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The 2019 National Survey of the Use of Booster Seats

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16. Abstract

This technical report presents results from the 2019 National Survey of the Use of Booster Seats (NSUBS), the only probability-based nationwide child restraint use survey in the United States that observes restraint use and interviews an adult occupant to collect age, sex, height, weight, race, ethnicity, and other data. NHTSA's National Center for Statistics and Analysis conducts the NSUBS.

The 2019 NSUBS found that 37.0 percent of 4- to 7-year-old children were restrained in booster seats in 2019 as compared to 40.1 percent in 2017 when the last NSUBS was conducted. This was not a statistically significant change. Restraint use for all children under 13 was 87.9 percent in 2019, not statistically different than the 2017 estimate of 90.1 percent. There were some indications of premature transition to restraint types that are not appropriate for children's age, height, and weight.

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Definitions and Categories in NSUBS

In the survey, an occupant is considered to be "restrained" if the occupant meets any of the following five definitions:

Rear-Facing Car Seat — The child occupant is in a seat that sits on top of the vehicle seat in such a way that the child faces the rear of the vehicle, and the harness straps are across the child's front. The harness straps must be secured.

Forward-Facing Car Seat — The child occupant is in a seat that sits on top of the vehicle seat in such a way that the occupant faces the front of the vehicle, and with harness straps that are across the child's front. The harness straps must be secured.

High-Backed Booster Seat — The child occupant is in a seat with a seat back that sits on top of the vehicle seat, and has a seat belt across the front of the child's body, whether lap or lap/shoulder. No harness is in use, but the child must be secured by the vehicle seat belt.

Backless Booster Seat — The child occupant is sitting on a platform with no seat back that sits on top of the vehicle seat, and has a seat belt across the front of the child's body, whether lap or lap/shoulder. No harness is in use, but the child must be secured by the vehicle seat belt.

Seat Belt — The occupant (of any age) is sitting on the vehicle seat and the seat belt is across front of the body (includes lap and shoulder belts or lap in the case of lap-only belts). In a lap/shoulder combination, the shoulder belt must be over the shoulder and cannot be under his or her arm.

Unrestrained — All other cases: no restraint type is used at all or the restraint type is used not as it is intended. This includes the seat belt not being buckled or the shoulder strap being placed behind the shoulder, or the harness straps being unbuckled.

Although the NSUBS collects children's individual ages, heights, and weights, we combine these results into categories in order to produce reliable estimates.

Age Categories
The NSUBS uses the following age categories: 0, 1-3, 4-7, 8-12, 13-15, 16-24, 25-69, and 70 and above for interview data. The choice of these age groups is motivated by consistency with the NOPUS survey, which uses the same age groups.

The age groups for the observation data are different since there is only one age group, 0-12 (referred to here as "up to 12" or "newborn to 12," depending on context) for children.

Height and Weight Categories
The NSUBS uses the following height categories: under 36 inches tall, 37 to 53 inches, 54 to 56 inches, and 57 inches or taller.

The survey uses the weight categories 0 to 19 pounds (referred to as "up to 19 pounds"), 20 to 40 pounds, 41 to 60 pounds, and 61 pounds or heavier.

These categories were chosen because they are used in NHTSA's current recommendations for the choice of restraint use for children.

Regional Categories
The 30 Primary Sampling Units (PSUs) selected in the NSUBS constitute a probability sample of PSUs (counties and groups thereof) in the United States. The data is not sufficient to produce State-by-State results. However, NSUBS can and does produce regional estimates using the Census Regions defined as follows:

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: WA, OR, CA, NV, ID, UT, AZ, NM, CO, WY, MT

These definitions of the four NSUBS regions are the same regional definitions used in the NOPUS survey. The NSUBS regional categories were chosen to be the same as the NOPUS categories for the purpose of consistency.

Time of Day and Day of Week Categories
The NSUBS uses the following day of week and time of day categories.

Weekday Rush Hour: Before 10 a.m. and 3:30 to 6 p.m., Monday to Friday
Weekday Outside of Rush Hour: 10 a.m. to 3:30 p.m., Monday to Friday
Weekend: 8 a.m. to 6 p.m. on Saturday and Sunday

Race and Ethnicity Categories
Please consult Section 4, "Demographic Results," for the classifications of race and ethnicity in NSUBS.

Executive Summary

This report presents results from the 2019 National Survey of the Use of Booster Seats (NSUBS), the only probability-based nationwide child restraint use survey in the United States that observes restraint use and interviews an adult occupant to collect data such as the race and ethnicity of all occupants in the vehicle. The National Highway Traffic Safety Administration's National Center for Statistics and Analysis conducts the NSUBS.

In 2000, Congress passed the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act that directed the Department of Transportation to develop, within 1 year after enactment of the TREAD Act, a 5-year strategic plan to reduce by 25 percent the deaths and injuries among 4- to 8-year-olds caused by the failure to use booster seats. In response, NHTSA began the NSUBS survey in 2006 to provide a national estimate of booster seat use in order to target its outreach programs. The agency has continued this survey to further NHTSA's safety goals. Since 2009 the NSUBS survey has been conducted every other year, with the 2019 NSUBS being the ninth administration of it. The survey was redesigned in 2015 to update the sample design.

The primary purpose of the NSUBS is to estimate booster seat use among 4- to 7-year-old children. In addition, the survey provides estimates of the extent to which children are "prematurely transitioned" to restraint types that are inappropriate for their age, height, and weight. The survey also provides child restraint use by major demographics as well as restraint use of other occupants by race and ethnicity.

The following are some major findings from the 2019 NSUBS:

- The appropriate restraint system for a 4- to 7-year-old child is either a forward-facing car seat or a booster seat, depending on the child's height and weight.

    - In 2019, the NSUBS found that the use of appropriate child restraint for this age group was 69.5 percent (32.5 percent were in forward-facing car seats and 37.0 percent were in booster seats), an increase from 68.5 percent in 2017.
    - In 2019, as many as 30.4 percent of children 4 to 7 years old were not being properly restrained (16.6% were restrained by seat belts and 13.8% were unrestrained), a decrease from 31.4 percent in 2017.

- Premature transition to restraint types that are not appropriate for children's age, height, and weight continued in 2019. However, there was improvement in the use of appropriate restraint type among children 6 to 7 years old whereby forward-facing car seat use increased significantly to 15.5 percent in 2019 from 8.5 percent in 2017, and seat belt use decreased significantly from 35.2 percent in 2017 to 25.0 percent in 2019. There were no other significant differences in restraint types between 2019 and 2017 among the age, height, and weight categories.

- Restraint use for all children under 13 was 87.9 percent in 2019, not statistically different than the 2017 estimate of 90.1 percent. Restraint use among children 8 to 12 years old who are Non-Hispanic Other increased significantly to 97.8 percent in 2019 from 82.9 percent in 2017. There were no other significant differences in restraint use between 2019 and 2017 among the major demographics.

1. Introduction

In 2000, Congress passed the TREAD Act (Pub. L. 106-414), which directed the Department of Transportation to develop a 5-year strategic plan to reduce by 25 percent deaths and injuries among 4- to 8-year-olds caused by failure to use booster seats. Therefore, there was a need for reliable data on who was not using booster seats to direct outreach programs where they are most needed.

In 2006, NHTSA conducted the first-ever nationwide probability-based survey of booster seat use in the United States: National Survey of the Use of Booster Seats (NSUBS). NSUBS collected data based on the observation of children in vehicles. The population of children captured by the NSUBS comprises of children newborn to 12 years old riding in passenger vehicles that stop at the four types of data collection sites, gas stations, fast-food restaurants, day care centers, and recreation centers. Prior to the NSUBS, research sponsored by NHTSA and several other organizations have estimated booster seat use in the United States; however, these estimates were not sufficiently reliable because they used data either from a non-probability sample that may not result in national estimates or from telephone interviews that may not result in reliable estimates.

NHTSA has used the NSUBS data in its outreach programs and campaigns on child passenger safety in recent years. According to NHTSA's Fatality Analysis Reporting System, the total number of traffic crash fatalities among children 4 to 7 years old was 255 in 2018, which is 20 percent less than what it was 10 years ago at 319 fatalities.

In 2015, the NSUBS was redesigned. The first six surveys used the 2006 NSUBS design that was based upon a subset of PSUs used for the National Occupant Protection Use Survey (NOPUS). The data used for designing the 2006 NSUBS was outdated and needed to be brought up to date. Additionally, conducting the study through several cycles has provided valuable knowledge on needed improvements. Please consult Section 6, "NSUBS Methodology," for details about the redesign.

The 2019, NSUBS employs the 2015 sample and was conducted from July 13 to July 31, 2019. The survey estimates were computed based on the results of 8,313 children observed in 5,605 vehicles at 436 observation sites across the country.

This report presents the survey results from the 2019 NSUBS. It includes the national estimates of the booster seat use among children 4 to 7 years old since 2006. This report also provides restraint type by age, weight, and height, along with restraint usage by major demographics. Throughout the report comparisons are made between the 2019 results and the results from the previous NSUBS, which was conducted in 2017. The last section describes the NSUBS methodology.

This report has classified child restraint system use into four general categories: car seats (with harness strap, including rear-facing and forward-facing), booster seats (without harness strap, including high-backed and backless), seat belts, and unrestrained. Please refer to the "Definitions and Categories in NSUBS" for detailed definitions.

Unless otherwise indicated, the terms "significant" and "statistically significant" are used interchangeably throughout this report. "Significant" always means "statistically significant" and the statistical significance level is a p-value of 0.05. In the tables below, the significant changes (those with p-values less than 0.05) are formatted in boldface type. Percentages may not add up to 100 due to rounding in figures and tables.

2. The National Estimates of Booster Seat Use

Who Should Be in Booster Seats?

NHTSA's current car seat recommendation for children 4 to 7 years old is: Keep your child in a forward-facing car seat with a harness and tether until the child reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the forward-facing car seat with a harness, it's time to travel in a booster seat, but still in the back seat.

