



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**



DOT HS 811 414

November 2010

Occupant Restraint Use in 2009- Results From the National Occupant Protection Use Survey Controlled Intersection Study

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Technical Report Documentation Page

1. Report No. DOT HS 811 414		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Occupant Restraint Use in 2009 - Results From the National Occupant Protection Use Survey Controlled Intersection Study				5. Report Date November 2010	
				6. Performing Organization Code NVS-421	
7. Author(s) Timothy M. Pickrell* and Tony Jianqiang Ye†				8. Performing Organization Report No.	
9. Performing Organization Name Mathematical Analysis Division, National Center for Statistics and Analysis National Highway Traffic Safety Administration U.S. Department of Transportation 1200 New Jersey Avenue SE. Washington, DC 20590				10. Work Unit No. (TR AIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Mathematical Analysis Division, National Center for Statistics and Analysis National Highway Traffic Safety Administration U.S. Department of Transportation 1200 New Jersey Avenue SE. Washington, DC 20590				13. Type of Report and Period Covered NHTSA Technical Report	
				14. Sponsoring Agency Code	
15. Supplementary Notes * Mathematical Statistician, Mathematical Analysis Division, National Center for Statistics and Analysis, NHTSA † Statistician, Bowhead Systems Management Inc., a contractor working with the Mathematical Analysis Division, National Center for Statistics and Analysis, NHTSA					
Abstract This report presents results from the 2009 National Occupant Protection Use Survey (NOPUS) Controlled Intersection Study. NOPUS is the only nationwide probability-based occupant restraint use survey. This survey is conducted annually by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration. The 2009 NOPUS found that seat belt use continued to be lower among 16- to 24-year-olds than other age groups, lower among males than females, and lower among black occupants than occupants of the other race groups. Seat belt use among black occupants increased significantly from 75 percent in 2008 to 79 percent in 2009. The seat belt use in rear seats in 2009 stood at 70 percent and continued to be lower than in front seats. The restraint use for all children from birth to 7 years old stood at 88 percent in 2009 as compared to 87 percent in 2008. Child restraint use in the Midwest increased significantly from 85 percent in 2008 to 90 percent in 2009, and child restraint use continued to be higher in the West than in the other regions.					
17. Key Words Seat belt use, child restraint use, observational survey, demographics, rear-seat seat belt use, occupant protection, NOPUS, controlled intersections			18. Distribution Statement Document is available to the public from the National Technical Information Service www.ntis.gov .		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 32	22. Price

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Executive Summary

The National Occupant Protection Use Survey (NOPUS) is the only nationwide probability-based survey of seat belt use (for occupants 8 and older in both front and rear seats), motorcycle helmet use, child restraint use (for children less than 8 years old), and driver electronic device use in the United States. It is conducted annually by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration. NOPUS is comprised of two sub-surveys: the Moving Traffic (MT) survey and the Controlled Intersection (CI) survey.

In the CI survey, occupants of passenger vehicles with no commercial or government markings are observed from the roadside at intersections controlled by stop signs or stop lights. Only the stopped vehicles are observed to permit time to collect a variety of information required by the survey. NOPUS derives its estimates of rear seat belt use, child restraint use, driver electronic device use, and demographic characteristics of the vehicle occupants from the CI survey.

This report presents occupant restraint use results from the 2009 National Occupant Protection Use Survey Controlled Intersection Study. NHTSA will publish results on the driver electronic device use in a separate report.

The following are some of the major findings on occupant restraint use from the 2009 NOPUS Controlled Intersection Study:

- Seat belt use continued to be lower among 16- to 24-year-olds than other age groups.
- Seat belt use continued to be lower among males than females.
- Seat belt use continued to be lower among black occupants than occupants of the other race groups. However, there was a significant increase in seat belt use among black occupants from 75 percent in 2008 to 79 percent in 2009.
- Seat belt use continued to be lower among drivers driving alone than among drivers with passengers.
- Seat belt use in rear seats in 2009 stood at 70 percent and continued to be lower than in front seats.
- Seat belt use in rear seats in 2009 continued to be higher among the States with laws requiring seat belt use in all seating positions (78%) than among the States requiring seat belt use only in the front seat (64%).
- The restraint use for all children from birth to 7 years old stood at 88 percent in 2009 as compared to 87 percent in 2008.
- Over 94 percent of children under 8 rode in the rear seat of vehicles in 2009. More precisely, 99 percent of infants, 99 percent of children 1 to 3 years old, and 90 percent of children 4 to 7 years old rode in the rear seat.
- Child restraint use in the Midwest increased significantly from 85 percent in 2008 to 90 percent in 2009.
- Child restraint use continued to be higher in the West than in the other regions in 2009.
- Restraint use for children driven by a belted driver continued to be higher than for those driven by an unbelted driver. In 2009, restraint use among children driven by an unbelted driver increased significantly to 66 percent from the prior year's rate of 54 percent.

1. Introduction

The National Occupant Protection Use Survey is the only nationwide probability-based survey of seat belt use (for occupants 8 and older in both front and rear seats), motorcycle helmet use, child restraint use (for children less than 8 years old), and driver electronic device use in the United States. It is conducted annually by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration. NOPUS is comprised of two sub-surveys: the Moving Traffic (MT) survey and the Controlled Intersection (CI) survey.

In the MT survey, the shoulder belt use data of front-seat occupants and helmet use data of motorcyclists are collected by observing passenger vehicle occupants either at the roadside or, in the case of expressways, while riding in vehicles in the traffic. NOPUS derives its major estimates of front seat belt use and motorcycle helmet use from the MT survey. NHTSA has already published the results from the 2009 NOPUS MT survey in late 2009 [1, 2]. In contrast, the CI survey data is collected at intersections controlled by stop signs or stoplights, where vehicle occupants are observed from the roadside. Only the stopped vehicles are observed to permit time to collect the variety of information required by the survey. NOPUS derives its estimates of rear seat belt use, child restraint use, driver electronic device use, and demographic characteristics of the vehicle occupants from the CI survey.

Only motorcycles and passenger vehicles with no commercial or government markings are observed in NOPUS. Restraint use is not recorded for occupants of commercial vehicles, buses, taxis, or emergency vehicles. The population of interest includes all 50 States, the District of Columbia, with the sample observation sites consisting of Federal, State, county highways, residential streets, and rural roads. Data are collected only during daylight hours when light is adequate to observe seat belt use through vehicles' windshields.

The 2009 NOPUS data collection was conducted between 7 a.m. and 6 p.m. during the period from June 1, 2009 to June 20, 2009. The 2009 NOPUS survey data is based on the results of 70,493 occupants observed in the 49,475 vehicles at the 1,496 data collection sites. Of these observed occupants, 3,543 were children under 8. More details on the NOPUS sampling, data collection and estimation are discussed in Chapter 5: NOPUS Methodology.

The purpose of this report is to present occupant restraint use results from the 2009 National Occupant Protection Use Survey Controlled Intersection Study. NHTSA will publish results on the driver electronic device use in a separate report. In previous years, NHTSA usually presented the results from the NOPUS CI survey through three or four Research Notes, each of which covers one specific topic. This consolidated report is an attempt to pool together as much data as possible from the 2009 NOPUS CI survey for the convenience of data users. However, in order to be consistent with the publications in previous years, chapters in this report are arranged to cover similar topics to those in the Research Notes published previously [3, 4, and 5].

It may be noted that the terms “significant” and “statistically significant” are used interchangeably throughout this report. “Significant” always means “statistically significant” and the statistical significance level is chosen to be 0.1.

2. Demographic Results

Seat belt use nationwide was 84 percent in 2009, a slight gain from the 2008 use rate of 83 percent. This chapter presents the demographic breakdown of the 84 percent occupants who used seat belt use in 2009.

Although the NOPUS CI data are collected solely from vehicles stopped at intersections controlled by stop signs or stoplights, the estimates in this publication concerning seat belt use in the front seat reflect use by occupants in transit on all types of roadways. This is accomplished by making adjustments using data from the MT survey that observes seat belt use in vehicles in transit on general roadways.

Table 1 on page 6 presents results of passenger vehicle occupant seat belt use by demographic and other characteristics in 2008 and 2009 and the changes between the two years. Some major results are highlighted in the following sections.

Age

In 2009, there was no significant change in the seat belt use as compared to 2008 across four age groups of occupants: 8-15 years old, 16-24 years old, 25-69 years old and 70 and older. Figure 1 shows a comparison of the seat belt use rates between 2008 and 2009 among occupants of all age groups.

