What's an Apology Worth? Decomposing the effect of apologies on medical malpractice payments using state apology laws

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Abstract

Past studies find that apologies affect the outcomes of medical malpractice litigation, but such studies have largely been limited to laboratory surveys or case studies. Following Ho and Liu (2010), we use the passage of state-level apology laws that exclude apologies from being used as evidence in medical malpractice cases, and estimate that apologizing to a patient in cases of medical malpractice litigation reduces the average payout by \$32,000. This paper seeks to unpack the mechanism of apologies by examining the differential impact of apologies laws by various sub-samples. We find that apologies are most valuable for cases involving obstetrics and anesthesia, for cases involving infants, and for cases involving improper management by the physician and failures to diagnose.

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I. Introduction

What is an apology worth? Are they just words, or do they have economic value? Past studies on apologies and medical malpractice have used surveys and case studies to establish the importance of apologies in swaying jury and judge opinions.¹ Doctors are often culturally conditioned to avoid apologies to avoid admitting fault (Lamb et al., 2003; Novack et al., 1989; Pinkus, 2000) and thus avoid litigation, yet surveys of patients often reveal a main reason patients decide to litigate is due to the lack of an apology (Hickson et al., 1992; May & Stengel, 1990; Vincent & Young, 1994). Programs that encouraged apologies and disclosure in individual hospitals have been shown to yield substantial savings in hospital litigation costs (Liebman & Hyman, 2004, 2005; Kraman & Hamm, 1999). Ho and Liu (2010) find that apology laws, which exclude apologies from being used as evidence in medical malpractice litigation, expedite the speed of resolution. Despite the above claims of the effectiveness of apologies, no study has yet attempted to quantify how the value of an apology in medical malpractice litigation depends on the characteristics of the case.

In this study, we adopt a similar difference-in-difference approach as Ho and Liu (2010) by taking advantage of the propagation of the state-level "apology laws" that have been implemented in 36 states. These laws state that apologies made by medical practitioners cannot be used as evidence in medical malpractice litigation. The laws are intended to protect statements of apology made by physicians in order to increase the likelihood of their use. Ho and Liu (2010) use this approach to measure the aggregate effect of the apology law, and they find that in states that have apology laws, cases are settled faster, and claim payout for most severe medical injuries (i.e. death and quadriplegia) drop by 15-18%. This study builds on Ho and Liu's (2010)

¹ See next section for a review of the literature.

work but seeks to understand how apologies work by looking at where apology laws are most effective. We do this by decomposing the effect of the law by case characteristics, using categories such as allegation nature, patient gender and age.

We use the National Practitioner Databank (NPDB) dataset, which contains detailed information of every malpractice case with positive payment made by medical practitioners in the United States since 1991.² This dataset has been frequently used in the field to study various tort reforms. Unfortunately, our dataset does not identify which physicians apologize. However, for reasons we discuss in detail in the Discussion, our estimates should provide a lower bound for the value apologies have both in swaying the actions of potential litigants and as evidence in malpractice cases.

Overall, the passage of the apology law accounts for a \$32,342 (12.8%) decrease in the size of malpractice payments.³ More interestingly, by repeating the analysis on sub-samples, we are able to decompose that effect. We find that the effect is concentrated on cases involving obstetrics and anesthesia, cases involving infants, cases with male patients, and cases involving improper management by the physician and failures to diagnose.

The next section briefly reviews the background and literature of apologies in medical malpractice. We then consider the economic mechanisms that underlie the estimates. The following section describes the data and the empirical methodology. The final section presents and discusses the results.

² This dataset however does not contain any claims without payment, any open claim information, or any claims payout made by an entities. For more discussion on how it might affect the interpretation of our results, see Data Section.

³ The estimate has been inflated to Year 2010 dollars.

II. Background on Apologies in Medical Malpractice

The existing work on apology in medical malpractice can be divided between studies of patient attitudes toward litigation, and case studies of individual hospital disclosure programs. The first set uses hypothetical situations and analyzes whether apologies can reduce the subjects' likelihood to litigate (Gallagher et al, 2003; Witman et al., 1996; Mazor et al. 2004; Wu, 1999; Wu et al., 2009). Robbennolt (2003, 2006) provides a comprehensive psychological overview of why and how apologies could be effective in reducing patient's likelihood to litigate.

Another set of studies examine apology policies at the hospital level. Studies by Liebman & Hyman (2004, 2005) and Kraman & Hamm (1999), examine the effectiveness of apology programs at individual hospitals. Both find that programs that encourage effective apologies and disclosure of mistakes can dramatically reduce malpractice payments. Boothman (2009) finds that the apology and disclosure program at the University of Michigan Health Service reports a dramatic decrease of 47% in compensation payments and a drop in settlement time from 20 months to 6 months, after its implementation in 2001. While the findings for hospital-level apology programs are promising, it is not clear whether the impact of State-level apology laws would be as remarkable. For example, these aforementioned hospitals could be under the management of reforming administrators, or may have other concurrent programs (e.g. full information disclosure program at University of Michigan Health Services); therefore, the reduction in claim frequency or payout could be attributed to factors besides the apology program. In other words, the true effect of apologies on medical malpractice litigation in these studies could be overestimated. Alternatively, such studies could underestimate the value of apologies if a broader change in how the law treats apologies would make them more effective.

Our study takes advantage of a recent medical malpractice reform—the "apology law." Most apology laws declare that a statement of apology made by a medical practitioner to a patient is inadmissible as evidence of liability in court. Most follow a similar template. For example, the Connecticut law states that:

In any civil action brought by an alleged victim of an unanticipated outcome of medical care, or in any arbitration proceeding related to such civil action, any and all statements, affirmations, gestures or conduct expressing **apology, fault, sympathy, commiseration, condolence, compassion or a general sense of benevolence** that are made by a health care provider or an employee of a health care provider to the alleged victim, a relative of the alleged victim or a representative of the alleged victim and that relate to the discomfort, pain, suffering, injury or death of the alleged victim as a result of the unanticipated outcome of medical care shall be inadmissible as evidence of an admission of liability or as evidence of an admission against interest. (emphasis added)

Across states there are some slight variations in the types of statements that are protected but all generally include a combination of the following: apology, fault, sympathy, commiseration, condolence, compassion, and admissions of mistakes, errors, and liability.⁴

As of January 2009, 36 States (including Washington D.C.) have enacted various forms

of apology laws. Table 1 lists all of the State legal codes pertaining to medical apologies.⁵

[Insert Table 1 About Here]

⁴ Some studies (McDonnell and Guenther, 2008; Morse, 2009) divide apology laws into laws that exempt full apologies—apologies admitting guilt—versus laws that only exempt partial apologies—apologies that only offer sympathy. We do not here, because past authors do not agree on what constitutes a full versus partial apology and because F-tests find no significant difference in states with full versus partial apologies.

⁵ California, Massachusetts, Florida, Tennessee, Texas, and Washington have general apology statutes that apply across all industries while the other 30 States have specific laws that only protect the statements of apology made by health care providers. The States can be first divided into two types depending on the applicability of these laws: general versus health practitioners only. Following Ho and Liu (2010), who had perform an F-test checking whether they can group the general versus health-care only laws together, the F-test fails to reject the null hypotheses that these two types of apology laws have the same impact. Therefore, for the remainder of the paper, we are not going to differentiate between general and health-care only apology laws.

Despite this wide-spread adoption, there has been very little empirical economic analysis examining the laws' effectiveness. Ho and Liu (2010) are the first to evaluate the effectiveness of these state-level apology programs. They find that apology laws help to expedite the resolution process and reduce claim frequencies. Their paper provides a theoretical economic model examining the effects of apologies, and empirically focuses on the effectiveness of apology laws at the aggregate (state) level. In contrast, this paper focuses on examining the effectiveness of apologies at the case-level. In particular, we examine how the effectiveness of apologies may differ by patient-, physician-, and case characteristics.

