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The Cost of Defensive Medicine in the United States

J. William Thomas PhD

University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center

Erika C. Ziller PhD

University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center

Deborah Thayer MBA

University of Southern Maine, Cutler Institute

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By J. William Thomas, Erika C. Ziller, and Deborah A. Thayer

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Low Costs Of Defensive Medicine, Small Savings From Tort Reform

J. William Thomas

(jwthomas@usm.maine.edu) is a visiting professor at the Cutler Institute for Health and Social Policy, Muskie School of Public Service, University of Southern Maine, in Portland.

Erika C. Ziller is a research associate at the Cutler Institute for Health and Social Policy.

Deborah A. Thayer is a research associate at the Population Health and Health Policy Program, Cutler Institute for Health and Social Policy.

ABSTRACT In this paper we present the costs of defensive medicine in thirty-five clinical specialties to determine whether malpractice liability reforms would greatly reduce health care costs. Defensive medicine includes tests and procedures ordered by physicians principally to reduce perceived threats of medical malpractice liability. The practice is commonly assumed to increase health care costs. The results of studies of the costs of defensive medicine have been inconsistent. We found that estimated savings resulting from a 10 percent decline in medical malpractice premiums would be less than 1 percent of total medical care costs in every specialty. These savings are lower than most previous estimates, and they suggest that the presumed impact of tort reform on health care costs may be overstated.

Because medical malpractice insurance premiums account for less than 2 percent of total estimated national health spending,¹ some observers assert that tort reform would do little to help control rising health care costs. However, others point out that physicians' efforts to avoid malpractice litigation—by ordering marginally useful tests, performing marginally useful procedures, and prescribing marginally useful medications—can add billions of dollars to our national health care bill.

Background On Defensive Medicine

Defensive medicine is generally agreed to exist, but the extent and the costs involved have been the subject of much debate. A distinction is sometimes made between “positive” defensive medicine—extra tests or procedures performed primarily to reduce malpractice liability—and “negative” defensive medicine, by which physicians avoid treating high-risk patients, performing high-risk procedures, or practicing in certain geographic areas because of fear of potential malpractice litigation.^{2–4} In this paper our focus

is on positive defensive medicine.

Direct surveys of physicians during the past thirty years have yielded estimates ranging from 21 percent to 98 percent of responding physicians admitting to defensive medicine practices.^{3,5–7} The wide range of estimates is due to several factors, including differences among specialties and variations in survey question wording. However, findings from empirical studies using data sources, such as Medicare payments or health claims, that describe costs and services that were actually used in patient care suggest that defensive medicine behavior may be less prevalent than reported in direct surveys of physicians.

FEAR OF LITIGATION Some studies have reported strong relationships between physicians' fear of malpractice litigation and behavior that may reduce litigation risks, such as the use of caesarean section instead of vaginal birth.^{8–13} Other studies have found such relationships to be complex, weak, or nonexistent.^{14–17}

EFFECTS ON HEALTH CARE COSTS Studies that examine the effects of defensive medicine on health care costs have produced similarly conflicting findings. Several studies have found

lower health care costs in states that have enacted direct reforms, such as limits on awards for noneconomic damages, compared to states that have no such reforms.^{18–20} Other studies have found weak relationships, or no relationships at all, between either malpractice premiums and health care costs or direct reforms and health care costs.^{16,17,21,22}

Nearly all of the studies cited above focused on limited sets of clinical conditions or clinical specialties, or both. However, a few recent studies have used data supporting more comprehensive estimates of defensive medicine costs, and these suggest that reforms aimed at limiting damage awards are likely to lead to only modest cost savings.^{20–23}

Based on these more recent studies, the Congressional Budget Office now estimates that decreased use of health care services associated with specific tort reforms could reduce national medical spending by 0.3 percent.²⁴ A more detailed review of the research cited above is available in the online Technical Appendix.²⁵

In the study reported here, we used a recently developed analytic methodology—called episode definition—and a national health care claims database that together enabled us to develop a more precise estimate of defensive medicine costs than previously available. Further, we developed separate estimates for all clinical conditions and across a wide range of physician specialties.

