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The elderly account for a disproportionate share of medical spending, but little is known about how they are treated by the medical malpractice system, or how tort reform affects elderly claimants. We compare paid medical malpractice claims brought by elderly plaintiffs in Texas during 1988–2009 to those brought by adult non-elderly plaintiffs. Controlling for healthcare utilization (based on inpatient days), elderly paid claims rose from about 20% to about 40% of the adult non-elderly rate by the early 2000s. Mean and median payouts per claim also converged, although the elderly were far less likely to receive large payouts. Tort reform strongly affected claim rates and payouts for both groups, but disproportionately reduced payouts to elderly claimants. We thus find evidence of convergence between the elderly and the adult non-elderly in both claim rates and payouts, which is interrupted by tort reform. (*JEL* I18, K23, K32)

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1. Introduction

The elderly account for a disproportionate share of medical spending. They are more prone than the non-elderly to be harmed by medical error, because they use healthcare system more often and more intensely, often have multiple medical conditions, and are more fragile. Yet little attention has been paid to how they are treated by the medical malpractice ("med mal") system—let alone how they are affected by tort reform. Past med mal studies have focused on overall system costs or on particular physician specialties or procedures, not on particular plaintiff groups.

We study med mal claims by the elderly, excluding nursing home claims, and how they differ from claims by the non-elderly, using a unique closed claims database maintained by the TX Department of Insurance covering 1988–2009. Texas enacted a strict cap on non-economic damages ("non-economic cap") and other tort reforms for suits filed after September 1, 2003, so we also assess how tort reform affected med mal claimants, and whether the impact on the elderly differed from its impact on other claimants.

Controlling for healthcare utilization (based on hospital inpatient days), the ratio of elderly to adult non-elderly paid claims rose sharply, from under 20% over 1988–90 to about 40% over 2001–03, but then leveled off. Mean and median payouts to the elderly were substantially lower at the beginning of our sample period, but rose over time and fully converged by the end of our sample period, but only for pre-reform claims. Post-reform, payouts to the elderly dropped more than payouts to the adult non-elderly. Our main story is thus "interrupted convergence." Prior to reform, elderly patterns in claiming were converging to those for the adult non-elderly. After tort reform, convergence ceases, and at least for payouts, reverses to some degree. We also find that the elderly settle claims faster, are less likely to take cases to trial, and are far less likely to receive "blockbuster" payouts.

We seek here to describe med mal litigation by the elderly and how it is affected by tort reform. We do not address the normative question of whether the rate of claiming by the elderly or payouts to elderly claimants were too high, too low, or about right, either before or after the 2003 reforms.

Part II reviews the limited literature on malpractice claiming by the elderly and describes our dataset. Part III assesses med mal claims by elderly and non-elderly claimants and the impact of Texas' 2003 reforms. Part IV discusses our findings. Part V concludes.

2. Literature Review, Data Sources, and Tort Reform

2.1. Literature Review

The empirical literature on med mal claiming by the elderly is modest and dated.[1] Only one academic paper and one government report specifically study this topic. Sager et al. analyzed Wisconsin malpractice claims from 1983 to 1984, and found that the elderly were significantly less likely to initiate malpractice suits (Sager et al., 1990). A GAO report on malpractice claims against hospitals over 1986–90 found that Medicare patients accounted for about 32% of hospital discharges and 44% of inpatient days but made only about 10% of claims and received about 10% of dollar payouts (General Accounting Office, 1993). In addition, Studdert et al. examined factors that predict whether negligently injured patients sue, and found that those over age 75 were less likely to file claims (Studdert et al., 2000).

A similarly small body of work examines how tort reform affects elderly claimants. Various commentators have suggested that a non-economic cap will have a disparate impact on claims by the elderly, who often have zero or small economic damages (Washburn, 2002; Finley, 2004; Daniels and Martin, 2009; Rubin and Shepherd, 2008). But the limited empirical evidence is mixed. Using tried cases drawn from jury verdict reporters in three states, Finley concluded that non-economic caps hit the elderly harder than the non-elderly (Finley, 2004). In contrast, Studdert et al. found no evidence of a disparate impact in a study of California jury verdicts (Studdert et al., 2004). No study examines whether caps differentially affect the elderly in settled cases.

This study is the first to present longitudinal evidence on med mal claiming by the elderly, in both tried and settled cases. We examine claim frequency, payout, and duration, both before and after Texas's major 2003 tort reforms. In prior work, holding claiming rates constant, we

1. There is a more extensive literature on the frequency of medical error among elderly patients. Because our data do not allow us to address this issue, we do not discuss it further.

estimated that the 2003 Texas non-economic cap would reduce aggregate payouts to elderly claimants in settled cases by 31%, compared with 16% for adult-non-elderly plaintiffs (Hyman et al., 2009). However, our estimate of the mean of the per-case percentage reductions in payout was smaller: *8% for elderly claimants v. 5% for adult-non-elderly claimants*, and the difference between these percentages was not statistically significant (Hyman et al., 2009).

The simulation methodology we used assumes no change in case mix and did not let us estimate the cap's effect on claim frequency. In practice, as we discuss below, the Texas med mal reforms greatly reduced claim frequency. If the elderly faced a larger percentage cut in expected payouts than other claimants, they might be expected to suffer a larger percentage drop in claims as well.

2.2. Data Sources

We study med mal claims by elderly plaintiffs against physicians and hospitals. We do not study claims against nursing homes.[2] Our data come from the Texas Closed Claims Database (TCCD), a publicly accessible database maintained by the Texas Department of Insurance (TDI). This database contains individual reports of all personal injury claims closed from 1988 on, covered by five lines of commercial insurance—mono-line general liability, auto, multi-peril, medical professional liability, and other professional liability—involving payouts by all defendants of more than $10,000 in nominal dollars. Data are currently available through 2009. TDI checks the reports for internal consistency and reconciles them against aggregate annual reports filed by each insurer.[3]

2. We study claims by the elderly against nursing homes separately (Paik et al., 2012b).

3. This paper is one of a series using the Texas closed claims database to explore different aspects of medical malpractice and personal injury litigation. For an overview, see Black et al. (2013). For a fuller discussion of the *TCCD*, the med mal dataset, and dataset limitations, see Black et al. (2008). The Texas Department of Insurance (TDI) summary *Closed Claim Reporting Guide* (2009) and the data on which we rely are available at http://www.tdi.texas.gov/reports/report4.html. The current version of the TDI reporting forms (long and short forms) are available at http://www.tdi.texas.gov/forms/form12.html, and the 2011 *Closed Claim Reporting Guide* (containing reporting instructions) is available at www.tdi.texas.gov/company/documents/CCGuide2011.doc. The long and short forms did not change significantly during our

2.2.1. *Med mal dataset*. We use this overall database to construct a dataset of med mal claims that includes the following cases:

- Payout by all defendants is at least $25,000 in 1988 dollars (roughly $45,500 in 2009 dollars) ("large paid claims").[4]
- The claim meets two of the following three criteria:
  - It was paid under medical professional liability insurance;
  - It was against a physician or hospital;
  - It involved injuries caused by "complications or misadventures of medical or surgical care."[5]

A "claim" is an incident causing bodily injury that results in a policyholder request to an insurer for coverage. An insurer must file a report with TDI in the year a claim "closes"—when the insurer "has made all indemnity and expense payments on the claim."[6]

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study period, except for an increase in 2009 in the minimum dollar thresholds for reporting, discussed below.

4. Claims with payout of $10,000–$25,000 are reported on a "Short Form"; claims with payout of at least $25,000 are reported on a "Long Form." The Long Form contains the nature of the injury, which we require to classify a claim as involving medical malpractice, and plaintiff age, which we need to study claims by the elderly; the Short Form omits this information. We, therefore, study only Long-Form claims. The reporting thresholds are not inflation-adjusted. Thus, some claims that were reported on the Long Form in later years would have been reported in earlier years on the Short Form if the thresholds had been inflation adjusted. To address this "bracket creep," we limit the sample to cases with payout of at least $25,000 in 1988 dollars. The large paid claims we study account for 99% of total payout on all paid claims. We convert payouts to 1988 dollars using the *Consumer Price Index for All Urban Consumers* (CPI). Source: www.bls.gov/cpi. In regressions we define year as (calendar year – first year used in the regression, either 1988 or 1990, depending on the regression). As we discuss below, the reporting thresholds increased for claims closed after September 1, 2009 (§ 2.3.2 below).

5. We exclude claims against nursing homes from our sample. Other types of health-care providers (for example, nurses and free-standing medical clinics) are not separately listed in the Long Form. We also include cases that meet one of the three criteria and are likely to involve medical malpractice. For example, we include 60 cases against physicians or hospitals which were paid under "other professional liability" rather than medical professional liability insurance. We exclude cases that meet two of the criteria, but seem unlikely to involve medical malpractice. Thus, we exclude cases paid under automobile liability insurance even if they meet the other two criteria. Details on our inclusion rules are available from the authors on request.

6. TDI, *Closed Claim Reporting Guide* (2009), at 18.

Many med mal cases involve multiple defendants. We review all claim reports to identify duplicate reports. When duplicate reports exist, we generally treat the last-filed report as the primary report. This report should capture any prior payouts by parties that were not required to file closed claim reports, such as self-insured hospitals. Our sample includes 16,034 non-duplicate cases involving total payouts over 1988–2009 of $4.9 billion.[7]

For cases with smaller or zero payout, we know the aggregate number of "claims" closed per year covered by medical professional liability insurance, and the aggregate dollars paid, but not plaintiff ages. Over our sample period, the large paid claims we study represent 14% of all reported claims (including zero payout claims), 67% of claims with non-zero payout, and 99% of all payout dollars.[8]

2.2.2. *Other types of cases*. In robustness checks, we use the other four lines of commercially insured personal liability claims included in the TCCD to control for trends in personal injury claims in Texas, not specific to med mal, that could affect med mal claims as well. To construct this dataset, we use the type of insurance to determine the type of claim, except (i) we remove med mal cases; and (ii) we treat cases which are covered by medical professional liability insurance but are not med mal cases, as "other professional liability" cases (over 90% of these cases are against dentists). For areas other than med mal, we rely on TDI to identify duplicate reports.