III. Conceptual Framework

In this section, we consider the economic mechanisms that drive apologies to establish a framework for interpreting the estimates. A more mathematically formal representation can be found in Ho (2010) and Ho and Liu (2010); we focus here on the intuition. We assume that patients have two main factors that determine whether they seek litigation conditional on the medical outcome, 1) the monetary incentive and 2) the psychic value of their relationship with the doctor. Similarly, doctors have two main factors in determining whether to apologize, 1) their own monetary costs of litigation and 2) the psychic value of their relationship with their patients decide to litigate by weighing the monetary benefits from litigation with the psychic costs of suing their doctor. A physician who has good relationship with patient would therefore reduce the probability of litigation. In this model, an apology would enhance the relationship between patients and physicians by signaling the doctor's good intentions to the patient. Patients find it more psychically costly to sue their doctor after they have received an apology. Doctors decide to apologize or not by weighing the monetary costs of the increased costs of litigation

with the psychic benefits of strengthening the relationship with their patients. The third major player will be the Courts who decide the size of the settlement award in case of litigation. Apologies serve as a signal to the courts of the guilt of the doctor. If we assume that plaintiffs use evidence of apologies optimally and that how apologies are viewed are not affected substantially by the passage of the laws, then the expected settlement award is larger when plaintiffs have the option to use apologies as evidence, relative to when laws prohibit their usage. Apology laws work by reducing the expected damage award that doctors face if the case goes to court. The reduced expected damage award leads to a lower expected settlement payment, which leads to lower monetary costs faced by doctors if they decide to apologize. Therefore the law makes it more likely for doctors to apologize.

The frequency and severity of malpractice claims are reduced then through two channels. Patients are less likely to sue and will demand lower payments both because their likelihood of winning a lawsuit is reduced, and because the increased likelihood that a doctor improved the doctor-patient relationship using an apology. The current analysis will not be able to disentangle the value of the apology as evidence to the Judge from the value of the apology on reducing the patient's demand; that question will be pursued in future research.

The law could also have unintended consequences that are evident if imperfect information is allowed. For example, if doctors are shortsighted in their apologies, then more apologies by doctors could increase the awareness of mistakes by patients and thus lead to more lawsuits (Studdert et al, 2007). Similarly if patients become aware that the consequences of an apology are reduced, then the law would effectively devalue all apologies made by doctors, and potentially worsen patient-doctor relationships on average (Cohen, 2003; Ho, 2010). Finally, if apologies are successful at reducing the consequences of malpractice errors, then we may expect

to see an increase in medical errors as well. Past research (Ho and Liu, 2010) find little evidence for these perverse effects. If such effects do exist, they would attenuate the size of the effects we are estimating, and further suggest that the effect sizes we observe constitute the lower bound of value of apology.

The model also suggests where to expect the locus of effect. Since apologies restore relationships, we expect apologies to occur more in fields where reputation matters more, such as in obstetrics versus emergency medicine. If male patients put more weight on their relationship with the doctor we would also expect apologies to have a larger value for men.⁶ Also, because we argue that apologies serve as an informational signal, we would expect a larger effect when there is greater uncertainty about the doctor's performance. This would also suggest that apologies should be more important for younger doctors, rather than older, well-established ones.

IV. Data

To assess the impact of these various types of apology laws, we use data drawn from the NPDB database.⁷ The NPDB contains all medical malpractice cases with non-zero payments made by health practitioners, though notably the NPDB does not include cases made by institutions. For each claim, there is information regarding the year the incident occurred,⁸ the nature of the allegation (e.g., diagnosis related, anesthesia related, surgery related, etc.), the practitioner's graduation year and age group, the practitioner's work and licensing state, and

⁶ While we know of no empirical evidence for which gender should value relationships more, Weisman and Teitelbaum (1985) and Cooper-Patrick et al. (1999) have identified gender concordance as factors that affect the patient-physician relationship.

⁷ Due to the Federal Health Care Quality Improvement Act (HCQIA), all malpractice payments—either as part of a settlement or as part of a court judgment—made by or on behalf of a licensed health care provider must be reported within 30 days

⁸ Since the finest date information we have about the case are years, we cannot use any finer definition of date (such as months, quarters) to look at the cases that took place right before the law passed and the cases that took place right after the law passed.

whether the payment was for a court judgment or an out of court settlement. This dataset has been widely used in many studies related to medical malpractice (see Baicker & Chandra, 2005; Chandra, Nundy, & Seabury, 2005; Durrance, 2009; Matsa, 2007). We restrict our analysis to the reports in which adverse events occurred after 1991 due to the incomplete reporting in the earlier years and include events up until 2009. Table 2A provides summary statistics at the individual level. There are a total of 234,826 payment reports in our sample.⁹

It is important to acknowledge that because payments by institutions are not recorded, there is a "corporate shield" loophole, through which settlement payments made on behalf of a practitioner by an institution are not recorded in NPDB. Chandra, Nundy, and Seabury (2005) compare data from the NPDB with other sources of malpractice information from California and New York and while they find approximately 20% of cases are excluded from the NPDB in this way, they find that case characteristics do not differ between the NPDB and databases that included institutional payments. Notably, California passed an apology law in 2000, yet Chandra et al. (2005) did not observe any time trend or discontinuity in differences between the NPDB and their California dataset. This at least suggests that the apology laws are not systematically shifting lawsuits from doctors to institutions and thus should not bias our results. Also since the focus of our study is on the differences between subgroup, the corporate shield only matters if the effect differs by sub-population. Otherwise our results should be interpreted with the caveat that we are finding the effect of apologies on payments made against individuals.

Table 2A shows the average claim payout reported in NPDB to be \$249,654 and 3.87 years is the average time to reach a resolution. NPDB includes malpractice cases against all health practitioners, which expands beyond physicians. Malpractices claims against physicians

⁹ For state level summary statistics, please see details in Ho and Liu (2010).

are the most frequent being 72.7% of all reported cases in NPDB, and claims against dentists come second, being 13.42% of the cases. When cases are broken down by allegation nature, 27.7% of cases are diagnosis related, 25% of cases are surgery related, and 27.9% of cases are treatment related. Most payments in the dataset are a result of a settlement, and only 2.5% of all reported cases are a result of a judgment. However, we should be cautious that cases that go to court could take longer to reach resolution and thus have not been included in our dataset, and the summary statistics could grossly underestimate the number of cases that may one day resolve in court.

[Insert Table 2A About Here]

For payments filed after Jan 31, 2004, NPDB requires further information on the outcome of the incident (e.g., emotional injury, minor temporary injury, major permanent injury, death, etc.), the specific malpractice act (e.g. failure to diagnose, failure to monitor, delay in treatment, improper technique, wrong diagnose, etc.), and the patient's age and gender. The summary statistics of the subsample is presented in Table 2B. The breakdown of medical outcome shows that 27% of claims involved the death of the patient.¹⁰ At the other extreme, 5.4% of cases are deemed as emotional injury and insignificant injury by the person who files the report. More women (57.85%) filed malpractice claims than men (42.15%). Patients of age 40 through 49 are the most frequently age group in the dataset. As for the specific cause of malpractice, NPDB has listed nearly 100 reason codes, of which up to two can be chosen. We use the first listed reason code. In Table 2B, we only list reason codes that account for more than 1% of claims. From the

¹⁰ With further examination, interestingly most death occur for patients whose age is age 40-49 (19.7%) and second highest being age 50-59 (18.5%) In contrast to popular belief, less than 7% of cases results in death involved an infant before age 1.

distribution of reason codes, one can see that most malpractice reasons are diagnosis or treatment related.

[Insert Table 2B About Here]

V. Empirical estimation strategy

In our empirical analysis, we will estimate the effect of apology laws on the size of payment (i.e. *claim severity*) by subgroups using a difference-in-difference method, which compares claim payout in states that have passed an apology law to states that have not, and claim payout in states before and after the law passed.