Study Data And Methods

Our analytic approach was similar to that of several previously reported empirical studies of defensive medicine^{9,10,16,17,22} in that we quantified relationships between a “tort signal,” used as a measure of physicians’ perceived liability risk, and medical care costs. With those relationships specified, we determined how costs would change in response to developments such as tort law reforms that might affect physicians’ perceptions of malpractice liability risks.

We drew on two primary sources of data for the study. We measured health care costs using a database of more than 400 million paid medical and pharmaceutical claims from CIGNA HealthCare for the two-year period July 1, 2004, through June 30, 2006. As the tort signal, we used data on physicians’ medical malpractice insurance premiums.

We first describe the construction of our health care cost and medical malpractice insurance premium variables. Next, we indicate how costs were attributed to individual physicians and how the physicians’ medical malpractice insurance premiums were determined. Finally, we describe the analytic approach with which

relationships between costs and insurance premiums were specified.

COSTS AND PREMIUMS Claims from the CIGNA database were grouped into episodes of care using Ingenix’s Episode Treatment Group (ETG) software, Version 6.0.²⁶ If, for example, claims show a member as having a diagnosis of acute sinusitis, the software would link the claim for the physician office visit at which the symptoms were diagnosed and any related claims such as laboratory tests, imaging, or prescribed medications.

Costs on individual claims were standardized to remove variability related to provider pricing. Methods used for cost standardization are described in the Technical Appendix.²⁵ Episode total costs in our calculations reflect these standardizations. Differences in costs between groups of episodes indicate differences in quantity and mix of services and resources used, not price differences. Because inpatient claims are inclusive of all services provided during inpatient stays, it was not possible with these claims data to distinguish care management differences such as the use of intensive care units.

Physicians’ medical malpractice premiums were determined using data from state insurance department rate filings submitted by insurers. Medical malpractice, like all other forms of insurance, is regulated in every state by the department of insurance. Insurer rate filings are considered public data in all states, accessible through open records or freedom-of-information requests. We obtained medical malpractice rate filings from companies with large market share in thirty states, where more than 70 percent of CIGNA members live.

Medical malpractice premiums differ by clinical risk category, which is a function of specialty and surgery and obstetrics procedures performed; the amount of insurance coverage being purchased; and the number of years of risk exposure being insured. First-year physicians always have the lowest premiums, and physicians who have been with a company for five or more years, called mature physicians, always have the highest premium rate.

We standardized the tort signal that might be associated with different levels of malpractice insurance coverage across physicians by using premiums for mature physicians with policies that insurers describe as “\$1 million/\$3 million coverage,” meaning that physicians are insured up to \$1 million for each separate incident and a total of \$3 million per year. This allowed us to eliminate variability in the tort signal.

Using data on insurer market share from the National Association of Insurance Commissioners, we calculated the average medical mal-

practice premium. The premium calculation was weighted in terms of insurer market share by calendar quarter for each of 61 physician risk categories—known as Insurance Service Organization, or ISO, classes—and each of 108 malpractice insurance territories comprising 3,143 counties in 30 states. A state-level summary of medical malpractice premium data is given in Technical Appendix Table 1.²⁵

ATTRIBUTING COSTS TO PHYSICIANS Responsibility for the costs of individual episodes was assigned to physicians on the basis of the physicians' professional costs. An episode was attributed to a physician if the physician accounted for the largest percentage, and at least 30 percent, of the episode's included professional costs. This is the episode attribution rule used by many health plans for provider economic profiling.

DETERMINING PREMIUM RATES For medical malpractice insurance, some clinical specialties—such as general surgery—fall into a single risk category. For example, ISO 80143 is for general surgery. Many specialties, however, are divided by insurers into multiple categories, usually on the basis of amount and kinds of surgery performed. For example, gynecologists are partitioned into three risk groups—ISO 80244 for no surgery; ISO 80277 for minor surgery; and ISO 80167 for major surgery.

Although rate filings are considered public information in all states, methods used by insurers to determine physicians' risk-category assignments are not available to the public and are treated as proprietary by insurers. However, we were able to define standard risk-category assignment procedures using practice specialty and certification designations available in CIGNA's provider file, and physicians' billed service codes available in our claims database.

