HHS Public Access

Author manuscript

Ann Epidemiol. Author manuscript; available in PMC 2017 December 01.

Published in final edited form as:

Ann Epidemiol. 2016 December ; 26(12): 833–837.e1. doi:10.1016/j.annepidem.2016.10.002.

The association between handheld phone bans and the prevalence of handheld phone conversations among young drivers in the United States

Motao Zhu, MD, MS, PhD[1,2,3], **Toni M. Rudisill, MS, PhD**[3], **Steven Heeringa, PhD**[4], **David Swedler, PhD**[5], and **Donald A Redelmeier, MD**[6]

Motao Zhu: mozhu@hsc.wvu.edu; Toni M. Rudisill: trudisill@hsc.wvu.ed; Steven Heeringa: sheering@umich.edu; David Swedler: swedler@illinois.edu; Donald A Redelmeier: dar@ices.on.ca

[1]The Center for Injury Research and Policy, The Research Institute at Nationwide Children's Hospital, Columbus, Ohio, 43205, USA

[2]Department of Pediatrics, College of Medicine, Ohio State University, Columbus, Ohio, 43210, USA

[3]Injury Control Research Center, West Virginia University, PO BOX 9151, Morgantown, West Virginia, 26506, USA

[4]Survey Research Center, University of Michigan, Ann Arbor, MI, 48109, USA

[5]Dept. of Environmental and Occupational Health Sciences, University of Illinois at Chicago, Chicago, IL, 60607, USA

[6]Sunnybrook Hospital, University of Toronto, Toronto, ON, M4N 3M5, Canada

Abstract

Purpose—Fourteen U.S. states and the District of Columbia have banned handheld phone use for all drivers. We examined whether such legislation was associated with reduced handheld phone conversations among drivers < 25 years of age.

Methods—Data from the 2008–2013 National Occupant Protection Use Survey were merged with states' legislation. The outcome was roadside-observed handheld phone conversation at stop signs or lights. Logistic regression was used.

Results—A total of 32,784 young drivers were observed. Relative to drivers who were observed in states without a universal handheld phone ban, the adjusted odds ratio (aOR) of phone conversation was 0.42 (95% confidence interval CI: 0.33, 0.53) for drivers who were observed in states with bans. The relative reduction in phone conversation was 46% (23%, 61%) for laws that

CORRESPONDING AUTHOR: Motao Zhu, MD, MS, PhD, The Center for Injury Research and Policy, The Research Institute at Nationwide Children's Hospital, 700 Children's Drive, RB3-WB5217, Columbus, Ohio, 43205, USA, Motao.Zhu@NationwideChildrens.org, Telephone: 614-355-6687.

were effective < 1 year, 55% (32%, 70%) for 1–2 years, 63% (51%, 72%) for ≥ 2 years, relative to no laws.

Conclusions—Universal handheld phone bans may be effective at reducing handheld phone use among young drivers.

Keywords

Automobile driving; adolescent; epidemiology; legislation

INTRODUCTION

Traffic crashes are the leading cause of death among persons aged 15–24 years in the United States (U.S.), accounting for about one quarter (6,510 fatalities) of all deaths for this demographic group during 2013 (1). Distracted driving is a prevalent traffic safety hazard (2–4); for example, a 2014 national survey reported that approximately 56% of drivers aged 16–18 years and 72% of drivers aged 19–24 years talked on a cell phone while driving in the past month (4). Handheld phone use while driving is distracting because it requires that attention be diverted away from the roadway when dialing a number, receiving a call, or holding a phone to the ear. In addition, when auditory and speech demands are high, driving performance is further degraded by cognitive distraction (5–9).

