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Special report from the CDC

Predictors of rear seat belt use among U.S. adults, 2012☆

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The Journal of Safety Research has partnered with the Office of the Associate Director for Science, Division of Unintentional Injury Prevention in the National Center for Injury Prevention & Control at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, USA, to briefly report on some of the latest findings in the research community. This report is the 36th in a series of CDC articles.

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ABSTRACT

Introduction: Seat belt use reduces the risk of injuries and fatalities among motor vehicle occupants in a crash, but belt use in rear seating positions is consistently lower than front seating positions. Knowledge is limited concerning factors associated with seat belt use among adult rear seat passengers. *Methods:* Data from the 2012 *ConsumerStyles* survey were used to calculate weighted percentages of self-reported rear seat belt use by demographic characteristics and type of rear seat belt use enforcement. Multivariable regression was used to calculate prevalence ratios for rear seat belt use, adjusting for person-, household- and geographic-level demographic variables as well as for type of seat belt law in place in the state. *Results:* Rear seat belt use varied by age, race, geographic region, metropolitan status, and type of enforcement. Multivariable regression showed that respondents living in states with primary (Adjusted Prevalence Ratio (APR): 1.23) and secondary (APR: 1.11) rear seat belt use enforcement laws were significantly more likely to report always wearing a seat belt in the rear seat compared with those living in a state with no rear seat belt use enforcement law. *Conclusions and practical applications:* Several factors were associated with self-reported seat belt use in rear seating positions. Evidence suggests that primary enforcement covering all seating positions is an effective intervention that can be employed to increase seat belt use and in turn prevent motor vehicle injuries to rear-seated occupants.

1. Introduction

Observational studies report that the use of seat belts in rear seating positions was at least 10 percentage points lower than front seat belt use every year from 2009 to 2012 (Pickrell, 2014). Among adult non-drivers (i.e., front-right seat passengers and rear seat passengers), those in rear seats represented 26% of deaths in 2012 (unpublished data, FARS data query 10/29/2014). Among rear seat occupants, seat belt use can reduce the risk for death by 60% (Zhu, Cummings, & Chu, 2007). Additionally, multiple studies have documented the increased risk of death (Bose, Arregui-Dalmases, Sanchez-Molina, Velazquez-Ameijide, & Crandall, 2013; Mayrose et al., 2005) or serious injury (Ichikawa, Nakahara, & Wakai, 2002) for restrained occupants when unrestrained rear seat occupants are also in the vehicle. For example, in fatal frontal crashes in the United States, the odds of driver death in the presence of unrestrained rear-seat occupants are more than double those in which rear-seat occupants are restrained (Bose et al., 2013).

Much of the existing literature on predictors of adult seat belt use focuses on seat belt wearing generally (without specifying a seating position) or relies on data sources (e.g., observational) that are limited in the breadth of individual-level data that can be collected (Beck, Shults, Mack, & Ryan, 2007; Pickrell, 2014; Strine et al., 2010). Therefore, the purpose of this study was to improve our understanding of predictors of seat belt use among adult rear seat passengers.

☆ Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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2. Methods

The data used in this study came from the summer wave of Porter Novelli's[1] 2012 *ConsumerStyles* database (Summer ConsumerStyles, 2012 Survey, 2012). The *ConsumerStyles* database is built annually from a series of web-based surveys that gather information about Americans, including information about their health-related attitudes and behaviors.

The Summer *ConsumerStyles* survey was fielded from June 19–July 3, 2012 to 4754 adults (18 years or older) and a supplemental sample of 1648 adults with children aged 12–17 who previously completed the spring wave and belong to GfK's KnowledgePanel[2]. A total of 4170 surveys were returned, for a response rate of 65%.

The data were weighted to match the U.S. Current Population Survey proportions for sex, age, household income, race/ethnicity, household size, education level, census region, metropolitan status, and whether or not a respondent had internet access prior to joining the panel. Weights were then scaled back to reflect the sample size of the study (ConsumerStyles, 2012 Methodology, 2012).

The CDC licensed the results of the 2012 Summer *ConsumerStyles* survey post-collection from Porter Novelli, and analysis of these data was exempt from institutional review board approval because personal identifiers were not included in the data file.

Survey respondents were asked how often they wear seat belts when riding in the back seat of a car, truck, van, or sport utility vehicle. We combined response categories of 'nearly always,' 'sometimes,' 'seldom,' and 'never,' into a single 'less than always' category and compared with 'always' for the purposes of our analyses. Respondents who reported never riding in the back seat were excluded from all analyses ($n = 217$). For each state in 2012, we used data from the Insurance Institute for Highway Safety (IIHS) to determine whether there was a rear seat belt law for adults, and if there was a law, whether it was a primary (allows law enforcement to ticket a driver or passenger for not wearing a seat belt without any other traffic offense taking place) or secondary law (law enforcement may only ticket for not wearing a seat belt when there is another citable traffic violation).