National Estimates

The 2019 NSUBS found that booster seat use among 4- to 7-year-old children decreased from 40.1 percent in 2017 to 37.0 percent in 2019 (Figure 1 and Tables 1 and 2). This is not a statistically significant change.
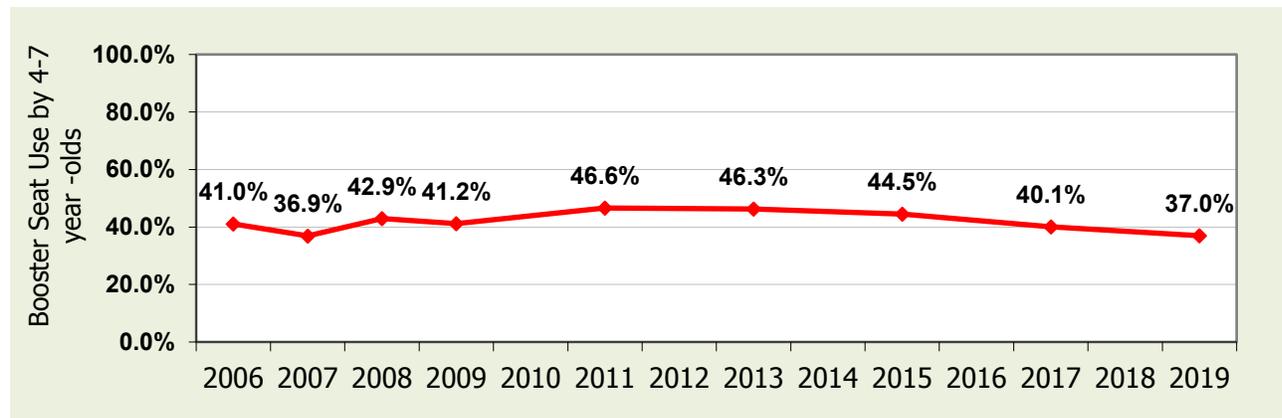
Figure 1. Booster Seat Use, National Estimates.

The appropriate restraint system for a child 4 to 7 years old is either a forward-facing car seat or a booster seat, depending on the child's height and weight. In 2019 the NSUBS found that about 37.0 percent of children in this age group were using booster seats (either high-backed or backless), 32.5 percent were restrained in forward-facing car seats, 16.6 percent were in seat belts, and 13.8 percent were unrestrained (**Figure 1**, **Figure 2**, and Table 2). These results indicate that:

- The child restraint use for this age group was 69.5 percent (32.5% were in forward facing car seats and 37.0% were in booster seats) in 2019, an increase from 68.5 percent in 2017.
- In 2019, as many as 30.4 percent (16.6% in seat belts and 13.8% unrestrained) of children 4 to 7 were not being properly restrained, a decrease from 31.4 percent in 2017.
- The percentage of children 4 to 7 restrained in forward-facing car seats increased from 28.4 percent in 2017 to 32.5 percent in 2019. This change is not statistically significant.

3
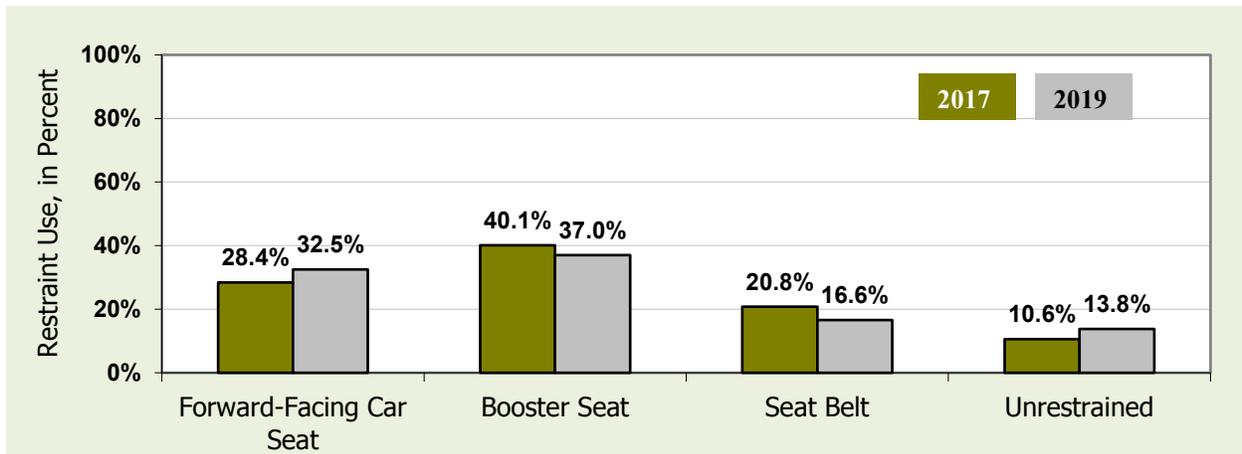
Figure 2. Restraint Use for Children 4 to 7 Years Old.

The 2019 NSUBS survey found that among the 4- to 7-year-olds, the younger children (4- and 5-year-olds) had lower booster seat use than the older (6- and 7-year-olds) children. In 2019 about 32.0 percent of children 4 and 5, as compared to 43.3 percent of children 6 and 7, were restrained in booster seats. Booster seat use among children 4 and 5 decreased from 37.5 percent in 2017 to 32.0 percent in 2019. Booster seat use among children 6 and 7 also decreased slightly from 43.8 percent in 2017 to 43.3 percent in 2019. However, forward-facing car seat use among children 6 and 7 years old increased significantly to 15.5 percent in 2019 from 8.5 percent in 2017. Seat belt use decreased significantly from 35.2 percent in 2017 to 25.0 percent in 2019 among the 6- and 7-year-olds. **Figures 3** and **4** and Table 2 show the distributions of restraint use for these two age sub-groups, as well as the changes between 2017 and 2019.

Figure 3. Restraint Use for Children 4 and 5 Years Old.

Figure 4. Restraint Use for Children 6 and 7 Years Old.

Table 1. Booster Seat Use, by Age, Weight, or Height

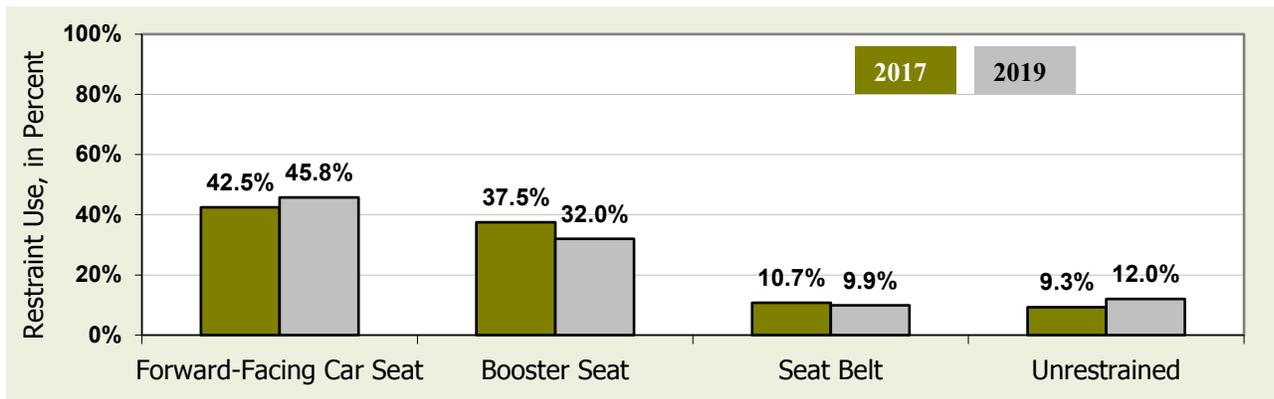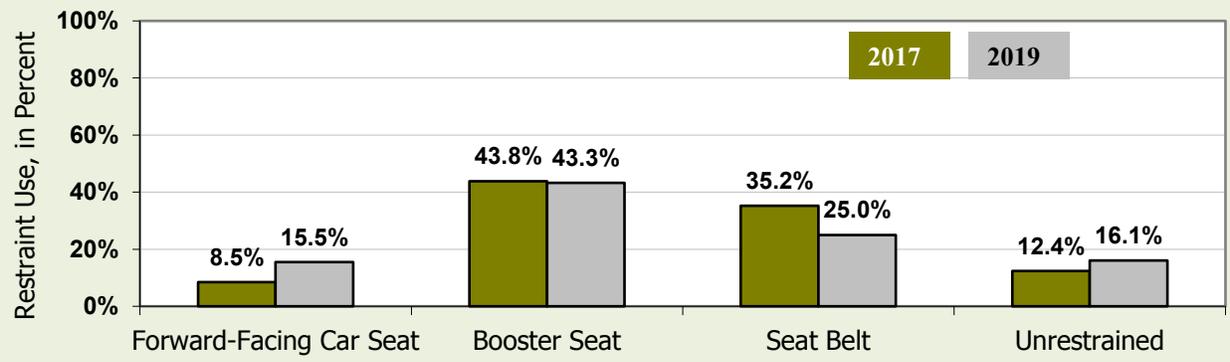| Booster Seat Type[1]	2017		2019		2017-2019 Change		
	Percentage[2] of Children[3] Using the Booster Type	95% Confidence Interval[4]	Percentage[2] of Children[3] Using the Booster Type	95% Confidence Interval[4]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
Children 1 to 3 Years Old							
Booster Seat (Overall)	7.6%	(5.3, 10.9)	7.5%	(5.3, 10.4)	-0.1	(-4.3, 4.1)	0.95
High-Backed Booster Seat	5.4%	(3.7, 7.9)	6.3%	(4.5, 8.8)	0.9	(-2.3, 4.2)	0.56
Backless Booster Seat	2.2%	(1.5, 3.3)	1.1%	(0.6, 2.0)	-1.1	(-2.4, 0.2)	0.11
Children 4 to 7 Years Old							
Booster Seat (Overall)	40.1%	(36.2, 44.2)	37.0%	(30.2, 44.3)	-3.1	(-11.9, 5.6)	0.47
High-Backed Booster Seat	20.8%	(17.7, 24.3)	22.5%	(18.0, 27.8)	1.8	(-4.8, 8.3)	0.59
Backless Booster Seat	**19.3%**	**(16.3, 22.8)**	**14.5%**	**(11.1, 18.6)**	**-4.9**	**(-9.6, -0.1)**	**0.04[6]**
Children 8 to 12 Years Old							
Booster Seat (Overall)	10.7%	(8.5, 13.3)	12.7%	(10.7, 15.0)	2.1	(-1.2, 5.4)	0.21
High-Backed Booster Seat	3.3%	(2.5, 4.3)	5.2%	(3.7, 7.4)	1.9	(-0.2, 4.1)	0.07
Backless Booster Seat	7.4%	(5.5, 9.8)	7.5%	(5.8, 9.6)	0.1	(-3.1, 3.4)	0.93
Children Who Weigh 20 to 40 Pounds							
Booster Seat (Overall)	15.3%	(12.7, 18.3)	13.7%	(10.1, 18.3)	-1.6	(-7.4, 4.1)	0.56
High-Backed Booster Seat	9.9%	(8.3, 11.8)	10.9%	(7.8, 14.9)	1.0	(-3.4, 5.3)	0.66
Backless Booster Seat	**5.4%**	**(3.9, 7.5)**	**2.8%**	**(1.9, 4.1)**	**-2.6**	**(-5.0, -0.2)**	**0.03[6]**
Children Who Weigh Between 41 to 60 Pounds							
Booster Seat (Overall)	39.3%	(35.3, 43.5)	39.0%	(33.9, 44.3)	-0.4	(-7.5, 6.8)	0.92
High-Backed Booster Seat	18.9%	(16.0, 22.1)	21.2%	(17.6, 25.4)	2.4	(-3.1, 7.8)	0.39
Backless Booster Seat	20.4%	(17.5, 23.8)	17.7%	(14.0, 22.1)	-2.7	(-7.7, 2.3)	0.27
Children Up to 12 Years Old Who Weigh More Than 60 Pounds							
Booster Seat (Overall)	11.3%	(9.1, 13.8)	12.1%	(9.8, 14.8)	0.8	(-2.3, 3.9)	0.60
High-Backed Booster Seat	3.4%	(2.5, 4.6)	5.1%	(3.6, 7.3)	1.7	(-0.5, 3.9)	0.13
Backless Booster Seat	7.9%	(5.9, 10.4)	7.0%	(5.1, 9.5)	-0.9	(-4.1, 2.4)	0.59
Children Who Are at Most 36 Inches Tall							
Booster Seat (Overall)	11.1%	(9.2, 13.3)	9.0%	(6.5, 12.2)	-2.1	(-6.0, 1.7)	0.27
High-Backed Booster Seat	6.9%	(5.9, 8.2)	6.6%	(4.6, 9.3)	-0.3	(-3.2, 2.5)	0.81
Backless Booster Seat	4.2%	(3.0, 5.8)	2.3%	(1.4, 4.0)	-1.8	(-3.9, 0.3)	0.09
Children Up to 12 Years Old Who Are 37 to 53 Inches Tall							
Booster Seat (Overall)	32.5%	(29.3, 35.9)	31.3%	(25.8, 37.5)	-1.2	(-7.9, 5.5)	0.72
High-Backed Booster Seat	16.1%	(13.7, 18.8)	18.0%	(14.5, 22.3)	2.0	(-2.9, 6.9)	0.42
Backless Booster Seat	16.4%	(13.8, 19.5)	13.3%	(10.4, 16.8)	-3.2	(-7.0, 0.7)	0.11
Children Up to 12 Years Old Who Are 54 to 56 Inches Tall							
Booster Seat (Overall)	12.7%	(9.1, 17.4)	15.6%	(11.1, 21.5)	2.9	(-3.7, 9.6)	0.38
High-Backed Booster Seat	**3.0%**	**(1.4, 6.4)**	**8.3%**	**(5.3, 12.7)**	**5.2**	**(1.0, 9.5)**	**0.02[6]**
Backless Booster Seat	9.6%	(6.7, 13.6)	7.3%	(3.9, 13.4)	-2.3	(-7.9, 3.3)	0.41
Children Up to 12 Years Old Who Are Taller Than 56 Inches							
Booster Seat (Overall)	4.0%	(2.8, 5.8)	4.9%	(3.2, 7.2)	0.8	(-1.2, 2.9)	0.42
High-Backed Booster Seat	1.7%	(1.1, 2.5)	2.4%	(1.3, 4.6)	0.8	(-0.9, 2.4)	0.35
Backless Booster Seat	2.4%	(1.4, 3.9)	2.4%	(1.3, 4.6)	0.1	(-1.6, 1.8)	0.94

