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The Failure of"˜Sorry: An Empirical Evaluation of Apology Laws, Health Care, and Medical Malpractice

Benjamin J. McMichael
University of Alabama - School of Law, bmcmichael@law.ua.edu

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As part of the effort to contain the size and frequency of medical malpractice claims, many states have adopted apology laws. These laws make apologies from physicians to patients inadmissible in any subsequent court proceedings. The basic rationale behind apology laws is that meritless malpractice claims are less likely to be filed when a physician can apologize to his or her patient without risking those statements being used in court. Through the use of a unique dataset, this article corrects several misunderstandings concerning this new generation of tort reform.

First, it shows that while apology laws may reduce the frequency and size of malpractice claims as intended, they may also have a perverse effect on patients' propensity to litigate. If a physician knows more about whether a patient's injury was caused by malpractice than the patient, an apology could alert the patient to that malpractice and encourage the filing of a claim.

Second, the article provides the first empirical analysis of the effect of apology laws on clinical outcomes, investigating their ability to reduce the practice of defensive medicine. Examining over 1.6 million hospital stays for heart attack patients, the article finds no evidence that apology laws reduce defensive medicine. Apology laws do not decrease the intensity of treatment received by patients. In fact, they increase the medical resources used to treat heart attack patients, consistent with an increase in defensive medicine. Based on these empirical findings, the article concludes that apology laws are not effective tort reforms and that states should look to other policies if they wish to achieve the goals of apology laws.

[*] Postdoctoral Scholar, Vanderbilt University; J.D., Vanderbilt University Law School; Ph.D., Vanderbilt University; B.S., Wake Forest University. Thanks to Kevin Stack, W. Kip Viscusi, Clayton Masterman, and the members of the Vanderbilt Law and Economics Department for helpful comments and suggestions.

INTRODUCTION

Legal and psychological research has consistently demonstrated the value of apologies in legal contexts, finding that apologies can assuage the anger and soothe the aggression felt by victims following an injury, start the healing process for those victims, and restore prior relationships.[1] Beyond the important restorative and therapeutic benefits apologies have for victims, apologies can—by reducing victims' desire for vindication—decrease the propensity of victims to file suit, facilitate quicker settlements, and encourage parties to settle for smaller amounts.[2]

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[1] AARON LAZARE, ON APOLOGY 1 (2004) ("Apologies have the power to heal humiliations and grudges, remove the desire for vengeance and generate forgiveness on the part of the offended parties."); Aviva Orenstein, *Apology Excepted: Incorporating A Feminist Analysis Into Evidence Policy Where You Would Least Expect It*, 28 SW. U.L. REV. 221, 241 (1999) ("[A]pologies can transform individuals and regenerate relationships."); *see* Stephanos Bibas & Richard A. Bierschbach, *Integrating Remorse and Apology into Criminal Procedure*, 114 YALE L.J. 87, 88–90 (2004); Susan Daicoff, *Apology, Forgiveness, Reconciliation & Therapeutic Justice*, 13 PEPP. DISP. RESOL. L.J. 131, 134 (2013); Ken'ichi Ohbuchi et al., *Apology as Aggression Control: Its Role in Mediating Appraisal of and Response to Harm*, 56 J. PERS. SOC. PSYCHOL. 219, 221 (1989).

[2] *See* Carol B. Liebman & Chris Stern Hyman, *A mediation skills model to manage disclosure of errors and adverse events to patients* 23 HEALTH AFF. 22 (2004); Jeffrey S. Helmreich, *Does*

Despite the benefits of apologies, potential defendants have historically been counseled against apologizing because apologies themselves may be evidence of wrongdoing and thus may increase the likelihood that victims seek legal redress and improve victims' chances of prevailing in legal disputes.[3] Thus the paradox of apologies: apologizing may facilitate dispute resolution and reduce a party's overall risk from litigation, but a wrongdoer may be hesitant to apologize out of fear of future liability.

To address this paradox state legislatures have passed apology laws,[4] which are designed to facilitate apologies by reducing or eliminating the risk of apologizing for the wrongdoer. More specifically, apology laws are reforms to state evidentiary codes that prohibit a plaintiff from introducing into evidence a statement of apology, sympathy, or condolence by the defendant. In theory, once the defendant no longer fears the use of an apology against her at trial, she becomes free to apologize to the plaintiff, thereby generating all of the benefits of apologies while avoiding the costs. Although apology laws are formally changes to state rules of evidence, these laws function primarily as tort reforms.[5] Indeed, Yonathan Arbel and Yotam Kaplan recently noted that "despite appearances, apology laws *are* de-facto tort reform."[6] Moreover, as with other, more familiar tort reforms, the stated goals of apology laws include reducing the risk that a lawsuit will be filed and encouraging the quick resolution of those suits that are filed.[7] To say that the debate over tort reform remains contentious would be an understatement, and though apology laws have engendered less vitriol than other tort reforms, these laws have staunch advocates on both sides of the debate.[8]

"Sorry" Incriminate? Evidence, Harm and the Protection of Apology, 21 CORNELL J.L. PUB. POL'Y 567, 567 (2012) ("Apology has proven a dramatically effective means of resolving conflict and preventing litigation").

[3] *See, e.g.*, Jennifer K. Robbennolt, *Apologies and Legal Settlement: An Empirical Examination*, 102 MICH. L. REV. 460, 477 (2003) ("[A]ttorneys and others fear that any apology will be admitted into evidence as an admission of fault. Consequently, some clients are hesitant to apologize. Likewise, lawyers and insurance companies may be unlikely to advise their clients to apologize or to make any statement that could be construed as an apology. In fact, they may actively discourage such statements.").

[4] *See* Michelle Mello, David M. Studdert, & Allen Kachalia, *The Medical Liability Climate and Prospects for Reform*, 312 JAMA 2146, 2151 (2014) (discussing apology laws as a new type of reform effort).

[5] *See* Benjamin Ho & Elaine Liu, *Does Sorry Work? The Impact of Apology Laws on Medical Malpractice*, 43 J. RISK & UNCERTAINTY 141 (2011) [hereinafter Ho & Liu, *Does Sorry Work*] (treating apology laws as tort reforms); Benjamin Ho and Elaine Liu, *What's an Apology Worth? Decomposing the Effect of Apologies on Medical Malpractice Payments Using State Apology Laws*, 8 J. EMPIRICAL L. STUD. 179 (2011) [hereinafter Ho & Liu, *What's an Apology Worth*] (same); *see also* Yonathan Arbel & Yotam Kaplan, *Tort Reform through the Backdoor: A Critique of Law and Apologies*, 89 S. CAL. L. REV. 3 (forthcoming 2017) (arguing that advocates have treated apology laws as tort reforms).

[6] Arbel & Kaplan, *supra* note 5.

[7] *See infra* Part II.B.

[8] *See* Arbel & Kaplan, *supra* note 5, at 15–19 (discussing the legislative landscape of apology laws and tort reforms); *see also* Rogan Kersh, *Medical Malpractice and the New Politics of Health Care, in* MEDICAL MALPRACTICE AND THE U.S. HEALTH CARE SYSTEM 43, 49–63 (William M. Sage & Rogan Kersh eds., 2006) (discussing the politics of tort reform generally).

The discussion of apologies and apology laws has influenced policy changes in relatively short order, with 37 states adopting an apology law between 1999 and 2014.[9] In fact, apology laws now outstrip more familiar tort reforms, such as noneconomic damages caps, in popularity among states. While the merits of apologies have been discussed in a variety of contexts,[10] apology laws are primarily directed at medical malpractice, with a majority of enacted apology laws applying only to actions against health care providers.[11] Apology laws have even received attention at the federal level with then-Senators Barrack Obama and Hillary Clinton introducing legislation that included a federal apology law as one way to address high levels of medical malpractice litigation.[12] Accordingly, this Article focuses squarely on medical malpractice. Beyond the fact that medical malpractice is clearly the target of apology laws, it is an important context in which to investigate these laws because it has the potential to add significant costs to an already expensive health care system[13] and because it has been a salient locus for the tort reform debate over the last forty years.[14] Moreover, since prior work has focused on this area, it is possible to directly compare apology laws with other tort reforms.

Despite the widespread interest in apology laws and the fact that the ongoing debate over apology laws has demonstrated the capability to generate real policy change,[15] two important problems persist. First, the debate has become muddled, with state legislatures often conflating apology laws with apologies more generally and failing to treat apology laws as tort reforms, even though these laws are justified along the same lines as other tort reforms, are designed to achieve similar goals, and—like other reforms—are limited to medical malpractice.[16] This lack of consideration of apology laws in a tort reform context is problematic because states only evaluate apology laws in the narrow context of their ability to encourage apologies and, less commonly, their ability to reduce the number and size of malpractice claims. The effect of apology laws on the health care system

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[9] *See* Benjamin J. McMichael et al., *Sorry is Never Enough: The Effect of State Apology Laws on Medical Malpractice Liability Risk* 44 (Owen Graduate School of Management Working Paper, 2016), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2883693 (listing the states that have adopted apology laws).

[10] *See* Arbel & Kaplan, *supra*, note 5; Erin A. O'Hara & Douglas Yarn, *On Apology and Consilience*, 77 WASH. L. REV. 1121, 1124 (2002).

[11] *See* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 144 n.4 ("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.").

[12] *See* Hillary Rodham Clinton & Barrack Obama, *Making Patient Safety the Centerpiece of Medical Liability Reform*, 354 N. ENGL. J. MED. 2205, 2206 (2006) (discussing their proposal).

[13] *See* Michelle M. Mello et al., *National Costs of the Medical Liability System*, 29 HEALTH AFF. 1569, 1569 (2010) ("Overall annual medical liability system costs, including defensive medicine, are estimated to be $55.6 billion in 2008 dollars, or 2.4 percent of total health care spending.").

[14] *See* DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, REPORT OF THE SECRETARY'S COMMISSION ON MEDICAL MALPRACTICE (1973) (detailing an early investigation into the role of medical malpractice).

[15] Arbel & Kaplan, *supra* note 5, at 15 ("Much to the envy of legal scholars everywhere, the Legal Apologists have had a tremendous impact on policy.").

[16] *See infra* Part I.B.

more generally has been almost completely ignored, even though this effect is one of the most hotly debated points of contention with respect to other tort reforms.[17] Second and relatedly, in a recent comprehensive report prepared for the Medicare Payment Advisory Commission, two leading scholars noted that "[v]ery limited evidence exists on the effect of apology laws on liability and clinical outcomes."[18] In other words, even if lawmakers wanted to evaluate the effect of apology laws on the health care system, they lack the evidence necessary to do so.

This Article makes two main contributions to address each of these problems in the ongoing debate over apology laws. First, it provides clarity to this debate by explicitly situating apology laws in the tort reform context. Importantly, this discussion of apology laws as tort reforms demonstrates that, in addition to working as they are intended and generating all of the benefits associated with apologies, apology laws may have perverse effects and actually increase the risk of liability for physicians.[19] Second, this Article provides the first empirical evaluation of the effect of apology laws on clinical outcomes by examining these laws' influence on physicians' practice of defensive medicine.[20] Because the effects of apology laws as tort reforms are theoretically ambiguous, an empirical investigation is necessary to provide a clear picture of the role that these laws play in the health care system. To date, the only rigorous empirical analyses of apology laws have focused solely on the effects of these laws on medical malpractice settlements and damages awards, not on clinical outcomes.[21] Thus, the analysis presented here addresses the previously identified lack of evidence on clinical outcomes and fills a significant gap in the current understanding of apology laws.

To better understand apology laws beyond the courtroom, I use a nationally representative dataset of over 1.6 million hospital stays between 1999 and 2011 to analyze the effects of these laws on the treatment decisions of physicians caring for heart attack patients. Historically, cardiology and cardiothoracic surgery have been at high risk for medical malpractice lawsuits, and physicians practicing in these

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[17] *See infra* Part II.A.

[18] MICHELLE M. MELLO & ALLEN KACHALIA, MEDICAL MALPRACTICE: EVIDENCE ON REFORM ALTERNATIVES AND CLAIMS INVOLVING ELDERLY PATIENTS 90 (2016); *see also* Michelle M. Mello et al., *Medical Liability—Prospects for Federal Reform*, 376 N. ENG. J. MED (forthcoming 2017) (noting that "insufficient evidence" exists to evaluate the effects of apology laws).

[19] Ho & Liu, *Does Sorry Work*, *supra* note 5, at 155 (explaining that apology laws may have "unintended consequences").

[20] Physicians practice defensive medicine when they perform tests or procedures primarily for the purpose of avoiding future malpractice claims and not because those tests or procedures are medically necessary. *See* David M. Studdert et al., *Defensive medicine among high-risk specialist physicians in a volatile malpractice environment*, 293 JAMA 2609, 2609 (2005) (discussing defensive medicine). Defensive medicine has the potential to cause individual patients unnecessary pain and expense and to add substantial costs—often estimated in the tens of billions—to an already expensive health care system. *See* Kenneth D. Illingworth et al., *The Impact of Tort Reform and Quality Improvements on Medical Liability Claims: A Tale of 2 States*, 30 AM. J. OF MED. QUALITY 263, 263–270 (2015) (estimating the cost of defensive medicine to be $50 billion). Part II.A.3 *infra* discusses defensive medicine in detail.

[21] *See* McMichael et al., *supra* note 9, at 11–12; Ho & Liu, *Does Sorry Work*, *supra* note 5, at 141; Ho & Liu, *What's an Apology Worth*, *supra* note 5, at 179.

specialties have practiced defensive medicine.[22] Thus, cardiac care is an excellent context in which to evaluate the effects of apology laws on defensive medicine. Equally important, the availability of data on over 1.6 million hospital stays, which represent one out of every four heart attacks that occurred over a thirteen-year period, allows me to develop sound empirical evidence and draw robust conclusions about the role of apology laws in the care received by patients.[23] For each heart attack patient, I am able to observe the treatment received, up to fifteen additional diagnoses beyond the heart attack, how long the patient remained in the hospital, the cost of the hospital stay, and a variety of characteristics of the treating hospital. This information provides a nearly exhaustive view of the care received by individual patients, which in turn provides a complete view of the effects of apology laws.

In general, I find no evidence that physicians change the types of treatment that heart attack patients receive and thus no evidence that apology laws reduce the practice of defensive medicine. This stands in stark contrast to the effect of noneconomic damages caps which, for the same population of patients, reduce the provision of more medically intensive treatments.[24] However, I find consistent evidence that apology laws induce longer stays in the hospital, which is consistent with greater resource use and defensive medicine more generally.[25] I also find some evidence that apology laws increase the mortality risk faced by heart attack patients; thus, the longer hospital stays do not benefit patients.

Based on the results of the empirical analysis, I argue that apology laws fail as tort reforms, as they do not reduce, and indeed increase, the practice of defensive medicine. I also explore why apology laws may have this perverse and counterintuitive effect. Specifically, the evidence suggests these laws encourage physicians to deliver ineffective apologies that signal the occurrence of malpractice to patients who otherwise would not have discovered it. In this way, apology laws can increase physicians' risk of facing malpractice claims and, in turn, encourage the increased practice of defensive medicine. Based on the propensity of apology laws to increase the practice of defensive medicine, I make two recommendations. First, state legislatures should look to alternative reforms if they desire to accomplish the goals of tort reform, including the reduction of medical malpractice claims and the practice of defensive medicine. Second, individual physicians should *not* apologize unless they have received the training necessary to do so effectively—training that does not accompany the passage of apology laws.

The remainder of this Article proceeds as follows. Section I discusses the interpersonal and societal benefits of apologies and the formalization of apologies through apology laws. Section II discusses apology laws in a tort reform context

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[22] Daniel Kessler & Mark McClellan, *Do doctors practice defensive medicine?*, 111 Q.J. ECON. 353, 363 (1996); David M. Studdert et al., *Prevalence and Characteristics of Physicians Prone to Malpractice Claims*, 374 NEW ENG. J. MED. 354, 357 (2016).

[23] Ronen Avraham & Max Schanzenbach, *The Impact of Tort Reform on Intensity of Treatment: Evidence From Heart Patients*, 39 J. HEALTH ECON. 273, 276 (2015) (examining similar data as that analyzed here and estimating that approximately 25% of all heart attacks are included in the data).

[24] *Id*. at 278–82.

[25] As discussed in greater detail below, length of stay is often used in the medical literature as a proxy for resource use associated with a particular patient. *See infra* Part III.B.

and explains how these laws may benefit patients and what factors may cause apology laws to have unintended consequences, such as an increase in litigation. Section III empirically investigates the effects of apology laws on physician treatment decisions and other clinical outcomes. Section IV discusses the policy implications of this empirical analysis and makes specific recommendations based on that analysis.

I. APOLOGIES AND APOLOGY LAWS

Prior work on apologies and apology laws has focused primarily on the ability of the latter to achieve the benefits associated with the former. While this remains an important line of inquiry, it is important to recognize that *apologies* in a legal context and *apology laws* are distinct. Accordingly, this section provides an overview of the benefits of apologies in a legal context before separately tracing the development of apology laws.

A. The Benefits of "Sorry"

Though hard to define with exacting specificity, "apologies are described generally as admissions of blameworthiness and regret for doing harm."[26] While most people likely understand intuitively the value of apologies in their personal interactions, psychological and legal research has documented benefits of apologies that extend well beyond everyday interactions.[27] First, a number of scholars have expounded on the therapeutic benefits of apologies in general. Second, within the context of litigation, research has demonstrated that apologies can reduce the likelihood of claims, shorten settlement times, lower settlement amounts, and generally facilitate dispute resolution.

1. Apologies and Reparative Discourse: The Therapeutic Effects of "Sorry"

Psychological research has demonstrated that apologies can soothe the aggression that victims feel following a harm.[28] In general, following "a heartfelt apology, victims . . . report feeling near instantaneous erosion of anger and pain."[29] Research on the effects of apologies has found that, by apologizing, the offender acknowledges her fault and recognizes the victim's harm.[30] In doing so, the

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[26] O'Hara & Yarn, *supra* note 10, at 1130–31; *see also* Aaron Lazare, *The Healing Force of Apology in Medical Malpractice and Beyond*, 57 DEPAUL L. REV. 251, 255 (2008) ("An apology, in its simplest terms, is an acknowledgement of responsibility for an offense coupled with an expression of remorse.").

[27] Arbel & Kaplan, *supra* note 5, at 10 n.29 (reporting that 326 articles have addressed apologies in the legal literature alone); *see also* Xuan-Thao Nguyen, *Apologies as Intellectual Property Remedies: Lessons from China*, 44 CONN L. REV. 883, 891 (2012) ("In the last two decades, apology legal scholarship has become increasingly robust.").

[28] Ken'ichi Ohbuchi et al., *supra* note 1.

[29] O'Hara & Yarn, *supra* note 10, at 1124.

[30] *See* LAZARE, *supra* note 1, at 107 (discussing the role that acknowledgement plays in apologies); *see also* Lee Taft, *Apology Subverted: The Commodification of Apology*, 109 YALE L. J. 1135,

offender alters how the victim attributes the cause of the negative action to the offender, thereby mollifying the anger and aggression a victim typically experiences following a harm.[31] Even though an apology implies a level of culpability, psychological experiments have consistently found that an apology nevertheless causes a victim to reduce her attribution of fault to the offender and increases the perception that the reasons for the harm were outside of the offender's control.[32]

In addition to soothing aggression and assuaging anger, apologies can serve broader purposes. For example, Susan Daicoff has explained that "[a]pology, forgiveness, and reconciliation can have great benefits by reducing . . . negative emotions and improving the potential for individual reform . . . [and] can maximize the therapeutic aspects of legal matters and minimize the anti-therapeutic ones for wrongdoers and affected persons alike."[33] Daicoff further noted that apologizing can foster therapeutic guilt within the wrongdoer (which can motivate future changes in behavior), allow victims to release anger in a healthy manner, facilitate victims' movements through the grief process,[34] and "begin to restore to the harmed person what was taken away by the apologizer's acts."[35]

In the realm of medical malpractice, Aaron Lazare has explained that apologies can be particularly important because "there is so much at stake—such as the patient's functioning and survival—[and] time is precious."[36] An apology from a physician to a patient can serve many healing functions, including allowing the patient to "feel[] cared for," facilitating the "[r]estoration of self-respect and dignity," encouraging the "[r]estoration of power," acknowledging the "[s]uffering of the offender" (i.e., the physician), and "[a]ssur[ing] shared values."[37] When physicians, who often serve in positions of great trust, commit errors that result in harm to patients, the experience can prove incredibly jarring. In this setting, apologies can be particularly important as a means to begin the healing process.

2. Apologies and Litigation: The Role of "Sorry" in Dispute Resolution

The benefits of apologies outside of litigation have been well-documented, and many of these have the potential to facilitate dispute resolution. In general,

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1136–37 (2000) (relating the story of the anger a young woman felt after the physicians who negligently caused the death of her husband failed to apologize).

[31] Bernard Weiner et al., *Public Confession and Forgiveness*, 59 J. PERS. 281, 308 (1991).

[32] For an in depth discussion of this paradoxical effect of apologies and the experiments demonstrating it, see Jennifer K. Robbennolt, *Apologies and Reasonableness: Some Implications of Psychology for Torts*, 59 DEPAUL L. REV. 489, 492 (2010).

[33] Susan Daicoff, *Apology, Forgiveness, Reconciliation & Therapeutic Jurisprudence*, 13 PEPP. DISP. RESOL. L.J. 131, 143 (2013).

[34] *Id*. at 144–49

[35] *Id*. at 149; *see also* Stephano Bibas & Richard A. Bierschbach, *Integrating Remorse and Apology into Criminal Procedure*, 114 YALE L.J. 85, 90 (2004) (arguing that "[a]pology . . . is a powerful ritual for offenders, victims, and communities" and that apologies can serve to refocus the legal system on "constructive measures to heal offenders, victims, and communities"); *id.* at 103 (noting that apologies can play an important role in "restorative justice").

[36] Lazare, *supra* note 26, at 264.