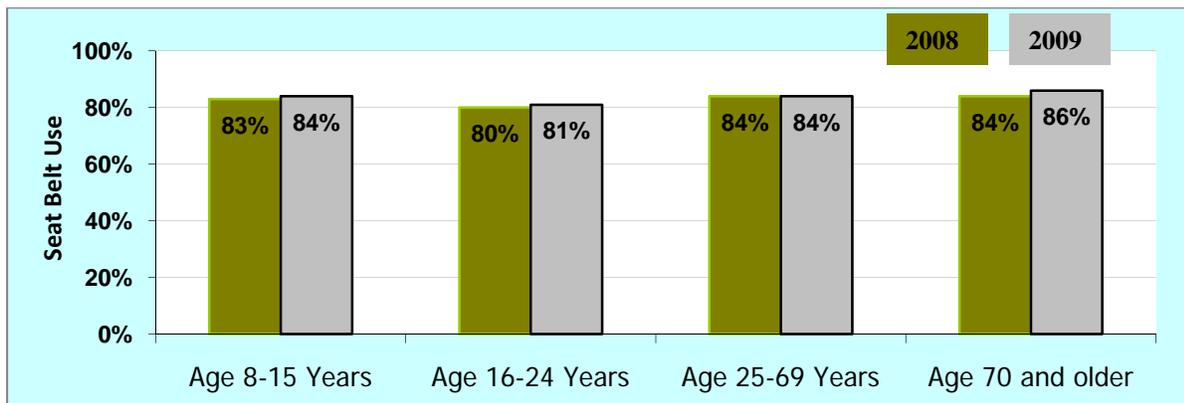


Figure 1: Seat Belt Use by Age for Occupants 8 and Older in 2008 and 2009

Figure 2 displays the trends of seat belt use for all age groups over a period of 8 years (2002 to 2009). It shows that in 2009, seat belt use continued to be lower among 16- to 24-year-olds than other age groups.

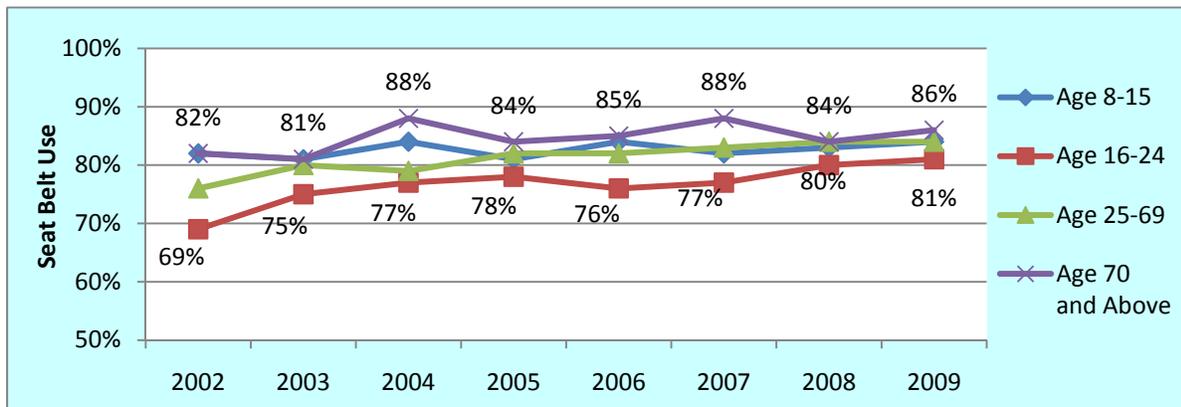


Figure 2: Seat Belt Use by Age for Occupants 8 and Older, 2002-2009

This figure also shows that in 2009 the seat belt use for occupants 70 and older was 86 percent, which is significantly higher than the other age groups.

Gender

Figure 3 shows the trend of seat belt use among male and female occupants over a period of 8 years (2002 to 2009). In 2009, seat belt use continued to be lower among males (81%) than females (87%).

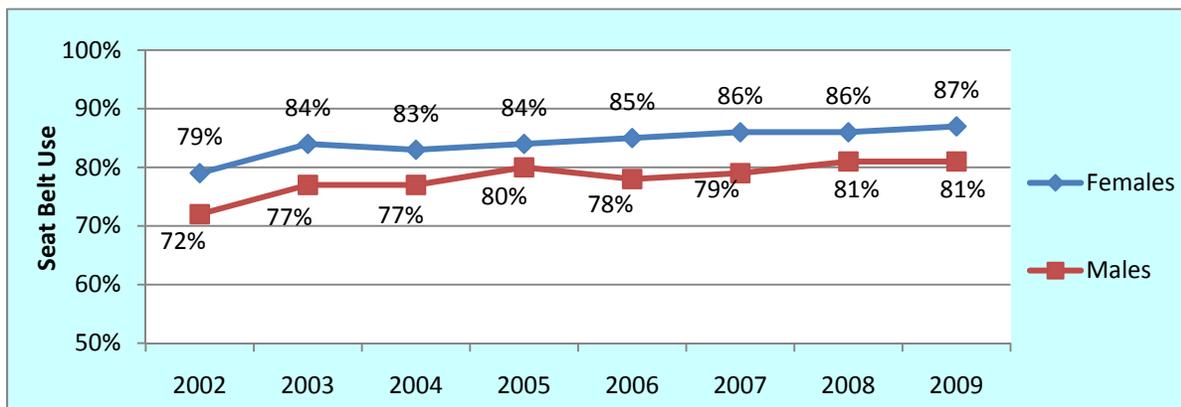


Figure 3: Seat Belt Use by Gender for Occupants 8 and Older, 2002-2009

Race

In NOPUS, the race of vehicle occupants is recorded as black, white, and member of other races. The characterization is based on the visual assessment by the data collectors who observe vehicle occupants from roadsides.

According to the 2009 NOPUS, seat belt use among black occupants increased significantly from 75 percent in 2008 to 79 percent in 2009 as shown by Figure 4.

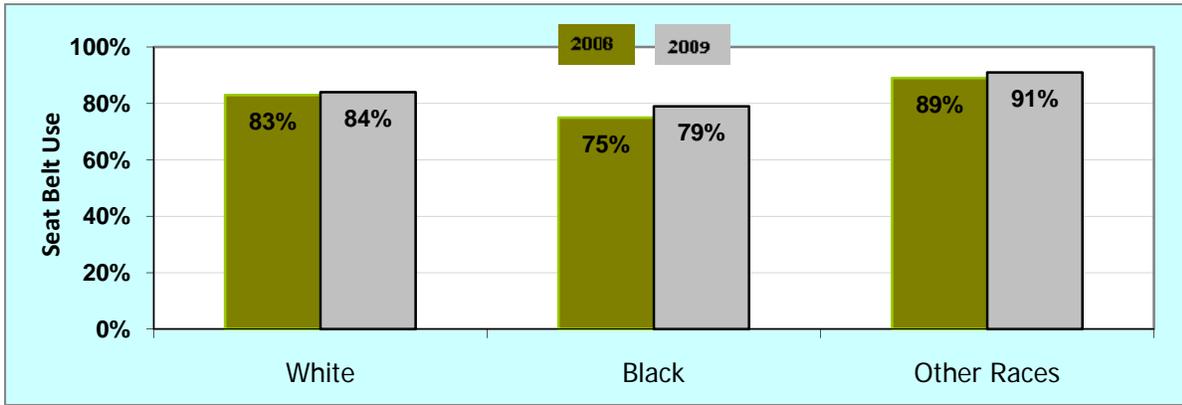


Figure 4: Seat Belt Use by Race for Occupants 8 and Older in 2008 and 2009

Figure 5 shows the trends of seat belt use among occupants who are white, black, and members of other races over a period of 5 years (2005 to 2009). In 2009, seat belt use continued to be lower among black occupants than occupants of the other race groups. Seat belt use for members of other races was significantly higher than the complementary group (white and black occupants combined).