7. In 35 cases, the broader med mal dataset from which we draw our sample includes duplicate reports where one involves a nursing home but the other(s) involve a physician or hospital as defendant. We include the claim against the physician or hospital in our dataset. In identifying duplicate reports, we sometimes exercised judgment when claim reports were similar but not identical. Insurers also make some reporting errors that TDI does not catch. In a few cases when both the error and the correction were apparent, we corrected the underlying data. Details on the procedure we used to identify duplicates and the data adjustments we made are available from the authors on request. Claim reports may not capture all payouts by non-reporting defendants, either because the insurer which filed the last report was unaware of these payments or because the non-reporting defendant had not yet paid when the last report was filed.

8. A "claim" reflects an insurer receiving a report from an insured about an actual or potential claim by injured plaintiff. We have data on aggregate claims, including zero-payout claims, beginning in 1990. Over 1990–2009, there are 17,131 large paid med mal claims, 19,930 total claims individually reported, and 124,362 total claims (each of these counts includes duplicate claims).

2.2.3. *Other data sources*. We obtain estimated Texas population by age and year from the U.S. Census Bureau.[9] We use three measures of the relative intensity of healthcare consumption by the elderly versus other age groups: share of healthcare spending, inpatient days, and hospital discharges. We obtain data on hospital discharges and hospital inpatient days by patient age for the "South" U.S. census region (which includes Texas) from the National Hospital Discharge Survey (NHDS). To estimate Texas discharges by patient age, we adjust these data for differences between the Texas age composition and that for the remainder of the South region.[10] We obtain data on U.S. healthcare spending for selected years from the Centers for Medicare and Medicaid Services, and interpolate or extrapolate to estimate spending for other years.[11]

2.2.4. *Age group categories*. We generally focus on two broad age groups: adult non-elderly claimants (age 19–64); and elderly claimants (age 65 and over). For some analyses, we add baby/child (age 0–18), and separate elderly claimants into age brackets (ages 65–74, 75–84, and 85 and over).

2.3. Dataset Limitations and Sample Selection Bias

2.3.1. *Dataset limitations*. The TCCD includes only "insured" claims. Most physicians carry malpractice insurance, but we lack data on claims against physicians employed by the University of Texas hospital system,

9. The annual population estimates are available at http://www.census.gov/popest/states/, click on State Estimates by Demographic Characteristics, then download data file under State Single Year of Age and Sex Population Estimates.

10. NHDS discharge data through 2008 are available from ICPSR at http://www.icpsr.umich.edu/icpsrweb/ICPSR/series/43. The original source is *National Hospital Discharge Survey*, 1979–2008, National Center for Health Statistics (NCHS), at Centers for Disease Control. We obtain the 2009 data from NCHS at http://www.cdc.gov/nchs/nhds/nhds_questionnaires.htm. Our Texas discharge and patient day estimates assume that Texas has the same ratio of discharges/population and patient days/population as the rest of the South region, both overall and for each age range.

11. Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, National Health Expenditure Data by Age, at http://www.cms.hhs.gov/NationalHealthExpendData/04_NationalHealthAccountsAgePHC.asp#TopOfPage. Data are available for 1987, 1996, 1999, 2002, and 2004. We extrapolate for years prior to 1987 using the 1987 data point, interpolate for 1988–1995 using the 1987–1996 trend line, interpolate for 1997–2003 using surrounding years, and extrapolate to 2005–2009 using a linear trend based on 1996–2004 data.

which is self-insured. We similarly lack data on self-insured hospitals. We have data on plaintiff age, employment status, and county of injury, but not injury severity, gender, or county of residence. We lack data on cases with zero or small payout. We have data on the final plaintiff demand, but not on any earlier demands. We lack data on medical injuries that do not result in med mal claims, so we can assess the impact of the med mal system and tort reform only on the subset of elderly patients who bring claims, or would have done so without reform.

2.3.2. *2009 Changes to reporting thresholds*. Effective September 1, 2009, the thresholds for individual claim reports rose to: no report if payout of $25,000 or less (nominal $); short-form report for payout from $25,001 to $75,000; and long-form report for claims with payout more than $75,000. This change causes 11 med mal claims in our dataset during this period to be reported on a short, rather than long form (below, we call these "short-form claims from 2009"). For these claims, with payouts from $45,000 to $75,000 (nominal), we lack data on plaintiff age. We use claim frequency for the 8 months of 2009 to assign these claims to age categories: two claims to baby and child, seven to adult non-elderly, and two to elderly.[12]

2.3.3. *Sample selection bias*. One goal of this project is to assess the relative impact of tort reform on elderly versus younger claimants, especially the adult non-elderly. To make this assessment, we need enough time to pass so that our sample of post-reform cases will be reasonably representative of all post-reform cases. The concern is sample selection bias: we observe cases only when they close, and slow-to-close cases may differ systematically from quick-to-close cases. For example, if cases with larger payouts or more complex cases take longer to close, and do so differentially for the elderly, when compared with the adult non-elderly, our post-reform results could be biased if we cut off data collection too soon.

12. On the rule change, see TDI, *Closed Claim Reporting Guide* (2009), at 2. More specifically, we assigned 1 claim to age 0–1, 1 to age 1–18, 7 claims to age 19–64, 1 claim to age 65–74, and 1 claim to age 75–84. In regressions in which we include other types of cases as a control for general Texas trends, we drop these intermediate short-form claims rather than assign them to age groups.

Fortunately, as we discuss below, payout has a negligible association with claim duration. Complexity does predict longer duration, but the effect is similar for elderly and adult non-elderly claimants. Overall, we judge that ending the sample period in 2009 is a reasonable compromise, taking into account the risk if we use too-short a post-reform period (sample selection bias), the risk if the post-reform period is too long (potential impact of factors other than tort reform on our results), and the value of providing policy-relevant research on how tort reform affects the elderly in a timely manner.

2.4. 2003 Med Mal Reforms

In 2003, Texas adopted a package of tort reforms, which affected med mal claims but not other types of personal injury claims. A key element of the reforms was a cap on non-economic damages in med mal cases against physicians and other individual healthcare providers at $250,000 nominal ($161,000 in the 1988 dollars we use in this article), with an additional $250,000 possible if a hospital or other healthcare institution is also liable, up to a maximum of two institutions, for a maximum overall cap of $750,000. The cap applies to suits filed after September 1, 2003. This cap would be expected to reduce both claim frequency and payouts. Anecdotal evidence suggests a large impact on claim rates and payouts, as well as a decline of more than 50% in inflation-adjusted med mal insurance premiums.[13] We do not study the effect of the cap on insurance premiums.

Texas also has long had an inflation-adjusted cap on economic plus non-economic damages in death cases, at $975,000 in 1988 dollars. Other components of the 2003 reforms include making the death cap apply per claim, rather than per defendant, higher evidentiary standards for cases involving emergency room care, a requirement that plaintiffs file an expert report within 120 days of suit with regard to each defendant's negligence (by a practicing physician, if the defendant is a physician), and a 10-year "statute of repose" (a flat bar on claims more than 10 years after the date of injury, regardless of delayed date of discovery or other factors that might toll the general statute of limitations).

13. On claim frequency and payouts, see Carter (2006) and Daniels and Martin (2009). On med mal premia, see Guardado (2009) and Slavin (2010).

There is an important complication in assessing the impact of the 2003 tort reforms, which we return to below. For each closed claim with a lawsuit filed, we know whether the cap applies. But some claims close quickly, while others take longer—so the claims that are closed in any given post-reform period are a mix of pre- and post-reform claims. Claims that close in 2004 are almost entirely pre-reform, while those that close in 2009 are mostly post-reform.[14] The results we observe in any given post-reform year reflect a mix of pre- and post-reform claims. Stated differently, the 2003 reforms either apply or not to any given claim, but the effects of reform phase in over time when viewed across all closed claims.

3. Empirical Results

3.1. Overview

We begin with an overview of total payouts. Figure 1 shows total payouts per capita for elderly and adult non-elderly claimants, adjusted for population growth of each group. The solid line shows payouts to adult non-elderly claimants; the dotted line shows payouts to elderly claimants. The dashed line shows total dollar payouts to the elderly as a fraction of total payouts to all plaintiffs. In this and later graphs, the vertical line between 2003 and 2004 separates the pre- and post-tort-reform periods. As one progresses further into the post-reform period, an ever-larger percentage of cases are affected by tort reform. By 2009, 93% of adult non-elderly claims and 89% of elderly claims are post-reform.

As Figure 1 reflects, per-capita payouts to adult non-elderly claimants were roughly flat from 1990 to 2003, but dropped sharply after tort reform,

14. Of the 14,889 suit-filed cases in our dataset, 1,536 were filed after September 1, 2003. The reforms affect 0.3% of cases closed in 2003, 4.3% for 2004, 17.5% for 2005, 44.4% for 2006, 75.2% for 2007, 86.1% for 2008, and 90.1% for 2009. In 55 claims with no lawsuit filed, injury before September1, 2003, and closed after September 1, 2003, we cannot conclusively determine whether the 2003 tort reforms apply. We judge that for the 33 cases with injury in 2002 or earlier, there was likely an opportunity to bring suit before the deadline if the plaintiffs' lawyer saw reason to do so, so we treat these as pre-reform cases. The cases with injury in 2003 present a closer question. We treat the 10 cases which close by year-end 2003 as pre-reform, and the remaining 12 cases, with closing in 2004 or later as post-reform. In robustness checks, our results are not sensitive to how we handle these 55 cases.