1. Booster seats are classified into two types: those with seat backs ("high-backed") and those without ("backless").
2. Estimates might not sum to totals due to rounding.
3. Survey data is obtained for children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window.
4. The Wilson confidence interval is used in the estimated percentages in the children group (e.g., children in high-backed booster seat), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/(2(n_{EFF} + t^2))$, 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.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.
6. 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**.
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.

Note: Booster seat use rates for children newborn to 12 months old and who weigh less than 20 pounds are not provided due to the insufficient data to produce reliable estimates.
Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

Table 2. Distribution of Restraint Types Among Children 4 to 7 Years Old, by Sub-Age Groups

Restraint Type[1]	2017		2019		2017-2019 Change		
	Percentage[2] of Children[3] Observed in the Restraint Type	95% Confidence Interval[4]	Percentage[2] of Children[3] Observed in the Restraint Type	95% Confidence Interval[4]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
Children 4 and 5 Years Old							
Rear-Facing Car Seat	NA	NA	NA	NA	NA	NA	NA
Forward-Facing Car Seat	42.5%	(37.4, 47.8)	45.8%	(38.6, 53.1)	3.2	(-6.6, 13.0)	0.51
Booster Seat (Overall)	37.5%	(33.1, 42.2)	32.0%	(25.3, 39.6)	-5.5	(-15.0, 4.0)	0.25
High-Backed Booster Seat	23.0%	(19.5, 26.9)	22.6%	(17.6, 28.4)	-0.4	(-8.0, 7.2)	0.91
Backless Booster Seat	**14.5%**	**(11.7, 17.9)**	**9.4%**	**(6.7, 13.0)**	**-5.1**	**(-9.6, -0.6)**	**0.03**
Seat Belt	10.7%	(8.2, 13.8)	9.9%	(7.5, 13.1)	-0.8	(-4.9, 3.4)	0.71
No Restraint Observed	9.3%	(6.4, 13.1)	12.0%	(8.2, 17.4)	2.8	(-3.3, 8.9)	0.36
Children 6 and 7 Years Old							
Rear-Facing Car Seat	NA	NA	NA	NA	NA	NA	NA
Forward-Facing Car Seat	**8.5%**	**(6.5, 11.1)**	**15.5%**	**(11.6, 20.5)**	**7.0**	**(2.0, 12.0)**	**0.01[6]**
Booster Seat (Overall)	43.8%	(37.7, 50.1)	43.3%	(35.7, 51.3)	-0.5	(-10.3, 9.4)	0.92
High-Backed Booster Seat	17.7%	(14.1, 21.9)	22.5%	(18.0, 27.7)	4.8	(-1.2, 10.8)	0.11
Backless Booster Seat	26.1%	(21.6, 31.2)	20.9%	(15.9, 26.8)	-5.3	(-12.4, 1.8)	0.14
Seat Belt	**35.2%**	**(29.1, 41.7)**	**25.0%**	**(21.3, 29.2)**	**-10.1**	**(-16.5, -3.7)**	**< 0.01[6]**
No Restraint Observed	12.4%	(9.2, 16.5)	16.1%	(10.4, 24.0)	3.7	(-4.5, 11.8)	0.37
Children 4 to 7 Years Old							
Rear-Facing Car Seat	NA	NA	0.2%	(0.1, 0.4)	NA	NA	NA
Forward-Facing Car Seat	28.4%	(24.6, 32.6)	32.5%	(27.5, 37.9)	4.0	(-3.2, 11.3)	0.26
Booster Seat (Overall)	40.1%	(36.2, 44.2)	37.0%	(30.2, 44.3)	-3.1	(-11.9, 5.6)	0.47
High-Backed Booster Seat	20.8%	(17.7, 24.3)	22.5%	(18.0, 27.8)	1.8	(-4.8, 8.3)	0.59
Backless Booster Seat	**19.3%**	**(16.3, 22.8)**	**14.5%**	**(11.1, 18.6)**	**-4.9**	**(-9.6, -0.1)**	**0.04**
Seat Belt	20.8%	(17.1, 25.1)	16.6%	(14.3, 19.1)	-4.3	(-8.9, 0.4)	0.07
No Restraint Observed	10.6%	(7.7, 14.4)	13.8%	(9.3, 20.0)	3.3	(-3.5, 10.1)	0.34

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Estimates might not sum to totals due to rounding.
3. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window
4. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are in high-backed booster seat), 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.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.
6. 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**.

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.

NA: Data not sufficient to produce a reliable estimate.
Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

3. Premature Transition

The NSUBS, although its primary purpose is to estimate booster seat use, also provides estimates of the extent to which children are "prematurely transitioned" to restraint types that are inappropriate for their age and size. In this section, we discuss the phenomenon of premature transition.

NHTSA recommends that parents refer to the specific car seat manufacturer's instructions on weight and height limits. Car seats on the market exhibit a wide variation in height and weight limits. Many height limits range from 36 to 54 inches, and many weight limits range from 40 to 60 or more pounds. These limits were considered in discussing the extent of premature transition in previous NSUBS publications. NHTSA's previous best-practice recommendations for car seat and booster seat use (revised in 2011) included some weight and height guidelines. For comparison purposes with previous survey results, we will briefly discuss similar weight and height results from the 2019 NSUBS survey.

It should be noted that if a column corresponding to a data series or a data category is missing from a figure, it means that there is not sufficient data to produce a reliable estimate for the data category. Also, please note that sometimes estimates might not sum to totals due to rounding.

Premature Transition Among Children Under Age 1

NHTSA recommends: "Your child under age 1 should always ride in a rear-facing car seat. There are different types of rear-facing car seats: Infant-only seats can only be used rear-facing; convertible and all-in-one car seats typically have higher height and weight limits for the rear-facing position, allowing you to keep your child rear-facing for a longer period of time" (NHTSA, n.a.).

As shown in **Figure 5**, about 8.2 percent of children under age 1 were not in rear-facing car seats in 2019; most of these infants were prematurely transitioned to forward-facing car seats.
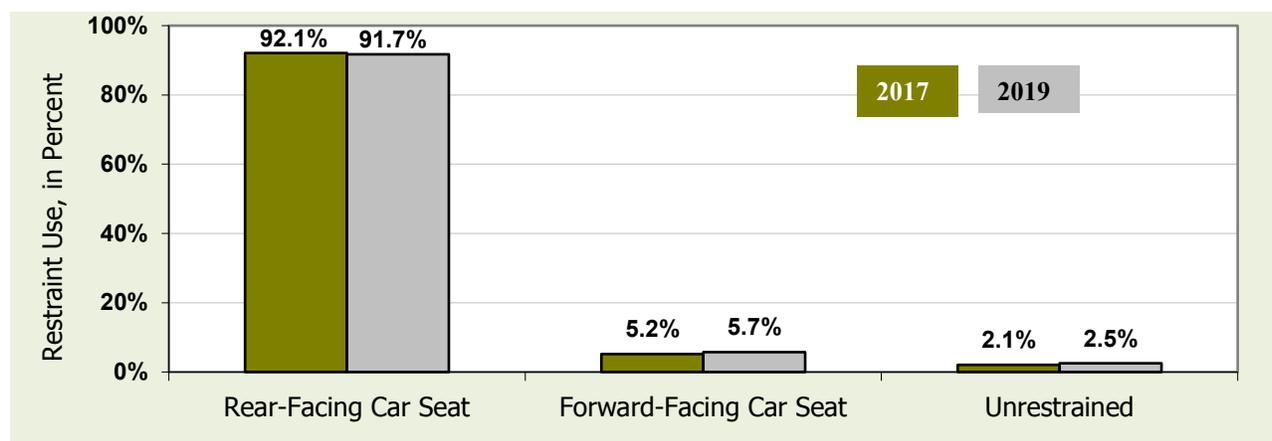

Figure 5. Restraint Use for Children Under Age 1.