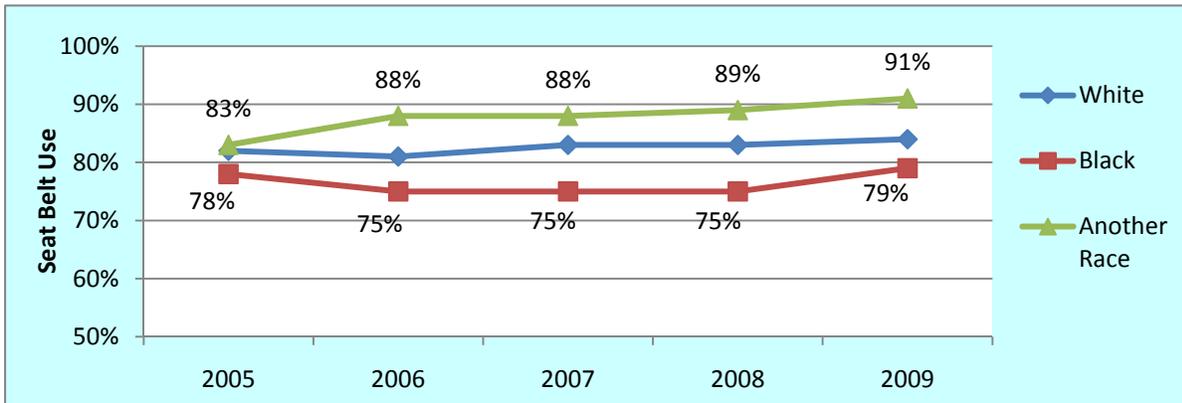


Figure 5: Seat Belt Use by Race for Occupants 8 and Older, 2005-2009

Presence of Passengers and Seat Belt Use

Figure 6 displays a clear pattern that seat belt use continued to be lower among drivers driving alone than among drivers with passengers.

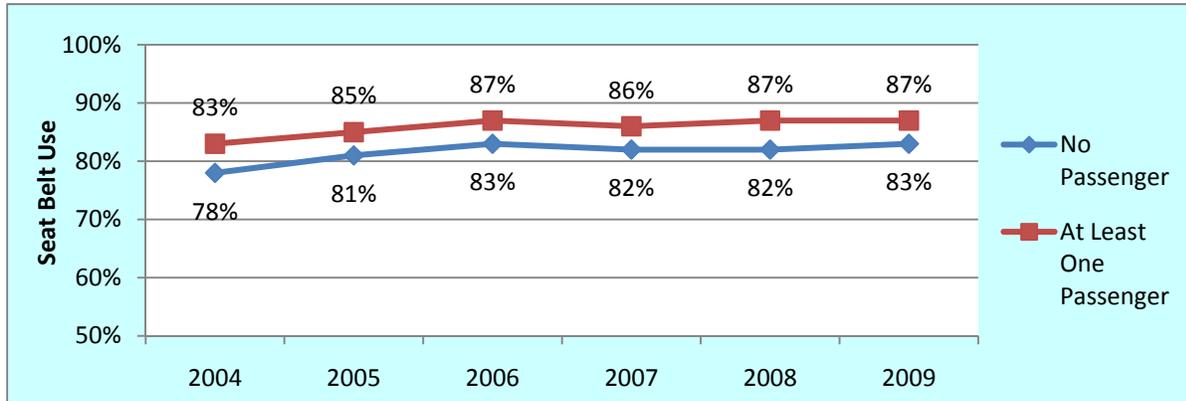


Figure 6: Passenger Effect on Seat Belt Use for Occupants 8 and Older, 2004-2009

Table 1: Passenger Vehicle Occupant Seat Belt Use by Demographic and Other Characteristics

Occupant Group ¹	2008		2009		2008-2009 Change	
	Belt Use ²	Confidence That Use Is High or Low in Group ³	Belt Use ²	Confidence That Use Is High or Low in Group ³	Change in Percentage Points	Confidence in a Change in Percentage ⁴
All Occupants ⁵	83%		84%		1	68%
Males	81%	100%	81%	100%	0	50%
Females	86%	100%	87%	100%	1	78%
Occupants by Age Group ⁵						
8-15	83%	55%	84%	58%	1	17%
16-24	80%	96%	81%	98%	1	15%
25-69	84%	94%	84%	90%	0	66%
70 and Older	84%	73%	86%	94%	2	69%
Occupants by Race ⁵						
White	83%	58%	84%	75%	1	43%
Black	75%	100%	79%	99%	4	94%
Members of Other Races	89%	100%	91%	100%	2	67%
Drivers With						
No Passengers	82%	100%	83%	100%	1	73%
At Least One Passenger	87%	100%	87%	100%	0	42%
Drivers With						
No Passengers	82%	100%	83%	100%	1	73%
Passengers All Under 8	89%	100%	88%	100%	-1	15%
Passengers All 8 and Older	86%	100%	87%	100%	1	41%
Some Passengers Under 8 and Some 8 or Older	88%	99%	90%	100%	2	60%
Drivers Age 16-24 With						
No Passengers	81%	91%	83%	85%	2	69%
Passengers All 16-24	80%	85%	80%	91%	0	5%
At Least One Passenger Not 16-24	87%	100%	83%	51%	-4	55%
Occupants Age 16-24 When						
All Occupants Are 16-24	80%	98%	81%	53%	1	41%
At Least One Occupant Is Not 16-24	83%	98%	81%	53%	-2	37%

¹ Drivers and right-front passengers of passenger vehicles with no commercial or government markings.

² Use of shoulder belts observed between 7 a.m. and 6 p.m.

³ The statistical confidence that use in the occupant group (e.g., white occupants) is higher or lower than use in the corresponding complementary occupant groups (e.g., combined black and other occupants). Confidences that meet or exceed 90 percent are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as “100 percent” are between 99.5 percent and 100 percent.

⁴ The degree of statistical confidence that the 2009 use rate is different from the 2008 rate. Confidences that meet or exceed 90% are formatted in boldface type.

⁵ The age, gender, and racial classifications are based on the subjective assessments of roadside observers.

Source: National Occupant Protection Use Survey, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

3. Seat Belt Use in Rear Seats

Not all vehicles on the road today have shoulder belts in the rear seats. Based on the 2008 vehicle registration data from the National Vehicle Population Profile, R.L. Polk & Co., an estimated 89 percent of passenger vehicles on the road have shoulder belts in the rear outboard seating positions. In the remaining 11 percent of vehicles that have only lap belts in the rear outboard seats, all rear-seat vehicle occupants are counted by NOPUS as not using shoulder belts, regardless of whether they are using lap belts. Consequently, NOPUS rear-seat shoulder belt use estimates reflect both the degree to which vehicle occupants use restraints and the prevalence of shoulder belts in these seating positions.

It may be noted that rear-seat occupants might be underestimated in NOPUS because NOPUS only observes up to two passengers in the second row of seats and none in the third row and beyond.

Table 3 on Page 9 presents results of seat belt use in the rear seat of passenger vehicles in 2008 and 2009 as well as the changes between the two years. Some major results are highlighted in the following sections.

Seat Belt Use in Rear Seats versus in Front Seats

Figure 7 displays the trend of seat belt use in rear and front seats over a period of 6 years (2004 to 2009). A comparison of the two profiles shows that seat belt use in rear seats stood at 70 percent in 2009, which is not statistically different from 74 percent in 2008. However, as in the previous years, seat belt use in 2009 was lower in the rear seat than in the front seat.

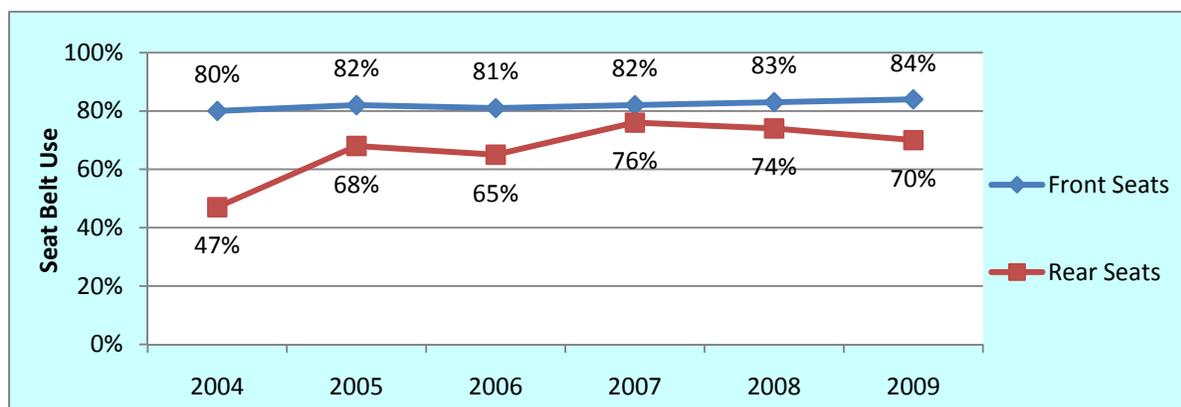


Figure 7: Seat Belt Use by Seating Position for Occupants 8 and Older, 2004-2009

State Laws and Rear-Seat Belt Use

At the time the 2009 survey was conducted, 21 States and the District of Columbia required all vehicle occupants 18 and older to use seat belts when riding in the rear seat. Minnesota's rear-seat seat belt use laws took effect on June 9, 2009. Table 2 provides a list of these States.