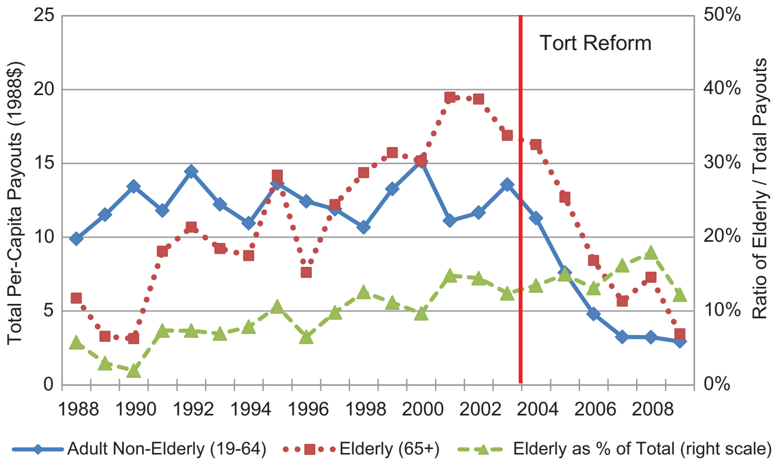

Figure 1. Total Per-Capita Payouts to Adult Non-elderly and Elderly Claimants. Total payout per capita by year for elderly and adult non-elderly claimants (left scale), and ratio of elderly payouts/total payout to all plaintiffs (right scale), for 12,841 non-duplicate, non-nursing-home, med mal cases closed from 1988 to 2009 with payout >$25,000 in 1988 dollars. Amounts in 1988 dollars.

from an average of about $12 per capita over 2001–03 to only $3 per capita in 2009.[15] Per-capita payouts to elderly claimants increased steadily from about $3 in 1990 to about $19 over 2001–03, before dropping to under $4 in 2009. As we develop below, the post-reform drop in payouts per capita comes from a combination of fewer claims, and lower payout per claim in the claims that are still brought.

As the dashed line shows, the share of total payouts received by elderly claimants increased from less than 5% over 1988–90 to around 14% over 2001–03, and then dropped to 12% in 2009. Thus, Figure 1 provides graphical support for our overall theme that tort reform interrupted a pattern of convergence between the elderly and the adult non-elderly.

In unreported regressions, we confirm that prior to tort reform, there is no significant trend in per-capita payouts to the adult non-elderly, and a

15. Figure 1 includes 1988–89. Known under-reporting of claims during those years means that total payouts (the top two lines in the figure) will be low. We include these years in the figure because we have no reason for thinking that the under-reporting affects the fraction of payouts make to elderly plaintiffs (the bottom dashed line in the figure).

Table 1. Summary Statistics on Large Paid Claims, 1988–2009

Panel A: Med mal claims

Paying defendant	No. of claims	% Elderly claimants	Total payout ($M)	% Paid to elderly
Physician	7,997	14.7	1,596	12.0
Hospital	1,380	34.8	340	20.5
Physician + Hospital	6,229	14.5	2,857	7.4
Other	428	22.9	79	23.7
Total	16,034	16.6	4,871	10.1

Panel B: Medical care use

Age group	% of population	% of hospital discharges	% of inpatient days	% of healthcare spending
Babies (<1)	1.7	14.7	11.3	13.4*
Children (1–18)	28.1	7.9	6.4	
Adult non-elderly (19–64)	60.3	50.8	46.8	51.6
Elderly (65+)	10.0	26.7	35.5	35.0
Total	100	100	100	100

Panel A: Number of claims, percent involving elderly claimants, total payouts, and percent paid to elderly plaintiffs, for 16,034 non-duplicate med mal cases closed from 1988 to 2009 with payout >$25,000 in 1988 dollars. Payouts in 1988 $ millions. *Panel B:* Percent of population, percent of hospital discharges, percent of hospital inpatient days, and percent of healthcare spending represented by indicated age groups. Percentages may not sum to 100% due to rounding. *indicates combined percentage for babies and children.

statistically significant rise in payouts to the elderly. In a regression of per-capita payout on year and constant term over 1990–2003, the coefficient on year is -0.016 ($t = 0.18$) for the adult non-elderly, versus 0.996 ($t = 6.50$) for the elderly. Tort reform affected both groups strongly. From 2003 to 2009, total payouts dropped by 78% for the adult non-elderly, and 80% for the elderly. Total dollar payouts to both groups together dropped from an average of about $200 million over 2001–03 to only $53 million in 2009. We explore below the extent to which the post-reform trends in total payout reflect changes in claim frequency, payouts per claim, or both.

In Table 1, we turn from time trends to averages across all years in the dataset. Table 1, Panel A, presents summary statistics on claim frequency and payout, by type of paying defendant(s), and the fraction of claims and payouts attributable to elderly plaintiffs. Table 1, Panel B, presents summary information on population, hospital discharges, inpatient days, and medical spending for different age groups. To assess the elderly's use of the malpractice system, we need to adjust for their disproportionate use of medical care. Hospital discharges, inpatient days, and medical spending provide different measures of treatment intensity, which we use to control for exposure to malpractice risk. Below, we rely principally on inpatient days as an intensity measure, but verify robustness with the other measures. The elderly account for 10% of population, 27% of hospital discharges, 35% of medical spending, and 36% of inpatient days, but represent only 17% of large paid claims and 10% of payouts.[16]

As Table 1, Panel A, reflects, claims by the elderly, when made, are disproportionately likely to be against hospitals, rather than physicians. The elderly account for 16.6% of malpractice claims overall, but 34.8% of claims against hospitals. This disparity could reflect the conventional wisdom that the elderly tend not to sue their doctors, the location and intensity of their medical care, or a combination of these factors. Our data do not allow us to assess which of these factors explain our findings.

Table 2 divides the sample into finer age ranges, and provides additional detail on payout per claim. We define a measure of "claiming propensity" as the ratio of (percent of large paid claims) to (percent of inpatient days). This ratio is 1 by definition for the whole population, but it is 1.36 for the adult non-elderly versus only 0.47 for the elderly. Among the elderly, claiming propensity declines with age; it is 0.66 for the young elderly (age 65–74), 0.38 for the moderate elderly (age 75–84), and 0.25 for those 85 and older. The last two columns in Table 2 show a similar but milder pattern for mean and median payouts: lower payouts for the elderly than for adult non-elderly claimants; with payouts declining with age among the elderly.

3.2. Claim Frequency

We turn next to an analysis of time trends in claim frequency. Figure 2*a* shows time trends in the number of large paid med mal claims per 100,000 persons from 1990 to 2009, separately for elderly claimants (dotted line) and adult non-elderly claimants (solid line). We omit 1988–89 because of underreporting in these years, which TDI addressed by auditing insurers

16. Each of the intensity measures has a time trend, even though the elderly share of total population is nearly constant at 10%. All three measures rise for the first half of our sample period, and fall in the second half; the decline is steepest for inpatient days.

Table 2. Large Paid Claims and Claiming Propensity by Age Group, 1988–2009

Age group	% of population	% of inpatient days	% of claims	Claiming propensity	% of total payout	Payout/claim ($ '000)	
						Mean	Median
Baby/child (0–18)	29.7	17.7	19.9	1.13	33.5	511	174
Adult non-elderly (19–64)	60.3	46.8	63.5	1.36	56.4	270	121
All elderly (65+)	10.0	35.5	16.6	0.47	10.1	185	106
Young elderly (65–74)	5.6	14.3	9.4	0.66	6.0	193	114
Moderate elderly (75–84)	3.3	13.9	5.4	0.38	3.2	181	94
Very elderly (85+)	1.1	7.3	1.8	0.25	0.9	158	85

Percentages of population, inpatient days, and claims, claiming propensity [(% of claims)/(% of inpatient days)], percentage of total payout, and mean and median payout per claim for plaintiffs in indicated age ranges, for 16,034 non-duplicate, non-nursing-home, med mal cases closed from 1988 to 2009 with payout >$25,000 in 1988 dollars. Amounts in 1988 dollars; per-claim payouts in $ thousands. Percentages may not sum to 100% due to rounding.

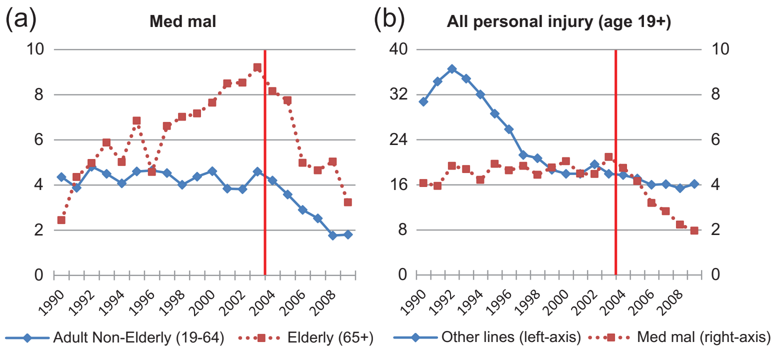

Figure 2. Time Trends in Claims per 100,000 Persons.
(*a*) Large paid claims per 100,000 persons for elderly and adult non-elderly plaintiffs for 12,059 non-duplicate, non-nursing-home, med mal cases closed from 1990 to 2009 with payout >$25,000 in 1988 dollars. (*b*) Large paid claims per 100,000 adult claimants (age 19+), separately for med mal cases and 64,376 other large paid personal injury claims included in TDI dataset, closed from 1990 to 2009. 1988 and 1989 are omitted due to underreporting in these years.

beginning in 1990.[17] Claims per 100,000 adult non-elderly persons were roughly flat through 2003, but then declined during the post-reform period, from 4.6 in 2003 to 1.8 in 2009. In contrast, claims per 100,000 elderly persons increased dramatically during the pre-reform period, from 2.4 in 1990 to 9.2 in 2003, before falling to 3.2 in 2009.[18] We confirm the apparent structural break, coinciding with the 2003 reforms, in regression analyses below.