A crucial assumption for using this empirical strategy is that the passage of apology laws is not correlated with any other event that would affect medical litigation—an obvious possibility being the passage of other tort reform or malpractice laws. To ensure that a correlation with other malpractice laws does not drive our results, we include controls for other tort reforms.¹¹ Furthermore, in each specification, we cluster standard errors by state to avoid problems of serial correlation (Bertrand, Duflo, & Mullainathan, 2004).

We employ the following Ordinary Least Squares (OLS) specification to estimate the impact of the law:

$$Y_{ist} = \lambda controls_{ist} + \beta a pology_{st} + \sum_{t} \delta_{t} Year_{t} + \sum_{s} \delta_{s} State_{s} + \varepsilon_{st}, - - - - Eq(1)$$

where Y_{ist} is claim payout for case *i* in state *s* during year *t* and *apology* is an indicator variable which is one if an apology law was in effect in state *s* during year *t*, and otherwise is

¹¹ The other law measures for which we have controlled the timing in our study include the existence of noneconomic cap, punitive cap, laws on full information disclosure, joint and several liabilities, and collateral source rule. The information on the existence of the laws (excluding information disclosure laws) is from the annual produced by the American Tort Reform Association and we cross check it with the information provided in Currie and MacLeod (2008). The information on the disclosure laws is from Gibson and Del Vacchio (2006).

zero. Our main coefficients of interest are β . β represent the change in claim payout due to the adoption of the apology law. The result is presented in Column 1 Table 3. We are interested in how the value of apology could be different across subgroups (i.e. practitioner's licensed field, allegation nature, patient's age, patient's gender and specific act of malpractice). Therefore, we estimate Eq (1) with a set of interaction terms between the subgroup and the indicator for apology law. For example, if we are interested in how the effectiveness of apology laws could different across license field (physicians, osteopathic physician, dentists, podiatrists, or chiropractors), we would estimate:

$$Y_{ist} = \lambda controls_{ist} + \sum_{l} \delta_{l} (LicenseFie \ ld_{l})_{i} + \sum_{l} \alpha_{l} (LicenseFie \ ld_{l})_{i} * apology_{st}$$
$$+ \sum_{l} \delta_{l} Year_{l} + \sum_{s} \delta_{s} State_{s} + \varepsilon_{st}, - - - - - Eq(2)$$

The vector of coefficients δ would inform us which licensed field has higher claim payout. The α 's represent the change in claim payout for each license field due to the apology laws. The results by allegation natures are presented in Table 3. The remaining tables consider other partitions of the data. Table 4 considers the effects of the law by the specific act of allegation nature, Table 5 by licensing field, Table 6 by the patients' age group and Table 7 by the patients' gender.

VI. Results

Table 3 reports OLS results broken down by the nature of the allegation. Column 1 presents the aggregate effect of the apology law on the size of claim payments and finds that cases in states with the law have payments that are \$32,342 (12.8%) less than cases in states before the law was passed or where the law was never passed at all. All specifications control for

the implementation of other state-level tort reform laws, the physician's experience and whether the payment was a settlement or $judgment^{12}$ as well as state- and year- fixed effects.

[Insert Table 3 About Here]

In Column 2, we decompose the effect of apologies by allegation nature (the NPDB categorizes allegations as Diagnosis, Anesthesia, Surgery, Medication, IV, Obstetrics, Treatment, Monitoring, Equipment or Other). Column 3 adds controls for medical injury, though we lose many of our observations since injuries were not reported until 2004. The omitted category is behaviorial health. We find the effect varies substantially by allegation nature, with apologies for obstetric related claims having the highest value at \$125,000, followed by anesthesia (\$87,000), monitoring (\$55,000), medication (\$46,000) and diagnosis (\$45,000). There is a censoring problem because medical malpractice payments are constrained to be non-negative. Thus Columns 4 and 5 repeat the analysis using a Tobit specification and find largely similar results. However, as shown in Ai and Norton (2003) and Norton, Wang and Ai (2004), the marginal effect of a change in both interacted variables is not equal to the marginal effect of changing the interaction term, thus the coefficient and the standard errors of interaction terms in non-linear modesl such as tobit, logit and probit needs to be handled with caution.Therefore, for the rest of the paper, we focus on the OLS results.

As reported in Column 3, we find that obstetrics cases payout would reduce by \$125,000 and anesthesia claim payout would reduce by \$45,000 (relative to the default category) if the states have the apology laws. While it is perhaps unsurprising that the largest effects were found in cases involving obstetrics and anesthesia since such cases have the highest average base claim severities, it is notable that the value of apologies for diagnosis and monitoring related claims are

¹² We also run specifications where payment type is omitted, or where all cases that were settled in court were excluded, and find largely the same coefficients.

also high relative to their base rate. This difference could be attributed to the difference between mistakes of commission versus mistakes of omission. Table 4 provides considers such differences in further detail.

[Insert Table 4 About Here]

In Table 4, we decompose claim payouts by the specific act of malpractice. In NPDB, all reports filed after Jan 2004 are required to choose 1 or 2 reason codes out of 100 provided reason codes. We exclude all reason codes which were chosen less than 1% of the time, and we are left with 130,060 cases. The regression result is presented in Table 4. The default category is when the mistake is "Failure to Monitor". We find that there is huge variance in terms of claim payout by type of mistake (Column 1). Some mistakes are much more costly compared to others-the claim payout for "Failure to Diagnose" would be \$231,000 more than "Surgical or Other Foreign Body Retained", unconditional on malpractice injuries. While the cost of mistakes vary dramatically, the effectiveness of apology vary less. For certain malpractice reasons, such as "Improper Management", "Improper Performance" and "Wrong or Misdiagnosis", apologizing could reduce claim sizes by \$33,000-\$46,000 per case (Column 2). However, this difference in the value of apology could be due to the difference in medical injury outcomes. Therefore, in Column 3, we again include a set of indicators controlling for the type of injuries, and find less variation in payout across reasons for mistakes. We still do observe that some mistakes would benefit more from apologies, including "Failure to Diagnose" and "Improper Management".

[Insert Table 5 About Here]

Table 5 decomposes the apology effect by the licensing field of the practitioner. Column 1 finds that cases involving physicians or osteopathic physicians are associated with significantly higher payments than cases involving dentists, podiatrists or chiropractors. The default category includes practitioners licensed in other medical fields (nurses, pharmacists, etc.) so the coefficients report differences in payments relative to these fields. The much higher payments associated with physicians could explain the results of Column 2, where we add interaction terms between field and apology law to see how the effect of the law differs by field. Column 2 shows the laws predominantly affect the payoffs of physicians and osteopathic physicians and had little effect on other fields. Physician in states with apology laws would pay \$35,000 per case less than physicians in state without apology laws on average, and osteopathic physician would pay \$38,000 less on average if they are in the states with apology laws. This could be due to the fact that much of the emphasis of these laws have focused on physicians, or it could simply be due to the fact that cases involving physicians have much higher payments. Column 3 adds controls for the severity of medical outcome to account for the fact that cases physicians deal tend to be more severe than those of dentists or chiropractors. We still find persistently significantly larger effects of apologies for physicians and osteopathic physicians.

In Table 6, we test whether there is a difference in claim payout when patient age differs. Since patient's age is only available in cases reported after Jan 2004, the sample size is restricted. We find that the age of patient is responsible for substantial variation in the data. In Column 1, the payout for fetuses, which is the default category, and those who are less than one year old, is the highest in medical malpractice litigation. We observe a sharp decline (\$311,000) once the patient's age is above one. Comparing the coefficient in Column 2 and Column 3, we can conclude that much of the difference in payout based on patient's age is due to the difference in severity of injuries. Fetuses are more likely to be associated with death in the dataset. Yet another notable point is that even after controlling for medical injuries, we still observe some

differences in payouts depending upon patients' age. Most importantly, apologizing to the family when the patient is less than 1 year old would significantly reduce the claims by \$115,000. Column 3 suggests that the effect of apologies appears to be declining with the age of the patient.