[37] *Id*. at 263.

apologies can affect legal disputes through several different avenues.[38] Psychological research has demonstrated that the course of a dispute can be influenced by how those involved perceive that dispute.[39] Prior work has also found that the course of a dispute depends on factors such as whether the injured party feels she has been treated fairly and whether she attributes causation and fault to the offender.[40] Apologies can affect perceptions of the dispute and these other relevant factors by influencing how participants interpret "fair versus unfair treatment, attributions of responsibility, and perceived dignity vis-à-vis the wrongdoer," thereby "lead[ing] to greater willingness to settle claims and greater satisfaction with outcomes."[41]

A number of explanations for the positive effects of apologies on disputes have been advanced over the years. For example, one reason victims may be less likely to pursue a dispute following an apology is that they infer from the apology that the cause of the underlying incident is less stable and that, therefore, the incident is less likely to be repeated.[42] Victims often report that they pursue lawsuits not to receive compensation but to change the injurer's behavior in the future, thus preventing future harm.[43] If victims pursue litigation in order to ensure that the harmful actions will not recur, then victims' perceptions of apologies as indicators that the harmful actions are less likely to be repeated suggests that apologies would increase settlements and decrease litigious behavior by victims.[44] Another explanation for why apologies may increase settlements and facilitate dispute resolution more generally comes from equity theory. According to this theory, the injury inflicted on the victim by the wrongdoer creates an inequity, or

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[38] Jennifer K. Robbennolt, *Apologies and Legal Settlement: An Empirical Examination*, 102 MICH. L. REV. 460, 477 (2003) ("[R]esearch on the factors that lead injured parties to instigate and pursue legal claims suggests several avenues by which an apology might influence settlement behavior."); *see also, e.g.*, Mark Bennett & Deborah Earwaker, *Victim's Response to Apologies: The Effects of Offender Responsibility and Offense Severity*, 134 J. SOC. PSYCHOL. 457 (1994); Gregg J. Gold & Bernard Weiner, *Remorse, Confession, Group Identity, and Expectancies about Repeating a Transgression*, 22 BASIC & APPLIED SOC. PSYCHOL. 291 (2000); Holley S. Hodgins & Elizabeth Liebeskind, *Apology Versus Defense: Antecedents and Consequences*, 39 J. EXPERIMENTAL SOC. PSYCHOL. 297 (2003); Ken-ichi Ohbuchi & Kobun Sato, *Children's Reactions to Mitigating Accounts*, 134 J. SOC. PSYCHOL. 5 (1994); Steven J. Scher & John M. Darley, *How Effective Are the Things People Say to Apologize? Effects of the Realization of the Apology Speech Act*, 26 J. PSYCHOLINGUISTIC RES. 127, 134–35 (1997).

[39] Robbennolt, *supra* note 38, at 477

[40] *Id.*

[41] *Id.*

[42] *See* Gold & Weiner, *supra* note 38, at 291.

[43] Thomas H. Gallagher et al., *Patients' and Physicians' Attitudes Regarding the Disclosure of Medical Errors*, 289 JAMA 1001, 1002 (2003); Gerald B. Hickson et al., *Factors That Prompted Families to File Medical Malpractice Claims Following Prenatal Injuries*, 267 JAMA 1359, 1361 (1992); Charles Vincent et al., *Why Do People Sue Doctors? A Study of Patients and Relatives Taking Legal Action*, 343 LANCET 1609, 1612 (1994); Amy B. Witman et al., *How Do Patients Want Physicians to Handle Mistakes? A Survey of Internal Medicine Patients in an Academic Setting*, 156 ARCHIVES OF INTERNAL MED. 2565, 2566 (1996).

[44] Robbennolt, *supra* note 38, at 473.

moral imbalance, in their relationship.[45] Individuals are motivated to restore equity to inequitable relationships, and one way to achieve this restoration is an apology.[46] These two theories are not the only ones that have been advanced in the context of apologies and litigation, but they have in common with other theories and explanations that apologies generally facilitate dispute resolution and decrease litigation.[47]

Experimental and empirical research has generally borne out these theoretical predictions. Jennifer Robbennolt conducted a series of studies in which participants assumed the perspective of the victim and were asked to evaluate a settlement offer from the injurer.[48] She found that victims who received an apology were more likely to have a favorable view of the injurer and to accept a settlement offer.[49] Studies focusing specifically on health care and medical malpractice have yielded similar results. For example, Kathleen Mazor and others examined patients' responses to medical errors in an experimental setting.[50] Members of a health care plan were provided with vignettes describing a medical error and the physician's response to that error.[51] In the hypothetical, the physician either denied responsibility and offered little information or took responsibility for the error and offered detailed information on steps that would be taken to prevent similar errors in the future.[52] Participants who read the vignette in which the physician took responsibility responded that they would be less likely to seek legal advice regarding the medical error, and nearly 90% of participants reported that, in the event of an error, they would prefer that the physician say she was "sincerely sorry."[53]

Similarly, other studies relying on experiments and surveys in the medical malpractice context have found that individuals are less likely to pursue a claim

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[45] *Id*. at 477; *see generally* Elaine Walster et al., *New Directions in Equity Research*, 25 J. PERS. & SOC. PSYCHOL. 153–163 (1973).

[46] Robbennolt, *supra* note 38, at 477; Walster, *supra* note 45, at 263.

[47] For examples of other theories, see Orenstein, *supra* note 1, at 241 ("[A]pologies can transform individuals and regenerate relationships."); NICHOLAS TAVUCHIS, MEA CULPA: A SOCIOLOGY OF APOLOGY 13 (1991) ("An apology thus speaks to an act that cannot be undone but that cannot go unnoticed without compromising the current and future relationship of the parties, the legitimacy of the violated rule, and the wider social web in which the participants are enmeshed.").

[48] *See also* Russell Korobkin & Chris Guthrie, *Psychological Barriers to Litigation Settlement: An Experimental Approach*, 93 MICH. L. REV. 107 (1994) (finding that, when asked to evaluate a settlement offer by a hypothetical landlord, hypothetical tenants were marginally more likely to accept the offer of settlement when the landlord apologized).

[49] *See* Robbennolt, *supra* note 38, at 497 (noting that hypothetical victims who received an apology were more likely to accept a settlement offer); Jennifer K. Robbennolt, *Apologies and Settlement Levers*, 3 J. EMPIRICAL L. STUD. 333, 367–68 (2006) ("[A]pologies can promote settlement by altering the injured parties' perceptions of the situation and the offender so as to make them more amenable to settlement discussions and by altering the values of the injured parties' settlement levers in ways that are likely to increase the chances of settlement.").

[50] Kathleen M. Mazor et al., *Health Plan Members' Views about Disclosure of Medical Errors*, 140 ANNALS INTERNAL MED. 409 (2004) [hereinafter Mazor et al., ANNALS]; *see also* Kathleen M. Mazor et al., *Health plan members' views on forgiving medical errors*, 11 AM. J. MANAGED CARE 49 (2005).

[51] Mazor et al., ANNALS, *supra* note 50, at 409–11.

[52] *Id*. at 409–11.

[53] *Id*. at 415.

against a physician following a medical error if the physician proffers an apology. Amy Witman, Deric Park, and Steven Hardin found that "patients were significantly more likely to either report or sue the physician when he or she failed to acknowledge the mistake."[54] A subsequent study found that 37% of survey respondents would not have sued their physician following a medical error if they had received a full apology and explanation.[55] Perhaps the most well-known study in this area was conducted by Gerald Hickson and his colleagues.[56] One of the first studies to empirically document that remuneration was not necessarily the primary reason individuals file malpractice claims, Hickson et al. noted that "24% [of patients] indicated that they filed when they realized that physicians had failed to be completely honest with them about what happened," which was the same percentage of patients that indicated they filed a claim because they needed money to care for the injuries caused by medical errors.[57]

Beyond experimental studies, other evidence has confirmed that, when implemented as part of hospital- or system-wide programs, apologies can reduce both the frequency and average size of medical malpractice claims.[58] For example, studying Pennsylvania hospitals, Carol Liebman and Chris Hyman concluded that "[o]pen communication and mediation that offers emotional as well as financial satisfaction hold the promise of addressing both problems in a way that is fair to doctors, patients, and families."[59] One specific apology and disclosure program that has been well-studied was implemented at the University of Michigan Health System. One study that examined this program found that the number of monthly claims, i.e., demands for compensation, decreased by 36% and that the number of lawsuits fell by 65% relative to pre-implementation rates.[60] Of the claims and lawsuits that were still asserted, the hospital saved nearly 60% in compensation paid out to claimants and saw its mean lawsuit costs fall from just over $400,000 to just over $225,000.[61] A later study of the Michigan program found that payments to claimants decreased by 47% and that the time to resolution decreased from nearly

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[54] Witman et al., *supra* note 43, at 2566; *see also* Marlynn L. May & Daniel B. Stengel, *Who Sues Their Doctors? How Patients Handle Medical Grievances*, 24 L. & SOC'Y REV. 105 (1990) (reporting similar findings).

[55] Vincent et al., *supra* note 43, at 1612.

[56] Hickson et al., *supra* note 43, at 1361.

[57] *Id*.

[58] *See, e.g.*, Steve S. Kraman & Ginny Hamm, *Risk Management: Extreme Honesty May be the Best Policy*, 131 ANNALS OF INTERNAL MED. 963 (noting that, after it implemented an investigation, disclosure, and apology program, a Veteran's Affairs hospital in Kentucky enjoyed financial savings); CAROL B. LIEBMAN & CHRIS STERN HYMAN, MEDICAL ERROR DISCLOSURE, MEDIATION SKILLS, AND MALPRACTICE LITIGATION: A DEMONSTRATION PROJECT IN PENNSYLVANIA 7, *available at* http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.596.1143&rep=rep1&type=pdf ("Open communication and mediation that offers emotional as well as financial satisfaction hold the promise of addressing both problems in a way that is fair to doctors, patients, and families.").

[59] LIEBMAN & HYMAN, *supra* note 58, at 7; *see also* Carol B. Liebman & Chris Stern Hyman, *A mediation skills model to manage disclosure of errors and adverse events to patients*. 23 HEALTH AFF. 22 (2004). At the time of the study, Pennsylvania had not enacted an apology law.

[60] Allen Kachalia et al., *Liability Claims and Costs Before and After Implementation of a Medical Error Disclosure Program*, 153 ANNALS INTERNAL MED. 213, 215 (2010). Michigan did not pass an apology law until 2011—one year after this study was published.

[61] *Id*.

two years to only six months.[62] Yet another study concerning this program found a statistically significant reduction in the number of patient encounters resulting in a claim, the average payment per claim, and the time to resolution of a claim.[63]

While these "programs, typically implemented at well-resourced academic medical centers, have reported substantially lower malpractice claims and costs," their results may not be generalizable, given their somewhat unique medical settings.[64] Efforts to generalize apology and disclosure programs are ongoing, such as the Agency for Health Care Research and Quality's CANDOR toolkit.[65] However, this toolkit, like all hospital-specific programs, still requires that institutions take affirmative steps to implement it, limiting its generalizability. On the other hand, apology laws, which are discussed in the next Section, apply to every health care provider in states that have enacted them.

B. Legalizing "Sorry": The Rapid Development of Apology Laws

Apology laws are states' attempts to generate the benefits of apologies across their entire health care systems. The reasoning that underlies these laws is straightforward.[66] Physicians (and other providers) could avoid some malpractice disputes and attenuate the severity of those disputes that do occur by apologizing. However, physicians avoid apologizing because they believe (or have been counseled) that doing so could expose them to increased risk of liability since an apology would generally be admissible as evidence of liability (as an admission against interest).[67] Apology laws, in theory, eliminate this risk by rendering a physician's apology inadmissible as evidence in any subsequent malpractice proceeding.[68]

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[62] Richard C. Boothman, et al., *A better approach to medical malpractice claims?: the University of Michigan experience*, 2 J. HEALTH LIFE SCI. L. 125 (2009).

[63] Megan A. Adams et al., *Effect of a Health System's Medical Error Disclosure Program on Gastroenterology-Related Claims Rates and Costs*, 109 AM. J. GASTROENTEROLOGY 460 (2014) (finding that cases were resolved 26% faster).

[64] Ho & Liu, *What's an Apology Worth*, *supra* note 5, at 181 ("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.").

[65] *See* AHRQ, *Communication and Optimal Resolution (CANDOR) Toolkit*, https://www.ahrq.gov/professionals/ quality-patient-safety/patient-safety-resources/resources/candor/introduction.html.

[66] *See, e.g.*, California Assembly Comm. on Judiciary, *Historical Notes to Cal. Evid. Code* § 1160 (noting in reference to California's apology law that "[t]he author introduced this bill in an attempt to reduce lawsuits and encourage settlements by fostering the use of apologies in connection with accident-related injuries or death"); *see also, e.g.*, Haw. Rev. Stat. Ann. § 626-1, Rule 409.5 ("The rule favors expressions of sympathy as embodying desirable social interactions and contributing to civil settlements.").

[67] Robbennolt, *supra* note 38; *see* Robin E. Ebert, Note, *Attorneys, Tell Your Clients to Say They're Sorry: Apologies in the Health Care Industry*, 5 IND. HEALTH L. REV. 337, 338 (2008) ("Apologizing in the wake of a medical error, however, is not a common practice among physicians."); *see also* Phinney v. Vinson, 605 A.2d 849, 850 (Vt. 1992) (finding the defendant physician's apology to be admissible as an admission against interest).

[68] *See* Tenn. R. Evid. 409.1 ("The underlying theory of Rule 409.1 is that a settlement of a lawsuit is more likely if the defendant is free to express sympathy for the plaintiff's injuries without making

However, not all apology laws are created equally, and these laws can be broadly categorized as either "partial apology laws" or "full apology laws."[69] Partial apology laws protect statements of sympathy, condolence, and apology, but they *do not* protect statements admitting fault, error, or negligence. For example, Virginia's apology law, which is a partial apology law, provides that "statements . . . expressing sympathy, commiseration, [or] condolence . . . together with apologies that are made by the health care provider . . . to the patient . . . shall be inadmissible as evidence of an admission of liability."[70] The law specifically provides that "[a] statement of fault . . . shall not be made inadmissible."[71] On the other hand, full apology laws protect all of the statements protected by partial laws but additionally protect statements of fault or liability. For example, Georgia's full apology law protects both general statements of apology and condolence as well as outright admissions of "mistake" or "error."[72]

Since Massachusetts enacted the first (partial) apology law in 1986,[73] partial apology laws have proved substantially more popular than their cousins that offer more protection. Texas enacted the nation's second partial apology law in 1999, and since that time, 31 states have enacted their own partial apology laws.[74] Colorado enacted the first full apology law in 2003, and four more states have since enacted similar laws. Figure 1 provides an overview of the development of apology laws over time, and Table A1 in the Technical Appendix provides a comprehensive listing of the enactment of apology laws since 1986.[75] As is evident from Figure 1, only a very small proportion of the population of the United States was covered by an apology law in 1999, but a substantial majority of Americans were subject to such a law by 2011.

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a statement that would be admissible as an admission of a party opponent. Without this rule, a defendant's statement such is 'I am sorry that you have suffered so much from the accident' might well be admissible as an admission of a party opponent. Accordingly, defense counsel may advise against making such statements in order to avoid the creation of harmful evidence. Yet a simple apology may go a long way toward making an injured party feel more comfortable with a nonjudicial settlement of the matter.").

[69] *See* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 145 (using the same terminology). *But see* McMichael et al., *supra* note 9, at 7 (calling "partial apology laws" simply "apology laws" and "full apology laws" simply "admission laws").

[70] VA. CODE ANN. § 8.01-581.20:1.

[71] *Id.*

[72] *Id.*

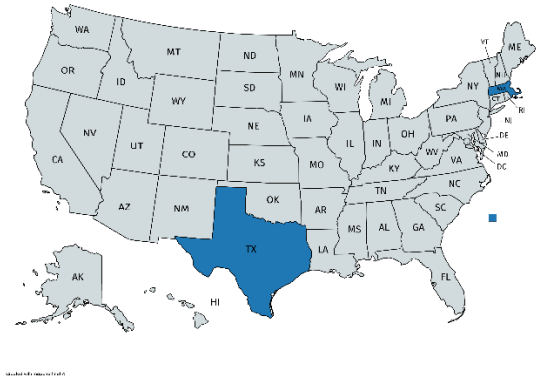
[73] MASS. GEN. LAWS CH. 233, § 23D.

[74] Here and throughout this Article, I treat the District of Columbia as a state for the purposes of apology laws.

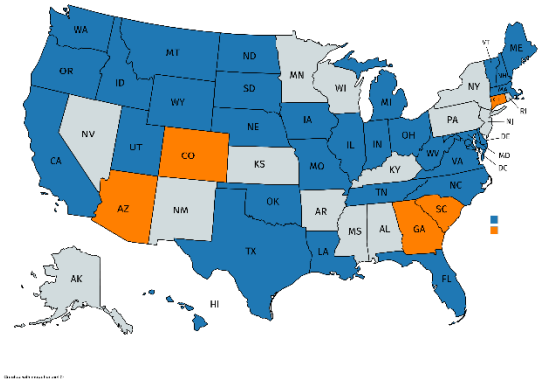
[75] All figures and tables with the prefix "A" may be found in the Technical Appendix.

Figure 1: Apology Laws Over Time

1999



2011



Partial Apology Law *Full Apology Law* *No Apology Law*

The importance of apology laws in the health care context is evidenced by the fact that, of the 38 states that have passed an apology law to date, the majority limit the application of these laws to the health care arena.[76] This importance is further demonstrated by proposed federal action on apology laws in health care. In September 2005, then-Senators Hillary Clinton and Barrack Obama co-sponsored the National Medical Error Disclosure and Compensation (MEDiC) Bill, which included the creation of a federal apology law.[77] Arguing in favor of their bill, Clinton and Obama acknowledged that the American health care system faced a number of problems related to malpractice litigation, including that "in some specialties, high premiums [were] forcing physicians to give up performing certain high-risk procedures [and] leaving patients without access to a full range of medical services."[78] On the other hand, the Senators explained that "[i]nstead of focusing on the few areas of intense disagreement, such as the possibility of mandating caps on the financial damages awarded to patients, [they] believe[d] that the discussion should center on a more fundamental issue: the need to improve patient safety."

[76] *See supra* note 11 and accompanying text.
[77] *See* National MEDiC Act, S.1784, 109th Cong.
[78] Clinton & Obama, *supra* note 12, at 2205.

Their proposal to improve patient safety, as contained in the MEDiC Bill, included a federal apology law. Specifically, they noted that "[a]ny apology offered by a health care provider during negotiations shall be kept confidential and could not be used in any subsequent legal proceedings as an admission of guilt if those negotiations ended without mutually acceptable compensation."[79]

In addition to illustrating the salience of apology laws, the rhetoric surrounding this bill, which echoed the rhetoric surrounding many state apology laws, demonstrates that these laws are best understood as a species of tort reform. Indeed, Clinton and Obama specifically juxtapose apology laws and damages caps in their defense of the MEDiC Bill. Though the MEDiC Bill failed to pass, the bill's failure does not appear to have deterred states, with 12 states passing apology laws in the years following the introduction of the MEDiC Bill. The rapid development of apology laws across the country demonstrates the success of the so-called "legal apologists" in convincing state legislatures of the benefits of apologies.[80] However, while the legal apologists have enjoyed success in state capitols across the country and even attracted the attention of federal officials who have historically been opposed to tort reform,[81] the apology law movement has not been without internal divisions. For example, one important objection to apology laws is that they negate the moral value of apologies. Lee Taft explained that an apology "is moral . . . because the person who apologizes . . . exposes himself to the consequences of his wrongful act."[82] Apology laws, which are specifically designed to eliminate the legal consequences of apologizing, may therefore strip apologies of their moral meaning.[83] In other words, apology laws may "'cheapen the meaning of an apology,' because the wrongdoer knows she has nothing to lose by apologizing."[84] Stripped of their moral value, some commentators have argued that apologies will be unable to achieve the individual and social benefits described above[85] and that apologies will simply be used as strategic tools to reduce legal risk.[86]

While this objection illustrates that apology laws are not without their limitations, these laws have nonetheless been proposed as a new generation of tort

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[79] *Id.*

[80] Arbel & Kaplan, *supra* note 5, at 6.

[81] Former President Obama has previously stated his opposition to noneconomic damages caps. *See* CBS, 60 Minutes, September, 11, 2009.

[82] Lee Taft, *Apology Subverted: The Commodification of Apology*, 109 YALE L. J. 1135, 1142 (2000).

[83] Lee Taft, *Apology Within a Moral Dialectic: A Reply to Professor Robbennolt*, 103 MICH. L. REV. 1010, 1013 (2005) (arguing that, when an apology lacks consequences, "we risk subverting its moral dimension"); *see also id*. (arguing that only unprotected apologies can fulfill the moral and ethical purposes of apologies).

[84] Ebert, *supra* note 67, at 364; *see also* Benjamin Ho, *Apologies as Signals: With Evidence from a Trust Game*, 58 MGMT. SCI. 141, 142–43 (2012) (discussing apologies in the context of "cheap talk").

[85] Ebert, *supra* note 84, at 364 ("[P]hysicians who utilize apologies as a means to manipulate the injured party may engender hostility between the parties, rather than easing the conflict by offering a genuine expression of sympathy.").

[86] *See* O'Hara & Yarn, *supra* note 10, at 1186 ("[A]pology can be used as a tool for organizations to strategically take advantage of individual victims' instincts to forgive in the face of apology.").

reform that may be able to promote better communication between patients and physicians, thereby controlling the costs associated with malpractice liability in the health care system. The next section discusses apology laws as a form of tort reform in greater detail.

II. APOLOGY LAWS: TORT REFORMS IN DISGUISE

Following a decade-long lull that roughly coincided with the debate over the Affordable Care Act ("ACA"), tort reform has begun to return to the forefront of the national health care discussion, with Congress considering a variety of potential reforms to the health care system recently.[87] Perhaps the gold standard of these reforms is a cap on noneconomic damages, which prevents courts from awarding damages for harms such as pain and suffering above the cap amount. California spearheaded the modern movement towards noneconomic damages caps, and other "damages-centric reforms,"[88] beginning in 1975 with its Medical Injury Compensation Reform Act ("MICRA").[89] Since these damages-centric reforms first became popular in the 1970s and 1980s, states have experimented with other types of reforms.[90] Most of these later reforms have failed to surpass the original reforms in popularity,[91] but apology laws are an exception to this trend.