In Figure 2*b*, we compare claim rates for med mal cases to those in the other four lines of personal injury claims included in our dataset. Figure 2*b* shows rates for all adults (age 19+). During the first part of the 1990s, claim rates declined for other liability cases, while med mal claim rates were stable. Thus, over 1990–96, the claim rates for med mal and for other claims do not satisfy the usual "parallel trends" (or, at a minimum, similar, and

17. We have no reason to expect bias in which claims went unreported, so we include 1988–89 in all analyses except those which involve claim rates, either absolute or relative to an absolute denominator such as population.

18. We lack data on unpaid claims and small paid claims, but have no reason to think there were large time trends in the fraction of claims that result in a payout large enough to be included in our dataset. Thus, the trends in large paid claims likely reflect similar trends in total paid claims.

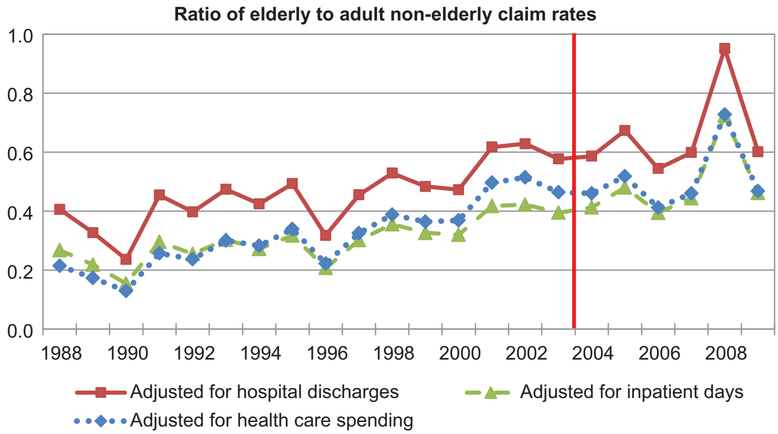

Figure 3. Time Trends in Claim Rates by Age Group.
Ratio of elderly to adult non-elderly claim rates, adjusted for number of hospital discharges and inpatient days and share of U.S. healthcare spending, for 12,841 non-duplicate, non-nursing-home, med mal cases closed from 1988 to 2009 with payout >$25,000 in 1988 dollars.

linear trends) assumption underlying difference-in-differences (DiD) analysis. Over 1997–2003, the trends for the two groups are similar, though still with a declining trend for other types of claims which is not seen pre-reform in med mal claims. Thus, over this period, it is plausible to use other personal injury claims as a control group that can capture general trends in Texas personal injury litigation, unrelated to the 2003 med mal reforms. Still, given the very different trends in other claims prior to 1997, we see the comparison between med mal and other lines as a robustness check on our results in Figure 2*a*, rather than as our principal results. Post-reform the claim rates for the two groups diverge. Med mal claim rates drop sharply, while claim rates for other personal liability claims continue to show a modest downward trend. Claim rate trends for other liability cases are declining over 1997–2009 for adult non-elderly and modestly rising for elderly cases (not shown in Figure 2*b*).

Rates per unit population do not take into account the elderly's more intense use of medical care. In Figure 3, we show the ratio of the elderly to adult non-elderly claim rate, controlling separately for hospital discharges (solid line), inpatient days (dashed line), and share of healthcare spending (dotted line). Figure 3 begins in 1988, because we have no reason to believe that underreporting in 1988–89 affected these ratios.[19]

The trends are qualitatively similar for all three intensity measures. The relative frequency of claims by the elderly rises strongly through the early 2000s, but then levels off well below the adult non-elderly level. Controlling for inpatient days, the elderly/adult non-elderly ratio rises from an average of 18% over 1988–90 to an average of 41% over 2001–03, but, apart from an unexplained jump in 2008, remains in the 40–45% range thereafter.

In Table 3, we turn to regression analysis of time trends in the frequency of large paid claims per 100,000 persons, using year, a constant term, and a structural break variable, which we call "post-reform period," to reflect the extent to which the 2003 reforms influence claim rates in each post-reform year.[20] This variable is zero for years before 2003, nearly zero for 2003, and rises toward 1 thereafter. We define it as follows. The *observed* ratio of post-reform claims to total claims in a given year is a downward biased measure of the extent to which the reforms affect claims rates, because the reforms suppress post-reform claims.[21] As detailed in the Appendix, we therefore use pre-reform data on claim survival times to estimate the "post-reform period" variable. We estimate this variable separately for adult non-elderly, elderly, all non-elderly, or all claims, as appropriate for a particular regression. The post-reform period variable reaches 0.97 for all claims (0.98 for elderly claims) in 2009.

Table 3 confirms the visual findings from Figure 2. As regression (1) indicates, there is no significant pre-reform time trend in adult non-elderly claim rates. In contrast, regression (2) shows a strong rise in pre-reform claim rates for elderly plaintiffs.

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19. We adjust each individual claim for healthcare intensity based on the year of injury, rather than the year in which the claim was closed.

20. In this and all other regressions, year is coded as year – first year in sample. Thus, in Table 3, year is coded as year – 1990. In a regression with year and constant term as the only independent variables, the coefficient on the constant term is the estimated value of the dependent variable in the first year in the sample.

21. For example, suppose that in a given period, we would expect: (i) without the effect of the reforms on claim rates, to see 20 large paid claims; (ii) half of these hypothetical claims would be pre-reform; and (iii) reform reduces claim rates by 50%. We would then observe ten pre-reform and five post-reform claims. Two-thirds of observed claims (10/15) will be pre-reform. We would wrongly infer that we are only one-third of the way into the post-reform period, instead of half-way.

Table 3. Effects of Tort Reform on Annual Claim Rates per 100,000 Persons

Data	Med mal (1990–2009)			All lines (1997–2009)		
Regression	(1)	(2)	(3)	(4)	(5)	(6)
Age group	19–64	65+	All adults	19–64	65+	All adults
Weighting	None	None	Population	None	None	Population
Year	−0.006	**0.416**	−0.007	**−0.527**	**0.250**	**−0.484**
	(0.30)	**(9.30)*****	(0.32)	**(3.94)*****	**(2.39)****	**(3.69)*****
Post-reform period	**−2.35**	**−7.00**	**-2.33**	0.45	**−3.20**	0.110
	(6.84)***	**(10.78)*****	**(6.79)*****	(0.39)	**(3.14)*****	(0.10)
Med mal dummy				**−17.50**	**−5.32**	**−17.25**
				(25.56) ***	**(11.15)*****	**(25.64)*****
Elderly			−0.73			**−9.08**
			(1.52)			**(14.39)*****
Year*elderly			**0.42**			**0.57**
			(8.45)***			**(5.44)*****
Elderly*post-reform period			**-4.94**			−2.07
			(6.48)***			(1.85)*
Year*med mal dummy				**0.52**	0.13	**0.45**
				(3.66)***	(1.05)	**(3.47)*****
Med mal dummy*post-reform period				**−2.74**	**−3.53**	−2.18
				(2.20)**	**(3.01)*****	(1.98)*
Med mal dummy*elderly						**10.80**
						(20.05)**

Continued.

Table 3. Continued.

Data	Med mal (1990–2009)			All lines (1997–2009)		
Regression	(1)	(2)	(3)	(4)	(5)	(6)
Age group	19–64	65+	All adults	19–64	65+	All adults
Weighting	None	None	Population	None	None	Population
Med mal*elderly*post-reform						**−4.21**
						(**4.20**)***
Constant	4.40	3.66	4.41	21.83	12.04	21.68
	(25.45)	(8.14)	(25.62)	(32.99)	(27.46)	(31.83)
Observations	20	20	40	26	26	52
Adjusted R^2	0.872	0.814	0.909	0.993	0.951	0.992
% Drop (2003–09)	−60.6%	−64.9%				

Regressions (1)–(3): Ordinary least squares regressions for indicated age groups, of claims per 100,000 persons, included in dataset of 12,059 non-duplicate, non-nursing-home, med mal cases closed from 1990 to 2009 non-duplicate, non-nursing-home cases involving adult claimants with payout more than $25,000 in 1988 dollars. Post-reform period is estimated probability that claim closed in each year was filed pre-reform, computed separately for elderly and non-elderly plaintiffs. 1988 and 1989 are omitted due to underreporting in these years. Last row shows drop in actual claims from 2003 to 2009 = (2009 claims rate − 2003 claims rate)/(2003 claim rate). Regressions (4)–(6): Ordinary least squares regressions for indicated age groups, of claims per 100,000 persons, included in dataset of 8,061 med mal and 36,152 other personal injury cases closed from 1997 to 2009. *t*-statistics, based on robust standard errors, are in parentheses. *, **, and *** indicate significance at the 10, 5, and 1% levels (omitted for constant term). Significant results (at 5% or better) are in boldface.

Post-reform, there is a sharp drop in claims for both groups, shown in the significant negative coefficient on the post-reform period variable in all three regressions. The last row of Table 3 shows the percentage drop in claim rates from 2003 to 2009. The raw drop for the elderly is 65%, which is only slightly larger than the 61% drop for the adult non-elderly. However, the effective drop for the elderly is likely larger than this, because the elderly claim rate was rising prior to reform, and might have continued to rise but for reforms.[22] The drop in large paid med mal claims is similar to the drop in all med mal claims, including smaller paid claims and unpaid claims. That drop is 57%, from a 2000–04 average (8,349) to the 2009 level (3,603).

In regression (3), we combine both age groups, and use a DiD-like specification to assess differences between them. Note that in a customary DiD specification, one group is treated, the other is a control. Here, in contrast, both groups are "treated" by med mal reform. Thus, this specification assesses whether treatment effects differ between them. We use population weights because there are many more adult non-elderly; without these weights, the two groups would be weighted equally in the combined regression.[23] As expected, the elderly show a positive time trend, indicated by the significant positive coefficient on year*elderly. The elderly also show a larger post-reform drop, indicated by the significant negative coefficient on elderly*post-reform period. Note that this larger drop is relative to an overall positive relative time trend. The regression model assumes that this time trend would continue in the post-reform period, but for tort reform.