10

Premature Transition Among Children 1 to 3 Years Old

NHTSA recommends: "Keep your 1- to 3-year-old children in rear-facing car seats for as long as possible. It's the best way to keep him or her safe. Your child should remain in a rear-facing car seat until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the rear-facing car seat, your child is ready to travel in a forward-facing car seat with a harness and tether." (NHTSA, n.a.)

Therefore, the appropriate restraint types for children 1 to 3 years old should be either rear-facing car seats or forward-facing car seats. The 2019 NSUBS found that only 83.7 percent of children 1 to 3 years old were restrained either in rear-facing car seats (17.4%) or in forward-facing car seats (66.3%) in 2019. About 7.5 percent of children 1 to 3 years old were prematurely transitioned to booster seats and 3.1 percent to seat belts. **Figure 6** shows the distribution of restraint types for children 1 to 3 years old in 2017 and 2019.

Figure 6. Restraint Use for Children 1 to 3 Years Old.

While the percentage restrained in rear-facing car seats increased from 13.7 percent in 2017 to 17.4 percent in 2019, the percentage restrained in forward-facing car seats decreased from 71.4 percent in 2017 to 66.3 percent in 2019. About 3.1 percent of children were prematurely transitioned to seat belt in 2019, an increase from 2.6 percent in 2017. About 5.7 percent of children were unrestrained in 2019, an increase from 4.7 percent in 2017.

Premature Transition Among Children 4 to 7 Years Old

NHTSA recommends: "Keep your 4- to 7-year-old children in forward-facing car seats with a harness and tether until they reach the top height or weight limit allowed by your car seat's manufacturer. Once they outgrow their forward-facing car seat with a harness, it's time to travel in a booster seat, but still in the back seat" (NHTSA, n.a.)

Therefore, the appropriate restraint types for children 4 to 7 years old should be either forward-facing car seats with harness or booster seats. However, the 2019 NSUBS found that only 69.5 percent of children 4 to 7 years old were restrained either in forward-facing car seats (32.5%) or in booster seats (37.0%) in 2019. About 16.6 percent of children 4 to 7 years old were prematurely transitioned to seat belts and 13.8 percent were unrestrained. **Figure 7** shows the distribution of restraint types for children 4 to 7 years old in 2017 and 2019.
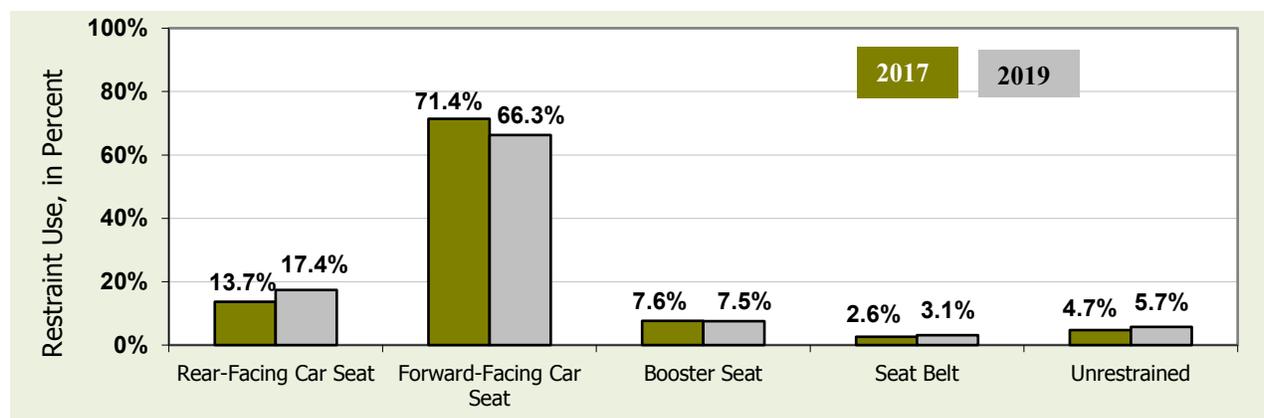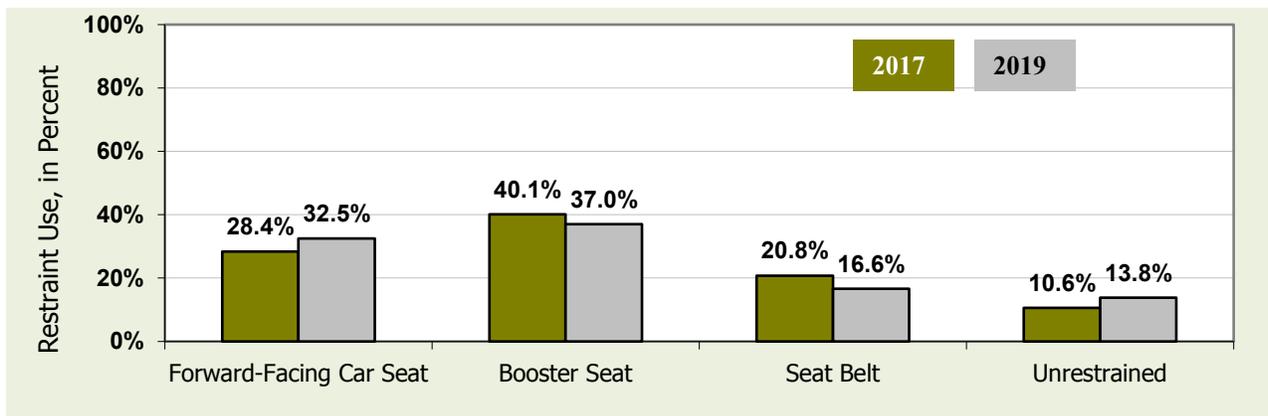
Figure 7. Restraint Use for Children 4 to 7 Years Old.

While the percentage restrained in booster seats decreased from 40.1 percent in 2017 to 37.0 percent in 2019, the percentage restrained in forward-facing car seats increased from 28.4 percent in 2017 to 32.5 percent in 2019. About 16.6 percent of children were prematurely transitioned to seat belt in 2019, a decrease from 20.8 percent in 2017. About 13.8 percent of children were unrestrained in 2019, an increase from 10.6 percent in 2017.

Restraint Use Among Children 8 to 12 Years Old

NHTSA recommends: "Keep your 8- to 12-year-old children in booster seats until they are big enough to fit in a seat belt properly" (NHTSA, n.a.).

Figure 8 shows the distribution of restraint types for children 8 to 12 years old in 2017 and 2019. The percentage of children 8 to 12 years old restrained in a booster seat increased from 10.7 percent in 2017 to 12.7 percent in 2019. However, the percentage in seat belts decreased from 74.7 percent in 2017 to 72.3 percent in 2019. The percentage unrestrained in 2019 is 12.8 percent, a decrease from 13.5 percent in 2017.
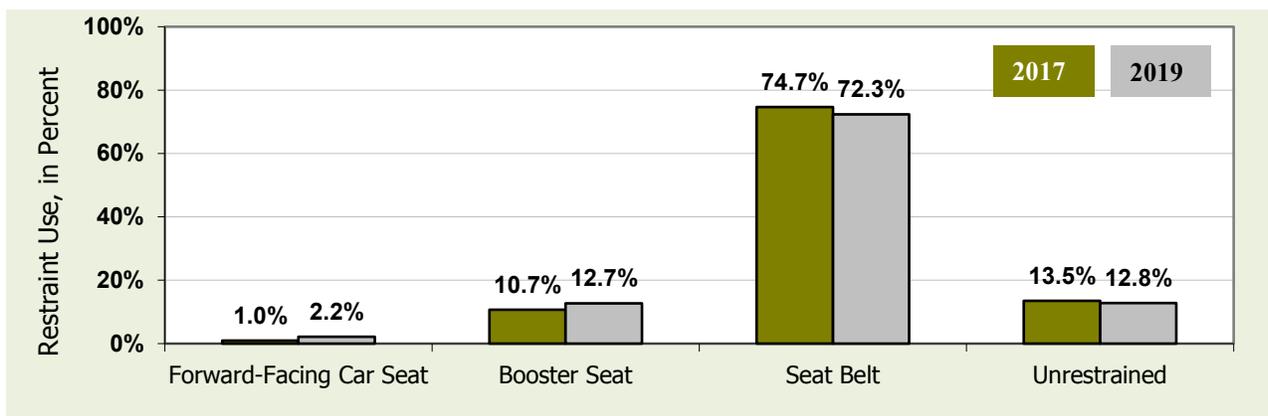
Figure 8. Restraint Use for Children 8 to 12 Years Old.

Premature Transition Based on Weight and Height

NHTSA's car seat recommendations for children of all ages are:

- Select a car seat based on your child's age and size (height and weight), then choose a seat that fits in your vehicle, and use it every time.
- Always refer to your specific car seat manufacturer's instructions (check height and weight limits) and read the vehicle owner's manual on how to install the car seat using the seat belt or lower anchors and a tether, if available.
- To maximize safety, keep your child in the car seat as long as the child fits within the manufacturer's height and weight requirements.
- Keep your child in the back seat at least through age 12.

NHTSA recommends consulting the manufacturer's manual for car seat weight and height limits, as noted above.

Child car seats on the market exhibit a wide variation in height and weight limits. Height limits range between 36 and 54 inches, and weight limits range from 40 to 60 or more pounds. Previous NSUBS publications considered these limits in assessing premature transition with respect to NHTSA's previous guidelines. This section uses the same weight and height benchmarks, referencing NHTSA's previous guidelines, to examine any premature transition changes in 2019.

