**Influence and Deterrence:**

**How Obstetricians Respond to Litigation against Themselves and their Colleagues**

**David Dranove***

**and**

**Yasutora Watanabe***

**10/9/2007**

***** Department of Management and Strategy, Kellogg School of Management, Northwestern University.

**Influence and Deterrence:**
**How Obstetricians Respond to Litigation against Themselves and their Colleagues**

**Abstract:** The willingness of individuals to engage in a harmful act may be influenced by direct personal experiences and the experiences of others, which can inform individuals about the likely consequences of their actions. In this paper, we examine how obstetricians respond to litigation. It is contended that obstetricians respond to increases in litigiousness by performing more caesarian sections. Using micro data, we examine whether physicians perform more caesarians after they or their colleagues have been contacted about a lawsuit. We observe very small, short-lived increases in caesarian section rates. It does not appear that the recent sharp rise in caesarian section rates is in direct response to litigation. We present indirect evidence that the increase may instead represent a change in consumer tastes.

**Influence and Deterrence:**

**How Obstetricians Respond to Litigation against Themselves and their Colleagues**

## I. Introduction

One of the main goals of the legal system is to deter harmful acts, including acts of negligence and criminality. The willingness of individuals to engage in a harmful act may be influenced by many factors, ranging from direct personal experiences (e.g., an individual may have been punished for a harmful act) to experiences of friends, family, colleagues and the larger community. These experiences can inform individuals about the likelihood that they will "get caught" committing a harmful act as well as the subsequent punishment.

The range of factors that might influence the expectation of punishment is reflected in theoretical models of criminal behavior. In seminal work by Becker (1968) and others, the likelihood of punishment does not vary across individuals, but instead varies according the type of crime or the target of crime. For example, in Wilson and Kelling's (1982) broken window theory, individuals infer the probability of arrest in a given neighborhood by examining the level of decay. In Sah (1991), individuals form different assessments of the likelihood of punishment, based on the arrests of others they know. In Lochner (2003), potential criminals are influenced by their own arrest history as well as the experiences of others.

Lochner (2007) reports results of a survey showing that potential criminals' expectations about the probability of arrest are influenced by their own experiences and the experiences of siblings. It is not clear whether potential criminals believe that law enforcement is tougher or that their own criminal skills are weaker. Lochner also presents data showing that the perceived probability of arrest affects the level of petty larceny and auto thefts. Either the potential criminals fear arrest, or their family members are exerting pressure to remain "clean." In either event, these results indicate that criminal behavior is influenced by individual and family experience with the legal system, and that enhanced law enforcement activity would reduce criminal behavior.

The same issues arise in the liability system, including the realm of medical malpractice which is the focus of this study. When physicians select a test or procedure, they must assess the probability of a malpractice claim and the subsequent punishment. This assessment may be influenced by their own history, the experiences of colleagues, or even national trends. Physicians who have been sued may believe that the probability of litigation is high, or that their own ability is low. Physicians whose colleagues have been sued may also believe that the probability of litigation is high. In both cases, their colleagues and the hospital where they work may exert pressure on them to take extra caution. As with Lochner (2007), our main interest is identifying the role of personal and other influences on negligent behavior, without necessarily sorting out how these influences manifest themselves.

Concerns about medical malpractice have intensified in the past few years. According to the *Medical Liability Monitor*, malpractice premiums for most physicians declined in real terms through the 1990s, but increased by 50 percent or more between 2000 and 2004 (see Table 1). According to the American Medical Association, at least 20 states are currently in a "full-blown" malpractice crisis.[1] The fields of obstetrics,

---

[1] See AMA 2005. This was up from 12 states reported by the AMA in mid 2002. The 19 states determined to be in crisis in October 2003 include: Arkansas, Connecticut, Florida, Georgia, Illinois, Kentucky,

neurosurgery and emergency medicine have been especially hard hit. Malpractice concerns in these three specialties have received the most media attention, and these specialties have experienced the largest malpractice premium increases.

Delivery by caesarian section is thought to be a defensive response by obstetricians who believe that caesarian delivery reduces the risk of a claim and the potential size of the claim.[2] Thus, virtually all studies of the deterrence effect of liability in obstetrics focus on the caesarian section rate, which increased nationwide by 10 percentage points between 1996 and 2001.[3] The decision to deliver by caesarian is not the physician's alone to make, but there is general consensus that physicians can influence the mother's choice, and that physician concerns about medical liability risk have contributed to the increased rate of caesarians.

What factors might influence the willingness of obstetricians to encourage women to deliver by caesarian section? (The vast majority of deliveries are performed by board certified obstetricians and we will refer to all physicians in our data as obstetricians.) Following the works in criminal justice by Sah (1991) and Lochner (2003), we hypothesize that obstetricians might be influenced by both personal and external factors. Obstetricians may consider whether they have recently experienced a claim and whether this was the first time or a commonplace occurrence. Recent claims against colleagues

---

Mississippi, Missouri, New Jersey, Nevada, New York, North Carolina, Ohio, Oregon, Pennsylvania, Texas, Washington, West Virginia and Wyoming. In June 2004 the AMA added Massachusetts to the list of states in crisis.

[2] There are numerous references in both the research and mass media making this connection. For example, the President of the Massachusetts Medical Society stated in 2004: "…doctors are under pressure to exhaust every delivery option available, often including C-sections, because of malpractice worries" Source: Fargen, J., (2007). To take another example: "Childbirth activists believe that … doctors fear malpractice claims… so they encourage women to have caesarians that are not necessary." Source: Cassidy, T. (2007) Fear of malpractice has even been linked to rising caesarian rates in other nations. For example, see Curtis (2006).

[3] Source: National Center for Health Statistics, 2001, "Trends in Cesarean Births and Vaginal Birth after Previous Cesarian, 1991-1999" NVSR Volume 49, No. 13.

might cause the obstetricians to believe that the environment has become more litigious. At the same time, their hospital may exert pressure to take greater care. Obstetricians may also be influenced by county wide trends in litigation or even statewide (or nationwide) trends, perhaps through information gleaned from newspaper articles or professional society gatherings.

In this study, we examine which, if any of these factors influence caesarian section rates in the state of Florida. Our data combine individual patient-level hospital discharge data for the period 1994-2000 with physician-level medical malpractice closed claims data from 1979-2003. We find that obstetricians do increase caesarian section rates subsequent to the first time they are sued, but not thereafter. The experiences of other obstetricians at the hospital also matter. The timing of these effects differs, however, and the effects are both small in magnitude and very short-lived. Changes in countywide litigation rates do not have any impact on caesarean section rates. We conclude that personal and local experiences with litigation have only a small and short-lived effect on negligent behavior.

## II. Background on Defensive Medicine and Caesarian Delivery

There have been numerous efforts to determine how the legal environment affects the practice of medicine (CBO, 2006). When physicians are surveyed about how they respond to lawsuits, they usually state that they will adopt a more defensive practice style, for example by ordering more diagnostic tests.[4] However, research examining whether state tort reform legislation affects medical decision making has generated mixed results.[5]

Caesarian delivery, which is the focus of our study, is generally regarded as a "defensive" practice. As an editorial in the medical journal *The Lancet* states, "From a defensive medicine perspective, US obstetricians seem to be viewing caesarean section as a safe option."[6] This sentiment applies to hospitals as well. There are several reasons why the desire to be "safe" can lead to an increased rate of caesarian delivery. Hospitals may require obstetricians to use fetal monitoring during a vaginal delivery. This will help them identify potential problems that might require switching to caesarian section. Even if the rate of fetal monitoring did not change, an obstetrician who observed an abnormal pattern on the monitor and was fearful of litigation might opt for an immediate caesarean delivery. Other reasons for choosing caesarians as a defensive practice include modest evidence that vaginal deliveries have poorer outcomes for breech births, a decline in midforceps vaginal deliveries resulting in the need to perform caesarian delivery in the event of dystocia (failure to progress in labor), and the prevailing dictum that "once a caesarian, always a caesarian" that puts an obstetrician who prescribes a vaginal birth after caesarian ("VBAC") at risk for going against community standards.[7]

The choice of delivery mode ultimately belongs to the patient. However, medical providers – both doctors and hospitals – can influence that decision. Hospitals may respond to malpractice claim by changing policies, such as implementing a fetal

[4] For example, see Charles et al. (1985), Elmore et al., (2005), ACOG (various years) and Kessler and McClellan (1998).
[5] According to CBO (2006), some studies find a negative relationship with tort limits and health spending, some studies find a positive relationship, and still others find no relationship. See also Currie and Macleod (2006).
[6] Wagner, M. (2000)
[7] Thacker, S. (1989)

monitoring requirement for specific cases. Obstetricians may also attempt to unilaterally implement similar practices. Physicians may also “lobby” their patients in favor of caesarian delivery. Obstetricians usually initiate a discussion of delivery mode early in the pregnancy and can articulate in favor of their preferred option. (Of course, the choice of delivery mode can be changed if the circumstances dictate.) Six to nine months later, there will be an observed increase in caesarians.

