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

NHTSA

DOT HS 813 186

September 2021

Occupant Restraint Use in 2020: Results From the NOPUS Controlled Intersection Study

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Suggested APA Format Citation:

Enriquez, J. (2021, September). *Occupant restraint use in 2020: Results from the NOPUS controlled intersection study* (Report No. DOT HS 813 186). National Highway Traffic Safety Administration.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT HS 813 186		

4. Title and Subtitle	5. Report Date
Occupant Restraint Use in 2020: Results From the NOPUS Controlled Intersection Study	September 2021
	6. Performing Organization Code NSA-210
7. Author Jacob Enriquez, National Center for Statistics and Analysis	**8. Performing Organization Report No.**
9. Performing Organization Name Mathematical Analysis Division National Center for Statistics and Analysis National Highway Traffic Safety Administration 1200 New Jersey Avenue SE Washington, DC 20590	**10. Work Unit No. (TRAIS)**
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address National Highway Traffic Safety Administration 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
Bowhead Logistics Solutions LLC contributed to the production of this report.

16. Abstract

This report presents results from the 2020 National Occupant Protection Use Survey (NOPUS) Controlled Intersection Study, the only nationwide probability-based occupant restraint use survey. NHTSA's National Center for Statistics and Analysis conducts this survey annually. The 2020 NOPUS found no significant changes in seat belt use in front seats as well as seat belt use in rear seats from 2019 to 2020 across all demographics and characteristics. Seat belt use in the front seats continued to be lower for males (88.4%) than females (92.8%). Seat belt use continued to be lower in rear seats (80.0%) than in front seats (90.3%). Restraint use for children from birth to age 7 in 2020 was 93.6 percent, not statistically different from 91.3 percent in 2019.

17. Key Words	18. Distribution Statement
seat belt use, child restraint use, observational survey, demographics, rear-seat seat belt use, occupant protection, NOPUS, controlled intersections, car seat	This document is available from the National Technical Information Service, www.ntis.gov.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	34	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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Definitions

The estimates computed from the 2020 National Occupant Protection Use Survey (NOPUS) Controlled Intersection Study reflect the population of all occupants on the road at a typical daylight moment, not just those at intersections.

Vehicle occupants observed in the NOPUS survey are counted as "belted" if they appear 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 follows:

- Restrained in a rear-facing car seat if the child appears to be on a seat on top of the vehicle seat, facing the rear of the vehicle, with harness straps across the front of the child.
- Restrained in a forward-facing car seat if the child appears to be on a seat on top of the vehicle seat, facing the front of the vehicle, with 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 with a shoulder belt across the front of the child.
- 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 if the child is in a seat on top of the vehicle seat.
- Restrained if the child is restrained by any of the above.
- The remaining children are classified as unrestrained. Note that in the survey there is no mention of being "unrestrained" in, for example, a forward-facing car 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 reliable if observed from the roadside.

The racial categories "Black," "White," and "Members of other races" in the NOPUS reflect subjective characterizations by roadside observers regarding the race of vehicle occupants. Likewise, observers record age groups (8 to 15 years old, 16 to 24 years old, 25 to 69 years old, and 70 and older) that best fit their visual assessment of each observed occupant.

"Expressways" are defined as roadways with limited access, while "surface streets" are all other roadways.

A roadway is defined to have "fast traffic" during the observation period if the average speed of passenger vehicles passing the observers exceeds 50 mph, with "medium-speed traffic" defined as 31 mph to 50 mph, and "slow traffic" defined as 30 mph or slower.

A roadway is defined to have "heavy traffic" during the observation period if the average number of vehicles on the roadway is greater than 5 per lane per mile, with "moderately dense traffic" defined as greater than 1 but less than or equal to 5 vehicles per lane per mile, and "light traffic"

as less than or equal to 1 vehicle per lane per mile. Please note that this traffic density breakdown was revised in the 2011 NOPUS to better capture the traffic patterns.

The NOPUS sample design does not allow for State-by-State restraint use estimates; however, NOPUS produces estimates by region, defined as follows:

Northeast: Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Midwest: Iowa, Kansas, Illinois, Indiana, Michigan, Minnesota, Missouri, North Dakota, Nebraska, Ohio, South Dakota, and Wisconsin.

South: Alabama, Arkansas, the District of Columbia, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

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 under age 8, and driver electronic device use in the United States. The National Highway Traffic Safety Administration's National Center for Statistics and Analysis (NCSA) conducts this survey annually. Two sub-surveys – the Moving Traffic Survey and the Controlled Intersection Study – comprise the NOPUS.

In the Controlled Intersection Study, occupants of passenger vehicles are observed from the roadside at intersections controlled by stop signs or stoplights. Only stopped vehicles are observed to allow ample time to collect a variety of information required by the survey. NOPUS derives its estimates of seat belt use in rear seats, child restraint use, driver electronic device use, and demographic characteristics of vehicle occupants from the Controlled Intersection Study. Estimates from this study reflect the population of all occupants on the road at a typical daylight moment, not just those at intersections. Details about the NOPUS sample design are in Section 5 of this report.

This report presents results of occupant restraint use from the 2020 NOPUS Controlled Intersection Study. NHTSA publishes the driver electronic device use results and the motorcycle helmet use results in separate research notes. The following are the major findings from the 2020 NOPUS Controlled Intersection Study.

Front Seat Belt Use (Among Occupants 8 and Older):

- Overall front seat belt use in 2020 was 90.3 percent, not statistically different at the 0.05 level from 90.7 percent in 2019. There were no significant changes in front seat belt use from 2019 to 2020 across all demographics and characteristics.
- Seat belt use continued to be lower for males (88.4%) than females (92.8%).
- Seat belt use continued to be lower among 16- to 24-year-olds (86.9%) than other age groups.
- Seat belt use continued to be lower among Black occupants (85.2%) than White occupants (90.5%) and members of other races (92.8%).

Rear Seat Belt Use (Among Occupants 8 and Older):

- There were no significant changes in rear-seat belt use from 2019 to 2020 across all demographics and characteristics.
- Seat belt use continued to be lower in rear seats (80.0%) than in front seats (90.3%).
- The difference in rear-seat belt use between States requiring belt use in all seating positions (80.4%) and States requiring belt use only in front seats (78.4%) has not been this close in the last 16 years.

Child Restraint Use (for Children From Birth to 7 Years Old):

- Restraint use for children from birth to 7 years old in 2020 was 93.6 percent, not statistically different from 91.3 percent in 2019.

- Child restraint use in the south and midwest regions increased for the last 2 years, causing these two regions to tie with the west region which had a 94.4 percent child restraint use rate in 2020.
- Restraint use for children driven by belted drivers (95.7%) continued to be significantly higher than for those driven by unbelted drivers (67.4%).
- Rear seat placement among children from birth to 7 years old in 2020 was 92.7 percent, not statistically different from 94.5 percent in 2019.

1 Introduction

The NOPUS is the only nationwide probability-based survey of seat belt use for occupants of age 8 and older in both front and rear seats, motorcycle helmet use, child restraint use for children under age 8, and driver electronic device use in the United States. NCSA conducts the NOPUS annually. Two sub-surveys, the Moving Traffic Survey and the Controlled Intersection Study, comprise the NOPUS.

In the Moving Traffic Survey, front-seat occupant shoulder belt use data and motorcyclist helmet use data are collected either at the roadside or by data collectors in vehicles (on expressways). NOPUS estimates of front-seat belt use and motorcycle helmet use are from the Moving Traffic Survey. The collective front-seat belt use estimate (also known as NHTSA's national seat belt estimate) is described in Seat Belt Use in 2020 - Overall Results (NCSA, 2020).

In contrast, the NOPUS Controlled Intersection Study data are collected at intersections controlled by stop signs or stoplights, where vehicle occupants are observed from the roadside. Since the vehicles are stationary, data collectors have enough time to record occupants' characteristics such as race, age, and sex. The 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 Controlled Intersection Study.

Only motorcycles and passenger vehicles (passenger cars, pickup trucks, SUVs, and vans) are observed in the NOPUS. The population of interest includes all 50 States and the District of Columbia, with the sample observation sites consisting of Federal, State, and county highways, residential streets, and rural roads. Data are collected only during daylight hours when light is adequate to observe seat belt use through the vehicle windshield.

The 2020 NOPUS data were collected from July 27 to August 16, 2020, which is two months later than the usual time frame due to the coronavirus pandemic. In a typical year, data are collected in early June, immediately following the *Click It or Ticket* campaign. The 2020 NOPUS survey data are based on the results of 65,387 occupants observed in 48,090 vehicles, which are respectively 9 percent and 8 percent less than the 2019 sample due to reduced traffic volume from the coronavirus pandemic. Of those observed occupants, 2,263 were children under age 8. More details on the NOPUS sampling, data collection, and estimation are discussed in Section 5: NOPUS Methodology.

Please note that the terms "significant" and "statistically significant" are used interchangeably throughout this report. "Significant" always means "statistically significant," and the statistical significance level is alpha = 0.05. In tables below, the data with *p*-values that are less than 0.05 are formatted in boldface type.

The percentages provided in this report are interpreted as the percentage of occupants during an average daylight moment.

2 Demographic Results in Front Seats

The national seat belt use estimate in 2020 was 90.3 percent, not a significant change from 90.7 percent in 2019 (NCSA, 2020). This section presents a demographic breakdown of the occupants who used seat belts in 2020. Table 1 presents passenger vehicle occupant seat belt use in front seats by demographic and other characteristics in 2019 and 2020. NOPUS demographics are highlighted below.

Age

Figure 1 and Table 1 show a comparison of seat belt use rates from 2019 and 2020 across four age groups. None of the age groups experienced a significant year-to-year change in seat belt use rate.