To mitigate this risk, 14 states and the District of Columbia have enacted a handheld phone ban for all drivers (universal handheld phone ban) as of August 2016 (10). In general, it prohibits drivers from engaging a call using at least one hand on a public highway, but it allows hands-free calling by using headphones, ear buds, Bluetooth, or speaker phone. Few studies have examined the effectiveness of such laws in reducing driver handheld phone use (11–14). These studies are consistent in findings that universal handheld phone bans are associated with reduced handheld phone use. However, there are unique challenges in enforcing handheld phone laws. Handheld phone conversation is prohibited, but dialing a number on a speaker phone (hands-free use) is generally allowed. It is difficult for police officers to distinguish whether dialing is handheld or hands-free use. It is challenging for police to detect drivers holding a phone to their ear and citations of handheld phone use are low (15). It would be interesting to examine whether the ban has long-term effectiveness without high-level enforcement. In addition, the monetary amount of fine may be important to drivers violating traffic laws; for example, increasing a fine from $5 to $100 was associated with 11% increase in seat belt use (16). The objective of this study was to determine the relationship between a state's handheld phone ban, including specific provisions of these bans around fines and its long-term effectiveness, and the prevalence of handheld phone use among a nationally representative sample of young drivers.

MATERIALS AND METHODS

Data sources

The primary data source was the 2008–2013 National Occupant Protection Use Survey (NOPUS) (17). NOPUS is a national observational survey examining driver electronic device use, seat belt use, and child restraint use at randomly selected traffic stop signs and

stoplights in the United States (18). Observers collect data on the stopped passenger vehicles including casual assessment of the driver's age and race. The survey is conducted in June each year with observations collected between 7 a.m. and 6 p.m. The sampling design involves two-stage sampling with stratified probability proportional to size (18). In each year, approximately 50 primary sampling units and 1,200 observational sites are selected (18).

A dataset of each state's distracted driving legislation spanning from January 1, 2008 through December 31, 2013 was compiled from several sources including web searches (19), the Insurance Institute for Highway Safety (10), and the Governor's Highway Safety Association (20). Each piece of legislation was subsequently retrieved from the respective states' legislative archives and verified independently by two individuals. The dataset contained information on effective dates and amount of fines. In this article, the focus was on legislation applicable to all ages of drivers, hereafter called universal handheld phone bans.

Information on each state's number of cell phone subscriptions from each year was compiled from the Federal Communications Commission's Local Telephone Competition reports (21, 22). Population estimates were obtained from the U.S. Census Bureau (23). Cell phone subscriptions and population estimates were used to estimate the number of cell phone subscriptions per 100 residents each year as a measure of the ownership of cell phones in the state's general public.

Study population

The study population included participants who were drivers in the 2008–2013 NOPUS survey and judged less than 25 years of age by roadside observers. NOPUS has three categories (<25, 25–69, 70+) in driver's age, and we chose those under 25 years given their high cell phone use. Because of the methodology of the NOPUS survey (not all states are sampled), this yielded a sample of drivers spanning 35 states (See Web Appendix: Table A. 1.) Nine out of 35 states implemented universal handheld phone bans by 2013.

Variables

The dependent variable of interest, handheld cell phone use, was recorded at four levels in NOPUS: holding phones to their ears, speaking with visible headsets, visibly manipulating handheld devices, and no observed electronic device use. Each driver was assessed for about 10 seconds before the observer assigned him/her to one of the four categories (17). For this analysis, driver behavior was dichotomized into handheld phone conversation (holding phones to their ears) or not (the later three categories). The category of visibly manipulating handheld devices might include a small proportion of manual phone number dialing, but dialing is typically less than the 10-second observation duration. We suspect that visibly manipulating handheld devices might be more aligned with texting than dialing.

The primary predictor variable was whether a universal handheld phone ban was in effect for the state of the observed driver. Additional factors for secondary analysis included amount of fine and the length of time since legislation enacted. States' universal handheld phone bans in effect at the time of the NOPUS survey were categorized into presence/absence.

Nine states implemented such a ban by 2013. A table listing each state in the analysis and the characteristics of handheld phone bans appears in the Appendix (Table A.1.). As fines are typically listed as a range in legislation, the minimum was taken, and further categorized into <$100 or ≥ $100 without accounting for administrative court fees.