Children Weighing Less Than 20 Pounds

NHTSA's previous recommendation states that for the best possible protection, infants should be kept in the back seat, in rear-facing child safety seats, as long as possible up to the height or weight limit of the particular seat. At a minimum, infants should be kept rear-facing until a minimum of age 1 and at least 20 pounds. According to NHTSA's current car seat recommendation, children under age 1 should be in rear-facing car seats (NHTSA, n.a.).
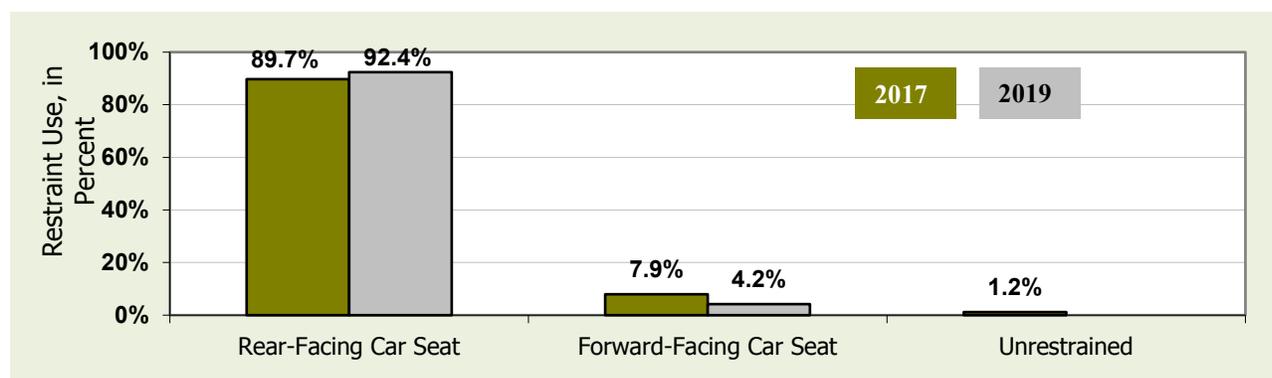
Figure 9. Restraint Use for Children Under 20 Pounds.

As shown in **Figure 9**, the 2019 NSUBS found that 4.2 percent of children under 20 pounds were prematurely transitioned to forward-facing car seats, down from 7.9 percent in 2017. The percentage unrestrained is not shown because there is not sufficient data to produce a reliable estimate for that data category.

Compared to 2017, more children under 20 pounds were in rear-facing seats in 2019: 92.4 percent of children weighing under 20 pounds were in rear-facing car seats, up from 89.7 percent in 2017 (**Figure 9**).

Children Weighing 20 to 40 Pounds

NHTSA's previous recommendation stated that when children outgrow their rear-facing seats (at a minimum age 1 and at least 20 pounds) they should ride in forward-facing child safety seats, in the back seat, with a harness and tether, until they reach the upper weight or height limit of the particular seat, usually at around age 4 and 40 pounds. NHTSA currently recommends that when children outgrow their rear-facing car seats, they should ride in forward-facing car seats, in the back seat, with a harness and tether (NHTSA, n.a.).

The 2019 NSUBS found that 41.6 percent of children weighing 20 to 40 pounds were not in forward-facing car seats in 2019 (39.0% in 2017) (**Figure 10**). Note, however, that some 20- to 40-pound children could be infants who should be in rear-facing car seats, and some booster seats have weight limits as low as 30 pounds.
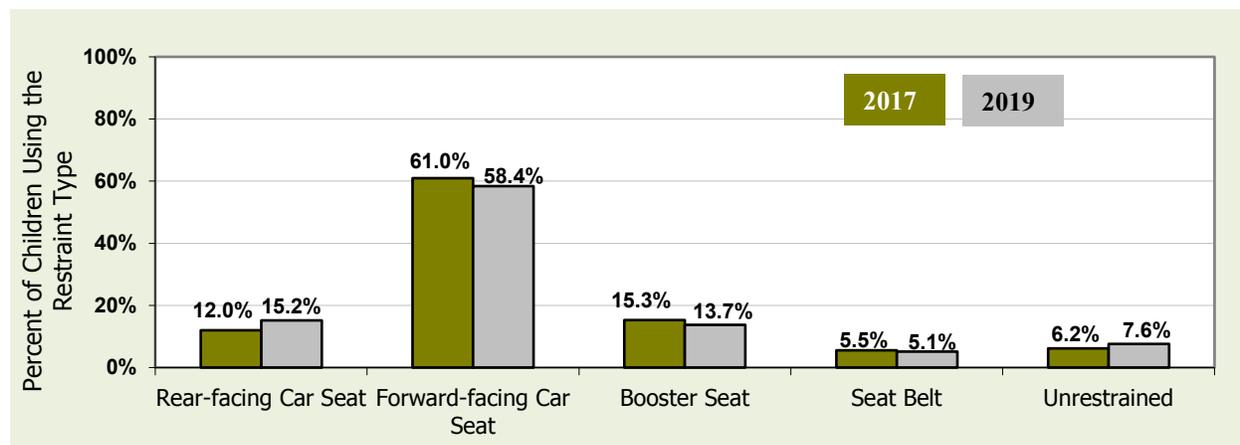
Figure 10. Distribution of Restraint Types for Children Who Were 20 to 40 Lbs.

Children Less Than 57 Inches Tall

NHTSA's previous recommendation stated that once children outgrow their forward-facing seats (usually at around age 4 and 40 pounds), they should ride in booster seats, in the back seat, until the vehicle seat belts fit properly. NHTSA recommends that seat belts fit properly when the lap belt lies snugly across the upper thighs, not the stomach. The shoulder belt fits across the chest, usually at age 8 or when they are 57 inches tall. The shoulder belt should lie snugly across the shoulder and chest and not cross the neck or face. NHTSA currently recommends that once children outgrow their forward-facing car seats, they should ride in booster seats, in the back seat, until the vehicle seat belts fit properly. Seat belts fit properly when the lap belt lies snugly across the upper thighs, not the stomach. The shoulder belt should lie snugly across the shoulder and chest and not cross the neck or face (NHTSA, n.a.).

The 2019 NSUBS found that:

- 39.5 percent of children up to 12 years old who were 37 to 53 inches tall were either unrestrained (13.7%) or prematurely transitioned to seat belts (25.8%) in 2019 (Table 5 and Figure 11).
- 80.3 percent of children up to 12 years old who were 54 to 56 inches tall were either unrestrained (12.9%) or prematurely transitioned to seat belts (67.4%) in 2019 (Table 5 and Figure 11). However, since 54 to 56 inches is marginally below NHTSA's previously set 57-inch benchmark, it might not be significant as a public safety result.

Figure 11 shows many of those children less than 57 inches tall prematurely transitioned to seat belts in 2019.

- Booster seat use among children up to 12 years old who were 37 to 53 inches tall decreased slightly to 31.3 percent in 2019 from 32.5 percent in 2017; however, seat belt use also decreased from 29.8 percent in 2017 to 25.8 percent in 2019 (Figure 12).
- Booster seat use among children up to 12 years old who were 54 to 56 inches tall increased from 12.7 percent in 2017 to 15.6 percent in 2019; however, seat belt use decreased from 73.3 percent in 2017 to 67.4 percent in 2019 (Figure 13).
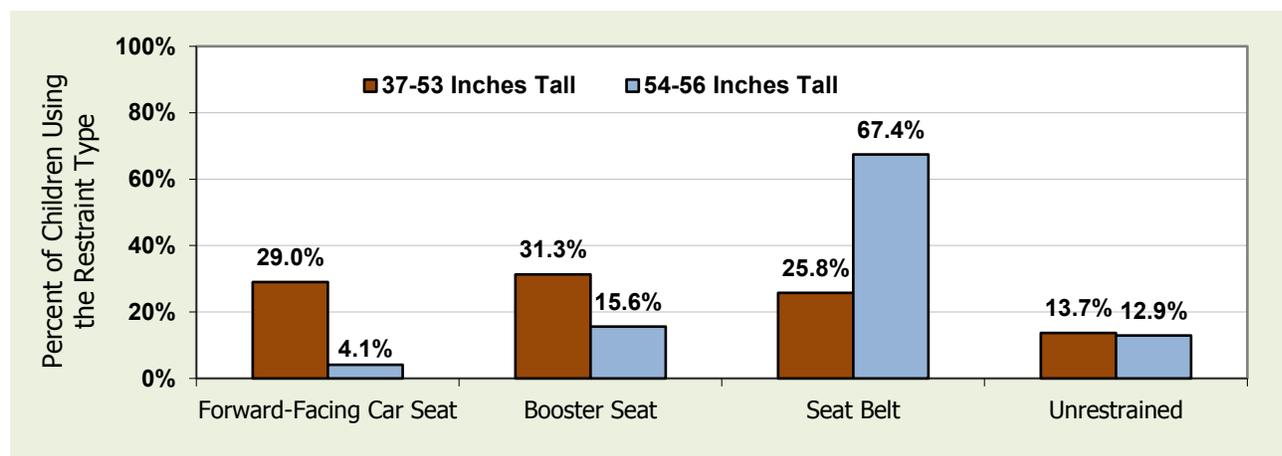
Figure 11. Distribution of Restraint Types in 2019 for Children up to 12 Years Old Who Were 37-56 Inches Tall.

Figure 12. Distribution of Restraint Types for Children up to 12 Years Old Who Were 37-53 Inches Tall.

Figure 13. Distribution of Restraint Types for Children up to 12 Years Old Who Were 54-56 Inches Tall.