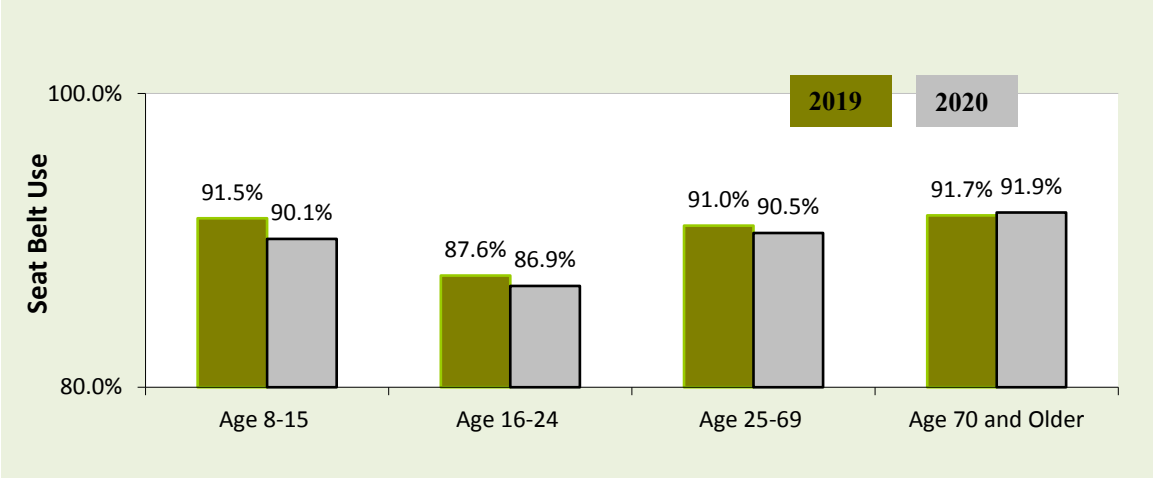

Figure 1. Seat Belt Use by Age for Occupants 8 and Older in 2019 and 2020

Figure 2 displays the trends of seat belt use for the four age groups over a 10-year period (2011-2020). Seat belt use among 16- to 24-year-olds has been consistently lower than other age groups.

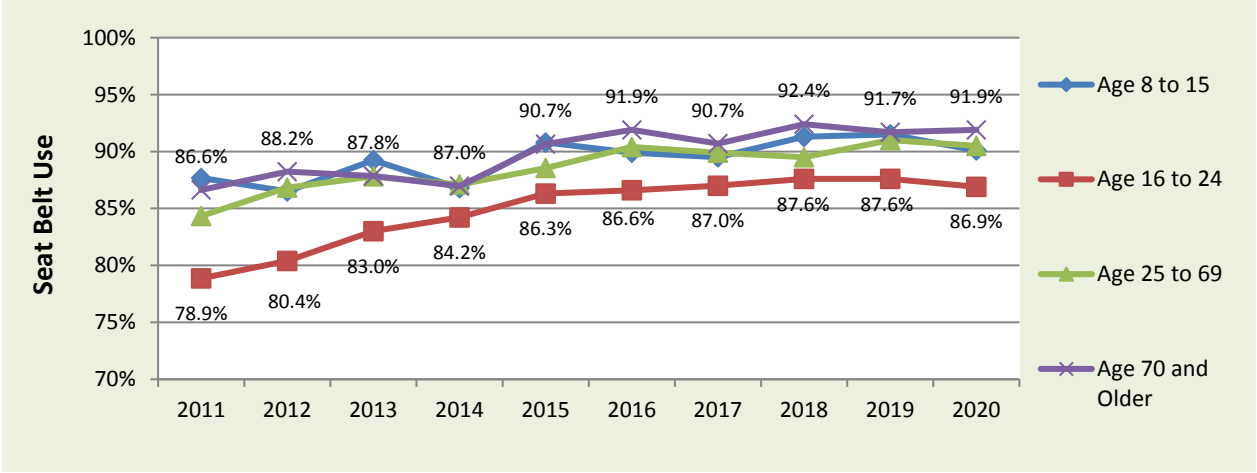

Figure 2. Seat Belt Use by Age for Occupants 8 and Older, 2011-2020

Sex

Figure 3 shows the trends of seat belt use for male and female occupants over a 10-year period (2011 to 2020). In 2020, seat belt use continued to be lower for males (88.4%) than for females (92.8%).

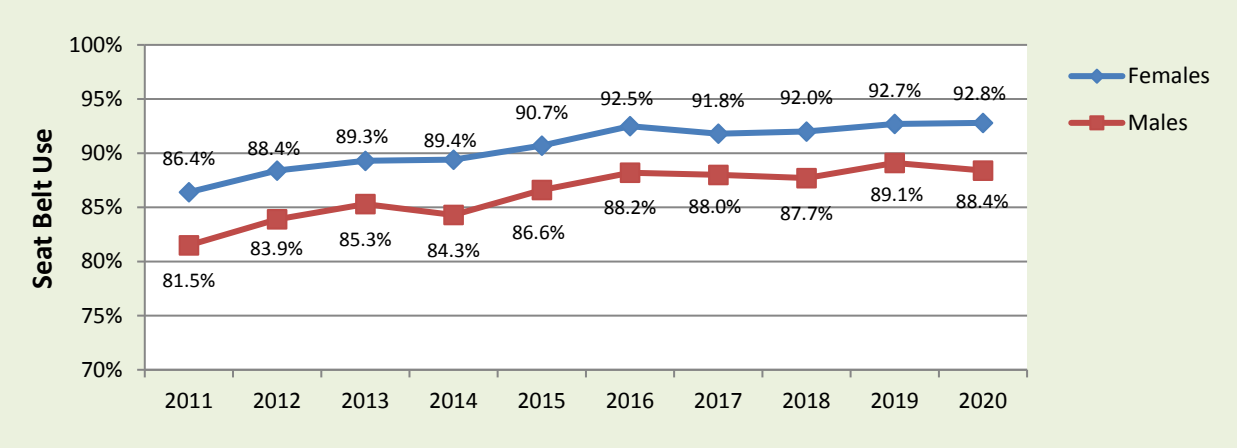

Figure 3. Seat Belt Use by Sex for Occupants 8 and Older, 2011-2020

Race

In the NOPUS, observed vehicle occupant race categories are Black, White, and members of other races. This characterization is based on the visual assessment of the data collectors who observe vehicle occupants from roadsides.

Figure 4 shows the trends of seat belt use among the three race categories over a 10-year period (2011 to 2020). In 2020 seat belt use continued to be lower among Black occupants than White occupants and members of other races. Furthermore, seat belt use for members of other races continued to be higher than for the other two race categories. There were no significant changes in seat belt use from 2019 to 2020 for any of the occupant race categories.

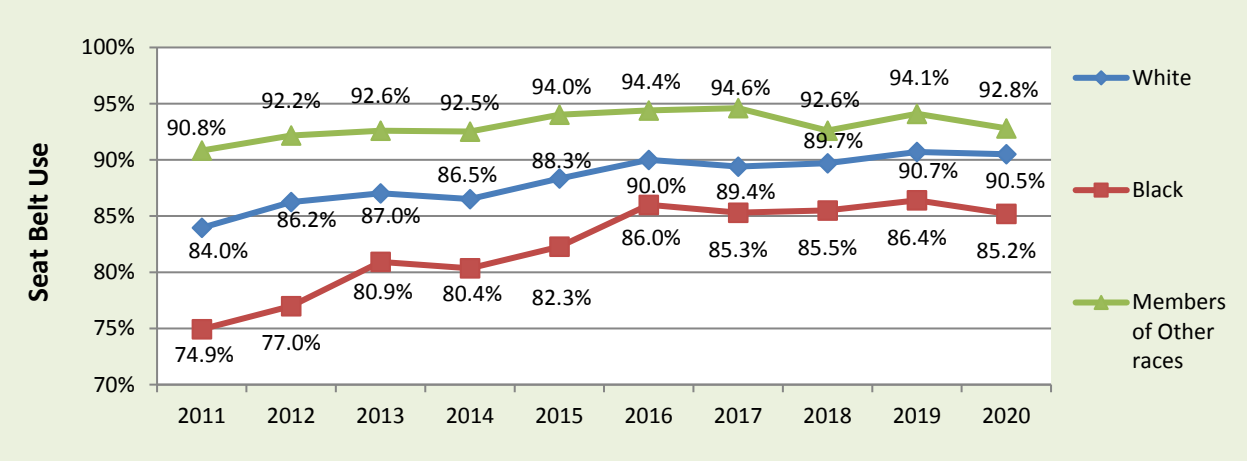

Figure 4. Seat Belt Use by Race for Occupants 8 and Older, 2011-2020

Presence of Passengers and Seat Belt Use

Figure 5 shows that seat belt use continued to be lower for a driver driving alone (89.7%) than for a driver driving with at least one passenger in the vehicle (92.3%).

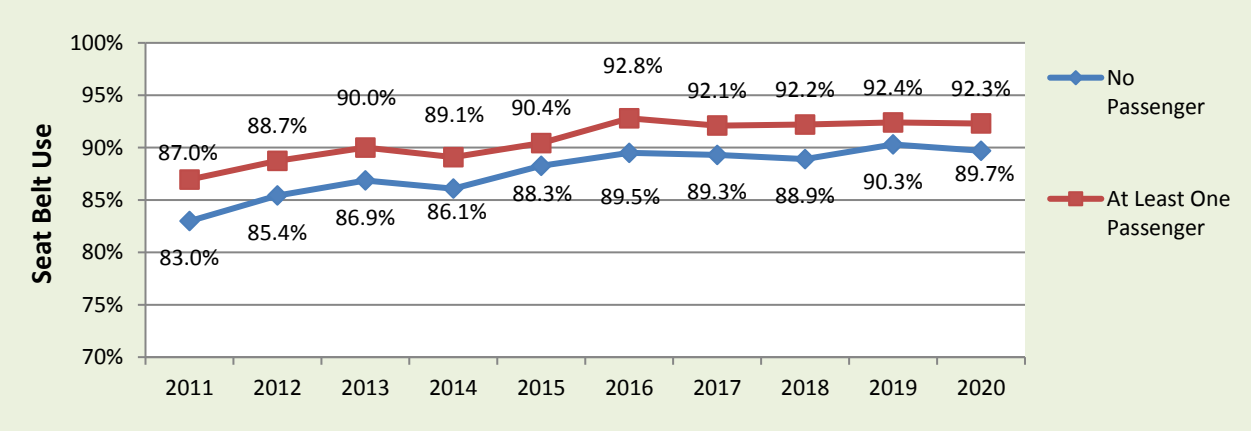

Figure 5. Passenger Effect on Seat Belt Use for Occupants 8 and Older, 2011-2020

Table 1. Passenger Vehicle Occupant Seat Belt Use in Front Seats (Ages 8 and Older) by Demographic and Other Characteristics