As a robustness check on these results, we control in regressions (4)–(6) for trends in claim rates for other personal injury claims. We limit the sample to 1997–2009, because of the sharp drop over 1990–1996 in claim rates for other lines, shown in Figure 2*b*. The shorter time period both limits statistical power and increases the correlation between the year trend variable and the post-reform period variable.[24] Regression (4) provides a DiD

22. A caveat: we find in other work a national trend toward lower claim rates during this period, independent of tort reform. If this national trend affected Texas as well, our estimates overstate the impact of reform on claim rates (Paik et al., 2012a).

23. In robustness checks, we obtain similar results without population weights.

24. The year trend rises smoothly from 1997 to 2009. The post-reform variable is zero through 2003, then rises smoothly toward 1 during the post-reform period. The correlation between the two is 0.77 over 1990–2009, but rises to 0.89 over the shorter 1997–2009 period. Combined with smaller sample size from dropping 1990–96, this produces much larger standard errors for the key med mal dummy*post-reform period

specification, in which we compare adult non-elderly med mal claims to other adult non-elderly personal injury claims. We include an interaction between year and med mal dummy (=1 for med mal claims; 0 otherwise). This allows for linear but non-parallel time trends for med mal versus other claims. The coefficient on year is significant and negative, indicating a continued decline in claim rates for non-med mal claims. The coefficient on med mal dummy*year is significant and positive and effectively offsets the negative coefficient on year. This confirms the lack of a pre-reform time trend in adult non-elderly med mal claim rates. The variable of principal interest is the interaction between med mal dummy and post-reform period variable. The coefficient on this interaction is negative and significant, and is only slightly different in magnitude than the corresponding coefficient in regression (1). We thus confirm a post-reform drop in med mal claim rates for the adult non-elderly.

Regression (5) is similar to regression (4), but limited to elderly claimants. The positive coefficient on year indicates a rise in claims for the elderly in other lines of cases, suggesting that the rise in elderly willingness to sue over our sample period is not limited to med mal cases. This suggestion of a general trend in elderly willingness to sue is strengthened by comparing this positive coefficient to the negative coefficient on year for adult non-elderly. There is still a negative coefficient on the med mal*post-reform period interaction, indicating a post-reform drop in med mal claim rates, relative to claim rates for other types of cases.

In regression (6), we implement a triple-differences specification, using all ages and all lines of cases. There is a drop in med mal claim rates, indicated by the negative and marginally significant coefficient on med mal*post-reform period. This coefficient becomes significant in an unreported regression in which we add the triple interaction elderly*med mal*year to regression (6), thus allowing for different time trends in elderly versus adult non-elderly claim rates both overall and within med mal cases. There is mild evidence of a drop in elderly claim rates (relative to the overall rising trend) for other lines of cases, indicated in the negative and marginally significant coefficient on elderly*post-reform period, but an additional post-reform decline in med mal cases, brought by elderly

variable in regression (4), compared with those for the non-interacted post-reform period variable in regressions (1)–(3).

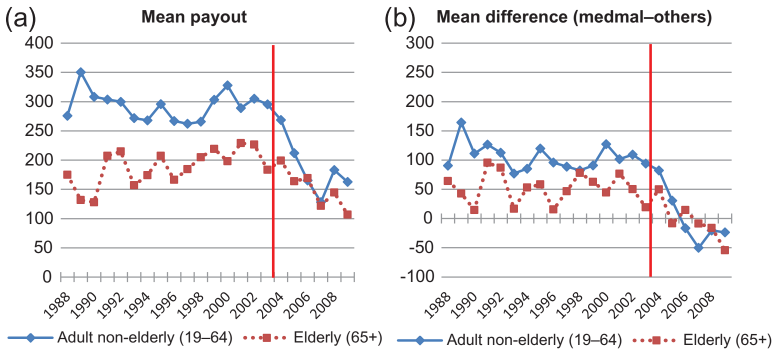

Figure 4. Payout per Claim: Elderly versus Adult Non-Elderly.
(*a*) Mean payout per claim by year, separately for elderly and adult non-elderly claimants. (*b*) Differences in mean payout per claim between med mal claims and other liability claims by year, separately for elderly and adult non-elderly claimants; 12,841 non-duplicate, non-nursing home, med mal cases and 69,922 non-duplicate, other liability cases, closed from 1988 to 2009 with payout >$25,000 in 1988 dollars. Amounts in 1988 $ thousands.

claimants, reflected in the negative coefficient on the triple interaction of elderly*med mal*post-reform period.

3.3. Payout per Claim

We have thus far examined changes in claim rates and total payouts. We turn in this section to payout per claim. As we did for claim rates, we report results both for a med mal-only, DiD research design, and a triple difference research design, in which we use payout per claim for other lines of personal injury claims to control for trends affecting payouts for personal injury claims in Texas generally.

Figure 4*a* presents time trends in mean payouts in med mal cases. We provide separate lines for adult non-elderly and elderly claimants. Over 1988–2003, mean payout to the adult non-elderly was flat to gently declining, with substantial year-to-year variation. In contrast, mean payout to the elderly was rising, but remained below the adult non-elderly level. After 2003, payout per claim drops for both groups.

The gap between the two groups continues to shrink, and is essentially gone by 2006–07. After that, the elderly and adult non-elderly lines diverge, especially in 2008 and 2009. This divergence is driven by post-reform claims. Over 2005–09, if we examine only pre-reform claims, there is no significant difference in mean or median payout between the elderly and the adult non-elderly. In contrast, for post-reform claims, mean and median payouts to adult non-elderly are significantly higher than for the elderly (mean = \$154, 000 versus \$116,000; $t = 2.96$).

In Figure 4*b*, we report the *difference* in mean payouts between med mal claims and the other four lines. Prior to reform, there is scatter, but no pre-reform trend for either the adult non-elderly or the elderly. In unreported figures, we find similar trends for each of the other four lines of personal injury claims—no time trend in payouts for the adult non-elderly, and a modestly rising trend for the elderly. This contrasts with the results for claim rates shown in Figure 2, where we found different trends for the two groups, especially over 1990–96. The other four lines also show no change in trend following the 2003 med mal reforms for either elderly or adult non-elderly claimants. These results—both the similar pre-reform trends for med mal versus other lines, and the lack of a change in trend for the other lines—support use of a triple-difference research design, in which we use the other lines as a control group for med mal claims.

After reform, med mal payouts drop sharply, relative to those for other lines. Pre-reform, med mal cases are, on average, larger than other personal injury claims, measured by payout. After reform, they become smaller.

We turn next in Table 4 to regression analysis of how the 2003 reforms affected med mal payouts. Regressions (1)–(3) are limited to med mal claims and cover, respectively, adult non-elderly claimants, elderly claimants, and all adult claimants. We use ln(payout) as dependent variable, and year, a post-reform dummy (= 1 if the claim was subject to the non-economic cap, 0 otherwise), and interactions of these variables as our principal independent variables. The reforms were adopted prospectively, for suits filed on or after September 1, 2003. Many plaintiffs' attorneys scrambled to file suit before the reforms, and we indeed find a surge in filings in August 2003. This affected the composition of cases filed shortly before reform, and also that of the cases that remained unfiled, but were filed soon after reform. We control for these differences using an immediate pre-suit dummy, which equals 1 for cases with suit filed in May–August 2003, and an immediate post-reform dummy, which equals 1 for cases with

Table 4. Regressions: Payout per Claim and Claimant Age

Dep. variable	*ln(payout)*					
Data	Med mal cases			all lines		
Regression	(1)	(2)	(3)	(4)	[5]	[6]
Age group	19–64	65+	19+	19–64	65+	19+
Year	**−0.0040**	0.0088	**−0.0036**	0.0010	**0.0137**	0.0012
	(**2.40**)**	(1.63)	(**2.08**)**	(1.08)	(**5.01**)***	(1.33)
Post-reform dummy	**−0.3074**	**−0.4664**	**−0.3120**	−0.0312	−0.0581	−0.0349
	(**10.44**)***	(**6.94**)***	(**10.95**)***	(1.65)	(1.50)	(1.86)*
Elderly			**2.9007**			**1.5384**
			(**2.97**)***			(**2.92**)***
Year*elderly			**0.0101**			**0.0094**
			(**2.14**)**			(**3.98**)***
Post-reform dummy*elderly			**−0.1371**			0.0221
			(**2.05**)**			(0.51)
Medmal				**0.2679**	**0.1038**	**0.2652**
				(**9.43**)***	(**3.30**)***	(**9.47**)***
Post-reform dummy*medmal				**−0.3178**	**−0.4620**	**−0.3198**
				(**11.87**)***	(**8.73**)***	(**12.36**)***
Medmal*elderly						**−0.1698**
						(**6.88**)***
Post-reform dummy*medmal*elderly						**−0.1559**
						(**2.61**)***
ln (age + 1)	−0.0321	**−0.7276**	−0.0262	0.0024	**−0.3455**	0.0009
	(1.06)	(**2.93**)***	(0.86)	(0.24)	(**2.99**)***	(0.09)

(*Continued.*)

Table 4. Continued.

