Highway Loss Data Institute Bulletin

Hand-Held Cellphone Laws and Collision Claim Frequencies

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INTRODUCTION

Cellphone use in the United States has grown quickly during the past decade. According to the Cellular Telecommunications and Internet Association (2009), cellphone subscribers increased 42 percent between 2005 and 2009. Minutes of use surged from 195 billion in June 2000 to more than 1.1 trillion in June 2008. There is growing public concern about the contribution of cellphone use and/or text messaging to distracted driving.

A number of jurisdictions worldwide, including several US states, have made it illegal to use hand-held cellphones while driving. Evidence on the effectiveness of these bans is mixed. The Insurance Institute for Highway Safety (IIHS) has studied driver response to three of the statewide bans on hand-held phone use (McCartt and Geary, 2004; McCartt and Hellinga, 2007; McCartt et al., in press). In November 2001, New York became the first state to implement a ban on hand-held cellphone use for drivers, and driver phone use immediately declined by an estimated 47 percent. The District of Columbia passed a ban in 2004, and driver cellphone use dropped 41 percent. Connecticut's ban took effect in 2005, and hand-held phone use declined by an estimated 76 percent. The estimated effects of these three cellphone laws differ considerably, but results indicate that banning hand-held cellphone phone use can affect phone use.

The purpose of this Highway Loss Data Institute (HLDI) bulletin was to examine state level automobile insurance collision claim frequencies to determine if the reduction in hand-held cellphone use was accompanied by measurable changes in claim frequency after enactment of cellphone bans. Trends for Connecticut, New York, and the District of Columbia were examined because IIHS has documented that hand-held cellphone use decreased after these jurisdictions enacted bans. California also is included in the analysis because it is a large state and its ban is fairly recent.

RESULTS

Monthly collision claim frequencies (measured in claims per 100 insured vehicle years) were calculated by state for vehicles 0-3 years old (i.e., calendar year 2008 would include model years 2007-09). Claim frequencies for study jurisdictions, those with hand-held cellphone bans, were compared with neighboring jurisdictions that did not enact similar bans. This method of analysis was used to control for possible changes in claim frequency unrelated to the bans: e.g., economic downturn, change in miles driven, and seasonality. Results of these comparisons are illustrated in Figures 1-4.

California's hand-held cellphone ban took effect in July 2008. Figure 1 shows collision claim frequencies for California for the months before and after the ban. Aggregate claim frequencies for the neighboring states of Arizona, Nevada, and Oregon are shown as control states. Monthly fluctuations in claim frequencies for California were very similar to those for the comparison states. Although claim frequencies for California fluctuated monthly, no notable change was apparent coincident with enactment of the state's hand-held cellphone ban.

Figures 2 and 3 show collision claim frequencies for Connecticut and the District of Columbia compared with control states. Due to the urban nature of the District of Columbia, claim frequencies for the District were compared with those for Baltimore City in Maryland as well as the states of Virginia and Maryland. Results for Connecticut and the District were similar to California in that, following enactment of hand-held cellphone bans, monthly collision claim frequencies did not trend differently compared with control states. Trends in collision claim frequencies for Connecticut and the District essentially paralleled those for the respective control states.

Figure 4 shows collision claim frequencies for the state of New York compared with control states. Suffolk, Westchester, and Nassau counties were excluded from analysis because these jurisdictions enacted cellphone bans prior to the statewide ban. Monthly claim frequencies for New York after the ban ultimately trended lower than those for the control states. However, the decreasing trend for New York had begun before the ban.

To further examine trends in collision claim frequencies, a simple time-based regression model was developed, and the model was applied to loss data for each of the study states and their respective control states. The regression models used a Poisson distribution and the following variables:

- MonthIndex: continuous, sequential variable to identify each month in the time series
- StateType: categorical variable used to identify a state as the study state or part of the control states
- BanStatus: categorical variable also used to identify the status of a ban for each month.

One 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.