Occupant Group[1]	2019		2020		2019 – 2020 Change		
	Belt Use[2]	95% Confidence Interval[3]	Belt Use[2]	95% Confidence Interval[3]	Change in Percentage[7]	95% Confidence Interval[4]	*P*-value[5]
All Occupants	90.7%	(89.2, 92.0)	90.3%	(88.7, 91.7)	-0.4	(-1.9, 1.1)	0.58
Males[6]	89.1%	(87.4, 90.6)	88.4%	(86.7, 90.0)	-0.7	(-2.5, 1.1)	0.45
Females[6]	92.7%	(91.3, 93.8)	92.8%	(91.3, 94.0)	0.1	(-1.3, 1.5)	0.87
Occupants by Age Group[6]							
8 to 15	91.5%	(87.8, 94.1)	90.1%	(85.8, 93.3)	-1.4	(-6.0, 3.2)	0.55
16 to 24	87.6%	(84.6, 90.1)	86.9%	(84.6, 88.9)	-0.7	(-3.9, 2.4)	0.65
25 to 69	91.0%	(89.5, 92.3)	90.5%	(88.9, 92.0)	-0.4	(-1.9, 1.1)	0.56
70 and Older	91.7%	(89.6, 93.3)	91.9%	(90.2, 93.3)	0.2	(-1.5, 1.9)	0.79
Occupants by Race[6]							
White	90.7%	(89.1, 92.2)	90.5%	(88.8, 92.1)	-0.2	(-1.8, 1.4)	0.81
Black	86.4%	(81.6, 90.1)	85.2%	(78.7, 89.9)	-1.2	(-4.9, 2.5)	0.52
Members of Other Races	94.1%	(92.6, 95.4)	92.8%	(91.2, 94.1)	-1.4	(-3.1, 0.4)	0.12
Drivers With							
No Passengers	90.3%	(88.8, 91.6)	89.7%	(87.9, 91.3)	-0.6	(-2.2, 1.0)	0.44
At Least One Passenger	92.4%	(90.7, 93.9)	92.3%	(90.9, 93.6)	-0.1	(-1.8, 1.6)	0.91
Drivers With							
No Passengers	90.3%	(88.8, 91.6)	89.7%	(87.9, 91.3)	-0.6	(-2.2, 1.0)	0.44
Passengers All Under 8	91.9%	(87.4, 94.8)	90.5%	(86.1, 93.7)	-1.3	(-6.0, 3.3)	0.56
Passengers All 8 and Older	92.3%	(90.6, 93.7)	92.3%	(90.9, 93.5)	0.0	(-1.7, 1.8)	0.96
Some Passengers Under 8 and Some 8 or Older	95.4%	(94.0, 96.5)	94.5%	(91.1, 96.7)	-0.9	(-3.4, 1.6)	0.46
Drivers 16-24 With							
No Passengers	87.4%	(84.6, 89.7)	87.6%	(84.7, 90.0)	0.2	(-3.3, 3.8)	0.89
Passengers All 16-24	86.9%	(81.6, 90.9)	85.2%	(80.8, 88.8)	-1.7	(-7.9, 4.4)	0.57
At Least One Passenger Not 16-24	88.5%	(82.1, 92.8)	88.5%	(84.7, 91.4)	-0.1	(-6.9, 6.8)	0.99
Occupants 16-24 When							
All Occupants Are 16-24	86.8%	(83.5, 89.6)	86.2%	(83.4, 88.6)	-0.7	(-4.6, 3.3)	0.73
At Least One Occupant Is Not 16-24	89.5%	(85.8, 92.2)	88.5%	(85.6, 90.9)	-0.9	(-4.9, 3.1)	0.64

[1] Drivers and right-front passengers of passenger vehicles.
[2] Use of shoulder belts observed from 7 a.m. to 6 p.m.
[3] The Wilson confidence interval is used in the estimated percentages in the occupant group (e.g., occupants who are male), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/\left(2(n_{EFF} + t^2)\right)$, where p is the estimated percentage of Belt Use, $n_{EFF} = n/D_{EFF}$ is the effective sample size (where n is the sample size and D_{EFF} is the design effect), $t = t_{(1-\alpha/2)}(df)$, is a multiplier from the t-distribution with df degrees of freedom, and $q = 1 - p$. For percentages, these endpoints are multiplied by 100.

[4] The regular symmetric interval was used for the estimated change in percentage point, which is in the form: $p \pm t_{(1-\alpha/2)}(df)\sqrt{v(p)}$, where p is the estimated change in percentage point, $v(p)$ is its estimated variance, and $t_{(1-\alpha/2)}(df)$ is a multiplier from the t-distribution with df degrees of freedom.
[5] A p-value of 0.05 or less indicates that there is a statistically significant difference (at the alpha=0.05 level) between the year-over-year estimates for the group in question**; indicated in bold type**.
[6] The age, sex, and racial classifications are based on the subjective assessments of roadside observers.
[7] The "Change in Percentage Points" column was computed using unrounded estimates and may not equal the difference between the rounded estimates displayed in the table.
Source: NOPUS, 2019, 2020.

3 Seat Belt Use in Rear Seats

According to Federal Motor Vehicle Safety Standard (FMVSS) No. 208, Occupant Crash Protection, all passenger cars shall be equipped with integral lap and shoulder belts at every front outboard designated seating position and every rear designated seating position (except for side-facing seating positions). Using the 2020 vehicle registration data from the National Vehicle Population Profile (R. L. Polk & Co., n.a.), NHTSA estimated that 96.4 percent of passenger vehicles on the road have shoulder belts in the rear outboard seating positions. Of the 3.6 percent of vehicles that have only lap belts in the rear outboard seats, all observed rear-seat vehicle occupants are counted by NOPUS as *unbelted (not restrained with a shoulder belt)*, even if 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 availability of shoulder belts in these seating positions. Please note that NOPUS only observes up to two passengers in the second row of seats and none in the third row and beyond.

Table 3 presents results of seat belt use in rear seats of passenger vehicles in 2019 and 2020 as well as the changes between the 2 years. Some major results are highlighted below.

Seat Belt Use in Rear Seats Versus in Front Seats

Figure 6 displays the front and rear-seat belt use trends from 2011 to 2020. As in previous years, seat belt use in 2020 was lower in rear seats (80.0%) than in front seats (90.3%).

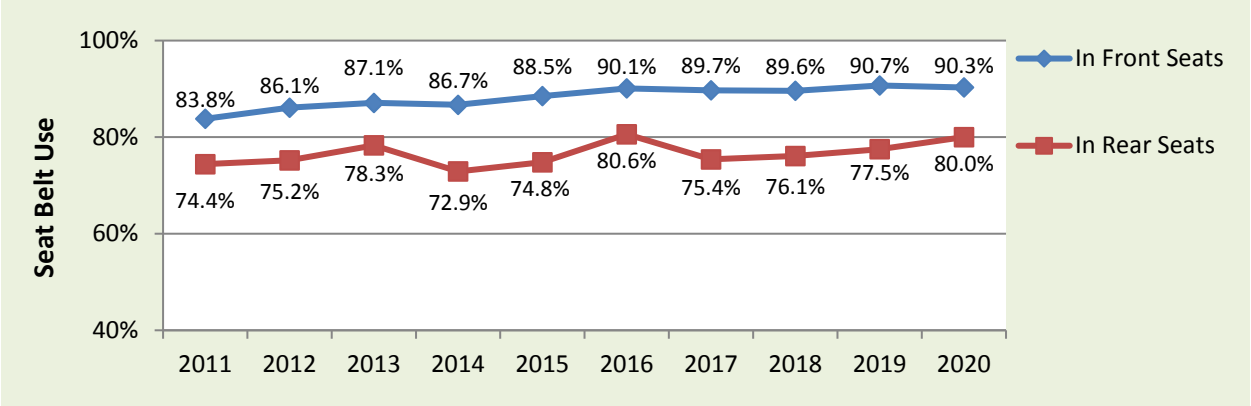

Figure 6. Seat Belt Use by Seating Position for Occupants 8 and Older, 2011-2020

State Laws and Rear-Seat Belt Use

At the time the 2020 NOPUS survey was conducted, 30 States and the District of Columbia required all vehicle occupants 18 and older to use seat belts when riding in rear seats (Highway Loss Data Institute, 2020). Please note that rear-seat belt use laws are secondary in Alabama, Idaho, Kansas, Maryland, Massachusetts, Montana, Nevada, New Jersey, North Carolina, Vermont, and Wyoming. Secondary seat belt laws state that a law enforcement officer may issue a ticket for not wearing a seat belt only when there is another citable traffic infraction. New Hampshire is the only State that does not have mandatory seat belt laws for adults 18 and older.

Table 2 is a list of States requiring seat belts be used in all seating positions.

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

Alabama	Alaska	California
Delaware	District of Columbia	Hawaii
Idaho	Illinois	Indiana
Kansas	Kentucky	Louisiana
Maine	Maryland	Massachusetts
Minnesota	Mississippi	Montana
Nevada	New Jersey	New Mexico
North Carolina	Oregon	Rhode Island
South Carolina	Texas	Utah
Vermont	Washington	Wisconsin
Wyoming		

States with laws in effect as of July 2020, requiring people 18 and older to use seat belts in all seating positions. The District of Columbia also included.
Source: Highway Loss Data Institute, 2021.

Figure 7 shows the trends of rear-seat belt use among passengers in the States with or without laws requiring belt use in all seating positions over the period 2011-2020. Rear-seat belt use in States with laws requiring belt use only in front seats increased from 68.0 percent in 2019 to 78.4 percent in 2020. Even though this is not a statistically significant increase, the difference in rear-seat belt use between States requiring belt use in all seating positions and States requiring belt use only in front seats has not been this close in the last 16 years.