Table 3. The Types of Restraints Used by Children Newborn to 12 Years Old, by Age

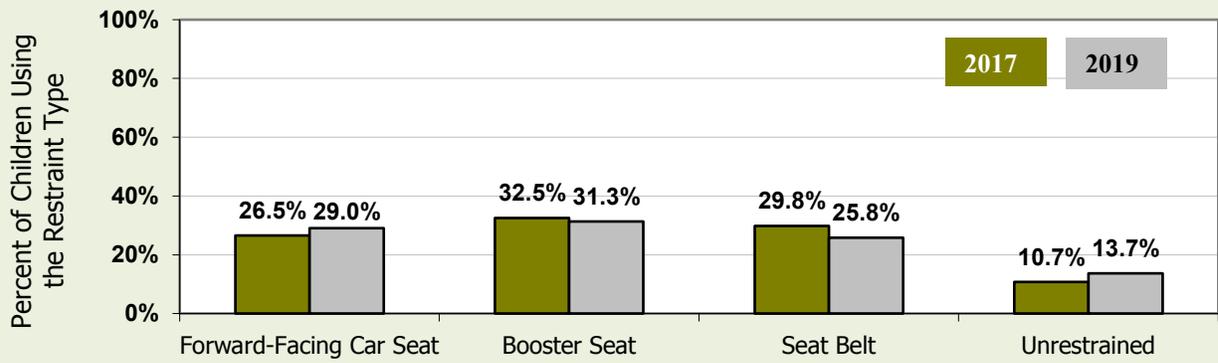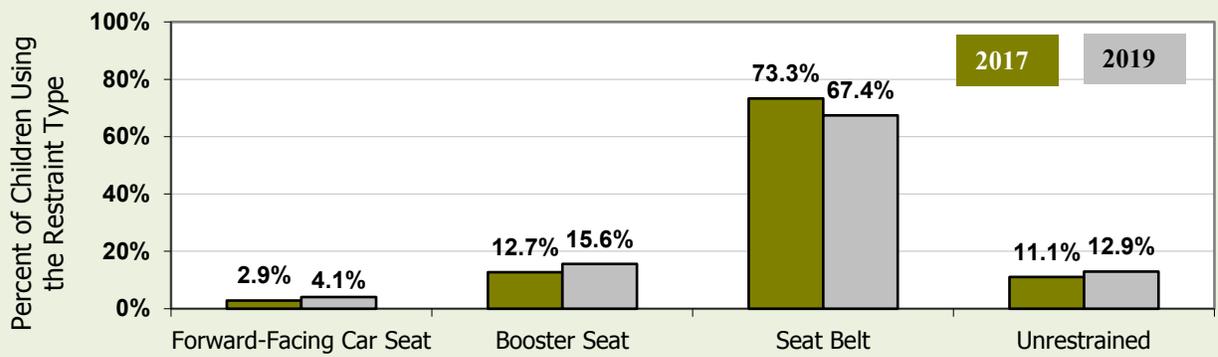| Restraint Type[1]	2017		2019		2017-2019 Change		
	Percentage[2] of Children[3] Observed Using the Restraint Type	95% Confidence Interval[4]	Percentage[2] of Children[3] Observed Using the Restraint Type	95% Confidence Interval[4]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
Children Less Than 1 Year Old							
Rear-Facing Car Seat	92.1%	(89.1, 94.3)	91.7%	(87.2, 94.7)	-0.4	(-5.0, 4.2)	0.86
Forward-Facing Car Seat	5.2%	(3.2, 8.2)	5.7%	(3.2, 10.1)	0.6	(-4.2, 5.3)	0.81
Booster Seat (Overall)	NA	NA	NA	NA	NA	NA	NA
High-Backed Booster Seat	NA	NA	NA	NA	NA	NA	NA
Backless Booster Seat	NA	NA	NA	NA	NA	NA	NA
Seat Belt	NA	NA	NA	NA	NA	NA	NA
No Restraint Observed	2.1%	(1.1, 3.9)	2.5%	(1.0, 6.3)	0.4	(-2.6, 3.4)	0.78
Children 1 to 3 Years Old							
Rear-Facing Car Seat	13.7%	(10.8, 17.4)	17.4%	(14.6, 20.7)	3.7	(-0.4, 7.7)	0.07
Forward-Facing Car Seat	71.4%	(67.5, 74.9)	66.3%	(62.6, 69.8)	-5.0	(-10.6, 0.5)	0.07
Booster Seat (Overall)	7.6%	(5.3, 10.9)	7.5%	(5.3, 10.4)	-0.1	(-4.3, 4.1)	0.95
High-Backed Booster Seat	5.4%	(3.7, 7.9)	6.3%	(4.5, 8.8)	0.9	(-2.3, 4.2)	0.56
Backless Booster Seat	2.2%	(1.5, 3.3)	1.1%	(0.6, 2.0)	-1.1	(-2.4, 0.2)	0.11
Seat Belt	2.6%	(1.4, 4.5)	3.1%	(2.0, 4.8)	0.5	(-1.8, 2.9)	0.64
No Restraint Observed	4.7%	(3.2, 6.9)	5.7%	(4.0, 8.1)	0.9	(-2.2, 4.0)	0.55
Children 4 to 7 Years Old							
Rear-Facing Car Seat	NA	NA	0.2%	(0.1, 0.4)	NA	NA	NA
Forward-Facing Car Seat	28.4%	(24.6, 32.6)	32.5%	(27.5, 37.9)	4.0	(-3.2, 11.3)	0.26
Booster Seat (Overall)	40.1%	(36.2, 44.2)	37.0%	(30.2, 44.3)	-3.1	(-11.9, 5.6)	0.47
High-Backed Booster Seat	20.8%	(17.7, 24.3)	22.5%	(18.0, 27.8)	1.8	(-4.8, 8.3)	0.59
Backless Booster Seat	**19.3%**	**(16.3, 22.8)**	**14.5%**	**(11.1, 18.6)**	**-4.9**	**(-9.6, -0.1)**	**0.04**
Seat Belt	20.8%	(17.1, 25.1)	16.6%	(14.3, 19.1)	-4.3	(-8.9, 0.4)	0.07
No Restraint Observed	10.6%	(7.7, 14.4)	13.8%	(9.3, 20.0)	3.3	(-3.5, 10.1)	0.34
Children 8 to 12 Years Old							
Rear-Facing Car Seat	0.2%	(0.1, 0.6)	NA	NA	NA	NA	NA
Forward-Facing Car Seat	1.0%	(0.6, 1.6)	2.2%	(1.3, 3.6)	1.2	(-0.1, 2.5)	0.08
Booster Seat (Overall)	10.7%	(8.5, 13.3)	12.7%	(10.7, 15.0)	2.1	(-1.2, 5.4)	0.21
High-Backed Booster Seat	3.3%	(2.5, 4.3)	5.2%	(3.7, 7.4)	1.9	(-0.2, 4.1)	0.07
Backless Booster Seat	7.4%	(5.5, 9.8)	7.5%	(5.8, 9.6)	0.1	(-3.1, 3.4)	0.93
Seat Belt	74.7%	(70.5, 78.5)	72.3%	(66.3, 77.6)	-2.4	(-11.0, 6.2)	0.58
No Restraint Observed	13.5%	(10.3, 17.4)	12.8%	(8.8, 18.2)	-0.7	(-7.3, 5.9)	0.83

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Estimates might not sum to totals due to rounding.
3. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window
4. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are in high-backed booster seat), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/(2(n_{EFF} + t^2))$, 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.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.

6. 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**.
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.

NA: Data not sufficient to produce a reliable estimate.

Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

Table 4. The Types of Restraints Used by Children Newborn to 12 Years Old, by Weight

Restraint Type[1]	2017		2019		2017-2019 Change		
	Percentage[2] of Children[3] Observed Using the Restraint Type	95% Confidence Interval[4]	Percentage[2] of Children[3] Observed Using the Restraint Type	95% Confidence Interval[4]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
Children Who Weigh Less Than 20 Pounds							
Rear-Facing Car Seat	89.7%	(85.8, 92.7)	92.4%	(84.4, 96.4)	2.6	(-3.8, 9.1)	0.41
Forward-Facing Car Seat	7.9%	(5.2, 11.8)	4.2%	(1.7, 10.2)	-3.7	(-8.9, 1.6)	0.16
Booster Seat (Overall)	NA	NA	NA	NA	NA	NA	NA
High-Backed Booster Seat	NA	NA	NA	NA	NA	NA	NA
Backless Booster Seat	NA	NA	NA	NA	NA	NA	NA
Seat Belt	NA	NA	NA	NA	NA	NA	NA
No Restraint Observed	1.2%	(0.5, 2.8)	NA	NA	NA	NA	NA
Children Who Weigh Between 20 and 40 Pounds							
Rear-Facing Car Seat	12.0%	(9.8, 14.6)	15.2%	(12.9, 17.8)	3.2	(-0.1, 6.5)	0.06
Forward-Facing Car Seat	61.0%	(57.3, 64.5)	58.4%	(53.7, 63.0)	-2.5	(-9.0, 3.9)	0.43
Booster Seat (Overall)	15.3%	(12.7, 18.3)	13.7%	(10.1, 18.3)	-1.6	(-7.4, 4.1)	0.56
High-Backed Booster Seat	9.9%	(8.3, 11.8)	10.9%	(7.8, 14.9)	1.0	(-3.4, 5.3)	0.66
Backless Booster Seat	**5.4%**	**(3.9, 7.5)**	**2.8%**	**(1.9, 4.1)**	**-2.6**	**(-5.0, -0.2)**	**0.03**
Seat Belt	5.5%	(4.0, 7.6)	5.1%	(3.7, 7.1)	-0.4	(-3.1, 2.3)	0.75
No Restraint Observed	6.2%	(4.3, 8.8)	7.6%	(5.3, 10.7)	1.4	(-2.6, 5.4)	0.47
Children Who Weigh Between 41 and 60 Pounds							
Rear-Facing Car Seat	NA	NA	NA	NA	NA	NA	NA
Forward-Facing Car Seat	21.0%	(18.1, 24.2)	23.5%	(18.7, 29.0)	2.5	(-4.1, 9.1)	0.45
Booster Seat (Overall)	39.3%	(35.3, 43.5)	39.0%	(33.9, 44.3)	-0.4	(-7.5, 6.8)	0.92
High-Backed Booster Seat	18.9%	(16.0, 22.1)	21.2%	(17.6, 25.4)	2.4	(-3.1, 7.8)	0.39
Backless Booster Seat	20.4%	(17.5, 23.8)	17.7%	(14.0, 22.1)	-2.7	(-7.7, 2.3)	0.27
Seat Belt	28.3%	(24.6, 32.4)	25.1%	(21.7, 28.7)	-3.3	(-8.5, 2.0)	0.22
No Restraint Observed	11.3%	(8.5, 14.8)	12.4%	(8.9, 17.0)	1.1	(-4.0, 6.2)	0.66
Children Who Weigh More Than 60 Pounds							
Rear-Facing Car Seat	0.2%	(0.1, 0.6)	NA	NA	NA	NA	NA
Forward-Facing Car Seat	1.3%	(0.8, 2.3)	2.9%	(1.9, 4.3)	1.5	(-0.0, 3.1)	0.06
Booster Seat (Overall)	11.3%	(9.1, 13.8)	12.1%	(9.8, 14.8)	0.8	(-2.3, 3.9)	0.60
High-Backed Booster Seat	3.4%	(2.5, 4.6)	5.1%	(3.6, 7.3)	1.7	(-0.5, 3.9)	0.13
Backless Booster Seat	7.9%	(5.9, 10.4)	7.0%	(5.1, 9.5)	-0.9	(-4.1, 2.4)	0.59
Seat Belt	74.0%	(69.4, 78.0)	70.5%	(63.8, 76.4)	-3.5	(-12.7, 5.7)	0.44
No Restraint Observed	13.2%	(10.0, 17.4)	14.6%	(9.5, 21.8)	1.4	(-6.9, 9.6)	0.74

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.

