

# Safety Belt Laws and Disparities in Safety Belt Use Among US High-School Drivers

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Motor vehicle crashes are the leading cause of death and acquired disability for teenagers in the United States,<sup>1</sup> and lack of safety belt use is a major contributing factor for injury.<sup>2,3</sup> Strong evidence indicates that safety belt laws are among the most important interventions in increasing safety belt use.<sup>4</sup>

Safety belt laws have been enacted by states since 1984 and vary in the nature of their provisions.<sup>5</sup> In 2006, only 25 states and the District of Columbia had primary enforcement laws in effect: nonuse of a safety belt was considered a primary offense, and the law permitted police to stop motorists solely for not using a safety belt. The remaining 24 states with safety belt laws considered nonuse of a safety belt a secondary offense and permitted police to issue a ticket for belt nonuse only if the vehicle was stopped for another offense, such as speeding. New Hampshire was the only state with no safety belt law. As of March 2012, 17 US states still have secondary safety belt laws in effect, and New Hampshire still has no safety belt law at all.<sup>6</sup> Previous research has shown that primary safety belt laws are associated with higher safety belt use and lower crash-related injuries and mortality in the general population as compared with secondary laws.<sup>7-17</sup>

Few studies have examined the effect of primary versus secondary enforcement safety belt laws on belt use behavior and injury outcomes in teenagers. Such a specific study is warranted because of the lack of studies on the association between graduated driver licensing stages and safety belt use in the United States, and effective policies might be needed to increase use. Previous studies have reported higher belt use by teenaged passengers in primary than in secondary enforcement states,<sup>18-20</sup> but no studies have examined the association in novice teenaged drivers. Self-reported safety belt use increased between 1986 and 2000 among high-school 12th grade students in states with secondarily enforced

**Objectives.** We compared reported safety belt use, for both drivers and passengers, among teenagers with learner's permits, provisional licenses, and unrestricted licenses in states with primary or secondary enforcement of safety belt laws.

**Methods.** Our data source was the 2006 National Young Driver Survey, which included a national representative sample of 3126 high-school drivers. We used multivariate, log-linear regression analyses to assess associations between safety belt laws and belt use.

**Results.** Teenaged drivers were 12% less likely to wear a safety belt as drivers and 15% less likely to wear one as passengers in states with a secondary safety belt law than in states with a primary law. The apparent reduction in belt use among teenagers as they progressed from learner to unrestricted license holder occurred in only secondary enforcement states. Groups reporting particularly low use included African American drivers, rural residents, academically challenged students, and those driving pickup trucks.

**Conclusions.** The results provided further evidence for enactment of primary enforcement provisions in safety belt laws because primary laws are associated with higher safety belt use rates and lower crash-related injuries and mortality. (*Am J Public Health.* 2012;102:1128-1134. doi:10.2105/AJPH.2011.300493)

safety belt laws.<sup>21</sup> In addition, mandatory safety belt laws adopted by US states between 1991 and 2005 have been associated with lower deaths and serious injuries and higher safety belt use among high-school students when riding as passengers.<sup>19</sup>

The current study extended this line of research by establishing the association between safety belt law provisions and both teenaged passengers and teenaged drivers. It is particularly important to know how the prevalence of safety belt use among teenagers varies as they progress through the licensing process, from learners—who are supervised at all times by adults in the vehicles—to unrestricted, fully licensed drivers, and how this is associated with the enforcement status of state safety belt laws. Because teenaged drivers are most likely to crash in the first months after licensure,<sup>22,23</sup> wearing safety belts at the time of the crash is of great importance to reduce the severity or incidence of injury.

Because reported safety belt use is higher among drivers than among passengers,<sup>24-28</sup> the aim of this study was to compare reported safety

belt use, both as drivers and as passengers, among novice teenaged learners and among provisional and unrestricted teenaged drivers in primary versus secondary enforcement states.