While apology laws have outstripped noneconomic damages caps and other reforms in popularity among state legislatures, their place within the overall landscape of the tort reform debate remains nebulous for two important reasons. First, because apology laws are often viewed as simple measures to encourage apologies, their ability to function as tort reforms is often overlooked. Second, while traditional damages-centric reforms have been subject to intense empirical scrutiny over the past three decades,[92] apology laws have gone largely unexamined.[93] This Section offers some clarity on the debate over apology laws as tort reforms. It first discusses the ongoing debate concerning tort reform before

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[87] Kimberly Kindy, *House GOP quietly advances key elements of tort reform*, WASH. POST, March 9, 2017, https://www.washingtonpost.com/national/house-gop-quietly-advances-key-elements-of-tort-reform/2017/03/09/d52213b2-0414-11e7-b1e9-a05d3c21f7cf_story.html?utm_term=.e26c8fd1d34a; *see also* Robert Pear, *G.O.P. Bill Would Make Medical Malpractice Suits Harder to Win*, N.Y. TIMES, April 15, 2017, https://www.nytimes.com/2017/04/15/us/politics/republicans-health-care-bill-medical-malpractice-suits.html.

[88] By damages-centric reforms, I mean tort reforms that act directly on a court's ability to impose or apportion damages. Beyond noneconomic damages caps, other "damages-centric" reforms include caps on punitive damages, caps on total damages, and reforms to the traditional joint and several liability rule.

[89] For a review of the historical development of tort reforms, see Deborah L. Rhode, *Frivolous Litigation and Civil Justice Reform: Miscasting the Problem, Recasting the Solution*, 54 DUKE L.J. 447 (2004).

[90] Rogan Kersh, *Medical Malpractice and the New Politics of Health Care*, *in* MEDICAL MALPRACTICE AND THE U.S. HEALTH CARE SYSTEM 43, 46 (William M. Sage & Rogan Kersh, eds., 2006); *See id.* at 48 (discussing a series of "first generation" and "second generation" tort reforms).

[91] *See id.* at 43–54.

[92] *See* MELLO & KACHALIA, *supra* note 18, at 32–61.

[93] *Id*. at 90; *see also* Mello et al., *supra* note 18, at 3.

examining how apology laws can function as tort reforms. It then reviews the scant empirical evidence on apology laws as tort reforms.

A. The Tort Reform Debate

Staunch advocates populate both sides of the ongoing debate over tort reform. Typically, those in favor of tort reform tend to be physicians, hospitals, and others connected with the health care industry. On the other side of the debate, the most vocal advocates tend to be plaintiffs' attorneys. Historically—though by no means exclusively—Republicans have been greater allies in the push for tort reform than have Democrats.[94] While the debate has been raging for over four decades, with each side making numerous nuanced arguments, three general points of contention dominate the discussion. This section engages with this ongoing debate, discussing the evidence and arguments made in connection with each point.

1. Medical Malpractice Litigation: Too Much or Too Little?

Beginning with the pro-tort-reform point of view, proponents argue that too many medical malpractice claims are filed in the United States and that a large percentage of these claims are frivolous. The American Medical Association ("AMA") contends that "most liability claims are without merit," and some empirical evidence supports this claim.[95] For example, analyzing data from 24 malpractice insurers, researchers concluded that more than 75% of claims result in no payment to the complainant[96] and projected that, "by the age of 65 years, 75% of physicians in low-risk specialties and 99% of those in high-risk specialties [would have] face[d] a claim."[97] Examining another data source, other researchers found that only 55% of claims against physicians resulted in litigation and that 54% of those cases that were litigated were dismissed.[98] Based on this evidence, the AMA argues that "most liability claims are without merit" and further notes that, as a result of this high volume of litigation, "physicians in certain states [can see]

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[94] *See* Arbel & Kaplan, *supra* note 5, at 14–15 (discussing Republicans' historical propensity to support tort reforms and Democrats' propensity to oppose them); *see also* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 144; Paul H. Rubin, *Public Choice and Tort Reform*, 124 PUB. CHOICE 223, 233 (2005).

[95] AMA, MEDICAL LIABILITY REFORM NOW! 1 (2016).

[96] Anupam B. Jena et al., *Malpractice risk according to physician specialty*. 365 N. ENG. J. MED. 629, 629 (2011) "78% of all claims did not result in payments to claimants."); *see also* Jose R. Guardado, *Professional Liability Insurance Indemnity Payments, Expenses and Claim Disposition, 2004-2013* 3 (Am. Med. Ass'n, Policy Research Perspectives No. 2013-4, 2014) (noting that 65% of malpractice claims were dropped, dismissed, or withdrawn).

[97] Jena et al., *supra* note 96, at 633; *see also* Carol K. Kane**,** *Medical Liability Claim Frequency: A 2007-2008 Snapshot of Physicians* 2 (Am. Med. Ass'n, Policy Research Perspectives No. 2010-1, 2010) ("42.2 percent of physicians surveyed over the 2007 to 2008 field period had a medical liability claim filed against them at some point in their career."); *id*. at 3 ("90 percent of general surgeons age 55 and older have been sued.").

[98] Anupam B. Jena et al., *Outcomes of medical malpractice litigation against US physicians*, 172 ARCHIVES INTERNAL MED. 892, 893 (2012).

liability premiums [that] can exceed $100,000 and sometimes even $200,000 per year."[99]

On the other side of the debate, those opposed to tort reform argue that too few medical malpractice claims are filed in the United States. As a threshold matter, opponents of tort reform emphasize that medical errors do, in fact, occur. The National Academy of Medicine estimated in 1999 that 98,000 people die each year at a cost of $29 billion because of medical errors.[100] A more recent study estimated that more than 250,000 people died as a result of medical errors in 2013, placing medical errors just behind heart disease and cancer in terms of cause of death in the United States.[101] Relatedly, one study estimated that 18% of hospital patients suffer a medical injury.[102] Despite the pervasiveness of medical errors, the American Association for Justice ("AAJ"),[103] which is among the most vocal opponents of tort reform, points out that "very few injured patients ever file a medical negligence lawsuit."[104] For example, one study found that, of patients who received a surgical operation in error or who received an operation on the wrong site, less than 25% filed claims or lawsuits.[105] Examining a sample of malpractice claims from five different insurers, David Studdert and several co-authors concluded that "portraits of a malpractice system that is stricken with frivolous litigation are overblown" and "that the malpractice system performs reasonably well in its function of separating claims without merit from those with merit and compensating the latter."[106] Commenting on these findings, William Sage noted that "the major problem out there is medical errors that are not compensated, rather than frivolous claims that are compensated."[107]

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[99] AMA, *supra* note 95, at 2.

[100] INSTITUTE OF MEDICINE, TO ERR IS HUMAN: BUILDING A SAFER HEALTH SYSTEM (1999). The National Academy of Medicine was formerly known as the Institute of Medicine.

[101] Martin A. Makary & Daniel Michael, *Medical error—the third leading cause of death in the US*, 353 Brit. Med. J. i2139 (2016). *But see* Aaron Carroll, *Death by Medical Error: Adding Context to Scary Headlines*, THE INCIDENTAL ECONOMIST (August 17, 2016, 7:37 AM), http://theincidentaleconomist.com/wordpress/death-by-medical-error-adding-context-to-scary-headlines/ (questioning the methodology underlying these "sensationalistic" estimates).

[102] Christopher P. Landrigan et al., *Temporal Trends in Rates of Patent Harm Resulting from Medical Care*, 363 NEW ENG. J. MED. 2124, 2127 (2010); *see also* Philip F. Stahel et al., *Wrong-Site and Wrong-Patient Procedures in the Universal Protocol Era*, 145 ARCHIVES SURGERY 978, 981 (2010) (noting "a persisting high frequency of surgical 'never events,'" which are mistakes that should "never" happen).

[103] Formerly the American Trial Lawyers Association.

[104] AAJ, MEDICAL NEGLIGENCE: THE ROLE OF AMERICA'S CIVIL JUSTICE SYSTEM IN PROTECTING PATIENT'S RIGHTS 8 (2011).

[105] DANIEL R. LEVINSON, ADVERSE EVENTS IN HOSPITALS: NATIONAL INCIDENCE AMONG MEDICARE BENEFICIARIES 47 (2010).

[106] David M. Studdert et al., *Claims, Errors and Compensation Payments in Medical Malpractice Litigation*, 354 NEW ENG. J. MED. 2024, 2031 (2006).

[107] Amanda Gardner, *Frivolous Claims Make Up Small Share of Malpractice Suits*, HEALTH DAY (May 10, 2006), https://consumer.healthday.com/general-health-information-16/doctor-news-206/frivolous-claims-make-up-small-share-of-malpractice-suits-532622.html (quoting William M. Sage); *see also* TOM BAKER, THE MEDICAL MALPRACTICE MYTH 22 (2005) ("[W]e have an epidemic of medical malpractice; not of malpractice lawsuits.").

Given the competing claims made by each side with respect to whether there is a glut or dearth of medical malpractice claims, it is no surprise that they differ on the need for tort reforms to reduce the number of claims filed. In general, the evidence on the effectiveness of tort reforms is somewhat mixed.[108] For example, Ronen Avraham found that noneconomic damages caps decrease the number and size of payments made as part of malpractice disputes,[109] and this reduction appears to decrease the malpractice premiums physicians must pay.[110] On the other hand, John Donohue and Daniel Ho "f[ou]nd no evidence that [noneconomic damages] caps affect the number of malpractice claims against physicians."[111] After reviewing existing studies as part of a comprehensive report for the Medicare Payment Advisory Commission, Michelle Mello and Allen Kachalia concluded that noneconomic damages caps reduce the frequency of claims made against physicians and the amount of compensation paid to complainants.[112] Examining other traditional tort reforms, such as joint and several liability reform and collateral source rule reform, they found either little evidence of an effect or evidence that these reforms have no impact on the malpractice risk faced by physicians.[113]

The ability of noneconomic damages caps to decrease the size and frequency of payments made to resolve malpractice claims is welcome news to those who argue that the majority of malpractice claims are frivolous. On the other hand, opponents of tort reform point out that, because most claims are not frivolous and because those that are frivolous are effectively filtered out by the legal system, the reduction in claims impairs the rights of victims. Some empirical evidence supports this contention. For example, Andrew Friedson and Thomas Kniesner explain that noneconomic damages caps "can best be thought of as a 25% tax on the asset value of settlements."[114] This may be particularly problematic for victims

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[108] *Compare* Ronen Avraham, *An Empirical Study of the Impact of Tort Reforms on Medical Malpractice Settlement Payments*, 36 J.L. STUD. S183, S186 (2007) (finding noneconomic damages caps reduce medical malpractice liability risk), *with* John J. Donohue III & Daniel E. Ho, *The Impact of Damage Caps on Malpractice Claims: Randomization Inference with Difference-in-Differences*, 4 J. EMPIRICAL L. STUD. 69, 69 (2007) (finding noneconomic damages caps do not reduce medical malpractice liability risk).

[109] Avraham (2007), *supra* note 108, at S186 ("[Noneconomic damages caps] appear[] sometimes to decrease the number of positive payments and at other times to decrease the magnitude of payments.").

[110] *See* Patricia Born et al., *The Effects of Tort Reform on Medical Malpractice Insurers' Ultimate Losses*, 76 J. RISK & INS. 197 (2009) (finding that noneconomic damages caps reduce medical malpractice losses and increase the profitability of medical malpractice insurers); *see also* W. Kip Viscusi & Patricia H. Born, *Damages Caps, Insureability, and the Performance of Medical Malpractice Insurance*, 72 J. RISK & INS. 23 (2005) (finding that insurers pass some of the savings from lower malpractice liability payments on to physicians).

[111] Donohue & Ho, *supra* note 108, at 69; *see also* Katherine Baicker & Amitabh Chandra, *The Effect of Malpractice Liability on the Delivery of Health Care* ii (Nat'l Bureau of Econ. Research, Working Paper No. 10709, 2004) ("[I]ncreases in malpractice payments made on behalf of physicians do not seem to be the driving force behind increases in premiums.").

[112] MELLO & KACHALIA, *supra* note 18, at 3; *id.* at 39 ("The weight of the evidence suggests that caps reduce claims frequency [and] achieve substantial savings in average claims payments.").

[113] *Id*. at 3–4.

[114] Andrew I. Friedson & Thomas J. Kniesner, *Losers and Losers: Some Demographics of Medical Malpractice Tort Reforms*, 45 J. RISK & UNCERTAINTY 115, 115 (2012).

because, as noted by Joanna Shepherd, attorneys are reluctant to take medical malpractice cases when the possible damages are below a certain threshold—$250,000 is a relevant threshold for many attorneys.[115] If tort reform reduces damages, victims may find it more difficult to obtain representation and, thus, compensation for their injuries. Overall, both sides make compelling arguments with respect to the current level of medical malpractice claims, and both sides can point to empirical evidence supporting their claims.

2. Tort Liability and Access to Health Care

During the debate over the ACA, "access to health care" became something of a refrain because it is one of the most important policy issues in health care. While the ACA eschewed an attempt at federal tort reform, reform at the state level may have important implications for whether individuals can access the care they need. Pro-reform groups, such as the AMA, argue that, as a result of the number of meritless malpractice claims and high malpractice insurance premiums, individuals' access to health care is impaired because physicians choose not to practice in areas with high malpractice liability risk, do not provide care to high-risk patients, and avoid certain procedures that may be medically beneficial because the risk of liability is too high.[116] Some evidence supports these claims. For example, Andrea Carpentieri and several co-authors surveyed members of the American Congress of Obstetricians and Gynecologists—generally considered a high-risk specialty[117]—in 2015 and found that 40% of those surveyed had made changes to their practice in the last three years as a result of the affordability or availability of malpractice insurance.[118] Beyond changing how they practice, many physicians change where they practice as a result of liability costs. The AMA explains that "[t]he research provides a convincing argument that physician supply is more plentiful and patients' access to care is enhanced in areas where physicians are under less pressure from the liability system."[119]

The AAJ counters that "[a]necdotal accounts of doctors fleeing states in response to increased insurance premiums have proved to be either unrepresentative isolated events, or flat out false."[120] For example, one report from the federal government noted that claims of physicians fleeing high-risk jurisdictions may have been over-stated.[121] Pointing to data from the AMA, the

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[115] Joanna M. Shepherd, *Uncovering the Silent Victims of the American Medical Liability System*, 67 VAND. L. REV. 151, 151 (2014).
[116] *See* AMA, *supra* note 95.
[117] Anupam B. Jena et al., *supra* note 96, at 632.
[118] ANDREW M. CARPENTIERI ET AL., OVERVIEW OF THE 2015 ACOG SURVEY ON PROFESSIONAL LIABILITY. AMERICAN CONGRESS OF OBSTETRICIANS AND GYNECOLOGISTS 2 (2015), *available at* www.acog.org/-/media/Departments/Professional-Liability/2015PLSurveyNationalSummary11315.pdf; *see also* Emily R. Carrier et al., *Physicians' fears of malpractice lawsuits are not assuaged by tort reforms*, 29 HEALTH AFF. 1585, 1587 (2010) (reporting that over 60% of physicians ordered tests to avoid the appearance of malpractice).
[119] AMA, *supra* note 95, at 3.
[120] AAJ, *supra* note 104, at 11.
[121] *See* GENERAL ACCOUNTING OFFICE, MEDICAL MALPRACTICE: IMPLICATIONS OF RISING PREMIUMS ON ACCESS TO HEALTH CARE 12–26 (2003), *available at* http://www.gao.gov/

AAJ notes that the number of physicians has "been increasing across the board for many years" and that states without caps on noneconomic damages have more physicians per capita than states that have enacted this reform.[122]

Examining different measures of access to health care, studies have generally found that tort reforms increase access.[123] Beginning with the most well-studied measure of access—physician supply—most studies have found that tort reforms—particularly noneconomic damages caps—increase the supply of physicians. As Mello and Kachalia note, "[a]mong 12 controlled studies, 10 have found significant increase in physician supply in at least some models," though these observed increases are generally small—usually between 2% and 5%—and concentrated among high-risk specialists and physicians in rural areas.[124] Beyond physician supply, other studies have examined more nuanced measures of access.[125] Eric Helland and Mark Showalter concluded that, when physicians face less risk of liability, they increase the number of hours they supply care.[126] Using a measure of access that became quite popular during the ACA debate—health insurance coverage—another study found that, when physicians are protected by tort reforms, health insurance coverage increases for groups who are price-sensitive.[127] Overall, the evidence suggests that tort reforms can increase access to care, but the increase in access is often small.[128]

3. Defensive Medicine, Deterrence, and the Cost of Health Care

The most hotly debated point with respect to medical malpractice and tort reform is the prevalence of defensive medicine and the ability of tort reforms to reduce its practice. In general, defensive medicine is "a deviation from sound

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new.items/d03836.pdf. *But see* Letter from Douglas W. Elmendorf, Dir., Cong. Budget Office, to Senator John D. Rockefeller IV, (Dec. 10, 2009), *available at* https://www.cbo.gov/sites/default/files/111th-congress-2009-2010/reports/12-10-medicalmalpractice.pdf (noting that, after the 2003 report mentioned above, the Congressional Budget Office had re-evaluated its earlier stance on the effect of medical malpractice liability risk on the health care system).

[122] AAJ, *supra* note 104, at 11. It is important to note that simply looking at the mean number of physicians in states with and without noneconomic damages caps provides very little information about whether caps actually increase the number of physicians. *See infra* Part III.D (discussing the flaws in this methodology).

[123] *See* MELLO & KACHALIA, *supra* note 18, at 32–61 (providing a thorough review of this literature).

[124] *Id*. at 36.

[125] *See, e.g.*, Benjamin J. McMichael, *Beyond Physicians: The Effect of Licensing and Liability Laws on the Supply of Nurse Practitioners and Physician Assistants* 23–40 (Mercatus Center Working Paper, 2017), *available at* https://www.mercatus.org/system/files/mcmichael-scope-of-practice-mercatus-working-paper-v1.pdf (examining the effect of tort reform on the supply of nurse practitioners and physician assistants).

[126] Eric Helland & Mark H. Showalter, *The Impact of Liability on the Physician Labor Market*, 52 J.L. & ECON. 635, 637–38 (2009) ("[A] 10 percent increase in expected liability costs . . . is associated with a 2.85 decrease in hours worked per week.").

[127] Ronen Avraham & Max Schanzenbach, *The Impact of Tort Reform on Private Health Insurance Coverage*, 12 AM. L. & ECON. REV. 319, 336–48 (2010).

[128] *See generally*, MELLO & KACHALIA, *supra* note 18, at 32–61.

medical practice that is induced primarily by a threat of liability."[129] For example, a physician may order an unnecessary diagnostic test involving magnetic resonance imaging on a knee to rule out torn ligaments when she knows—based on other examinations and tests—that the knee is merely sprained in order to protect herself against a malpractice claim in the future. While the practice of defensive medicine obviously has implications for patients who are subject to unnecessary (and often painful) medical tests and procedures, defensive medicine could also contribute to the high costs of the health care system, as patients are charged for services which are, by definition, medically unnecessary.

The existence and prevalence of defensive medicine have been extensively debated in both policy and academic arenas, but when asked, most physicians respond that they practice defensively.[130] While most physicians are fully insured against the direct costs associated with malpractice claims, they nevertheless face incentives to avoid claims based on uninsurable costs. David Dranove and several colleagues have explained that these other costs include reputational harm, the stress of litigation, and the time away from their practices that physicians must spend defending a claim.[131] Whether the incentives created by these costs cause physicians to provide safe and effective care or encourage them to practice defensively remains an important point of contention.

The AMA argues that "our medical liability system causes health care expenditures to be higher than they otherwise would be" because "the fear of lawsuits affects the way in which physicians practice."[132] This argument finds some support in existing empirical research. For example, Brandon Roberts and Irving Hoch found that, for every additional lawsuit per 100,000 county residents in Mississippi, Medicare spending increased by nearly $2.50 per beneficiary, suggesting that up to 1.6% of Medicare spending in Mississippi was due solely to the malpractice liability climate.[133] In another study, Katherine Baicker, Elliot Fisher, and Amitabh Chandra determined that a 10% increase in the average payment to a complainant was associated with up to a 1.8% increase in the use of diagnostic procedures.[134] Estimates of the total cost of defensive medicine across the entire health care system vary widely: some estimates place it around $55 billion,[135] but applying other methods results in estimates between $120 and $220 billion.[136]

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[129] Studdert et al., *supra* note 20.

[130] *Id.* (noting that 93% of physicians in Pennsylvania reported that they practiced defensive medicine).

[131] David Dranove et al., *Delivering Bad News: Market Responses to Negligence*, 55 J.L. & ECON. 1, 1–8 (2012).

[132] AMA, *supra* note 95, at 5.

[133] Brandon Roberts & Irving Hock, *Malpractice Litigation and Medical Costs in Mississippi*, 16 HEALTH ECON. 841, 845–55 (2007). *But see* J. William Thomas et al., *Low Costs of Defensive Medicine, Small Savings From Tort Reform*, 29 HEALTH AFF. 1578, 1578 (2010) (noting that "the presumed impact of tort reform on health care costs may be overstated").

[134] Katherine Baicker et al., *Malpractice Liability Costs and the Practice of Medicine in the Medicare Program*, 26 HEALTH AFF. 841, 841–52 (2007).

[135] Mello et al., *supra* note 13; *see also* Illingworth et al., *supra* note 20 (estimating $50 billion).

[136] *See* AMA, *supra* note 95, at 7 (describing the application of other methods and arriving at a final estimate "in a range of $120.6 and $217.1 billion").

The AAJ counters that defensive medicine is not commonly practiced.[137] Citing government and academic research, the AAJ notes that little conclusive evidence suggests the widespread practice of defensive medicine.[138] Indeed, some empirical evidence suggests that malpractice liability effectively encourages physicians and other providers to provide safer and more effective care and that defensive medicine may actually benefit patients. For example Praveen Dhankar, Mahmud Khan, and Shalini Bagga found that "an increase in medical malpractice risk leads to a reduction in resource use and improvement in health outcome for patients with less severe medical conditions."[139] Similarly, Bernard Black, Amy Wagner, and Zenon Zabinski found an association between malpractice payouts and patient safety indicators, suggesting that malpractice liability may be tied to the provision of safe care in a systematic way.[140]

Beyond the potential for defensive medicine to positively affect patient outcomes, the AAJ explains that what has traditionally been understood as defensive medicine may simply represent physicians' attempts to generate additional income by providing more services—sometimes referred to as the practice of "offensive medicine."[141] The idea that physicians practice offensively because the extra tests and procedures generate more income, and not because physicians fear malpractice claims, finds some support in existing research. Troyen Brennan, Michelle Mello, and David Studdert explain that "[i]n medicine practiced as a business, defensive medicine is understood and may even be profitable."[142]

While proponents and opponents continue to disagree on the overall prevalence of defensive medicine, a variety of empirical studies have examined the ability of tort reform to effectively reduce its practice and decrease costs for the health care system overall.[143] In what may be the seminal study on defensive medicine, Daniel Kessler and Mark McCellan examined Medicare spending on patients suffering from ischemic heart disease and heart attacks.[144] They found that states with "direct"[145] tort reforms had significantly lower Medicare spending for

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[137] AAJ, *supra* note 104, at 16–18.