Table 2 does not include Louisiana because the effective date of its rear-seat seat belt use laws, August 15, 2009, is after the completion of the 2009 NOPUS. On January 18, 2010, the legislation was signed into law in New Jersey requiring all occupants to buckle up, regardless of their seating position in a vehicle

Table 2: States With Laws Requiring Seat Belts Be Used in All Seating Positions

Alaska	California	Delaware
District of Columbia	Idaho	Indiana
Kentucky	Maine	Massachusetts
Minnesota	Montana	Nevada
New Mexico	North Carolina	Oregon
Rhode Island	South Carolina	Utah
Vermont	Washington	Wisconsin
Wyoming		

States with laws in effect as of June 30, 2009, requiring people 18 and older to use seat belts in all seating positions. Also includes the District of Columbia. The rear-seat seat belt use laws in Minnesota took effect on June 9, 2009. In no other States did such laws take effect during the period July 1, 2008 – June 30, 2009.

Figure 8 shows trends of rear-seat belt use among occupants the States with or without laws requiring belt use in all seating positions over a period of 5 years (2005 to 2009). These profiles show that as in the previous years, seat belt use in rear seats in 2009 was higher among the States with laws requiring belt use in all seating positions (78%) than among the States requiring belt use only in the front seat (64%).

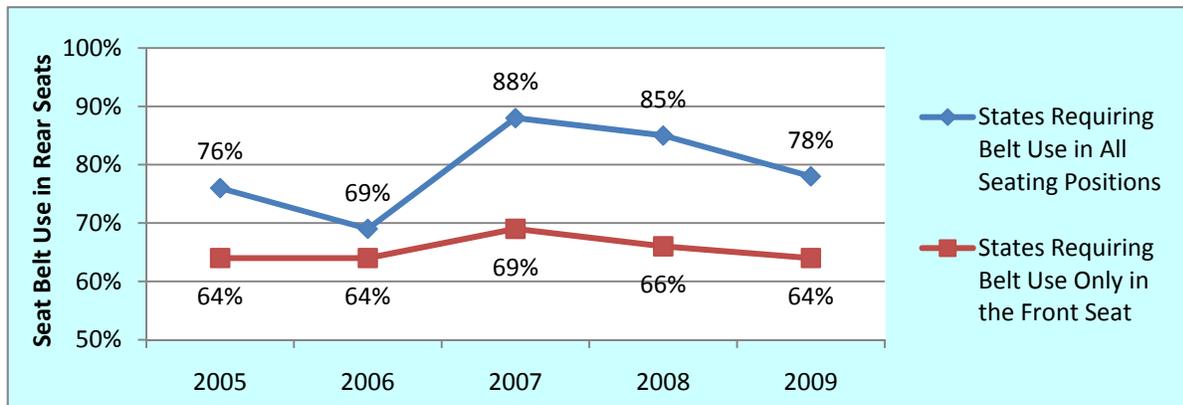


Figure 8: Seat Belt Use in Rear Seats by State Law Type for Occupants 8 and Older, 2004-2009

Table 3: Seat Belt Use in the Rear Seat of Passenger Vehicles, by Major Characteristics

Passenger Group ¹	2008		2009		2008-2009 Change	
	Belt Use ²	Confidence That Use Is High or Low in Group ³	Belt Use ²	Confidence That Use Is High or Low in Group ³	Change in Percentage Points	Confidence in a Change in Percentage ⁴
All Passengers ⁵	74%		70%		-4	87%
Males	71%	100%	67%	99%	-4	68%
Females	77%	100%	72%	99%	-5	91%
Passengers by Age Group ⁵						
8-15	80%	100%	76%	100%	-4	89%
16-24	69%	97%	66%	99%	-3	56%
25-69	71%	91%	64%	100%	-7	94%
70 and Older	74%	52%	82%	99%	8	60%
Passengers by Race ⁵						
White	77%	100%	73%	100%	-4	90%
Black	58%	100%	56%	100%	-2	11%
Members of Other Races	70%	88%	66%	81%	-4	58%
Passengers in States With Laws Requiring Belts Be Used						
In All Seating Positions	85%	100%	78%	100%	-7	92%
In the Front Seat Only	66%	100%	64%	100%	-2	48%

¹ Up to two passengers observed in the second row of seats in passenger vehicles with no commercial or government markings.

² Use of shoulder belts observed between 7 a.m. and 6 p.m.

³ The statistical confidence that use in the passenger group (e.g., white passengers) is higher or lower than use in the corresponding complementary passenger groups (e.g., combined black and other passengers). Confidences that meet or exceed 90 percent are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as “100 percent” are between 99.5 percent and 100.0 percent.

⁴ The degree of statistical confidence that the 2009 use rate is different from the 2008 rate. Confidences that meet or exceed 90 percent are formatted in boldface type.

⁵ The Age, gender, and racial classifications are based on the subjective assessments of roadside observers.

Source: National Occupant Protection Use Survey, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

4. Child Restraint Use

In 2009, NOPUS continued to collect roadside observational data on child restraint use for all children under 8 years old. Table 5 on Page 14 presents results of child restraint use in passenger motor vehicles by major characteristics in 2008 and 2009 as well as the changes between the 2 years. Table 7 on Page 16 divides the occupants into three age groups and reports seat belt use by some other characteristics among these groups. Table 6 on Page 15 presents results on child rear placement by major characteristics in 2008 and 2009 as well as the changes between the 2 years. Some of the major results from the 2009 NOPUS Controlled Intersection Study are discussed in the following sections.

Child Restraint Use for All Children Under 8

Figure 9 shows the trend of child restraint use since 2002. It shows that the restraint use for all children under 8 stood at 88 percent in 2009 as compared to 87 percent in 2008.

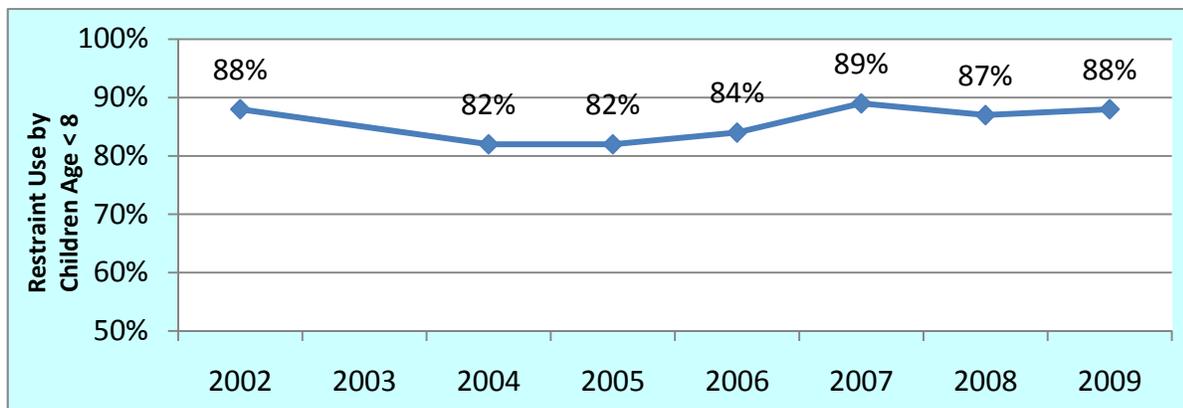
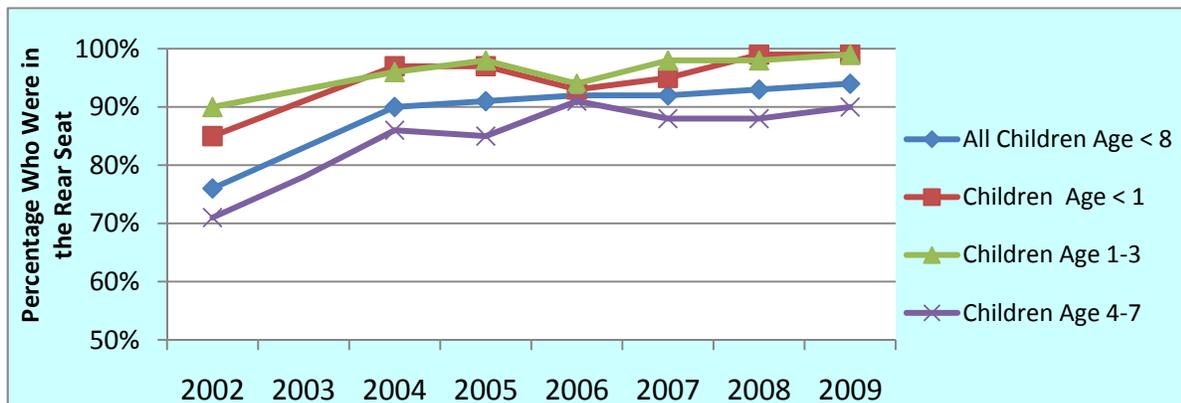