## METHODS

The data source was the National Young Driver Survey (NYDS), carried out through a paper-and-pencil questionnaire among a nationally representative sample of 5665 students in 9th, 10th, and 11th grade who were attending 19 873 US public high schools in 2006. The NYDS was conducted in 68 randomly selected high schools in 34 states during spring 2006 to provide national estimates of the driving experience of teenagers in public high schools in the United States. Details of the teenager-centered survey methods and cluster-randomized sample design have been published previously.<sup>29</sup>

## Variable Definitions

For this study, the NYDS sample of 5665 respondents was limited to the 3126

respondents who described themselves as drivers by answering the following 2 questions: (1) “Which of the following statements best describe your experience with driving? Mark only one.” (“I do not drive yet”; “I am learning to drive”; or “I drive on my own”) and (2) “Which of the following statements best describes the driving license you have right now?” (“I am only supposed to drive to school and back,” referring to those with a “hardship license” available in a minority of US states designed to permit 14- and 15-year-old rural teenagers to drive to and from school; “I am only supposed to drive with an adult,” referring to those with a learner’s permit, which is typically held for 6–12 months while the teenager learns to drive under adult supervision; “I can drive on my own, but I am not supposed to drive under some conditions, like not late at night or not with passengers,” referring to those with a provisional license, which is typically held for a period of 6–12 months after passing the behind-the-wheel driving test; or “I can drive on my own with no conditions,” referring to those with a full, unrestricted license). We analyzed driver’s license status by constructing a 3-level categorical variable (learner’s permit; provisional license; unrestricted license), with “hardship license” and “provisional license” grouped into the “provisional license” category.

The primary outcomes of interest for the analyses were the self-reported prevalences of driver and passenger safety belt use. Students were instructed to answer 2 questions on safety belt use: (1) “Please mark how often the following statement is true for you: ‘I wear my seat belt when I drive.’” and (2) “How often do you wear your seat belt when you are a passenger?” Response categories for these questions were “rarely or never,” “sometimes or occasionally,” and “often or always.” Driver and passenger safety belt use were dichotomized for analysis (often/always vs less than often/always).

States were classified as having primary or secondary enforcement safety belt laws according to their status as of 2006.<sup>6</sup> In the 34 states in which the NYDS was carried out, 17 had a primary enforcement law and 17 had a secondary enforcement law.

Other factors related to seat belt use among teenaged drivers examined included age, sex,

race/ethnicity, socioeconomic level, vehicle type, grade point average, and urbanicity. Urbanicity and socioeconomic status were defined at the school level. Urbanicity was categorized by using a population census-based classification developed by the National Center for Education Statistics<sup>30</sup> to classify schools according to their proximity to an urbanized area and was dichotomized into urban/suburban (large- or medium-size city and its urban fringe) versus rural/small town for analyses. Schools with proportions of students receiving subsidized lunch or breakfast that were higher than the median for the entire sample were classified as lower socioeconomic level, whereas schools with proportions lower than the median were classified as higher socioeconomic level. Students self-reported their school grade level (“What grade are you in: 9th, 10th, 11th?”); sex (“Are you male or female?”); race/ethnicity (“Which of the following best describe you: White, Black or African American, Hispanic or Latino, Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, and other?”; the last 4 categories were collapsed and formed the “other” category in the analyses); academic grades (“In the past 12 months, how would you describe your grades in school: mostly A’s, mostly B’s, mostly C’s, mostly D’s, mostly F’s, none of these grades, not sure?”); and vehicle type (“What type of vehicle do you drive most often: car, SUV [sport utility vehicle], minivan, pickup truck, or motorcycle?”; motorcycle drivers were excluded from the analyses).