Additional independent variables were the driver's sex, race (White, African American, other), the rurality of the observational site (urban, suburban, rural), the driver's seatbelt use (yes or no), vehicle type (passenger car, pick-up truck, van or sports utility vehicle), and the state's number of cell phone subscriptions per 100 residents.

Data analysis

Logistic regression was fitted to estimate the odds ratio of driver handheld phone conversation accounting for the survey's complex sample design (i.e. clustering, strata, etc.). The NOPUS data provides 56 replicate weights for 2011–2013 data, 62 replicate weights for 2010 data, but no replicate weights for the 2008–2009 data. To combine 2008–2013 data, we created pseudo strata and clusters from primary sampling units, and used the Taylor Series approximation method to compute standard errors for all descriptive estimates and the model parameter estimates (24). To verify our pseudo strata method, we applied pseudo strata and replicate weights method to 2011–2013. Both methods produced the same point estimates and confidence limits for odds ratio for handheld phone ban when rounding to two decimal places.

To determine whether handheld phone ban and provisions were associated with driver handheld phone conversation, an adjusted odds ratio (aOR) was calculated for presence/absence of a universal ban. The adjusted odds ratio was estimated by comparing drivers in 9 states with ban to drivers in 26 states without bans, and by comparing drivers before and after the ban in 6 states where a ban was implemented in 2008–2013. We further estimated the adjusted odds ratio according to minimal state fines (< $100 vs ≥ $100) and length since implementation (< 1 year, 1–2 years, ≥ 2 years). Separate models were estimated for each provision and adjusted for sex, race, seatbelt use, vehicle type, rurality of the observation site, and the number of cell phone subscriptions per 100 residents. In sensitivity analysis of categorizing handheld phone conversation, we left out two categories (speaking with visible headsets, visibly manipulating hand-held devices), and kept "holding phones to their ears" and "no observed electronic device use" to estimate the odds ratios in comparison of handheld phone ban with no ban. All analyses were run in SAS version 9.4 using the complex sample procedures. Confidence limits were based on a 95% interval, all hypothesis tests were two-sided with $\alpha = 0.05$.

RESULTS

Of the 380,645 passenger vehicle occupants observed in 2008–2013 NOPUS, a total of 266,461 were drivers, and 32,784 (12%) were drivers under age 25 years. A total of 2,289 (7.0%) out of 32,784 young drivers were talking on a handheld phone at a typical daylight stop (Table 1). Table 1 describes demographic details of the drivers and their vehicles. Only 32% of observed participants were in states with a universal handheld phone ban. Most observed drivers in states with bans were in states with bans in effect ≥ 2 years.

Compared with male drivers, female drivers were 89 percent (odds ratio OR: 1.89, 95% confidence interval 1.64, 2.18) more likely to talk on a handheld phone while driving (Table 2). The OR for handheld phone conversation while driving was 1.24 (0.94, 1.65) for African Americans and 0.75 (0.59, 0.94) for other races, relative to White. The rate of driver handheld phone conversation was similar regardless of whether the driver used seatbelt or not. Drivers in vans and sport utility vehicles were more likely to talk on a handheld phone than those in passenger cars.

Compared with drivers who were observed in states without a universal handheld phone ban, the relative reduction in the odds of handheld phone conversation while driving was 58 percent [aOR: 0.42 (0.33, 0.53)] for drivers who were observed in states with such bans (Table 3). The relative reduction in phone use was 46 percent (23%, 61%) for laws that were effective < 1 year, 55 percent (32%, 70%) for 1–2 years, 63 percent (51%, 72%) for ≥ 2 years, relative to no laws (Figure 2). Relative to drivers who were observed in states with a minimal fine < $100, the aOR of phone conversation was 0.71 (0.51, 1.00) for drivers who were observed in states with a minimal fine ≥ $100.

In sensitivity analysis of leaving out speaking with visible headsets and visibly manipulating hand-held devices, the crude odds ratio was 0.42 (0.34, 0.51) and the adjusted odds ratio was 0.42 (0.34, 0.53) for comparing handheld ban versus no ban. They were similar to the main analysis.