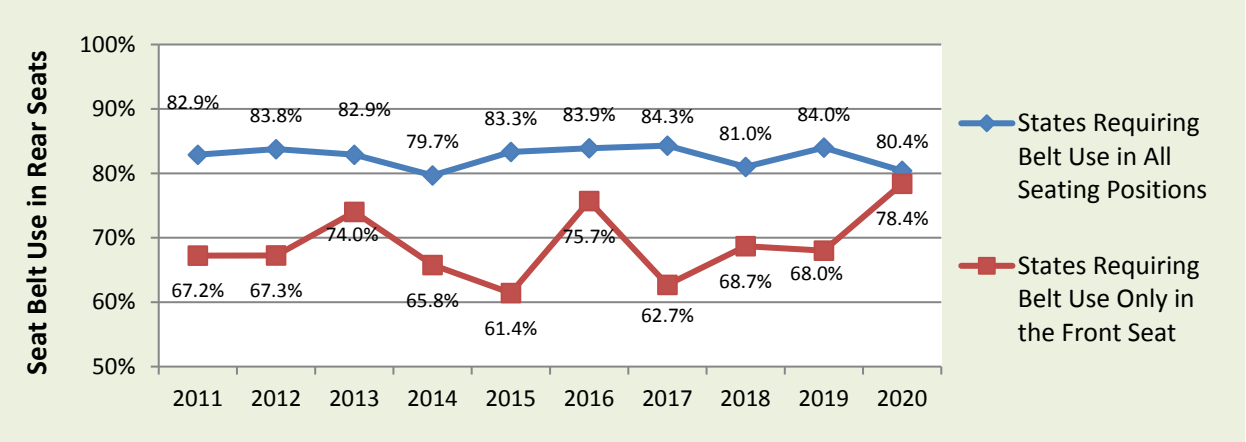

Figure 7. Seat Belt Use in Rear Seats by State Law Type for Occupants 8 and Older, 2011-2020

Similar to female occupants in front seats, seat belt use among female passengers in rear seats (82.2%) was higher than the seat belt use among male passengers in rear seats (78.2%). Seat belt use continued to be lower among Black occupants than White occupants and members of other races in both front and rear seats. None of the year-to-year changes in seat belt use in rear seats was statistically significant.

Table 3. Seat Belt Use in Rear Seats (Ages 8 and Older) of Passenger Vehicles, by Major Characteristics

Passenger Group[1]	2019		2020		2019 – 2020 Change		
	Belt Use[2]	95% Confidence Interval[3]	Belt Use[2]	95% Confidence Interval[3]	Change in Percentage[7]	95% Confidence Interval[4]	*P*-value[5]
All Passengers	77.5%	(71.2, 82.8)	80.0%	(74.9, 84.3)	2.5	(-4.9, 9.9)	0.50
Males[6]	76.2%	(70.7, 80.9)	78.2%	(72.7, 82.8)	2.0	(-4.5, 8.4)	0.53
Females[6]	78.9%	(70.1, 85.7)	82.2%	(75.7, 87.2)	3.2	(-7.3, 13.7)	0.53
Passengers by Age Group[6]							
8 to 15	83.9%	(78.6, 88.1)	88.6%	(83.1, 92.4)	4.7	(-1.1, 10.4)	0.11
16 to 24	75.1%	(67.8, 81.2)	78.6%	(72.1, 83.9)	3.5	(-5.1, 12.2)	0.41
25 to 69	71.1%	(59.2, 80.7)	72.1%	(62.5, 80.0)	0.9	(-15.2, 17.1)	0.90
70 and Older	85.0%	(69.4, 93.4)	85.0%	(70.6, 93.0)	0.0	(-18.1, 18.0)	1.00
Passengers by Race[6]							
White	81.2%	(77.8, 84.2)	80.8%	(76.3, 84.6)	-0.5	(-5.2, 4.3)	0.85
Black	65.0%	(51.4, 76.4)	69.9%	(55.1, 81.5)	5.0	(-13.9, 23.8)	0.59
Members of Other Races	73.5%	(58.2, 84.6)	83.2%	(74.1, 89.5)	9.7	(-8.1, 27.5)	0.27
Passengers in States With Laws Requiring Belts Be Used							
In All Seating Positions	84.0%	(78.9, 88.1)	80.4%	(74.4, 85.4)	-3.6	(-8.5, 1.3)	0.14
In Front Seats Only	68.0%	(54.8, 78.8)	78.4%	(67.7, 86.3)	10.5	(-9.6, 30.5)	0.29

[1] Up to two passengers observed in the second row of seats in passenger vehicles.
[2] Use of shoulder belts observed from 7 a.m. to 6 p.m.
[3] The Wilson confidence interval is used in the estimated percentages in the occupant group (e.g., occupants who are male), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/\left(2(n_{EFF} + t^2)\right)$, where p is the estimated percentage of Belt Use, $n_{EFF} = n/D_{EFF}$ is the effective sample size (where n is the sample size and D_{EFF} is the design effect), $t = t_{(1-\alpha/2)}(df)$, is a multiplier from the t-distribution with df degrees of freedom, and $q = 1 - p$. For percentages, these endpoints are multiplied by 100.
[4] The regular symmetric interval was used for the estimated change in percentage point, which is in the form: $p \pm t_{(1-\alpha/2)}(df)\sqrt{v(p)}$, where p is the estimated change in percentage point, $v(p)$ is its estimated variance, and $t_{(1-\alpha/2)}(df)$ is a multiplier from the t-distribution with df degrees of freedom.
[5] A p-value of 0.05 or less indicates that there is a statistically significant difference (at the alpha=0.05 level) between the year-over-year estimates for the group in question, **indicated in bold type**.
[6] The age, sex, and racial classifications are based on the subjective assessments of roadside observers.
[7] The "Change in Percentage Points" column was computed using unrounded estimates and may not equal the difference between the rounded estimates displayed in the table.
Source: NOPUS, 2019, 2020.

4 Child Restraint Use

In 2020, the NOPUS continued to collect roadside observational data on child restraint use for all children under 8 years old. Detailed results of child restraint use are presented in Tables 5, 6, and 7. Table 5 presents the results of child restraint use in passenger motor vehicles by major characteristics in 2019 and 2020 as well as the changes between the 2 years. Table 6 presents results on child rear seat placement by major characteristics in 2019 and 2020 as well as the changes between the 2 years. Table 7 divides the child occupants into three age groups and reports restraint use by some other characteristics among these groups. Some of the major results of child restraint use are discussed below.

Child Restraint Use Among All Children Under Age 8

Restraint use for children under age 8 in 2020 is 93.6 percent, up from 91.3 percent in 2019. Figure 8 shows the child restraint use trend since 2011.

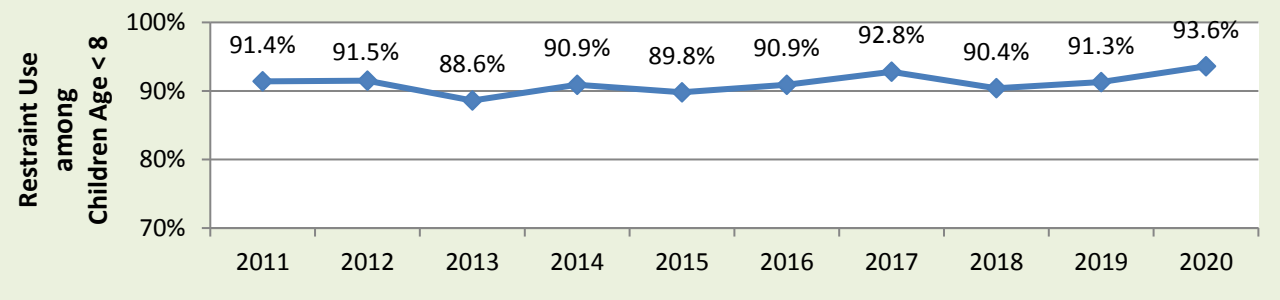

Figure 8. Child Restraint Use Among Children Under 8 Years Old, 2011-2020

Child Rear Seat Placement

Figure 9 shows the trends for each age group of rear-seat placement of children under age 8 from 2011 to 2020. The 2020 NOPUS found that 92.7 percent of children under age 8 rode in rear seats of vehicles. In the infant group (from birth to 12 months), 98.4 percent rode in rear seats. Nearly all (98.8%) children 1 to 3 years old and 87.3 percent of 4- to 7-year-olds were in rear seats in 2020. Rear seat placement among children driven by drivers 16 to 24 years old decreased from 99.0 percent in 2019 to 92.7 percent in 2020.

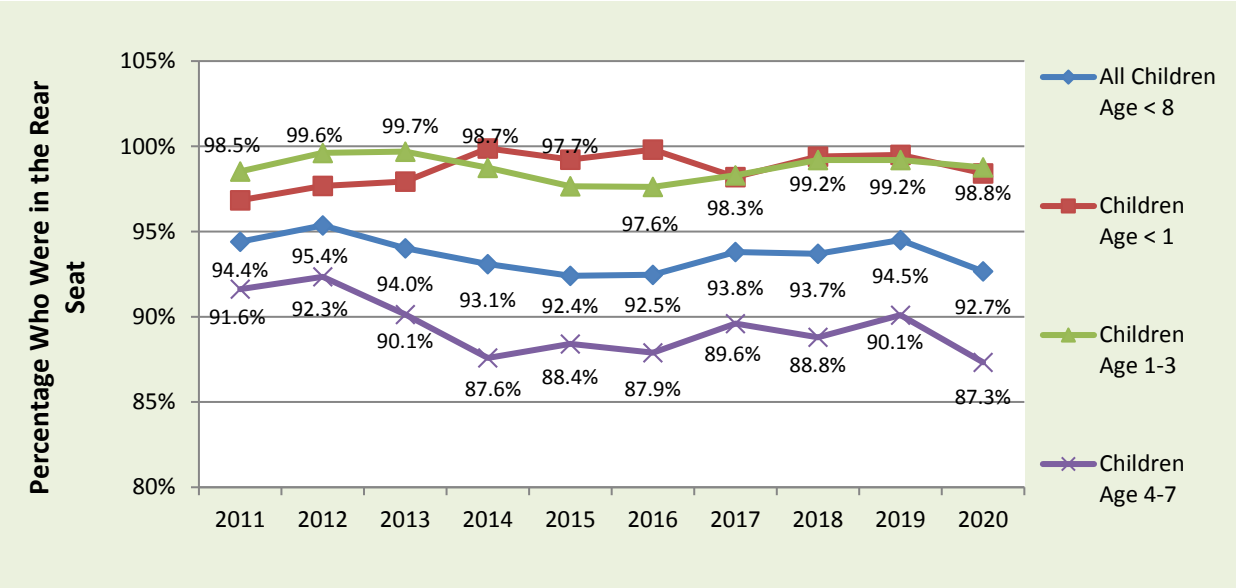

Figure 9. Child Rear Seat Placement, 2011-2020

At the time the 2020 survey was conducted, 11 States required children 5 and younger who weighed less than 80 pounds and were less than 54 inches tall, to ride in the rear seats of vehicles. Table 4 lists the States with child rear seat placement laws.

*Table 4. States With Laws Requiring Children 5 and Younger to Be in Rear Seats**

California	Georgia	Louisiana
Maine	Nebraska	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 July 27, 2020. In no other States did such laws take effect during the period June 27, 2019, to July 27, 2020. In Delaware, children 11 and younger and 65 inches or less must be in rear seats if passenger air bags are active.
Source: Highway Loss Data Institute, 2021.

