Highway Loss Data Institute Bulletin

Texting Laws and Collision Claim Frequencies

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INTRODUCTION

As of July 31, 2010, 30 states and the District of Columbia had enacted laws banning all motorists from texting while driving. This reflects concern among policymakers about the rapid growth of text messaging (according to the Cellular Telecommunications and Internet Association [2010], the number of monthly text messages has risen from about 14 million in 2000 to more than 150 billion in 2009) coupled with highly publicized reports that texting while driving may increase crash risk by 23 times (Olson et al., 2009).

The purpose of the research reported in this Highway Loss Data Institute (HLDI) bulletin was to determine whether the laws banning text messaging are reducing collision claims. The very large volume of collision data reported to HLDI by its member companies – which account for more than 80 percent of the private passenger insurance market – give it the ability to gain early, statistically reliable estimates of even small changes in crash frequency. This can be very useful in informing policymakers quickly about the benefits of, in this case, texting bans for improving highway safety. In addition, it can inform insurers about the benefits they can expect from texting laws in terms of lower claims costs.

The current bulletin uses an analytical procedure analogous to that reported in a previous bulletin (Vol. 26, No. 17) that examined insurance claims experience following the enactment of hand-held cellphone bans for drivers. In brief, the collision claims frequency experience of states with texting bans is compared with that of neighboring states that either had no ban or, at least, had no substantial change in ban status during the months before and after the ban became effective in the states studied. Two changes have been made from the prior study of hand-held cellphone bans. Additional demographic variables have been included in the models to control their effects on any changes in collision claims experience and the number of vehicle model years has been expanded. In the prior bulletin, HLDI reported that, generally, there had been no increase in collision claim frequency as cellphone use (and texting) has increased and that hand-held cellphone bans had no effect on collisions as reported to insurers. The current bulletin looks at whether texting bans – which address a behavior thought to be even riskier than talking on cellphones – have been more effective.

METHODS

Study states – The 30 states with texting while driving bans for all drivers are Alaska, Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Oregon, Rhode Island, Tennessee, Utah, Vermont, Virginia, Washington, Wisconsin, and Wyoming. Nearly three-quarters of these states enacted their laws after May 2009, too recently for their laws to be studied. Of the eight remaining jurisdictions Alaska was excluded because it does not have a neighboring state, and the District of Columbia and Connecticut enacted all-driver hand-held bans at the same time as the texting ban. New Jersey was not suitable for trend analysis because the mix of insurers supplying data to HLDI has changed significantly in recent years. This left four states for analysis: California, Louisiana, Minnesota and Washington.

California's texting ban for all drivers went into effect in January 2009. In July 2008, at the start of the study and 6 months prior to the all-driver texting ban, California banned all drivers from talking on hand-held phones and banned drivers younger than 18 from texting or talking on any kind of phone. Arizona, Oregon and Nevada were selected as control states. Like California, Oregon had cellphone and texting bans for teen drivers during the entire study period, while no such laws were in effect in Arizona or Nevada.

Louisiana's texting ban for all drivers went into effect in July 2008. Louisiana introduced a cellphone ban for drivers younger than 18 along with the all-driver texting ban. Arkansas, Mississippi and Texas were selected as control states. In 2005, Texas banned cellphones and texting for teen drivers. These bans remained unchanged throughout the study period.

Minnesota's texting ban for all drivers went into effect in August 2008. In January 2006 Minnesota introduced a cellphone ban for young drivers. Iowa and Wisconsin were selected as control states. Iowa and Wisconsin did not have any cellphone or texting bans during the study period. North Dakota and South Dakota were considered but not included as control states for Minnesota because the insurance data were very limited in these sparsely populated states.

Washington's texting ban for all drivers went into effect in January 2008 and an all-driver ban on hand-held phone use became effective in July 2008. The effects of the hand-held ban were not studied separately. The texting and hand-held bans are intended to reduce crashes and, thus, the addition of a hand-held ban six months after the texting ban should serve to further reduce claim frequency. Idaho and Oregon were selected as control states. Oregon banned cellphones and texting for drivers younger than 18 with learner's permits or intermediate licenses on the same day Washington's texting ban went into effect.

Because two study states (California and Louisiana) and 1 control state (Oregon) had bans that took effect during the study period for drivers younger than 18, additional models were run to exclude drivers 18 and younger. This did not significantly alter the estimated effect of the ban in California, Louisiana or Washington, the 3 affected states (results in Appendix A).

Insurance data – Automobile insurance covers damages to vehicles and property as well as injuries to people involved in crashes. Different insurance coverages pay for vehicle damage versus injuries, and different coverages may apply depending on who is at fault.