### Statistical Analysis

We calculated estimates of the prevalence (with 95% confidence intervals [CIs]) of driver and passenger safety belt use for the total high-school study population as well as separately for primary and secondary enforcement safety belt law states. The distribution of the sociodemographic characteristics of the population by type of law was assessed with a robust  $\chi^2$  test of association. We assessed differences in unadjusted prevalence of driver and passenger safety belt use between primary and secondary law states for each selected sociodemographic subgroup with Cochran-Mantel-Haenszel tests of association for safety belt use and type of law stratified by sociodemographic characteristics.

To assess the independent association of selected characteristics with safety belt use while driving and while riding as a passenger, we used separate multivariate log-linear regression models to estimate adjusted prevalence ratios with corresponding 95% CIs for the total teenaged sample. Several of the enforcement law by sociodemographic interaction terms were significant ( $P < .05$ ) in log-binary regression models; therefore, the models were stratified by type of safety belt law. We used a robust variance estimator: implicit Taylor series linearization, which used generalized estimating equations with a sandwich estimator. Survey data were weighted to reflect different probabilities of selection and to adjust for nonresponse. Analyses were performed with SUDAAN 10.0 (Research Triangle Institute, Research Triangle Park, NC).

## RESULTS

Slightly more than half of the teenaged drivers studied (55%) resided in a state with a secondary enforcement safety belt law. The characteristics of the teenaged driver sample in primary enforcement states resembled those in secondary enforcement states other than having a larger predominance of 10th and 11th grade students in the secondary law states (results not shown).

Tables 1 and 2 present the weighted prevalence of reported safety belt use as a driver and as a passenger, respectively, according to state law (primary vs secondary enforcement) and other characteristics. For the population as a whole, 8 of 10 US high-school students who drove (81.5%; 95% CI = 77.0%, 85.2%) self-reported that they often/always wore a safety belt as a driver, whereas 5.8% (95% CI = 4.3%, 7.8%) reported rarely/never doing so. However, only 2 of 3 students (68.9%; 95% CI = 64.5%, 72.9%) reported often/always wearing a safety belt as passengers, and 1 in 10 (10.0%; 95% CI = 8.0%, 12.4%) reported rarely/never doing so.

Reported driver safety belt use was 8.2% lower in secondary law states (77.8%; 95% CI = 70.0%, 84.0%) than in primary law states (86.0%; 95% CI = 82.7%, 88.7%). Passenger safety belt use was lower than driver safety belt use in both primary and secondary enforcement states, with a similar difference (8.8%)

**TABLE 1—Weighted Prevalence of Often/Always Wearing a Safety Belt as a Driver, by Type of State Safety Belt Law and Selected Characteristics: United States, National Young Driver Survey, 2006**

Characteristic	Total, %	Primary Law States, %	Secondary Law States, %	Prevalence Difference <sup>a</sup>	P
Total	81.5	86.0	77.8	8.2	.021
Grade					
9th	80.6	85.8	73.6	12.2	.046
10th	84.5	87.7	82.2	5.5	.143
11th	79.1	84.5	75.0	9.5	.083
Sex					
Female	85.8	90.0	82.2	7.8	.034
Male	77.7	82.3	74.1	8.2	.055
Race/ethnicity					
African American	68.6	76.1	58.2	17.9	.032
Latino/Hispanic	83.6	87.1	79.2	7.9	.235
Other	85.5	93.8	76.3	17.5	.003
White	82.9	87.3	79.8	7.5	.04
Urbanicity					
Urban/suburban	87.8	88.2	87.5	0.7	.82
Rural/town	76.0	84.5	68.0	16.5	.006
Driver's license					
Learner's permit	87.8	88.5	87.1	1.4	.588
Provisional license	80.3	85.6	74.3	11.3	.023
Unrestricted license	74.0	82.1	69.1	13.0	.046
Academic grades					
A's and B's	85.5	89.3	82.5	6.8	.073
C's	73.0	79.8	67.8	12.0	.025
D's and F's	53.5	69.2	41.2	28.0	.053
Socioeconomic level school					
Higher	84.5	85.9	83.7	2.2	.657
Lower	78.3	86.5	66.8	19.7	.001
Vehicle type					
Car	83.3	87.3	79.9	7.4	.032
SUV	85.9	93.0	80.2	12.8	.008
Minivan	93.5	91.7	94.5	-2.8	.578
Pickup truck	65.9	72.0	60.8	11.2	.052