The events surrounding an injury and malpractice claim may inform obstetricians and hospitals as they consider defensive practices.[8] This is the typical sequence of events. Providers almost always know about an injury when it occurs. Research suggests that there are many more injuries than claims, however, and providers may not view an injury as a cause for concern about legal action.[9] A patient contemplating legal action usually retains an attorney who will ask the hospital for the relevant medical records. All of this occurs within weeks or a few months of the injury. The attorney sends the records to an independent medical expert who gives an opinion as to whether there may have been negligence. At the same time, the hospital may review its defensive practices to ascertain if it is taking due care.

If the expert indicates that negligence may have occurred, the plaintiff’s attorney contacts the responsible providers to inform them about the potential for a lawsuit and the likely damages. The obstetrician is usually the first provider to be notified. This contact must occur within a statutory time frame that varies according to the injury. In practice, the contact occurs within a few weeks or months of the receipt of the expert report, and no more than three to six months after the injury. After this contact, the physician will

[8] We thank Joan Lebow of Lebow, Malecki & Tasch for providing us with information about the pre-litigation process.
[9] Weiler, P. et al, (1993)

retain an attorney and discover, perhaps for the first time, what is involved in defending against litigation. Over time, the obstetrician might remain free of subsequent lawsuits and some may determine that being sued is "not that bad," leading to a reversion to the pre-injury practice style.

This timing suggests that there are a number of key events that might influence provider decision making: The injury itself, the request for hospital records, and the first contact with the obstetrician at which the potential for a lawsuit is raised. Any resulting change in caesarian section rates may take even longer, because it may take time for physicians to convince patients of the "need" for a caesarian. Unfortunately, our data provides information only about the first contact with the obstetrician; we will interpret our results in light of the timing of the key events.

Despite the conventional wisdom that defensive medicine has contributed towards the use of caesareans, the empirical evidence linking the two is mixed. Baldwin et al. (1995) find no relationship between an obstetrician's claims history and caesarean section rates. However, Localio et al. (1993) found significant higher caesarian rates among physicians who had been sued. These studies date from a time when there was relative calm in the malpractice environment and the caesarian section rate was relatively flat; the relevance to today's environment is unclear. Moreover, neither of these studies incorporates physician fixed effects, so it is impossible to rule out that physicians who had been sued had some other reason for preferring caesarian delivery.

Using state-level variation of malpractice payments and per-physician number of claims as measures of malpractice risk, Kim (2008) investigates the effect of state level malpractice risk on cesarean rate during 1992-1998. He finds that the state-level malpractice risk has no effect on the rate of cesarean.

Grant and McInnes (2004; henceforth GM) study changes in physician caesarian section rates from 1992 through 1995 based on the occurrence of claims during 1993-1994 and the dollar amount for which these claims were resolved. They find that claims resulting in nominal awards are associated with reductions in caesarian section rates, while claims resulting in large awards are associated with increases.

GM's before/after framework eliminates some of the potential bias associated with cross-section studies. Even so, their study has several limitations.[10] Perhaps the most notable is that they implicitly assume that physicians can anticipate the size of an award at the time a claim is filed. In fact, most claims were not resolved until well after the time period they studied, making it difficult to interpret their findings.[11] What makes these results even more puzzling is that physicians are experience rated, so that the amount of the claims resolution should not matter. Moreover, GM find that other loss-adjustment expenses, such as time spent in litigation, have no effect on physician decision making. Yet it is precisely these expenses, which are directly borne by the physician, that ought to matter.

Gimm (2005) also examines how obstetricians respond to lawsuits. His study covers the period 1992-2000, uses data that is very similar to ours, and incorporates

[10] For example, GM do not account for claims occurring in 1992 or 1995, although these would conceivably affect some of the observed change in caesarian section rates between 1992 and 1995. Nor do they consider the time of the claim – a claim in early 1993 is posited to have the same impact as one in late 1994. Finally, like other studies from this time, their data precede the run-up in malpractice premiums.

[11] One set of findings is particularly difficult to interpret. They find that if a physician is sued and the claim is resolved for a nominal amount, the caesarian section rate decreases from the moment of the claim. They infer that physicians in such a circumstance take a more optimistic view of the liability system. But the physician could not know the dispensation of the claim at the moment it is filed. A claim should always be bad news when compared with the alternative.

physician fixed effects. He aggregates data to the physician level and finds that caesarian section rates do not vary after a lawsuit. He does not consider multiple sources of information or examine the timing of responses.

## III. Data

We use patient-level hospital discharge data collected by Florida's Agency for Health Care Administration (AHCA) during 1994-2000 related to deliveries of a newborn, which records all of the deliveries occurred in hospitals in Florida. AHCA data includes information about the treatment (diagnosis related group codes), patient characteristics (age, race, zip code, type of insurance, risk factors such as multiple gestation and previous Cesarean), physician's license numbers, hospital number identifying a hospital that care is provided, and year and quarter in which patients received care. We can also count number of deliveries each physician performs in each quarter using physician's license numbers. The summary statistics of AHCH data is provided in Table 2.

A total of 4,599 unique physicians presided over at least one delivery during our sample period. We want to restrict our attention to those physicians who routinely perform deliveries. Not only are these physicians are most likely to be paying attention to the physicians who perform just a handful of deliveries may well be facing unique circumstances (e.g. an emergency delivery when no obstetrician is available.) Thus, we limit our sample to those physician/years in which the physician has performed at least 25 deliveries. We will refer to these physicians as obstetricians, although we do not know their specialty certification.

We match the physician license numbers to data of closed medical malpractice claims collected by Florida's Department of Financial Services for the period of 1979-July 2003. This data covers every malpractice claim made in Florida that is resolved as of July 2003. The data contains information on medical malpractice claims such as date of occurrence, date of claim, date of filing of lawsuits, and date of resolution, with corresponding physician's license number for. We rearrange this data to construct individual history of claims for each physician dating back to 1979 that covers much longer period than the AHCA data. The rearranged history includes all dates of occurrence (date of the occurrence of an alleged medical malpractice incident), claim (date the side of the physicians are contacted by the side of the patients), and filing of lawsuit (date a lawsuit is filed if it is filed at all). We also construct county-level variables such number of claims and lawsuit filings for non-OB/GY physicians that can be used as proxies for county-wide litigiousness.

Tables 3 to 5 show the number of quarters in which a physician received a new malpractice claim. Table 4a reports the distribution of numbers of claims physicians and hospitals received in a year. Table 4b presents adjusted claims for which we count whether a physician is contacted for each quarter. We make this adjustment because claims data are likely to be double-counted if a claim is against multiple physicians due to the way it is recorded in the original data. Table 5a aggregates the data in Table 4a at hospital level after assigning physicians to the hospital they perform. In case if a physician performs delivery at more than one hospital, we assign the physician to the hospital which he or she performs majority of deliveries at. Table 5b reports the aggregated data presented in Table 4b at hospital level.

## IV. Model

To motivate the empirical analysis, we present a simple model of the choice between caesarean and vaginal delivery. For simplicity, we assume that the choice is made by an obstetrician, although a similar analysis would apply to hospitals and we interpret our empirical results as reflecting decisions made by the obstetrician and the hospital.