[Insert Table 6 About Here]

In Table 7, we examine the difference in payouts for male versus female patients, and whether apologies are more effective on male or female patients. We find that claim payout is between \$17,000 to \$57,000 higher when the patient is male depending on specification, even after controlling for the outcome of the medical injury. This may explain why apologies are \$22,000 to \$23,000 more effective at reducing payment sizes when the patient is male than when the patient is female.

[Insert Table 7 About Here]

VII. Discussion and Threats to Validity

For the purpose of estimating the value of apology, it would be ideal if there are some estimates of the frequency of apologies before and after the apology law passed. Then we could back out the value of apology with some assumptions. However, we have not been able to locate such information. Therefore, given the restriction, it would be helpful to understand whether our estimates provide an upper bound or a lower bound.

If it were the case that doctors always apologize after the law is passed, and never apologize before the law is passed, then the estimated effect of the law would equal the full effect of the apology. However, since it is likely that some apologies would have occurred with or without the law, the average effect of the law (which is what we have estimated above) would underestimate the average effect of apologies. As a result, our estimate serves as a lower bound of the value of apology. Similarly, since we do not have data on lawsuits that did not occur, we only see the effect of the laws on cases that led to a payment. These extrinsic margin effects of apologies go uncounted in our estimate, furthering the underestimation.

Our analysis is based on the difference-in-differences technique, which could be biased if there are unobserved changes taking place in these states at the same time as the implementation of apology laws. Ho and Liu (2010) provide some evidence that implementation of apology laws is rarely a political movement. For example, it is not correlated with any particular political party. The timing of apology law is different from the timing of other tort reform. In fact, many of the states with apology laws do not have the most typical reforms such as caps on noneconomic damage (e.g. Conneticut, Arizona, Delaware, Indiana). The actual implementation of apology law is often attributed to efforts by individual activists or non-governmental organizations (such as the Sorry Works Coalition). Another threat is that our dataset only includes closed claim with positive payouts. There could be several scenarios as a result of apology laws that could lead to selection effects that bias our results. Apology laws could result in more cases settled without payment, or apology laws could result in claims settling sooner changing the composition of cases that we observe. We argue that both scenarios should lead to an underestimate of the effect of the apology laws. In the first scenario, where apology laws lead many cases to never be filed, then we fail to include all the \$0 payments in our estimate, and thus we would underestimate the value of apology, though the Tobit estimate should mitigate this effect. In the second scenario, if cases resolve faster in apology law states, then we should observe a different composition of cases in the short run. Ho and Liu (2010) find that the cases that take longer to resolve have more severe outcomes and higher payouts. This suggests that states with apology laws will temporarily have a higher concentration of cases involving more

severe injuries in the years immediately after the laws are passed. Therefore, even if claim severity did not change, we would expect a positive coefficient for the effect of apology laws. Therefore the negative coefficient that we do observe must be driven by the reduction in claim severity and is an underestimate of the value of apology.

There is a third possibility if doctors' new penchant to apologize inform patients of injuries that they had not previously been aware of, then apologies could actually create more lawsuits. However, Ho and Liu (2010) argue that this possibility is unlikely.

Another concern is that states with apology laws could be intrinsically different or may have more malpractice claims before the law. To address this concern, Table 8 looks for claim severity differences in states that passed the law, in the years before the law was passed and finds no pattern of significance.

[Insert Table 8 About Here]

We now consider several additional specifications to test the robustness of our results. Columns 1 and 2 of Table 9 consider only cases that were not settled in court by excluding the 3% of cases that were based on court judgment. We find minimal differences with our basic specification.

[Insert Table 9 About Here]

To address the above issues of selection due to the time truncation problem, columns 3 and columns 4 consider only cases that were initiated before 2004, allowing the cases to have 5 years to resolve, Here again, we obtain largely similar coefficients.

A viable alternate specification is OLS regression on the log of payments, rather than on the level. We prefer the regression on levels so that we can estimate a dollar value for apologies in different categories and to facilitate comparisons of the value of apologies between categories that may have different base rates. However, we include the results of the log specification in the Appendix.

VIII. Conclusion

Apologies are a common part of everyday experience, yet they also play a significant role in interactions that have substantial economic consequences such as medical malpractice litigation. In this study, we take advantage of the implementation of apology laws across the United States to attempt to quantify the lower bound of the value patients and courts place on apologies. We also attempt to locate the locus of the effect, and find that apologies are most effective in cases involving obstetrics and anesthesia, in cases involving improper management or a failure to diagnose, and in cases involving infants and small children. Apologies have substantial value either as evidence for the courts, or as a mechanism that helps to alleviate a patient's demands for restitution. The identification of the relative importance of each channel remains open for future work.

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State	<u>Year Law</u> Passed	<u>Full Versus</u> Partial	Statutes
Massachusetts	1986	Partial	ALM GL ch. 233, § 23D (1986)
Texas	1999	Partial	Tex Civ Prac & Rem Code Ann 18.061 (1999).
California	2000	Partial	Cal Evid Code 1160 (2000).
Florida	2001	Partial	Fla Stat Ann Ch 90.4026 (2004).
Washington	2002	Partial	Rev. Code Wash. §5.66.010(2002)
Tennessee	2003	Partial	Tenn. Evid. Rule §409.1
Colorado	2003	Full	Colo Rev Stat Sec 13-25-135 (2003)
Oregon	2003	Partial	Oreg Rev Stat Sec 677.082 (2003).
Maryland	2004	Partial	Md. COURTS AND JUDICIAL PROCEEDINGS Code Ann. § 10-920
North Carolina	2004	Partial	N.C. Gen. Stat. § 8C-1, Rule 413 (2004)
Ohio	2004	Partial	ORC Ann. 2317.43 (2006)
Oklahoma	2004	Partial	(63 Okl. St. § 1-1708.1H
Wyoming	2004	Partial	Wyo Stat. § 1-1-130
Connecticut	2005	Full	Conn. Gen. Stat. § 52-184d (2005)
Louisiana	2005	Partial	La. R.S. 13:3715.5 (2005)
Maine	2005	Partial	24 M.R.S. § 2907 (2005)
Missouri	2005	Partial	Mo.Rev.Stat §538.229 (2005)
New Hampshire	2005	Partial	N.H.Rev. Stat. Ann. § 507-E:4 (2005)
South Dakota	2005	Partial	S.D. Codified Laws § 19-12-14 (2005)
Virginia	2005	Partial	Va. Code Ann. §8.01-581.20:1 (2005)
Arizona	2005	Full	A.R.S. § 12-2605
Georgia	2005	Full	O.C.G.A. § 24-3-37.1
Illinois	2005	Partial	735 ILCS 5/8-1901 (2005)
Montana	2005	Partial	Mont. Code Anno., § 26-1-814 (2005)
West Virginia	2005	Partial	W. Va. Code § 55-7-11a (2005)
Delaware	2006	Partial	Delaware Del. Code Ann. Tit. 10, 4318 (2006)
Idaho	2006	Partial	Ida. ALS 204; 2006 Idaho Sess. Laws 204;
Indiana	2006	Partial	Ind. HEA 1112
Iowa	2006	Partial	Iowa HF 2716 (2006)
South Carolina	2006	Full	South Carolina Ch.1, Title19 Code of Laws 1976, 19-1-190 (2006)
Utah	2006	Partial	2006 Ut. SB 41
Vermont	2006	Partial	Vermont S 198 Sec. 1. 12 V.S.A. 1912 (2006)
Hawaii	2006	Partial	HRS section 626-1, Hawaii Rules of Evidence Rule 409.5
Nebraska	2007	Partial	Nebraska Neb. Laws L.B. 373 (2007)
North Dakota	2007	Partial	North Dakota ND H.B. 1333 (2007)
District of Columbia	2007	Partial	D.C. Code 16-2841 (2007)