[138] *Id.*; *see also* CONGRESSIONAL BUDGET OFFICE, LIMITING TORT LIABILITY FOR MEDICAL MALPRACTICE 1–3 (2004); Baicker & Chandra, *supra* note 111, at 2–4; GENERAL ACCOUNTING OFFICE, *supra* note 121 at 1–5. It is important to note that, since the government report relied upon by the AAJ in making its arguments was issued, new conclusions have been drawn. *See supra* note 121.

[139] Praveen Dhankar et al., Effect of Medical Malpractice on Resource Use and Mortality of AMI Patients, 4 J. EMPIRICAL L. STUD. 163, 163 (2007). *But see* Avraham & Schanzenbach, *supra* note 23, at 275 n.4 (questioning the methodology of Dhankar et al.).

[140] Bernard S. Black et al., *The Association Between Patient Safety Indicators and Medical Malpractice Risk: Evidence from Florida and Texa*s, 3 AM. J. OF HEALTH ECON. 109, 134–35 (2017).

[141] AAJ, *supra* note 104, at 17.

[142] Troyen A. Brennan, Michelle M. Mello, & David M. Studdert, *Liability, Patient Safety, and Defensive Medicine: What Does the Future Hold?*, *in* MEDICAL MALPRACTICE AND THE U.S. HEALTH CARE SYSTEM 93, 112 (William M. Sage & Rogan Kersh eds., 2006).

[143] *See* MELLO & KACHALIA, *supra* note 18, at 32–61 (reviewing these studies in great depth).

[144] Kessler & McClellan, *supra* note 22, at 363.

[145] "Direct" tort reforms include damages caps, bans on punitive damages, no mandatory prejudgment interest, and collateral source rule reform. *Id.* at 371.

these cardiac patients.[146] Despite this lower spending, Kessler and McClellan found no evidence that cardiac patients in tort reform states were at any increased risk of mortality or medical complications.[147]

Later studies have investigated the effects of tort reform on other measures of defensive medicine and have found similar results. For example, Ronen Avraham and Max Schanzenbach conducted a study along the same lines as Kessler and McClellan by examining heart attack patients.[148] They found that a noneconomic damages cap reduced the probability that a patient received an intensive treatment by between 3% and 5%, indicating these caps reduce the pressure on physicians to perform more intensive and invasive procedures.[149] Similar to earlier studies, Avraham and Schanzenbach also found "that tort reform is not associated with an increase in mortality from coronary artery disease [and that] if anything, mortality declines."[150] Beyond affecting treatment decisions, tort reforms (particularly noneconomic damages caps) have been shown to reduce the rate at which physicians refer patients to specialists,[151] the overall number of surgeries,[152] the rate of episiotomies,[153] the number of hospital admissions,[154] and the number of hospital inpatient days.[155]

However, not every study has found evidence that tort reforms reduce the practice of defensive medicine. For example, Frank Sloan and John Shadle concluded that tort reforms do not effectively limit Medicare spending, suggesting that they do not ameliorate the practice of defensive medicine.[156] Myungho Paik and several co-authors "f[ou]nd no evidence that Texas's tort reforms bent the cost curve downward."[157] Paik and several of the same co-authors conducted a later study of Medicare spending and "f[ou]nd that damage caps have no significant impact on Medicare Part A spending, but predict roughly 4% higher Medicare Part B spending."[158] Relatedly, and consistent with the AAJ's arguments concerning offensive medicine, Janet Currie and Bentley MacLeod found that noneconomic

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[146] *Id.* at 353.
[147] *Id.*; *see also* Daniel Kessler & Mark McClellan, *Malpractice law and health care reform: optimal liability policy in an era of managed care*, 84 J. PUB. ECON. 175, 175–197 (2002).
[148] Avraham & Schanzenbach, *supra* note 23, at 276.
[149] *Id*. at 278.
[150] *Id*. at 273.
[151] Xiao Xu et al., *The effect of medical malpractice liability on rate of referrals received by specialist physicians, 8* HEALTH ECON., POLICY & L. 453, 465–75 (2013).
[152] Anca M. Cotet, *The impact of noneconomic damages cap on health care delivery in hospitals*, 14 AM. L. & ECON. REV. 192, 217 (2012).
[153] Michael Frakes, *Defensive medicine and obstetric practices*, 9 J. EMPIRICAL L. STUD. 457, 459 (2012).
[154] Cotet, *supra* note 152, at 217.
[155] Frakes, *supra* note 153, at 459.
[156] Frank A. Sloan & John H. Shadle, *Is There Empirical Evidence for "Defensive Medicine"? A Reassessment*, 28 J. OF HEALTH ECON. 481, 481–91 (2009). *But see* Avraham & Schanzenbach, *supra* note 23, at 275 (noting that "Sloan and Shaddle had significantly smaller sample sizes than" earlier studies and that this could explain the absence of an effect of tort reform).
[157] Myungho Paik et al., *Will tort reform bend the cost curve? Evidence from Texas*, 9 J. EMPIRICAL L. STUD. 173, 173 (2012).
[158] Myungho Paik et al., *Do Doctors Practice Defensive Medicine, Revisited* 2 (Northwestern L. & Econ. Research Paper No. 13-20, 2016), *available at* http://ssrn.com/abstract=2110656.

damages caps increase the use of unnecessary C-sections and the chances of experiencing complications during labor and delivery.[159]

As with the effect of tort reform on access to health care, the effect of reform on defensive medicine and associated costs is mixed. Reviewing the evidence available at the time, the Congressional Budget Office "concluded that the weight of empirical evidence now demonstrates a link between tort reform and the use of health care services" and projected that enacting a package of five tort reforms "would reduce national health spending . . . by roughly 0.5 percent."[160] Similarly, in their recent review of the existing evidence, Mello and Kachalia concluded that "[a] reasonable conclusion to draw from [the existing] studies is that noneconomic damages caps have been shown to be associated with reductions in some, albeit not all, indicators of defensive medicine."[161]

While extensive evidence concerning the effect of traditional tort reforms on defensive medicine has been developed, very little evidence concerning apology laws exists.[162] This article begins to fill the large gap in both the tort reform and apologies literatures by specifically examining the effect of apology laws on the practice of defensive medicine. However, before conducting an empirical analysis of apology laws, it is important to understand how they function as tort reforms, and the remainder of this Section situates apology laws firmly in the tort reform context.

B. Apology Laws as Tort Reforms: Theory, Practice, and Evidence

Though apology laws are formally changes to state rules of evidence, two important aspects of these laws clearly delineate them as tort reforms. First, states justify the enactment of these laws based on their ability to reduce the number of malpractice claims that are filed and facilitate the settlement of those that are filed.[163] States do not generally appeal to the ability of apologies to promote reparative discourse, encourage reconciliation among wrongdoers and victims, or facilitate the healing process within communities. States' narrow focus on apology laws as a means to alter the litigation landscape echoes their historical approach to tort reform, which has been centered on the goal of curtailing litigation-related risks. Second, many states have limited the applicability of apology laws to medical malpractice.[164] This strategy of limiting apology laws to medical malpractice is

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[159] Janet Currie & W. Bentley MacLeod, *First Do No Harm? Tort Reform and Birth Outcomes*, 123 Q.J. ECON. 795, 820 (2008).

[160] Letter from Elmendorf, *supra* note 121 at 4.

[161] MELLO & KACHALIA, *supra* note 18, at 36. Mello and Kachalia review the evidence concerning the effects of other tort reforms as well, but this evidence is generally not as extensive as that concerning noneconomic damages caps. *See id*. at 32–61.

[162] *Id.* at 92 ("The available evidence is too limited to draw a conclusion about [the general effects of apology laws]; a reasonable summary at this point is that the liability-reducing effects of apology laws have not yet been demonstrated.").

[163] See *supra* note 66.

[164] *See* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 144 n.4 ("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

similar to the approach some states have used with more familiar tort reforms, demonstrating that apology laws, in practice, function as tort reforms.[165] Beyond these two aspects of apology laws themselves, Arbel and Kaplan carefully traced the political development of these laws, highlighting how proponents of tort reform adopted apology laws as a new means to accomplish the goals of tort reform.[166]

While states' approaches to apology laws echo their approaches to tort reform more generally, they do not evaluate apology laws as such. For example, though many states have limited apology laws to medical malpractice, they have ignored the effect of these laws on the health care system. In contrast, the ability of noneconomic damages caps and other tort reforms to impact health care is one of the most important points of contention among those who support and oppose these reforms. Moreover, despite the importance of apology laws as a new generation of tort reform and despite the theoretical and empirical attention *apologies* have received in the legal, economic, and psychological literatures, *apology laws* as tort reforms remain understudied.[167] To date, only three rigorous empirical studies have examined apology laws, and these studies have been limited to the litigation context, i.e., the first point of contention above. This dearth of evidence is problematic because apology laws are sufficiently different from traditional tort reforms that conclusions about the effects of the former cannot be extrapolated from the effects of the latter. As Mello and Kachalia note, "although there are good theoretical reasons to believe the number and average payment per paid claim may drop in the presence of apology laws, there are also theoretical reasons that claim frequency may increase."[168] The same theoretical reasons that predict conflicting effects of apology laws on paid claims also predict conflicting effects of these laws on the practice of defensive medicine.

More specifically, apology laws differ from traditional tort reforms in two key respects. First, apology laws require action on the part of the defendant at (or near) the time of the injury in order to affect malpractice liability risk, i.e., the defendant must apologize. Second, assuming an apology is delivered consistent with the law's intent, the apology itself must assuage the patient's anger and not, in some way, encourage the patient to pursue a claim. Based on these two features of apology laws, their effect on medical malpractice liability risk and defensive medicine is not as straightforward as other reforms. For example, the effect of noneconomic damages caps on medical malpractice claims is uncomplicated: (1) caps decrease the size of payments because they impose a strict cutoff on one part of any malpractice award, and (2) caps decrease the number of claims asserted because some patients will decide not to file a claim against their physicians based on the smaller payment they can expect.[169] Physicians, recognizing the decreased

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health care providers."); *see also, e.g.*, VA. CODE ANN. § 8.01-581.20:1 (limiting the protection of apology laws to health care providers).

[165] *See, e.g.*, Ind. Code Ann. § 34-18-14-3 (imposing a limit on damages in medical malpractice actions only).

[166] *See* Arbel & Kaplan, *supra* note 5, at 16 ("Tort reformers borrowed from Legal Apologists both the means and the rhetoric to advance their goals.").

[167] MELLO & KACHALIA, *supra* note 18; Mello et al., *supra* note 18.

[168] *Id*.

[169] *See* Avraham (2007), *supra* note 108, at S188–94.

risk of being held liable for malpractice, decrease their practice of defensive medicine in the presence of noneconomic damages caps.[170] Apology laws may have a similar effect on malpractice claims and the practice of defensive medicine, but as explained by Ho and Liu, these laws may have very different effects based on what assumptions one makes about the underlying episode of health care. In general, three theories explain how apology laws may work to affect medical malpractice litigation.

First, apology laws may work exactly as intended. As detailed above, apologies from physicians to patients can assuage anger, soothe aggression, and thereby decrease physicians' liability risk. States passed apology laws to encourage exactly this type of behavior by physicians and generate exactly these types of benefits. Ho and Liu explain that an apology "law eliminates the primary cost the doctor faces from an apology," i.e., the possibility that an apology may be used as evidence in a subsequent trial, and that "[t]hus in a symmetric information world, the law has exactly its intended effects."[171] By "symmetric information world," Ho and Liu mean that when a physician commits malpractice, both the physician and the patient have the same information and are fully aware that malpractice has occurred. Ho and Liu theorize that, when this is the case, apology laws work exactly as states intend them to by reducing the frequency and size of malpractice payments.

Next, apology laws may have the opposite of their intended effect. Ho and Liu contrast the symmetric information world with the asymmetric information world in which one party possesses private information to which the other party is not privy. In this context, the physician has private information about whether malpractice occurred. Though it may seem counterintuitive, "[m]ost patients never learn they are victims of a medical error" because of the complexity of medical care and the inability of many patients to comprehend the intricacies of their care.[172] Ho and Liu explain that, in an asymmetric information world, the theoretical effects of apology laws become unclear;[173] however, they note that apology laws could have the perverse effects of increasing the size and frequency of malpractice claims. When patients do not know whether their injuries stem from malpractice or are a natural result of their illness or course of treatment, apologies from physicians could signal the occurrence of malpractice to patients who otherwise would not have discovered that malpractice.[174] Even if patients cannot use the apology itself as evidence of malpractice, apologies by physicians can encourage patients to seek other admissible evidence and turn to the legal system for redress, thereby increasing the frequency and size of malpractice payments.

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[170] *Id*.

[171] Ho & Liu, *Does Sorry Work*, *supra* note 5, at 150.

[172] Sandra G. Boodman, *Should Hospitals—and Doctors—Apologize for Medical Mistakes*, WASH. POST (March 12, 2017), https://www.washingtonpost.com/national/health-science/should-hospitals--and-doctors--apologize-for-medical-mistakes/2017/03/10/1cad035a-fd20-11e6-8f41-ea6ed597e4ca_story.html?utm_term=.6ffb6f748305.

[173] Ho & Liu, *Does Sorry Work*, *supra* note 5, at 150 ("Unfortunately, private information also makes the model's predictions indeterminate.").

[174] Similarly, if a patient suspects malpractice has occurred but is not sure, an apology could confirm the malpractice and embolden her to file a claim.

Finally, apology laws may simply have no effect.[175] As noted above, *apologies* are not equivalent to *apology laws*, despite the fact that discussions of the latter tend to center on promoting the benefits of the former. If apology laws do not encourage apologies, then, regardless of whether the physician-patient relationship is characterized by symmetric or asymmetric information, apology laws will have no effect because nothing will have changed in that relationship.

Among the three theories of apology laws, empirical research has found support for the first two. Ho and Liu conducted two separate studies of apology laws. In both studies, they analyzed data on malpractice claim payouts contained in the National Practitioner Databank, which includes information on most of the positive payments made to resolve malpractice disputes since the 1990s.[176] Throughout their analyses, they did not differentiate between full and partial apology laws but amalgamated them into a single category.[177]

In their first study, Ho and Liu examined the number of malpractice cases and the total payments made to resolve these cases at the state level.[178] They found that apology laws increase the frequency of malpractice claims by about 15%[179] and that these laws increase claim payouts by about 25%.[180] However, based on an analysis of four states that enacted apology laws relatively early, Ho and Liu concluded that, in the long run, the net effect of apology laws on claim frequency is zero or possibly negative, which is generally consistent with their intended effect.[181] Along the same lines, the researchers disaggregated malpractice claims by the severity of the injury involved and concluded, based on further analysis, that "after passing the law, there is a short-term increase in the number of cases that normally take many years to resolve, but an overall decrease in the number of cases involving the least significant injuries."[182] These results are broadly consistent with the goals of apology laws.

After conducting their state-level analysis, Ho and Liu analyzed individual malpractice claims and found that, following the passage of an apology law, claims involving severe injuries resolved more quickly.[183] Next, analyzing claims with different injury severities separately, the researchers concluded that claim payouts for the least severe injuries increased slightly but that the payments made to resolve

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[175] Ho and Liu do not explicitly consider this possibility, and they assume that apology laws encourage physicians to apologize more often. *Id.* at 142 ("Although we do not observe actual apologies, the maintained assumption of this paper is that by reducing the consequences of apologies, doctors would apologize more frequently.").

[176] Ho & Liu, *What's an Apology Worth*, *supra* note 5, at 185.

[177] *See* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 146.

[178] *Id.* 154.

[179] *Id.* at 156 ("The results show a consistent 14–15% increase in closed claim frequency with positive payouts.").

[180] *Id.* ("The results for the total compensation payout also show an increase of 20–27%.").

[181] *Id.* at 157 ("[A]pology laws' net effect [on the frequency of malpractice payments] is zero (or possibly negative) in the long run.").

[182] *Id.* at 159

[183] *Id.* ("For a case involving a major/permanent injury, conditional on resolution, the probability it resolves in any given year is increased by 19% when the apology law is in effect.").

claims involving the most severe injuries decreased substantially.[184] Summarizing the findings from their analysis of individual malpractice claims, Ho and Liu explained that their results "suggest that apology laws are consistent with the symmetric information model . . . as well as the legislators' intent."[185]

In a separate study, the same researchers further examined the impact of apology laws on claim payouts across different medical settings.[186] Beginning with claim payouts across all settings, Ho and Liu found payouts are $32,342 lower in states with apology laws;[187] however, the size of the payout reductions varied across injury types. For example, following the passage of an apology law, payouts for claims involving anesthesia-related injuries and those involving obstetrics injuries decreased by $45,000 and $125,000, respectively.[188] Similarly, Ho and Liu found that the effect of apology laws varied by the specific type of malpractice act. Malpractice claims involving "failure to diagnose" and "improper management" saw a larger decrease in average payout than claims involving other types of allegations as a result of the passage of an apology law.[189] The study also revealed differences in the effect of apology laws on claim payouts across provider type,[190] patient age,[191] and patient gender.[192]

While the second study conducted by Ho and Liu did not emphasize the conflicting theories concerning the effect of apology laws, I, along with co-authors Lawrence Van Horn and Kip Viscusi, returned to these conflicting theories in a recent study.[193] Unlike prior work, we used a dataset obtained directly from a national malpractice insurer which contained information on all malpractice claims asserted against 90% of the physicians practicing in a single specialty.[194] This dataset provided a more complete picture of the malpractice landscape because claims that involved no payout—which represent more than 50% of all claims asserted—were included in the dataset.[195] Focusing on partial apology laws, our work examined different aspects of malpractice risk.

In doing so, we explicitly tested for different effects of apology laws based on whether the information structure between the physician and patient was symmetric or asymmetric by examining the different information structures present when a physician is a surgeon (symmetric) or a non-surgeon (asymmetric).[196] In

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[184] *Id*. at 162 ("[A]fter the law is adopted, claim payout would be reduced by approximately $17,000–$27,000 for somewhat severe cases and $55,000–$73,000 for the most severe cases.").
[185] *Id.*; *see also id*. ("[T]he apology laws' combined effect is to increase apologies and decrease expected settlement time, and should in the long term speed up settlements and reduce the total number and value of malpractice payments.").
[186] Ho & Liu, *What's an Apology Worth*, *supra* note 5, at 179.
[187] *Id*. at 188.
[188] *Id*. at 190.
[189] *Id*.
[190] *Id.*
[191] *Id*. at 192
[192] *Id*. at 194.
[193] McMichael et al., *supra* note 9, at 13–17.
[194] *Id*. at 3
[195] *Id*. at 11
[196] *Id*. at 15 ("Asymmetric information is more likely to be present in malpractice claims involving non-surgeons than those involving surgeons. Surgeons generally interact with and treat patients in

general, we found very little evidence that apology laws affect the medical malpractice risk for surgeons one way or the other. On the other hand, for non-surgeons, we found evidence of a perverse effect of apology laws, consistent with the asymmetric information world. No evidence suggested that apology laws reduce the probability that a non-surgeon physician faces any malpractice claim. However, we found that the mix of claims faced by non-surgeons changes following the passage of an apology law, with the probability of claims that do not involve lawsuits decreasing and the probability of lawsuits increasing.[197] In other words, apology laws push people into the courtroom. We also found that, for non-surgeons, apology laws substantially increase the size of the payments made to resolve claims.[198] All of these results are consistent with the predictions of the asymmetric information world and suggest that apology laws have perverse effects for non-surgeons.[199]

Overall, the evidence on the effect of apology laws on medical malpractice litigation is mixed. Importantly, however, the evidence on apology laws generally is both limited and narrowly focused. Compared with other tort reforms, which have been subjected to over 100 separate analyses,[200] apology laws have been largely ignored. To the extent that they have not been ignored, the rigorous empirical work conducted so far has focused on apology laws only in the context of their ability to affect medical malpractice claims. Their effect on the health care system more generally has never been empirically evaluated. This article begins to remedy this problem.

III. EMPIRICAL ANALYSIS OF APOLOGY LAWS AS TORT REFORMS

This Section provides the first empirical analysis of apology laws beyond the narrow context of litigation, focusing specifically on the effects of these laws on the practice of defensive medicine. Examining the practice of defensive medicine necessarily involves examining clinical outcomes, and this study is the first to analyze the impact of apology laws on such outcomes. In developing evidence on apology laws and defensive medicine, I focus on the care received by heart attack patients, examining the treatments these patients receive, the resources used to treat these patients, and the quality of care provided. I limit my analysis to cardiac care for two reasons. First, as discussed in detail below, the cardiac care considered here is particularly well suited to examining the role of apology laws. Second, because prior work has previously examined the effect of noneconomic damages caps on the cardiac care I examine here, it is possible to make detailed

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a discrete event, i.e., the surgery they are performing plus any pre-operative and post-operative care. Because of this discrete interaction, patients who suffer an injury will likely have little trouble tracing that injury to an error that occurred during surgery. On the other hand, non-surgeons generally treat their patients over the course of years or may interact with patients a number of times when attempting to resolve an injury or illness. Thus, observing the malpractice of non-surgeon physicians may be more difficult.").

[197] *Id*. at 18–23.

[198] *Id*. at 23–25.

[199] *Id*. at 25–27.

[200] *See* MELLO & KACHALIA, *supra* note 18, at 32–61.

comparisons between the effects of apology laws and noneconomic damages caps.[201] In general, I follow a similar empirical strategy as Avraham and Schanzenbach but concentrate on apology laws instead of noneconomic damages caps.[202] By directly comparing apology laws to what is generally regarded as the most effective tort reform—noneconomic damages caps—it is possible to firmly situate apology laws in the tort reform landscape. Beyond clarifying the role of apology laws as tort reforms, the results presented here provide new evidence on and critical insight into how these laws affect the largest single sector in the American economy—health care.