When choosing between caesarian (*C*) and vaginal (*V*) delivery, the obstetrician considers three factors; profit, medical and other benefits (such as preference of patient), and the expected liability costs. Thus, the physician solves the following:

$$\max_{i \in \{C,V\}} \pi_i(X_j) + b_i(X_j) - p_i(X_j) \cdot q \cdot L,$$

where subscript $i \in \{C,V\}$ denotes delivery mode, $X_j$ is patient characteristics, $\pi_i$ is profit of performing procedure *i*, $b_i$ is the medical benefit, $p_i$ is perceived subjective probability of occurrence of an undesirable outcome[12], $q$ is the perceived subjective probability of a medical malpractice claim resulting from an undesirable outcome *conditional on the fact that the undesirable outcome has occurred*, and $L$ expected cost to the obstetrician in the event of a medical malpractice claim. We assume that the cost of experiencing a medical malpractice claim does not depend on the choice of procedure nor the characteristics of the patient. Because physicians are community rated for malpractice, the costs of a claim are largely the opportunity cost of dealing with a case

[12] Here, we define an undesirable outcome as an outcome that has a potential to result in a medical malpractice claim. Recall that the subjective probability of an undesirable outcome may be based on the obstetrician's perceived skill level as well as the perceived legal environment.

and the potential cost to reputation, both of which may be independent of the choice of procedure as well as the patient characteristics.[13]

It follows that an obstetrician will perform a caesarean iff

$$(\pi_C - \pi_V) + (b_C - b_V) - (p_C - p_V) \cdot q \cdot L > 0,$$

which is rewritten as

$$\Delta\pi(X_j) + \Delta b(X_j) - \Delta p(X_j) \cdot q \cdot L > 0, \qquad (1)$$

where $\Delta$ denotes the difference of a variable between caesarean and vaginal delivery. Inequality (1) includes latent variables indicating whether the patient received a caesarean section, and can be estimated using logit regression.

Now we consider empirical implementation of the model. The key theoretical predictor is $q$, which measures the perceived probability of a lawsuit subsequent to an undesirable outcome. In practice, this may be influenced by any number of factors: the physician's personal experience, the experiences of the physician's immediate colleagues, and the experience of all the physicians practicing in the same region. In some regressions, we allow $q$ to vary with patient characteristics. We recognize that $q$ may be correlated with unobserved physician preferences. We assume that these unobserved factors are time invariant and estimate (1) using physician fixed effects. Thus, the key action in our data is change over time in litigation at the level of the physician, the hospital, and the region.

We measure the information variables as follows:

[13] Though there is a limit on the amount of insurance coverage, recent study by Zeiler et al.(forthcoming) finds that actual payments to patients making medical malpractice claims are constrained at the insurance policy limit in most of the cases and that personal contributions by physicians to close claims were rare.

***Physician History***: Obstetricians may learn from their own experiences. We define physician history to be the cumulative number of times an obstetrician has been contacted about potential litigation. We do not know the date of the associated injury, due to data limitations, so we compute *Physician History* based on the quarter of the contact.[14]

***Hospital History***: Obstetricians may be influenced by their colleagues or by rules established by the hospital where they practice. [15] We do not have information about each physician's medical group, so we compute *Hospital History* by aggregating *Physician History* for all physicians who practice at the same hospital.

***County History***: Obstetricians may interact more broadly with their colleagues, for example at medical society meetings. They may also read about the legal environment in local newspapers. We base *County History* on the number of lawsuits filed against non-obstetricians in the county in which the obstetrician practices. We use lawsuits instead of contacts because the latter are private information known to the physicians who have been contacted. We use county as a convenient measure of the "regional" environment And we examine lawsuits against non-obstetricians to capture the broader legal environment.[16]

Per inequality (1), we must also control for factors that affect the relative profitability of each delivery mode, the medical benefits, and patient preferences. Different insurers may set different relative payment levels for each delivery mode. We include indicator variables for *HMO*, *PPO*, *Commercial Insurance*, *Medicare* (for disabled patients only), and *Medicaid* (the omitted category.) We use patient

---

[14] We do not use the number of claims per quarter because there is a possibility of double counting due to the way the data is recorded.

[15] Most obstetricians practice at just a single hospital. For those who divide their time across multiple hospitals, we assign them to the hospital at which they perform the majority of their deliveries.

[16] There are several counties in Florida in which only one hospital performs deliveries.

demographics as indicators of both profit and patient preferences. We know each patient's *age* and race (*black*, *Hispanic*, *other race*, and the omitted category *white*). We also know each patient's residence zip code, from which we infer the *income* using the zip code's median per capita income from the 2000 U.S. Census. We include a long list of diagnostic characteristics to indicate the medical benefits of caesarian delivery.[17] For the sake of clarity, we do not report the coefficients on these control variables in our regressions. Complete results are available upon request.

*Timing Issues*

As discussed earlier, the defensive response to an injury may unfold over time. We will address this in two ways.

First, we measure "discounted histories" using a range of discount rates. We compute discounted *Physician History* as:

$$H_{khct}^{Indiv} = \delta \cdot H_{khct-1}^{Indiv} + I_{khct}^{Indiv}, \text{ and } H_{khc0}^{Indiv} = 0$$

for obstetrician *k* at hospital *h* in county *c* at time *t*, where *t=0* is the first quarter of 1979,[18] $I_{khct}^{Indiv}$ is 1 if obstetrician *k* receive any new claims in period *t*, and $\delta$ discount factor.[19] Discounted *Hospital History* and discounted *County History* are calculated in analogous fashion.

Using these variables, our base empirical specification is:

[17] We thank Dr. Joel Shalowitz for helping us develop this list. The list contains only those indicators that would be included on an inpatient record, and thus misses potentially key controls such as the extent of prenatal care and prior history of complications during delivery. The specific variables that we include are listed in Table 2.
[18] Closed claims data starts from 1979 though we only use ACHC for 1994-2000.
[19] We fix discount factor at annual rate of 0.9 and 0.6 for estimation. In principle, this discount factor can be estimated with maximum likelihood. However, large number of observation and fixed effects makes it computationally very costly.

$$Y_{jkhct} = \beta_{Ins} X_j^{Ins} + \beta_{Other} X_j^{Other} + \gamma_{Indiv} H_{khct}^{Indiv} + \gamma_{Hosp} H_{hct}^{Hosp} + \gamma_{Cty} H_{ct}^{Cty} + \eta_k + \varphi_t + \varepsilon_{jkhct},$$

where $Y_{jkhct}$ is 1 for caesarian and 0 for vaginal delivery for patient *j*, $X_j^{Ins}$ is patient *j*'s insurance type, $X_j^{Other}$ represents a vector of other characteristics such as medical risk factors, age, race, and income, $\eta_k$ are the physician fixed effects, $\varphi_t$ are year-quarter fixed effects, and $\varepsilon_{jkhct}$ is an idiosyncratic shock.

We also estimate a detailed pattern of lagged responses.

$$Y_{jkhct} = \beta_{Ins} X_j^{Ins} + \beta_{Other} X_j^{Other} + \sum_{m=0}^{4} \gamma_{Indiv,m} I_{khc,t-m}^{Indiv} + \sum_{m=0}^{4} \gamma_{Hosp,m} I_{hc,t-m}^{Hosp} + \sum_{m=0}^{4} \gamma_{Cty,m} I_{c,t-m}^{Cty} + \eta_k + \varphi_t + \varepsilon_{jkhct}$$

Another timing issue arises when physicians are contacted more than once over the course of our data. Obstetricians may respond differently to each successive contact. We address this by allowing for different responses to the first, second, and subsequent claims. We denote each successive contact by adding a superscript to the left of the previous notation. The discounted histories of the first claims are computed as

$${}^{1st}H_{khct}^{Indiv} = \delta \cdot {}^{1st}H_{khct-1}^{Indiv} + {}^{1st}I_{khct}^{Indiv}, \text{ and } {}^{1st}H_{khc0}^{Indiv} = 0,$$

We do the same for the second and subsequent claims for individual physicians. We will use this structure to modify the discount and lagged specifications discussed above.

## V. Results

Table 8 presents the results of our regression of delivery mode on discounted cumulative *County History*, *Hospital History*, and *Physician History*. *Hospital History* is associated with a positive and significant increase in the choice of caesarian section.

Thus, when a physician at a hospital is contacted about a potential lawsuit, there is an associated hospital-wide increase in caesarians.

To get a sense of the magnitude of the hospital-wide response, consider the results in column (2) using the annual discount rate of 0.6.[20] Suppose that a physician in an average hospital is contacted by attorneys about a potential lawsuit. Noting that the annual number of deliveries at the average hospital is 1971, the coefficient of 1.1721 implies an immediate hospital-wide increase in the caesarian section rate of 0.06%. Given an average baseline caesarian rate of 26.7%, this increase is relatively unimportant. Note that the coefficient on *Hospital History* changes dramatically as the discount rate falls, suggesting the need to explore the time structure in more detail. We do so in later regressions.