Table 1. State with Statutes Pertaining to Apology Law

Number of Observation	234,720
Average Claim Severity	\$249,655
(standard deviation)	(468,293)
Average Years to Resolution	3.87
(standard deviation)	(2.18)
Practitioners' License Field (%)	
Physicians and Physician Intern	72.7
Osteopathic and Osteopathic Intern	4.79
Dentist and Dentist Intern	13.42
Podiatrist	2.17
Chiropractor	1.84
Others (nurse, health aide, psychologist, etc)	5.08
Allegation Nature (%)	
Diagnosis Related	27.68
Anesthesia Related	3.00
Surgery Related	25.00
Medication Related	5.41
IV-Blood Product Related	0.28
Obstetrics Related	6.08
Treatment Related	27.86
Monitoring Related	1.95
Equipment Product Related	0.56
Miscellaneous	2.01
Behavioral Health Related	0.19
Payment Type (%)	
Settlement	89.7
Judgment	2.51
Unknown	7.79

Table 2A. Summary Statistics--Individual Level

(Available If Reported	Alter Jali 2004)	
Number of Observations		77,341
Outcomes (%)		2.06
Emotional Injury Only	Insignificant	2.06
Insignificant Injury	injury	3.39
Minor Temporary Injury		15.28
Major Temporary Injury	"Somewhat"	9.9
Minor Permanent Injury	Sign. injury	13.76
Significant Permanent Injury		13.69
Major Permanent Injury	Significant	9.18
Quadriplegic	Injury	4.17
Death		27.13
Cannot be Determined		1.45
Patient Gender (%)		57 05
Female		57.85
Male		42.15
Patient's Age (%)		
Fetus		1.75
Under 1 year		5.16
Age 1 through 9		2.71
Age 10 through 19		4.58
Age 20 through 29		8.86
Age 30 through 39		16.08
Age 40 through 49		19.69
Age 50 through 59		18.51
Age 60 through 69		12.31
Age 70 or above		10.35
Specific Malpractice Act (%)		
failure to diagnose		15.20
failure to monitor		1.64
delay in diagnose		6.20
delay in treatment		1.70
improper management		6.40
improper performance		13.30
improper technique		6.20
surgical or other foreign body r	etained	1.85
wrong or misdiagnosis		2.7
others		44.81

Table 2B Summary Statistics--Individual Level (Available If Reported After Jan 2004)

	e in Claim Payout By Allegation Nature (in Y2010 dollar) OLS Model Tobit Mod				
	(1)	(2)	(3)	(4)	(5)
		(=)	(3)		(5)
Apology Law Passed	-32,342**			-34,593**	
	(11,343)	120 504**	45 205	(4,271)	1 40 4 7 7 4 4
Diagnosis	127,391**	138,584**	45,305+	130,272**	142,467**
A	(31,281)	(30,126)	(26,994)	(21,699)	(21,751)
Anesthesia	146,936**	159,985**	103,445**	149,300**	163,438**
	(29,003)	(28,448)	(33,362)	(22,283)	(22,414)
Surgery	41,395	52,740*	57,942*	45,954*	58,232**
	(27,185)	(26,063)	(22,967)	(21,703)	(21,756)
Medication	24,494	38,019	5,965	25,962	40,359+
	(27,307)	(26,680)	(24,446)	(21,989)	(22,087)
IV & Blood Product	71,290*	88,949**	82,622	71,911**	91,140**
	(27,736)	(28,362)	(96,906)	(27,888)	(28,881)
Obstetrics	325,217**	343,535**	172,106**	329,770**	348,994**
	(44,107)	(42,337)	(28,450)	(21,954)	(22,035)
Treatment Related	-21,653	-10,506	-24,515	-20,965	-9,315
	(23,679)	(23,193)	(19,202)	(21,696)	(21,746)
Monitoring Related	105,754**	120,749**	393	107,460**	123,631**
	(32,727)	(32,746)	(30,371)	(22,613)	(22,912)
Equipment/Product Related	-76,812**	-67,297**	-30,817	-75,466**	-66,497*
	(25,631)	(24,736)	(23,510)	(24,927)	(25,892)
Other Miscellaneous	-35,160	-31,941	-26,525	-33,908	-30,683
	(26,120)	(23,712)	(21,486)	(22,595)	(22,932)
Diagnosis *Apology		-27,736	-45,128**		-31,806**
		(24,000)	(16,194)		(6,635)
Anesthesia *Apology		-42,783+	-87,399**		-47,220**
		(23,434)	(28,877)		(16,415)
Surgery *Apology		-29,267**	-39,886**		-32,471**
		(10,618)	(9,288)		(6,518)
Medication*Apology		-45,588**	-45,923*		-48,286**
1		(14,491)	(17,574)		(12,048)
IV & Blood Product*Apology		-72,499*	-104,697		-79,827
1		(32,461)	(98,683)		(49,585)
Obstetrics*Apology		-96,685	-125,416*		-99,937**
		(68,750)	(54,470)		(12,930)
Treatment Related*Apology		-28,272+	-2,505		-28,323**
1 25		(14,641)	(13,008)		(5,957)
Monitoring Related*Apology		-47,964+	-55,253*		-51,938**
6 1 6		(26,358)	(25,013)		(16,594)
Equipment/Product Related*Apology		-23,041	-19,218		-19,496
1 r		(23,730)	(27,045)		(29,464)
Other Miscellaneous*Apology		2,830	-18,678		3,971
e lier miseenaneous ripology		(19,054)	(15,279)		(15,637)
Medical Injury Fixed Effects		(17,004)	(13,279) X		(10,007)
	224 826	224 826		224 826	224 826
N R squared	234,826	234,826	82,838	234,826	234,826
R-squared	0.08	0.08	0.198		

Table 3. Change in Claim Payout By Allegation Nature (in Y2010 dollar)

Note: The default category is A33. (+ significant at 10%; * significant at 5%; ** significant at 1%). All regressions control for state fixed effects, year fixed effects, other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure and other covariates include experience of physician and square of experience, payment type (whether it is settlement or judgment). Column 3 control for the severity of medical injuries, which is only avilable for cases that is reported after 2004.

	dollar)		
		OLS Model	
	(1)	(2)	(3)
Apology Law	-27,257**		
	(9,581)		
Failure to Diagnose	21,360+	27,039*	52,310**
	(11,128)	(11,307)	(8,277)
Delay in Diagnose	32,554**	35,059**	43,368**
	(10,356)	(10,468)	(8,915)
Delay in Treatment	17,798	19,338	26,113
	(16,743)	(16,254)	(17,323)
Improper Management	19,493+	27,740*	65,731**
	(11,547)	(11,909)	(14,124)
Improper Performance	-67,312**	-56,986**	43,338**
	(16,539)	(19,145)	(14,638)
Improper Technique	-159,460**	-157,846**	24,517
	(24,417)	(25,165)	(29,526)
Surgical or Other Foreign Body	-209,787**	-208,585**	-16,278
Retained	(22,610)	(23,493)	(14,117)
Wrong or Misdiagnose	6,213	12,798	33,817*
	(14,094)	(15,410)	(16,121)
Failure to Diagnose		-22,155	-43,132**
* Apology		(17,140)	(12,246)
Delay in Diagnose		5,530	-10,424
* Apology		(19,955)	(17,145)
Delay in Treatment		794	-12,604
* Apology		(31,426)	(36,004)
Improper Management		-44,590*	-57,268**
* Apology		(16,683)	(11,993)
Improper Performance		-46,789**	-19,430
* Apology		(10,429)	(13,674)
Improper Technique		16,783	22,209
* Apology		(38,347)	(28,673)
Surgical or Other Foreign Body		8,120	16,420
Retained * Apology		(20,619)	(22,653)
Wrong or Misdiagnose		-33,474**	-17,097
* Apology		(8,608)	(12,651)
Medical Injury Fixed Effects			Х
N	130,060	130,060	52,662
R-squared	0.075	0.076	0.201

Table 4. Change in Claim Payout By Malpractice Specific Act (in Y2010 dollar)

Note: The default category is female. (+ significant at 10%; * significant at 5%; ** significant at 1%). These regressions control for state fixed effect, year fixed effect, other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure, other covariates include experience of physician and square of experience, payment type (whether it is settlement or judgment). Column 3 control for the severity of medical injuries, which is only avilable for cases that is reported after 2004.

