

hepatitis as well as etiologic studies could include questions on needle sharing.

This study did not provide clues about how to implement more effective hepatitis control measures in a disaffiliated drug-using population. In spite of our awareness of the epidemic in late 1983, the disease spread in subsequent years. In general, traditional methods of containment of hepatitis A through immunoprophylaxis were not successful among IV drug users because of late reporting of diagnosis and inability or unwillingness of drug users to name their contacts.

Although we instituted outreach efforts in drug treatment facilities and to the community at large, we did not receive substantial cooperation from IV drug abusers in investigating cases. Without effective disease control in the highest risk group, we concentrated our efforts in places where a widespread outbreak of hepatitis could have occurred if a case had been introduced: food service establishments, schools, and day care facilities. Education and surveillance of illness in those settings might have prevented or reduced the likelihood of spread through food services and infected children.

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Malpractice Premiums and Primary Cesarean Section Rates in New York and Illinois

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Synopsis.....

The fear of malpractice liability is mentioned frequently as a cause of increased cesarean section

rates, but without quantitative investigations. This perception may be studied at an aggregate level by comparing malpractice insurance premiums, a proxy for liability risk, with primary cesarean section rates.

Both New York and Illinois are divided into territories for insurance rates; the premium was uniform within each territory over the period studied for each specialty. Premiums for obstetricians were linked to birth and procedure data from New York and Illinois hospitals for 1981 and 1983, respectively, to determine whether there was a correlation between premium levels and the primary cesarean section rate.

A statistically significant difference was found between mean cesarean rates by insurance premium

territories in each State. A correlation was observed between increased insurance rates among territories and increased cesarean section rates. Based on

these results, a substantial impact was found on delivery decisions resulting from the fear of malpractice suits.

ONE OF THE EXPLANATIONS for the increasing use of cesarean section in the United States concerns malpractice liability. In 1976, almost all questionnaires returned from 50 representative medical school department chairpersons, other professors, and obstetricians, mentioned malpractice suits as a factor in increased cesarean section rates (1). The adverse medical-legal climate was described by Petitti and coworkers in 1979 as contributing to physicians trying to avoid accusations of failure to intervene in equivocal situations (2). Taffel and Placek, in a 1983 article, mentioned that the fear of a lawsuit could contribute to precautionary obstetrics when there was an indication of fetal distress (3).

Controversy exists over the question of how important this influence may be. Marieskind, who reviewed the literature and interviewed more than 100 physicians, concluded that the threat of malpractice suits was the chief causal factor in the increased use of cesarean section (4). However, a National Institutes of Health (NIH) Consensus Conference report noted no evidence that fear of litigation and the consequent practice of defensive medicine were a major cause of the increased use of cesarean section (5). This finding was based on the observation that physicians practicing in settings in which they are not open to personal liability for malpractice, such as in the military and in Public Health Service hospitals, showed an increased use of cesarean sections comparable to that in the private sector.

Apparently, obstetricians are sued more often than physicians of all specialties considered together. According to the National Association of Insurance Commissioners (4), obstetricians are sued 10 times more than all physicians, while the National Center for Health Statistics estimates the rate at 2.4 times (5). A more recent estimate can be made from General Accounting Office (GAO) data on malpractice claims, which suggest a risk of suit 2.4 times greater than average and 3.4 times greater incidence of claims resulting in payment (6). One reason for the increased risk in this type of practice is the involvement with two patients, mother and baby.

To date, there have been no quantitative investi-

gations of the relationship between malpractice premiums and cesarean section rates. The NIH conference participants reported that they were unable at that time to determine the importance of defensive medicine as a factor in birth procedure decisions (5). Shiono and coworkers found that the forces influencing increases in the rate of cesarean section were not well understood. Although formal evidence was lacking, the perception appeared to have become increasingly widespread during the last 6 years that fear of litigation pushes borderline cases toward cesarean delivery (7). This paper reports on an examination of the effects of malpractice concerns on cesarean section rates, using data from New York and Illinois.

Legal Issues

Legal issues involving malpractice and the cesarean decision are summarized in the NIH report (5). Legally, a physician is held to a professional standard of care. If injury results from failure to meet that standard, the physician can be held liable.

There have been substantial increases in lawsuits which do not involve allegations of violations of the standard of care on the part of the physician (8). Some of these may reflect disappointment with less than perfect outcomes in complicated cases. Many people believe that victims of adverse medical results ought to be compensated.

Cesarean-related lawsuits fall into three main categories (5). One is negligence in performing the cesarean. Since this type of suit can arise in any surgical situation, it is the least relevant to physician decision-making. Another involves failure or delay in performing a cesarean section. This provides grounds if it can be argued that prompt surgery was necessary and could have prevented the injury. The last is performance of an unnecessary cesarean. There have been few successful suits for this reason, perhaps because the correctness of the decision to perform surgery is difficult to establish afterwards. It has been reported that 90 percent of obstetric malpractice cases involve either failure or delay in performing a cesarean, or improper use of forceps (5). Apparently, the course of least legal risk may involve surgical bias.