Figure 1 Collision Claim Frequencies for New Vehicles by Month
California vs. Control States (Arizona, Nevada, Oregon)

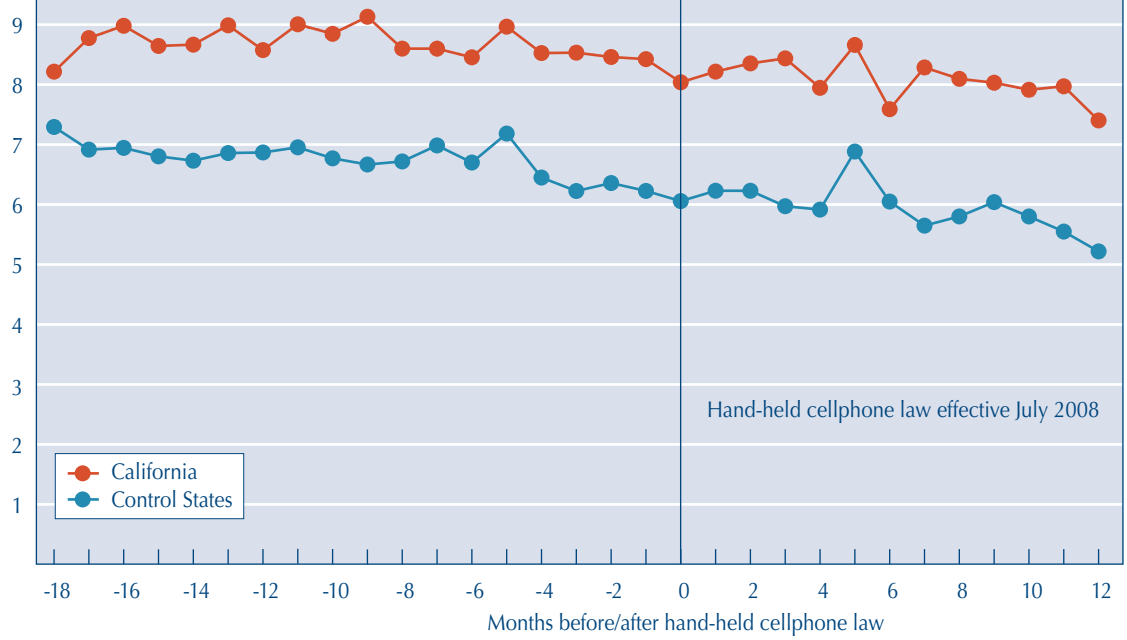


Figure 2 Collision Claim Frequencies for New Vehicles by Month
Connecticut vs. Control States (Massachusetts, New York)