Dep. variable	*ln(payout)*					
Data	Med mal cases			all lines		
Regression	(1)	(2)	(3)	(4)	[5]	[6]
Age group	19–64	65+	19+	19–64	65+	19+
ln (age + 1)*elderly			**−0.7349**			**−0.3909**
			(3.18)*			**(3.19)***
Employed	**0.0769**	−0.0089	**0.0741**	**0.2011**	**0.0560**	**0.1995**
	(4.30)*	(0.20)	**(4.32)***	**(12.92)***	**(2.38)**	**(12.81)***
Employed*elderly			−0.0780			**−0.1266**
			(1.81)*			**(4.98)***
Immediate pre- and post-reform dummies	Yes	Yes	Yes	Yes	Yes	Yes
Immed pre- and post-reform*medmal	n.a.	n.a.	n.a.	Yes	Yes	Yes
Injury type, constant	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,180	2,661	12,841	73,735	8,740	82,475
Adjusted R^2	0.1602	0.1436	0.1569	0.2056	0.2052	0.2036

County fixed effects regressions of payout/claim for 12,841 med mal cases (column [1]–[3]) and 82,475 cases (column [4]–[6]), closed from 1988 to 2009 with adult claimants and payout >$25,000 in 1988 dollars. All regressions exclude duplicate claims and nursing home cases. Adult non-elderly (age 19–64) is the omitted category in regressions (3) and (6). Amounts in 1988 dollars. *t*-statistics, using standard errors clustered on county, are in parentheses. *, **, and *** indicate significance at the 10, 5, and 1% levels, respectively (omitted for constant term). Significant results (at 5% level or better) are in boldface.

suit filed in September–December 2003.[25] Other control variables include ln(age +1), employment status, type of injury, and a constant term. All regressions include county fixed effects and county clusters.

Regressions (1) and (2) cover adult non-elderly and elderly claimants, respectively. Regression (3) includes both groups, plus an elderly dummy and interactions between this dummy and the other principal independent variables.[26] In regressions (1) and (2), the coefficient on year is negative and significant for adult non-elderly, and positive but insignificant for elderly claimants. In regression (3), the difference between the two groups shows up as a positive and statistically significant coefficient on the elderly*year interaction term.

Regressions (4) and (5) use a DiD specification, in which we compare results for med mal cases to those for the other four lines of cases, before and after reform. we implement the triple differences specification, by including all personal injury cases, adding a med mal dummy and interacting this dummy with the principal independent variables of interest. Regressions (4) and (5) cover adult non-elderly and elderly claimants, respectively. The coefficient on post-reform dummy captures the post-reform change in payout in non-med mal cases. This coefficient is negative but insignificant for both age groups. The coefficient of principal interest is the interaction med mal dummy*post-reform period, which captures the post-reform drop in payouts in med mal cases, relative to other personal injury cases. This drop is 27% for adult non-elderly and 37% for the elderly. These estimates are very close to those in the med mal only specifications in regressions (1) and (2).

In regression (6), we combine all claims, for both age groups, using a triple-differences specification to control for trends in non-med mal cases. The med mal dummy*post-reform interaction term captures the post-reform drop in payouts in med mal claims for the adult non-elderly; the point estimate is very close to that in regression (4). The triple interaction med mal dummy*post-reform period*elderly dummy captures the additional

25. Visual inspection of monthly trends in numbers of cases filed shows a large spike in August 2003, followed by a drop to below the pre-reform level in September. Our results are not sensitive to the length of the pre- and post-reform periods.

26. In regression (3), for simpler presentation, we do not interact these pre- and post-reform dummies with elderly dummy, but obtain similar results in regressions that include these interactions.

post-reform decline in med mal payouts to the elderly, estimated in this specification at 14%.

We thus find strong evidence for: (i) an economically large, 26–27% post-reform drop in med mal payouts to the adult non-elderly; and (ii) an additional 10–14% drop, depending on specification, in med mal payouts to the elderly.

3.4. The Elements of Damages

Compensatory damages can be either economic or non-economic, and the 2003 tort reforms capped only the latter. Thus, it is worth assessing how the breakdown of damages differs between elderly and adult non-elderly plaintiffs. We focus on *tried* cases, where the award at trial provides this breakdown for *awarded* damages.[27] We estimate *paid* damages of each type, assuming that payouts are allocated first to economic damages, second to non-economic damages, and third to punitive damages.[28]

Table 5, Panel A, reports mean and median "per case" ratios and the aggregate ratio of paid economic damages to total damages for adult non-elderly and elderly plaintiffs. However measured, elderly plaintiffs receive a lower proportion of paid economic damages. The difference is greatest for the aggregate ratio, where only 25% of elderly payouts are attributable to

27. For settled cases, we lack a reliable breakdown between economic and non-economic damages. The claim reporting form asks insurers to first assess whether the settlement "was influenced by a demand for or possible award of non-economic exemplary damages or pre-judgment interest." If yes, insurers are asked to provide a breakdown. Insurers provide this breakdown in only 35% of all settled cases. It seems likely that in many cases with no breakdown, the insurer judged that the settlement amount was less than economic damages—which is not the same thing as zero expected non-economic damages if the plaintiff were to win at trial. In settled cases, insurers allocated 29% of payouts to non-economic damages for elderly claimants versus 25% for adult non-elderly claimants. We discuss insurer allocations of damages in Black et al. (2013).

28. See Black et al. (2009) for details on our procedure for estimating damages. In brief, we first determine the allowed damages of each type, after all damage caps, including pre- and post-judgment interest on each type of damage. We then allocate the payout to allowed damages as follows: (i) to allowed economic damages until payout is exhausted or these damages are fully paid ("paid economic damages"); (ii) to allowed non-economic damages until payout is exhausted or these damages are fully paid ("paid non-economic damages"); (iii) to allowed punitive damages until payout is exhausted or these damages are fully paid ("paid punitive damages"). In a small number of trials, defendants pay more than the allowed verdict; we exclude this "payout bonus" from our analysis.

Table 5. Paid Damages by Plaintiff Age and Type of Damages

Panel A: Paid economic damages: percentages in tried cases

		Paid economic damages/total payout		
Age group	No. of cases	Mean per-case ratio (%)	Median per-case ratio (%)	Aggregate ratio (%)
Adult non-elderly (19-64)	263	47.4	37.6	56.7
Elderly (65+)	48	35.3	22.5	25.4
Elderly/adult non-elderly		74.5	59.9	44.9

Panel B: Paid damage in tried cases: amounts

Damages type	Economic damages		Non-economic + punitive damages	
Age group	Mean	Median	Mean	Median
Adult non-elderly	241	48	184	73
Elderly	70	36	206	130
Elderly/adult non-elderly (%)	29.1	76.1	111.5	178.2

Panel A: Mean per-case, Median per-case, and Aggregate ratio of paid economic damages/total payout, for 311 non-duplicate, non-nursing home, med mal cases involving adult plaintiffs with plaintiff verdicts (290 pre-reform and 21 post-reform cases), closed from 1988 to 2009 with payout more than $25,000 in 1988 dollars. *Panel B:* Mean and median amounts of paid economic damages and paid (non-economic + punitive damages), for 311 non-duplicate, non-nursing home, med mal cases involving adult plaintiffs with plaintiff verdicts, closed from 1988 to 2009 with payout >$25,000 in 1988 dollars. Mean and median amounts are based on all cases, including those with zero paid economic damages and positive (non-economic + punitive damages), or visa-versa. Amounts in 1988 $ thousands.

economic damages, compared with 57% for the adult non-elderly. Table 5 includes both pre-cap and post-cap cases, but the sample is dominated by pre-cap cases.

Table 5, Panel B, reports mean and median paid damages, separated into economic damages and (non-economic + punitive) damages for adult non-elderly and elderly plaintiffs. We combine non-economic damages and punitive damages because punitive damages are infrequently awarded and are paid even less frequently. They would not be meaningful as a separate category, especially for the elderly. Of 311 tried cases, only 10 adult non-elderly and one elderly case include paid punitive damages. As Table 5, Panel B, reflects, mean paid economic damages for adult non-elderly plaintiffs are $241,000 versus only $70,000 for elderly plaintiffs. The pattern reverses for paid (non-economic + punitive) damages; the mean for adult non-elderly plaintiffs is $184,000 v. $206,000 for elderly plaintiffs.[29] Median awards

29. There are only twenty-one post-cap trials in our dataset, of which five involve elderly plaintiffs. This is too few for us to directly assess how the non-economic cap affects allowed awards and payouts in tried cases.

show a similar pattern. The lower mean payouts to elderly plaintiffs are partly explained by lower economic damages. To be sure, it is likely that attorneys will only accept cases with low economic damages if expected (non-economic + punitive damages) are relatively high. The evidence in Table 5, Panel B, is consistent with this selection effect.

The difference in types of damages between elderly and other plaintiffs shown in Table 5 explains why one would expect the 2003 reforms to affect payouts to the elderly more than payouts to the adult non-elderly, as we find in Table 4. The differing effects of reform on payouts, in turn, explain why one would expect a larger drop in claim rates for the elderly than the adult non-elderly, and a larger falloff for the adult-non-elderly than for babies and children, as we find in Table 3.

3.5. Blockbuster Payouts

Med mal payouts have a strong positive skew—a limited number of large payouts account for a significant fraction of the total dollars paid by defendants and their insurers. We saw in Figure 4 that *mean* payouts are substantially lower for elderly than for non-elderly plaintiffs. In contrast the differences in median payouts to the two groups are smaller, although both differences largely disappear over our sample period. This pattern suggests that over the full sample period, the elderly are less likely to receive very large payouts. We confirm this by examining the largest ("blockbuster") payouts in our dataset. As Figure 5 reflects, the top 100 (200) claims are only 0.6% (1.3%) of total claims, but account for 13.4% (20.2%) of total payouts.[30]

As Figure 5 shows, although the elderly account for 17% of all claims (see Table 2), they account for only 1% of the largest 100 or 200 claims (one of the top 100; two of the top 200). Both were pre-cap death cases, which likely had small economic damages (we cannot be sure because both cases settled before trial). If the non-economic cap had applied during our entire sample period, it is possible that none of the top 200 payouts would have gone to an elderly claimant.