Table 1. Obstetric malpractice premiums and primary cesarean section rates in four New York territories outside of New York City, 1981

Counties in territory	Premium	Premium index	Number of hospitals	Births ¹	Primary cesareans	Primary cesarean rate (percent)
Nassau, Suffolk, Sullivan	\$30,175	2.21	21	27,517	4,167	² 15.1
Rockland	\$26,334	1.93	2	2,765	410	³ 14.8
Orange, Ulster, Westchester	\$23,108	1.70	18	13,414	1,848	² 13.8
All other	\$13,625	1.00	99	80,050	9,397	11.7

¹Less repeat cesareans.

²Significantly different from the "all other" group at the .05 level. Not significantly different from the remaining groups at the .05 level.

³If combined with either adjacent group, both adjacent groups become significantly different from the "all other" group at the .05 level, but not significantly different from each other.

SOURCE: Reference 11 and unpublished data from the New York State Insurance Department

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As the numbers of suits multiply and the numbers of claims paid rise, the costs of defense and insurance protection increase in parallel. Considering the monetary and emotional stakes in this issue, it would be surprising if physician behavior were not altered. The difficulty of estimating liability has caused many insurance providers to pull out, and the remainder to raise rates substantially. In many areas, self-insurance groups or captive insurance companies have been formed by the constituencies affected. Examples include the Medical Liability Mutual Insurance Company (MLMIC) in New York State and the Illinois State Medical Inter-Insurance Exchange (ISMIE).

Model and Results

It is not possible to say how any one obstetrician has altered procedures owing to fear of lawsuits, but it is possible to investigate this issue at an aggregate level. To the extent that payments to plaintiffs, together with costs to investigate and defend claims in a geographic area, are high, insurers will capitalize their expenses into relatively high insurance premiums. Hence, the liability premium in an area can be taken to represent the risk of incurring these costs. To the extent that the number of suits and the total costs are correlated, insurance premiums probably are the best indicator of lawsuit risk. However, data from a study of malpractice claims closed in 1984 suggest that the correlation is not exact (6).

According to GAO, the objective in setting insurance premiums is to raise sufficient funds to meet payments to be incurred during the period covered, the administrative costs of providing the insurance, and an amount for unanticipated contingencies (9). The ratemaking process attempts to predict future claims based on past experience and

changing circumstances, such as inflation, legal theories, and legislation. Statutory requirements frequently specify that premiums be adequate, not excessive, and not discriminatory.

As a starting point, given the total medical liability experience within a State, premiums are adjusted by specialty and sometimes geographic location, because each, in theory, represents a different level of risk for the insurer. As of 1986, in nine States, the leading insurers have multiple rating territories for physicians, based on historically different claims experience. In the other 41 States and the District of Columbia, premium rates generally apply to all physicians in a specialty in the entire State, since the claims and loss experience there varies little throughout the State (10). Rates are typically quoted for a specialty rather than for individual physicians. Some insurance companies assess a surcharge for physicians with unfavorable malpractice claims experience.

To examine this issue empirically, insurance data were obtained for two States. For New York, premium schedules on policies issued by MLMIC, which covers about 70 percent of that market, were provided by the New York State Insurance Department. The State is divided into a number of rate territories (five in 1981 and 1982, four in 1983); for a given amount of coverage and a given specialty, the premium was the same for physicians within each territory. In Illinois, ISMIE provides more than 75 percent of the liability insurance policies. Illinois is divided into three rate territories.

The hypothesis is that physicians located in geographic areas of greater malpractice risk will practice more defensive medicine and perform more cesareans. The initial unit of observation is the primary cesarean section rate for births in hospitals within particular insurance rate territories. For New York State, information on the number

Table 2. Obstetric malpractice premiums and primary cesarean section rates in three Illinois territories, 1983

Counties in territory	Premium	Premium index	Number of hospitals	Births ¹	Primary cesareans	Primary cesarean rate ² (percent)
Cook, DuPage, Kane, Lake, Madison, McHenry, Sangamon, St. Clair	\$27,960	1.65	94	113,291	13,899	12.3
Champaign, Kankakee, LaSalle, Macon, Vermillion, Will	\$22,436	1.33	15	12,239	1,337	10.9
All other	\$16,912	1.00	83	34,003	4,020	11.8

¹Less repeat cesareans.

²No 2 groups were significantly different at the .05 level. However, if the middle group is combined with either adjacent group, the differences are significant at the .05 level.

SOURCE: Unpublished data from Illinois Departments of Public Health and Insurance.

of births and delivery procedures used were obtained for all hospitals with maternity wards outside of New York City for 1981 (11). These were sorted into the four rate territories that applied (table 1).

