***1994***	***1998***	***2002***	***1994***	***1998***	***2002***
primary care	119	137	186	8.66	10.26	8.13	1,030	1,406	1,512	1.84%	1.67%	1.52%
ob/gyn	40	36	66	6.30	7.77	7.71	252	280	509	4.92%	3.55%	5.20%
anesthesia	37	52	50	21.06	26.18	22.97	779	1,361	1,149	2.97%	1.90%	2.21%
surgery	171	213	192	6.81	8.49	8.81	1,165	1,809	1,691	3.68%	3.06%	3.82%
radiology	30	31	28	13.54	14.04	21.22	406	435	594	1.76%	1.29%	1.79%
cardiology	58	97	103	8.38	11.47	13.36	486	1,112	1,376	1.37%	1.36%	1.45%
hematology/oncology	14	20	48	4.21	5.71	7.08	59	114	340	0.64%	0.51%	0.64%
other specialties	165	167	186	7.18	7.21	8.56	1,186	1,205	1,592	1.72%	1.40%	1.79%
total	*634*	*753*	*859*	*8.46*	*11.60*	*10.20*	*5,363*	*7,722*	*8,763*	*2.49%*	*2.02%*	*2.37%*

source: MGMA 1994, 1998, 2002

Table 2. OLS regressions

	1994		1998		2002	
Variable	coefficient	p-value	coefficient	p-value	coefficient	p-value
a. Dependent variable: physician income						
Malpractice premium/doctor (Ln)	0.1144	(0.000)	0.0126	(0.684)	0.0078	(0.633)
Wage/FTE non-physician (Ln)	0.0310	(0.446)	0.1351	(0.014)	0.1652	(0.000)
Managed care penetration	-0.0019	(0.124)	-0.0032	(0.018)	-0.0046	(0.000)
Total number of malpractice claims/doctor (Ln) by state	0.0346	(0.381)	0.0013	(0.974)	-0.0315	(0.521)
Specialty*						
Surgery	0.7379	(0.000)	0.8028	(0.000)	0.7645	(0.000)
Radiology	0.7607	(0.000)	0.8502	(0.000)	0.8856	(0.000)
Hematology/oncology	0.8025	(0.000)	0.7718	(0.000)	0.8246	(0.000)
Cardiology	0.8556	(0.000)	0.8085	(0.000)	0.8262	(0.000)
Ob/gyn	0.4406	(0.000)	0.4165	(0.000)	0.3669	(0.000)
Anesthesia	0.6299	(0.000)	0.6048	(0.000)	0.6409	(0.000)
Other specialties	0.5321	(0.000)	0.5426	(0.000)	0.5665	(0.000)
Payer†						
Medicare	0.0002	(0.840)	-0.0004	(0.651)	0.0005	(0.670)
Medicaid	-0.0046	(0.031)	-0.0007	(0.690)	-0.0048	(0.005)
Other payers	----------	----------	-0.0017	(0.294)	-0.0004	(0.927)

* Reference category is primary care.
† Reference category is private payer; in 1994, there are no "other payers."

Table 2. OLS regressions (cont'd.)

	1994		1998		2002	
Variable	coefficient	p-value	coefficient	p-value	coefficient	p-value
b. Dependent variable: revenue per physician						
Malpractice premium/doctor (Ln)	0.1239	(0.000)	0.0844	(0.025)	0.0747	(0.000)
Wage/FTE non-physician (Ln)	0.0168	(0.726)	0.0326	(0.545)	0.0225	(0.781)
Managed care penetration	-0.0003	(0.824)	-0.0029	(0.031)	-0.0038	(0.000)
Total number of malpractice claims/doctor (Ln) by state	0.0446	(0.180)	-0.0087	(0.810)	-0.1017	(0.028)
Specialty*						
Surgery	0.4058	(0.000)	0.4843	(0.000)	0.4377	(0.000)
Radiology	0.3680	(0.000)	0.4902	(0.000)	0.4859	(0.000)
Hematology/oncology	0.9211	(0.000)	1.2305	(0.000)	1.4567	(0.000)
Cardiology	0.5708	(0.000)	0.5996	(0.000)	0.6854	(0.000)
Ob/gyn	0.1650	(0.025)	0.2549	(0.000)	0.1669	(0.000)
Anesthesia	0.0832	(0.241)	0.1612	(0.008)	0.1289	(0.000)
Other specialties	0.3507	(0.000)	0.4288	(0.000)	0.3477	(0.000)
Payer†						
Medicare	-0.0024	(0.026)	-0.0023	(0.012)	-0.0028	(0.095)
Medicaid	-0.0086	(0.000)	-0.0034	(0.074)	-0.0070	(0.022)
Other payers	----------	----------	-0.0001	(0.942)	-0.0002	(0.829)

* Reference category is primary care.
† Reference category is private payer; in 1994, there are no "other payers."