Figure 9: Child Restraint Use among Children Under 8 Years Old, 2002-2009

Child Rear Placement

Figure 10 shows the trends of rear seat placement of children under 8 over the period of 8 years (2002 to 2009).

The 2009 NOPUS found that 94 percent of children under 8 rode in the rear seat of vehicles. Of all the infants (age less than 1 year), 99 percent rode in the rear seat. Ninety-nine percent of 1- to 3-year-olds and 90 percent of 4- to 7-year-old children were in the rear seat in 2009.



At the time the 2009 survey was conducted, 9 States required children 5 and younger who weighed less than 80 pounds and were less than 54 inches tall to ride in the rear seat of vehicles. Table 4 lists the 9 States with child rear placement laws.

Table 4: States With Laws Requiring Children 5 and Younger Be in the Rear Seat

California	Georgia	Maine
New Jersey	Rhode Island	South Carolina
Tennessee	Washington	Wyoming

Among children less than 80 pounds and less than 54" tall. States with laws in effect as of June 30, 2009. In no other States did such laws take effect during the period July 1, 2008 – June 30, 2009.

Child Restraint Use by Region

Child restraint use in the Midwest increased significantly from 85 percent in 2008 to 90 percent in 2009. Figure 11 shows a significant increase in the use of child restraint use in the Midwest.

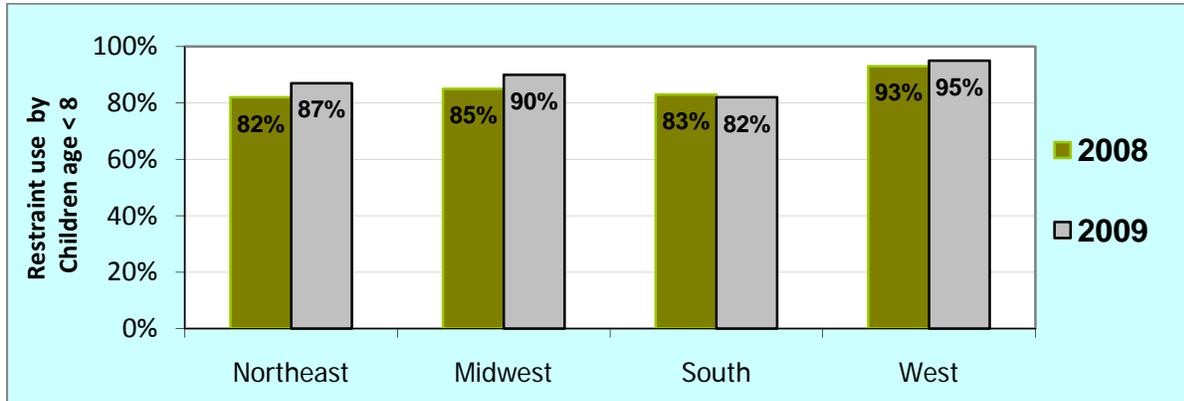


Figure 11: Child Restraint Use by Region in 2008 and 2009

As shown in Figure 12, the child restraint use continued to be higher in the West than in the other regions in 2009.

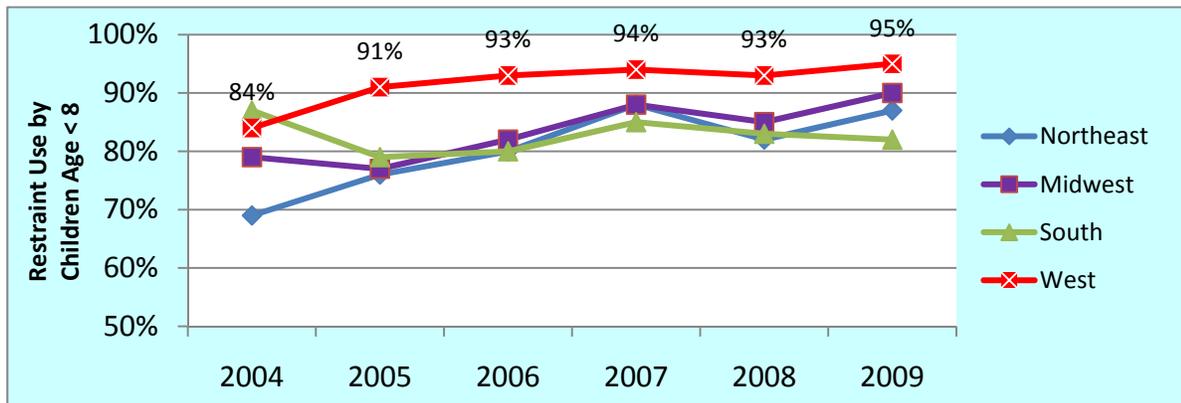


Figure 12: Child Restraint Use by Region, 2004-2009

Child Restraint Use by Driver Belt Status

As shown in Figure 13, the restraint use for children driven by a belted driver continued to be higher than for those driven by an unbelted driver. Figure 13 also shows that restraint use for children driven by an unbelted driver in 2009 increased significantly to 66 percent from the prior year's rate of 54 percent.

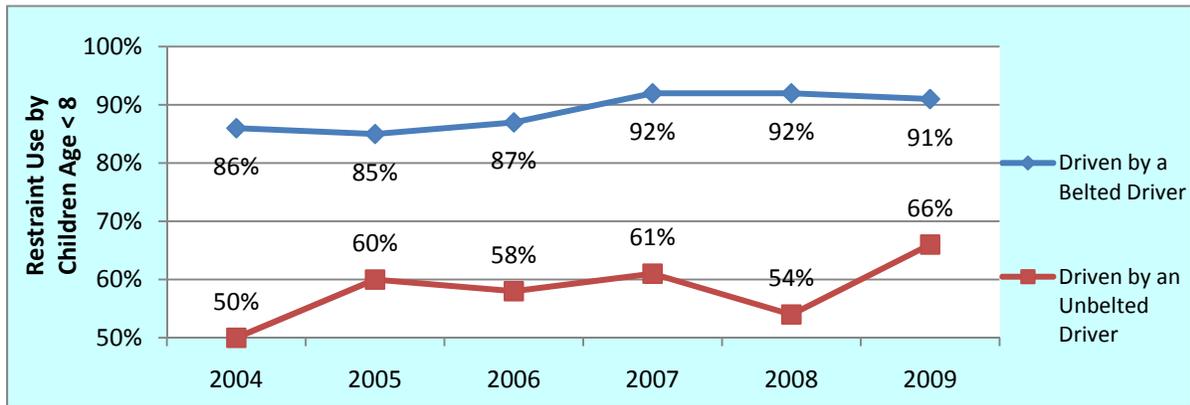


Figure 13: Child Restraint Use by Driver Belt Status, 2004-2009

Child Restraint Use by Age From NSUBS

Earlier this year, NHTSA has published the 2009 restraint use rates for children under 12 by age as follows: 98 percent for children from birth to 12 months; 96 percent for children age 1 to 3 years old; 87 percent for children age 4 to 7 years old; 85 percent for children 8 to 12 years old. These rates are from the 2009 National Survey of the Use of Booster Seats (NSUBS), which is another survey conducted by NHTSA to collect information about booster seat use and other types of restraint use for children under 12 [6, 7, and 8]. Since information about age is obtained by interviews in NSUBS and through visual assessment in NOPUS, the former is more accurate. For this reason, NHTSA publishes rates for the age groups from NSUBS instead of NOPUS. For more details about the 2009 NSUBS, please refer to the NHTSA technical report "The 2009 National Survey of the Use of Booster Seats" for race and ethnicity, restraint types, and other information for each age group. This report is available at the Web site <http://www-nrd.nhtsa.dot.gov/CMSWeb/index.aspx>.