MLMIC liability premiums for obstetricians ranged from a high of more than \$30,000 to a low of less than \$14,000 for 1981; they provided \$1 million for damages sustained by one person and \$3 million for total liability. These premiums were exceeded by only two other specialties, neurosurgery and orthopedic surgery. The premium index is a calculation that highlights the premium differences by assigning the territory with the lowest rate a value of 1 and scaling the territories with the higher rates accordingly. Between 1981 and 1983, the liability premiums increased 71 percent. Since the increase was uniform by territory, the premium index for 1983 was identical to that calculated for 1981.

The number of hospitals in each territory and the number of births, less repeat cesareans, is listed. The subtraction is made because typically there has been little choice in delivery method for this group (12). The substantial differences in claims payment experience, as reflected in the insurance premium variation, paralleled a swing of 3.4 percent in the cesarean section rate between the lowest and highest rate areas.

To determine whether the differences between these numbers are statistically significant, the mean primary cesarean rate for hospitals in each territory was calculated. A one-way analysis of variance procedure on these means provided an *F* ratio of 7.32. At the .01 significance level, the hypothesis can be rejected that the mean cesarean section rates between territories were identical. The cesarean rates for the first and third groups were significantly different from the fourth group at the .05 level, but not from each other. Further analysis

involved combining the second category (with only two hospitals) with either the territory immediately above or below it in the table. Using Tukey's difference test, with the same results for the Tukey *b* alternative test and the Scheffe test, at the .05 significance level for either three-category classification, there was a statistically significant difference between the "all other" counties category and each of the other two categories. The difference between the other two categories was not significant at the .05 level.

Similar tests were run with 1983 data from Illinois. Unpublished data on numbers of births and primary cesarean sections in hospitals within rate territories were obtained from the Illinois Department of Public Health. Figures on obstetrical liability rates for \$1 million coverage for damages sustained by one person and \$3 million for total liability were provided by the Illinois Department of Insurance. As reported in table 2, the territory with the highest premium again was associated with the highest cesarean rates, although the differences were narrower than in upstate New York. However, the lowest cesarean rates did not occur in the region with the lowest insurance premiums.

To test whether the differences were statistically significant, the mean primary cesarean section rate for hospitals was calculated for each territory. A one-way analysis of variance on the means produced an *F* ratio of 3.20, which indicated that the hypothesis that the mean cesarean section rates were identical in each territory can be rejected at a significance level of .05. No two individual groups were significantly different at the .05 level. However, reorganizing the categories by including the middle group of counties with either the first or last group and retesting to determine whether the difference between the territory with the higher premium and higher cesarean rate and the territory

with the lower premium and rate was statistically significant, produced an affirmative answer at the .05 and .01 levels (one-tail test), respectively.

Discussion

In both the New York and Illinois samples, differences in cesarean section rates proved to have a statistically significant correlation with differences in liability premiums. The differences in the cesarean section rate between the territories with the lowest and highest premiums was more than 3 percent for New York and about 0.5 percent for Illinois. The weaker relationship in the latter, as well as the less-than-perfect ordering between premiums and primary cesarean rates by territory, could result from two factors. First, the difference in liability premiums, as reflected in the premium index, is much lower in Illinois than in New York. This suggests that differences in cesarean incentives within a State may only be manifested if the differences in premiums are substantial. Alternatively, the impact of malpractice risks would need to be separated from other factors, such as variations in maternal and newborn factors, that could differ between regions or hospitals. That is, areas where various conditions during pregnancy or complications during labor are more prevalent would likely have a higher cesarean rate. Controlling for such factors is beyond the scope of this analysis.

The increased primary cesarean section rates suggested solely by the differences between areas with the high and low malpractice premiums imply at least 1,400 additional surgeries per year in New York State outside of New York City (updated to 1984 birth totals) (13), and more than 800 in Illinois (updated to 1985 birth totals) (14). Considering the increased maternal mortality rates with cesarean section, more maternal deaths could be expected (15). With estimated additional hospital and physician fees amounting to more than \$1,800 per surgery (1984 dollars) (15), increased medical bills of \$3.9 million are indicated for these two States alone.

On a national level, a 1 percent increase in cesarean section rates would translate into more than \$67 million in additional hospital and physician fees based on 1984 medical charges and 1985 births (15, 16). Factoring in inflation in the costs of medical services from mid-1984 to the end of 1986 raises this figure to almost \$80 million. The preceding sums do not include amounts that may be necessary for prolonged infant care. In addition, perhaps 11 more maternal deaths could be expected (15).

This study was directed toward the impact of differences in cesarean section rates that might result from differences in malpractice premiums between regions and did not directly assess how much cesarean surgery is performed overall as a result of fear of lawsuits. Based on the statistical significance of the differences, the amount appears substantial. Given the increase in cesarean section rates from 4.5 percent in 1965 to almost 23 percent in 1985 (16), future research should attempt to further quantify the role that malpractice concerns have played in this increase.

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