DISCUSSION

We found that universal handheld phone legislation was associated with markedly lower handheld phone conversation while driving among young drivers under age 25 years. The longer a universal ban had been implemented, the more effective it was at reducing phone calls while driving. A greater fine was borderline associated with a greater reduction in handheld phone conversation. Together, these findings may inform health policy for remaining U.S. states considering legislation.

Our observed 58 percent reduction in driver handheld phone conversation after a universal ban is similar to past research. McCartt et al reported that a universal handheld phone ban was associated with an immediate 76 percent reduction in roadside observed cell phone conversation among all drivers in Connecticut, a 47 percent reduction in New York, and a 41 percent in the District of Columbia (25). In a 2009 national survey, the proportion of drivers of all ages who talked on a handheld phone was 19 percent in states with universal handheld phone bans and 40 percent in states without universal handheld phone bans (11). The findings of the current analysis are similar to these other studies in that roadside-observed driver handheld phone conversation is markedly reduced after the universal handheld phone ban. However, the current study produced specific estimates for drivers under age 25 years while the other studies examined drivers of all ages. Universal handheld phone bans may reduce the prevalence of driver handheld phone calls simply because they are easy for the public to understand. A 2009 national survey, for example, found that 82 percent of drivers in states with universal handheld phone bans were aware of the ban, relative to 19 percent of drivers in states with a ban only for certain ages (11). Universal bans also facilitate law

enforcement because the police officer does not need to clearly assess driver age before stopping the driver, compared with age-specific bans for certain ages (26). While the youngest drivers are more likely to be distracted by a phone (27, 28), and older drivers may be more susceptible to cognitive distraction (29), a universal ban recognizes that all drivers benefit from reducing handheld cell phone use while driving. Studies in North Carolina reported that an age-specific all cell phone ban for drivers under age 18 years was not associated with reduced roadside handheld phone conversations five months and 2 years after its implementation (26, 30).

We found that a longer implementation of handheld ban was associated with reduced driver handheld phone conversations. McCartt et al reported that a universal handheld phone ban was associated with a 65 percent reduction in roadside observed cell phone conversation among all drivers in Connecticut three years and after the ban, a 25 percent reduction in New York seven years after the ban, and a 43 percent in the District of Columbia nearly five years after the ban (25). The sustained reduction in handheld phone conversations might be explained by the increased awareness of the laws. Surveys of North Carolina teenagers have found that the awareness of driver cell phone ban increased from 64 percent immediately after the ban to 78 percent two years after the ban (26, 30).

We found that a minimal fine of $100 or greater might be related with more reduction in handheld phone conversation, relative to a fine less than $100. Our estimate was based on only two states (California and Maryland), and it should be considered exploratory and treated with caution. Furthermore, most drivers were unlikely to be aware of the amount of fine in their state. A minimal fine of $100 could be considered a significant amount to deter handheld phone use while driving. In addition, the total monetary penalty can be much larger than the fine after including administrative court fees. A study of roadside-observed seat belt use reported that increasing a fine from $5 to $100 was associated with 11% increase in seat belt use, and that increasing a fine from $25 to $100 was associated with an approximately 7% increase in seat belt use (16). Another study found that the fine of $25 was related to a nearly 4% increase in roadside-observed seat belt use, relative to no fine (31). On the other hand, using average fine instead of minimal fine, a cross-sectional analysis of self-reported texting while driving among high school students reported that the prevalence of texting while driving was similar for participants in states with the average fine > $100 and ≤ $100 (32).