30. The top 100 claims account for $642 million in payouts, and the top 200 claims account for $967 million.

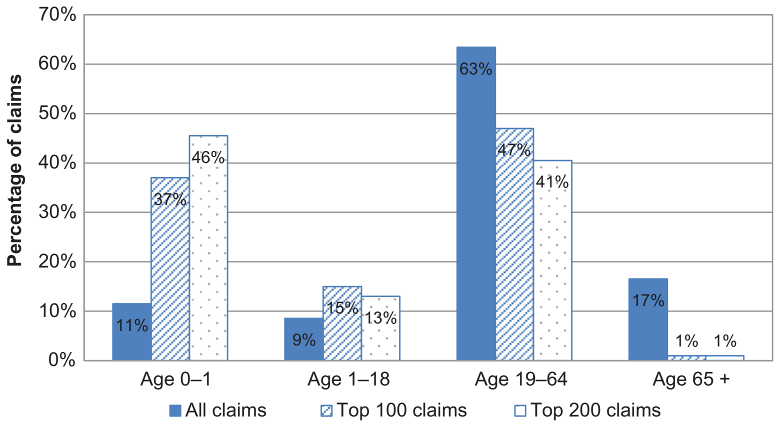

Figure 5. Distribution of Largest Payout Claims by Age Group.
Percent of all claims, and top 100 (200) claims made to claimants in indicated age ranges, for 16,034 non-duplicate, non-nursing home, med mal cases closed from 1988 to 2009 with payout >$25,000 in 1988 dollars. Amounts in 1988 dollars.

In blockbuster cases, the most common injury is brain damage/spinal cord injuries (71 of the top 100 cases, and 140 of the top 200), which often require costly long-term care. The second most common injury is death (7 of the top 100 cases, and 24 of the top 200), even though Texas caps economic plus non-economic damages plus pre-judgment interest in death cases at roughly $975,000 (prior to 2003, this cap was per defendant).

3.6. Claim Duration

Table 6 shows the impact of various factors, including elderly status, payout, and the presence of multiple defendants (as a proxy for case complexity) on claim duration, measured as days from when the defendant reports the claim to the insurer to when the claim is closed, and converted to fractions of a year.

One concern with our data, which Table 6 addresses, involves a limited post-reform period plus the risk of sample selection bias if claim closing patterns differ for the elderly than for the non-elderly. For example, if claims with larger payouts close more slowly, and the elderly are less likely to receive large payouts, our post-reform results could be biased. In fact, however, claims with larger payouts do not take significantly longer to

Table 6. Factors Influencing Claim Duration

Dependent variable	Ln (duration, report to close)			
Regression	(1)	(2)	(3)	(4)
Age group	19–64	65+	All adults	
Cases	All	All	All	Suit filed
Year	**0.0064**	**0.0242**	**0.0064**	0.0018
	(**4.91**)***	(**8.89**)***	(**4.90**)***	(1.54)
Elderly dummy			−0.2740	−0.1543
			(1.54)	(0.91)
Year*elderly			**0.0178**	**0.0134**
			(**5.89**)***	(**4.72**)***
Ln(payout)	0.0064	0.0045	0.0064	**−0.0245**
	(1.06)	(0.33)	(1.06)	(**4.38**)***
Ln(payout)*elderly			−0.0019	−0.0040
			(0.13)	(0.28)
Multidefendant dummy	**0.1682**	**0.1793**	**0.1682**	**0.1010**
	(**12.62**)***	(**7.14**)***	(**12.62**)***	(**8.33**)***
Multidefendant dummy*elderly			0.0111	−0.0348
			(0.39)	(1.31)
Post-reform dummy	**−0.2780**	**−0.4076**	**−0.2780**	**−0.2418**
	(**13.26**)***	(**10.44**)***	(**13.25**)***	(**12.27**)***
Post-reform dummy*elderly			**−0.1296**	−0.0651
			(**2.93**)***	(1.63)
Constant	0.5512	0.2772	0.5512	1.0670
	(7.51)	(1.71)	(7.51)	(16.05)
Observations	10,173	2,659	12,832	11,854
Adjusted R^2	0.0341	0.0648	0.0442	0.0274

Ordinary least squares regressions of ln(duration in days from claim report to claim closing date) for 12,832 non-duplicate, non-nursing-home med mal cases with adult claimants closed from 1988 to 2009 with payout more than $25,000 in 1988 dollars, excluding 11 short-form claims from 2009 with unknown plaintiff age. Amounts in 1988 dollars. *t*-statistics, based on robust standard errors, are in parentheses. *, **, and *** indicate significance at the 10, 5, and 1% levels, respectively (omitted for constant term). Significant results (at 5% level) are in boldface.

close. In regressions (1) and (2), the coefficient on ln(payout) is economically small and statistically insignificant for both the elderly and adult nonelderly. The point estimate is that if ln(payout) increases by 1 (thus, payout almost triples), duration increases by less than 1%. Moreover, the sign of the coefficient flips in regression (4), where we limit the sample to cases with suit filed. These patterns are similar for the elderly and the adult nonelderly, as shown by the insignificant coefficient on the ln(payout)*elderly interaction term in regressions (3) and (4).

The presence of multiple defendants does strongly predict longer duration. However, the coefficients are similar for both groups, as shown in regressions (3) and (4) by an insignificant coefficient on the multidefendant*elderly interaction term. Thus, there is no reason to expect bias due to our lack of data on claims that close after 2009.

In unreported regressions, we find that duration drops substantially post-reform, by about 41%, for elderly plaintiffs and 28% for adult non-elderly plaintiffs. The difference between the two groups is statistically significant ($t = 2.96$). The reasons for the drop in duration are not clear. Two speculations: Post-reform, plaintiffs' lawyers may avoid complex cases, so the cases they bring close faster. Tort reform could also encourage plaintiff's lawyers to drop weaker cases (by making them less remunerative); the remaining "strong" cases may settle more quickly. We cannot evaluate these or other possible explanations with our data.

Elderly claims do settle faster than adult non-elderly claims. Table 7 provides summary statistics on claim duration. The mean duration (from injury to closing) for elderly claimants is 3.49 years versus 3.97 years for adult non-elderly claimants—a difference of 0.5 years. The difference in median duration is 0.3 years. As Table 7 reflects, claim duration is shorter for elderly claimants partly because they bring claims more quickly after they are injured, and partly because their claims close faster once they are brought.[31]

We also analyzed non-parametric Kaplan–Meier survival curves for the period from injury to close, using cases that settled before trial completion. The elderly claim survival curve was consistently below the adult non-elderly curve.[32] For example, 4 years after injury, 70% of claims by the elderly are settled, compared with 61% of claims by the adult non-elderly. In unreported regressions, we confirm that elderly claims close faster over the full sample period, but also find evidence of convergence: the duration of elderly claims increases by about 1.0% per year; there is no similar trend for adult non-elderly claims.

31. In robustness checks, we obtain similar results if we limit the sample to cases with suit filed.

32. A log-rank test strongly rejects the null of equal survival functions ($\chi^2 = 134$, $p = .0000$).

Table 7. Claim Duration

	Duration			
	Injury to close		Claim opening to close	
Age group	Mean	Median	Mean	Median
Adult non-elderly (19–64)	3.97	3.62	2.55	2.22
Elderly (65+)	3.49	3.33	2.32	2.05
Adult non-elderly – elderly	**0.48**	**0.29**	**0.23**	**0.17**
t-stat for difference in mean or χ^2	**10.99*****	**62.22**	**7.05*****	**27.27**
(p-value) for difference in median		(**0.000**)***		(**0.000**)***

Mean and median claim duration in years for 12,832 non-duplicate, non-nursing-home, med mal cases closed from 1988 to 2009 with adult claimants and payout more than $25,000 in 1988 dollars, excluding 11 short-form claims from 2009 with unknown plaintiff age. Last row reports t-statistics for difference in means, and χ^2 for difference in medians (p-value in parentheses) *, **, and *** indicate significance at the 10, 5, and 1% levels, respectively. Significant results (at 5% level) are in boldface.

Table 8. Stage at Which Claims are Resolved

Age group	% No suit filed	% Trial
Adult non-elderly (19-64)	6.8%	3.1%
Elderly (65+)	10.8%	2.4%
Young elderly (65-74)	9.2%	2.3%
Moderate elderly (75-84)	11.2%	2.8%
Very elderly (85+)	17.9%	1.7%
Elderly – adult non-elderly	**4.0%**	−0.8%
t-statistic for difference in percent	(**6.94**)***	(1.93)*
Very elderly (85+) – other elderly	**7.9%**	−0.8%
t-statistic for difference in percent	(**4.13**)***	(0.74)

Fraction of claims resolved without trial and after full trial for elderly and adult non-elderly plaintiffs, for 12,832 non-duplicate, non-nursing-home, med mal cases closed from 1988 to 2009 with adult claimants and payout more than $25,000 in 1988 dollars, excluding 11 short-form claims from 2009 with unknown plaintiff age. Tried cases are reported as percent of cases with suit filed. Selected t-statistics for difference in percentages in parentheses. *, **, and *** indicate significance at the 10, 5, and 1% levels, respectively. Significant results (at 5% level) are in boldface.

3.7. Stage of Resolution

As Table 8 reflects, the elderly are more likely than the adult non-elderly to resolve a large paid claim without a lawsuit, and less likely to take a case to trial. For elderly claimants, the likelihood of resolution before a lawsuit is filed rises with age.

4. Discussion

4.1. Convergence

We document a pattern of convergence in claim frequency and payouts to elderly versus adult non-elderly claimants during 1988–2003. After Texas adopted med mal reforms in 2003, including a strict cap on non-economic damages, the convergence in claim rates and payouts stalled. Indeed, albeit more clearly in our data for payouts, the convergence trend reversed in part. To be sure, conclusions about the post-reform period are tentative, because we have only 5 years with a significant number of post-reform claims (2005–09). Below, we address possible explanations for the rise and apparent post-reform stall in convergence in claim rates and payouts payout per claim.