Note. SUV = sport utility vehicle. For the total sample (unweighted frequencies), n = 3126; for the primary law states (unweighted frequencies), n = 1517; and for the secondary law states (unweighted frequencies), n = 1609. Surveyed states with primary enforcement safety belt laws: AL, CA, CT, GA, HI, IA, IL, IN, LA, MI, NC, NJ, NM, OR, SC, TN, and TX. Surveyed states with secondary enforcement safety belt laws: AZ, CO, FL, ID, MA, MN, MO, MS, MT, NE, NV, OH, PA, UT, VA, VT, and WI.  
<sup>a</sup>The difference between the prevalence in primary law states and the prevalence in secondary law states.

between secondary law states (64.9%; 95% CI = 57.4%, 71.7%) and primary law states (73.7%; 95% CI = 70.1%, 77.1%).

The lowest prevalence of driver safety belt use was reported in secondary law states among drivers with D or F grades (41.2%), those driving a pickup truck (60.8%), and African American students (58.2%). Among teenagers residing in secondary enforcement

states, only those having a learner's permit, living in urban or suburban areas, attending higher socioeconomic level schools, and driving minivans had at least 84% prevalence of often/always wearing a safety belt when driving.

The lowest prevalence of passenger safety belt use was reported in secondary law states among drivers with D or F grades (32.9%), those driving a pickup truck (49.1%), and

African American students (37.9%). Among teenagers residing in secondary enforcement states, only those living in urban or suburban areas, attending higher socioeconomic level schools, and driving minivans had at least 74% prevalence of often/always wearing a safety belt when riding as a passenger.

Teenaged drivers with a learner's permit reported similar safety belt use in primary (88.5%) and secondary (87.1%) enforcement states. Although significant declines in safety belt use were reported among provisional and unrestricted licensees in secondary enforcement states, belt use remained relatively high in primary enforcement states and did not vary significantly across the stages of licensure. Drivers with a learner's permit reported similar safety belt use as passengers in both primary (74.1%) and secondary law states (69.7%). Belt use by passengers did not vary significantly by license status in primary enforcement states but was significantly lower for unrestricted license holders in secondary enforcement states.

For several other sociodemographic subgroups, the degree of disparity in reported safety belt use by subgroup categories was more pronounced in secondary than in primary enforcement states. For example, African American students were least likely to report often/always wearing a safety belt in both primary and secondary law states, but the rate of reported often/always using the safety belt as either a driver or a passenger was significantly lower for African American students compared with White students in secondary than in primary law states.

Tables 3 and 4 show adjusted prevalence ratios for the independent association between selected characteristics and safety belt use in the total population. Safety belt law status emerged as an independent factor associated with safety belt use as a driver and a passenger: the adjusted prevalence of driver and passenger safety belt use was lower in states with a secondary safety belt law than in states with a primary law (driver: prevalence ratio = 0.88; 95% CI = 0.82, 0.96; passenger: prevalence ratio = 0.85; 95% CI = 0.76, 0.94), after we controlled for grade, sex, race/ethnicity, urbanicity, academic grade, school socioeconomic level, driver's license, and vehicle type. Other factors independently associated with lower

**TABLE 2—Weighted Prevalence of Often/Always Wearing a Safety Belt as a Passenger, by Type of State Safety Belt Law and Selected Characteristics: United States, National Young Driver Survey, 2006**