Limitations

This analysis possesses several limitations. First, the NOPUS classification of driver's age is an imperfect assessment from the roadside observer. However, since NOPUS records broad categories (<25, 25–69, 70+) and uses trained observers with established quality controls to minimize misclassification, we believe it is unlikely to vary systematically across time or states. Second, handheld phone conversation was observed at traffic lights or stop signs when drivers might be more likely to make a short call, relative to moving traffic (33). Third, our estimates may be subject to residual confounding. Handheld phone ban effectiveness should ideally be estimated with many repeated measures of calling while driving before and after the ban implementation within the same state. However, our analysis had a limited

number of years for states that have implemented handheld phone bans. We used states without handheld phone ban as controls, and there might be differences between states with and without handheld phone bans that could contribute to the estimated ban effectiveness. Nevertheless, our estimates were comparable to other studies (13, 25). Fourth, we used a minimal fine of $100. The total monetary penalty can be much larger than the fine after including administrative court fees. Our estimate of fine was based on only two states, and should be considered exploratory. Lastly, we were unable to determine the rate at which law enforcement within a given state issues citations. Thus we were unable to control for the likelihood that a driver would be facing a ticket in any given state.

CONCLUSIONS

In conclusion, the findings of this analysis suggest that driver handheld phone conversation may be lower for drivers in states with universal handheld phone bans. As of August 2016 in the U.S., 14 states and the District of Columbia had universal handheld phone ban for all drivers (10). If targeted efforts are planned and implemented to enact universal handheld phone ban in the remaining 36 states, further reduction in driver handheld phone calls would be expected at a national scale.

Acknowledgments

The authors would like to thank Timothy Pickrell of the National Highway Traffic Safety Administration for providing data of the National Occupant Protection Use Survey. MZ had full access to the data in the study and takes responsibility for the integrity of the data and the accuracy of the analysis. All authors report no conflicts of interest. MZ and TR received support from the US National Institute of Child Health and Human Development (grants R01HD074594 and R21HD085122); and from the US National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (grant R49CE002109). The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

LIST OF ABBREVIATIONS

aOR	adjusted odds ratio
CI	confidence interval
NOPUS	National Occupant Protection Use Survey
OR	odds ratio
SUV	sport utility vehicle
US	United States

References

1. National Center for Injury Prevention and Control CfDCaP. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. Jul 18. 2016 https://wwwcdcgov/injury/wisqars/ [Internet]Available from: www.cdc.gov/ncipc/wisqars
2. Jones DS. Doctors and the Dangers of Driving. New England Journal of Medicine. 2014; 370(1):8–11. [PubMed: 24382063]
3. Lerner BH. Drunk Driving, Distracted Driving, Moralism, and Public Health. New England Journal of Medicine. 2011; 365(10):879–81. [PubMed: 21899449]