This study is based on collision coverage data. This coverage insures against physical damage to a driver's vehicle sustained in a crash with an object or other vehicle, generally when the driver is at fault. Such claims are the most frequent for insurers, and, hence they provide the greatest power in looking at changes in crash frequency. In addition, because they represent the crashes of culpable drivers, they should be sensitive to changes in driver attention, although they do not necessarily account for all crashes that might be attributable to distraction. For example, a driver texting on a phone might crash into another vehicle that violates his or her right of way; the other person is at fault, but absent the distraction of texting, the crash still might not have occurred.

HLDI has data on the vehicles insured by its member companies, as well as the claims that the insureds file for losses in automobile crashes, under various insurance coverages. As a result, HLDI can calculate the frequency of insurance claims while controlling for the amount of exposure. This study examined loss data under collision coverage for calendar years 2007-09. Results are based on 54,401,123 insured vehicle years and 3,313,507 collision claims.

Rated drivers – HLDI collects a limited number of factors about rated drivers including age, gender, marital status, and garaging location. The rated driver is the one considered to represent the greatest loss potential for an insured vehicle. In a household with multiple vehicles and/or drivers, the assignment of drivers to vehicles can vary from insurance company to company and from state to state but typically it reflects the driver most likely to operate the vehicle. Information on the actual driver at the time of a loss is not available in the HLDI database. In the present study, the data were stratified by rated driver age group (<25, 25-65, 66+, or unknown), gender (male, female, or unknown), marital status (married, single, or unknown), and vehicle density of garaging location (<50, 50-99, 100-249, 250-499, 500-999, ≥1,000 registered vehicles per square mile).

Vehicles – The vehicles in this study were 2000-10 models. Data from calendar year 2007 included 2000-08 models, data from calendar year 2008 included 2001-09 models, and data from calendar year 2009 included 2002-10 models. Additional models were run that limited the sample in a given calendar year to the three most recent model years; essentially restricting the sample to relatively new vehicles. Results of this analysis are presented in Appendix B. While collision coverage is not mandatory most new vehicles carry the coverage primarily because it is required by lenders. As vehicles age people tend to drop collision coverage.

Analysis methods – Regression analysis was used to quantify the effect of texting bans on collision claim frequency while controlling for other factors. The dataset was stratified by vehicle model year, rated driver age group, gender, marital status, garaging state, vehicle density, and calendar year and month. For example, a unit of observation was May 2008 collision exposure and claim count for 2007 model vehicles, with young married males as rated drivers and vehicles garaged in an area of Iowa with a vehicle density of 50-99 vehicles per square mile. Frequency (claims per year of exposure) was modeled using Poisson regression with a logarithmic link function. Collision claim frequency was defined as the number of collision claims divided by the number of insured vehicle years. Independent variables corresponding to vehicle model year, driver age group, gender, marital status, and vehicle density were included in the model to control for any frequency fluctuations affected by changes in the demographic composition over time.

To control for other factors not covered by these variables and unrelated to the texting bans (e.g., economic downturn, change in miles driven, climate), collision loss data from neighboring states were used as controls. These neighboring states with the exception of Oregon did not change their cellphone or texting laws during the study period. An example is Texas, one of the control states for Louisiana, where there were no changes in the relevant laws. Cellphone and texting bans for teen drivers in this state were in effect during the entire study period. The presence of such bans would not interfere with the results of this analysis because the bans remained unchanged. Other independent variables are listed below.

- Month index: continuous, sequential variable to identify each month in the time series
- State type: categorical variable used to identify a state as a study state or part of the control states
- Ban status: categorical variable also used to identify the status of a ban for each month; 1 value was used to identify months during the period before the ban, and another was used to identify months during the period after the ban

Two interactions were used in the model. The first, month index and state type, estimated trend lines for both a study state and control states. The estimate for the month index variable represents the trend for the control states, while the estimate for the month index and state type interaction is the difference between trends for a study state and control states. The second, more critical interaction, state type and ban status, similarly quantified the difference in claim frequency between states with and without texting bans. A p-value less than 0.05 for this interaction indicates the ban had a statistically meaningful effect on collision claim frequency.

Additional models were run for each state with a ban, treating each control state separately, allowing multiple controls for a study state and producing separate effects of a ban relative to each of the controls. For all regression models, additional runs were performed with the dataset restricted to youthful drivers (<25) and drivers 25 and older.