2. Estimates might not sum to totals due to rounding.

3. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window

4. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are in high-backed booster seat), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/(2(n_{EFF} + t^2))$, 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.

5. 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. The degrees of freedom in 2019 is different from that used in 2017.

6. 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.

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.

NA: Data not sufficient to produce a reliable estimate. Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

Table 5. The Types of Restraints Used by Children Newborn to 12 Years Old, by Height

Restraint Type[1]	2017		2019		2017-2019 Change		
	Percentage[2] of Children[3] Observed Using the Restraint Type	95% Confidence Interval[4]	Percentage[2] of Children[3] Observed Using the Restraint Type	95% Confidence Interval[4]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
Children Who Are at Most 36 Inches Tall							
Rear-Facing Car Seat	24.0%	(21.0, 27.3)	28.7%	(25.2, 32.5)	4.7	(-0.1, 9.5)	0.06
Forward-Facing Car Seat	55.1%	(51.6, 58.5)	52.4%	(48.5, 56.1)	-2.7	(-8.5, 3.0)	0.34
Booster Seat (Overall)	11.1%	(9.2, 13.3)	9.0%	(6.5, 12.2)	-2.1	(-6.0, 1.7)	0.27
High-Backed Booster Seat	6.9%	(5.9, 8.2)	6.6%	(4.6, 9.3)	-0.3	(-3.2, 2.5)	0.81
Backless Booster Seat	4.2%	(3.0, 5.8)	2.3%	(1,4, 4.0)	-1.8	(-3.9, 0.3)	0.09
Seat Belt	4.1%	(3.1, 5.5)	3.6%	(2.4, 5.3)	-0.5	(-2.5, 1.5)	0.60
No Restraint Observed	5.7%	(3.9, 8.3)	6.4%	(4.3, 9.5)	0.7	(-3.0, 4.3)	0.71
Children Who Are 37 to 53 Inches Tall							
Rear-Facing Car Seat	0.4%	(0.2, 0.8)	0.3%	(0.1, 0.6)	-0.2	(-0.4, 0.1)	0.24
Forward-Facing Car Seat	26.5%	(22.9, 30.6)	29.0%	(24.6, 33.8)	2.4	(-3.4, 8.2)	0.40
Booster Seat (Overall)	32.5%	(29.3, 35.9)	31.3%	(25.8, 37.5)	-1.2	(-7.9, 5.5)	0.72
High-Backed Booster Seat	16.1%	(13.7, 18.8)	18.0%	(14.5, 22.3)	2.0	(-2.9, 6.9)	0.42
Backless Booster Seat	16.4%	(13.8, 19.5)	13.3%	(10.4, 16.8)	-3.2	(-7.0, 0.7)	0.11
Seat Belt	29.8%	(25.9, 34.1)	25.8%	(22.5, 29.3)	-4.0	(-9.4, 1.3)	0.13
No Restraint Observed	10.7%	(8.1, 14.1)	13.7%	(9.5, 19.2)	2.9	(-3.4, 9.3)	0.35
Children Who Are 54 to 56 Inches Tall							
Rear-Facing Car Seat	NA	NA	NA	NA	NA	NA	NA
Forward-Facing Car Seat	2.9%	(1.4, 5.7)	4.1%	(1.8, 9.0)	1.2	(-2.7, 5.1)	0.53
Booster Seat (Overall)	12.7%	(9.1, 17.4)	15.6%	(11.1, 21.5)	2.9	(-3.7, 9.6)	0.38
High-Backed Booster Seat	**3.0%**	**(1.4, 6.4)**	**8.3%**	**(5.3, 12.7)**	**5.2**	**(1.0, 9.5)**	**0.02**
Backless Booster Seat	9.6%	(6.7, 13.6)	7.3%	(3.9, 13.4)	-2.3	(-7.9, 3.3)	0.41
Seat Belt	73.3%	(68.0, 78.1)	67.4%	(56.2, 76.9)	-5.9	(-18.9, 7.2)	0.36
No Restraint Observed	11.1%	(7.8, 15.7)	12.9%	(7.6, 21.1)	1.8	(-5.4, 8.9)	0.62
Children Who Are Taller Than 56 Inches							
Rear-Facing Car Seat	NA	NA	NA	NA	NA	NA	NA
Forward-Facing Car Seat	0.4%	(0.2, 1.0)	1.3%	(0.5, 3.2)	0.8	(-0.4, 2.0)	0.17
Booster Seat (Overall)	4.0%	(2.8, 5.8)	4.9%	(3.2, 7.2)	0.8	(-1.2, 2.9)	0.42
High-Backed Booster Seat	1.7%	(1.1, 2.5)	2.4%	(1.3, 4.6)	0.8	(-0.9, 2.4)	0.35
Backless Booster Seat	2.4%	(1.4, 3.9)	2.4%	(1.3, 4.6)	0.1	(-1.6, 1.8)	0.94
Seat Belt	82.8%	(76.8, 87.5)	84.7%	(80.7, 88.0)	1.9	(-3.7, 7.5)	0.50
No Restraint Observed	12.8%	(8.5, 18.8)	9.2%	(6.1, 13.7)	-3.6	(-10.2, 3.1)	0.28

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Estimates might not sum to totals due to rounding.
3. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window
4. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are in high-backed booster seat), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/(2(n_{EFF} + t^2))$, 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.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.

6. 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**.

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.

NA: Data not sufficient to produce a reliable estimate.

Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

4. Demographic Results

Although its primary purpose is to estimate booster seat use among 4- to 7-year-olds, the NSUBS has information on the restraint use of all children under 13. Additionally, information on race, ethnicity, height, and weight is collected for occupants of under 13 in order to identify and address areas of low restraint use rates. This section reports some major demographic results of child restraint use from the 2019 NSUBS.

Please note that restraint use percentages in this section include any type of restraint, even those that may be inappropriate for a child's age, weight and height. It should also be noted that if a column corresponding to a data series or a data category is missing from a figure, it means that there is not sufficient data to produce a reliable estimate for the data category. Also, sometimes estimates might not sum to totals due to rounding.

Overall, restraint use for all children newborn to 12 years old decreased to 87.9 percent in 2019, compared to 90.1 percent in 2017. This is not a statistically significant change (Figure 14).

Age

The restraint use rates for children from birth to 12 months old, 1 to 3 years old, 4 to 7 years old, and 8 to 12 years old in 2019 were 97.5 percent, 94.3 percent, 86.2 percent, and 87.2 percent, respectively. **Figure 14** compares the restraint use of children newborn to 12 years old by age in 2017 and 2019. None of these changes from 2017 to 2019 are statistically significant.
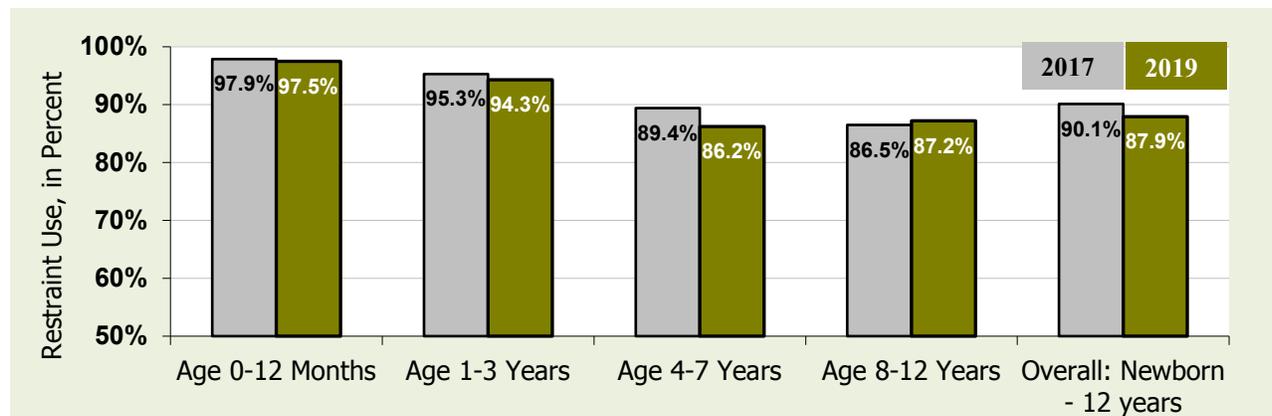
Figure 14. Child Restraint Use by Age and Year.

Race and Ethnicity

NSUBS data collectors conduct interviews to obtain self-identified race and ethnicity of passenger vehicle occupants including all child occupants under 13. This is different from the way NOPUS collects racial information of vehicle occupants which is through visual assessment.

Figure 15 shows the overall picture of child restraint use by race and ethnicity across all age groups. Non-Hispanic White children from birth to 12 months old had the highest restraint use (100.0%) while Non-Hispanic Black children 4 to 7 years old had the lowest (66.3%).
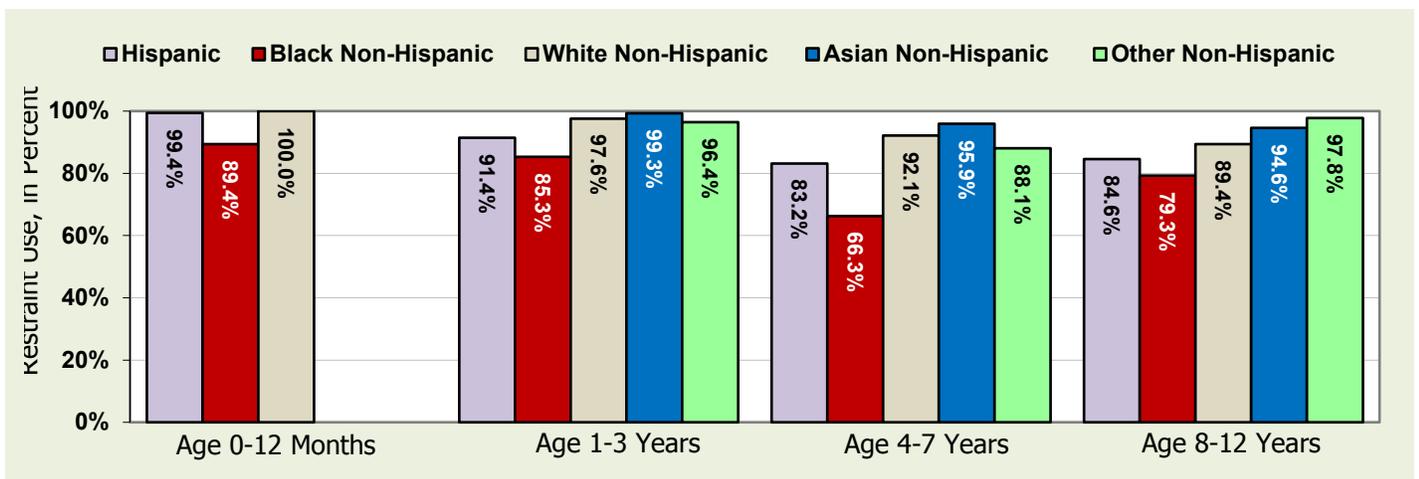
Figure 15. Child Restraint Use by Race and Ethnicity.