4. AAA Foundation for Traffic Safety. 2014 Traffic Safety Culture Index. Washington DC: Feburary. 2015 Report No
5. Coben JH, Zhu M. Keeping an eye on distracted driving. JAMA. 2013; 309(9):877–8. [PubMed: 23462782]
6. Ship AN. The Most Primary of Care — Talking about Driving and Distraction. New England Journal of Medicine. 2010; 362(23):2145–7. [PubMed: 20558364]
7. Redelmeier DA, Tibshirani RJ. Association between Cellular-Telephone Calls and Motor Vehicle Collisions. The New England Journal of Medicine. 1997; 336(7):453–8. [PubMed: 9017937]
8. McEvoy SP, Stevenson MR, Mccartt AT, Woodward M, Haworth C, Palamara P, et al. Role Of Mobile Phones In Motor Vehicle Crashes Resulting In Hospital Attendance: A Case-Crossover Study. BMJ: British Medical Journal. 2005; 331(7514):428–30. [PubMed: 16012176]
9. Klauer SG, Guo F, Simons-Morton BG, Ouimet MC, Lee SE, Dingus TA. Distracted Driving and Risk of Road Crashes among Novice and Experienced Drivers. New England Journal of Medicine. 2014; 370(1):54–9. [PubMed: 24382065]
10. Insurance Institute for Highway Safety. Distracted driving. 2016. [Available from: http://www.iihs.org/iihs/topics/laws/cellphonelaws?topicName=distracted-driving
11. Bratiman KA, McCartt AT. National Reported Patterns of Driver Cell Phone Use in the United States. Traffic Injury Prevention. 2010; 11(6):543–8. [PubMed: 21128181]
12. Mccartt AT, Hellinga LA. Longer-Term Effects of Washington, DC, Law on Drivers' Hand-Held Cell Phone Use. Traffic Injury Prevention. 2007; 8(2):199–204. [PubMed: 17497524]
13. Cheng C. DO CELL PHONE BANS CHANGE DRIVER BEHAVIOR? Economic Inquiry. 2015; 53(3):1420–36.
14. Carpenter CS, Nguyen HV. Effects of a Driver Cellphone Ban on Overall, Handheld, and Hands-Free Cellphone Use While Driving: New Evidence from Canada. Health Economics. 2015; 24(11): 1452–67. [PubMed: 25208808]
15. Rudisill TM, Zhu M. Who actually receives cell phone use while driving citations and how much are these laws enforced among states? A descriptive, cross-sectional study. BMJ Open. 2016; 6(6)
16. National Highway Traffic Safety Administration. Primary laws and fines levels are associated with increases in seat belt use, 1997–2008. 2010; 400 http://wwwnhtsagov/staticfiles/traffic_tech/TT400pdf [Internet].
17. National Highway Traffic Safety Administration. Traffic safety facts: driver electronic device use in 2013. Washinton DC: 2015.
18. National Highway Traffic Safety Administration. Traffic Safety Facts, Driver Electronic Device Use Observation Protocol. 2010. http://wwwdistractiongov/research/PDF-Files/Driver-Electronic-Device-Use-Observation-Protocolpdf [Internet]DOT HS 811 361
19. Hands Free Info. Index: cell phone laws, legislation by state. 2014. [Available from: http://handsfreeinfo.com/index-cell-phone-laws-legislation-by-state/
20. Governors Highway Safety Association. Distracted driving laws 2014. [Available from: http://www.ghsa.org/html/stateinfo/laws/cellphone_laws.html
21. Federal Communications Commission. [March 10, 2016] Local telephone competition: status as 506 of June 30, 2001. 2002. http://transitionfccgov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0202pdf [Internet]
22. Federal Communications Commission. [March 10, 2016] Local telephone competition: status as of June 30, 2010. 2011. http://transitionfccgov/Daily_Releases/Daily_Business/2011/db0321/DOC-305297A1pdf [Internet]
23. U.S. Census Bureau. Population estimates: state totals. 2015. [Available from: http://www.census.gov/popest/data/state/totals/2014/index.html
24. Woodruff RS. A simple method for approximating the variance of a complicated estimate. Journal of the American Statistical Association. 1971; 66(334):411–4.
25. Mccartt AT, Hellinga LA, Strouse LM, Farmer CM. Long-Term Effects of Handheld Cell Phone Laws on Driver Handheld Cell Phone Use. Traffic Injury Prevention. 2010; 11(2):133–41. [PubMed: 20373232]

26. Goodwin AH, O'Brien NP, Foss RD. Effect of North Carolina's restriction on teenage driver cell phone use two years after implementation. Accident Analysis & Prevention. 2012; 48(0):363–7. [PubMed: 22664702]
27. Lam LT. Distractions and the risk of car crash injury: The effect of drivers' age. Journal of Safety Research. 2002; 33(3):411–9. [PubMed: 12405001]
28. Neyens DM, Boyle LN. The effect of distractions on the crash types of teenage drivers. Accident Analysis & Prevention. 2007; 39(1):206–12. [PubMed: 16996017]
29. Strayer DL, Drew FA. Profiles in Driver Distraction: Effects of Cell Phone Conversations on Younger and Older Drivers. Human Factors: The Journal of the Human Factors and Ergonomics Society. 2004; 46(4):640–9.
30. Foss RD, Goodwin AH, Mccartt AT, Hellinga LA. Short-term effects of a teenage driver cell phone restriction. Accident Analysis & Prevention. 2009; 41(3):419–24. [PubMed: 19393787]
31. Houston DJ, Richardson LE Jr. Getting Americans to buckle up: The efficacy of state seat belt laws. Accident Analysis & Prevention. 2005; 37(6):1114–20. [PubMed: 16029869]
32. Rudisill TM, Zhu M. The association between states' texting regulations and the prevalence of texting while driving among U.S. high school students. Annals of Epidemiology. 25(12):888–93.
33. Hill L, Rybar J, Styer T, Fram E, Merchant G, Eastman A. Prevalence of and Attitudes About Distracted Driving in College Students. Traffic Injury Prevention. 2015; 16(4):362–7. [PubMed: 25133486]