RESULTS

Figures 1-4 show the monthly collision claim frequencies for each of the states with a ban, compared with the frequencies for their control states. All indicate largely similar patterns of variation between the ban and no-ban states, For example, Figure 1 shows collision claim frequencies for California during the months before and after the texting ban (month 0 corresponds to January 2009 when the ban took effect). Aggregate claim frequencies for the neighboring states of Arizona, Nevada, and Oregon are shown as control states. The two lines are essentially parallel. Monthly fluctuations in claim frequencies in California are similar to those in the control states. Although claim frequencies for California fluctuated monthly, no notable change appeared when the texting ban was enacted, compared with the control states.

Figures 2-4 similarly show collision claim frequencies for Louisiana, Minnesota, and Washington before and after texting bans took effect, compared to the aggregated claim frequencies for the neighboring, control states. As for California, monthly fluctuations in claim frequencies in the study states are similar to those in their control states. However, small differences are hard to detect on the graph and the lines represent actual frequencies not modeled frequencies which account for differences in the study and control populations.

FIGURE 1 COLLISION CLAIM FREQUENCIES FOR VEHICLES UP TO NINE YEARS-OLD BY MONTH CALIFORNIA VS. CONTROL STATES (ARIZONA, NEVADA, OREGON)

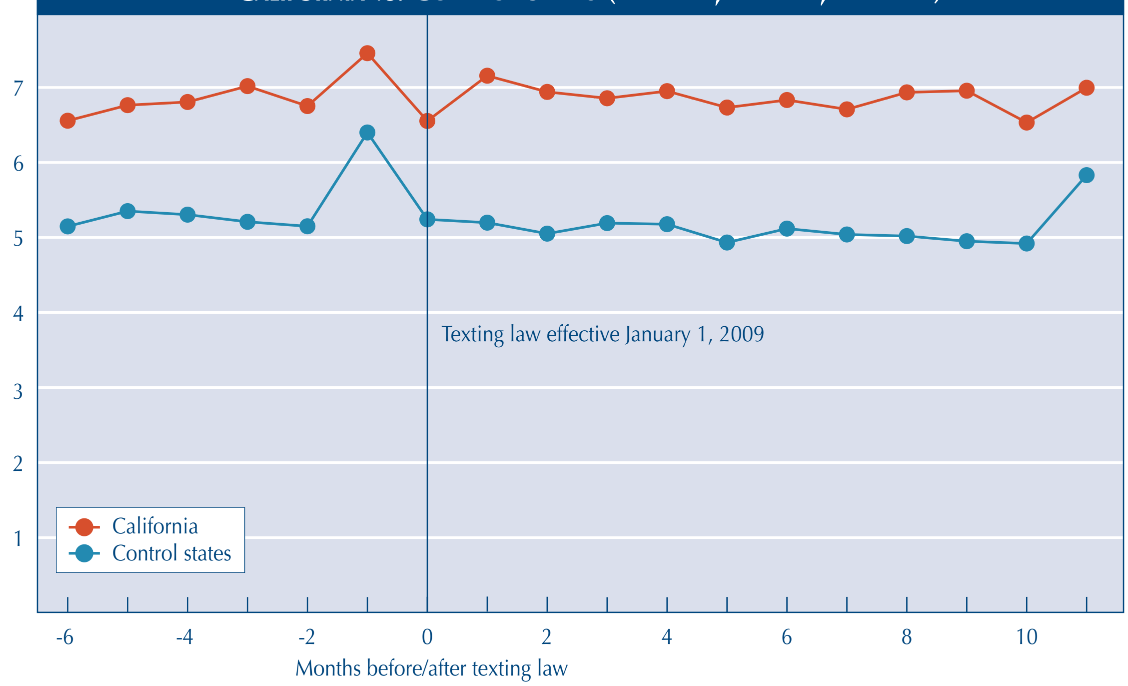


FIGURE 2 COLLISION CLAIM FREQUENCIES FOR VEHICLES UP TO NINE YEARS-OLD BY MONTH LOUISIANA VS CONTROL STATES (ARKANSAS, MISSISSIPPI, TEXAS)