The point estimate for the coefficient on *Physician History* suggests an immediate response that is a bit larger in magnitude (0.13% increase in caesarians immediately after contact) but this estimate is not statistically significant. These regressions do not distinguish among first, second, and subsequent physician contacts, however. The full story regarding *Physician History* is more complex, as we show below.

*County History* is not associated with delivery mode in these or any subsequent regressions.

All regressions, including those reported in Table 8, include patient characteristics, physician fixed effects, and year-quarter fixed effects, all of which are statistically significant at p<.001. Figure 1 plots the year-quarter fixed effect coefficients using the model with a discount rate of 0.6 (the results are virtually identical using the other

[20] We do not attempt to determine which discount rate bets fits the data, preferring to rely on the regressions using lagged contacts to best identify the time dimension of the response.

discount rates.)  The figure also includes the raw caesarian section rate.  The figure shows that the year-quarter fixed effects closely follow the time trend in the raw data.   In other words, the *History* variables do not, by themselves, explain the increasing trend in caesarian section rates.  All subsequent regressions reveal the same pattern.  Whatever has caused the pronounced upswing in Caesarians, it is not due to the influence of individual, hospital-wide, or regional contacts with the legal system.

Table 9 decomposes *Physician History* into first, second, and subsequent contacts. At a discount rate of 0.9 and 0.6, the first contact is associated with a statistically significant increase in caesarian rates of 0.5%-0.7% in the quarter immediately after contact.  However, the first contact has no effect using a discount rate of 0.3 and second and subsequent contacts never have a significant effect.   Results for *Hospital History*, *County History*, and the year-quarter trends are virtually identical to those reported in Table 8.

Because the results differ so markedly as we vary the discount rate, it is important to more precisely estimate the lag structure of information.  Table 10 reports the results of regressions that allow for lags of up to four quarters.  (Longer lags proved to be insignificant in all specifications.)   We restrict attention to the first physician contact, as subsequent contacts have an insignificant effect.  We also explore leads, which capture the possibility that information is available and acted upon prior to the quarter in which the physician is contacted.

As in all previous models, *County History* remains insignificant.  *Hospital History* is significant but only for lag 0.  Based on the coefficient of approximately 1.06, there is a hospital-wide increase in caesarian rates of about .05% during the quarter in which a physician at that hospital is contacted. However, the caesarian rate immediately reverts back to the baseline level in subsequent quarters (apart from the general year-quarter trend that affects all hospitals.) The timing of the physician's response to his or her own contact is much different. In addition to the immediate hospital-wide effect, the response by the contacted physician does not show up until three quarters later. During this quarter, the caesarian rate increases by a significant 1.31%. The increase in the subsequent quarter of 0.63% is borderline insignificant. Finally, note that leads are never significant.

These results are consistent with the pattern of information disclosure and provider response described earlier. Hospitals are notified about the potential for a lawsuit shortly after an injury occurs, when the patient's attorney asks for medical records. At this time, the hospital may institute systematic defensive practices, though our results suggest the impact is modest. The affected physician responds more strongly, but this does not manifest itself until 9-12 months later, suggesting that the main response by the affected physician is to influence the delivery mode of new patients. Remarkably, both the hospital-wide and physician-specific responses are short-lived.

Table 11 allows for the hospital-wide response to vary for physicians who have had previous contacts and according to the physician's overall volume of deliveries. We find that the lag 0 hospital-wide response is equally big for physicians with and without prior contacts. There is an additional lag 2 response for physicians with at least one prior contact. Turning to overall volume, the lag 0 hospital-wide response appears to exclusively affect low volume physicians. Likewise, there is a lag 3 increase in caesarians that is also concentrated in low volume physicians at the affected hospital.

*Specification checks*

We have used physician fixed effects throughout our analysis. Thus, we make two key identifying assumptions. First, we assume that there is no variation over time in physician skills. We are unable to fully assess this assumption. As a partial check, we restricted our analysis to physicians with at least five years experience, so as to eliminate those who may be moving down the learning curve. Our results are virtually identical.

Second, we assume that unobservable characteristics of a physician's patients, particularly those characteristics that predict the need for caesarians, do not change if that physician is contacted. To assess the latter, we looked for changes in observable characteristics. Specifically, we ran a linear probability model predicting the need for caesarians on a subsample of physicians who were never contacted. We used the results to predict the need for caesarians among those physicians who had been contacted. Using the sample of physicians who were contacted, we then regressed the predicted probability of a caesarian on the *Physician History* and *Hospital History* variables as well as a vector of physician and year/quarter fixed effects. We found that the predicted probability of a caesarian decreases significantly by about -.005 to -.01 in the $2^{nd}$ and $3^{th}$ quarters after contact. If the same pattern held true for unobservable patient characteristics that were uncorrelated with our observables, then our results for these quarters would be biased against finding an increase in caesarian rates. In any event, the magnitudes involved remain small and the effects disappear by the fourth quarter after contact.

*Did Malpractice Fears Contribute to Rising Caesarian Rates?*

We find scarce direct evidence linking litigation to rising caesarian section rates. If the increase in caesarians is not the direct response of physicians and hospitals facing lawsuits or the reaction to an increase in the litigiousness of the local market, then perhaps it reflects a changing national malpractice climate. Recall from Table 1, however, that malpractice premiums for obstetricians in Florida and nationwide remained flat until 2000, more than a year after the rise in caesarian rates had commenced.

As another informal check on the "national malpractice climate" hypothesis, we looked for an increase in media coverage of malpractice. We counted "media hits" using the Lexis-Nexus search engine for the years 1993-2000. We search the New York Times and Washington Post for the terms "malpractice" and "obstetrics" or "obstetricians.[21]" Figure 2 plots the year-quarter fixed effects against quarterly media hits. Although the two are positively correlated, the correlation disappears once we control for a simple linear time trend.[22]

This leaves open the possibility that the increase in caesarians is driven by patient preferences rather than defensive medicine. Caesarians offer patients the convenience of scheduling their childbirth and are usually much less painful than vaginal deliveries. One observer described the growing demand for caesarians as the "too posh to push" phenomenon, while Britney Spears explained her decision to deliver by caesarian by saying, "I don't want to go through the pain."[23] We conducted another Lexis Nexus

---

[21] We initially searched all news sources and news wires but this retrieved too many documents. We then narrowed the search to the *Times* and *Post* so as to provide a consistent search over time.

[22] We also regressed differences in the year-quarter effects against levels and differences in media hits, using both raw values and kernel smoothed values. Again, any results disappear upon inclusion of a simple time trend.

[23] For "Too posh to push" quote, see Cassidy, T. (2007). For Spears quote, see WENN Entertainment News Wire Service (2005).

search to ascertain trends in media reports about caesarians performed for the convenience of the mother.[24] Figure 3 shows that the trend in these media reports closely tracks the trend in caesarians up to 2000. When we regress the year-quarter fixed effects on these media hits and include a time trend, the coefficient on media hits is still insignificant. However, if we exclude the last year of data, the coefficient on media hits on convenience is positive and significant at $p<.01$. (When we do the same for media hits on malpractice, the coefficient on media hits is actually negative and significant.) Considering that the media may have stopped covering a phenomenon that was no longer "news", these correlations suggest that changing patient preferences, more than malpractice fears, drove the increase in caesarian section rates.

**VI. Discussion**

We observed two distinct examples of defensive medicine in obstetrics. At roughly the time when a hospital would receive a request for medical records subsequent to an injury, there is a very small and short-lived hospital-wide increase in the caesarian section rate. This may reflect temporary defensive measures taken by the hospital as it reviews its care processes. This increase appears to be concentrated among low volume providers, who may receive the most scrutiny or may be most susceptible to direction by the hospital. Approximately 9 months later, there is a larger increase in the caesarian section rate for the responsible physician. This may reflect efforts by that obstetrician to

[24]We searched using keywords "(caesarian OR cesarian OR cesarean) AND convenience." An initial search resulted in 204 hits for this range. Each quarter was then considered separately and all articles were evaluated for their relevance in relating caesarian section and patient convenience. If the article did not relate the two terms in either way, it was discarded in the count. When the same article was printed in different media outlets, as is common for Associated Press articles, each printing instance was counted separately. We also limited the search to the *New York Times* and *Washington Post* but this yielded zero hits in several years.

