



Insurance Institute for
Highway Safety



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Research on rear-seat safety and primary-enforcement safety belt use laws

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The Insurance Institute for Highway Safety is a nonprofit research and communications organization that identifies ways to reduce deaths, injuries and property damage from crashes on our nation's roads. We are supported by auto insurers. Thank you for the opportunity to submit for the record research findings about restraint use in the rear seat and its effect on injury risk, as well as the role of primary enforcement of safety belt use laws in increasing belt use and reducing fatalities.

Rear seat restraint use and its effect on injury risk

In the event of a crash, the protection provided to occupants in the rear seat is different than the protection available to occupants in the front. In particular, for rear occupants in frontal crashes, there are no automatic restraints, such as airbags, that limit forward motion and reduce the crash energy experienced. In the rear seat, occupant protection in frontal crashes relies solely on the vehicle safety belt or an add-on child restraint, making it even more important that occupants buckle up.

The National Highway Traffic Safety Administration conducts a national observational survey on safety belt use each year among occupants 8 years and older. In that survey, observed restraint use in the rear has improved over time, increasing from 47 percent in 2004 to 75 percent in 2015.^{1,2} However, it remains consistently lower than front-seat restraint use (89 percent in 2015).

In a recent study by the Institute and the Children's Hospital of Philadelphia, we examined nationally representative data on tow-away crashes during 2007-12 with a focus on rear-seat occupants. Restraint use for occupants of all ages in the rear seat was 88 percent, but use varied significantly by age. Children up to age 4 had the highest rate of restraint use at 99 percent, primarily in child restraints, while adults ages 20-54 had the lowest rate at 70 percent.³

In that study, more than half of the serious injuries (58.8 percent) and deaths (55.4 percent) in the rear involved unrestrained occupants, even though most occupants were restrained. Unrestrained occupants in the rear were nearly 8 times as likely to suffer a serious injury compared with restrained occupants.

In addition to posing a risk to themselves, unrestrained rear-seat occupants increase the risk of fatal injury to other occupants in the vehicle.^{4,5} In a study of fatal crashes occurring during 2001-09, drivers were 2.37 times as likely to be fatally injured in crashes in which the left rear passenger was unrestrained compared with when the passenger was restrained.⁴ The risk of fatality increased with each additional unrestrained rear-seat occupant. There is evidence that unrestrained occupants also represent a risk to other occupants in the rear,⁵ although research on this is limited.

Passenger attitudes toward belt use in the rear seat

In a recent nationwide survey conducted by the Institute, nearly 30 percent of adult rear-seat passengers said they sometimes do not wear their safety belt in the rear seat, compared with only 9 percent who reported riding unbelted in the front seat.⁶ When people who said they are less likely to buckle up in the rear seat than in the front seat were asked for their reasons, the most common answers showed that belt use in the rear seat is not a priority. A quarter believed using a safety belt isn't necessary in the rear because it is safer than the front, and nearly 15 percent said they forget, aren't in the habit, or find it inconvenient. However, 73 percent said they would be more likely to buckle up if they knew the driver could get pulled over if they didn't.

Primary-enforcement safety belt use laws

Primary-enforcement safety belt use laws allow a police officer to stop and cite a motorist solely for not using a safety belt. In states with secondary enforcement, police can only enforce the law if the motorist has been pulled over for another violation first.

Today, 49 states and the District of Columbia have laws requiring front-seat occupants to buckle up; 35 of these laws allow primary enforcement, and 15 allow only secondary enforcement.⁷ Twenty-eight states and the District of Columbia have safety belt use laws covering all rear-seat occupants; 19 of these laws allow primary enforcement and 10 allow only secondary enforcement. Only four states, including Maryland, allow primary enforcement in the front seat but not the rear seat.

As summarized below, a large body of research has focused on the effects of primary-enforcement belt laws for front-seat occupants. In states with these laws, safety belt use rates are higher than in states with secondary-enforcement laws. As a result, crash deaths are reduced. Primary-enforcement belt use laws result in higher belt use rates because drivers believe they will be ticketed if they don't buckle up.

The most recent national observational survey conducted in 2016 shows that front-seat belt use rates averaged 92.1 percent in primary-enforcement states, compared with 83.0 percent in secondary states, a difference of 9 percentage points.⁸ A number of observational studies have shown that upgrading laws from secondary to primary enforcement boosts safety belt use. A study of six states showed that states that went from secondary to primary enforcement saw a median increase of 14 percentage points in observed front-seat belt use.⁹ Based on drivers' self-reports, the percentage who said they never buckle up was twice as high in states with secondary-enforcement laws than in states with primary-enforcement laws.¹⁰

The Institute's research has shown that upgrading safety belt use laws to primary enforcement also reduces traffic deaths.¹¹ Driver fatality rates during 1989-2003 in nine states (California, Georgia, Indiana, Louisiana, Maryland, Michigan, New Jersey, Oklahoma, and Washington) and the District of Columbia, where secondary enforcement laws were upgraded to primary enforcement, were compared with fatality rates in 14 states where the laws remained secondary during the same period. The annual rate of passenger vehicle driver deaths per mile of travel declined in both groups of states, but the decrease was bigger in the states that changed to primary enforcement. Taking into account the timing of the change in each state and other factors that could have affected crash rates, primary-enforcement laws were associated with a 7 percent reduction in death rates.