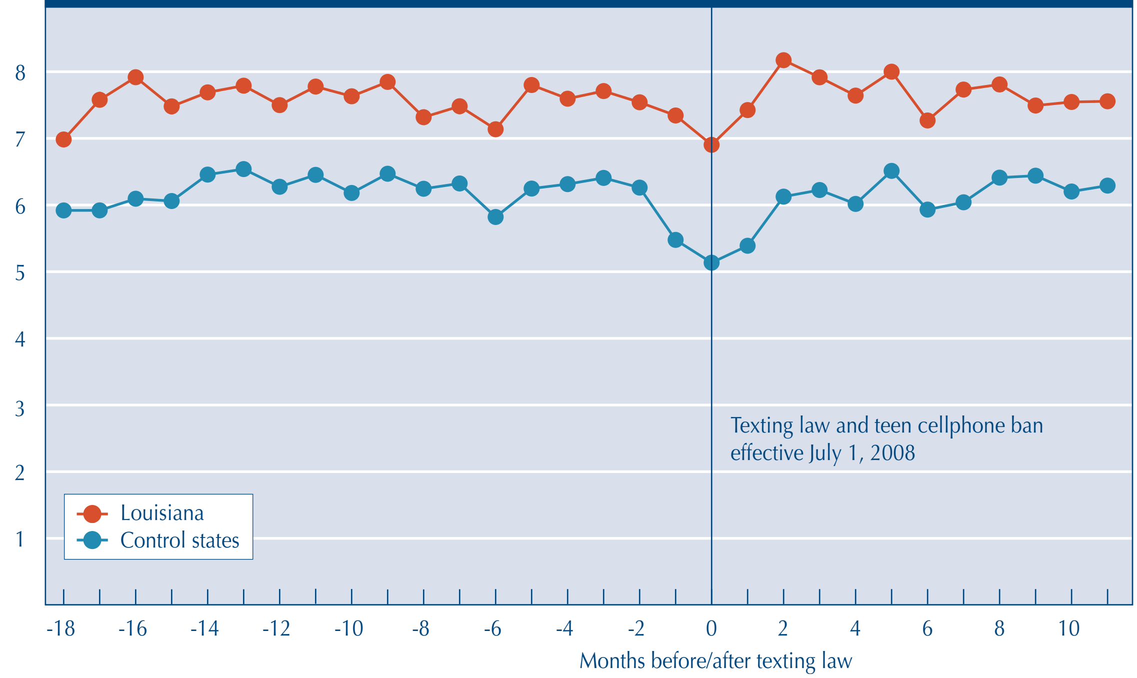


FIGURE 3 COLLISION CLAIM FREQUENCIES FOR VEHICLES UP TO NINE YEARS-OLD BY MONTH MINNESOTA VS. CONTROL STATES (IOWA, WISCONSIN)