Child Restraint Use by Region

There were no significant changes in child restraint use from 2019 to 2020 in any of the regions, as shown in Figure 10. Among all regions, the biggest change occurred in the Northeast. Child restraint use increased from 86.1 percent in 2019 to 91.4 percent in 2020.

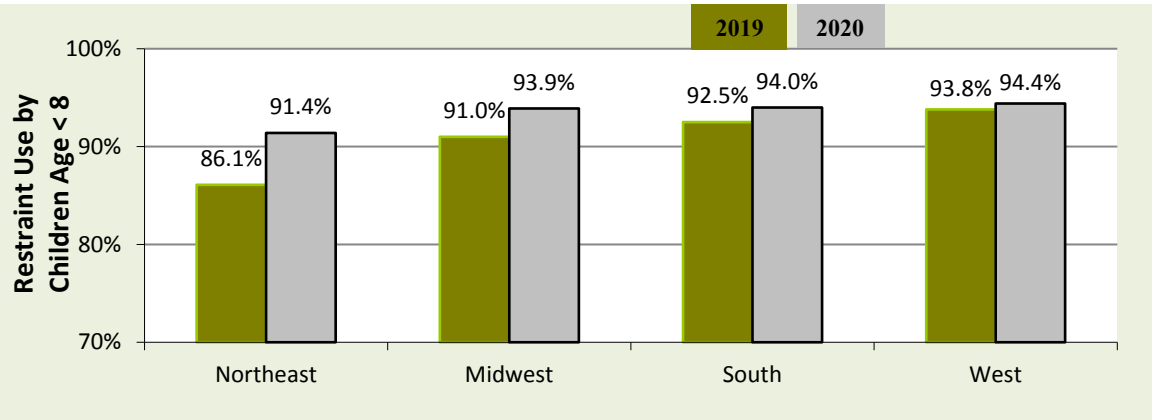

Figure 10. Child Restraint Use by Region in 2019 and 2020

Child restraint use in the south and midwest regions increased for the last 2 years, causing them to tie with the west region which has a 94.4 percent child restraint use rate in 2020 (Figure 11).

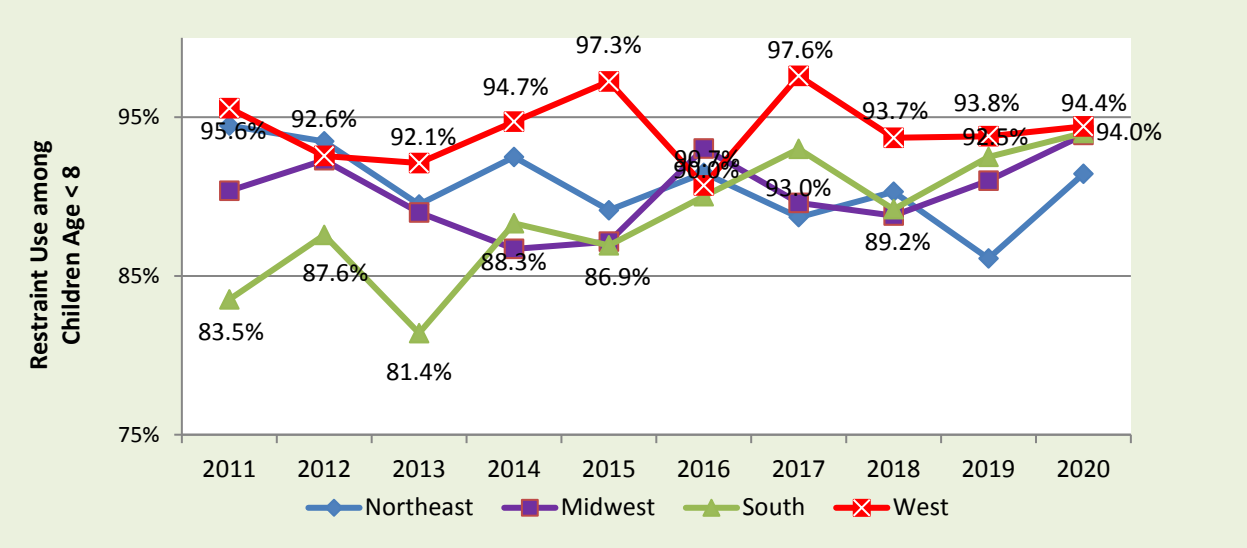

Figure 11. Child Restraint Use by Region, 2011-2020

Child Restraint Use by Time of Week

Child restraint use increased for each of the time of week categories; however, none are statistically significant (Figure 12).

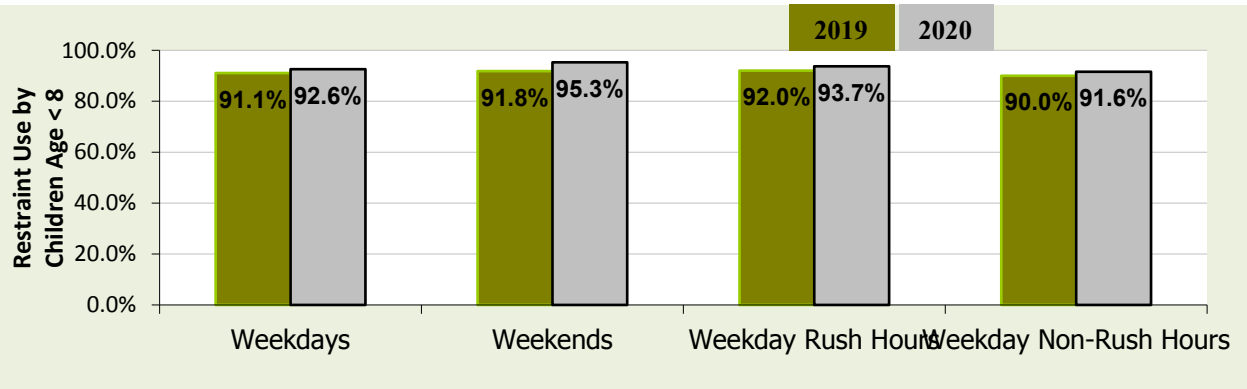

Figure 12. Child Restraint Use by Time of Week in 2019 and 2020

Child Restraint Use by Vehicle Type

Child restraint use increased for each of the vehicle types, with the largest increase coming from children traveling in pickup trucks. However, none of the increases are statistically significant (Figure 13).

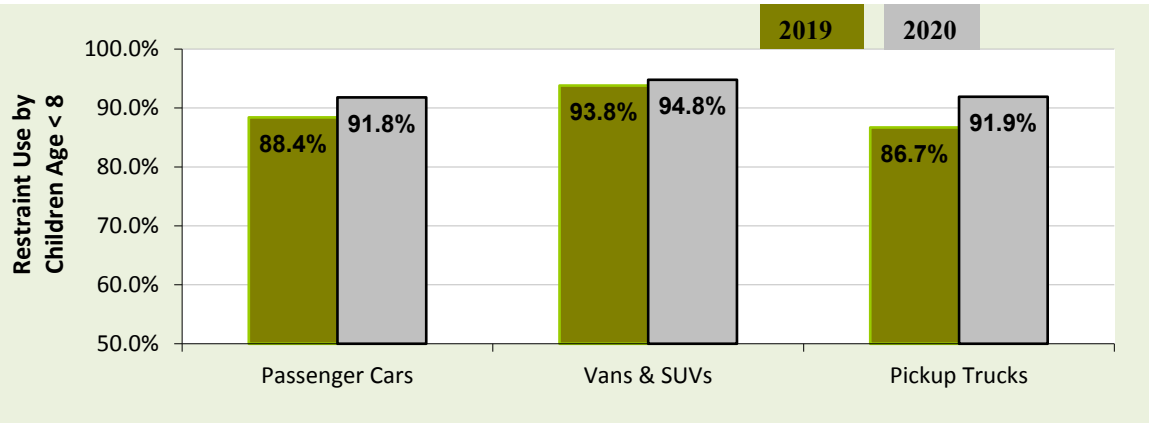

Figure 13. Child Restraint Use by Vehicle Type in 2019 and 2020

Child Restraint Use by Driver Type and Belt Use Status

As shown in Figure 14, restraint use for children driven by belted drivers continued to be significantly higher than for those driven by unbelted drivers.