A. Medical Context

Throughout my empirical analysis, I consider cardiac patients who have suffered an acute myocardial infarction ("AMI" or heart attack).[203] The care received by these patients is uniquely well suited to an empirical investigation into the role of apology laws in attenuating defensive medicine for several reasons.[204] First, heart surgeons and cardiologists face significant liability pressure, meaning that liability reforms, including apology laws, should have a more salient effect on these physicians than other types of physicians. Second, heart disease is the leading cause of death in the United States,[205] making care provided to patients suffering from heart attacks the best place to start when examining the role of apology laws. Third, AMI patients are almost always admitted to a hospital for non-elective procedures. This allows for a detailed analysis of these patients using only data on hospital patients.[206] The non-elective nature of the procedures used to treat AMIs also means that patients and physicians have very little ability to schedule procedures far into the future, which limits the number of factors that can confound the analysis of apology laws. Fourth, and most importantly, the treatment choices for AMI patients allow for some discretion on the part of the treating physician. The presence of "gray areas" in which physicians could legitimately choose either the more intensive or less intensive treatment option means that it is possible to observe some marginal changes in physician treatment choices in response to the passage of an apology law.

In general, physicians have three options when treating AMI patients. First, the least intensive option is medical management, which involves no surgical intervention.[207] Second, at the intermediate level of intensity is percutaneous

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[201] In particular, the analysis here is similar to that conducted by Avraham & Schanzenbach, *supra* note 23.

[202] *See id*.

[203] The Cleveland Clinic provides a useful overview of AMIs. *See* H. Michael Bolooki & Arman Askari, *Acute Myocardial Infarction*, CLEVELAND CLINIC CENTER FOR CONTINUING EDUCATION (August 2010), http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/cardiology/acute-myocardial-infarction/.

[204] *See* Avraham & Schanzenbach, *supra* note 23, at 273–74 (discussing similar reasons).

[205] *Id.* at 274.

[206] Additionally, as noted by Avraham and Schanzenbach, using an inpatient dataset for AMI patients avoids problematic selection issues. *Id.*

[207] *See* Bolooki & Askari, *supra* note 203 (discussing medical management).

transluminal coronary angioplasty ("PTCA"), which is a minimally invasive procedure where a physician inserts a catheter into the patient's heart to address arterial blockages.[208] Third, the most intensive treatment option for AMIs is coronary artery bypass grafting ("CABG"), which is a type of open heart surgery colloquially referred to as heart bypass surgery.[209]

Collectively, these three treatment options create several gray areas where physicians may choose either a more intensive or less intensive procedure. Some patients will be candidates for both medical management and a more intensive intervention.[210] If a physician is practicing defensively, she may be more willing to "put her thumb on the scale" in favor of a more intensive treatment instead of medically managing a patient's condition. Thus, a shift away from more intensive treatments to less intensive treatments following the passage of a tort reform is evidence that the reform reduces the practice of defensive medicine. Another gray area exists for some patients who require more intensive treatment, as physicians may have discretion to perform either PTCA or CABG.[211] When only one or two arteries are blocked, physicians often have discretion to choose between these two treatment options—physicians lack this discretion and almost always choose CABG when three or more are blocked.[212] CABG is typically more profitable than PTCA, but, because it is more invasive, it may expose health care providers to greater liability risk than PTCA. Thus, physicians may be more willing to perform the more intensive CABG when they have discretion to do so following the passage of tort reform because of a decrease in liability risk.[213]

In addition to the procedure chosen to treat a particular AMI patient, I also examine the costs associated with a particular hospital admission and the length of stay in the hospital. Even within the gray areas outlined above, physicians' ability to substitute between procedures may be limited. Because costs and length of stay can vary much more easily—it is easy to order extra tests or require a patient to stay a little longer—than treatment choices, these variables may provide more information on the role of apology laws in the practice of defensive medicine. Additionally, much of the evidence concerning defensive medicine comes from

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[208] Avraham & Schanzenbach, *supra* note 23, at 273, discuss PTCA in relation to medical management and CABG. PTCA is also referred to as Percutaneous Coronary Intervention. *See* Bolooki & Askari, *supra* note 203.

[209] *See id.*

[210] Avraham & Schanzenbach, *supra* note 23, at 274, note PTCA is almost always chosen before CABG. They further explain that PTCA and CABG are almost never performed together, meaning medical management, PTCA, and CABG are, essentially, mutually exclusive and collectively exhaustive categories of treatment. I am able to confirm this through my own independent analysis of the data described below.

[211] *Id.*

[212] *Id.* at 278 ("PTCA is a substitute only for CABG when there is a blockage on one or two arteries. If the blockage is on three or four arteries, the prevailing standard is to perform CABG.").

[213] As Avraham and Schanzenbach, *id.*, explain, physicians may be more willing to perform the more intensive CABG when they have discretion to do so following the passage of tort reform for two reasons. First, consistent with the practice of defensive medicine, physicians may be more willing to perform CABG when protected by tort reform because they are less exposed to liability. Second, consistent with the practice of offensive medicine, physicians may choose to perform CABG over PTCA because the former is more profitable and, with the passage of tort reform, less risky in terms of liability.

changes in ancillary services like medical imaging and in costs associated with treatment.[214] Accordingly, I investigate the effect of apology laws on the costs of treating AMI patients. I supplement the cost analysis with a length-of-stay analysis because cost data in the NIS are only estimates of true cost based on hospital charges, which can vary widely and may be only weakly correlated with true costs.[215] This means that length of stay may actually capture the resources used to treat a given patient more accurately. Length of stay is commonly used in the health services research literature as a proxy for resource use,[216] and, unlike cost, length of stay is stable across hospitals.

Finally, I examine the mortality of AMI patients to measure the effect of apology laws on the quality of care delivered by physicians when treating these patients. While other quality measures are available,[217] quality measurement—despite its prominence in the health care debate—is still in its infancy, is subject to manipulation by those who are incentivized to "improve" quality, and may fail to capture true quality.[218] Because of the problems with existing quality metrics, I examine mortality rates because death is well measured and is nearly universally considered an undesirable outcome following treatment for an AMI.[219] Moreover, given the status of heart disease as the leading cause of death in the United States, AMI death rates are important beyond their ability to proxy for the quality of care.[220]

B. Data

To conduct an empirical analysis of the effect of apology laws on the practice of defensive medicine (and, as a corollary, offensive medicine), I use a dataset that contains information on all of the health care outcomes described above. Specifically, I use data from the National Inpatient Sample ("NIS"), which is part of a family of health care databases developed by the Healthcare Cost and Utilization Project ("HCUP").[221] The NIS is the largest all-payer dataset for inpatient care in the United States and contains a 20% random sample of hospitals in the United States. Each year, approximately one thousand hospitals are sampled, and between five and eight million hospital stays are included in the database. If a

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[214] *See supra* Part II.A.3.

[215] *See* Avraham & Schanzenbach, *supra* note 23, at 276–77.

[216] *See, e.g.*, Edward F. Philbin et al., *Length of Stay and Procedure Utilization Are the Major Determinants of Hospital Charges for Heart Failure*, 24 CLINICAL CARDIOLOGY 56, 56–62 (2000).

[217] For an overview of the quality of care indicators developed by AHRQ, see *Introduction*, QUALITYINDICATORS.AHRQ.GOV, https://www.qualityindicators.ahrq.gov/ (last visited June 27, 2017).

[218] In one egregious example, hospitals began "throwing away less-than-perfect organs and denying the sickest people lifesaving transplants" in order to satisfy newly implemented federal quality standards. Casey Ross, *Hospitals are Throwing Out Organs and Denying Transplants to Meet Federal Standards*, THE RUNDOWN: HEALTH (August 13, 2016, 9:52 AM), http://www.pbs.org/newshour/rundown/hospitals-throwing-organs-denying-transplants-meet-federal-standards/.

[219] Avraham & Schanzenbach, *supra* note 23, at 283.

[220] *See id.* at 283–84 (examining mortality rates); Kessler & McClellan, *supra* note 22, at 376 (same).

[221] The NIS is not available for public download. The data use agreement that allows the data to be used for this Article is on file with HCUP and Vanderbilt University.

hospital is chosen for inclusion in the NIS, all inpatient records for the relevant year are included in the dataset. In my analysis, I examine hospital stays that occurred between 1999 and 2011.[222]

Using diagnosis codes available in the NIS, I isolate all patients who suffered an AMI.[223] Because over 90% of AMI patients are admitted to the hospital, using the NIS to isolate AMI patients captures a large number of people who suffered an AMI during the sample time frame. In fact, approximately one out of every four heart attacks each year appears in the dataset I analyze here.[224] In addition to diagnosis codes, the NIS includes procedure codes which allow me to classify individuals as receiving medical management, PTCA, or CABG.[225] Beyond the diagnosis and treatment for each AMI patient, the NIS contains information on costs,[226] length of stay, and mortality.

Beyond these outcome variables, I use data in the NIS to construct a series of control variables. The NIS includes patient age and sex at the time of hospital admission. Each patient may also have up to 15 diagnoses entered into her record. From these additional diagnoses, I am able to construct the constituent parts of the Charlson Comorbidity Index, which I use to control for a variety of comorbidities that may influence treatment choice and other outcomes of interest.[227] The NIS also includes the source of payment for each patient's hospital stay, such as Medicare, Medicaid, and private insurance. Controlling for the source of payment is important because physicians may face different incentives with respect to treatment choice and length of stay depending on the source of payment.[228] Additionally, as Avraham and Schanzenbach note, the impetus behind the practice of offensive medicine is the desire to perform more profitable procedures, and this impetus will be stronger for patients with "better" sources of payment (e.g., private

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[222] Beginning in 2012, the NIS no longer includes information on the location of hospitals, so it becomes impossible to determine whether the physicians at a given hospital are governed by an apology law. In 1999, 22 states participated in the NIS, and by 2011, 47 states had participated at least one year. *See* Avraham & Schanzenbach, *supra* note 23, at 286 (reporting state participation in the NIS).

[223] More specifically, I restrict my dataset using the same procedure as Avraham & Schanzenbach, *supra* note 23, at 276.

[224] *Id*. ("We estimate that we observe roughly 25% of all heart attacks that occurred in the sample timeframe in the states included in the NIS.").

[225] It is also possible to separate those receiving CABG into CABG on one or two arteries and CABG on three or four arteries.

[226] Information on the actual cost to treat a given patient is not available. Similarly, information on what the patient paid as a result of her stay is not available. However, the NIS includes charges associated with a given hospital stay, and an accompanying dataset (available through HCUP) can be used to translate these hospital charges into a coarse measure of costs. Unfortunately, both the information and cost data derived from these are "notoriously noisy." *Id.* at 277.

[227] *See* Bing Li et al., *Risk adjustment performance of Charlson and Elixhauser comorbidities in ICD-9 and ICD-10 administrative databases*, 8 BMC HEALTH SERVICES RESEARCH 1, 1–2 (2008) ("As major determinants of patient outcomes, comorbidities or coexisting conditions have been studied extensively for decades."); *see also id.* (noting that the Charlson comorbidity index is a "commonly used instrument[] for risk adjustment analyses").

[228] *See, e.g.*, Diane Alexander & Janet Currie, *Are Publicly Insured Children Less Likely to be Admitted to Hospital than the Privately Insured (and Does It Matter?)* 1 (Nat'l Bureau of Econ. Research, Working Paper No. 22542, 2016) ("[H]ospitals are less likely to admit publicly insured children than privately insured children. . . .").

insurance generally pays more for a given procedure than Medicare or Medicaid).[229] Additionally, the NIS includes data on the hospital where a given patient is treated. The type of hospital may influence what treatments patients receive. Relevant to the analysis here, the NIS includes information on whether the hospital is a teaching hospital;[230] whether the hospital is large, medium, or small; whether the hospital is public or private; whether the hospital is for-profit or not-for-profit; and whether the hospital is in a rural area.[231]

Finally, I supplement the information contained in the NIS with information from Ronen Avraham's Database of State Tort Law Reforms (5^{th}).[232] Based on this database, I code states as having enacted a noneconomic damages cap or not. I also create an index of other reforms, consistent with prior work, that includes the following: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform.[233] By including controls for these reforms, I am able to isolate the effect of apology laws.

Table A2 in the Technical Appendix provides an overview of the data used in my empirical analysis. Each year, I observe between 109,000 and 144,000 AMI patients treated at hospitals across the country.[234] At the beginning of the data period in 1999, only about 3% of all AMI patients received care in a state that had a partial apology law; however, by the end of the period in 2011, over 70% of patients received care in a state that had enacted a partial apology law. Similarly, full apology law coverage increases from zero in 1999 to over 10% in 2011. In general, more men than women suffer AMIs, and the average age of those treated hovers just under 70. Across the years examined here, the percentage of patients receiving PTCA increases substantially from just under 25% to over 45%. However, the percentage receiving CABG decreases slightly from about 10% to about 8%. Similarly, length of stay decreases by nearly a full day from 5.5 days to 4.7. Costs, however, increase by about $6,000 between 2001 and 2011.[235]

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[229] Avraham & Schanzenbach, *supra* note 23, at 275.

[230] *See* Laura G. Burke et al., *Association Between Teaching Status and Mortality in US Hospitals*, 317 JAMA 2105, 2105 (2017) ("[M]ajor teaching hospital status was associated with lower mortality rates for common conditions compared with nonteaching hospitals.").

[231] For an overview of the differences across hospital types, see PAUL J. FELDSTEIN, HEALTH POLICY ISSUES 225–36 (6th ed. 2015).

[232] Ronen Avraham, *Database of State Tor Law Reforms (5th)* 9–166 (U of Texas Law, Law and Econ Research Paper No. e555, 2014), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=902711.

[233] Avraham & Schanzenbach, *supra* note 23, at 285.

[234] Compared to the data examined by Avraham and Schanzenbach, the data analyzed here include more individual observations each year. *See id.* However, the summary statistics reported in Table A2 are remarkably similar to the statistics for the dataset analyzed by Avraham and Schanzenbach, easing concerns that different definitions of the underlying sample are causing any problems in comparing the results for apology laws generated here with the results for noneconomic damages caps generated there.

[235] Cost data is not included in the NIS before 2001. Here, and throughout my analysis, costs are reported in 2011 dollars to adjust for inflation.

C. Hypotheses

The three theories concerning the effect of apology laws on medical malpractice claims discussed above can be directly extended to generate three competing hypotheses concerning the effect of apology laws on the practice of defensive medicine,[236] which I refer to as the intended effects hypothesis, the perverse effects hypothesis, and the no effect hypothesis. For convenience, the predictions associated with each hypothesis are summarized in Table A3 in the Technical Appendix.

Beginning with the intended effects hypothesis, apology laws can facilitate and encourage apologies from physicians to patients and thereby decrease the frequency and size of medical malpractice claims. Physicians, anticipating a successful apology in the event of a medical error, should be under less pressure to practice defensively and should, therefore, be more willing to choose less intensive treatments if apology laws have their intended effects. In other words, physicians should be more willing to choose medical management over PTCA or CABG for patients who could benefit from medical management. Along the same lines, if apology laws have their intended effect, physicians may be more willing to perform CABG over PTCA for patients who are candidates for both. As Avraham and Schanzenbach note, CABG may involve more liability risk than PTCA, meaning physicians may choose not to perform CABG in order to avoid this risk. Thus, if apology laws work as intended, the probability of receiving CABG should increase.[237] In general, if apology laws work as intended, then they should have similar effects on the outcomes associated with AMI patients as noneconomic damages caps, including decreasing costs and mortality rates. The results presented by Ho and Liu generally indicate that apology laws can have their intended effect and, therefore, suggest that these laws should have a similar effect on the treatment of AMI patients as noneconomic damages caps.

Next, with respect to the perverse effects hypothesis, apology laws may have exactly the opposite of their intended effects. As discussed above, theory predicts that apology laws will have their intended effects if patients and physicians have symmetric information. However, in the case of asymmetric information, where the physician knows more about whether malpractice occurred than the patient and can signal the occurrence of malpractice with an apology, the effect of apology laws on malpractice liability risk becomes theoretically ambiguous. This theoretical ambiguity and possibility of perverse effects in the litigation realm are also present in the realm of defensive medicine. In other words, it is possible that all of the impacts predicted by the intended effects hypothesis are reversed, with treatment intensity, costs, and length of stay increasing. Given this theoretical ambiguity, it is helpful to look at existing empirical evidence. I, along with Van Horn and Viscusi, found that, in the presence of asymmetric information, apology laws have perverse effects. In the context of AMI patients, asymmetric information may be present because patients may find it difficult—following an emergency situation—to sort out whether their injuries stemmed from their illness, were a

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[236] *See supra* Part II.B.

[237] Avraham & Schanzenbach, *supra* note 23, at 274.

natural consequence of their treatment, or were caused by malpractice.[238] Therefore, if AMI treatment is characterized by asymmetric information and apologies can serve as signals of malpractice, then apology laws could have the opposite effect of noneconomic damages caps.

Finally, as to the no effect hypothesis, it is possible that apology laws simply have no effect because they fail to encourage apologies. If physicians are either unaware of or simply ignore apology laws and, accordingly, do not change their behavior surrounding apologies, then apology laws can have neither their intended nor perverse effects. While possible, it is unlikely that apology laws simply fail to encourage apologies. First, there is evidence that state medical societies announce the passage of an apology law to their members.[239] Second, as discussed above, previous research has already demonstrated that apology laws do affect litigants' behavior.[240] Though these studies find conflicting evidence, each finds statistically significant effects of apology laws, suggesting that apology laws have some measureable effect.

D. Empirical Methodology

The goal of this empirical analysis is to identify a causal relationship (not merely an association) between apology laws and defensive medicine. In an ideal world, a laboratory experiment, in which some physicians would be randomly assigned to receive the protection of an apology law while others would receive no protection, would be used to determine the effect of apology laws on physician practice patterns.[241] This would facilitate clean statistical analyses between the treatment (apology law) and control (no apology law) groups. While a laboratory experiment is not possible for both practical and ethical reasons, it is possible to exploit what is sometimes referred to as a natural experiment to draw inferences about the effect of particular laws. In this "experiment," the units of observation

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[238] *See* McMichael et al., *supra* note 9, at 15 (explaining that the greater the inability of patients to trace their injury to malpractice, the greater the impact of asymmetric information on the effect of apology laws). It is important to note that AMI patients may suffer an injury following treatment for reasons completely unrelated to malpractice, as AMIs themselves are obviously dangerous and all medical treatments involve some risk that cannot be eliminated even in the complete absence of malpractice.

[239] For example, Pennsylvania is the most recent state to pass an apology law. Following its passage, the Pennsylvania Medical Society issued a press release, alerting physicians in the state to the law's passage. *See* Press Release, Pennsylvania Medical Society, Lawyers and Doctors come together and Agree It's Ok to Say 'I'm sorry' (October 23, 2013), *available at* https://www.pamedsoc.org/about-pamed/news-room/Apology%20Signing; *see also* Andis Robeznieks, *New Pa. law encourages doc apologies*, MODERN HEALTHCARE (October 23, 2013), http://www.modernhealthcare.com/article/20131023/MODERNPHYSICIAN/310239974.

[240] *See* Ho & Liu, *What's an Apology Worth*, *supra* note 5; Ho & Liu, *Does Sorry Work*, *supra* note 5; McMichael et al., *supra* note 9.

[241] *See* Shahar Dilbarry et al., *Regulatory Avoidance and Suicide: An Empirical Analysis*, 92 IND. L.J. 24 (forthcoming 2017) (referring to a laboratory experiment as the "gold standard"); Michael Frakes, *The Surprising Relevance of Medical Malpractice Law*, 82 CHI. L. REV. 317, 364 (2015) (discussing idealized laboratory settings when examining the impact of changes in laws).

(or subjects) are individual hospital stays for AMI patients, and the "treatment" is the passage of an apology law which is determined by individual states.

Based on the application of the treatment to the subjects, it is possible to estimate the impact of apology laws on the practice of defensive medicine assuming that all else is equal. In a laboratory with random assignment of the treatment, all else is equal, and the control group provides a counterfactual against which to compare the treated group. Outside of the laboratory, however, all else may not be equal. Because there may be some common factor that both systematically affects which hospital stays are covered by apology laws and impacts the outcome of interest, there is no valid counterfactual against which to compare the treated group. Accordingly, a straightforward comparison of those patient stays that were covered by an apology law and those that were not will not necessarily yield valid estimates of the effect of apology laws. It is possible to compare AMI hospital stays in a single state that passed an apology law before and after this passage. This results in comparing hospital stays in two environments that are very similar to one another—they are both in the same state—but one is covered by an apology law and the other is not. From the differences in outcome measures—treatments received, costs, length of stay, and mortality—it is possible to infer the effect of the apology law. However, a simple before and after comparison is problematic because physician treatment patterns, health care norms, the disease burden of the population, and many other factors are almost certainly changing over time for many different reasons. Disentangling the impact of these other factors from the impact of an apology law on the outcome measures would be impossible.

To create a more convincing counterfactual group against which to compare the treated group, social scientists routinely use a difference-in-differences modeling approach. Specifically, researchers can construct a comparison group that is comprised of states that are subject to all of the same time-varying factors but are not "treated" with an apology law. By examining the outcome measures in this comparison group, it is possible to determine how the outcome measures would have trended over time in response to changes in factors that are unrelated to apology laws. By comparing the trends in the outcome measures over time across the treated and non-treated groups, it is possible to account for these factors—even if it is impossible to observe the factors themselves—and thereby isolate the amount of change in a given outcome measure that is attributable to apology laws.

In mathematical terms, a simple difference-in-differences approach involves the following. First, the difference in a relevant outcome measure before and after the passage of an apology law in states that adopted such a law is calculated. Second, this calculation is repeated for the states that did not pass an apology law. Next, the difference in the differences calculated in the first two steps is taken. This difference in differences allows researchers to effectively net out the unobservable factors that may affect the outcome measure and isolate the effect of apology laws on this outcome measure.[242] When estimating the effect of apology

[242] To take a relatively simple example, consider states one and two. Before the passage of an apology law, the rate of a certain type of treatment is 10 in state one and 20 in state two. State one passes an apology law, while state two does not. After the passage of this law, the rate of treatment in state one is 50, and the rate of treatment in state two is 40. The simple difference-in-differences

laws on the practice of defensive medicine, I use a substantially more complex approach than that described above by estimating empirical models that draw on the staggered adoption of partial apology laws in 31 states and full apology laws in five states over a 13 year time frame.[243] While the empirical models estimated in the primary analysis are more complex and much richer than the simple difference-in-differences calculation described above, this description captures the essence of the models reported below.