Characteristic	Total, %	Primary Law States, %	Secondary Law States, %	Prevalence Difference <sup>a</sup>	P
Total	68.9	73.7	64.9	8.8	.024
Grade					
9th	68.7	71.6	65.0	6.6	.31
10th	68.9	74.0	65.3	8.7	.047
11th	68.8	74.7	64.5	10.2	.065
Sex					
Female	75.0	79.4	71.3	8.1	.091
Male	63.5	68.5	59.6	8.9	.028
Race/ethnicity					
African American	50.8	60.3	37.9	22.4	.018
Latino/Hispanic	67.3	75.5	57.2	18.3	.023
Other	76.4	85.5	66.3	19.2	.003
White	71.3	75.3	68.6	6.7	.101
Urbanicity					
Urban/suburban	74.6	75.4	74.1	1.3	.732
Rural/town	64.0	72.8	55.6	17.2	.006
Driver's license					
Learner's permit	71.8	74.1	69.7	4.4	.298
Provisional license	69.3	73.7	64.6	9.1	.089
Unrestricted license	64.7	73.2	59.6	13.6	.048
Academic grades					
A's and B's	73.8	78.5	70.1	8.4	.04
C's	58.6	65.5	53.3	12.2	.081
D's and F's	39.8	48.8	32.9	15.9	.251
Socioeconomic level school					
Higher	73.8	74.0	73.8	0.2	.96
Lower	64.1	74.1	50.4	23.7	.001
Vehicle type					
Car	70.8	75.3	66.9	8.4	.045
SUV	70.7	78.1	64.9	13.2	.016
Minivan	83.0	80.0	84.9	-4.9	.546
Pickup truck	54.7	61.6	49.1	12.5	.042

Note. SUV = sport utility vehicle. For the total sample (unweighted frequencies), n = 3126; for the primary law states (unweighted frequencies), n = 1517; and for the secondary law states (unweighted frequencies), n = 1609. Surveyed states with primary enforcement safety belt laws: AL, CA, CT, GA, HI, IA, IL, IN, LA, MI, NC, NJ, NM, OR, SC, TN, and TX. Surveyed states with secondary enforcement safety belt laws: AZ, CO, FL, ID, MA, MN, MO, MS, MT, NE, NV, OH, PA, UT, VA, VT, and WI.  
<sup>a</sup>The difference between the prevalence in primary law states and the prevalence in secondary law states.

safety belt use included sex, race/ethnicity, academic grade, and vehicle type driven.

## DISCUSSION

US high-school students were 12% less likely to report often/always wearing a safety belt as drivers and 15% less likely to report

wearing one as passengers in states with a secondary enforcement safety belt law than in states with a primary law. Groups reporting particularly low use included African American students, rural residents, academically challenged students, and those driving pickup trucks.

The combined association of state law and driver's license status with safety belt use was

notable. After we controlled for sociodemographic and driving factors, we found that drivers with provisional or unrestricted licenses residing in secondary, but not primary, law states were less likely than drivers with learner's permits to use a safety belt while driving. Our findings indicate that the apparent reduction in safety belt use observed among teenagers as they progress through the licensing process (from learner's permit to provisional license to unrestricted license) might be mitigated in states with a primary provision.

To our knowledge, prevalence estimates and sociodemographic differences in driver and passenger safety belt use by type of safety belt law enforcement and driver licensure stage among high-school students have not been previously reported. Our results suggested that secondary enforcement safety belt laws are associated with more variability in driver and passenger safety belt use among several teenaged subgroups: rural teenagers, those attending lower socioeconomic level schools, lower-achieving students, and those holding an unrestricted driver's license and, to a lesser extent, those with a provisional driver's license. Academically challenged students had the lowest rate of safety belt use. Our finding that this subgroup reported lower prevalence in secondary enforcement states by 28% when compared with those in primary enforcement states, and the fact that the characteristics of the population in primary enforcement states were similar to those in secondary enforcement states, seems to suggest that conversion to primary enforcement laws could lead to higher levels of safety belt use among this subgroup.