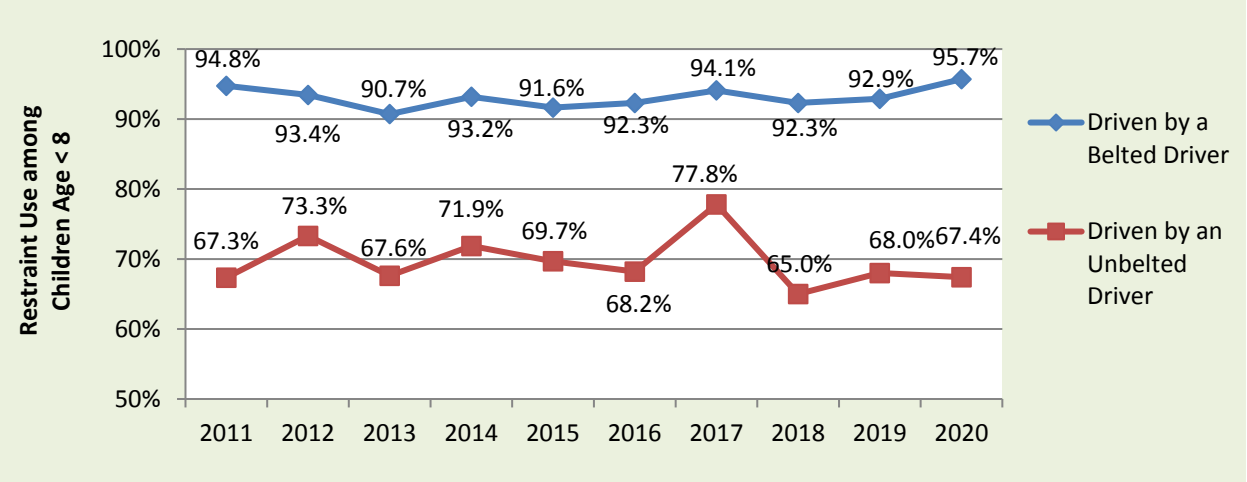

Figure 14. Child Restraint Use by Driver Belt Status, 2011-2020

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

Child Passenger Group[1]	2019		2020		2019 – 2020 Change		
	Restraint Use[2]	95% Confidence Interval[3]	Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[6]	Confidence in a Change in Use[4]	*P*-value[5]
All Child Passengers (From Birth to 7 Years)	91.3%	(88.8, 93.3)	93.6%	(91.0, 95.5)	2.3	(-0.5, 5.0)	0.10
0 (Infants)	98.6%	(94.7, 99.6)	98.5%	(95.1, 99.6)	-0.1	(-2.9, 2.8)	0.96
1-3	95.0%	(90.8, 97.4)	95.7%	(92.9, 97.5)	0.7	(-3.1, 4.6)	0.71
4-7	**86.8%**	**(83.3, 89.7)**	**91.0%**	**(87.4, 93.6)**	**4.2**	**(0.1, 8.3)**	**0.05**
Children Driven by							
a Belted Driver	**92.9%**	**(90.8, 94.6)**	**95.7%**	**(94.2, 96.9)**	**2.8**	**(0.8, 4.8)**	**0.01**
an Unbelted Driver	68.0%	(56.2, 77.9)	67.4%	(51.9, 79.9)	-0.6	(-18.5, 17.3)	0.94
a Male Driver	90.5%	(87.4, 93.0)	92.6%	(89.0, 95.0)	2.0	(-1.4, 5.4)	0.23
a Female Driver	91.8%	(89.0, 94.0)	94.5%	(91.6, 96.4)	2.6	(-0.4, 5.7)	0.09
a Driver 16 to 24	90.9%	(82.1, 95.6)	88.5%	(69.4, 96.3)	-2.4	(-17.5, 12.7)	0.75
a Driver 25 to 69	91.4%	(88.6, 93.6)	94.0%	(91.8, 95.7)	2.6	(-0.1, 5.3)	0.06
a Driver 70 and Older	89.9%	(67.8, 97.4)	90.8%	(70.4, 97.6)	0.9	(-17.4, 19.3)	0.92
a White Driver	93.2%	(90.6, 95.1)	94.3%	(91.4, 96.2)	1.1	(-1.8, 4.0)	0.45
a Black Driver	82.3%	(75.5, 87.5)	90.0%	(79.1, 95.6)	7.8	(-2.1, 17.7)	0.12
a Driver Who is a Member of Other Races	89.2%	(84.2, 92.8)	93.1%	(84.2, 97.2)	3.9	(-3.0, 10.8)	0.26
Children in							
Front Seats	77.1%	(62.1, 87.4)	84.0%	(70.6, 92.0)	6.9	(-9.7, 23.4)	0.40
Rear Seats	92.2%	(90.0, 93.9)	94.3%	(92.0, 96.0)	2.2	(-0.3, 4.7)	0.09
Child Passengers on							
Expressways	**92.9%**	**(90.2, 94.8)**	**96.1%**	**(93.3, 97.7)**	**3.2**	**(0.2, 6.2)**	**0.04**
Surface Streets	90.3%	(86.8, 92.9)	91.6%	(88.0, 94.1)	1.3	(-2.8, 5.4)	0.53
Child Passengers Traveling in							
Fast Traffic	93.2%	(90.9, 95.0)	95.0%	(92.2, 96.9)	1.8	(-0.8, 4.3)	0.16
Medium-Speed Traffic	90.9%	(86.5, 94.0)	94.5%	(91.7, 96.4)	3.6	(-0.1, 7.3)	0.06
Slow Traffic	88.2%	(82.7, 92.1)	88.2%	(80.0, 93.3)	0.0	(-8.4, 8.3)	1.00
Child Passengers Traveling in							
Heavy Traffic	**91.1%**	**(88.6, 93.1)**	**95.6%**	**(92.7, 97.4)**	**4.5**	**(1.3, 7.7)**	**0.01**
Moderately Dense Traffic	92.1%	(87.7, 95.1)	93.7%	(89.9, 96.2)	1.6	(-2.9, 6.1)	0.47
Slow Traffic	90.8%	(85.5, 94.3)	79.4%	(63.4, 89.6)	-11.4	(-25.5, 2.8)	0.11
Child Passengers Travelling Through							
Not Clear Weather Conditions	92.9%	(84.8, 96.8)	94.2%	(87.9, 97.3)	1.4	(-4.1, 6.9)	0.61
Clear Weather Conditions	91.2%	(88.8, 93.0)	93.5%	(90.8, 95.5)	2.4	(-0.5, 5.2)	0.10
Child Passengers in							
Passenger Cars	88.4%	(84.0, 91.8)	91.8%	(87.7, 94.7)	3.4	(-0.4, 7.2)	0.08
Vans and SUVs	93.8%	(90.8, 95.9)	94.8%	(91.1, 97.0)	1.0	(-2.8, 4.8)	0.59
Pickup Trucks	86.7%	(78.3, 92.2)	91.9%	(86.9, 95.1)	5.2	(-2.1, 12.4)	0.15
Child Passengers in the							
Northeast	86.1%	(79.6, 90.8)	91.4%	(88.0, 93.9)	5.3	(-2.2, 12.8)	0.16
Midwest	91.0%	(85.6, 94.5)	93.9%	(85.0, 97.6)	2.9	(-5.5, 11.2)	0.49
South	92.5%	(88.8, 95.1)	94.0%	(89.5, 96.6)	1.5	(-1.3, 4.2)	0.28
West	93.8%	(91.1, 95.6)	94.4%	(86.5, 97.8)	0.7	(-3.7, 5.0)	0.76

Child Passenger Group[1]	2019		2020		2019 – 2020 Change		
	Restraint Use[2]	95% Confidence Interval[3]	Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[6]	Confidence in a Change in Use[4]	*P*-value[5]
Child Passengers in							
Urban Areas	**91.1%**	**(88.4, 93.2)**	**94.9%**	**(92.7, 96.4)**	**3.8**	**(0.6, 7.0)**	**0.02**
Rural Areas	92.0%	(87.3, 95.0)	90.9%	(84.3, 94.8)	-1.1	(-6.5, 4.3)	0.68
Child Passengers Traveling During							
Weekdays	91.1%	(87.7, 93.6)	92.6%	(89.2, 95.0)	1.5	(-2.6, 5.6)	0.45
Rush Hours	92.0%	(88.4, 94.6)	93.7%	(88.7, 96.6)	1.7	(-3.2, 6.5)	0.49
Non-Rush Hours	90.0%	(84.2, 93.8)	91.6%	(87.7, 94.3)	1.6	(-4.4, 7.6)	0.59
Weekends	91.8%	(87.0, 94.9)	95.3%	(91.9, 97.3)	3.5	(-0.6, 7.6)	0.09

[1] Passengers under age 8 observed from 7 a.m. to 6 p.m. in the right-front seat or the second row of seats in passenger vehicles that are stopped at a stop sign or stoplight. Age, sex, and racial classifications are based on the subjective assessments of roadside observers.

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

[3] The Wilson confidence interval is used in the estimated percentages in the occupant group (e.g., occupants who are male), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/\left(2(n_{EFF} + t^2)\right)$, where p is the estimated percentage of Belt Use, $n_{EFF} = n/D_{EFF}$ is the effective sample size (where n is the sample size and D_{EFF} is the design effect), $t = t_{(1-\alpha/2)}(df)$, is a multiplier from the t-distribution with df degrees of freedom, and $q = 1 - p$. For percentages, these endpoints are multiplied by 100.

[4] The regular symmetric interval was used for the estimated change in percentage point, which is in the form: $p \pm t_{(1-\alpha/2)}(df)\sqrt{v(p)}$, where p is the estimated change in percentage point, $v(p)$ is its estimated variance, and $t_{(1-\alpha/2)}(df)$ is a multiplier from the t-distribution with df degrees of freedom.

[5] A p-value of 0.05 or less indicates that there is a statistically significant difference (at the alpha=0.05 level) between the year-over-year estimates for the group in question, **indicated in bold type**.

[6] The "Change in Percentage Points" column was computed using unrounded estimates and may not equal the difference between the rounded estimates displayed in the table.

Source: NOPUS, 2019, 2020.

Table 6. The Percentage of Children Who Rode in Rear Seats, by Major Characteristics