Throughout my analysis, I estimate ordinary least squares ("OLS") regression models, and the full specification of the empirical model is reported and discussed in the technical appendix. I examine several different outcomes of interest, captured by several different dependent variables in the OLS regressions. First, when examining the treatment choices made by physicians, the dependent variable is an indicator variable for whether a particular treatment was chosen—indicator variables take the value one if the relevant treatment was chosen and zero otherwise. Second, when looking at resource use, the dependent variable is the natural logarithm of costs and the natural logarithm of length of stay.[244] Finally, when examining quality of care by looking at deaths, the dependent variable is an indicator that takes the value one if the patient died.

The independent variable of interest is an indicator that takes the value one if a state had an apology law in place in a given year. The coefficient on this variable is the difference-in-differences estimator described above and captures the effect of apology laws on different outcomes of interest. Throughout the analysis, I report results with a single apology law indicator variable as well as results with separate indicator variables for partial and full apology laws. In addition to the apology law variables, the empirical model includes a series of control variables to account for other factors that may influence the outcomes of interest. First, at the individual patient level, the models include variables (determined at the time of admission) for the patient's sex, the patient's age, and the square of the patient's age. The models also include the constituent parts of the Charlson Comorbidity Index as discussed above and indicator variables for whether a patient was covered by Medicare, Medicaid, or private insurance. Second, at the hospital level, a series of indicator variables capture the type of hospital where the patient was treated, as discussed above. Third, the models control for the effects of other tort reforms. An indicator for whether a state had a noneconomic damages cap in place controls for the effect of that reform, and a separate variable controls for the other tort reforms

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calculation here is: (50 – 10) – (40 – 20) = 20. This result is different than if one simply compared state one with itself before and after the passage of the apology law (50 – 10 = 40) or if one simply compared the two states after state one passed its apology law (50 – 40 = 10).

[243] Because a difference-in-differences model generates estimates of the effect of apology laws based on states changing their laws, more changes in state laws mean better estimates of the underlying effect. With over 30 states changing between 1999 and 2011, the models estimated in this study exploit more than enough state variation to generate valid estimates of the effects of apology laws. *See* Frakes, *supra* note 241, at 363 (using only 25 state law changes).

[244] Both of these variables exhibit substantial right skews. It is standard practice in the literature to take the natural logarithm of a variable to transform it from a skewed distribution to a more normal distribution. *See, e.g.*, Avraham & Schanzenbach, *supra* note 23, at 277; Frakes, *supra* note 241, at 368; *see also* Dilbarry et al., *supra* note 241, at 26–27 n.124.

discussed above.[245] Finally, all of the models include hospital and year fixed effects. The inclusion of these variables is the key to estimating a difference-in-differences model as described above.[246] Throughout the analysis, I account for the NIS's stratification by weighting each observation by a discharge weight, and I cluster the standard errors at the state level.[247]

E. Results and Discussion

This Section reports the main results of my empirical analysis. In the interest of clarity, only the estimated coefficients for the apology law variables are reported here. Throughout this Section, all of the results tables are organized the same way. Each column of each table reports the results from a single regression. The first three columns in each table report the results for a single apology law variable that takes the value one if a state had either a partial or full apology law in place in a given year. The last three columns in each table report results with separate indicator variables for partial and full apology laws. While all of the reported models include hospital and year fixed effects, they incrementally add control variables in order to provide a more complete picture of the empirical evidence on apology laws.

1. Treatment Choice Results

Table 1 reports the results of regression models that estimate the probability that an AMI patient receives any intensive treatment, i.e., PTCA or CABG, instead of medical management. Because both the dependent variable and the apology law variables are indicators, the reported coefficients can be interpreted as percentage point changes in the probability that the patient receives any intensive treatment.[248] For example, the reported coefficient in column (3) can be understood as a 0.4 percentage point decrease in the probability that an AMI patient receives either PTCA or CABG. However, neither this coefficient, nor any coefficient in the six reported models, is statistically significant. In other words, I find no statistical evidence that apology laws reduce the practice of defensive medicine. Across the entire sample of AMI patients, approximately 45.5% receive one of these intensive

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[245] *See supra* Part III.B.

[246] Instead of state fixed effects, I include hospital fixed effects. It is not possible to include both state and hospital fixed effects, as they are perfectly collinear. Hospital fixed effects are preferred to state fixed effects because they eliminate more heterogeneity and generate more precisely estimated results. *See* Avraham & Schanzenbach, *supra* note 23, at 276 (discussing a preference for hospital fixed effects over state fixed effects). However, I have estimated all of the models reported below with state fixed effects with little change in the results.

[247] To address the possibility that the rate of PTCA, the rate of CABG, LOS, and other outcomes are correlated within a particular state, I estimate standard errors clustered at the state level. *See* Marianne Bertrand et al., *How Much Should We Trust Differences-In-Differences Estimates?*, 119 Q.J. ECON. 249, 258 (2004) (noting that clustering can address the problem of serial autocorrelation).

[248] More specifically, for a given coefficient β, the interpretation is that enacting an apology law produced a $(100 \times \beta)$ percentage point change in the probability that the patient receives either PTCA or CABG.

treatments. Thus, even ignoring the lack of statistical significance, apology laws have negligible effects on the probability a patient receives an intensive treatment.[249] Overall, I find no evidence that apology laws decrease treatment intensity generally and thus no evidence that these laws reduce the practice of defensive medicine.

Table 1: Effect of Apology Laws on the Probability of Receiving a Major Intervention

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	-0.001	-0.004	-0.004			
	(0.005)	(0.005)	(0.005)			
Partial Apology Law				-0.002	-0.006	-0.005
				(0.006)	(0.005)	(0.006)
Full Apology Law				0.005	0.003	0.005
				(0.016)	(0.014)	(0.014)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,651,524	1,651,339	1,651,339	1,651,524	1,651,339	1,651,339
R-squared	0.312	0.386	0.386	0.312	0.386	0.386

Notes: The dependent variable is an indicator that takes the value one if the patient received either percutaneous transluminal coronary angioplasty ("PTCA") or coronary artery bypass grafting ("CABG"). "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses. * statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

To further explore the impact of apology laws on the practice of defensive medicine, I separately estimate the effects of these laws on the probability of receiving different intensive treatments. Table 2 reports regression results with an indicator variable for whether the patient receives PTCA as the dependent variable. Across all of the models reported in Table 2, there is no statistically significant evidence that apology laws affect physicians' decisions to treat patients with PTCA,

[249] A 0.5 percentage point change corresponds to only a 1.1% change in the average probability of receiving an intensive treatment.

meaning these laws do not reduce the practice of defensive medicine. Table 3 reports results with an indicator for whether the patient receives CABG as the dependent variable. I again find no statistically significant effect of the general apology law variable or the partial apology law variable; however, full apology laws have a consistently statistically significant effect on the probability that patients receive CABG, increasing this probability by between 0.9 and 1.1 percentage points.

Table 2: Effect of Apology Laws on the Probability of Receiving PTCA

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	-0.003	-0.006	-0.005			
	(0.005)	(0.004)	(0.004)			
Partial Apology Law				-0.003	-0.006	-0.006
				(0.005)	(0.005)	(0.005)
Full Apology Law				-0.005	-0.006	-0.004
				(0.015)	(0.012)	(0.012)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,651,524	1,651,339	1,651,339	1,651,524	1,651,339	1,651,339
R-squared	0.219	0.292	0.292	0.219	0.292	0.292

Notes: The dependent variable is an indicator that takes the value one if the patient received percutaneous transluminal coronary angioplasty ("PTCA"). "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses. * statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

Table 3: Effect of Apology Laws on the Probability of Receiving CABG

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.003	0.002	0.002			
	(0.003)	(0.002)	(0.002)			
Partial Apology Law				0.001	0.001	0.000
				(0.003)	(0.003)	(0.003)
Full Apology Law				0.011***	0.010**	0.009**
				(0.004)	(0.004)	(0.004)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,651,524	1,651,339	1,651,339	1,651,524	1,651,339	1,651,339
R-squared	0.068	0.080	0.080	0.068	0.080	0.080

Notes: The dependent variable is an indicator that takes the value one if the patient received coronary artery bypass grafting ("CABG"). "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses. * statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

Because the CABG results in Table 3 are somewhat stronger than the other treatment choice results, I perform a series of statistical tests to evaluate the robustness of these results. The specifics of these tests are reported in the Technical Appendix, but the important point is that the effect of full apology laws on the probability of receiving CABG is *not robust*. For example, full apology laws have a stronger positive effect on the probability of receiving CABG on three or four arteries than on the probability of receiving CABG on one or two arteries, despite the fact that physicians often have little discretion when choosing among procedures to treat three or more blocked arteries. Similarly, implementing slight changes to the model that are standard in the literature erases the statistically significant effects of full apology laws on the probability patients are treated with CABG. Overall, the robustness checks suggest that this effect should be interpreted with skepticism.

Across all of the treatment choice results, I find no consistent evidence that apology laws of either type affect the intensity of treatment received by heart attack patients and thus no evidence that these laws reduce the practice of defensive

medicine. The estimated effects of apology laws contrast with the effects of noneconomic damages caps estimated by Avraham and Schanzenbach, who find consistent and statistically significant evidence that caps reduce treatment intensity.[250] Though the effects of apology laws are similar in size and direction to those of noneconomic damages caps, the effects of apology laws are almost never statistically significant, meaning that these effects are statistically indistinguishable from no effect.[251] This general lack of statistical significance is not consistent with the intended effect of apology laws, as these laws are designed to have a meaningful impact on malpractice risk and thereby attenuate the practice of defensive medicine.

2. Resource Use Results

Table 4 reports regressions with the natural logarithm of total costs as the dependent variable.[252] Though none of the estimated effects are statistically significant, every coefficient is positive, implying that, if anything, apology laws *increase* the costs associated with treatment. Because the cost variable is in logarithmic form and the apology law variables are indicators, the coefficients reported in Table 4 can be interpreted as percentage changes.[253] For example, in column (6), the partial and full apology law coefficients can be understood as 1% and 1.1% increases, respectively. As with the treatment choice results, the evidence for the effect of apology laws on costs contrasts with the evidence for noneconomic damages caps reported by Avraham and Schanzenbach. Where Avraham and Schanzenbach found a statistically significant *decrease* in costs as a result of noneconomic damages caps, I find a statistically insignificant *increase* in costs as a result of apology laws.[254]

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[250] Avraham & Schanzenbach, *supra* note 23, at 282.

[251] The one exception to this pattern of statistical insignificance does not survive the robustness checks to which it is subjected, meaning that the only evidence that apology laws work as intended should be interpreted with skepticism.

[252] I examine the natural logarithm because of the substantial right skew in the cost variable. *See supra* note 244.

[253] More specifically, because the dependent variable is in logarithmic form, the marginal effect of an indicator variable with coefficient β is approximately $(\exp(\beta) - 1)(100)\%$. Robert Halvorsen & Raymond Palmquist, *The Interpretation of Dummy Variables in Semilogarithmic Equations*, 70 AM. ECON. REV. 474, 474–75 (1980).

[254] Avraham & Schanzenbach, *supra* note 23, at 278–82.

Table 4: Effect of Apology Laws on Costs

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.008	0.009	0.010			
	(0.016)	(0.016)	(0.016)			
Partial Apology Law				0.007	0.008	0.010
				(0.017)	(0.018)	(0.017)
Full Apology Law				0.013	0.011	0.011
				(0.026)	(0.027)	(0.026)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,236,865	1,236,733	1,236,733	1,236,865	1,236,733	1,236,733
R-squared	0.269	0.296	0.296	0.269	0.296	0.296

Notes: The dependent variable is the natural logarithm of costs per treated patient. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses. * statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

To further address changes in resource use following the passage of apology laws, Table 5 reports results with the natural logarithm of length of stay as the dependent variable. Apology laws have a consistently statistically significant and *positive* effect on length of stay. As with the cost regressions reported above, the individual coefficients may be interpreted as percentage increases because the dependent variable is in logarithmic form. Specifically, in columns (1) – (3), passing any apology law causes length of stay to increase by between 2.7% and 3.3%. In columns (4) – (6), partial apology laws increase length of stay by between 2% and 2.7%, while full apology laws increase length of stay by between 4.5% and 5.9%. Given a mean length of stay across the entire sample of about 5.3 days, apology laws increase the time spent in the hospital by between 2.6 and 7.5 hours. While these are relatively small increases, any increase in length of stay suggests that apology laws increase the resources used to care for AMI patients, which is inconsistent with these laws reducing the practice of defensive medicine.

Table 5: Effect of Apology Laws on Length of Stay

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.027***	0.032***	0.027***			
	(0.010)	(0.010)	(0.009)			
Partial Apology Law				0.020*	0.027**	0.024**
				(0.010)	(0.011)	(0.009)
Full Apology Law				0.057***	0.054***	0.044**
				(0.016)	(0.016)	(0.019)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,598,137	1,597,976	1,597,976	1,598,137	1,597,976	1,597,976
R-squared	0.079	0.202	0.203	0.079	0.203	0.203

Notes: The dependent variable is the natural logarithm of length of stay for each patient. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses. * statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

Because of the important implications of the length of stay results and because these coefficients are the only ones to be consistently statistically significant, I investigate the robustness of these results in several ways. The details and results of this investigation are discussed in the Technical Appendix, but overall, I find strong and consistent evidence that the effect of apology laws on length of stay is robust and therefore represents a true effect. For example, these results remain largely unchanged when the empirical models are altered, and more importantly, I find a clear pattern that the average length of stay steadily increases in the years following the passage of an apology law when there was no such pattern of increase prior to the passage of the law.

Overall, the evidence suggests that apology laws *increase* the resources used to treat heart attack patients. In stark contrast to the effects of noneconomic damages caps, apology laws increase the costs associated with treating AMI patients, though, as with treatment choice, these effects are not statistically significant. More important, however, is the positive and consistently significant effect apology laws have on length of stay. At its core, defensive medicine involves physicians making small decisions every day that increase the resources

used to treat individual patients. If apology laws decreased malpractice pressure, physicians should be slightly more comfortable sending patients home a little earlier—indeed, the general trend between 1999 and 2011 was to send patients home earlier. However, apology laws incite exactly the opposite approach from physicians, as they keep patients in the hospital longer in the presence of these laws.[255] Increasing resource use in response to a law that purports to reduce malpractice risk supports the perverse effects hypothesis outlined above.[256]

3. Quality of Care Results

Table 6 reports regression results where the dependent variable is an indicator for whether the patient died.[257] The reported coefficients in Table 6 can be interpreted as percentage point changes in the probability of death. Though the estimated coefficients are generally close to zero, there is some statistically significant evidence that apology laws *increase* the risk of dying. Based on the results in column (6), the positive effect of apology laws on mortality stems primarily from full apology laws, as this coefficient is statistically significant, while the coefficient for partial apology laws is not. In general, the evidence suggests that apology laws may increase the probability of death by 0.2 percentage points—0.4 percentage points in the case of full apology laws. While a small effect, a 0.4 percentage point increase is not insubstantial, given a death rate of only 6.8%.[258] This result is inconsistent with the effect of noneconomic damages caps, which reduce mortality rates.[259]

To test whether the counterintuitive effect of apology laws on death rates is spurious, I perform several robustness checks. As with the length of stay results, the effect of apology laws on mortality survives the series of robustness checks to which I subject it, suggesting that death rates increase in the wake of apology laws. Thus, consistent with the perverse effects hypothesis, apology laws adversely impact the care received by patients. Overall, the weight of the evidence supports the perverse effects hypothesis. The implications of these results are explored in the next Section.

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[255] This raises the obvious question of why physicians would continue to apologize if doing so increases their malpractice risk and ultimately causes them to expend more resources when treating patients. This important question is addressed in Section IV.A, *infra*.

[256] An alternative interpretation of the resource use results is that apology laws simply increase the amount of care delivered to heart attack patients, consistent with an increase in the quality of care. However, this interpretation is ruled out in the next section, which demonstrates that, even with more resources used, heart attack patients are more likely to die following the passage of apology laws. An increase in mortality is not consistent with heart attack patients receiving better care.

[257] Some disagreement exists in the literature about whether it is appropriate to use the NIS to count deaths related to AMIs. Dhankar et al., *supra* note 139, at 168, use the measure of mortality provided by the NIS. However, Avraham & Schanzenbach, *supra* note 23, at 283, instead use death rates from both coronary artery disease and myocardial infarction from the National Vital Statistics Mortality files. I examine the mortality rates reported in the NIS because doing so allows me to (1) use all of the same control variables as in other parts of the analysis and (2) focus specifically on deaths related to AMIs—neither of these is possible when using other datasets.

[258] This represents a 6% increase.

[259] Avraham & Schanzenbach, *supra* note 23, at 283–84.

Table 6: Effect of Apology Laws on Mortality

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.001	0.002	0.002*			
	(0.001)	(0.001)	(0.001)			
Partial Apology Law				0.001	0.002	0.002
				(0.002)	(0.001)	(0.001)
Full Apology Law				0.003	0.003	0.004*
				(0.003)	(0.003)	(0.002)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,650,016	1,649,831	1,649,831	1,650,016	1,649,831	1,649,831
R-squared	0.010	0.044	0.044	0.010	0.044	0.044

Notes: The dependent variable is an indicator that takes the value one if the patient died. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses. * statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

IV. POLICY IMPLICATIONS

Reviewing the evidence presented here, there is little to suggest that apology laws work as intended. Indeed, the evidence indicates that apology laws increase the practice of defensive medicine, consistent with the perverse effects hypothesis. To be clear, the intended effect of apology laws is to facilitate settlements and reduce the filing of medical malpractice claims, but an important corollary to this intended effect is the reduction of the practice of defensive medicine. However, the results reported above do not suggest that physicians react to the passage of apology laws in ways consistent with their risk of medical malpractice liability declining, and much of the evidence suggests physicians react to the passage of apology laws consistent with their risk of medical malpractice liability increasing.

Though perhaps somewhat surprising given the demonstrated benefits of apologies, the perverse effects of apology laws on defensive medicine are consistent with some of the previous findings regarding the impact of apology laws

on medical malpractice litigation.[260] More important than their consistency with existing evidence, however, the perverse effects of apology laws demonstrated above raise three significant questions. First, what explains these perverse effects? Second, where should lawmakers go from here? Third, what should physicians do with the existing evidence on apology laws? This Section addresses these questions in turn.

A. Exploring the Perverse Effects of Apology Laws

When examining the failure of apology laws to have their intended effect on the practice of defensive medicine, it is useful to begin by focusing on the disconnect between *apologies*, which have consistently been shown to reduce the frequency and severity of malpractice claims, and *apology laws*, for which there is mixed evidence. That disconnect may stem from one aspect of apology laws that has generally been omitted from prior examinations of apologies: asymmetric information.[261] As noted above, asymmetric information exists when one party possesses more information than the other party. In the context of medical malpractice, the relevant information asymmetry occurs when a physician possesses more information than the patient about whether malpractice occurred. Given the vulnerability of patients around the time they suffer an AMI and the many avenues through which an injury or other adverse outcome can occur—many of which involve no malpractice by the physician—determining whether malpractice occurred from the patient's point of view may be relatively difficult. An apology from a physician may signal the occurrence of malpractice to a patient who otherwise would not have discovered it. That apology may also embolden a patient in her conclusion that malpractice has occurred when she may have otherwise been unsure. Even if the apology itself is protected by an apology law, the patient is free to search for other admissible evidence. If apologies from physicians routinely signal the occurrence of malpractice, then apology laws, which facilitate these apologies, will increase malpractice liability risk.[262] And an increase in this risk could easily account for the perverse effects reported above.

If the presence of asymmetric information is driving the perverse effects reported above, that begs the question: why has asymmetric information not caused perverse effects in the myriad apology and disclosure programs at individual hospitals? The answer likely lies in the nature of these programs versus the nature of apology laws. These programs are generally implemented at well-heeled academic institutions or other large hospitals that have the resources to train physicians exactly how and when to apologize.[263] From these programs, physicians

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[260] *See* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 155–59; *see also* McMichael et al., *supra* note 9, at 18–23.

[261] To date, no experimental study of apologies has explicitly considered the potential role of asymmetric information, though some studies have addressed a somewhat related problem. *See* Robbennolt, *supra* note 38, at 492 (discussing a paradox related to asymmetric information).

[262] McMichael et al., *supra* note 9, at 27–28, found evidence of this effect.

[263] Michelle M. Mello et al., *The Medical Liability Climate and Prospects for Reform*, 312 JAMA, 2146, 2151 (2014).

may learn what to say and when to say it, learn how to avoid "botched apologies,"[264] and receive the support of trained staff. [265] If they are able to communicate effectively with patients, physicians may be able to signal the occurrence of malpractice in a way that still assuages patient anger or assuage patient anger without conveying any signal at all. Effective communication could mitigate the role of asymmetric information and avoid the perverse effect of increasing the propensity of patients to sue.

More generally, Erin O'Hara O'Connor conducted a thorough review of the existing literature on apologies across a variety of disciplines. Though she focused on organizational apologies, the lessons from her work also apply in the physician-patient context. She identified four key components of an effective apology: (1) "the identification of a wrongful act," (2) "an expression of remorse," (3) "a promise to forbear future transgressions," and (4) "an offer to repair the damages in some way."[266] On the other hand, O'Hara O'Connor explains, ineffective apologies often involve one or more of the following: (1) a delay in making the apology, (2) the use of a passive medium (such as a written apology), and (3) an unwillingness to accept the burden of one's wrongdoing.[267] Without understanding these important lessons through training, practice, and support, physicians may offer apologies that ultimately exacerbate their problems following a medical error rather than assuaging patient anger and reducing the risk of facing a malpractice claim. In contrast to the carefully developed training and support physicians receive as part of specific programs, apology laws provide no guidance at all on how or when to apologize. This lack of guidance could easily explain the failure of apology laws to generalize the benefits observed in connection with specific apology programs.