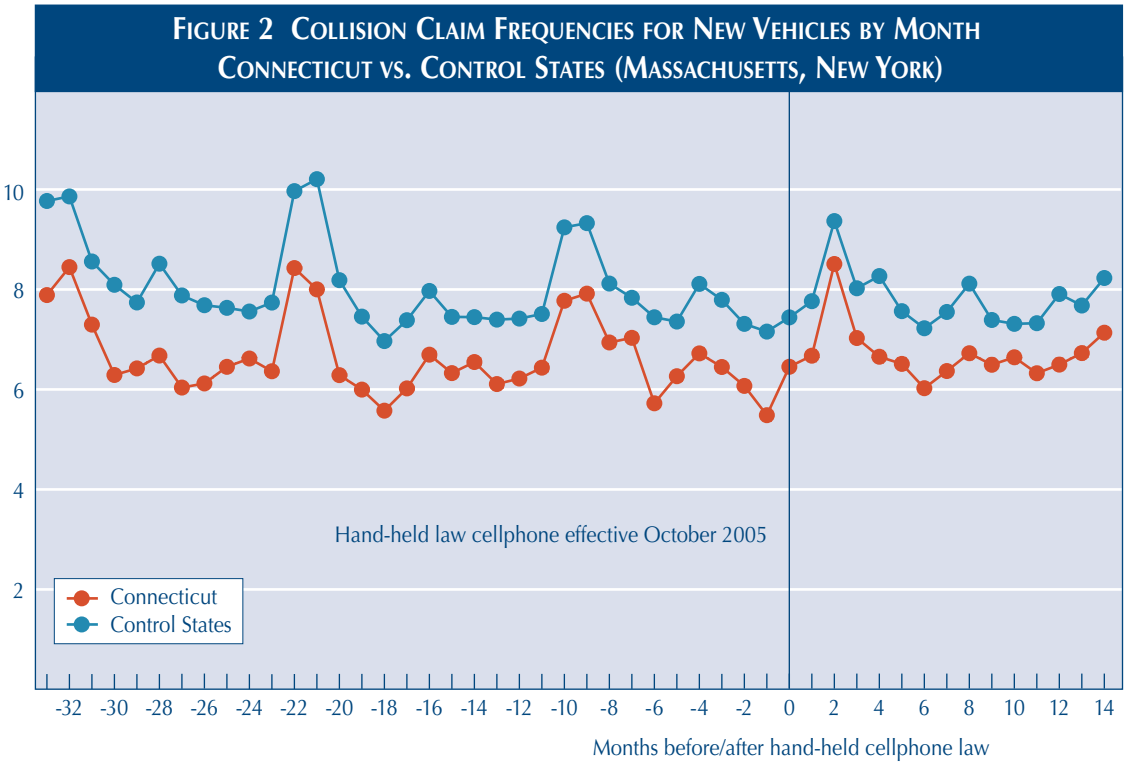


Figure 3 Collision Claim Frequencies for New Vehicles by Month
District of Columbia vs. Control States (Maryland, Virginia) and Baltimore City