To reduce the chance of surgical physicians being misclassified as nonsurgical, we used a statistical procedure—based on the Poisson distribution—for each major and minor surgery ISO to identify the minimum number of claims necessary to assure, with 95 percent confidence, that a physician having no major or minor surgery claims was assigned the correct risk category. Specific qualification criteria were developed for sixty-one physician risk categories. Criteria for cardiologists and cardiac surgeons are shown in Technical Appendix Exhibit 1.²⁵

MODELING COSTS OF DEFENSIVE MEDICINE We constructed separate analytic files for each of the approximately 22,000 combinations of clinical conditions and insurance risk groups. Each of these files contained one record per physician and included the natural log of the physician's average episode costs as the dependent variable in our analyses. Each file also included average

medical malpractice insurance premiums—since premiums could differ by calendar quarter—as the principal independent variable.

CIGNA's member and provider files contributed data for additional independent variables, used as control variables in our analyses. From the provider file, controls included physicians' state and specialty certification status. With data from the member file, average patient age, sex, and health status²⁷ were calculated for each physician. If a patient had multiple episodes with the same physician, one of the episodes was selected randomly so that observations included in averages would be independent.

One other control variable, included as a measure of physician competition, was the number of physicians in the relevant specialty per 100,000 people in the physician's county or Metropolitan Statistical Area, which we obtained from the Area Resource File, Health Resources and Services Administration. Finally, each record included the number of patients managed in that condition by the physician.

With these data, we structured two-level hierarchical models, with the physician as level 1 and the geographic area as level 2. Hierarchical regression accounts for differences in dependent variable variance that may occur because of clustering of cases—such as multiple patients managed by a single physician, or multiple physicians practicing in a single geographic area. Average medical malpractice insurance premium; physicians' certification status; number of physicians per 100,000 population; and patients' average age, sex, and health status served as fixed effects. Physicians' state of residence was used as a random effect, and the number of patients as the weighting factor.

LIMITATIONS Our methodology has several limitations. Although our database for calculating market share-weighted average malpractice premiums is as comprehensive as any previously used in defensive medicine studies, it does not include data for self-insured physician populations, such as large hospital systems. Furthermore, our malpractice premium rates are area averages, and not individual physicians' malpractice premium values.

Physicians' ISO assignments were based on procedures devised by our research team, not by the malpractice insurers themselves. One insurer was willing to share with us its rules for assigning risk categories to physicians, and we found that percentages of physicians assigned to the different categories by our procedures were similar to the percentages for that insurer's assignments. However, we recognize that our procedures might well differ from those of some, perhaps many, of the other companies.

Study Results

Our CIGNA claims are grouped into thirty-five million completed episodes—that is, those with identifiable starting and ending dates. Of these, 23 million were attributed to physicians in the 30 states for which we have medical malpractice insurance premium data, and physicians in our 61 defined insurance risk groups accounted for 22.7 million of these. Limiting our analyses to physicians for whom we were 95 percent confident of correct insurance risk category assignment and to clinical conditions that included sufficient numbers of physicians for regression analysis further reduced the number of episodes to a final count of 15.4 million.

Exhibit 1 shows the results of our ISO assign-

ment process. In seventeen specialties, physicians were assigned to a single ISO category. Twelve other specialties were partitioned into two ISOs each. Four specialties included three ISOs each, and two specialties each included four ISOs.

We found that increases in episode costs were significantly related to increases in medical malpractice premiums in 449 of our ISO- and condition-specific analyses. As shown in the right-hand column of Exhibit 1, significant relationships were found in all but six clinical specialties; and in all but nine specialties, significant relationships were found in multiple types of cases.

Specialty-specific results are summarized in Exhibit 2. Results are shown by insurance risk