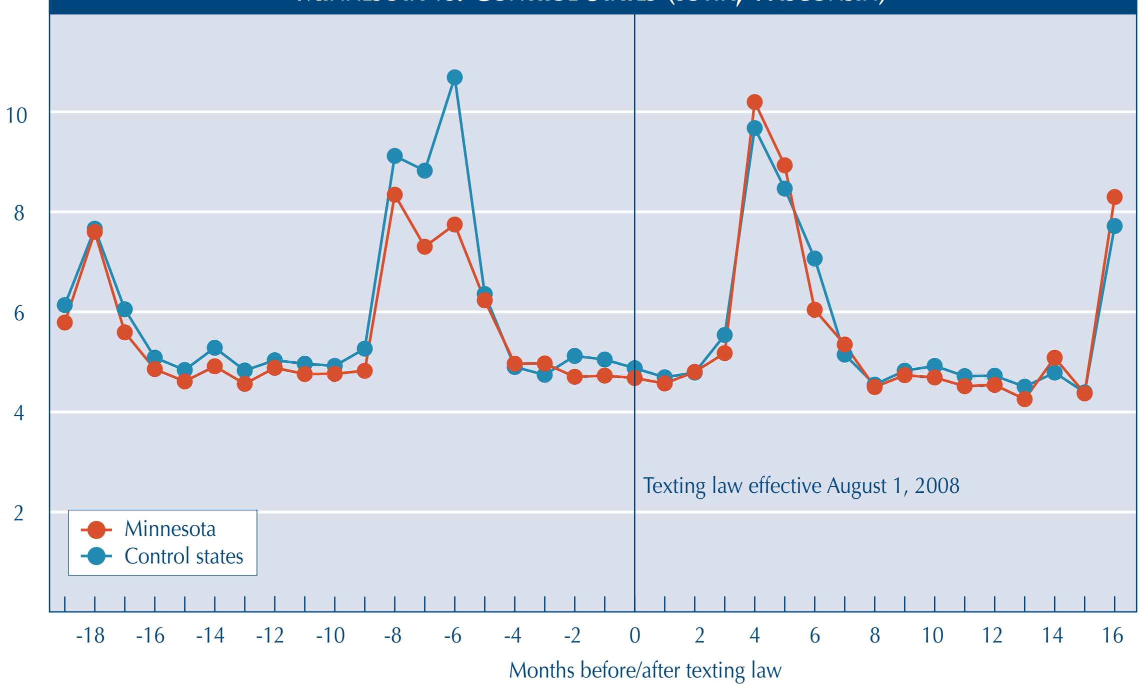
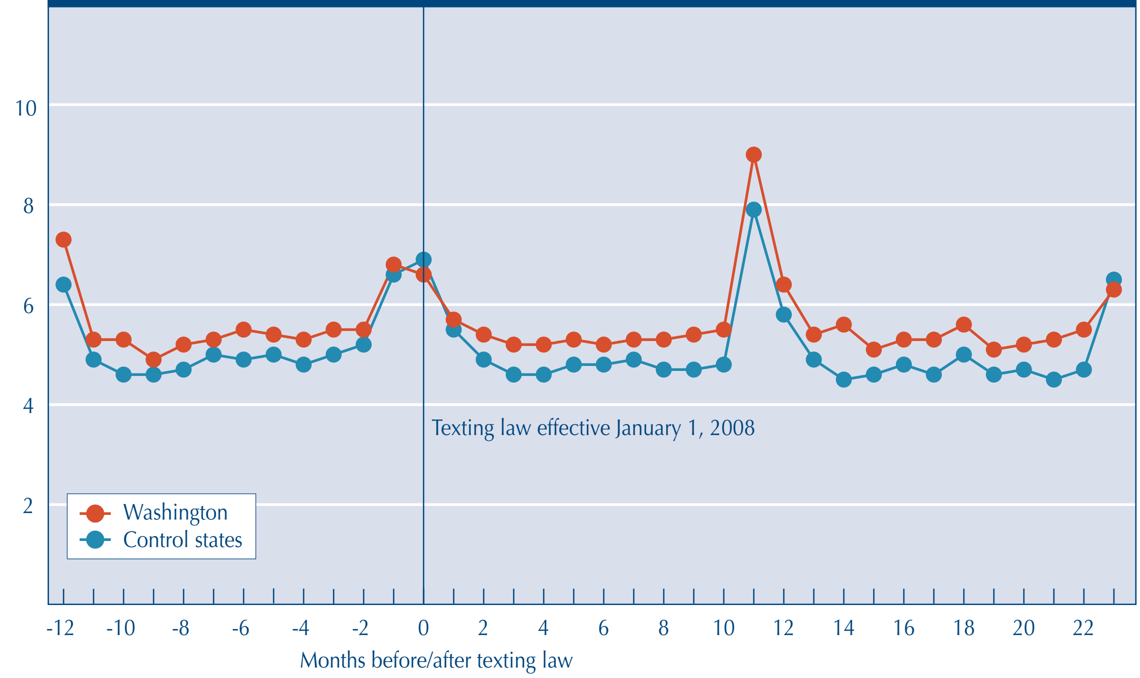


FIGURE 4 COLLISION CLAIM FREQUENCIES FOR VEHICLES UP TO NINE YEARS-OLD BY MONTH WASHINGTON VS. CONTROL STATES (IDAHO, OREGON)



The regression analyses provide estimates of the correlation between the texting bans and collision claim frequency after controlling for these other variables in both the study and control states. Table 1 shows the regression results for California. Most effect estimates corresponding to the demographic and geographic control variables agree with previous collision claim frequency analysis: Older vehicles generally produce fewer claims; youthful age and single marital status are associated with higher collision claim frequencies; higher frequencies are observed in high-density areas, compared with rural areas.

The estimate for month index (0.0037) indicates a slight increasing trend for the control states, whereas the estimate (-0.0032) for the interaction of month index and state type indicates an even slighter downward trend for California during the study period. The estimate (0.1247) of state type indicates that, without regard to the ban, collision claim frequencies were higher in California than in the control states. The estimate for the interaction of state type and ban status (0.0736) is statistically significant ($p < 0.0001$), indicating the model did detect an effect of the ban on collision claim frequencies in California. However, this effect indicates that collision frequencies rose following the texting ban.

In the regression models comparing California to each of its 3 control states separately, estimated effects of demographic and geographic variables did not change substantially from the aggregated control model. Neither did the estimate corresponding to the general time trend (month index). The estimates corresponding to the effect of the texting ban varied by control state. The texting ban in California was associated with a significant 25.5% ($p < 0.0001$) increase in collision claim frequency compared with Oregon, a 6.2% ($p = 0.0002$) statistically significant increase in frequency compared with Nevada, and a 0.2% ($p = 0.8456$) statistically insignificant decrease in frequency compared with Arizona. Thus, California's experience after enacting the texting ban differed most clearly from that of Oregon, with essentially similar experience compared to Arizona.