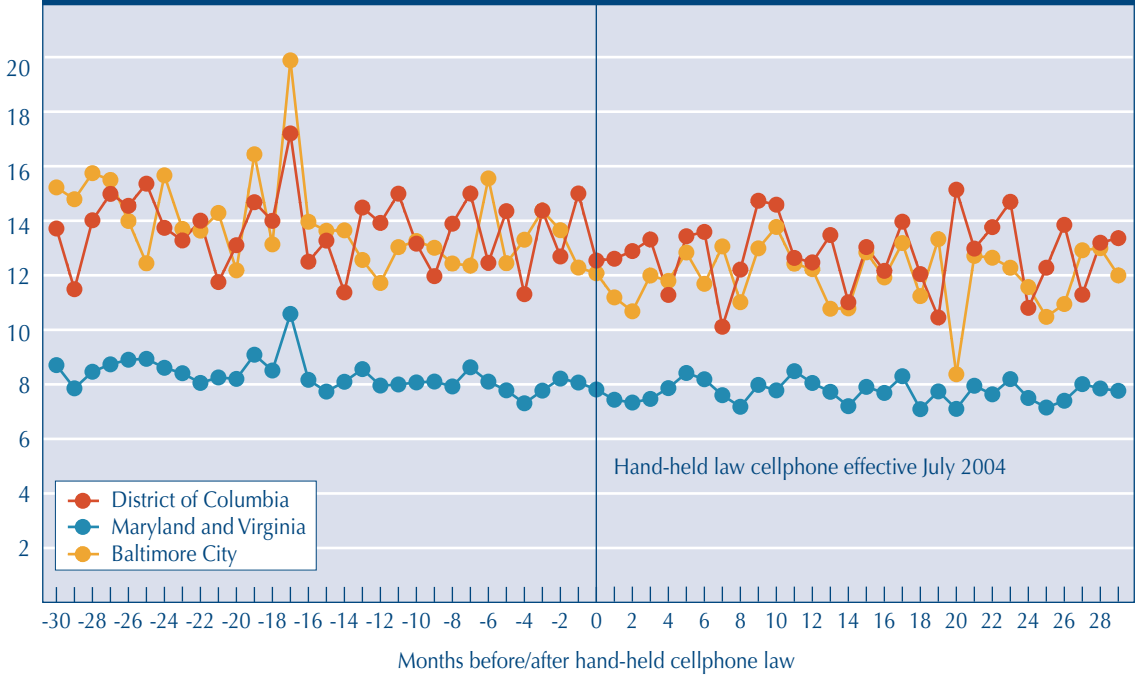
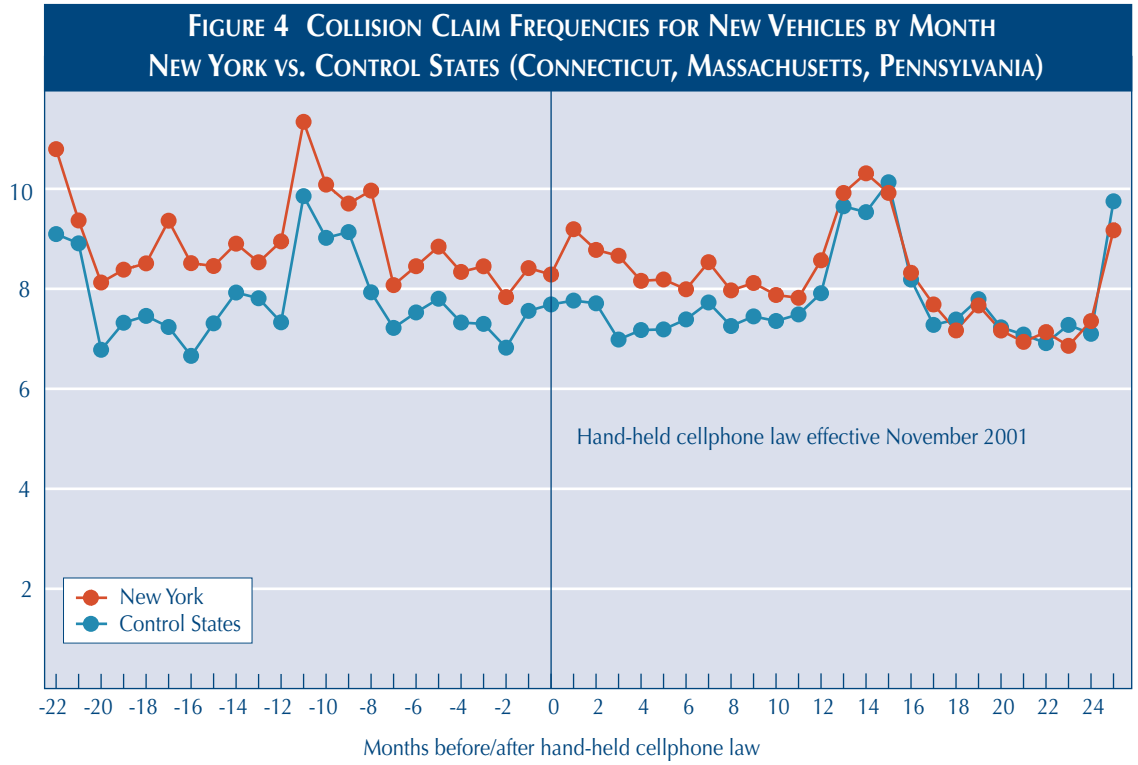


Figure 4 Collision Claim Frequencies for New Vehicles by Month
New York vs. Control States (Connecticut, Massachusetts, Pennsylvania)



Two interactions were used in the model. The first interaction, MonthIndex and StateType, estimated trend lines for both the study state and control states. The estimate for the MonthIndex variable represents the trend for the control states, whereas the estimate for the MonthIndex and StateType interaction is the difference between trends for the study state and control states. The second, more critical, interaction, StateType and BanStatus, provided a simple test of the ban's effect on collision claim frequencies in the study state. A p-value less than 0.05 for this interaction indicates the ban had a measurable effect on collision claim frequency.