APPENDICES

Table A.1

Handheld phone bans applicable to drivers of all ages that were effective in each state sampled in the 2008–2013 National Occupant Protection Use Survey, United States

State	Effective date	Amount of fine ($)
Alabama	NA	
Arkansas	NA	
California	07/01/08	20
Colorado	NA	
Connecticut	10/01/05	150
Florida	NA	
Georgia	NA	
Illinois[a]	NA	
Indiana	NA	
Kentucky	NA	
Maine	NA	
Maryland	10/01/10	0–40
Massachusetts	NA	
Michigan	NA	
Minnesota	NA	
Mississippi	NA	
Missouri	NA	
North Carolina	NA	
North Dakota	NA	
Nebraska	NA	

State	Effective date	Amount of fine ($)
Nevada	01/01/12	250
New Hampshire[a]	NA	
New Jersey	07/01/04	100–250
New Mexico	NA	
New York	11/01/01	100
Ohio	NA	
Oklahoma	NA	
Oregon	01/01/10	142
Pennsylvania	NA	
South Carolina	NA	
Texas	NA	
Utah	NA	
Washington	07/01/08	124
West Virginia	07/01/12	100
Wisconsin	NA	

Abbreviations: NA: not applicable; no universal ban exists

[a]Illinois and New Hampshire implemented handheld phone bans after 2013.

HIGHLIGHTS

- Universal handheld phone bans were associated with reduced cell phone conversation.
- Laws implemented > 1 year were associated with greater reduction in cell phone conversation among drivers.

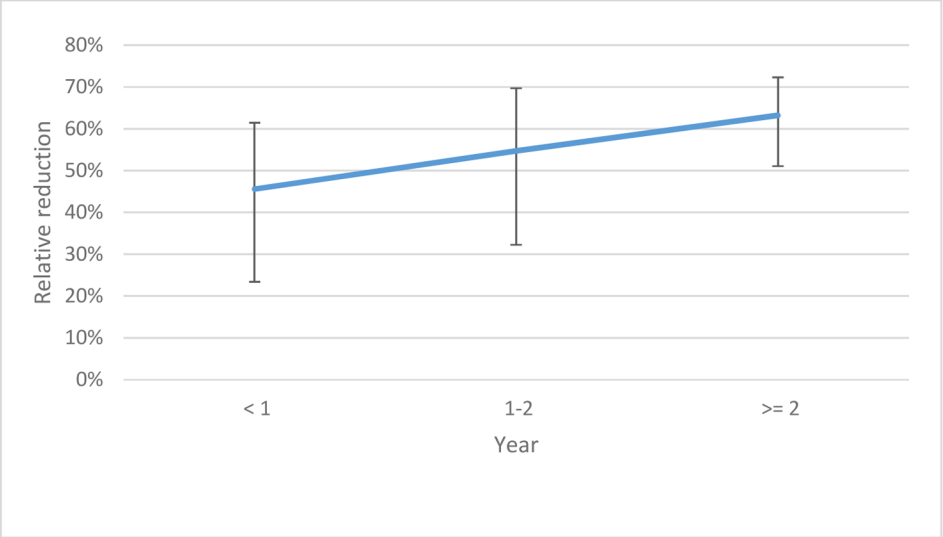

Figure 1.

Relative reduction in driver handheld phone conversation according to the length of time since legislation enactment

a: Error bar indicates 95% confidence interval.