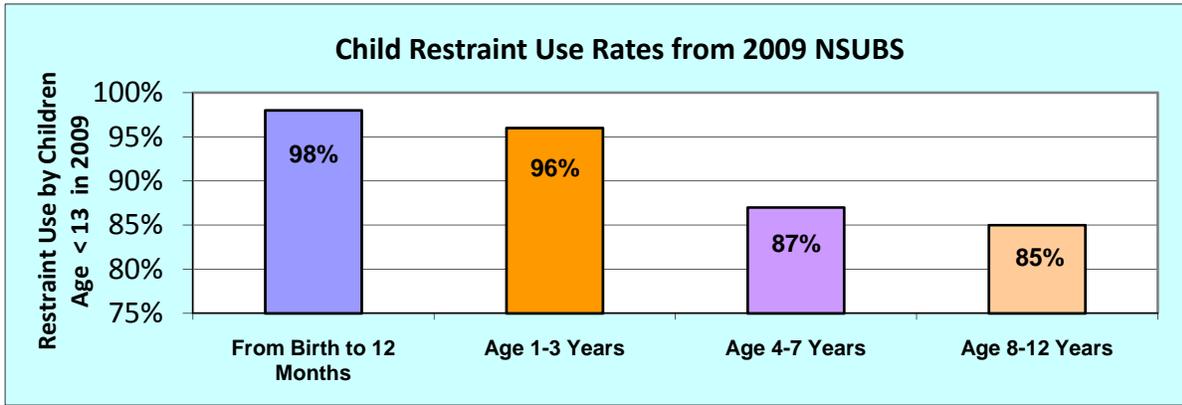


Figure 14: Child Restraint Use by Age (Data Source: 2009 NSUBS, NHTSA)

Table 5: Child Restraint Use in Passenger Motor Vehicles, by Major Characteristics

Child Passenger Group ¹	2008		2009		2008–2009 Change	
	Restraint Use ²	Confidence That Use Is High or Low in Group ³	Restraint Use ²	Confidence That Use Is High or Low in Group ³	Change in Percentage Points	Confidence in a Change in Use ⁴
All Child Passengers (From Birth to 7 Years)	87%		88%		1	51%
Children Driven by						
a Belted Driver	92%	100%	91%	100%	-1	53%
an Unbelted Driver	54%	100%	66%	100%	12	97%
a Male Driver	85%	93%	87%	79%	2	57%
a Female Driver	88%	93%	89%	79%	1	24%
a Driver Age 16-24	88%	65%	89%	66%	1	20%
a Driver Age 25-69	87%	68%	88%	63%	1	55%
a Driver Age 70+	90%	72%	86%	64%	-4	38%
a White Driver	89%	100%	90%	100%	1	44%
a Black Driver	76%	100%	71%	100%	-5	79%
a Driver of Another Race	86%	70%	88%	50%	2	44%
Children in						
the Front Seat	74%	100%	74%	100%	0	5%
the Rear Seat	88%	100%	89%	100%	1	45%
Child Passengers on						
Expressways	91%	100%	90%	89%	-1	69%
Surface Streets	85%	100%	87%	89%	2	76%
Child Passengers Traveling in						
Fast Traffic	88%	78%	90%	93%	2	65%
Medium-Speed Traffic	89%	90%	87%	82%	-2	72%
Slow Traffic	84%	96%	87%	61%	3	61%
Child Passengers in						
Passenger Cars	86%	73%	84%	100%	-2	84%
Vans & SUVs	90%	98%	93%	100%	3	97%
Pickup Trucks	73%	99%	80%	99%	7	72%
Child Passengers in the						
Northeast	82%	98%	87%	61%	5	83%
Midwest	85%	79%	90%	83%	5	93%
South	83%	96%	82%	100%	-1	32%
West	93%	100%	95%	100%	2	71%
Child Passengers in						
Urban Areas	85%	81%	86%	79%	1	19%
Suburban Areas	89%	98%	89%	80%	0	4%
Rural Areas	83%	96%	87%	67%	4	58%
Child Passengers Traveling During						
Weekdays	88%	83%	88%	61%	0	15%
Rush Hours	90%	97%	88%	50%	-2	74%
Nonrush Hours	86%	97%	88%	50%	2	42%
Weekends	85%	83%	88%	61%	3	74%

¹ Passengers under 8 years old observed between 7 a.m. and 6 p.m. in the right-front seat or the second row of seats in passenger vehicles with no commercial or government markings that are stopped at a stop sign or stop light. Age, gender, and racial classifications are based on the subjective assessments of roadside observers.

² Use of child safety seats (forward- or rear-facing), booster seats, and seat belts.

³ The statistical confidence that use in the passenger group (e.g., child passengers in the Northeast) is higher or lower than use in the corresponding complementary passenger group (e.g., combined child passengers in the Midwest, in the South and in the West). Confidences that meet or exceed 90 percent are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as “100 percent” are between 99.5 percent and 100.0 percent.

⁴ The degree of statistical confidence that the 2009 use rate is different from the 2008 rate. Confidences that meet or exceed 90 percent are formatted in boldface type.

Source: National Occupant Protection Use Survey, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

Table 6: The Percent of Children Who Rode in the Rear Seat, by Major Characteristics

Child Passenger Group ¹	2008		2009		2008-2009 Change	
	Percentage Who Were in Rear Seat ²	Confidence That Use Is High or Low in Group ³	Percentage Who Were in Rear Seat ²	Confidence That Use Is High or Low in Group ³	Change in Percentage Points	Confidence in a Change in Rear Seat Occupancy ⁴
All Child Passengers (From Birth to 7 Years)	93%		94%		1	80%
Age 0 (Infants)	99%	100%	99%	100%	0	57%
Age 1-3	98%	100%	99%	100%	1	69%
Age 4-7	88%	100%	90%	100%	2	82%
Child Passengers in States With ⁵ Law Requiring Children Ages 0-5 Be in the Rear Seat	94%	85%	96%	85%	2	62%
No Such Law	93%	85%	94%	85%	1	74%
Children Driven by						
a Belted Driver	93%	82%	95%	99%	2	85%
an Unbelted Driver	91%	82%	90%	99%	-1	38%
a Male Driver	93%	57%	94%	66%	1	45%
a Female Driver	93%	57%	94%	66%	1	82%
a Driver Age 16-24	95%	98%	98%	100%	3	88%
a Driver Age 25-69	93%	99%	94%	98%	-1	85%
a Driver Age 70+	98%	99%	84%	94%	-14	95%
a White Driver	94%	99%	94%	65%	0	4%
a Black Driver	93%	55%	96%	92%	3	61%
a Driver of Another Race	88%	99%	92%	84%	4	83%
Child Passengers on						
Expressways	94%	74%	96%	100%	2	76%
Surface Streets	93%	74%	93%	100%	0	51%
Child Passengers Traveling in						
Fast Traffic	94%	89%	94%	54%	0	3%
Medium-Speed Traffic	94%	76%	94%	56%	0	50%
Slow Traffic	91%	94%	94%	53%	3	83%
Child Passengers in						
Passenger Cars	93%	56%	96%	100%	3	96%
Vans & SUVs	94%	97%	95%	92%	1	50%
Pickup Trucks	84%	100%	76%	100%	-8	96%
Child Passengers in the						
Northeast	93%	57%	97%	100%	4	99%
Midwest	91%	89%	92%	90%	1	36%
South	95%	91%	93%	76%	-2	58%
West	92%	71%	94%	57%	2	82%
Child Passengers in						
Urban Areas	90%	94%	96%	91%	6	96%
Suburban Areas	94%	98%	95%	89%	1	66%
Rural Areas	92%	79%	92%	96%	0	9%
Child Passengers Traveling During						
Weekdays						
Rush Hours	92%	100%	93%	97%	1	66%
Nonrush Hours	91%	79%	92%	88%	1	51%
Weekends	93%	79%	94%	88%	1	47%
Weekends	95%	100%	96%	97%	1	60%
Child Passengers in a						
Rear-Facing Car Seat	98%	100%	99%	100%	1	21%
Front-Facing Car Seat	99%	100%	99%	100%	0	28%
High-Backed Booster Seat	99%	100%	100%	UA	1	UA
Seat belt or Backless Booster Seat	87%	100%	90%	100%	3	89%
No Restraint Observed	86%	100%	88%	100%	2	48%

¹Passengers under 8 years old observed between 7 a.m. and 6 p.m. in the right-front seat or the second row of seats in passenger vehicles with no commercial or government markings that are stopped at a stop sign or stoplight. Age, gender, and racial classifications are based on the subjective assessments of roadside observers.