Child Passenger Group[1]	2019		2020		2019 – 2020 Change		
	Percentage Who Were in Rear Seat[2]	95% Confidence Interval[3]	Percentage Who Were in Rear Seat[2]	95% Confidence Interval[3]	Change in Percentage Points[6]	Confidence in a Change in Use[4]	*P*-value[5]
All Child Passengers (From Birth to 7 Years)	94.5%	(92.3, 96.1)	92.7%	(90.4, 94.5)	-1.9	(-5.1, 1.4)	0.25
0 (Infants)	99.5%	(98.5, 99.8)	98.4%	(95.6, 99.4)	-1.0	(-3.0, 0.9)	0.28
1-3	99.2%	(98.0, 99.7)	98.8%	(97.3, 99.4)	-0.4	(-1.7, 0.9)	0.53
4-7	90.1%	(86.5, 92.8)	87.3%	(83.3, 90.5)	-2.7	(-8.3, 2.8)	0.32
Child Passengers in States With[6]							
Law Requiring Children From Birth of 5 Years Be in Rear Seats	94.1%	(89.8, 96.6)	93.0%	(89.0, 95.6)	-1.1	(-6.9, 4.8)	0.71
No Such Law	94.6%	(92.3, 96.3)	92.6%	(89.8, 94.7)	-2.0	(-5.6, 1.5)	0.25
Children Driven by							
a Belted Driver	94.6%	(92.3, 96.2)	93.1%	(90.6, 94.9)	-1.5	(-4.9, 1.9)	0.36
an Unbelted Driver	93.4%	(87.1, 96.7)	87.9%	(81.1, 92.4)	-5.5	(-13.3, 2.3)	0.16
a Male Driver	95.2%	(92.1, 97.1)	93.3%	(90.0, 95.6)	-1.9	(-5.5, 1.7)	0.29
a Female Driver	94.1%	(91.5, 95.9)	92.1%	(88.7, 94.6)	-2.0	(-6.1, 2.2)	0.34
a Driver 16 to 24	99.0%	(97.0, 99.6)	92.7%	(81.7, 97.3)	-6.3	(-13.8, 1.3)	0.10
a Driver 25 to 69	93.9%	(91.5, 95.7)	92.8%	(90.7, 94.4)	-1.2	(-4.4, 2.1)	0.47
a Driver 70 and Older	97.6%	(92.9, 99.2)	86.3%	(62.8, 95.9)	-11.3	(-28.6, 6.0)	0.19
a White Driver	94.4%	(91.9, 96.1)	92.3%	(89.9, 94.2)	-2.0	(-5.3, 1.2)	0.21
a Black Driver	95.6%	(90.8, 97.9)	94.9%	(89.6, 97.6)	-0.6	(-6.2, 4.9)	0.82
a Driver Who is a Member of Other Races	94.5%	(89.9, 97.1)	92.5%	(84.9, 96.4)	-2.0	(-9.7, 5.7)	0.60
Child Passengers on							
Expressways	**97.3%**	**(95.0, 98.6)**	**93.0%**	**(89.7, 95.2)**	**-4.4**	**(-7.8, -1.0)**	**0.01**
Surface Streets	92.6%	(89.8, 94.6)	92.4%	(89.4, 94.6)	-0.2	(-4.2, 3.9)	0.94
Child Passengers Traveling in							
Fast Traffic	96.1%	(93.3, 97.8)	92.8%	(89.9, 94.9)	-3.3	(-6.8, 0.1)	0.06
Medium-Speed Traffic	93.7%	(90.9, 95.6)	93.1%	(89.6, 95.5)	-0.6	(-4.8, 3.7)	0.79
Slow Traffic	92.4%	(89.3, 94.7)	91.6%	(86.1, 95.1)	-0.8	(-6.0, 4.4)	0.76
Child Passengers Traveling in							
Heavy Traffic	95.2%	(92.9, 96.8)	93.0%	(89.9, 95.2)	-2.2	(-5.9, 1.5)	0.23
Moderately Dense Traffic	95.0%	(91.1, 97.2)	92.5%	(88.3, 95.2)	-2.5	(-8.3, 3.2)	0.38
Slow Traffic	88.6%	(81.6, 93.1)	91.1%	(86.2, 94.3)	2.5	(-4.4, 9.4)	0.47
Child Passengers Travelling Through							
Not Clear Weather Conditions	92.7%	(87.1, 95.9)	89.0%	(77.7, 95.0)	-3.6	(-12.8, 5.5)	0.42
Clear Weather Conditions	94.7%	(92.6, 96.3)	93.1%	(90.7, 94.9)	-1.7	(-4.8, 1.5)	0.28
Child Passengers in							
Passenger Cars	94.4%	(90.7, 96.7)	92.5%	(88.4, 95.2)	-1.9	(-6.4, 2.5)	0.39
Vans and SUVs	95.8%	(93.9, 97.1)	94.4%	(91.4, 96.4)	-1.4	(-4.8, 2.0)	0.41
Pickup Trucks	84.2%	(74.9, 90.6)	84.4%	(74.9, 90.7)	0.1	(-11.1, 11.4)	0.98
Child Passengers in the							
Northeast	**97.6%**	**(95.9, 98.6)**	**91.5%**	**(86.4, 94.8)**	**-6.1**	**(-10.4, -1.8)**	**0.01**
Midwest	93.3%	(89.4, 95.9)	91.0%	(84.1, 95.1)	-2.3	(-9.4, 4.7)	0.50
South	93.9%	(89.5, 96.6)	92.9%	(88.9, 95.6)	-1.0	(-7.0, 5.0)	0.73
West	94.3%	(87.1, 97.6)	95.1%	(92.7, 96.8)	0.8	(-3.5, 5.1)	0.70
Child Passengers in							
Urban Areas	**95.3%**	**(93.3, 96.7)**	**92.2%**	**(89.4, 94.3)**	**-3.1**	**(-6.2, -0.0)**	**0.05**
Rural Areas	92.6%	(88.1, 95.5)	93.7%	(90.1, 96.1)	1.1	(-4.2, 6.4)	0.67
Child Passengers Traveling During							
Weekdays	94.2%	(91.9, 95.8)	91.8%	(88.4, 94.2)	-2.4	(-6.1, 1.3)	0.19
Rush Hours	94.9%	(91.7, 96.9)	91.3%	(87.1, 94.3)	-3.6	(-8.0, 0.8)	0.10
Non-Rush Hours	93.3%	(90.8, 95.1)	92.2%	(87.6, 95.1)	-1.1	(-5.4, 3.2)	0.60
Weekends	95.2%	(91.9, 97.2)	94.2%	(91.2, 96.2)	-1.0	(-5.2, 3.3)	0.65

Child Passengers in a							
Rear-Facing Car Seat	99.6%	(98.5, 99.9)	99.6%	(98.4, 99.9)	0.0	(-1.1, 1.1)	0.99
Forward-Facing Car Seat	99.1%	(97.2, 99.7)	98.8%	(97.3, 99.5)	-0.3	(-2.1, 1.5)	0.76
High-Backed Booster Seat	99.4%	(96.5, 99.9)	100.0%	(100.0, 100.0)	0.6	(-0.6, 1.8)	0.34
Seat belt or Backless Booster Seat	89.2%	(84.5, 92.6)	85.9%	(80.9, 89.7)	-3.3	(-10.2, 3.6)	0.34
No Restraint Observed	85.5%	(76.8, 91.4)	81.7%	(69.1, 89.9)	-3.8	(-17.7, 10.1)	0.58

[1]Passengers under 8 observed from 7 a.m. to 6 p.m. in the right-front seat or the second row of seats in passenger vehicles that are stopped at a stop sign or stoplight. Age, sex, 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 Wilson confidence interval is used in the estimated percentages in the occupant group (e.g., occupants who are male), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/\left(2(n_{EFF} + t^2)\right)$, where p is the estimated percentage of Belt Use, $n_{EFF} = n/D_{EFF}$ is the effective sample size (where n is the sample size and D_{EFF} is the design effect), $t = t_{(1-\alpha/2)}(df)$, is a multiplier from the t-distribution with df degrees of freedom, and $q = 1 - p$. For percentages, these endpoints are multiplied by 100.

[4] The regular symmetric interval was used for the estimated change in percentage point, which is in the form: $p \pm t_{(1-\alpha/2)}(df)\sqrt{v(p)}$, where p is the estimated change in percentage point, $v(p)$ is its estimated variance, and $t_{(1-\alpha/2)}(df)$ is a multiplier from the t-distribution with df degrees of freedom.

[5] A p-value of 0.05 or less indicates that there is a statistically significant difference (at the alpha=0.05 level) between the year-over-year estimates for the group in question, **indicated in bold type**.

[6] The "Change in Percentage Points" column was computed using unrounded estimates and may not equal the difference between the rounded estimates displayed in the table.

Source: NOPUS, 2019, 2020.

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

Child Passenger Group[1]	2019		2020		2019 – 2020 Change		
	Restraint Use[2]	95% Confidence Interval[3]	Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[6]	Confidence in a Change in Use[4]	*P*-value[5]
Infants (From Birth to 12 Months)							
Infants Driven by							
a Belted Driver	98.5%	(94.3, 99.6)	98.4%	(94.8, 99.5)	-0.1	(-3.0, 2.9)	0.97
an Unbelted Driver	100.0%	(100.0, 100.0)	NA	NA	NA	NA	NA
a Male Driver	99.7%	(98.2, 100.0)	96.5%	(88.8, 99.0)	-3.2	(-7.7, 1.3)	0.16
a Female Driver	98.0%	(91.8, 99.5)	100.0%	(100.0, 100.0)	2.0	(-1.1, 5.2)	0.20
Infants in							
Passenger Cars	96.4%	(86.2, 99.1)	97.8%	(91.0, 99.5)	1.4	(-5.1, 8.0)	0.66
Vans and SUVs	99.8%	(98.9, 100.0)	98.8%	(92.9, 99.8)	-1.0	(-3.6, 1.5)	0.41
Pickup Trucks	NA	NA	NA	NA	NA	NA	NA
Infants in the							
Northeast	100.0%	(100.0, 100.0)	NA	NA	NA	NA	NA
Midwest	100.0%	(100.0, 100.0)	96.9%	(82.4, 99.5)	-3.1	(-9.8, 3.5)	0.34
South	97.1%	(89.0, 99.3)	99.5%	(96.5, 99.9)	2.4	(-2.1, 6.8)	0.29
West	99.4%	(96.0, 99.9)	100.0%	(100.0, 100.0)	0.6	(-0.7, 2.0)	0.35
Infants in							
Urban Areas	98.2%	(92.6, 99.6)	98.6%	(93.7, 99.7)	0.4	(-3.4, 4.2)	0.83
Rural Areas	99.6%	(97.7, 99.9)	98.4%	(90.5, 99.7)	-1.2	(-4.7, 2.2)	0.47
Children 1 to 3							
Children 1-3 Driven by							
a Belted Driver	96.3%	(92.8, 98.1)	97.3%	(95.7, 98.3)	1.0	(-1.7, 3.7)	0.45
an Unbelted Driver	72.5%	(53.1, 86.0)	80.0%	(59.0, 91.7)	7.4	(-17.4, 32.2)	0.54
a Male Driver	94.8%	(89.1, 97.6)	95.5%	(91.8, 97.6)	0.7	(-4.5, 5.9)	0.78
a Female Driver	95.1%	(90.2, 97.6)	95.9%	(91.9, 98.0)	0.8	(-3.4, 5.0)	0.71
Children 1-3 in							
Passenger Cars	92.2%	(83.1, 96.6)	95.6%	(92.5, 97.5)	3.4	(-3.4, 10.3)	0.31
Vans and SUVs	97.1%	(93.7, 98.7)	95.7%	(90.4, 98.1)	-1.4	(-5.9, 3.1)	0.53
Pickup Trucks	92.9%	(77.9, 98.0)	96.4%	(91.5, 98.5)	3.5	(-5.8, 12.8)	0.45
Children 1-3 in the							
Northeast	93.1%	(81.7, 97.6)	97.3%	(90.8, 99.3)	4.3	(-6.0, 14.5)	0.40
Midwest	95.0%	(80.6, 98.8)	92.5%	(80.2, 97.4)	-2.5	(-14.3, 9.4)	0.67
South	94.8%	(87.1, 98.0)	95.8%	(91.1, 98.1)	1.1	(-4.5, 6.7)	0.70
West	97.5%	(96.4, 98.2)	96.9%	(89.1, 99.1)	-0.6	(-4.8, 3.6)	0.77
Children 1-3 in							
Urban Areas	96.2%	(92.7, 98.1)	97.0%	(94.4, 98.4)	0.7	(-2.9, 4.4)	0.68
Rural Areas	92.1%	(82.9, 96.6)	92.9%	(84.9, 96.8)	0.8	(-7.8, 9.3)	0.85
Children 4 to 7							
Children 4-7 Driven by							
a Belted Driver	**89.1%**	**(85.9, 91.6)**	**94.1%**	**(91.6, 95.9)**	**5.0**	**(1.4, 8.5)**	**0.01**
an Unbelted Driver	56.6%	(43.9, 68.5)	49.3%	(32.5, 66.3)	-7.3	(-26.8, 12.2)	0.45
a Male Driver	86.1%	(81.6, 89.6)	90.0%	(85.0, 93.5)	4.0	(-1.0, 8.9)	0.11
a Female Driver	87.4%	(82.6, 91.0)	91.9%	(87.9, 94.7)	4.6	(-1.1, 10.2)	0.11
Children 4-7 in							
Passenger Cars	83.8%	(77.7, 88.6)	87.4%	(80.5, 92.1)	3.5	(-3.2, 10.3)	0.29
Vans and SUVs	89.7%	(85.1, 93.0)	93.2%	(88.5, 96.0)	3.4	(-1.7, 8.5)	0.18
Pickup Trucks	80.2%	(69.0, 88.1)	89.4%	(81.8, 94.0)	9.2	(-2.1, 20.5)	0.11
Children 4-7 in the							
Northeast	77.1%	(67.1, 84.8)	87.2%	(81.4, 91.3)	10.0	(-2.0, 22.0)	0.10