Crude analyses examined associations between demographic characteristics and type of rear seat belt use enforcement with always wearing a seat belt when riding in the rear seat. Demographic characteristics examined included gender, age, race/ethnicity (categorized mutually exclusively as white, black, Hispanic, or other [American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, or multiracial]), education, marital status, household income, census region, and metropolitan status of the respondent's residence (categorized as metropolitan or non-metropolitan using the U.S. Census Bureau standards [Zients, 2013]). Type of rear seat belt use enforcement was categorized as primary law, secondary law, or no law. Weighted percentages, 95% confidence intervals (CI), and chi-square test for categorical variables or Cochran–Armitage trend test for categorical variables that had potential linear trend were calculated for seat belt use in the rear seat. Multivariable regression was performed using the log-binomial model with the Log link function to calculate the prevalence ratios and 95% CIs for always wearing a seat belt when riding in the rear seat, adjusting for demographic variables as well as type of rear seat belt use enforcement. Results with p-value < 0.05 were considered statistically significant. All analyses were completed using Statistical Analysis Software (SAS) version 9.3 (SAS Institute, Inc., Cary, North Carolina).

3. Results

In 2012, 62% of respondents reported always wearing a seat belt when riding in the rear seat (Table 1). Respondents living in the West were significantly more likely to report always wearing a seat belt (75%) compared with those living in the Northeast, Midwest, and South (52%, 58%, 60%, respectively [$p < 0.01$]). In 2012, 16 states and the District of Columbia had primary rear seat belt use enforcement, 10 states had secondary rear seat belt use enforcement, and 24 states had no rear seat belt use enforcement. Respondents living in states with a primary seat belt law covering rear seat occupants were significantly more likely to report always wearing a seat belt (71%) compared with those living in states with secondary (62%) or no law (54%) for rear seat passengers ($p < 0.01$). Respondents in secondary law states were also significantly more likely to report seat belt use compared with those living in states with no law ($p < 0.05$).

When all predictors were included in the multivariable model (Table 2), respondents aged 18–24 years were 9% more likely to report always wearing a seat belt than those aged 25–44 ($p < 0.05$) when controlling for other variables. Respondents aged 45–64 years and 65 years and over were 14% and 16% more likely, respectively, to report always wearing a seat belt in the rear seat than those aged 25–44 years. Respondents living in metropolitan areas were 11% more likely to report always wearing a seat belt in the rear seat, compared with those living in non-metropolitan areas. Respondents living in the West were 25% more likely to report always wearing a seat belt in the rear seat than those living in the Midwest or Northeast and almost 20% more likely to report always wearing a seat belt than those living in the South. Respondents in states with primary and secondary rear seat belt use laws were 23% and 11% more likely, respectively, to report always wearing a seat belt in the rear seat than those living in a state with no rear seat belt use law (Table 2).

4. Discussion

We found that only 62% of adults reported always wearing their seat belts when riding in a rear seat. Although studies have shown restraint use in both front and rear seating positions have increased over time, belt use in rear seats remains lower than in other seating positions (Boyle & Lampkin, 2008; Pickrell, 2014; Trowbridge & Kent, 2009). For example, observed front seat belt use was 86% in 2012 compared with 75% for rear seat occupants aged 8 years and older (Pickrell, 2014). The lower use may be because of perceptions that the rear seat is safer compared with other seating positions. While the rear seat was previously reported safer than the front seat in older model vehicles (Mayrose & Priya, 2008; Smith & Cummings, 2004), several vehicle safety improvements introduced since 1997 have changed the relative protection for rear versus front seating positions, making the front seat safer than the rear seat for belted occupants over 15 years of age (Bilston, Du, & Brown, 2010). However, restrained children aged 9–15 are still at lower risk for serious injury or fatality when sitting in the rear seat (Bilston et al., 2010).

This study found that primary rear seat belt use laws are strongly associated with rear seat belt use, echoing results from studies of overall seat belt use and primary law enforcement (Beck & Shults, 2009; Beck et al., 2007). In 2012, only 40% of the U.S. adult population was covered by a primary rear seat belt use enforcement law (U.S. Census Bureau). Our crude analysis showed that presence of a primary law was significantly associated with

[1] Porter Novelli Public Services is a public relations firm with offices in Washington, DC.

[2] GfK's KnowledgePanel members are randomly recruited using probability-based sampling and include respondents regardless of whether or not they have landline phones or Internet access. If needed, households are provided with a laptop computer and access to the Internet. The panel is continuously replenished and maintains approximately 50,000 panelists.