4.2. Why Did Elderly Claims Rise Over 1988–2003, Before Tort Reform?

Controlling for healthcare intensity, we find a 2.5-fold rise over 1988–2003 in the rate of large paid claims by elderly claimants (relative to the adult non-elderly rate). Possible explanations include (i) greater physician willingness to perform risky procedures on elderly patients, some of which lead to malpractice claims; (ii) a cultural shift toward greater willingness by the elderly to initiate a claim; and (iii) increased willingness of lawyers to take these claims.[33] We cannot differentiate among these explanations with our data, and they might well act synergistically.

4.3. Why Are Elderly Claim Rates Lower than Non-Elderly Rates?

Although claims by the elderly increased substantially, the elderly still bring claims much less often than the adult non-elderly. For example, over 2001–05, the most recent 5 years which were not heavily influenced by the 2003 tort reforms, the inpatient-days-adjusted elderly claim rate was about 50% of the adult non-elderly rate. Possible reasons include reluctance to bring suit, especially against physicians (see Table 1), lesser familiarity of med mal lawyers with elderly claims, and lower expected damages for

33. Fragility (elderly more likely to be injured than non-elderly) should be captured by our control for intensity, unless fragility is increasing.

many claims. All of these explanations seem plausible; we cannot distinguish between them with our data.

4.4. Why Were Elderly Per-Claim Payouts Smaller—and Why Did Pre-Reform Payouts Converge?

Mean and median payouts to the elderly and adult non-elderly that were governed by pre-reform rules fully converged by the later years of the period we study. There remains, however, an almost total absence of very large payouts to the elderly. This could reflect lower economic damages among the elderly, including a low incidence of high-outlier economic damages. Few elderly will have large lost earnings, and their medical expenses will often be more modest than those for the adult non-elderly because they have a shorter remaining life-span during which to incur these expenses.

The relative increase in pre-reform elderly payouts over our sample period could be partly explained by the rising life expectancy of the elderly and their somewhat greater tendency to still be working.[34] The relative increase could also be related to higher claim rates, which might be accompanied by a different mix of elderly claims. As before, we cannot distinguish between these explanations with our data.

4.5. Effects of Tort Reform

The 2003 tort reforms had a dramatic impact on claim rates and payouts per claim. We expected the impact to be larger for elderly plaintiffs, because a higher proportion of their damages are non-economic. We find evidence consistent with that expectation. There is evidence of a steeper drop in claim rates for the elderly, especially the very elderly. We also find a larger drop in per-claim payouts for the elderly, and in total payouts to the elderly as a group.

In prior work, we estimated that the Texas non-economic cap would result in a mean per-case payout decline in settled cases of 16% for the adult non-elderly and 31% for the elderly, holding case mix constant (Hyman

34. Life expectancy at age 65 was 16.9 years in 1988, and increased to 18.7 years in 2004 (*Vital Statistics of the United States 1988* and *National Vital Statistics Reports*, Vol. 56, No. 9). See http://www.cdc.gov/nchs/products/life_tables.htm. The labor force participation rate for ages 65–74 increased from 15.2% in 1986 to 23.6% in 2006; for those age 75+, the rate rose from 4.0 to 6.4%. See http://www.bls.gov/emp/emplab05.htm.

et al., 2009, table 9). These estimates are consistent with, although somewhat smaller than, the observed decline of 26–27% for the adult non-elderly and additional decline of 10–14% for the elderly, shown in Table 4. In our view, the correspondence between the simulated and actual results adds to the credibility to both, and suggests that plaintiffs' lawyers had limited ability to respond to the caps by adjusting case mix toward cases with higher economic damages.

A caveat: We also find in separate work a national trend toward lower paid claim rates for larger paid claims, starting around 2001, even in states without tort reform, with no clear cause (Paik et al., 2012a). Texas was likely affected by that national trend. This could explain part of the drop in claim rates.

4.6. Can Clever Lawyers Evade Damage Caps?

Professor Catherine Sharkey, based on a study of jury awards, has argued that economic and non-economic damages are sufficiently malleable that lawyers will respond to damages caps by transforming "capped" non-economic damages into "uncapped" economic damages, partly offsetting the impact of a damages cap (Sharkey, 2005). Professor Sharkey's analysis was based on comparing the amounts awarded by juries (and not post-trial payouts), pre- and post-reform. She did not analyze settled cases, which account for the vast majority of claims and dollars, and did not assess the impact of tort reform on claim frequency.

For Texas, the evidence does not support her speculation about substitution. After tort reform, claims dropped sharply; payout per claim also dropped sharply, and the combined effect was an over 75% drop in payout per capita. The falloff in claims reflects judgments by Texas plaintiffs' lawyers (presumably as smart, motivated, and good looking as lawyers elsewhere) that many cases are no longer worth bringing. Surveys of Texas lawyers paint a similar picture (Daniels and Martin, 2009). Any offset potential is manifestly limited.

4.7. The Value of Death Claims for the Elderly and Non-Elderly

An extensive literature estimates the value of a statistical life ("VSL"). One flashpoint in the debate over the use of VSL has been whether the lives of the elderly should have a lower value than the lives of younger people. Economists generally believe that there should be such a "senior discount." because the elderly have fewer (and often lower-quality) years of life remaining (Viscusi, 2009; Graham, 2008). Conversely, if the VSL is the same for elderly and non-elderly individuals, that means the value of a life-year is higher for the elderly. Senior citizens are predictably unenthusiastic about the senior discount (Bustillo, 2003). Regulatory attempts to incorporate a senior discount into cost–benefit analysis have been controversial (Viscusi, 2009; Graham, 2008; Sunstein, 2004; Tierney, 2003). What does our data imply about this debate?

First, under the pre-reform rules, we find convergence in per-claim payouts to elderly and adult non-elderly claimants, both in all cases and in death cases. To the extent there was a "senior discount," it appears to have shrunk. To be sure, we might still find a senior discount if we could control for case mix. Second, the amounts paid in death cases are well below standard VSL estimates, for all age groups, indicating systematic under-compensation by the tort system (Cross and Silver, 2006).

5. Conclusion

At the start of our sample period, and controlling for healthcare intensity, the elderly greatly under-claim, relative to the adult non-elderly. The elderly claiming rate rises over the first 15 years of our sample period, but still reaches only about half of the adult non-elderly rate, using inpatient days as the denominator. Claims by all age groups fall sharply after Texas's 2003 tort reforms. The elderly claiming rate relative to the adult non-elderly does not continue to increase post-reform, and may fall, suggesting that reform interrupted the convergence trend.

Per-claim payouts to elderly claimants begin well below the adult non-elderly level, but for pre-reform cases, they converge fully to the adult non-elderly level by the end of our sample period. The 2003 tort reforms reduce per-claim payouts for all age groups, with a somewhat larger impact on the elderly.

For defendants and insurers, payouts to the elderly are no longer the largely insignificant portion of total exposure that they were 20 years ago. Still, due to lower claiming rates and the differential impact of tort reform on the elderly, the share of med mal payouts to the elderly remains well below their share of healthcare use. And total payouts to elderly claimants, after rising steadily during the pre-reform period, have dropped back to the low levels that prevailed at the start of our sample period.

Our analysis does not address the policy question of whether the rate of claiming by the elderly and payouts to elderly were too high, too low, or about right, either pre- or post-reform. That judgement depends on data we do not have, including the merits of the claims that were brought, or that might have been brought in a different legal regime. Instead, we have used the data we have to provide information on how the elderly use the med mal liability system, compared to the non-elderly, and how tort reform affects that use. That is relevant to the policy debate about the merits of med mal liability reform, even if it provides no clear answers.

APPENDIX: CONSTRUCTION OF “POST-REFORM PERIOD” VARIABLE

The 2003 Texas reforms apply to cases with a lawsuit filed on or after September 1, 2003. Given the lag between suit and claim closing, we needed to develop a “post-reform period” variable that captures the gradual transition from the pre-reform to the post-reform period, and provides an estimate of what fraction of *potential* claims (claims that would have been brought without the reforms) that close in each year are post-reform. We proceed as follows. We predict for the entire dataset the probability that a suit filed at day 0 will survive for a given number of days, using the non-parametric Kaplan–Meier procedure.

For each day in each year, we use these survival probabilities to estimate the likelihood that a potential claim closed on that date will be post-reform. This probability is zero prior to the reform date and gradually rises toward 1 thereafter. We average these daily values to get an annual post-reform probability. As shown in Table 7, elderly claims close faster than non-elderly claims, so we estimate the post-reform variable separately for non-elderly, elderly, and all claims, as needed for each regression. We call this variable “post-reform period.” It rises smoothly from 0 in 2002 to 0.97 for all claims (0.96 for all non-elderly claims and 0.98 for elderly claims) in 2009. In robustness checks, we obtain similar results if we use the mid-year estimate instead of the average of daily estimates (see Table A1), and if we predict claim survival based on injury date instead of suit-filed date.

Table A1. Estimates of "Post-Reform Period" Variable

Closing year	All ages		All non-elderly		Elderly	
	Average daily	Mid-year	Average daily	Mid-year	Average daily	Mid-year
1988–2002	0	0	0	0	0	0
2003	0.001	0	0.001	0	0.001	0
2004	0.088	0.071	0.084	0.067	0.107	0.092
2005	0.429	0.431	0.417	0.419	0.490	0.497
2006	0.720	0.726	0.710	0.715	0.775	0.782
2007	0.863	0.865	0.856	0.859	0.899	0.900
2008	0.933	0.935	0.929	0.931	0.957	0.959
2009	0.965	0.965	0.963	0.963	0.981	0.981

Probability that, without the impact of the 2003 Texas tort reforms on claim filing rates, a med mal case closed on date *t* with a lawsuit filed would involve a suit filed on August 31, 2003 or earlier. Time from suit filing to closing is estimated using the Kaplan–Meier method based on 14,881 non-duplicate, non-nursing-home, med mal cases closed from 1988 to 2009. "Average daily" columns show estimates if cases have an equal probability of being filed on each day of the year; "mid-year" columns show estimates if we assume all cases in a given year are filed on June 30 of that year.

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