Child Passenger Group[1]	2019		2020		2019 – 2020 Change		
	Restraint Use[2]	95% Confidence Interval[3]	Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[6]	Confidence in a Change in Use[4]	*P*-value[5]
Midwest	86.2%	(78.0, 91.6)	93.8%	(83.7, 97.8)	7.6	(-3.2, 18.5)	0.16
South	89.2%	(83.9, 93.0)	90.8%	(83.5, 95.1)	1.6	(-3.8, 7.0)	0.55
West	90.6%	(87.0, 93.3)	91.5%	(82.5, 96.1)	0.9	(-4.2, 6.0)	0.72
Children 4-7 in							
Urban Areas	**85.7%**	**(81.8, 89.0)**	**92.5%**	**(89.3, 94.8)**	**6.8**	**(2.1, 11.5)**	**0.01**
Rural Areas	89.6%	(83.5, 93.6)	88.1%	(80.0, 93.2)	-1.5	(-8.7, 5.7)	0.67

[1] Passengers under 8 observed from 7 a.m. to 6 p.m. in the right-front seat or the second row of seats in passenger vehicles that are stopped at a stop sign or stoplight. Age, sex, and racial classifications are based on the subjective assessments of roadside observers.

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

[3] The Wilson confidence interval is used in the estimated percentages in the occupant group (e.g., occupants who are male), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/\left(2(n_{EFF} + t^2)\right)$, where p is the estimated percentage of Belt Use, $n_{EFF} = n/D_{EFF}$ is the effective sample size (where n is the sample size and D_{EFF} is the design effect), $t = t_{(1-\alpha/2)}(df)$, is a multiplier from the t-distribution with df degrees of freedom, and $q = 1 - p$. For percentages, these endpoints are multiplied by 100.

[4] The regular symmetric interval was used for the estimated change in percentage point, which is in the form: $p \pm t_{(1-\alpha/2)}(df)\sqrt{v(p)}$, where p is the estimated change in percentage point, $v(p)$ is its estimated variance, and $t_{(1-\alpha/2)}(df)$ is a multiplier from the t-distribution with df degrees of freedom.

[5] A p-value of 0.05 or less indicates that there is a statistically significant difference (at the alpha=0.05 level) between the year-over-year estimates for the group in question, **indicated with bold type**.

[6] The "Change in Percentage Points" column was computed using unrounded estimates and may not equal the difference between the rounded estimates displayed in the table.

NA: Data was not sufficient to produce a reliable estimate.

Source: NOPUS, 2019, 2020.

5 NOPUS Methodology

The NOPUS sample was redesigned in 2015 and that design has since been used to conduct the survey. This section discusses the sample design, data collection, and estimation used in the 2020 NOPUS Controlled Intersection Study. Data collection, estimation, and variance estimation for NOPUS are conducted by Westat, Inc., under the direction of the NCSA under Federal contract number 693JJ918D000001.

Sample Design

The NOPUS uses a complex multistage probability sample, statistical data editing, imputation for unknown values, and complex estimation procedures. The sample sites for the 2020 NOPUS were entirely from the 2015 NOPUS sample redesign.

The redesigned NOPUS sample was selected using a stratified two-stage design. The first stage of selection was the individual county or set of adjacent counties, referred to as the primary sampling unit (PSU) within the design framework. The PSUs were targeted for selection based on their measure of size (MOS). A sample of 57 primary sampling units (PSUs) were selected from a frame of 1,588 PSUs.

The second stage of selection or secondary sampling unit (SSU), within the selected PSUs, is the road segment. At the road segment level, the NOPUS data collectors are then positioned so that they can efficiently observe seat belt use, motorcycle helmet use, and driver electronic device use.

The NOPUS sample frame of PSUs excluded Puerto Rico and the U.S. Territories. All other counties in the United States were included in the sampling frame with the exception of 37 counties and three areas in Alaska; these locations were excluded on the basis of low traffic volume measured in terms of vehicle miles traveled (VMT) or because they were geographically isolated. The sample frame of SSUs excluded segments along unnamed roads, cul-de-sacs, private roads, and a variety of other road types that have traditionally had very low traffic volume measured by VMT.

One PSU was sampled with certainty because of its large VMT, and the remaining PSUs were then grouped into the eight major strata based on the four Census region (Northeast, Midwest, South, and West) and two urbanicity classes (Urban and Rural).

A sample of 57 PSUs was selected using a Sequential Poisson method with probability approximately proportional to the VMT as the MOS (Ohlsson, 1998). The new NOPUS sample was selected to maximize PSU overlap with the old sample, thus maintaining comparability of the estimates from the current and previous samples. A SSU sample of road segments within each PSU is selected based upon the types of roads and urban/rural status with specified sampling rates.

Table 8 shows the observed sample sizes of the 2020 NOPUS Controlled Intersection Study. A total of 65,387 occupants were observed in 48,090 vehicles, which are respectively 9 percent and 8 percent less than the 2019 sample due to reduced traffic volume from the coronavirus pandemic. Of these observed occupants, 2,263 were children under 8. Please note that due to

ineligibility, construction, danger in the area, or road closure, observations could not be completed at some of the sampled observation sites.

Table 8. Sites, Vehicles, and Occupants in the 2020 NOPUS Controlled Intersection Study

Numbers of	2019	2020	Percentage Change
Sites Observed	1,615	1,629	0.9%
Vehicles Observed	52,268	48,090	-8.0%
Total Occupants	71,519	65,387	-8.6%
Occupants 8 and Older	68,598	63,124	-8.0%
In Front Seat	65,489	60,365	-7.8%
In Rear Seat	3,109	2,759	-11.3%
Occupants Under 8	2,921	2,263	-22.5%
Children Under 1	413	282	-31.7%
Children 1 to 3	993	796	-19.8%
Children 4 to 7	1,515	1,185	-21.8%

Data Collection

The 2020 NOPUS data collection was conducted from July 27 to August 16, 2020, which is 2 months later than the usual time frame due to the coronavirus pandemic. In a typical year, data is collected in early June, immediately following the Click It or Ticket campaign.

Data collection protocols remain largely the same in the redesigned NOPUS from 2015; however, NHTSA made adjustments such as including government, emergency, and commercial vehicles, and those carrying hazardous materials. Such vehicles are subject to seat belt laws in relevant jurisdictions and should be observed.

In the NOPUS Controlled Intersection Study, trained data collectors observe restraint use of drivers and other occupants of passenger vehicles (passenger cars, pickup trucks, SUVs, and vans) that have stopped at a stop sign or stoplight during daylight hours from 7 a.m. to 6 p.m. Observations are made both on the surface streets and at the ends of the expressway exit ramps (where there are controlled intersections). Only stopped vehicles are observed based on the time required to collect the variety of information required by the survey, including subjective assessments of the vehicle occupant 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, allowing NOPUS to capture the uninfluenced behavior of the occupants.

The NOPUS Controlled Intersection Study is conducted annually following the NOPUS Moving Traffic Survey and is usually scheduled for all surface streets and limited access highway ramps, where NOPUS data from previous years indicate that a controlled intersection exists. If the data collectors arrive at an assigned surface street site and the site is not controlled, they are instructed to search for an alternate data collection site further along the same road segment. After the data

collectors have located a controlled intersection, they position themselves at the traffic signal or stop sign, facing the oncoming traffic from the side of the road. The data collectors walk in the direction of the oncoming traffic, away from the intersection to make their observations. When 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 allows, the data collectors also observe the other lanes of traffic. The data collectors are instructed to record the first behavior of the driver in which they observe.

Estimation

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

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

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 types 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 vehicle at the site k in the stratum j of the PSU *i*.

Note that estimates computed from the Controlled Intersection Study reflect the population of all occupants on the road at a typical daylight moment, not just those at intersections.

Prior to 2015, NHTSA's NOPUS publications reported integer percentage values for seat belt use point estimates. Along with updating the survey design, NHTSA has revised its NOPUS reporting format to be consistent with statistical best practices across the Federal Government. The new reporting format presents percentage point estimates with one decimal place. Along with this change, 95 percent confidence intervals and *p*-values accompany the point estimates.

In certain instances, NHTSA does not provide estimates. These are typically restraint use estimates whose numerator is based on fewer than five persons observed, or whose denominator is based on fewer than 30 people observed. 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.

6 References

Highway Loss Data Institute. (2020, February). *Seat belts* (Web page). Insurance Institute for Highway Safety. Available at www.iihs.org/topics/seat-belts#laws

National Center for Statistics and Analysis. (2021, February). *Seat belt use in 2020 – Overall results* (Traffic Safety Facts Research Note. Report No. DOT HS 813 072). National Highway Traffic Safety Administration. Available at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813072

Ohlsson, E. (1998). Sequential Poisson sampling. *Journal of Official Statistics, 14,* 149-162.

R. L. Polk & Co. (n.a.). National vehicle population profile.

DOT HS 813 186
September 2021

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

15362-092821-v3