		OLS Model	
	(1)	(2)	(3)
Apology law	-32,665*		
1 00	(12,521)		
Physicians & Interns	69,219**	75,120**	83,577**
•	(15,730)	(14,567)	(15,778)
Osteopathic Physicians & Interns	39,226*	45,157**	62,008**
	(17,562)	(16,506)	(19,003)
Dentist & Dental Resident	-169,394**	-168,422**	-50,606*
	(22,171)	(20,935)	(19,658)
Podiatrist	-115,017**	-114,440**	-47,414*
	(18,101)	(18,264)	(18,661)
Chiropractor	-129,770**	-130,536**	-26,753+
-	(18,040)	(17,733)	(15,081)
Physicians *Apology law		-35,161*	-46,429**
		(15,348)	(12,804)
Osteopathic *Apology law		-37,784*	-41,702*
		(15,776)	(16,177)
Dentist *Apology law		-1,749	37,104
1 00		(32,941)	(29,956)
Podiatrist*Apology law		10,105	31,472
1		(27,514)	(20,731)
Chiropractor*Apology law		11,672	16,404
		(19,503)	(17,892)
Medical Injuries Fixed Effects			Х
Ν	234,826	234,826	82,838
R-squared	0.076	0.076	0.195

 Table 5. Change in Claim Payout By Licensed Field (in Y2010 dollar)

Note: The default category is female. (+ significant at 10%; * significant at 5%; ** significant at 1%). These regressions control for state fixed effect, year fixed effect, other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure, other covariates include experience of physician and square of experience, payment type (whether it is settlement or judgment). Column 3 control for the severity of medical injuries, which is only avilable for cases that is reported after 2004.

Table 6. Change in Clair	n Payout By Pati	ents' Age (in Y2	010 dollar)
	(1)	(2)	(3)
Apology	-28,086**		
	(7,614)		
Under 1 year	-71,526	-46,594	-21,122
	(55,704)	(64,830)	(66,715)
Age 1-9	-310,808**	-300,840**	-114,248+
	(69,247)	(77,302)	(67,801)
Age 10-19	-393,016**	-392,618**	-151,126*
	(71,607)	(77,988)	(63,873)
Age 20-29	-377,473**	-371,262**	-131,719*
	(62,434)	(66,450)	(55,534)
Age 30-39	-357,004**	-350,783**	-116,959*
	(54,688)	(56,055)	(46,431)
Age 40-49	-367,374**	-362,460**	-130,628**
	(55,164)	(55,025)	(46,066)
Age 50-59	-375,050**	-372,025**	-152,530**
	(58,130)	(59,611)	(49,978)
Age 60-69	-400,320**	-398,573**	-190,399**
	(58,855)	(59,473)	(52,166)
Age 70 or above	-467,050**	-477,399**	-267,159**
	(66,237)	(66,277)	(56,527)
Under 1 year *Apology		-135,733*	-114,844+
		(66,729)	(66,513)
Age 1-9 *Apology		-41,672	-50,162
		(35,440)	(36,249)
Age 10-19 *Apology		-8,977	-23,597
		(33,219)	(27,610)
Age 20-29 * Apology		-28,779*	-39,504**
		(13,994)	(12,651)
Age 30-39 * Apology		-29,078*	-30,440**
		(11,378)	(9,327)
Age 40-49 * Apology		-24,806*	-33,094**
		(11,448)	(9,952)
Age 50-59 * Apology		-18,662	-20,666*
		(11,629)	(7,737)
Age 60-69 * Apology		-14,708	-14,976
		(11,447)	(9,117)
Age 70 or above * Apology		18,326	5,774
		(19,244)	(19,310)
Medical Injury Fixed Effects			Х
N	77,341	77,341	
	77,341 0.087	77,341 0.087	77,341 0.203

Note: The default category is female. (+ significant at 10%; * significant at 5%; ** significant at 1%). These regressions control for state fixed effect, year fixed effect, other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure, other covariates include experience of physician and square of experience, payment type (whether it is settlement or judgment). Column 3 control for the severity of medical injuries, which is only avilable for cases that is reported after 2004.

Table 7. Change in Claim Payout By Patients' Gender (in Y2010 dollar)							
	(1)	(2)	(3)				
Apology	-34,754** (8,123)						
Male Patient	49,765** (4,512)	56,756** (5,679)	17,101** (6,240)				
Male Patient * Apology		-23,385** (7,526)	-22,203** (6,614)				
Medical Injury Fixed Effects N R-squared	82,534 0.057	82,534 0.056	X 82,534 0.193				

Note: The default category is female. (+ significant at 10%; * significant at 5%; ** significant at 1%). These regressions control for state fixed effect, year fixed effect, other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure, other covariates include experience of physician and square of experience, payment type (whether it is settlement or judgment). Column 3 control for the severity of medical injuries, which is only avilable for cases that is reported after 2004.

Table 8: Pre Law Trends of Claim Severity					
Apology Law Passed	-31,176**				
	(10,600)				
One year before Law Passed	5,930				
	(10,724)				
Two year before Law Passed	-5,082				
	(8,199)				
Observations	234,826				
R-squared	0.044				

Note: (+ significant at 10%; * significant at 5%; ** significant at 1%). These regressions control for state fixed effect & year fixed effect. Robust standard errors in parentheses

<u>Dropped Cases that Went to Trial</u> <u>Dropped Cases that Occurred After 20</u>						
	(1)	(2)	(3)	(4)		
Apology Law Passed	-29,624**		-35,035**			
	(10,330)		(12,355)			
Diagnosis	127,645**	138,029**	124,732**	132,467**		
6	(32,473)	(31,183)	(34,578)	(34,763)		
Anesthesia	144,383**	155,942**	147,613**	154,638**		
	(30,239)	(29,492)	(33,001)	(33,100)		
Surgery	42,487	53,118+	38,923	47,837		
	(28,487)	(27,535)	(32,063)	(32,096)		
Medication	23,154	34,929	23,233	33,170		
	(28,706)	(28,551)	(32,189)	(32,000)		
IV & Blood Product	69,634*	83,458**	70,533*	81,612*		
	(29,842)	(31,068)	(31,078)	(31,854)		
Obstetrics	313,681**	331,228**	328,438**	339,756**		
obstatics	(46,642)	(44,300)	(45,510)	(45,433)		
Treatment Related	-19,025	-9,042	-22,850	-14,003		
Treatment Related	(24,649)	(24,377)	(29,247)	(29,493)		
Monitoring Deleted	(24,049) 110,901**	(24,377) 125,787**	(29,247) 104,389**	(29,493) 113,765**		
Monitoring Related				,		
	(34,120)	(33,877)	(35,767)	(36,387)		
Equipment/Product Related	-74,461**	-67,635*	-72,214*	-67,291*		
	(26,623)	(25,811)	(32,497)	(32,227)		
Other Miscellaneous	-32,641	-31,453	-43,566	-36,874		
	(26,410)	(24,419)	(30,345)	(29,576)		
Diagnosis *Apology		-26,579		-22,364		
		(23,251)		(25,838)		
Anesthesia *Apology		-35,464		-11,921		
		(25,119)		(31,221)		
Surgery *Apology		-28,602**		-39,127*		
		(10,238)		(15,393)		
Medication*Apology		-36,533**		-52,180*		
		(12,655)		(23,016)		
IV & Blood Product*Apology		-51,671		-66,889*		
		(34,536)		(25,845)		
Obstetrics*Apology		-92,835		-72,339		
1 00		(57,886)		(86,949)		
Treatment Related*Apology		-24,564+		-37,783+		
		(13,755)		(21,444)		
Monitoring Related*Apology		-48,124+		-41,713		
		(28,047)		(26,514)		
Equipment/Product Related*Apology		-14,044		-3,952		
		(22,404)		(36,622)		
Other Miscellaneous*Apology		8,195		-21,206		
Such miscentations Apology		(20,262)		(24,489)		
Ν	210,344	210,344	207,326	207,326		
R-squared	0.077	0.077	0.079	0.079		
K-squaleu	0.077	0.077	0.079	0.079		

Table 9. Change in Claim Payout By Allegation Nature (in Y2010 dollar)

Note: The default category is behavioral related cases. (+ significant at 10%; * significant at 5%; ** significant at 1%). These regressions control for state fixed effect, year fixed effect, other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure, other covariates include experience of physician and square of experience, payment type (whether it is settlement or judgment).