EXHIBIT 1

Number Of Case Types Suggesting Defensive Medicine, By Physician Specialty

Specialty	No. of ISO codes	Total no. of physicians	No. of 95% confident physicians	No. of conditions with significant results suggesting defensive medicine
Allergy and immunology	1	3,174	3,174	4
Cardiology, interventional	1	7,882	7,882	2
Cardiovascular disease	1	9,662	9,662	3
Dermatology	2	9,739	8,854	5
Emergency medicine	2	14,493	2,973	7
Endocrinology	2	5,472	3,312	0
Family/general practice	4	86,894	16,124	15
Gastroenterology	3	4,680	943	0
Geriatric medicine	3	5,613	3,057	10
Gynecology	3	1,595	1,039	4
Infectious disease	2	5,172	1,090	6
Internal medicine	2	113,420	92,372	16
Nephrology	2	7,374	3,580	3
Neurology	2	12,344	10,674	7
Nuclear medicine	1	1,205	1,205	0
Obstetrics/gynecology	1	32,219	32,219	15
Occupational medicine	1	412	412	0
Oncology/hematology	2	12,890	7,470	14
Ophthalmology	2	18,385	16,212	1
Otolaryngology, ENT	4	9,515	1,940	2
Pediatrics	2	53,534	13,227	13
Psychiatry	2	16,978	4,656	3
Pulmonary disease	1	8,150	8,150	3
Rheumatology	1	3,179	3,179	4
Surgery, cardiovascular	1	8,939	8,939	1
Surgery, colon and rectal	1	1,771	1,771	0
Surgery, general	1	28,045	28,045	10
Surgery, hand	1	2,076	2,076	3
Surgery, head and neck	1	1,326	1,326	5
Surgery, neurological	1	4,104	4,104	3
Surgery, orthopedic	2	22,680	6,411	6
Surgery, plastic	1	5,517	5,517	4
Surgery, thoracic	1	4,406	4,406	0
Surgery, vascular	1	5,683	5,683	1
Urology	3	9,812	6,950	4
Total	61	538,340	328,634	

SOURCE Authors' analysis. **NOTES** Insurance Service Organization (ISO) codes denote insurance risk categories. ENT is ear, nose, and throat.

EXHIBIT 2

Reduction In Defensive Medicine Costs Resulting From A 10 Percent Decrease In Medical Malpractice Premiums, By Physician Specialty

Specialty	Total costs (\$)	% with significant cost-to-premium relationship	Total no. of episodes	% of all episodes in specialty with significant cost-to-premium relationship	Savings from 10% premium decrease
Allergy and immunology	49,829,331	1.5	90,120	58.6	350,530
Cardiology, interventional	120,761,026	0.8	38,128	5.4	92,944
Cardiovascular disease	46,648,523	0.7	33,484	0.1	11,232
Dermatology	247,381,261	1.8	1,102,908	50.7	744,438
Emergency medicine	329,848,528	0.7	324,056	1.4	81,843
Endocrinology	52,947,555	0.0	44,692	0.0	-
Family/general practice	823,313,559	3.5	3,449,928	37.1	1,579,722
Gastroenterology	9,983,307	0.0	8,479	0.0	-
Geriatric medicine	16,211,685	2.1	54,541	6.2	29,026
Gynecology	26,827,949	1.1	33,553	6.9	30,795
Infectious disease	8,923,462	1.4	12,999	30.5	23,860
Internal medicine	2,362,212,159	5.6	3,783,663	34.8	3,822,661
Nephrology	25,720,445	0.6	7,512	4.0	11,110
Neurology	258,105,183	1.3	199,898	1.9	97,313
Nuclear medicine	2,491,361	0.0	933	0.0	-
Obstetrics/gynecology	1,657,148,490	6.3	1,952,058	11.0	776,800
Occupational medicine	1,419,937	0.0	4,540	0.0	-
Oncology/hematology	817,727,501	3.4	109,414	14.3	554,850
Ophthalmology	210,479,279	1.9	510,422	19.5	332,048
Otolaryngology, ENT	69,396,082	0.2	89,220	15.0	32,553
Pediatrics	454,098,797	6.6	2,157,286	81.4	1,588,652
Psychiatry	49,968,587	0.7	33,597	5.1	170,825
Pulmonary disease	47,614,105	1.0	31,859	6.6	49,160
Rheumatology	30,893,935	1.1	20,566	8.1	65,463
Surgery, cardiovascular	16,889,114	0.6	3,399	15.9	20,521
Surgery, colon and rectal	15,668,727	0.0	11,128	0.0	-
Surgery, general	1,018,380,585	2.9	428,007	20.8	782,486
Surgery, hand	36,918,689	1.4	26,766	3.0	33,207
Surgery, head and neck	63,074,942	4.0	75,290	20.2	221,384
Surgery, neurological	240,127,600	0.8	37,739	18.6	804,769
Surgery, orthopedic	545,807,420	1.3	313,122	5.4	557,695
Surgery, plastic	112,299,110	1.5	80,382	32.4	440,932
Surgery, thoracic	44,394,508	0.0	4,242	0.0	-
Surgery, vascular	10,475,730	0.3	4,344	0.5	27,940
Urology	388,889,451	0.5	278,369	4.2	151,242
Total	10,212,877,924	2.0	15,356,644	35.8	13,486,001