In addition, our study results concur with those of previous studies that reported lower safety belt use among the African American general population in secondary compared with primary enforcement safety belt law states<sup>31-38</sup> and extend this finding to the teenaged African American population. In particular, we documented lower driver and passenger safety belt use among African American teenagers in secondary than in primary enforcement safety belt law states. However, we also determined that even when we controlled for law status, African American race was an independent predictor of safety belt use. These results seem to suggest that higher safety belt use might be achieved among

**TABLE 3—Adjusted Prevalence Ratios for Reporting Often/Always Wearing Safety Belt as a Driver, by Type of State Safety Belt Law: United States, National Young Driver Survey, 2006**

Characteristic	All States, Adjusted Prevalence Ratio (95% CI)	Primary Law States, Adjusted Prevalence Ratio (95% CI)	Secondary Law States, Adjusted Prevalence Ratio (95% CI)
<b>Law</b>			
Secondary	0.88 (0.82, 0.96)	...	...
Primary (Ref)	1.00	...	...
<b>Grade</b>			
9th	0.95 (0.87, 1.04)	1.00 (0.89, 1.12)	0.92 (0.80, 1.05)
10th	0.99 (0.93, 1.06)	1.01 (0.91, 1.10)	0.97 (0.89, 1.07)
11th (Ref)	1.00	1.00	1.00
<b>Sex</b>			
Male	0.95 (0.91, 0.99)	0.97 (0.92, 1.02)	0.93 (0.86, 1.00)
Female (Ref)	1.00	1.00	1.00
<b>Race/ethnicity</b>			
African American	0.82 (0.74, 0.90)	0.87 (0.80, 0.96)	0.78 (0.65, 0.94)
Latino/Hispanic	1.01 (0.92, 1.11)	1.02 (0.95, 1.10)	1.00 (0.81, 1.23)
Other	1.01 (0.95, 1.08)	1.08 (1.01, 1.14)	0.94 (0.85, 1.04)
White (Ref)	1.00	1.00	1.00
<b>Urbanicity</b>			
Rural/town	0.93 (0.83, 1.04)	0.96 (0.90, 1.03)	0.90 (0.75, 1.07)
Urban/suburban (Ref)	1.00	1.00	1.00
<b>Driver's license</b>			
Unrestricted license	0.83 (0.77, 0.90)	0.92 (0.84, 1.02)	0.78 (0.71, 0.87)
Provisional license	0.91 (0.85, 0.96)	0.95 (0.89, 1.03)	0.89 (0.82, 0.96)
Learner's permit (Ref)	1.00	1.00	1.00
<b>Academic grades</b>			
D's and F's	0.65 (0.51, 0.83)	0.79 (0.61, 1.02)	0.52 (0.35, 0.76)
C's	0.88 (0.82, 0.94)	0.91 (0.84, 0.98)	0.85 (0.77, 0.94)
A's and B's (Ref)	1.00	1.00	1.00
<b>Socioeconomic level school</b>			
Lower	0.95 (0.85, 1.06)	1.03 (0.95, 1.10)	0.88 (0.73, 1.05)
Higher (Ref)	1.00	1.00	1.00
<b>Vehicle type</b>			
Pickup truck	0.79 (0.73, 0.86)	0.79 (0.72, 0.87)	0.81 (0.70, 0.93)
Minivan	1.03 (0.98, 1.08)	0.99 (0.89, 1.09)	1.04 (0.97, 1.10)
SUV	1.00 (0.95, 1.06)	1.04 (0.99, 1.09)	0.97 (0.89, 1.06)
Car (Ref)	1.00	1.00	1.00

Note. CI = confidence interval; SUV = sport utility vehicle. For the total sample (unweighted frequencies),  $n = 3126$ ; for the primary law states (unweighted frequencies),  $n = 1517$ ; and for the secondary law states (unweighted frequencies),  $n = 1609$ . Surveyed states with primary enforcement safety belt laws: AL, CA, CT, GA, HI, IA, IL, IN, LA, MI, NC, NJ, NM, OR, SC, TN, and TX. Surveyed states with secondary enforcement safety belt laws: AZ, CO, FL, ID, MA, MN, MO, MS, MT, NE, NV, OH, PA, UT, VA, VT, and WI.