"lobby" new patients in favor of caesarians. The fact that this effect is short-lived and limited to obstetricians with no previous contacts may indicate that obstetricians overreact to their first contact. It is possible, for example, that they rapidly discover that the litigation process is neither costly nor particularly painful. For example, physicians rarely make a financial payment to the plaintiff and do not appear to lose any income as a result of being sued (Danzon et al., 1990).

We failed to find defensive response to regional changes in litigation rates. When combined with the weak reactions to individual contacts, it is no surprise that the regression-adjusted time trend in caesarian section rates mirrors the unadjusted time trend. This leaves unanswered the fundamental question of whether the trend reflects concerns about malpractice. Our results refute the argument that the overall trend reflects the sum total of thousands of individual responses to lawsuits. At best, one might argue that the increase in caesarians represents some rising collective fear of litigation that is unrelated in the data to litigation rates. However, except for a general time trend, there is no direct link between caesarian section rates and malpractice premiums or between caesarian rates and media coverage of medical malpractice.

This is not to say that litigation has no effect on the obstetrics market. Patients may select their obstetrician based on their litigation history. Lawsuits are not usually filed (and thus become public information) until 6-12 months after contact, and there is minimal publicity given to such filings. Thus, this response, if present, would not materially affect most of our results. In ongoing research we are directly testing whether demand is affected by litigation.

**Table 1: Trends in Malpractice Premiums**

| | Median Increase Nationwide | | Median Increase Florida | |
|---|---|---|---|---|
| Year | ObGyn | General Surgery | ObGyn | General Surgery |
| 1997 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 0 | 0 | 0 |
| 1999 | 0 | 0 | 0 | 0 |
| 2000 | 7% | 10% | 5% | 10% |
| 2001 | 9% | 15% | 15% | 18% |
| 2002 | 20% | 29% | 21% | 45% |
| 2003 | 12% | 15% | 12% | 17% |
| 2004 | 15% | 15% | 13% | 22% |

*Source: *Medical Liability Monitor*, various years. National data are approximated from *MLM* reports.

**Table 2: Summary Statistics – Patient Level**

| | # of observations | mean | s.d | min | max |
|---|---|---|---|---|---|
| treatment | | | | | |
| cesarean | 957,722 | 0.267 | 0.442 | 0 | 1 |
| patient characteristics | | | | | |
| age | 957,722 | 26.947 | 6.265 | 11 | 58 |
| black | 957,722 | 0.209 | 0.406 | 0 | 1 |
| hispanic | 957,722 | 0.158 | 0.364 | 0 | 1 |
| white | 957,722 | 0. | 0. | 0 | 1 |
| other race | 957,722 | 0.062 | 0.241 | 0 | 1 |
| income per capita for zipcode (in $1,000) | 957,722 | 20.304 | 7.530 | 2.14 | 236.24 |
| hemorrhage | 957,722 | 0.016 | 0.124 | 0 | 1 |
| diabetes | 957,722 | 0.006 | 0.075 | 0 | 1 |
| feto | 957,722 | 0.026 | 0.160 | 0 | 1 |
| distress | 957,722 | 0.055 | 0.229 | 0 | 1 |
| trauma | 957,722 | 0.257 | 0.436 | 0 | 1 |
| previous history of caesarean | 957,722 | 0.126 | 0.332 | 0 | 1 |
| malposition | 957,722 | 0.014 | 0.116 | 0 | 1 |
| hypertention | 957,722 | 0.013 | 0.114 | 0 | 1 |
| multiple gestation | 957,722 | 0.010 | 0.101 | 0 | 1 |
| herpes | 957,722 | 0.006 | 0.076 | 0 | 1 |
| polyhydramnios | 957,722 | 0.005 | 0.068 | 0 | 1 |
| oligohydramnios | 957,722 | 0.020 | 0.140 | 0 | 1 |
| patient's insurance | | | | | |
| Medicaid | 957,722 | 0.322 | 0.467 | 0 | 1 |
| HMO | 957,722 | 0.306 | 0.461 | 0 | 1 |
| commercial insurance | 957,722 | 0.087 | 0.282 | 0 | 1 |
| PPO | 957,722 | 0.190 | 0.392 | 0 | 1 |
| Medicare | 957,722 | 0.002 | 0.045 | 0 | 1 |
| other insurance | 957,722 | 0.093 | 0.291 | 0 | 1 |

**Table 3: Aggregate Number of Claims against Obstetricians in State of Florida by Year**

| | Number of claims | Adjusted number of claims |
|---|---|---|
| 1994 | 359 | 359 |
| 1995 | 213 | 213 |
| 1996 | 245 | 245 |
| 1997 | 407 | 407 |
| 1998 | 357 | 357 |
| 1999 | 472 | 472 |
| 2000 | 410 | 410 |

**Table 4a: Distribution of Claims per Physician**

| | 0 Claim | 1 claim | 2 claims | >3 claims | Total |
|---|---|---|---|---|---|
| 1994 | 1,391 | 34 | 16 | 38 | 1,479 |
| 1995 | 1,520 | 38 | 10 | 23 | 1,591 |
| 1996 | 1,486 | 21 | 10 | 32 | 1,549 |
| 1997 | 1,645 | 24 | 22 | 29 | 1,720 |
| 1998 | 1,822 | 28 | 16 | 36 | 1,902 |
| 1999 | 1,842 | 31 | 13 | 42 | 1,928 |
| 2000 | 1,723 | 24 | 14 | 42 | 1,803 |

**Table 4b: Distribution of Adjusted Claims per Physician**

| | 0 Claim | 1 claim | 2 claims | 3 claims | Total |
|---|---|---|---|---|---|
| 1994 | 1,391 | 80 | 7 | 1 | 1,479 |
| 1995 | 1,520 | 64 | 7 | 0 | 1,591 |
| 1996 | 1,486 | 61 | 2 | 0 | 1,549 |
| 1997 | 1,645 | 69 | 6 | 0 | 1,720 |
| 1998 | 1,822 | 73 | 7 | 0 | 1,902 |
| 1999 | 1,842 | 82 | 4 | 0 | 1,928 |
| 2000 | 1,723 | 73 | 6 | 1 | 1,803 |

**Table 5a: Distribution of Claims per Hospital**

| | 0 Claim | 1 claim | 2 claims | 3 claims | 4 claims | >5 claims | Total |
|---|---|---|---|---|---|---|---|
| 1994 | 51 | 13 | 7 | 6 | 7 | 23 | 107 |
| 1995 | 50 | 18 | 8 | 13 | 7 | 14 | 110 |
| 1996 | 61 | 10 | 6 | 17 | 5 | 17 | 116 |
| 1997 | 60 | 9 | 14 | 11 | 6 | 32 | 132 |
| 1998 | 75 | 14 | 12 | 11 | 5 | 24 | 141 |
| 1999 | 70 | 13 | 4 | 12 | 6 | 32 | 137 |
| 2000 | 70 | 10 | 7 | 6 | 6 | 26 | 125 |

**Table 5b: Distribution of Adjusted Claims per Hospital**

| | 0 Claim | 1 claim | 2 claims | 3 claims | 4 claims | >5 claims | Total |
|---|---|---|---|---|---|---|---|
| 1994 | 51 | 22 | 13 | 9 | 6 | 6 | 107 |
| 1995 | 50 | 30 | 16 | 7 | 0 | 7 | 110 |
| 1996 | 61 | 27 | 19 | 5 | 1 | 3 | 116 |
| 1997 | 60 | 31 | 16 | 13 | 8 | 4 | 132 |
| 1998 | 75 | 31 | 11 | 11 | 6 | 7 | 141 |
| 1999 | 70 | 26 | 13 | 15 | 5 | 8 | 137 |
| 2000 | 70 | 22 | 13 | 7 | 5 | 8 | 125 |

Numbers in the Tables are numbers of hospitals. Total is the total number of hospital for the corresponding year.