SOURCE Authors' analysis. **NOTES** This exhibit has been abridged because of space constraints. The complete exhibit is available online by clicking on the Technical Appendix link in the box to the right of the article online. ENT is ear, nose, and throat.

group in Technical Appendix Tables 3 and 4.²⁵ For example, for allergy and immunology, the relationship between episode costs and medical malpractice insurance premiums was positive and significant in only 1.5 percent of episodes analyzed. However, these clinical conditions accounted for 58.6 percent of all episodes managed by physicians in that specialty.

Based on our results for these physicians, we calculated that a 10 percent reduction in medical malpractice insurance premiums would lead to a savings of \$350,530 across all episodes managed by allergy and immunology specialists.²⁸ (For additional results, see Appendix Exhibit 3 in the online Technical Appendix.)²⁵ On a per epi-

sode basis, the estimated savings are small, and this figure represents only 0.703 percent of medical care costs for these physicians.

Across all specialties, reductions in medical malpractice premiums would lead to statistically significant savings in 2.0 percent of the conditions analyzed, but these are high-volume situations, comprising 35.8 percent of all episodes. However, the magnitude of savings that could be realized is small, accounting for less than 1 percent of medical care costs in every specialty. Across all thirty-five specialties, savings associated with a 10 percent premium reduction in medical malpractice premiums would be just 0.132 percent. Even if medical malpractice pre-

Defensive medicine practices exist and are widespread, but their impact on medical care costs is small.

miums were to be reduced as much as 30 percent, defensive medicine costs would decline no more than 0.4 percent.

Recognizing that our findings could be sensitive to procedures used for assigning ISO codes—specifically, our methods for qualifying 95 percent confident ISO assignments—we repeated our analyses using all physicians in the database, not just those for whom we were 95 percent confident of ISO qualification. Results of these analyses were quite similar to those presented in Exhibit 2, with total savings from a 10 percent premium reduction accounting for 0.120 percent of total medical care costs.

Because our results also could be overly influenced by small numbers of physicians in some analyses, we reestimated our cost calculations, using results from only those analyses that included at least fifty-five physicians; total estimated cost savings were 0.134 percent of medical care costs.

To evaluate the validity of our cost estimate, we “drilled down” into the episodes included in the 449 risk and category combinations identified as significant, looking for evidence of defensive medicine practices. In 69 percent of the analyses, we found one or more cost components—such as evaluation and management costs or imaging

costs—with significant positive relationships to medical malpractice premiums. Although these analyses do not validate all of the relationships used in our cost calculation, they provide support for most, and they reinforce our findings of the existence of defensive medicine practices and their limited impact on medical care costs.

Conclusion

From our analyses, we conclude that defensive medicine practices exist and are widespread, but their impact on medical care costs is small. This conclusion is similar to those of other recent studies,^{18,21,23} and to that of the Congressional Budget Office (CBO).²⁴

There is a caution that applies to our cost estimate, as well as those of all empirical analyses of defensive medicine, including the CBO study referred to above.²⁴ Empirical analyses such as ours attempt to quantify relationships between differences in physicians’ perceived liability risk and associated behavior—in our case, behavior that influences health care costs. If some level of defensive behavior is shared by all or most physicians and is independent of variations in perceived risk, it will not be detected in studies such as this. However, we believe that such behavior would not be influenced by changes to the medical liability environment, and that the costs associated with such behavior are unlikely to be affected by tort system reforms, regardless of the level of reduction in medical malpractice insurance premiums.

Does our analysis suggest that tort reforms such as caps on damages and limits on attorneys’ fees should not be enacted? No, because even this small level of extra cost should be eliminated from the system. It does suggest, though, that claims of high levels of expected savings from tort reform are overstated.²⁹ ■

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