² The percentage of the child passenger group who were in the second row of seats at the time of observation.

³ The statistical confidence that use in the passenger group (e.g., child passengers in the Northeast) is higher or lower than use in the corresponding complementary passenger group (e.g., combined child passengers in the Midwest, in the South and in the West). Confidences that meet or exceed 90 percent are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as "100 percent" are between 99.5 percent and 100.0 percent.

⁴ The degree of statistical confidence that the percentage of the child passenger group who were in the rear seat in 2009 is different from the analogous percentage from 2008.

⁵ Use rates reflect the law in effect at the time data was collected. UA: Estimate not available

Source: National Occupant Protection Use Survey, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

Table 7: Child Restraint Use in Passenger Motor Vehicles, by Age and Other Characteristics

Child Passenger Group ¹	2008		2009		2008-2009 Change		
	Restraint Use ²	Confidence That Use Is High or Low in Group ³	Restraint Use ²	Confidence That Use Is High or Low in Group ³	Change in Percentage Points	Confidence in a Change in Use ⁴	
Infants (From Birth to 12 Months)							
Infants Driven by							
	a Belted Driver	98%	57%	99%	97%	1	65%
	an Unbelted Driver	98%	57%	93%	97%	-5	79%
	a Male Driver	97%	86%	98%	79%	1	34%
	a Female Driver	99%	86%	99%	79%	0	30%
Infants in							
	Passenger Cars	98%	56%	98%	75%	0	28%
	Vans & SUVs	98%	63%	100%	UA	2	UA
	Pickup Trucks	NA	NA	NA	NA	NA	NA
Infants in the							
	Northeast	97%	79%	98%	61%	1	33%
	Midwest	100%	UA	96%	93%	-4	UA
	South	99%	93%	99%	82%	0	35%
	West	97%	90%	100%	UA	3	UA
Infants in							
	Urban Areas	98%	55%	99%	87%	1	55%
	Suburban Areas	98%	64%	99%	81%	1	19%
	Rural Areas	98%	61%	97%	89%	-1	27%
Children Age 1-3 Years							
Children Age 1-3 Driven by							
	a Belted Driver	95%	100%	94%	99%	-1	53%
	an Unbelted Driver	73%	100%	85%	99%	12	93%
	a Male Driver	93%	52%	95%	70%	2	44%
	a Female Driver	93%	52%	93%	70%	0	14%
Children Age 1-3 in							
	Passenger Cars	90%	100%	92%	97%	2	65%
	Vans & SUVs	97%	100%	97%	100%	0	13%
	Pickup Trucks	89%	81%	83%	96%	-6	58%
Children Age 1-3 in the							
	Northeast	88%	90%	96%	81%	8	93%
	Midwest	93%	53%	93%	68%	0	1%
	South	91%	91%	89%	98%	-2	34%
	West	96%	99%	97%	98%	1	46%
Children Age 1-3 in							
	Urban Areas	85%	100%	91%	90%	6	82%
	Suburban Areas	95%	99%	95%	90%	0	4%
	Rural Areas	93%	52%	93%	70%	0	11%
Children Age 4-7 Years							
Children Age 4-7 Driven by							
	a Belted Driver	87%	100%	86%	100%	-1	29%
	an Unbelted Driver	39%	100%	54%	100%	15	96%
	a Male Driver	79%	74%	81%	83%	1	36%
	a Female Driver	81%	74%	83%	83%	2	51%
Children Age 4-7 in							
	Passenger Cars	80%	52%	75%	100%	-5	85%
	Vans & SUVs	83%	94%	90%	100%	7	99%
	Pickup Trucks	65%	98%	79%	78%	14	91%
Children Age 4-7 in the							
	Northeast	78%	74%	80%	72%	2	15%
	Midwest	78%	73%	86%	92%	8	96%
	South	73%	99%	74%	99%	1	16%
	West	89%	100%	92%	100%	3	60%
Children Age 4-7 in							
	Urban Areas	80%	57%	80%	70%	0	1%
	Suburban Areas	82%	91%	83%	65%	1	14%
	Rural Areas	76%	91%	82%	53%	6	70%

¹ Passengers under 8 years old observed between 7 a.m. and 6 p.m. in the right-front seat or the second row of seats in passenger vehicles with no commercial or government markings that are stopped at a stop sign or stoplight. Age, gender, and racial classifications are based on the subjective assessments of roadside observers.

² Use of child safety seats (forward- or rear-facing), booster seats, and seat belts.

³ The statistical confidences that use in the passenger group (e.g., child passengers in the Northeast) is higher or lower than use in the corresponding complementary passenger group (e.g., combined child passengers in the Midwest, in the South and in the West). Confidences that meet or exceed 90 percent are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as "100 percent" are between 99.5 percent and 100.0 percent.

⁴ The degree of statistical confidence that the percentage of the child passenger group who were in the rear seat in 2009 is different from the analogous percentage from 2008.

NA: Data not sufficient to produce a reliable estimate. UA: Estimate not available.

Source: National Occupant Protection Use Survey, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

5. NOPUS Methodology

This chapter briefly discusses the sample design, data collection, and estimation used in the 2009 NOPUS Controlled Intersection Study. For more details on the methodology of the survey, refer to the upcoming NHTSA technical report “National Occupant Protection Use Survey Methodology” which will be available at <http://www-nrd.nhtsa.dot.gov/Cats/index.aspx>. Data collection, estimation, and variance estimation for NOPUS are conducted by Westat, Inc., under the direction of NHTSA’s National Center for Statistics and Analysis under Federal contract number DTNH22-07-D-00057.

Sample Design

Currently, NOPUS is phasing in to the redesigned sample of observational sites. The redesigned sample contains a greater proportion of local roads, new roads and thus provides a better representation of the current U.S. population of motor vehicle occupants. Since the initial implementation of the redesign in 2006, NOPUS has had increasing number of sites from the redesigned sample and decreasing number of sites from the old sample every year. Data from 2005 and prior years were obtained from the old observational sites only.

The old sample design was a multi-stage, stratified sample design in which 50 primary sampling units (PSUs) were selected at the first stage and the strata were created using Census region, Metropolitan Statistical Area (MSA) or non-MSA status, and the State’s seat belt use rate (high = 70% and over, medium = 55 to under 70% and low = under 55%). In the second stage, roads were classified into two secondary strata prior to sampling, namely major roads (including limited access highways, U.S. roads, and State routes), and local roads (including county roads, residential roads, and rural roads). Major roads were then sampled from computerized road inventories supplied by State DOT offices in the 25 States represented by the sampled PSUs while local roads were clustered within Census tracts in the selected PSUs. For the 2009 NOPUS, 17 PSUs and 641 sites were selected from the old design.

The redesigned NOPUS sample was selected using a two-stage design with stratified probability-proportional-to-size (PPS) sampling at each stage. The sampling frame of PSUs for the 2006 redesigned sample included all counties in the U.S. but excluded Puerto Rico and the U.S. territories. In the redesigned sample, only one PSU was designated as a certainty sampling unit (i.e., probability one) due to its large vehicle miles traveled (VMT). In order to decrease the variances associated with the survey estimates, the remaining PSUs were stratified according to their predicted rates of restraint use based on a regression model that used primary enforcement law status, ratio of fatal crashes to VMT, percentage of college graduates, and several other relevant variables as predictors. The non-certainty PSUs were selected by systematic PPS sampling from these primary strata using VMT as the measure of size. The secondary sampling units (SSUs) consisted of road segments that lie at least partly inside the selected PSUs. To define road segments, the selected PSUs were divided into grids, usually of one-acre in size. For the 2009 NOPUS, 38 PSUs and 1,182 sites were selected from the redesigned sample.

Table 8 shows the observed sample sizes of the 2009 NOPUS. A total of 70,493 occupants were observed in the 49,475 vehicles at the 1,496 data collection sites. Of these observed occupants, 3,543 were children under 8. Please note that due to ineligibility, construction, danger in the area, or road closure, observations could not have been completed at some of the sampled observation sites.