Table 1 Results of Time-Based Regression Model for California vs. Control States (Arizona, Nevada, Oregon)

Parameter	Value	Degrees of freedom	Estimate	Standard error	Wald 95% Confidence limits		Chi-square	p-value
Intercept		1	-8.6662	0.0199	-8.7052	-8.6271	189,042	<0.0001
Model Year	2001	1	-0.2362	0.0180	-0.2715	-0.2009	171.9	<0.0001
	2002	1	-0.1992	0.0173	-0.2331	-0.1653	132.8	<0.0001
	2003	1	-0.1373	0.0173	-0.1711	-0.1035	63.4	<0.0001
	2004	1	-0.0912	0.0172	-0.1250	-0.0574	28.0	<0.0001
	2005	1	-0.0246	0.0172	-0.0583	0.0091	2.0	0.1529
	2006	1	0.0353	0.0172	0.0016	0.0690	4.2	0.0403
	2007	1	0.1035	0.0172	0.0698	0.1372	36.3	<0.0001
	2008	1	0.1385	0.0172	0.1047	0.1722	64.5	<0.0001
	2009	1	0.1555	0.0177	0.1209	0.1902	77.2	<0.0001
	2010	0	0	0	0	0		
Age Group	<25	1	0.3799	0.0102	0.3600	0.3999	1,393.2	<0.0001
	25-65	1	0.0146	0.0095	-0.0041	0.0332	2.3	0.1259
	66+	1	0.0572	0.0099	0.0378	0.0766	33.5	<0.0001
	Unknown	0	0	0	0	0		
Gender	Female	1	0.2593	0.0072	0.2452	0.2734	1,299.0	<0.0001
	Male	1	0.2007	0.0073	0.1864	0.2149	766.0	<0.0001
	Unknown	0	0	0	0	0		
Marital Status	Married	1	-0.2393	0.0070	-0.2530	-0.2256	1,167.7	<0.0001
	Single	1	-0.0214	0.0071	-0.0353	-0.0076	9.2	0.0024
	Unknown	0	0	0	0	0		
Registered Vehicle Density	<50	1	-0.2995	0.0043	-0.3078	-0.2912	4,956.5	<0.0001
	50-99	1	-0.2067	0.0034	-0.2134	-0.2001	3,696.8	<0.0001
	100-249	1	-0.1983	0.0033	-0.2047	-0.1919	3,683.6	<0.0001
	250-499	1	-0.1384	0.0033	-0.1448	-0.1319	1,771.2	<0.0001
	500-999	1	-0.1181	0.0046	-0.1271	-0.1091	662.0	<0.0001
	≥1,000	0	0	0	0	0		
Month Index		1	0.0037	0.0007	0.0024	0.0050	30.6	<0.0001
State Type		1	0.1247	0.0050	0.1149	0.1345	617.2	<0.0001
Ban Status		1	-0.1175	0.0073	-0.1318	-0.1032	258.7	<0.0001
Month Index * State Type		1	-0.0032	0.0008	-0.0048	-0.0017	17.1	<0.0001
State Type * Ban Status		1	0.0736	0.0086	0.0568	0.0904	73.9	<0.0001

Similar regression analyses were conducted for each of the other study states. Tables 2-5 summarize the estimates for the interaction of state type and ban status for California, Louisiana, Minnesota, and Washington compared with the aggregated control states and individual control states. They also show results when the data are restricted to youthful drivers (<25) and drivers 25 and older. Positive estimates indicate that the texting bans are associated with higher collision claim frequency. In California, Louisiana and Minnesota, the bans are associated with small but statistically significant increases in collision claims (7.6%, 6.7%, and 8.9%, respectively), when considering all age groups and aggregating across the control states. In Washington, the ban also was associated with an increase in crashes (0.8%), but it was not statistically significant.

When the datasets were restricted to youthful drivers (<25), increases in crashes were associated with the bans in all four states, and the effect was statistically significant in every state except Washington. In California, Louisiana and Washington, the estimated increases for youthful drivers were somewhat larger than the increases associated with drivers 25 and older.

Table 2 Effect Estimates of California's Texting Ban on Collision Claim Frequency

Ban State	Group	Estimate of State type * Ban status	Ban effect	p-value
California vs. all controls	All Ages	0.0736	7.6%	<0.0001
	Age 25+	0.0672	7.0%	<0.0001
	Age <25	0.1087	11.5%	<0.0001
California vs. Arizona	All Ages	-0.0022	-0.2%	0.8456
	Age 25+	-0.0056	-0.6%	0.6381
	Age <25	0.0084	0.8%	0.8102
California vs. Nevada	All Ages	0.0600	6.2%	0.0002
	Age 25+	0.0477	4.9%	0.0050
	Age <25	0.1292	13.8%	0.0132
California vs. Oregon	All Ages	0.2273	25.5%	<0.0001
	Age 25+	0.2175	24.3%	<0.0001
	Age <25	0.3046	35.6%	<0.0001