Additionally, the problems that arise from a lack of training are compounded by confusion surrounding apology laws themselves. Indeed, legal scholars have criticized apology laws for failing to protect the type of information patients often desire when hearing their physicians apologize.[268] Anna Mastroianni and several co-authors explain that injured patients "seek[] not only an expression of sympathy but also information about nature of the event and why it happened."[269] Mastroianni and her team further explain that physicians may not understand what aspects of an apologetic statement are protected.[270]

Two state court cases decided after Mastroianni and colleagues penned their critique of apology laws support their arguments. In *Davis v. Wooster*

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[264] *See* Aaron Lazare, *Go Ahead Say You're Sorry*, PSCYHOL. TODAY, Jan.–Feb. 1995, at 40, 76–78 (discussing botched apologies).
[265] *See* Boothman et al., *supra* note 62.
[266] Erin O'Hara O'Connor, *Organizational Apologies: BP as a Case Study*, 64 VAND. L. REV., 1959, 1965 (2011).
[267] *Id*. at 1982.
[268] *See* Mastroianni et al., *The Flaws in State 'Apology' and 'Disclosure' Laws Dilute Their Intended Impact on Malpractice Suits*, 29 HEALTH AFF. 1611, 1614 (2010) ("[M]ost apology laws do not protect, the key information that patients want communicated to them following an unanticipated outcome.").
[269] *Id*. at 1614–15.
[270] *Id*. at 1616.

Orthopaedics & Sports Medicine, an Ohio appellate court was confronted with the question of how to interpret the state's apology law.[271] In that case, an orthopedic surgeon who had caused the death of a patient following surgery explained that "he had nicked an artery and that he took full responsibility for it."[272] The physician argued that this admission of fault fell within the ambit of Ohio's partial apology law.[273] The court disagreed with the physician, and in reaching this conclusion, the court relied on multiple canons of construction.[274] While the court's analysis was sound, it is unreasonable to expect physicians to engage in lengthy statutory interpretation before deciding exactly what they will say when apologizing to patients. Along the same lines, a case in a Utah appellate court similarly illustrates the confusing nature of apology laws. In *Lawrence v. MountainStar Healthcare*, the Court of Appeals of Utah concluded, after a lengthy and detailed statutory interpretation, that some of the statements made by the defendants were protected by Utah's apology law, while others were not.[275] Together, these cases demonstrate that apology laws lack the clarity necessary to provide physicians with the type of guidance they need when apologizing.

This lack of guidance can lead to confusion which can, in turn, lead to poorly executed apologies. Mastroianni and colleagues explained that a poorly executed apology may involve "[m]erely expressing sympathy without sharing information about an injury's cause and prevention or accepting responsibility may strike patients as insincere, provoking rather than appeasing a potential plaintiff."[276] If physicians fail to understand what is protected and how to apologize, they may suffer all of the ill effects associated with apologizing (i.e., conveying a signal to an injured patient that malpractice has occurred) and enjoy none of the benefits (i.e., assuaging the patient's anger and dissuading legal action).[277] This critique obviously applies to partial apology laws, but it also explains the perverse effects associated with full apology laws. Physicians may simply not understand how much they can say under the protection of these laws and omit important information when speaking with patients. Overall, the absence of any training that would enable physicians to effectively apologize, the presence of asymmetric information which allows apologies to serve as signals of malpractice, and the general confusion over what is protected and how apology laws operate can explain why they increase malpractice risk and thus the practice of defensive medicine. However, this raises the obvious question of why physicians would continue to apologize, consistent with the goal of apology laws, if doing so raises, not lowers, their malpractice risk. There are two reasons why this may be the case.

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[271] 952 N.E.2d 1216, 1218 (Ohio Ct. App. 2011).
[272] *Id.*
[273] Unlike other states with similar laws, Ohio's apology law does not specifically exempt admissions of fault from the protection afforded by the law. *See* R.C. § 2317.43.
[274] 952 N.E.2d at 1218–22.
[275] 320 P.3d 1037, 1041–45 (Utah Ct. App. 2014).
[276] Mastroianni et al., *supra* note 268, at 1616.
[277] *See also id.* ("[L]aws that protect only expressions of sympathy and explanation may make for awkward communications, as it may be difficult to explain an error without discussing the different but closely related issues of responsibility or fault.").

First, as discussed in detail above, much of the academic and popular press coverage of apologies and apology laws has touted the benefits of these laws in alleviating medical malpractice liability risk. Long advised not to apologize following an error, physicians could have easily seen reports of how apology laws would change this culture and rushed to apologize in the wake of an error—even if they did not know how to do so effectively. They may also have rushed to apologize without fully understanding the nuances of apologies following medical errors based on various advocacy groups' support of apologies as dispute resolution mechanisms.[278] Second, following the passage of an apology law (and the popular, clinical, and academic discussions surrounding these laws), a culture change may have occurred in which physicians are simply expected to apologize. If such a culture change took place based on contemporaneously available evidence, physicians may have continued to apologize in the absence of any evidence suggesting that doing so actually increases malpractice risk.

B. Recommendation for Legislatures: Look Elsewhere

Apologies remain an important aspect of human interaction, and none of the results presented here undermine the moral role of apologies or the role that apologies can play in assuaging individual anger or in healing communities following a transgression. Prior legal and psychological research is clear that apologies have an important part to play in relationships and the reparative discourse that is so often necessary to maintain those relationships.[279] "Humans often de-escalate conflicts with conciliatory gestures" and "apologies can almost instantaneously erode the anger and pain associated with transgressions."[280] O'Hara O'Connor, employing an evolutionary approach to apology, traced the role of apologies and general conciliatory behavior through primate and human behavior, exploring the ways in which groups address problems following a transgression by one of their members.[281] This work suggests that apologies are deeply ingrained in our society and will continue to play important roles far into the future. To the extent that the legal system hinders or impinges upon the important part apologies play in modern society, apology laws may be justified as important means through which to reclaim apologies as a meaningful and necessary part of human interaction.

However, state legislatures historically have not appealed to these justifications when enacting apology laws. Instead, they focus on the narrow ability of apology laws to encourage settlements and avoid lawsuits in cases of medical malpractice, which is more consistent with the goals of tort reform than with restoring apologies to the important place they have historically occupied in individual interactions. To the extent that legislatures justify apology laws on the narrow grounds of tort reform in the context of medical malpractice, I find no

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[278] *See, e.g.*, *Our History and Mission*, SORRYWORKS.NET, https://sorryworks.net/history-and-mission/ (last visited May 19, 2017) (describing the history of one such advocacy organization).
[279] *See* O'Hara O'Connor, *supra* note 266, at 1964–71.
[280] *Id*. at 164–65.
[281] *Id*. at 1962–80.

empirical evidence supporting this justification. More generally, the evidence presented here and previous evidence on the effects of apology laws raise two important policy implications.[282] First, lawmakers should reconsider the use of apology laws to achieve the goals associated with tort reform. Second, to the extent that society would benefit from more (appropriately delivered) apologies, lawmakers should focus on the development of specific apology and disclosure programs.

Beginning with the role of apology laws as tort reforms, little evidence recommends them as such. Some evidence suggests apology laws reduce malpractice claim payments, but other evidence suggests that these laws either have no effect or increase claim payments.[283] Two separate studies have found that apology laws increase claim frequency to some degree.[284] However, while the effect of apology laws on medical malpractice claims themselves is undeniably important, increases or decreases in malpractice claims ultimately generate little value for society. Payments from physicians to patients are simply transfers of funds and generate no value in and of themselves. On the other hand, apology laws can create or destroy value for society by encouraging or discouraging the efficient delivery of medical care. For example, if they effectively reduced the practice of defensive medicine, apology laws could save wasted resources, thereby generating social value. In contrast, if they undermine the deterrence of the malpractice system, these laws could facilitate the provision of poor care, thereby destroying value.

None of the evidence reported above suggests that apology laws generate value for society by discouraging the practice of defensive medicine, and the weight of the evidence suggests that they increase defensive medicine with no benefit to patients. Thus, apology laws fail as tort reforms in the context of heart attack patients—one of the traditional contexts where tort reforms are evaluated. Given this failure, lawmakers are well advised to achieve the goals of tort reform through other means. If lawmakers' goals align with those in favor of tort reform, noneconomic damages caps have the most evidence to recommend them as effective tort reforms, though that evidence is not overwhelming. If the objective of lawmakers is to achieve the goals of tort reform without implementing traditional, damages-centric reforms, Mello and Kachalia have reviewed a number of other innovative reforms that states may implement.[285] Additionally, the federal government has funded a number of demonstration projects that focus on both patient safety and malpractice reduction that states may wish to explore.[286] While

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[282] In addition to these two important implications, continued research on apology laws is necessary. Future work should explore the effects of apology laws on the practice of defensive medicine in other areas of medical practice and the role of apology laws in promoting access to health care.

[283] *Compare* Ho & Liu, *Does Sorry Work*, *supra* note 5, at 159–62, and Ho & Liu, *What's an Apology Worth*, *supra* note 5, at 188–94, *with* McMichael et al., *supra* note 9, at 23–25.

[284] Ho & Liu, *Does Sorry Work*, *supra* note 5, at 186–87; McMichael et al., *supra* note 9, at 18–23.

[285] *See* MELLO & KACHALIA, *supra* note 18, at 61–101.

[286] *See* Medical Liability Reform and Patient Safety, AHRQ.gov, https://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/liability/demogrants.html (last visited June 27, 2017) (reviewing currently funded demonstration projects targeted at malpractice and patient safety).

there are a number of other reform options, the evidence available at this time suggests that apology laws are not the best choice to achieve the goals of tort reform.

However, this is not to suggest that *apologies* are not a viable reform option. The evidence reported here does not undermine prior work on the effect of apology and disclosure programs at specific hospitals and health systems; rather, it demonstrates that the benefits generated by these programs are not generalizable through apology laws. And the research is clear that apologies can generate a number of benefits for physicians, patients, and the health care system beyond their ability to reduce the frequency and severity of malpractice claims.[287] Thus, states that wish to address malpractice liability risk could encourage the adoption of these programs at hospitals and physician practices within their borders.

One program that includes an apology and disclosure component is the Communication and Optimal Resolution ("CANDOR") Toolkit developed by the Agency for Healthcare Research and Quality ("AHRQ").[288] "Based on expert input and lessons learned from the Agency's $23 million Patient Safety and Medical Liability grant initiative launched in 2009, the CANDOR toolkit" provides health care organizations with the training to, among other things, "[e]ngage patients and families in disclosure communication following adverse events."[289] The CANDOR Toolkit (and other specifically designed apology and disclosure programs) has the additional advantage that it can be adopted without state action. However, to the extent that hospitals and practitioners can be encouraged to implement this program (or other programs) through the passage of apology laws, these laws may be justified as part of a coordinated effort by state legislatures to encourage the adoption of apology and disclosure programs that can better realize the benefits of apologies than these laws can alone.

C. Advice for Physicians: Avoid Apologizing Without Training

Prior to the advent of apology laws and the development of robust research on the effect of apologies, attorneys generally advised their physician clients to avoid apologizing to injured patients.[290] In the wake of this research and the passage of apology laws, some commentators have urged physicians to apologize to injured patients, contradicting traditional legal advice.[291] While, as noted above, the intrinsic importance of apologies in modern society is difficult to deny, the existing empirical evidence on apology laws suggests that the unqualified advice urging physicians to apologize to injured patients is fundamentally flawed—even

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[287] *See supra* Part I.A.1.

[288] AHRQ, *Communication and Optimal Resolution (CANDOR) Toolkit*, https://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/candor/introduction.html.

[289] *Id.*

[290] *See* Robbennolt, *supra* note 3; *see also* Ebert, *supra* note 67.

[291] *See* Liebman & Hyman, *supra* note 59, at 24; Norman G. Tabler, Jr., *Dealing With a Medical Mistake: Should Physicians Apologize to Patients*, MEDICAL ECONOMICS (Nov. 10, 2013), http://medicaleconomics.modernmedicine.com/medical-economics/content/tags/apology-laws/dealing-medical-mistake-should-physicians-apologize-pati; *see also* Ebert, *supra* note 67.

when a physician practices in a state with an apology law. The advice that physicians should apologize in all cases makes no allowance for the possibility of asymmetric information or the nuances involved in an effective apology. Instead of simply advising physicians to always apologize, the better advice is that a *properly trained* physician should apologize following a medical error. This apology should be offered after the physician or trained support staff have evaluated the overall situation, and it should be offered in a manner consistent with the evidence on effective apologies.

Anecdotal evidence suggests that well-trained physicians offering effective apologies is becoming more common. For example, when Jake Gentry was injured as a result of a medical error in 2013, he received an apology from his surgeon, and based partly on this apology, his injury never generated a malpractice claim.[292] While care should be taken to ensure that victims of medical errors are not exploited by providers offering disingenuous apologies,[293] well designed apology and disclosure programs are becoming increasingly popular among hospitals and other health care providers. This bodes well for both patients, many of whom may only learn of a medical error as a result of these programs, and health care providers, who stand to see a reduction in their overall malpractice liability risk. Importantly, the evidence presented here suggests that physicians should encourage the development of and actively engage with these programs as they search for new ways to address medical errors and their malpractice liability risk because apology laws alone are simply inadequate.

CONCLUSION

Despite not being labeled as such by the state legislatures that have enacted them, apology laws are a new generation of tort reform. Because apology laws function as tort reforms and because they have outstripped traditional reforms in popularity among the states, placing them squarely within the tort reform debate has become increasingly important. More important, however, is developing the empirical evidence necessary to properly evaluate apology laws as tort reforms. This Article addressed both of these needs.

Apology laws function as tort reforms, but the way they influence medical malpractice claims and, in turn, the practice of defensive medicine is quite different than traditional reforms. These laws encourage physicians to apologize and rely on the ability of apologies to soothe an injured patient's anger and thereby decrease the patient's propensity to pursue a malpractice claim. However, an apology may actually increase an injured patient's propensity to sue if it signals to that patient the occurrence of malpractice. Thus, apology laws rely on a very different and less predictable mechanism than traditional tort reform. Understanding this mechanism

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[292] *See* Boodman, *supra* note 172 (discussing Gentry's case as well as those of other injured patients who did not receive apologies).

[293] This concern underlies many of the arguments offered by Arbel & Kaplan, *supra* note 5. *See also* Boodman, *supra* note 172 (noting the concerns that apology and disclosure "programs may take advantage of vulnerable patients who are not represented by a lawyer").

will allow lawmakers to make better and more informed decisions on the utility and desirability of apology laws as tort reforms.

Because the theoretical effect of apology laws on physicians' risk of medical malpractice liability and, therefore, their practice of defensive medicine is ambiguous, this Article provided the first empirical analysis of the effects of apology laws on the practice of defensive medicine. Using a dataset covering over 1.6 million hospital stays, this Article's analysis focused on the treatment received by heart attack patients. In general, the evidence demonstrated that apology laws fail to discourage the practice of defensive medicine—even in a medical context where other tort reforms have succeeded. Indeed, these laws intensify the practice of defensive medicine, as the time patients spend in the hospital increases by up to 5% in the presence of these laws. And this additional defensive medicine does not appear to benefit patients, as some evidence suggested apology laws increase the probability of dying following treatment for an AMI.

Overall, while *apologies* can effectively accomplish some of the goals of tort reform, *apology laws* cannot effectively do so. If states wish to achieve these goals, traditional tort reforms are likely a better option; however, encouraging the development of specific apology and disclosure programs has the potential to both achieve the goals of tort reform and generate the benefits associated with apologies. Similarly, physicians should actively seek out these programs if they wish to generate and enjoy the benefits associated with apologies, as apology laws alone are simply inadequate.

TECHNICAL APPENDIX

To Accompany

The Failure of "Sorry":
An Empirical Evaluation of Apology Laws, Health Care, and Medical Malpractice

Benjamin J. McMichael

Postdoctoral Scholar
Vanderbilt University
401 21st Avenue South
Nashville, TN, 37203
benjamin.j.mcmichael@vanderbilt.edu

Full Model Specification

Throughout my analysis, I estimate ordinary least squares ("OLS") regressions. The following equation captures the general form of the empirical model that is the basis of my analysis:

$$Y_{ihst} = \beta apology\ law_{st} + \lambda patient\ characteristics_{ihst} + \delta hospital\ characteristics_{hst} + \vartheta other\ tort\ reforms_{st} + \varphi_h + \tau_t + \varepsilon_{ihst}.$$

In this equation, *i* indexes individual hospital stays, *h* indexes hospitals, *s* indexes states, and *t* indexes years. The dependent variable, *Y*, takes various forms throughout the analysis. First, when examining the treatment choices made by physicians, it is an indicator variable for whether a particular treatment was chosen—indicator variables take the value one if the relevant treatment was chosen and zero otherwise. In the equations where *Y* is an indicator variable, I am estimating linear probability models ("LPMs").[1] Second, when looking at resource use, *Y* is the natural logarithm of costs and the natural logarithm of length of stay.[2] Finally, when examining quality of care by looking at deaths, *Y* is an indicator variable that takes the value one if the patient died.

The variable *apology law* is an indicator variable that takes the value one if a state had an apology law in place in a given year. The coefficient β is the difference-in-differences estimator described in the main text and captures the effect of apology laws. Throughout the analysis, I report results with a single apology law indicator variable as well as results with separate indicator variables for partial and full apology laws. Turning to the control variables, *patient characteristics* includes an indicator variable for whether the patient was female and the age of the patient.[3] Also included in *patient characteristics* are the constituent parts of the Charlson Comorbidity Index, as discussed in the main text, and indicator variables for whether a patient was covered by Medicare, Medicaid, or private insurance. Next, *hospital characteristics* includes a series of indicator variables that capture the type of hospital where the patient is treated, as discussed in the main text. Included in *other tort reforms* is an indicator for whether a state had a noneconomic damages cap in place, and a variable that controls for the other tort reforms discussed in the main text.[4] Next, φ and τ are vectors of hospital and year fixed effects, respectively. The inclusion of this series of variables for different hospitals and years is the key to estimating a difference-in-differences model

[1] *See* Benjamin Ho and Elaine Liu, *What's an Apology Worth? Decomposing the Effect of Apologies on Medical Malpractice Payments Using State Apology Laws*, 8 J. EMPIRICAL L. STUD. 179, 190 (2011) (discussing a preference for LPMs over other models such as logit and probit); *see also* Ronen Avraham & Max Schanzenbach, *The Impact of Tort Reform on Intensity of Treatment: Evidence From Heart Patients*, 39 J. HEALTH ECON. 273, 277 (2015) (estimating LPMs).

[2] Both of these variables exhibit substantial right skews. It is standard practice in the literature to take the natural logarithm of a variable to transform it from a skewed distribution to a more normal distribution. *See, e.g.*, Avraham & Schanzenbach, *supra* note 1; Michael Frakes, *The Surprising Relevance of Medical Malpractice Law*, 82 CHI. L. REV. 317, 368 (2015); *see also* Shahar Dilbarry et al., *Regulatory Avoidance and Suicide: An Empirical Analysis*, 92 IND. L.J. 24, 26–27 n.124 (forthcoming 2017).

[3] The age variable also enters as a quadratic term. *See* Avraham & Schanzenbach, *supra* note 1, at 276.

[4] *See* Part III.B of the main text.

as described in the main text.[5] Finally, I account for the NIS's stratification by weighting each observation by a discharge weight, and I cluster the standard errors at the state level.[6]

Robustness Checks

Treatment Choice Results

As noted in Section III.E.1 of the main text, I subject the results reported in Table 3—particularly the result that full apology laws have a positive and statistically significant effect on the probability a patient receives CABG—to a series of robustness checks. I first examine the impact of apology laws separately on the probability of receiving CABG on one or two arteries and on the probability of receiving it on three or four. As noted Section III.A of the main text, physicians often have discretion between PTCA and CABG when only one or two arteries are blocked but lack this discretion when three or four arteries are blocked. Tables A4 and A5 below report results for the effect of apology laws on the probability of receiving CABG on one or two arteries and on three or four arteries, respectively. Full apology laws have a smaller effect on the probability of receiving CABG on one or two arteries, and this effect is never statistically significant. However, full apology laws have a weakly statistically significant effect on the probability of receiving CABG on three or four arteries in the regression that lacks other controls. These results are not consistent with full apology laws simply decreasing the practice of defensive medicine, as physicians have little discretion when choosing between CABG on three or four arteries and other treatments. Next, I add state-specific time trends to the models as control variables. Including these time trends, which can be different for each state to account for differences in how treatments develop across individual states, ensures that the apology law variables are not simply picking up a general movement away from (or toward) CABG.[7] Once time trends are included, the statistically significant effect of full apology laws on the probability of receiving CABG disappears, suggesting that this effect is not robust and should be interpreted with skepticism.

Resource Use Results

Next, as explained in Section III.E.2, I test the robustness of the positive and statistically significant effects of apology laws on patients' lengths of stay as reported in Table 5. I investigate the robustness of these results in three ways. First, as with the CABG results, I add state-specific time trends to account for the fact that there was a general decline in length of stay between 1999 and 2011—these results are reported in Table A7. The coefficients in the models without any

[5] Instead of state fixed effects, I include hospital fixed effects. It is not possible to include both state and hospital fixed effects, as they are perfectly collinear. Hospital fixed effects are preferred to state fixed effects because they eliminate more heterogeneity and generate more precisely estimated results. *See* Avraham & Schanzenbach, *supra* note 1, at 276 (discussing a preference for hospital fixed effects over state fixed effects). However, I have estimated all of the models reported below with state fixed effects with little change in the results.

[6] To address the possibility that the rate of PTCA, the rate of CABG, length of stay, and other outcomes are correlated within a particular state, I estimate standard errors clustered at the state level. *See* Marianne Bertrand et al., *How Much Should We Trust Differences-In-Differences Estimates?*, 119 Q.J. ECON. 249, 258 (2004) (noting that clustering can address the problem of serial autocorrelation).

[7] Avraham & Schanzenbach, *supra* note 1, at 276, include state-specific linear time trends in their empirical models.

control variables become insignificant, but the coefficients in the models with controls remain highly statistically significant. Second, because there is some (statistically insignificant) evidence that apology laws influence the choice of treatment and because length of stay can vary mechanically with choice of treatment, I examine length of stay separately for patients who receive medical management, PTCA, and CABG—these results are reported in Table A8. Both types of apology laws increase length of stay for patients who receive medical management, suggesting that the effect of apology laws in increasing length of stay is not driven by treatment choice since medical management patients receive the least intensive treatment. For PTCA patients, the positive effect of full apology laws is statistically significant, and for CABG patients, partial apology laws have a statistically significant and positive effect on length of stay.