**Table 6a: Cumulative Distribution of Claims per Physician as of Q4 2004.**

| | Number | % | Cum % |
|---|---|---|---|
| 0 | 873 | 62.90 | 62.90 |
| 1 | 151 | 10.88 | 73.78 |
| 2 | 15 | 1.08 | 74.86 |
| 3 | 88 | 6.34 | 81.20 |
| 4 | 51 | 3.67 | 84.87 |
| 5 | 66 | 4.76 | 89.63 |
| 6 | 40 | 2.88 | 92.51 |
| 7 | 34 | 2.45 | 94.96 |
| 8+ | 70 | 5.04 | 100.00 |
| Total | 1,388 | 100.00 | |

**Table 6b: Adjusted Cumulative Distribution of Claims per Physician as of Q4 2004.**

| | Number | % | Cum % |
|---|---|---|---|
| 0 | 873 | 62.90 | 62.90 |
| 1 | 210 | 15.13 | 78.03 |
| 2 | 155 | 11.17 | 89.19 |
| 3 | 87 | 6.27 | 95.46 |
| 4 | 32 | 2.31 | 97.77 |
| 5 | 12 | 0.86 | 98.63 |
| 6 | 11 | 0.79 | 99.42 |
| 7 | 5 | 0.36 | 99.78 |
| 8+ | 3 | 0.22 | 100.00 |
| Total | 1,388 | 100.00 | |

**Table 7: Cumulative Distribution of Claims per Hospital as of Q4 2004**

| | # of observation | Mean | s.d | min | Max |
|---|---|---|---|---|---|
| Number of physician-quarter a new claim received 2000 Q4 | 115 | 9.51 | 10.71 | 0 | 64 |

**Table 8: OLS results with discounted county, hospital, and physician histories.**

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| Discount Rate | 0.9 | | 0.6 | | 0.3 | |
| County History | -0.0014 | | -0.0018 | | -0.0025 | |
| | (0.0014) | | (0.0023) | | (0.0040) | |
| Hospital History | 0.3852 | *** | 1.1721 | *** | 2.4089 | *** |
| | (0.0954) | | (0.3177) | | (0.5580) | |
| Physician History | 0.0006 | | 0.0013 | | 0.0005 | |
| | (0.0013) | | (0.0017) | | (0.0021) | |
| Patient Characteritcs | Included | *** | Included | *** | Included | *** |
| Year-quarter fixed effects | Included | *** | Included | *** | Included | *** |
| Physician fixed effects | Included | *** | Included | *** | Included | *** |
| # of observation | 957,722 | | 957,722 | | 957,722 | |
| Adj R-Squared | 0.3616 | | 0.3616 | | 0.3616 | |

Numbers in parenthesis are standard errors. Statistical significance of coefficients are denoted by *** for 1%, ** 5%, and * 10%. First column employs discount factor of 0.9, second 0.6, and third 0.3. Coefficients for patient characteristics are all significant.

**Table 9: OLS results with discounted county, hospital, and decomposed physician histories**

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| Discount Rate | 0.9 | | 0.6 | | 0.3 | |
| County History | -0.0013 | | -0.0018 | | -0.0025 | |
| | (0.0014) | | (0.0023) | | (0.0040) | |
| Hospital History | 0.3809 | *** | 1.1517 | *** | 2.3843 | *** |
| | (0.0954) | | (0.3179) | | (0.5586) | |
| Physician History | | | | | | |
| 1st contact | 0.0073 | *** | 0.0051 | * | 0.0021 | |
| | (0.0026) | | (0.0030) | | (0.0036) | |
| 2nd contact | -0.0030 | | 0.0025 | | 0.0046 | |
| | (0.0027) | | (0.0031) | | (0.0038) | |
| 3rd contact | -0.0020 | | -0.0030 | | -0.0041 | |
| | (0.0022) | | (0.0027) | | (0.0033) | |
| Patient Characteristics | Included | *** | Included | *** | Included | *** |
| Year-quarter fixed effects | Included | *** | Included | *** | Included | *** |
| Physician fixed effects | Included | *** | Included | *** | Included | *** |
| # of observations | 957,722 | | 957,722 | | 957,722 | |
| Adjusted R-squared | 0.3616 | | 0.3616 | | 0.3616 | |

Numbers in parenthesis are standard errors. Statistical significance of coefficients are denoted by *** for 1%, ** 5%, and * 10%. First column employs discount factor of 0.9, second 0.6, and third 0.3. Coefficients for patient characteristics are all significant.

**Table 10: OLS results with lags and leads**

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| Hospital Contact | | | | | | |
| Lag 0 | 1.0583 | *** | 1.0595 | *** | 1.0576 | *** |
| | (0.3387) | | (0.3388) | | (0.3388) | |
| Lag 1 | -0.1903 | | -0.1885 | | -0.1895 | |
| | (0.3347) | | (0.3347) | | (0.3348) | |
| Lag 2 | 0.3033 | | 0.3040 | | 0.2992 | |
| | (0.3475) | | (0.3475) | | (0.3476) | |
| Lag 3 | -0.0912 | | -0.0901 | | -0.0912 | |
| | (0.2761) | | (0.2761) | | (0.2761) | |
| Lag 4 | 0.0001 | | 0.0001 | | 0.0001 | |
| | (0.0163) | | (0.0163) | | (0.0163) | |
| Physician 1st Contact | | | | | | |
| Lag 0 | 0.0004 | | 0.0004 | | 0.0003 | |
| | (0.0046) | | (0.0047) | | (0.0047) | |
| Lag 1 | 0.0009 | | 0.0009 | | 0.0009 | |
| | (0.0048) | | (0.0048) | | (0.0048) | |
| Lag 2 | 0.0030 | | 0.0029 | | 0.0029 | |
| | (0.0047) | | (0.0048) | | (0.0048) | |
| Lag 3 | 0.0131 | *** | 0.0131 | *** | 0.0131 | *** |
| | (0.0047) | | (0.0047) | | (0.0047) | |
| Lag 4 | 0.0063 | | 0.0063 | | 0.0063 | |
| | (0.0047) | | (0.0047) | | (0.0047) | |
| Physician 1$^{st}$ Contact Leads | | | Included | | Included | |
| Hospital Contact Leads | | | | | Included | |
| # of observations | 957,722 | | 957,722 | | 957,722 | |
| Adjusted R-squared | 0.3616 | | 0.3616 | | 0.3616 | |

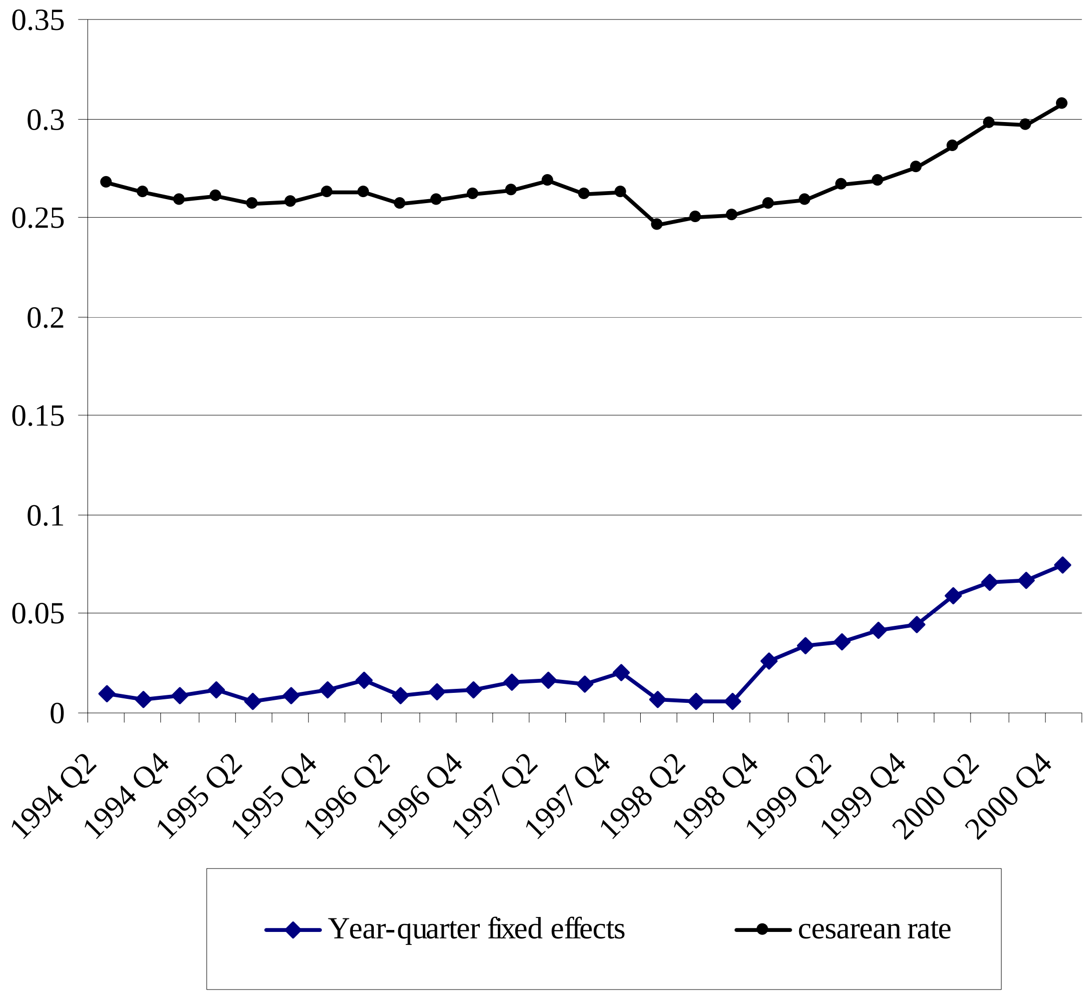
Numbers in parenthesis are standard errors. Significance of coefficients are denoted by *** for 1%, ** 5%, and * 10%. County Litigation Lags, Patient Characteristics, Year-quarter fixed effects, and Physician fixed effects are included. County Litigation Lags, Physician Contact Leads, and Hospital Contact Leads are not statistically significant.