To account for the possibility of more complex trend lines, terms corresponding to MonthIndex squared and MonthIndex cubed were attempted in the model. Results produced by these more complex terms did not alter the findings for the key interaction and therefore were excluded from the model.

Table 1 lists results of the regression model for California using Arizona, Nevada, and Oregon as control states. The negative estimate for MonthIndex indicates a decreasing trend for the control states, whereas the estimate for the interaction of MonthIndex and StateType indicates a slower decline for California. The positive estimate for StateType indicates that, without regard to the ban, collision claim frequencies were higher for California than for control states. The estimate for the interaction StateType and BanStatus was not statistically significant, indicating the model did not detect an effect of the ban on collision claim frequencies for California.

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

Parameter	Degrees of Freedom	Estimate	Standard Error	Wald 95% Confidence Limits		Chi-Square	p-value
Intercept	1	-8.657	0.0073	-8.671	-8.643	1417516	<0.0001
MonthIndex	1	-0.007	0.0006	-0.008	-0.005	101.91	<0.0001
StateType	1	0.293	0.0086	0.276	0.310	1168.89	<0.0001
BanStatus	1	-0.019	0.0114	-0.042	0.003	2.8	0.0943
MonthIndex*StateType	1	0.004	0.0008	0.003	0.006	30.17	<0.0001
StateType*BanStatus	1	-0.015	0.0135	-0.042	0.011	1.25	0.2635

Table 2 summarizes estimates for the interaction of StateType and BanStatus for regression models using data for California, Connecticut, District of Columbia (compared with control states), and New York. Additional models examined data restricted to youthful drivers (ages 16-24).

Table 2 Effect Estimates of Hand-Held Cellphone Bans on Collision Claim Frequency

Ban State	Group	Estimate of StateType*BanStatus	Ban Effect	p-value
California	All Ages	-0.0151	-1%	0.2635
California	Age <25	-0.0158	-2%	0.1116
Connecticut	All Ages	0.0351	4%	0.0317
Connecticut	Age <25	0.0513	5%	0.2835
District of Columbia (vs. Maryland and Virginia)	All Ages	-0.0461	-5%	0.1753
District of Columbia (vs. Maryland and Virginia)	Age <25	-0.0141	-1%	0.9117
District of Columbia (vs. Baltimore City)	All Ages	-0.0011	0%	0.9810
District of Columbia (vs. Baltimore City)	Age <25	-0.2309	-21%	0.1670
New York	All Ages	0.0324	3%	0.0052
New York	Age <25	0.0166	2%	0.6208

Only two of the ten estimates were statistically significant: all drivers in New York and all drivers in Connecticut. Positive estimates for the interaction of StateType and BanStatus indicate cellphone bans in these states were associated with higher collision claim frequencies. It is possible the predictions were a statistical artifact rather than an indication of a true disbenefit of hand-held cellphone laws. However, it is noteworthy that the model did not detect a benefit of hand-held cellphone laws on collision claim frequency for any of the states or any age group within the states.

DISCUSSION

Insurance collision loss experience does not indicate a decrease in crash risk when hand-held cellphone laws are enacted. Crashes in this bulletin included all collision claims reported to HLDI, whereas ideally crashes would have been restricted to claims involving driving while using hand-held cellphones. This information is not known to HLDI, nor to the insurance companies that supply data to HLDI, and is a clear limitation of the analysis. However, prior estimates of the effects of cellphone use on crash risk were so large, and reductions in observed hand-held cellphone use following the laws were so substantial, that reductions even in aggregate crashes would be expected after enactment of hand-held cellphone laws.

Data presented in this bulletin indicate that, during a time of large growth in the purchase of cellphones and in the use of these phones, collision claim rates either were flat or already decreasing before enactment of the laws. Claim frequencies for control states without laws also were declining and generally continued to trend in the same way as claim frequencies for the study states after the laws. There is no evidence that bans on hand-held cellphone use by drivers has affected these trends in collision claims.

REFERENCES

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