Third, to ensure that the apology law variables are not simply picking up some pre-existing trend in length of stay,[8] I estimate a model that includes indicator variables for three years before, two years before, and one year before the passage of an apology law—referred to as "leads." The model also includes an indicator for the year the apology law was enacted, one year after enactment, two years after enactment, three after enactment, and four-plus years after enactment—referred to as "lags." To reject the possibility that the apology law variables are simply picking up pre-existing trends in the data, there must be a clear movement toward a positive effect on length of stay following the passage of an apology law but not before. Because this movement is more easily visualized than traced through a series of coefficients in a table, Figure A1 reports the coefficients for the leads and lags from a linear regression—the points represent coefficient estimates and the lines represent the 10% confidence intervals.[9] There is a general movement in the positive direction following the passage of an apology law, suggesting that the apology law variables reported in the main results are not simply picking up pre-existing trends in the data.

Quality of Care Results

Finally, I test the robustness of the results reported in Section III.E.3. First, as with earlier models, I add a series of state-specific linear time trends to control for a general change in the death rate across the time period analyzed here—these results are reported in Table A9. With the inclusion of these additional controls, the positive effect of full apology laws on death rates becomes even stronger and more statistically significant, suggesting that the results in the main text reflect an actual (and perverse) effect of full apology laws on mortality. Next, to ensure that the apology law variables are not simply picking up pre-existing trends in the underlying data, I include a series of leads and lags in a regression model just as I did when examining the length of stay results. Figure A2 reports the coefficient estimates from this lead/lag analysis, and as with length of stay, there is a general movement toward an increase in the probability of death following the passage of a full apology law, though this movement is not as clear as it was with length of stay.

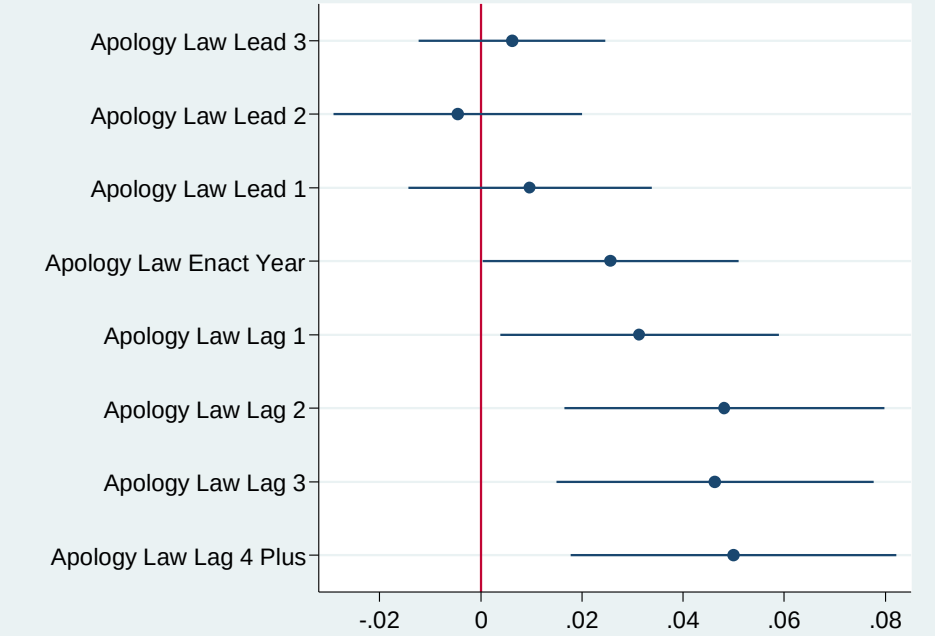
[8] As Avraham & Schanzenbach, *supra* note 1, at 276, explain, it is possible that there are pre-existing trends in the outcome variable and that passage of a tort reform is simply correlated with these pre-existing trends. If this is the case, the effect attributed to apology laws here would simply reflect this correlation and not a causal effect of apology laws. The models discussed here can address the possibility that apology laws are simply correlated with these pre-existing trends.

[9] If the 90% confidence interval does not cross the "zero line," then an effect is statistically significant.

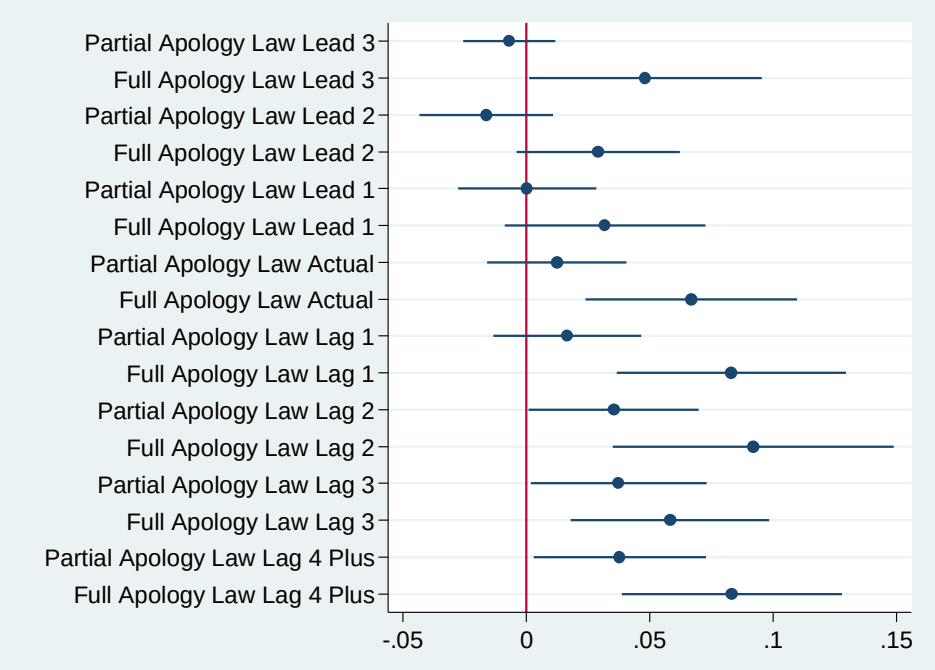
Figures

Figure A1: Lead and Lag Effects of Apology Laws on Length of Stay

Panel A: Single Apology Law Variable



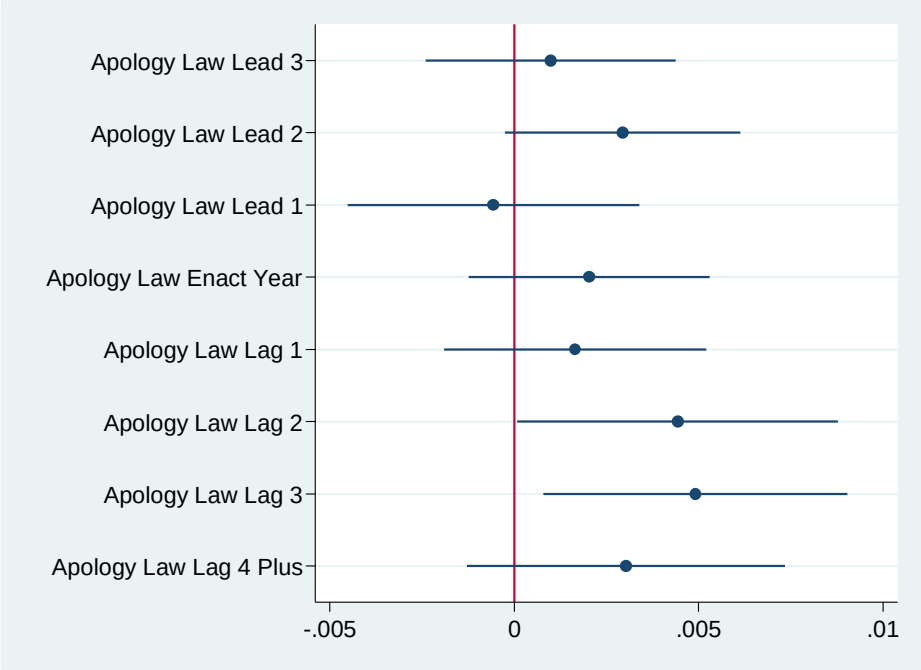
Panel B: Separate Apology Law Variables



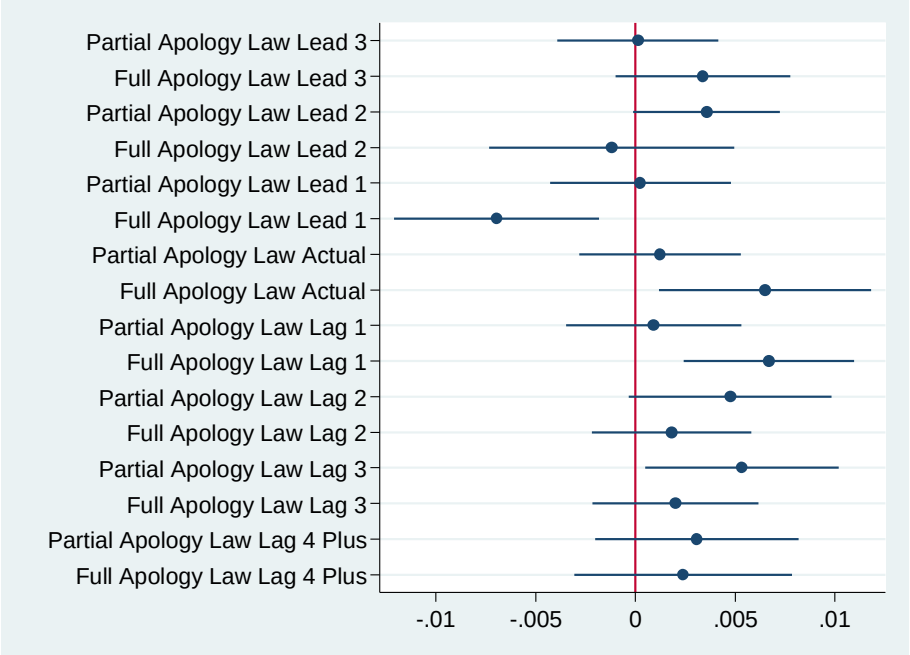
Notes: The coefficients and point estimates come from regressions that include a full set of controls and mirror those reported in columns (3) and (6) of Table 5.

Figure A2: Lead and Lag Effects of Apology Laws on Mortality

Panel A: Single Apology Law Variable



Panel B: Separate Apology Law Variables



Notes: The coefficients and point estimates come from regressions that include a full set of controls and mirror those reported in columns (3) and (6) of Table 6.

Tables

Table A1: Apology Laws

State	Year	Citation
	Partial	
Massachusetts	1986	MASS. GEN. LAWS ANN. ch. 233, § 23D
Texas	1999	TEX. CIV. PRAC. & REM. CODE ANN. § 18.061
California	2000	CAL. EVID. CODE § 1160
Florida	2001	FLA. STAT. ANN. § 90.4026
Washington	2002	WASH. REV. CODE ANN. § 5.66.010
Tennessee	2003	TENN. R. EVID. 409.1
Oregon	2003	OR. REV. STAT. ANN. § 677.082
Maryland	2004	MD. CODE ANN., CTS. & JUD. PROC. § 10-920
North Carolina	2004	N.C. GEN. STAT. ANN. 8C-1, 413
Ohio	2004	OHIO REV. CODE ANN. § 2317.43
Oklahoma	2004	OKLA. STAT. ANN. TIT. 63, § 1-1708.1H
Wyoming	2004	WYO. STAT. ANN. § 1-1-130
Louisiana	2005	LA. STAT. ANN. § 13:3715.5
Maine	2005	ME. REV. STAT. TIT. 24, § 2907
Missouri	2005	MO. ANN. STAT. § 538.229
New Hampshire	2005	N.H. REV. STAT. ANN. § 507-E:4
South Dakota	2005	S.D. CODIFIED LAWS § 19-19-411.1
Virginia	2005	VA. CODE ANN. § 8.01-581.20:1
Illinois	2005	735 ILL. COMP. STAT. ANN. 5/8-1901
Montana	2005	MONT. CODE ANN. § 26-1-814
West Virginia	2005	W. VA. CODE ANN. § 55-7-11A
Delaware	2006	DEL. CODE ANN. TIT. 10, § 4318
Idaho	2006	IDAHO CODE ANN. § 9-207
Indiana	2006	IND. CODE ANN. § 34-43.5-1-1 ET SEQ.
Iowa	2006	IOWA CODE ANN. § 622.31
Utah	2006	UTAH R. EVID. 409
Vermont	2006	VT. STAT. ANN. TIT. 12, § 1912
Hawaii	2006	HAW. REV. STAT. ANN. § 626-1, RULE 409.5
Nebraska	2007	NEB. REV. STAT. ANN. § 27-1201
North Dakota	2007	N.D. CENT. CODE ANN. § 31-04-12
District of Columbia	2007	D.C. CODE ANN. § 16-2841
Michigan	2011	MICH. COMP. LAWS ANN. § 600.2155
Pennsylvania	2013	35 PA STAT. ANN. § 10228.3

	Full	
Colorado	2003	COLO. REV. STAT. ANN. § 13-25-135
Connecticut	2005	CONN. GEN. STAT. ANN. § 52-184D
Arizona	2005	ARIZ. REV. STAT. ANN. § 12-2605
Georgia	2005	GA. CODE ANN. § 24-4-416
South Carolina	2006	S.C. CODE ANN. § 19-1-190

Table A2: Summary Statistics

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Observations	135,270	143,623	140,908	143,390	142,019	129,936	121,705	124,630	113,639	118,195	113,807	109,212	115,190
Both Laws	2.9%	21.8%	31.6%	33.4%	37.2%	50.2%	69.2%	74.5%	78.1%	76.2%	73.0%	70.3%	71.3%
Partial Apology Law	2.9%	21.8%	31.6%	33.4%	36.3%	48.8%	60.9%	63.9%	68.9%	65.9%	62.8%	62.6%	61.1%
Full Apology Law	0.0%	0.0%	0.0%	0.0%	0.9%	1.5%	8.3%	10.6%	9.2%	10.3%	10.1%	7.7%	10.2%
Age	69.0	69.0	69.2	68.8	68.8	68.8	68.8	68.2	68.2	68.3	67.9	67.9	68.0
Female	40.3%	40.9%	41.1%	40.8%	40.8%	40.5%	40.5%	39.4%	39.9%	39.9%	39.0%	39.0%	38.7%
Medicare	60.2%	60.6%	60.8%	60.8%	61.2%	60.3%	60.7%	58.3%	57.7%	57.5%	57.0%	56.9%	58.4%
Medicaid	3.9%	4.0%	4.1%	4.0%	4.5%	4.5%	4.8%	4.6%	4.6%	5.1%	5.5%	6.2%	5.9%
Private Insurance	29.9%	29.6%	29.3%	29.1%	27.9%	27.9%	27.4%	28.8%	29.1%	28.6%	28.0%	27.6%	26.3%
PTCA	24.2%	27.4%	30.0%	31.8%	34.1%	35.7%	38.4%	41.9%	40.7%	42.6%	44.9%	44.9%	46.0%
CABG	10.1%	10.6%	10.3%	10.8%	10.3%	9.9%	9.5%	10.1%	9.4%	9.0%	9.4%	8.6%	8.4%
Length of Stay (days)	5.56	5.58	5.48	5.51	5.49	5.45	5.34	5.22	5.11	5.07	5.02	4.77	4.73
Cost (2011 $)	NA	NA	13,034	14,322	15,086	16,564	17,363	18,001	18,013	18,781	18,838	18,980	19,488

Notes: Data come from all patients with a principle diagnosis of Acute Myocardial Infarction in the National Inpatient Sample.

Table A3: Hypotheses

Clinical Outcome	Hypotheses		
	Intended Effect	Perverse Effect	No Effect
Probability of Receiving . . .			
Any Major Intervention	-	+	**0**
PTCA	-	+	**0**
CABG	+	-	**0**
Cost	-	+	**0**
Length of Stay	-	+	**0**
Mortality	-	+	**0**

Table A4: Effect of Apology Laws on the Probability of Receiving CABG (One or Two Arteries)

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.002	0.002	0.002			
	(0.002)	(0.002)	(0.002)			
Partial Apology Law				0.002	0.002	0.002
				(0.002)	(0.002)	(0.002)
Full Apology Law				0.004	0.003	0.003
				(0.003)	(0.002)	(0.003)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,651,524	1,651,339	1,651,339	1,651,524	1,651,339	1,651,339
R-squared	0.033	0.037	0.037	0.033	0.037	0.037

Notes: The dependent variable is an indicator that takes the value one if the patient received CABG on one or two arteries. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses.
* statistically significant at the 10% level
** statistically significant at the 5% level
*** statistically significant at the 1% level

Table A5: Effect of Apology Laws on the Probability of Receiving CABG (Three or Four Arteries)

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.001	0.000	-0.000			
	(0.002)	(0.002)	(0.002)			
Partial Apology Law				-0.001	-0.001	-0.001
				(0.002)	(0.002)	(0.002)
Full Apology Law				0.007*	0.007	0.006
				(0.004)	(0.004)	(0.004)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,651,524	1,651,339	1,651,339	1,651,524	1,651,339	1,651,339
R-squared	0.044	0.052	0.052	0.044	0.052	0.052

Notes: The dependent variable is an indicator that takes the value one if the patient received CABG on three or four arteries. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses.
* statistically significant at the 10% level
** statistically significant at the 5% level
*** statistically significant at the 1% level

Table A6: Effect of Apology Laws on the Probability of Receiving CABG With State Time Trends

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.001	0.001	0.001			
	(0.000)	(0.002)	(0.002)			
Partial Apology Law				0.002	0.001	0.001
				(0.000)	(0.003)	(0.003)
Full Apology Law				-0.001	0.001	-0.000
				(0.000)	(0.003)	(0.004)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,651,524	1,651,339	1,651,339	1,651,524	1,651,339	1,651,339
R-squared	0.068	0.080	0.080	0.068	0.080	0.080

Notes: The dependent variable is an indicator that takes the value one if the patient received CABG. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include state-specific linear time trends, hospital fixed effects, and year fixed effects. All regressions are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses.

* statistically significant at the 10% level
** statistically significant at the 5% level
*** statistically significant at the 1% level

Table A7: Effect of Apology Laws on Length of Stay With State Time Trends

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.017	0.021**	0.020**			
	(0.000)	(0.008)	(0.008)			
Partial Apology Law				0.015	0.018**	0.018**
				(0.000)	(0.009)	(0.009)
Full Apology Law				0.029	0.037**	0.035**
				(0.000)	(0.015)	(0.016)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,598,137	1,597,976	1,597,976	1,598,137	1,597,976	1,597,976
R-squared	0.079	0.203	0.203	0.079	0.203	0.203

Notes: The dependent variable is the natural logarithm of length of stay. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include state-specific linear time trends, hospital fixed effects, and year fixed effects. All regressions are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses.
* statistically significant at the 10% level
** statistically significant at the 5% level
*** statistically significant at the 1% level

Table A8: Effect of Apology Laws on Length of Stay Across Procedure Types

Panel A: Med. Mgmt.	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.026**	0.031***	0.024**			
	(0.010)	(0.011)	(0.009)			
Partial Apology Law				0.024*	0.029**	0.024**
				(0.012)	(0.013)	(0.010)
Full Apology Law				0.038**	0.042**	0.023
				(0.018)	(0.018)	(0.022)
Observations	850,710	850,589	850,589	850,710	850,589	850,589
R-squared	0.095	0.186	0.186	0.095	0.186	0.186
Panel B: PTCA						
Both Laws	0.009	0.015	0.015			
	(0.012)	(0.011)	(0.011)			
Partial Apology Law				0.000	0.008	0.009
				(0.013)	(0.012)	(0.012)
Full Apology Law				0.048**	0.046**	0.047***
				(0.023)	(0.017)	(0.016)
Observations	599,395	599,364	599,364	599,395	599,364	599,364
R-squared	0.064	0.160	0.160	0.064	0.160	0.160
Panel C: CABG						
Both Laws	0.022**	0.029**	0.029***			
	(0.010)	(0.011)	(0.011)			
Partial Apology Law				0.024**	0.030**	0.030**
				(0.011)	(0.011)	(0.011)
Full Apology Law				0.015	0.026	0.026
				(0.033)	(0.025)	(0.025)
Observations	161,315	161,306	161,306	161,315	161,306	161,306
R-squared	0.072	0.172	0.172	0.072	0.172	0.172
Control Variables		x	x		x	x
Other Tort Reforms			x			x

Notes: The dependent variable is the natural logarithm of length of stay. The regressions in Panel A are limited to those patients that received medical management and no intensive intervention. The regressions in Panel B include only those patients that received PTCA. The regressions in Panel C include only those patients that received CABG. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include hospital and year fixed effects and are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses.
* statistically significant at the 10% level
** statistically significant at the 5% level
*** statistically significant at the 1% level

Table A9: Effect of Apology Laws on Mortality With State Time Trends

	(1)	(2)	(3)	(4)	(5)	(6)
Both Laws	0.001	0.002	0.002			
	(0.000)	(0.001)	(0.001)			
Partial Apology Law				-0.000	0.000	0.000
				(0.001)	(0.001)	(0.001)
Full Apology Law				0.009*	0.010**	0.011***
				(0.005)	(0.005)	(0.004)
Control Variables		x	x		x	x
Other Tort Reforms			x			x
Observations	1,650,016	1,649,831	1,649,831	1,650,016	1,649,831	1,649,831
R-squared	0.010	0.045	0.045	0.010	0.045	0.045

Notes: The dependent variable is an indicator that takes the value one if the patient died. "Control variables" include an indicator variable for whether the patient was female; the age of the patient; the square of patient's age; indicators for whether the patient was covered by Medicare, Medicaid, or private insurance; and the constituent parts of the Charlson Comorbidity Index, which are based on the diagnoses associated with a given patient. Also within "control variables" are a series of indicator variables for hospital type including: public, not-for-profit, for-profit, teaching, rural, large, medium, and small. "Other Tort reforms" include an indicator for whether a state had enacted a noneconomic damages cap, and an indicator for whether the following had been enacted: periodic payment reform, joint and several liability reform, punitive damages caps, and collateral source rule reform. All regressions include state-specific linear time trends, hospital fixed effects, and year fixed effects. All regressions are weighted by the discharge weights included in the NIS. Robust standard errors corrected for within-state correlation in the error term are reported in parentheses.

* statistically significant at the 10% level
** statistically significant at the 5% level
*** statistically significant at the 1% level