Table 3 Effect Estimates of Louisiana's Texting Ban on Collision Claim Frequency

Ban State	Group	Estimate of State type * Ban status	Ban effect	p-value
Louisiana vs. all controls	All Ages	0.0649	6.7%	<0.0001
	Age 25+	0.0616	6.4%	<0.0001
	Age <25	0.0772	8.0%	0.0027
Louisiana vs. Arkansas	All Ages	0.0698	7.2%	<0.0001
	Age 25+	0.0663	6.9%	<0.0001
	Age <25	0.0904	9.5%	0.0460
Louisiana vs. Mississippi	All Ages	0.0681	7.0%	<0.0001
	Age 25+	0.0644	6.7%	<0.0001
	Age <25	0.0985	10.4%	0.0282
Louisiana vs. Texas	All Ages	0.0643	6.6%	<0.0001
	Age 25+	0.0614	6.3%	<0.0001
	Age <25	0.0734	7.6%	0.0048

Table 4 Effect Estimates of Minnesota's Texting Ban on Collision Claim Frequency

Ban State	Group	Estimate of State type * Ban status	Ban effect	p-value
Minnesota vs. all controls	All Ages	0.0851	8.9%	<0.0001
	Age 25+	0.0860	9.0%	<0.0001
	Age <25	0.0677	7.0%	0.0408
Minnesota vs. Iowa	All Ages	0.0523	5.4%	0.0005
	Age 25+	0.0518	5.3%	0.0012
	Age <25	0.0419	4.3%	0.3426
Minnesota vs. Wisconsin	All Ages	0.1000	10.5%	<0.0001
	Age 25+	0.1012	10.6%	<0.0001
	Age <25	0.0811	8.4%	0.0250

Table 5 Effect Estimates of Washington's Texting Ban on Collision Claim Frequency				
Ban State	Group	Estimate of State type * Ban status	Ban effect	p-value
Washington vs. all controls	All Ages	0.0082	0.8%	0.4425
	Age 25+	0.0047	0.5%	0.6815
	Age <25	0.0484	5.0%	0.1373
Washington vs. Idaho	All Ages	-0.0355	-3.5%	0.0487
	Age 25+	-0.0448	-4.4%	0.0205
	Age <25	0.0436	4.5%	0.4034
Washington vs. Oregon	All Ages	0.0219	2.2%	0.0595
	Age 25+	0.0199	2.0%	0.1107
	Age <25	0.0501	5.1%	0.1659

DISCUSSION

Insurance collision loss experience does not indicate a decline in crash risk when texting laws are enacted. Rather, there appears to have been a small increase in claims in the states enacting texting bans, compared to neighboring states. Partly, this may reflect the difficulty of enforcing texting bans. A national survey by the Insurance Institute for Highway Safety found little difference between states with and without bans in the proportion of people reporting that they texted while driving (Braitman and McCartt, 2010). However, lack of compliance by itself would predict no change in crash experience, not an increase as observed in the insurance collision data.

This unexpected consequence of banning texting suggests that texting drivers have responded to the law, perhaps by attempting to avoid fines by hiding their phones from view. If this causes them to take their eyes off the road more than before the ban, then the bans may make texting more dangerous rather than eliminating it. Simulator research is consistent with this hypothesis. In one study, more than 3 times as many drivers experienced a simulated collision while using a head-down display (traditional dashboard display) compared with a head-up (display part of the windshield) (Charissis et al., 2008). Another simulator study found longer reaction times among commercial drivers using head-down versus head-up displays (Liu and Wen, 2004).

The results of this study seem clear. In none of the four states where texting bans could be studied was there a reduction in crashes. It's important to remember that the public safety issue in distracted driving is the crashes resulting from cellphone conversations and texting, not the use of these devices, per se. If the goal of texting and cellphone bans is the reduction of crash risk, then the bans have so far been ineffective. Bans on handheld cellphone use by drivers have had no effect on crashes (HLDI, 2009), as measured by collision claim frequencies, and texting bans may actually have increased crashes.

There are some weaknesses of this study and the study of cellphone bans that preceded it. For example, collision claims are not a perfect indicator of all crashes for which distraction is a factor. In addition, the study of laws like texting bans cannot achieve the rigor of true experimental studies, with random assignment of subjects (drivers) to conditions. Rather, this is a naturalistic experiment, relying on the assumption that no uncontrolled changes in the study or control states are masking a decrease in texting associated with the bans. Finally, there is the issue that these data don't include information on cellphone use or texting -- it is possible that crashes involving texting have decreased as a result of the bans but there has been an unexpected increase in crashes due to other causes. That, however, seems unlikely and, in any case, would imply that texting bans are responsible for those increases in other crashes.