Table 3. OLS regressions: Surgical specialists only

	1994		1998		2002	
Variable	coefficient	p-value	coefficient	p-value	coefficient	p-value
a. Dependent variable: physician income						
Malpractice premium/doctor (Ln)	0.0693	(0.054)	0.0275	(0.524)	0.0326	(0.430)
Wage/FTE non-physician (Ln)	0.1877	(0.056)	0.2196	(0.006)	0.4203	(0.000)
Managed care penetration	-0.0009	(0.645)	-0.0025	(0.254)	-0.0062	(0.001)
Total number of malpractice claims/doctor (Ln) by state	0.1233	(0.081)	0.1350	(0.122)	-0.0821	(0.345)
Payer*						
Medicare	0.0067	(0.001)	0.0051	(0.002)	0.0071	(0.000)
Medicaid	-0.0043	(0.171)	-0.0040	(0.200)	-0.0030	(0.369)
Other payers	----------	---------	0.0074	(0.094)	0.0077	(0.011)
b. Dependent variable: revenue per physician						
Malpractice premium/doctor (Ln)	0.0505	(0.069)	0.0406	(0.176)	0.0476	(0.150)
Wage/FTE non-physician (Ln)	0.2660	(0.012)	0.1626	(0.022)	0.2753	(0.008)
Managed care penetration	0.0012	(0.523)	-0.0030	(0.133)	-0.0052	(0.004)
Total number of malpractice claims/doctor (Ln) by state	0.0753	(0.181)	0.0877	(0.219)	-0.0872	(0.182)
Payer††						
Medicare	0.0010	(0.550)	-0.0009	(0.469)	0.0013	(0.489)
Medicaid	-0.0077	(0.025)	-0.0066	(0.038)	-0.0013	(0.793)
Other payers	----------	---------	0.0012	(0.773)	0.0062	(0.124)

* Reference category is private payer; in 1994, there are no "other payers."

Table 4. Elasticities of revenue per physician with respect to malpractice premiums per physician and labor expense per physician.[*]

Full Sample			
Year	1994	1998	2002
Malpractice Premium Elasticity	.10	.07	.05
Labor per Physician Elasticity	.28	.28	.31
Specialists Only			
Malpractice Premium Elasticity	.06	.06	.05[**]
Labor per Physician Elasticity	.43	.33	.49

[*] All coefficients significant at better than 0.95 level except **.

Table 5. First difference regressions

	Changes between 1998 and 2002	
Variable	coefficient	p-value
a. Dependent variable: Change in physician income		
Change in Malpractice premium/doctor (Ln)	0.0512	(0.015)
Change in Wage/FTE non-physician (Ln)	0.2058	(0.000)
Change in Total number of malpractice claims/doctor (Ln) by state	0.0942	(0.177)
Specialty*		
Surgery	-0.0683	(0.179)
Radiology	0.0394	(0.587)
Other specialties	-0.0336	(0.515)
Cardiology	-0.0253	(0.642)
Ob/gyn	-0.1529	(0.063)
Anesthesia	-0.0364	(0.642)
Multispecialty practices	-0.0514	(0.245)
Change in share for Payer†		
Medicare	0.0013	(0.405)
Medicaid	-0.0035	(0.264)
Other payers	-0.0017	(0.126)
b. Dependent variable: change in revenue per physician		
Change in Malpractice premium/doctor (Ln)	0.0469	(0.018)
Change in Wage/FTE non-physician (Ln)	0.1191	(0.027)
Change in Total number of malpractice claims/doctor (Ln) by state	0.0846	(0.199)
Specialty§		
Surgery	-0.0589	(0.220)
Radiology	0.0639	(0.352)
Other specialties	-0.0515	(0.292)
Cardiology	0.0373	(0.469)
Ob/gyn	-0.1375	(0.077)
Anesthesia	-0.0692	(0.350)
Multispecialty practices	-0.0101	(0.809)
Change in share for Payer**		
Medicare	0.0011	(0.479)
Medicaid	-0.0028	(0.344)
Other payers	-0.0005	(0.662)

* Reference category is primary care.
† Reference category is private payer; in 1994, there are no "other payers."

Appendix Table A. Average malpractice premium per physician by specialty and AMA state classification

	2002		1998		1994	
	AMA crisis states	**AMA non-crisis states**	**AMA crisis states**	**AMA non-crisis states**	**AMA crisis states**	**AMA non-crisis states**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**		**Mean (SD)**	**Mean (SD)**
All practices	$17,443 ($17,247)	$14,893 ($11,269)	$13,794 ($12,880)	$11,226 ($11,679)	$12,919 ($11,182)	$13,378 ($10,168)
Surgical practices only (includes ob/gyn)	$34,050 ($22,325)	$25,789 ($12,150)	$24,083 ($13,830)	$19,228 ($16,958)	$24,136 ($11,466)	$22,303 ($11,473)

REFERENCES

Baicker, K. and Chandra, A. (2005). "The Effect of Malpractice Liability on the Delivery of Health Care," *Forum for Health Economics & Policy, Forum: Frontiers in Health Policy Research* 8(4). http://www.bepress.com/fhep/8/4 (January 3, 2007).

Bovbjerg, R. and Berenson, R. (2005). "Myths and Mindsets in Medical Malpractice," Urban Institute Research Report, October 27.

Danzon, P.M., Pauly, M.V., and Kington, R.S. (1990). "The Effects of Malpractice Litigation on Physicians' Fees and Income," *American Economic Review* 80(2): 122-127.

Danzon, P.M. (2000). "Liability for Medical Malpractice," in J. Newhouse and A. Culyer (eds.) *Handbook of Health Economics: Volume 1B*. Amsterdam: North Holland.

Kessler, D., Sage, W., and Becker, D. (2005). "Impact of Malpractice Reforms on the Supply of Physician Services," *Journal of the American Medical Association* 293: 2618-2625.

Kessler, D. and McClellan, M. (1996). "Do Doctors Practice Defensive Medicine?" *The Quarterly Journal of Economics* 111(2): 353-390.

McGuire, T.G. and Pauly, M.V. (1991). "Physician Response to Fee Changes with Multiple Payers," *Journal of Health Economics* 10(4): 385-410.

Mello, M. and Kelly, C.N. (2005). "Effect of a Professional Liability Crisis on Residents' Practice Decisions," *Obstetrics and Gynecology* 105: 1287-1295.

Reinhardt, U. (1972). "A Production Function for Physician Services," *Review of Economics and Statistics* 54: 55-65.

Thurston, N. (2001). "Physician Market Power—Evidence from the Allocation of Malpractice Premiums," *Economic Inquiry* 39: 487-498.