Table 8: Sites, Vehicles and Occupants in the 2009 NOPUS

Numbers of	2008	2009	Percentage Change
Sites Observed	1,504	1,496	-1%
Vehicles Observed	55,199	49,475	-10%
Occupants Age >= 8 Years	75,018	66,950	-11%
Front Seat	71,085	63,682	-10%
Rear Seat	3,933	3,268	-11%
Occupants < 8 Years	4,268	3,543	-17%
Children < 1 Years	589	392	-33%
Children 1-3 Years	1,530	1,225	-20%
Children 4-7 Years	2,149	1,926	-10%

Data Collection

The 2009 NOPUS data collection was conducted during the period from June 1, 2009, to June 20, 2009.

In NOPUS Controlled Intersection Study, trained data collectors observe restraint use of drivers and other occupants of passenger vehicles having no commercial or government markings that have stopped at a stop sign or stoplight during daylight hours between 7 a.m. and 6 p.m. Observations are made both on the surface streets and at the ends of the expressway exit ramps (when there are controlled intersections). Only stopped vehicles are observed to permit time to collect the variety of information required by the survey, including subjective assessments of vehicle occupants' age and race. Observers collect data on the driver, right-front passenger, and up to two passengers in the second row of seats. Observers do not interview vehicle occupants so that NOPUS can capture the untainted behavior of occupants.

NOPUS Controlled Intersection Study is always done following NOPUS Moving Traffic Study and is usually scheduled for all surface streets and limited access highway ramps, where NOPUS data from previous years indicate that a controlled intersection existed. If the data collectors arrive at an assigned surface street site and the site is not controlled, they are instructed to search for an alternative. The data collectors usually move down the roadside and record vehicle and occupant characteristics. Once the traffic light turns green or they finish observing all vehicles, the data collectors return to the intersection to wait for the next traffic light cycle or next vehicle. They observe vehicles in the lane closest to their observational position, even if the closest lane is an exclusive turn lane (which is often the case at the controlled intersections.) When possible and if visibility allowed, the data collectors also observe other lanes of the traffic. The data collectors are instructed to record the first behavior of the driver they observe.

Regardless of road type, vehicles are observed for 40 minutes at the assigned intersections. Since data collection for the CI survey is immediately after completion the MT survey, no additional vehicles counts are conducted at controlled intersections. Instead, the independent counts from the MT survey observation sites are used for the corresponding CI survey sites.

Estimation

NOPUS estimates the rate of occupants restrained in restraint type (R) among the occupants having characteristic (C) using the formula,

$$\text{Restraint Use}_{CR} = \frac{\sum_{i,j,k} w_{ijk} F_{ijk} CR_{ijk}}{\sum_{i,j,k} w_{ijk} F_{ijk} C_{ijk}}$$

where w_{ijk} and F_{ijk} , respectively, denote the base weight and the product of various weight adjustment factors at the site k in the stratum j of the PSU i . CR_{ijk} stands for the number of observed occupants having characteristic C and restrained in restraint type R and C_{ijk} denotes the number of observed occupants having characteristic C at the site k in the stratum j of the PSU i . For example, the seat belt use by vehicle type is estimated using the above formula, where CR_{ijk} is the number of observed belted occupants in certain type of vehicles (such as passenger cars, vans & SUVs, or pickup trucks) and C_{ijk} is the number of ALL (belted and unbelted) occupants observed in that type of vehicles at the site k in the stratum j of the PSU i .

In certain instances, NHTSA does not provide estimates. These are typically restraint use estimates whose numerator is based on fewer than five persons observed, whose denominator is based on fewer than 30 people observed, or the estimates are not statistically different from 0 percent (i.e., the standard error is at least half the point estimate). These are reported as “NA” in publications. Any related estimate (i.e., change in use and confidence estimates) is not reported as well. The same criteria are used in reporting estimates from the NSUBS survey.

6. References

- [1] Pickrell, T. M., & Ye, T. J. (2009, September). *Seat Belt Use in 2009 – Overall Results*. DOT HS 811 100. Washington, DC: National Highway Traffic Safety Administration.
- [2] Pickrell, T. M., & Ye, T. J. (2009, December). *Motorcycle Helmet Use in 2009 – Overall Results*. DOT HS 811 254. Washington, DC: National Highway Traffic Safety Administration.
- [3] Pickrell, T. M., & Ye, T. J. (2009, August). *Seat Belt Use in 2008 – Demographic Results*. DOT HS 811 183. Washington, DC: National Highway Traffic Safety Administration.
- [4] Pickrell, T. M., & Ye, T. J. (2009a, May). *Seat Belt Use in Rear Seats in 2008*. DOT HS 811 133. Washington, DC: National Highway Traffic Safety Administration.
- [5] Pickrell, T. M., & Ye, T. J. (2009b, May) *Child Restraint Use in 2008 – Overall Results*. DOT HS 811 135. Washington, DC: National Highway Traffic Safety Administration.
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- [7] Pickrell, T. M., & Ye, T. J. (2009c, May). *Booster Seat Use in 2008*. DOT HS 811 121. Washington, DC: National Highway Traffic Safety Administration.
- [8] Pickrell, T. M., & Ye, T. J. (2009d, May). *Child Restraint Use in 2008 – Use of Correct Restraint Types*. DOT HS 811 132. Washington, DC: National Highway Traffic Safety Administration.

Appendix: Definitions

- Vehicle occupants observed in the NOPUS survey are counted as “belted” if they appeared to have a shoulder belt across the front of the body. NOPUS does not observe the use of lap belts because these restraints cannot be reliably observed from the roadside.

The survey classifies a child as:

- restrained in a rear-facing safety seat if the child appears to be on a seat on top of the vehicle seat, faced the rear of a vehicle, and there are harness straps across the front of the child;
 - restrained in a front-facing safety seat if the child appears to be on a seat on top of the vehicle seat, faced the front of a vehicle, and there are harness straps across the front of the child;
 - restrained in a high-backed booster seat if the child appears to be on a seat on top of the vehicle seat and there is a shoulder belt across the front of the child; and
 - restrained in a seat belt or backless booster seat if there is a shoulder belt across the front of the child but the observers cannot see whether the child is in a seat on top of the vehicle seat.
 - A child is considered restrained if s/he is restrained in any of these (a rear-facing safety seat, front-facing safety seat, high-backed booster seat, or seat belt or backless booster seat). The remaining children are classified as unrestrained. Note that in the survey there is no such notion of being “unrestrained” in, for example, a front-facing safety seat. NOPUS does not observe the use of lap belts, and does not distinguish between seat belts and backless booster seats, because these assessments cannot be reliably observed from the roadside.
- The racial categories “black,” “white,” and “members of other races” in NOPUS reflect subjective characterizations by roadside observers regarding the race of vehicle occupants. Likewise observers record all age group (8-15 years old, 16-24 years old, 25-69 years old, and 70 or older) that best fits their visual assessment of each observed occupant.
 - "Expressways" are defined as roadways with limited access, while "surface streets" comprise all other roadways.
 - A roadway is defined to have "fast traffic" if during the observation period the average speed of passenger vehicles that passed the observer(s) exceeded 50 mph, with "medium-speed traffic" defined as 31 to 50 mph and "slow traffic" defined as 30 mph or slower. The traffic speed data in the CI survey are matched to the MT survey data.
 - A roadway is defined to have "heavy traffic" if the average number of vehicles per lane mile on the roadway during the observation period exceeded 45 vehicles per lane mile, with "moderately dense traffic" defined as 26 to 45 vehicles per lane per mile and "light traffic" having at most 25 vehicles per lane per mile. The traffic density data in the CI survey are matched to the MT survey data.

- Since NOPUS is not a census but based on some probability sample, it is impossible to produce State-by-State restraint use results. However NOPUS can and does produce regional estimates using the following categories.
 - Northeast: ME, VT, NH, MA, RI, CT, NY, PA, NJ
 - Midwest: MI, OH, IN, IL, WI, MN, IA, MO, KS, NE, SD, ND
 - South: WV, MD, DE, VA, KY, TN, NC, SC, GA, FL, AL, MS, AR, LA, OK, TX, DC
 - West: AK, WA, OR, CA, NV, ID, UT, AZ, NM, CO, WY, MT, HI

These definitions of the four NOPUS regions are the same regional definitions used in the NSUBS.

DOT HS 811 414
November 2010



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