**Table 11: OLS results with interactions on hospital contacts**

| | (1) | | (2) | | | (3) | |
|---|---|---|---|---|---|---|---|
| Hospital Contact | | | | | | | |
| Lag 0 | 1.0583 | *** | 1.0562 | ** | | 2.7636 | *** |
| | (0.3387) | | (0.4837) | | | (0.6205) | |
| Lag 1 | -0.1903 | | 0.0865 | | | 0.2696 | |
| | (0.3347) | | (0.5312) | | | (0.6389) | |
| Lag 2 | 0.3033 | | -1.1782 | ** | | 0.3526 | |
| | (0.3475) | | (0.5210) | | | (0.6375) | |
| Lag 3 | -0.0912 | | -0.3290 | | | 1.2566 | ** |
| | (0.2761) | | (0.4709) | | | (0.6236) | |
| Hospital Contact x Prior Contact History | | | | | Hospital Contact x High Volume | | |
| Lag 0 | | | 0.0460 | | Lag 0 | -3.0604 | *** |
| | | | (0.6692) | | | (0.9083) | |
| Lag 1 | | | -0.4963 | | Lag 1 | 0.0711 | |
| | | | (0.6768) | | | (0.9291) | |
| Lag 2 | | | 2.6433 | *** | Lag 2 | 0.0632 | |
| | | | (0.6911) | | | (0.9342) | |
| Lag 3 | | | 0.3390 | | Lag 3 | -1.8470 | * |
| | | | (0.5769) | | | (0.9677) | |
| | | | | | Hospital Contact x Medium Volume | | |
| | | | | | Lag 0 | -2.0456 | *** |
| | | | | | | (0.7731) | |
| | | | | | Lag 1 | -0.8941 | |
| | | | | | | (0.7756) | |
| | | | | | Lag 2 | -0.2111 | |
| | | | | | | (0.7955) | |
| | | | | | Lag 3 | -1.6127 | ** |
| | | | | | | (0.6988) | |

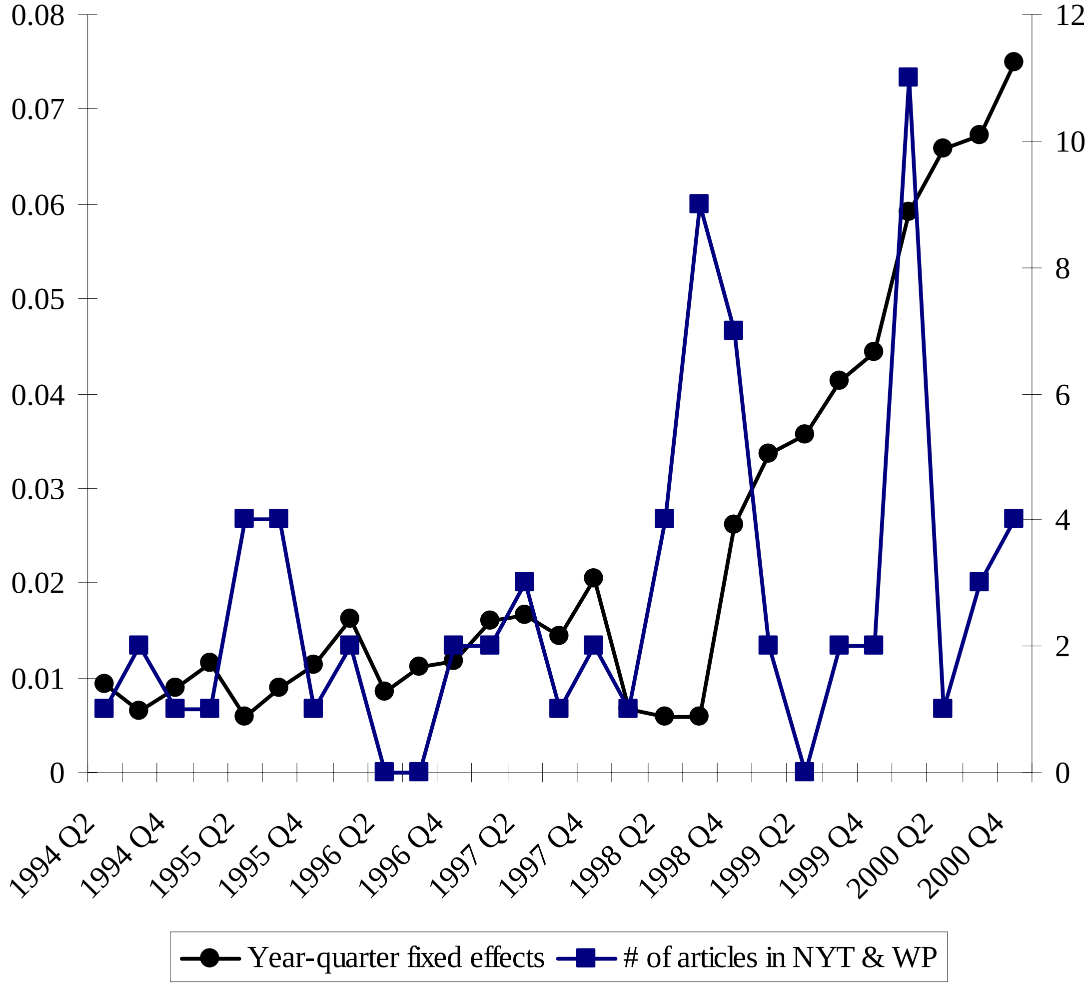
Numbers in parenthesis are standard errors. Significance of coefficients are denoted by *** for 1%, ** 5%, and * 10%. County Litigation Lags, Patient Characteristics, Year-quarter fixed effects, Physician fixed effects, and Lag 4 of all variables are included but not reported. County Litigation Lags, Physician Contact Leads, Hospital Contact Leads, and Lag 4s are not statistically significant.