Thus, the evidence is strong that for front-seat occupants, safety belt use rates are higher and crash deaths are lower in states with primary-enforcement belt use laws. Fewer studies have looked at the effect of belt use laws on rear-seat occupants, but there is evidence that rear-seat safety belt use is higher in states with belt use laws that cover all rear-seat occupants than in states that cover only the front seat. Based on the studies of the effects of primary laws on front-seat belt use, it is logical to assume that laws that allow primary enforcement of rear-seat belt use will result in higher rear-seat belt use rates than laws that allow only secondary enforcement.

Safety belt use laws covering rear-seat occupants can have an important influence on belt use. Based on the national observational survey of front and rear safety belt use in 2015, belt use in rear

seats was higher in states with laws requiring belt use in all seating positions (83 percent) than in states requiring belt use only in the front seat (61 percent).² In a 2007 national telephone survey of people 16 and older, 69 percent of respondents who thought there was a safety belt use law that covered the rear seat said they always used their safety belt when riding in the rear, compared with only 48 percent of those who did not think there was a law or did not know.¹²

There is some evidence that primary enforcement can increase safety belt use in the rear seat even more. In a 2012 national survey of people 13 and older, 54 percent of respondents in states without a belt use law for the rear seat reported that they always use their safety belt in the rear seat, compared with 62 percent in states with a secondary-enforcement rear safety belt use law and 71 percent in states with a primary-enforcement rear safety belt use law.¹³ After adjusting for demographic factors, respondents in states with primary and secondary rear-seat laws were 23 percent more likely and 11 percent more likely, respectively, to report always using a belt in the rear seat, compared with those in states with no rear-seat belt use law.

Summary and conclusions

Safety belt use in the rear seat continues to lag safety belt use in the front, even though it is clear that belt use among rear-seat occupants substantially reduces their risk of serious injury as well as the risk of fatal injury to front-seat occupants.

There is strong evidence that primary-enforcement belt use laws have been effective in getting front-seat occupants to buckle up, thereby reducing crash deaths. Few studies have looked at the effects of belt use laws for rear-seat occupants, but evidence from observational studies shows that safety belt use is higher in states where laws cover rear-seat occupants. Self-report surveys suggest that extending primary enforcement to the rear will increase safety belt use there.

References

1. Pickrell, T.M. and Ye, T.J. 2010. Occupant restraint use in 2009: results from the National Occupant Protection Use Survey Controlled Intersection Study. Report no. DOT HS-811-414. Washington, DC: National Highway Traffic Safety Administration.
2. Pickrell, T.M.; Li, R. and KC, S. 2016. Occupant restraint use in 2015: results from the NOPUS Controlled Intersection Study. Report no. DOT HS-812-330. Washington, DC: National Highway Traffic Safety Administration.
3. Durbin, D.R.; Jermakian, J.S.; Kallan, M.J.; McCartt, A.T.; Arbogast, K.B.; Zonfrillo, M.R.; and Myers, R.K. 2015. Rear seat safety: variation in protection by occupant, crash and vehicle characteristics. *Accident Analysis and Prevention* 80:185-92.
4. Bose, D.; Arregui-Dalmases, C.; Sanchez-Molina, D.; Velazquez-Ameijide, J.; and Crandall, J. 2013. Increased risk of driver fatality due to unrestrained rear-seat passengers in severe frontal crashes. *Accident Analysis and Prevention* 53:100-04.
5. MacLennan, P.A.; McGwin, Jr., G.; Metzger, J.; Moran, S.G.; and Rue III, L.W. 2004. Risk of injury for occupants of motor vehicle collisions from unbelted occupants. *Injury Prevention* 10(6):363-7.
6. Jermakian, J.S. and Weast, R. 2017. Passenger attitudes toward and use of rear seat belts. *Manuscript in preparation*.
7. Insurance Institute for Highway Safety. 2017. Safety belt laws. Arlington, VA. Available: <http://www.iihs.org/iihs/topics/laws/safetybeltuse>. Accessed: March 3, 2017.

8. Pickrell, T.M. and Li, R. 2016. Traffic Safety Facts Research Note; Seat belt use in 2016 – overall results. Report no. DOT-HS-812-243. Washington, DC: National Highway Traffic Safety Administration.
9. Shults, R.A.; Elder, R.W.; Sleet, D.A.; and Thompson, R.S. 2004. Primary enforcement seat belt laws are effective even in the face of rising belt use rates. *Accident Analysis and Prevention* 36:491-93.
10. Beck, L.F and Shults, R.A. 2009. Seat belt use in states and territories with primary and secondary laws: United States, 2006. *Journal of Safety Research* 40:469-72.
11. Farmer, C.M. and Williams, A.F. 2005. Effect on fatality risk of changing from secondary to primary seat belt enforcement. *Journal of Safety Research* 36:189-94.
12. Boyle, J.M. and Lampkin, C. 2008. 2007 motor vehicle occupant safety survey. Volume 2. Seat belt report. Report no. DOT-HS-810-975. Washington, DC: U.S. Department of Transportation.
13. Bhat, G.; Beck, L.F.; Bergen, G.; and Kresnow, M. 2015. Predictors of rear seat belt use among U.S. adults, 2012. *Journal of Safety Research* 53:103-06.