	Log(payout)			payout(Y2010 dollar)		
	(1)	(2)	(3)	(4)	(5)	(6)
Apology law	-0.050	-0.0648*			-44,927**	-36,129
	(0.032)	(0.027)			(16,469)	(22,530)
Physicians & Interns		0.861**	0.879**	0.683**	67,780**	73,188**
		(0.054)	(0.054)	(0.040)	(15,978)	(21,569)
Osteopathic Physicians & Interns		0.757**	0.768**	0.570**	37,881*	51,732*
		(0.067)	(0.069)	(0.046)	(17,817)	(24,317)
Dentist & Dental Resident		-1.136**	-1.147**	-0.357**	-175,880**	-61,234**
		(0.077)	(0.068)	(0.085)	(20,838)	(19,789)
Podiatrist		0.155*	0.165*	0.322**	-121,711**	-57,820*
		(0.066)	(0.066)	(0.082)	(18,620)	(21,811)
Chiropractor		-0.592**	-0.592**	-0.103	-137,906**	-37,489+
		(0.061)	(0.062)	(0.097)	(18,339)	(18,970)
Physicians *Apology law			-0.114**	-0.104+	5,611	-16,076
			(0.031)	(0.055)	(19,461)	(28,079)
Osteopathic *Apology law			-0.050	-0.009	3,285	-11,115
			(0.053)	(0.056)	(21,518)	(30,625)
Dentist *Apology law			0.080	0.087	38,996	67,503*
			(0.129)	(0.087)	(38,100)	(26,083)
Podiatrist*Apology law			-0.044	0.059	50,746	62,052*
			(0.104)	(0.080)	(32,907)	(23,611)
Chiropractor*Apology law			0.021	-0.062	52,443+	47,113*
			(0.077)	(0.129)	(26,285)	(20,603)
Other Law Change ^a	Х	Х	Х	Х	Х	Х
Other Covariates ^b	Х	Х	Х	Х	Х	Х
State-Year Fixed Effects	X	X	X	X	X	X
Medical Injuries Fixed Effects			-	X	-	X
N		234,826	82,838	234,826	82,838	82,838
R-squared		0.076	0.195	0.076	0.195	0.195
it oquarou		0.070	0.170	0.070	0.175	0.175

Appendix Table 1. Change in Claim Payout By Licensed Field

Note: The default category is other health practitioners (such as nurses, pharmacists, home aide etc)

(+ significant at 10%; * significant at 5%; ** significant at 1%)

a. Other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure

Appendix Table 2. Change in Claim Payout By Allegation Nature						
		log(payout		claim payout (Y2010 dollar)		
	(1)	(2)	(3)	(4)	(5)	
Apology Law Passed	-0.0561+			-772	8,591	
	(0.028)			(53,833)	(50,441)	
Diagnose	0.829**	0.849**	0.240*	138,310**	48,330	
	(0.105)	(0.104)	(0.100)	(37,056)	(33,445)	
Anesthesia	0.314*	0.286*	0.230*	159,710**	106,473**	
	(0.119)	(0.121)	(0.100)	(33,345)	(37,933)	
Surgery	0.446**	0.471**	0.397**	52,466	60,969*	
	(0.093)	(0.092)	(0.094)	(31,395)	(27,402)	
Medication	-0.046	-0.025	-0.112	37,745	8,995	
	(0.099)	(0.104)	(0.098)	(32,709)	(28,606)	
IV & Blood Product	0.345**	0.386**	0.052	88,674*	85,643	
	(0.116)	(0.113)	(0.165)	(37,235)	(96,066)	
Obstetrics	1.328**	1.367**	0.504**	343,260**	175,128**	
	(0.118)	(0.113)	(0.096)	(47,653)	(38,321)	
Treatment Related	-0.303**	-0.280**	-0.190*	-10,781	-21,486	
	(0.084)	(0.086)	(0.084)	(29,008)	(22,341)	
Monitoring Related	0.493**	0.496**	-0.133	120,475**	3,418	
e	(0.112)	(0.113)	(0.119)	(39,878)	(38,038)	
Equipment/Product Related	-0.660**	-0.684**	-0.288*	-67,572*	-27,788	
1 1	(0.098)	(0.097)	(0.124)	(29,449)	(25,118)	
Other Miscellaneous	-0.425**	-0.453**	-0.258*	-32,216	-23,491	
	(0.111)	(0.108)	(0.096)	(30,750)	(26,140)	
Diagnose *Apology	(0.111)	-0.052	-0.046	-26,968	-53,586	
Diagnose Apology		(0.069)	(0.054)	(68,062)	(59,057)	
Anesthesia *Apology		0.326*	-0.017	-42,015	-95,865	
mesuesia ripology		(0.129)	(0.093)	(65,224)	(62,052)	
Surgery *Apology		-0.0899*	-0.0987+	-28,499	-48,351	
Surgery reported		(0.035)	(0.053)	(55,875)	(46,520)	
Medication*Apology		-0.059	-0.180**	-44,820	-54,392	
incureation reportegy		(0.062)	(0.067)	(53,887)	(45,575)	
IV & Blood Product*Apology		-0.191	-0.261	-71,731	-113,164	
iv & blood Hodder Apology		(0.194)	(0.344)	(72,688)	(106,801)	
Obstetrics*Apology		-0.238+	-0.168+	-95,917	-133,869	
obsecures Apology		(0.132)	(0.089)	(97,806)	(85,840)	
Treatment Related*Apology		-0.076	-0.019	-27,504	-10,971	
Treatment Related Apology		(0.048)	(0.044)	(51,415)	(44,740)	
Monitoring Related*Apology		0.025	-0.014	-47,196	-63,714	
Wolltoning Kelated Apology		(0.098)	(0.086)	(72,373)	(60,778)	
Equipment/Product Related*Apology		0.138	0.000	-22,273	-27,689	
Equipment/Toduct Related Apology		(0.112)	(0.121)	(57,158)	(48,403)	
Other Miscellaneous*Apology		0.144*	-0.034	3,599	-27,142	
Other Wiscenaneous Apology		(0.063)	(0.065)	(57,513)	(45,055)	
_		. ,				
Other Law Change ^a	Х	Х	Х	Х	Х	
Other Covariates ^b	Х	Х	Х	Х	Х	
State-Year Fixed Effects	Х	Х	Х	Х	Х	
Medical Injury Fixed Effects			Х		Х	
N	234,826	234,826	82,838	234,826	82,838	
	234,820 0.08	234,820 0.08	82,838 0.198	0.08	82,838 0.198	
R-squared	0.06	0.06	0.198	0.06	0.190	

Appendix Table 2. Change in Claim Payout By Allegation Nature

Note: The default category is behavioral related cases. (+ significant at 10%; * significant at 5%; ** significant at 1%) a. Other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure

Dependent Variable	Cable 3. Change in Claim Payout By Malpractice log(payout)			claim payout (Y2010 dollar)	
-	(1)	(2)	(3)	(4)	(5)
Apology Law	-0.0965**			-36,355+	-36,261*
1 00	(0.034)			(21,356)	(14,980)
Failure to Diagnose	0.324**	0.333**	0.311**	18,759	42,463**
C	(0.032)	(0.032)	(0.035)	(14,094)	(9,813)
Delay in Diagnose	0.420**	0.428**	0.342**	26,749+	33,572**
	(0.030)	(0.032)	(0.043)	(13,435)	(10,681)
Delay in Treatment	0.266**	0.276**	0.199**	10,952	16,140
-	(0.043)	(0.042)	(0.050)	(19,211)	(19,130)
Improper Management	0.225**	0.243**	0.282**	19,440	55,846**
	(0.032)	(0.033)	(0.044)	(15,315)	(15,318)
Improper Performance	-0.118*	-0.034	0.274**	-65,370**	33,420+
	(0.048)	(0.047)	(0.039)	(21,808)	(16,827)
Improper Technique	-1.109**	-1.137**	0.150	-166,141**	14,601
	(0.074)	(0.071)	(0.098)	(27,647)	(30,761)
Surgical or Other Foreign Body	-1.143**	-1.148**	-0.107+	-216,907**	-26,325
Retained	(0.048)	(0.052)	(0.061)	(25,824)	(16,153)
Wrong or Misdiagnose	0.232**	0.249**	0.300**	4,531	23,893
	(0.051)	(0.051)	(0.060)	(17,528)	(17,794)
Failure to Diagnose		0.020	-0.021	11,932	-11,922
* Apology		(0.045)	(0.047)	(20,457)	(13,608)
Delay in Diagnose		0.036	0.045	39,681	20,754
* Apology		(0.056)	(0.053)	(25,721)	(18,837)
Delay in Treatment		-0.018	0.004	35,134	18,713
* Apology		(0.092)	(0.091)	(36,378)	(39,655)
Improper Management		-0.057	-0.001	-10,491	-26,259
* Apology		(0.051)	(0.041)	(22,710)	(18,000)
Improper Performance		-0.417**	-0.119*	-12,608	11,715
* Apology		(0.074)	(0.050)	(23,979)	(21,330)
Improper Technique		0.387*	0.085	50,971	53,581
* Apology		(0.164)	(0.095)	(44,147)	(34,849)
Surgical or Other Foreign Body		0.090	0.095	42,353	47,952+
Retained * Apology		(0.074)	(0.063)	(28,844)	(27,283)
Wrong or Misdiagnose		-0.026	0.061	713.5	14,133
* Apology		(0.054)	(0.068)	(18,010)	(18,188)
Other Law Change ^a	Х	Х	Х	Х	Х
Other Covariates ^b	Х	Х	Х	Х	Х
State-Year Fixed Effects	X	X	X	X	X
Medical Injury Fixed Effects			X		X
N	130,060	130,060	52,662	130,060	52,662
R-squared	0.075	0.076	0.201	0.076	0.201

Appendix Table 3. Change in Claim Payout By Malpractice Specific Act

Note: The default category is when the mistake is failure to monitor (1.64% of all cases)

(+ significant at 10%; * significant at 5%; ** significant at 1%)

a. Other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure

Dependent Variable		log(payout	t <u>)</u>	<u>claim payout (Y2010 dollar)</u>	
	(1)	(2)	(3)	(4)	(5)
Apology	-0.055			-144085	-94175
	(0.059)			(100,314)	(113,957)
Under 1 year		-0.100	-0.041	-74,733	-39,555
		(0.066)	(0.075)	(67,382)	(68,959)
Age 1-9	-0.771**	-0.872**	-0.266*	-329,358**	-133,071+
	(0.080)	(0.117)	(0.102)	(81,823)	(71,685)
Age 10-19	-1.166**	-1.295**	-0.449**	-421,130**	-169,965*
	(0.114)	(0.159)	(0.122)	(80,858)	(66,219)
Age 20-29	-0.997**	-1.085**	-0.273**	-399,839**	-150,610**
	(0.057)	(0.084)	(0.065)	(67,167)	(55,340)
Age 30-39	-0.852**	-0.925**	-0.155**	-379,302**	-135,814**
	(0.045)	(0.070)	(0.055)	(57,865)	(46,880)
Age 40-49	-0.848**	-0.941**	-0.205**	-391,001**	-149,509**
-	(0.052)	(0.070)	(0.055)	(57,023)	(46,422)
Age 50-59	-0.848**	-0.921**	-0.255**	-400,612**	-171,443**
	(0.059)	(0.075)	(0.057)	(61,681)	(50,660)
Age 60-69	-0.878**	-0.953**	-0.368**	-427,165**	-209,327**
	(0.063)	(0.069)	(0.057)	(61,002)	(51,919)
Age 70 or above	-1.146**	-1.276**	-0.700**	-506,073**	-286,150**
2	(0.063)	(0.089)	(0.068)	(68,714)	(57,734)
Under 1 year *Apology		-0.156	-0.181+	2,187	-24,760
		(0.139)	(0.107)	(102,021)	(113,295)
Age 1-9 *Apology		0.000	-0.003	97,049	40,521
		(0.090)	(0.096)	(120,610)	(133,107)
Age 10-19 *Apology		0.097	-0.011	129,697	67,035
		(0.149)	(0.122)	(112,154)	(118,034)
Age 20-29 * Apology		-0.046	-0.079	109,892	51,137
		(0.079)	(0.061)	(100,664)	(113,860)
Age 30-39 * Apology		-0.097	-0.0969*	109,557	60,173
		(0.060)	(0.046)	(96,422)	(108,666)
Age 40-49 * Apology		-0.031	-0.054	113,925	57,597
		(0.054)	(0.046)	(100,382)	(112,998)
Age 50-59 * Apology		-0.094	-0.071	120106	70,051
		(0.086)	(0.054)	(100,121)	(113,376)
Age 60-69 * Apology		-0.086	-0.067	124113	75773
		(0.100)	(0.061)	(100,645)	(113,658)
Age 70 or above * Apology		0.075	0.023	157,153	96,522
		(0.060)	(0.052)	(112,583)	(124,345)
Other Law Change ^a	Х	Х	Х	Х	Х
Other Covariates ^b	Х	Х	Х	Х	Х
State-Year Fixed Effects	X	X	X	X	X
Medical Injury Fixed Effects	21	1	X	2 x	X
N	77,341	77,341	77,341	77,341	77,341
R-squared	0.087	0.087	0.203	0.087	0.203
ix squared	0.007	0.007	0.203	0.007	0.205

Appendix Table 4. Change in Claim Payout By Patients' Age

Note: The default category is fetus. (+ significant at 10%; * significant at 5%; ** significant at 1%)

a. Other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure

Dependent Variable		log(payout	<u>claim payout (Y2010 dollar)</u>		
	(1)	(2)	(3)	(4)	(5)
Apology	-0.062			-29,692**	-30,685**
	(0.060)			(10,696)	(7,169)
Male Patient	0.226**	0.228**	0.024	53,347**	13,565*
	(0.018)	(0.018)	(0.018)	(5,802)	(5,661)
Male Patient * Apology		-0.004	-0.031	-11,949	-10,383
		(0.032)	(0.024)	(9,491)	(7,402)
Other Law Change ^a	Х	Х	Х	Х	Х
Other Covariates ^b	Х	Х	Х	Х	Х
State-Year Fixed Effects	Х	Х	Х	Х	Х
Medical Injury Fixed Effects			Х		Х
N	82,534	82,534	82,534	82,534	82,534
R-squared	0.111	0.111	0.398	0.057	0.193

Appendix Table 5. Change in Claim Payout By Patients' Gender

Note: The default category is female. (+ significant at 10%; * significant at 5%; ** significant at 1%)

a. Other law change includes non-economic damage cap, punitive damage cap, csr_tort, jsl_tort & law on information closure