African American teenagers and others with lower safety belt use by upgrading safety belt laws combined with other strategies.<sup>39,40</sup> Peer-led campaigns have shown some benefit in improving safety belt use among high-school teenagers (e.g., Minnesota's Drive Smart

Challenge).<sup>41</sup> In addition, high visibility enforcement programs, known to be effective in general populations, are being adapted to teenaged populations with some benefit in safety belt use (e.g., Utah's Teen Click It or Ticket program).<sup>42</sup>

It is well known that primary enforcement laws are associated with higher safety belt use rates. In understanding this association, we must consider 3 levels of influence: intrapersonal, interpersonal, and community.<sup>43</sup> Because primary enforcement allows for easier and stricter enforcement of the law, and primary laws lead to a more accurate knowledge of the law,<sup>44</sup> enactment of primary laws will likely lead to more enforcement of the law, an increased awareness of the law, and a perception of more enforcement,<sup>45</sup> which result in increased safety belt use. In addition, behavioral theory of reasoned action and previous empirical results indicate that intention to wear a safety belt, attitude toward wearing it, subjective norms regarding safety belts, normative pressure from friends and family to wear safety belts, and favorability toward primary enforcement safety belt laws can also contribute to higher safety belt use.<sup>46</sup>

### Limitations

Our findings may not be generalizable beyond US public school students in 9th to 11th grade choosing to participate in the study. The NYDS sample was nationally representative, but this does not necessarily make the sample representative of primary and secondary enforcement states. However, the NYDS sample covered an equal proportion (68%) of states with and without primary enforcement safety belt law provisions. The survey also may not reflect safety belt use and driving behaviors among students attending private schools and those who have dropped out or were absent. The NYDS data were cross-sectional, and causality between safety belt use, license status, and sociodemographic characteristics cannot be inferred. The study relied on self-reported data and, therefore, was subject to potential reporting bias. Our assessment of reported safety belt use was limited to 3 possible answers: (1) rarely/never, (2) sometimes/occasionally, and (3) often/always. Compared with other studies that used a 5-point Likert scale, we may have overestimated the prevalence of safety belt use by including those who often buckle up with those who always buckle up. Because awareness of the presence of any safety belt law may be higher in primary enforcement states, we cannot rule out the possibility that self-reported safety belt use was

**TABLE 4—Adjusted Prevalence Ratios for Reporting Often/Always Wearing Safety Belt as a Passenger, by Type of State Safety Belt Law: United States, National Young Driver Survey, 2006**