Moreover, there is strength in the similarity of findings. In four states, texting bans failed to produce a detectable reduction in crash risk, despite the geographic dispersion of these states and their controls. It is unlikely that uncontrolled covariates are confounding all the results. This is similar to the previous study, showing that hand-held cellphone bans have not affected crash risk in four different states. Two of the previously studied jurisdictions, Connecticut and the District of Columbia, had all driver texting bans come into effect at the same time as the studied hand-held bans. The findings of this study coupled with the previous analysis would suggest that simultaneously banning texting and cellphones for all drivers does not reduce collision claim frequencies.

These results indicate that distracted driving crashes are a complicated issue unlikely to be affected greatly by laws banning only one or another potential distraction. Distracted driving has long been a major contributor to the motor vehicle crash problem in the United States. In 1979, a report on the "Indiana Tri-Level Study" concluded that "driver error" had been the proximate cause of 9 out of 10 crashes investigated (Treat et al., 1979). Anecdotal evidence from insurance claims files and police crash reports over the years have provided an astounding array of ways in which drivers manage to be distracted from the driving task at just the wrong time -- from adjusting the radio, to eating and drinking, to tending a child in the rear seat, to reading, shaving, and applying makeup, to swatting bees. The National Highway Traffic Safety Administration (NHTSA) estimates that 21 percent of injury crashes and 16 percent of fatal crashes in 2008 involved driver distraction (NHTSA, 2009), but this probably is an underestimate of the distracted driving problem due to the fact that many crash reports don't have information on distracting events.

The long history and ubiquity of distracted driving crashes, coupled with the current findings, suggests that public policy that focuses on only one source of distraction (for example, cellphone conversations or texting) may fail simply because it doesn't recognize that drivers always are subject to distraction. Taking away cellphones may result only in drivers defaulting -- even unintentionally -- to new (or old) forms of distraction. In any case, the evidence to date indicates that cellphone conversations and texting no doubt increase crash risk during their occurrence (McEvoy et al., 2005, Redelmeier and Tibshirani, 1997, Olson et al., 2009); however, despite the increase in cellphone conversations and texting, there has not been an upwared trend in either fatal crashes or collision claims. And most importantly for policy makers, laws banning these practices are not reducing crash risk in the United States.

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Appendix A Effect Estimates of Texting Bans on Collision Claim Frequencies, Ages 19 and Older

Ban State	Group	Estimate of State type * Ban status	Ban effect	p-value
California	All	0.0658	6.8%	<0.0001
	Ages 19-24	0.0936	9.8%	0.0018
California vs. Arizona	All	-0.0066	-0.7%	0.5608
	Ages 19-24	-0.0122	-1.2%	0.7462
California vs. Nevada	All	0.0531	5.5%	0.0012
	Ages 19-24	0.1108	11.7%	0.0461
California vs. Oregon	All	0.2236	25.1%	<0.0001
	Ages 19-24	0.3247	38.4%	<0.0001
Louisiana	All	0.0614	6.3%	<0.0001
	Ages 19-24	0.0568	5.8%	0.0437
Louisiana vs. Arkansas	All	0.0693	7.2%	<0.0001
	Ages 19-24	0.1075	11.3%	0.0325
Louisiana vs. Mississippi	All	0.0628	6.5%	<0.0001
	Ages 19-24	0.0418	4.3%	0.4046
Louisiana vs. Texas	All	0.0609	6.3%	<0.0001
	Ages 19-24	0.0532	5.5%	0.0618
Washington	All	0.0139	1.4%	0.2276
	Ages 19-24	0.0355	3.6%	0.3435
Washington vs. Idaho	All	-0.0288	-2.8%	0.1349
	Ages 19-24	0.0123	1.2%	0.8373
Washington vs. Oregon	All	0.0273	2.8%	0.0291
	Ages 19-24	0.0438	4.5%	0.2916

Appendix B Effect Estimates of Texting Bans on Collision Claim Frequencies, 3 Vehicle Model Years per Calendar Year

Ban State	Group	Estimate of State type * Ban status	Ban effect	p-value
California vs. all controls	All Ages	0.0386	3.9%	0.0498
Louisiana vs. all controls	All Ages	0.0880	9.2%	<0.0001
Minnesota vs. all controls	All Ages	0.0837	8.7%	0.0005
Washington vs. all controls	All Ages	0.0379	3.9%	0.1045

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