**Figure 1: Year-quarter fixed effects and cesarean rates**



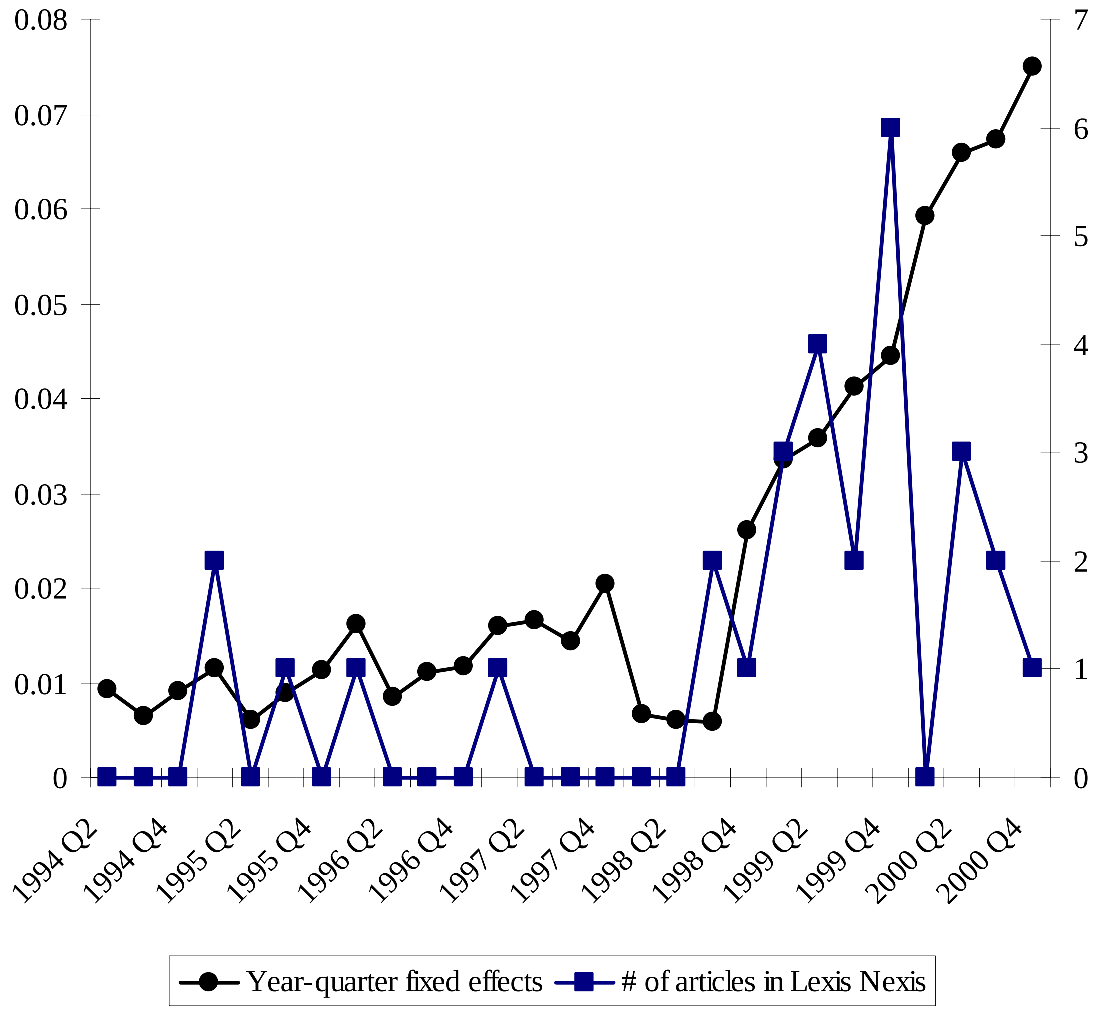

Cesarean rates are mean of dependent variable *Cesarean* for each quarter computed from the raw data. Year-quarter fixed effects are estimates from the third column in Table 8. Year-quarter fixed effects are virtually identical for all other specifications in Tables 8 to 11.

**Figure 2: Year-quarter fixed effects and media reporting on malpractice**




Year-quarter fixed effects are estimates from the third column in Table 8. Number of articles in NYT & WP is a sum of numbers of articles in New York Times and Washington Post containing words “malpractice” and “obstetrics” or “obstetricians.”

**Figure 3: Year-quarter fixed effects and media reporting on convenience**




Year-quarter fixed effects are estimates from the third column in Table 8. Regarding Number of articles in Nexis Lexis, we searched using keywords "(caesarian OR cesarian OR cesarean) AND convenience." All articles were evaluated for their relevance in relating caesarian section and patient convenience. If the article did not relate the two terms in either way, it was discarded in the count. When the same article was printed in different media outlets, each printing instance was counted separately.

**References**


Baldwin, L., et al., (1995) “Defensive Medicine and Obstetrics” *Journal of the American Medical Association*, Vol 274(20) pp1606-1610.

Becker, G., (1968) “Crime and Punishment: An Economic Approach,” *Journal of Political Economy*, 76: 169-217.

Cassidy, T. (2007), “Cesarian Rates and NYC” *New York Times*, 1/28/2007.

Charles, SC, JR Wilbert, and KJ Franke (1985) “Sued and nonsued physicians' self-reported reactions to malpractice litigation” American Journal of Psychiatry, 142, pp. 437-440

Currie, Janet, and MacLeod, W. Bentley (2006) “First Do No Harm?  Tort Reform and Birth Outocmes” NBER Working Paper No. W12478

Curtis, P., (2006) “Soaring Rate of Caesarian Births Linked to Legal Action Fear” *Guardian Home Pages,* 3/27/2006, p. 12.

Danzon, P., Pauly, M., and R. Kington (1990), “The Effects of Malpractice Litigation on Physicians' Fees and Incomes”, *The American Economic Review*, 80(2): pp. 122-127.

Elmore, G., et al., (2005) “Does Litigation Influence Medical Practice? The Influence of Community Radiologists' Medical Malpractice Perceptions and Experience on Screening Mammography” *Radiology*, 236, pp. 37-46

Fargen, J. (2007), “Risk, Malpractice Fears Push Bay State C-Section Surgeries” *Boston Herald* 1/24/2007.

Gimm, Gilbert, (2005) “The Impact of Malpractice Liability Claims on Physician Outcomes and Practice Patterns”  PhD Dissertation, University of Pennsylvania.

Grant, Darren and McInnes M., (2004) “Practice Exprerience and the Incidence of Cesarean Delivery:  Physician-Level Longitudinal Analysis” *Inquiry*, Summer 41 170-188

Gruber, Jonathan, John Kim, and Dina Mayzlin, (1999) “Physician Fees and Procedure Intensity: The Case of Cesarean Delivery,” *Journal of Health Economics*, 18(4), 473-490

Kessler, Daniel P. and McClellan, Mark B. (1996) “Do Doctors Practice Defensive Medicine?” *Quarterly Journal of Economics* 111:353-390.

Kim, Beomsoo, (2008) “The Impact of Malpractice Risk on Obstetric Procedure” *Journal of Legal Studies*

Localio, A. Russell, Lawthers, Ann G., Bengtson, Joan M., Hebert, Liesi E., Weaver, Susan L., Brennan, Troyen A., Landis, J. Richard, (1993) “Relationship Between Malpractice Claims and Cesarean Delivery” *Journal of the American Medical Association*, Vol 269 (3), pp 366-373.

Lochner, Lance (2003) “Individual Perceptions of the Criminal Justice System,” NBER Working Paper #9474

Lochner, Lance (2007) “Individual Perceptions of the Criminal Justice System,” *American Economic Review*, 97(1), pp 444-460.

National Center for Health Statistics (2001), “Trends in Cesarean Births and Vaginal Birth after Previous Cesarian, 1991-1999” NVSR Volume 49, No. 13

Sah, Raj. (1991) “Social Osmosis and Patterns of Crime,” *Journal of Political Economy* 99, 1272-95.

Thacker, S. (1989), “The Impact of Technology Assessment and Medical Malpractice on the Diffusion of Medical Technologies: The Case of Electronic Fetal Monitoring” In: Roston VP, Bulger RJ, eds. *Medical professional liability and the delivery of obstetrical care*, vol. II: An interdisciplinary review. Washington, DC: National Academy Press; 1989:2:9-26.

Wagner, M. (2000) “Choosing caesarean section,” *The Lancet*, Volume 356, Issue 9242, pp. 1677-1680

Weiler, P., et al. (1993) , *A Measure of Malpractice*, Cambridge, MA: Harvard University Press

WENN Entertainment News Wire Service (2005), “Spears ‘Predicts’ Caesarian” August 31, 2005.

Wison, James Q. and Kelling, George L. (1982) “The Police and Neighborhood Safety: Broken Windows,” Broken Windows” Atlantic Monthly, March, pp29-38

Zeiler, Kathryn, Silver, Charles M., Black, Bernard S., Hyman, David A. and Sage, William M., (Forthcoming) "Physicians' Insurance Limits and Malpractice Payments: Evidence from Texas Closed Claims, 1990-2003". *Journal of Legal Studies*, forthcoming