Characteristic	All States, Adjusted Prevalence Ratio (95% CI)	Primary Law States, Adjusted Prevalence Ratio (95% CI)	Secondary Law States, Adjusted Prevalence Ratio (95% CI)
<b>Law</b>			
Secondary	0.85 (0.76, 0.94)	...	...
Primary (Ref)	1.00	...	...
<b>Grade</b>			
9th	0.99 (0.88, 1.10)	0.99 (0.85, 1.16)	1.00 (0.86, 1.17)
10th	0.96 (0.88, 1.05)	0.97 (0.85, 1.10)	0.94 (0.83, 1.06)
11th (Ref)	1.00	1.00	1.00
<b>Sex</b>			
Male	0.89 (0.84, 0.95)	0.92 (0.86, 0.98)	0.87 (0.81, 0.93)
Female (Ref)	1.00	1.00	1.00
<b>Race/ethnicity</b>			
African American	0.73 (0.62, 0.85)	0.82 (0.72, 0.93)	0.64 (0.47, 0.89)
Latino/Hispanic	0.94 (0.82, 1.08)	1.05 (0.93, 1.19)	0.79 (0.56, 1.11)
Other	1.01 (0.92, 1.12)	1.11 (1.01, 1.22)	0.90 (0.78, 1.05)
White (Ref)	1.00	1.00	1.00
<b>Urbanicity</b>			
Rural/town	0.92 (0.81, 1.04)	0.94 (0.86, 1.02)	0.88 (0.74, 1.04)
Urban/suburban (Ref)	1.00	1.00	1.00
<b>Driver's license</b>			
Unrestricted license	0.89 (0.80, 0.98)	0.97 (0.86, 1.11)	0.84 (0.73, 0.96)
Provisional license	0.95 (0.88, 1.04)	0.99 (0.89, 1.09)	0.97 (0.86, 1.08)
Learner's permit (Ref)	1.00	1.00	1.00
<b>Academic grades</b>			
D's and F's	0.61 (0.46, 0.82)	0.65 (0.45, 0.95)	0.58 (0.37, 0.92)
C's	0.83 (0.74, 0.94)	0.86 (0.71, 1.02)	0.81 (0.69, 0.96)
A's and B's (Ref)	1.00	1.00	1.00
<b>Socioeconomic level school</b>			
Lower	0.90 (0.80, 1.02)	1.05 (0.96, 1.15)	0.77 (0.63, 0.92)
Higher (Ref)	1.00	1.00	1.00
<b>Vehicle type</b>			
Pickup truck	0.81 (0.73, 0.90)	0.82 (0.70, 0.96)	0.83 (0.72, 0.95)
Minivan	1.07 (0.98, 1.17)	1.02 (0.92, 1.12)	1.07 (0.94, 1.20)
SUV	0.98 (0.91, 1.06)	1.01 (0.92, 1.12)	0.96 (0.86, 1.07)
Car (Ref)	1.00	1.00	1.00

Note. CI = confidence interval; SUV = sport utility vehicle. For the total sample (unweighted frequencies),  $n = 3126$ ; for the primary law states (unweighted frequencies),  $n = 1517$ ; and for the secondary law states (unweighted frequencies),  $n = 1609$ . Surveyed states with primary safety belt laws: AL, CA, CT, GA, HI, IA, IL, IN, LA, MI, NC, NJ, NM, OR, SC, TN, and TX. Surveyed states with secondary safety belt laws: AZ, CO, FL, ID, MA, MN, MO, MS, MT, NE, NV, OH, PA, UT, VA, VT, and WI.

overestimated to a greater extent among certain subpopulation groups.

Despite these limitations, there continues to be an important place for self-report; it can provide information, such as age-specific and graduated driver licensing stage, that observational studies do not capture. Furthermore, as

measures of self-reported and observed use have converged,<sup>47</sup> it is important to recognize the complementary nature of self-report and observational data. Finally, because the NYDS passenger safety belt use question did not differentiate between the front seat and the rear seat, passenger safety belt use might vary

by vehicle seat row, but we were unable to assess this.

## Conclusions

This study provided further evidence in support of safety belt laws with primary enforcement as a potential strategy for increasing both driver and passenger safety belt use among teenagers throughout the licensing process. In addition, this study showed that primary enforcement safety belt laws may play a key role in mitigating the disparity in safety belt use among certain teenaged subpopulation groups. In particular, the reduction in safety belt use observed as teenagers progress through the licensing process appears to be mitigated in primary enforcement states. Because some teenaged subpopulations have lower safety belt use, even with primary enforcement laws, combined approaches that include upgrades to laws with campaigns and enforcement might be warranted. ■

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## Contributors

J. F. García-España wrote the first draft of the article, managed the data, and performed the statistical analyses. All authors contributed to the concept and survey development, designed the analysis plan, determined study objectives, interpreted data, contributed substantially to article drafts, and approved the final version of the article.

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The study protocol was approved by the institutional review board of The Children's Hospital of Philadelphia and the survey contractor (ORC Macro, Calverton, MD).

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