Table 1

Characteristics of the roadside-observed young drivers by handheld phone conversation status[a]

Characteristic	Driver not holding phone to ears (N=30,495)	Driver holding phone to ears (N=2,289)
	N (%)[b]	N (%)
Sex		
Male	15,018 (50)	782 (34)
Female	15,477 (50)	1,507 (66)
Race		
White	23,731 (79)	1,812 (80)
Black	2,284 (7)	220 (9)
Other	4,480 (14)	257 (11)
Location		
Urban	5,995 (21)	497 (22)
Suburban	17,880 (55)	1,379 (58)
Rural	6,620 (24)	413 (19)
Seatbelt use		
Yes	25,082 (82)	1,835 (79)
No	5,413 (18)	454 (21)
Vehicle type		
Passenger car	19,830 (64)	1,146 (60)
Pick-up truck	3,650 (12)	253 (11)
Van & SUV	7,015 (24)	620 (29)
Cell phone subscriptions per 100 residents	88[c]	87
Handheld phone ban		
Yes	10,232 (30)	419 (15)
No	20,263 (70)	1,870 (85)
Length since implementation		
No law	20,263 (70)	1,870 (85)
< 1 year	1,811 (5)	93 (3)
1–2 years	2,177 (6)	93 (3)
≥ 2 years	6,244 (19)	233 (8)
Minimal state fine		
No law	20,263 (70)	1,870 (85)
< $100	6,094 (17)	264 (9)
≥ $100	4,138 (14)	155 (6)

[a] source: 2008–2013 National Occupant Protection Use Survey

[b] percentage is based on the weighted frequency. It may not add up to 100% due to rounding,

[c] the average of the number of cell phone subscribers per 100 residents

Table 2

Handheld phone conversation while driving among young drivers: results of logistic regression

Characteristic	Total (N)	Percent of holding phone to ear	Odds Ratio[a] (95 % Confidence Limit)
Sex			
Male	15,800	4.9	1.00 (Referent)
Female	16,984	8.9	1.89 (1.64, 2.18)
Race			
White	25,543	7.1	1.00 (Referent)
African American	2,504	8.7	1.24 (0.94, 1.65)
Other	4,737	5.4	0.75 (0.59, 0.94)
Location			
Urban	6,492	7.4	1.00 (Referent)
Suburban	19,259	7.4	1.01 (0.80, 1.26)
Rural	7,033	5.7	0.76 (0.56, 1.02)
Seatbelt			
No	5,867	7.9	1.00 (Referent)
Yes	26,917	6.8	0.85 (0.69, 1.05)
Vehicle type			
Passenger car	21,246	6.6	1.00 (Referent)
Pick-up truck	3,903	6.5	0.99 (0.82, 1.19)
Van or SUV	7,635	8.2	1.27 (1.08, 1.48)

Abbreviations: SUV, sport utility vehicle

[a]Prevalence ratios were calculated using logistic regression for complex surveys

Table 3

The association between handheld phone behaviors of the 2008–2013 NOPUS participants and state legislation

Characteristic	Total N	Percent of holding phone to ear	Crude Odds Ratio (95 % Confidence Limit) [a]	Adjusted Odds Ratio (95% Confidence Limit)[a]
Handheld phone ban				
No	22,133	8.4	1.00 (Referent)	1.00 (Referent)
Yes	10,651	3.6	0.41 (0.34, 0.50)	0.42 (0.33, 0.53)
Minimal state fine [b]				
< $100	6,358	4.1	1.00 (Referent)	1.00 (Referent)
≥ $100	4,293	3.1	0.74 (0.53, 1.03)	0.71 (0.51, 1.00)

[a] All crude and adjusted rate ratios were calculated using logistic regression for complex surveys; adjusted models were adjusted for sex, race, urbanicity of location, seatbelt use, vehicle type, and the number of cell phone subscriptions per 100 residents.

[b] The analyses were limited to participants that were regulated by a hand-held phone ban.