As shown in **Figure 16**, Hispanics had lower restraint use rates than Non-Hispanics among all age groups except for the birth to 12 months old age group.
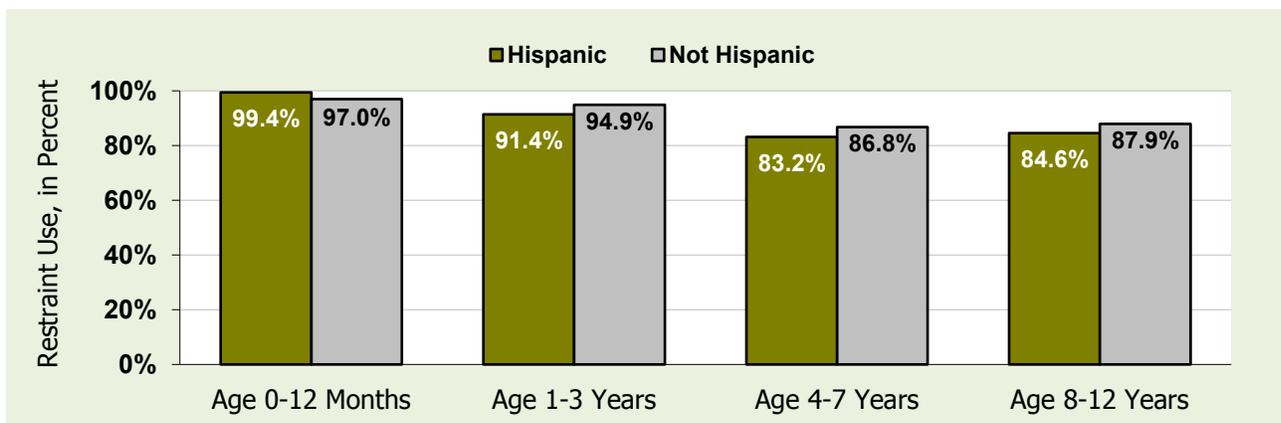
Figure 16. Child Restraint Use by Age and Hispanic Origin in 2019.

The 2019 NSUBS also shows that restraint use among children 8 to 12 years old who are Non-Hispanic Other increased significantly to 97.8 percent in 2019 from 82.9 percent in 2017 (Table 9).

Race and ethnicity data in the NSUBS is collected in accordance with Federal standards set forth by the Office of the Management and Budget (OMB). Specifically, the following 10 race/ethnicity categories are employed in the survey data collection:

Not Hispanic nor Latino and
- American Indian or Alaska Native
- Asian
- Black or African-American
- Native Hawaiian or Pacific Islander
- White

Hispanic or Latino and
- American Indian or Alaska Native
- Asian
- Black or African-American
- Native Hawaiian or Pacific Islander
- White

The NSUBS data collectors ask an adult occupant of a vehicle (usually the driver) to report the race and ethnicity of all occupants. Respondents reporting themselves (or others) to be multiracial are recorded by the data collector as such.

Because of insufficient numbers of children observed in certain race/ethnic groups, we report the NSUBS data using the following five collapsed race/ethnicity groups:

- Hispanic or Latino
- White Non-Hispanic
- Black or African-American Non-Hispanic
- Asian Non-Hispanic
- Other Non-Hispanic (which comprises people not of Hispanic origin who are American Indian, Alaska Native, Native Hawaiian, or Pacific Islander)

For information on the OMB standards for the collection of race and ethnicity data in government surveys, please see *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity*, Federal Register Notice, Volume 62, Number 210, pages 58781-58790, October 30, 1997, available at www.omb.gov.

Sex

Figure 17 shows the restraint use rates among boys and girls for each age group in 2019. Restraint use rates among girls were higher for all age groups except for the age group birth to 12 months old. There were no significant changes in restraint use rates between 2017 and 2019 for all age groups (Tables 6 – 9).
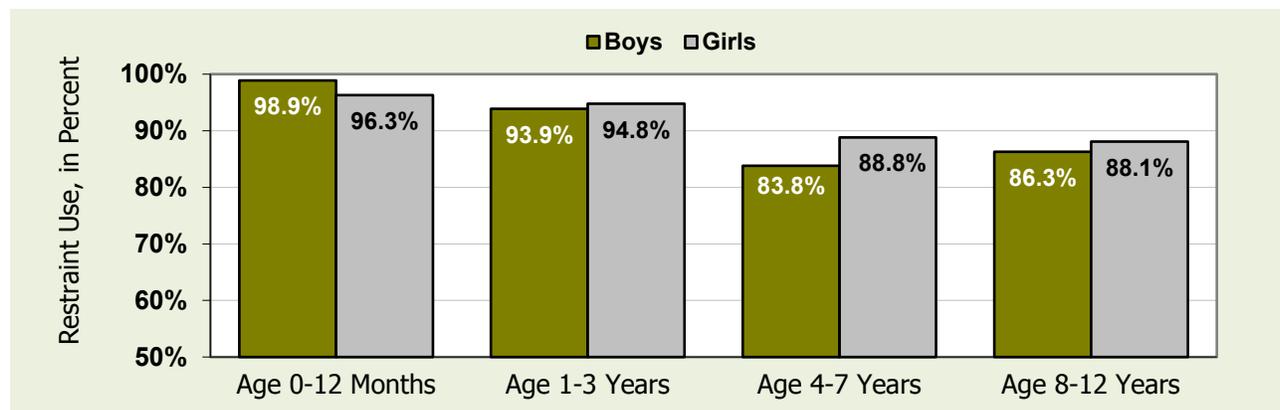

Figure 17. Child Restraint Use by Age and Sex in 2019.

Table 6. Restraint Use Among Children From Birth to 12 Months Old

Subgroup of Children 0-12 Months[1,4]	2017 Estimated Restraint Use[2]	2017 95% Confidence Interval[3]	2019 Estimated Restraint Use[2]	2019 95% Confidence Interval[3]	2017-2019 Change Change in Percentage Points[7]	2017-2019 Change 95% Confidence Interval[5]	P-value[6]
All Children 0-12 Months	97.9%	(96.1, 98.9)	97.5%	(93.7, 99.0)	-0.4	(-3.4, 2.6)	0.78
Children Who Are							
Boys	98.7%	(95.9, 99.6)	98.9%	(97.7, 99.5)	0.2	(-1.8, 2.2)	0.81
Girls	97.2%	(94.9, 98.5)	96.3%	(89.3, 98.8)	-0.9	(-5.9, 4.0)	0.70
Children Who Are Reported to Be[4]							
White Non-Hispanic	99.4%	(96.6, 99.9)	100.0%	(100.0, 100.0)	0.6	(-0.6, 1.7)	0.33
Black or African-American Non-Hispanic	93.0%	(84.9, 96.9)	89.4%	(70.1, 96.8)	-3.6	(-18.0, 10.8)	0.61
Asian Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Other Non-Hispanic	96.8%	(82.4, 99.5)	NA	NA	NA	NA	NA
Hispanic or Latino	97.7%	(92.5, 99.3)	99.4%	(96.4, 99.9)	1.6	(-1.5, 4.8)	0.30
Children Who Are Reported to Be[4]							
Hispanic or Latino	97.7%	(92.5, 99.3)	99.4%	(96.4, 99.9)	1.6	(-1.5, 4.8)	0.30
Neither Hispanic nor Latino	97.9%	(95.9, 99.0)	97.0%	(92.3, 98.9)	-0.9	(-4.4, 2.6)	0.60
Children Whose Height[4] Is							
0 to 36 Inches	97.9%	(96.1, 98.9)	97.6%	(93.7, 99.1)	-0.3	(-3.3, 2.7)	0.83
37 to 53 Inches	NA	NA	NA	NA	NA	NA	NA
54 to 56 Inches	NA	NA	NA	NA	NA	NA	NA
57 Inches or More	NA	NA	NA	NA	NA	NA	NA
Children Who Weigh[4]							
Up to 19 Pounds	99.0%	(97.6, 99.6)	97.6%	(91.0, 99.4)	-1.4	(-5.2, 2.4)	0.47
20 to 40 Pounds	95.7%	(89.9, 98.3)	97.3%	(89.9, 99.3)	1.6	(-4.2, 7.3)	0.58
41 to 60 Pounds	NA	NA	NA	NA	NA	NA	NA
61 Pounds or More	NA	NA	NA	NA	NA	NA	NA
Children Surveyed at a							
Gas Station	94.8%	(88.5, 97.8)	98.3%	(90.6, 99.7)	3.5	(-2.4, 9.4)	0.23
Fast-Food Restaurant	99.0%	(94.3, 99.8)	93.1%	(75.9, 98.3)	-5.9	(-16.3, 4.4)	0.25
Day Care Center	99.2%	(97.3, 99.8)	99.3%	(97.7, 99.8)	0.1	(-1.1, 1.2)	0.93
Recreation Center	NA	NA	95.4%	(79.6, 99.1)	NA	NA	NA

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Use of car seats (forward- or rear-facing), booster seats, and seat belts. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window.
3. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are reported to be Hispanic or Latino), 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. Race, ethnicity, height, weight, and age of children are obtained by asking an adult occupant.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.
6. 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**.

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.

NA: Data not sufficient to produce a reliable estimate.

Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

Table 7. Restraint use Among Children 1 to 3 Years Old

Subgroup of Children 1 to 3 Years Old[1,4]	2017		2019		2017-2019 Change		
	Estimated Restraint Use[2]	95% Confidence Interval[3]	Estimated Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
All Children 1 to 3 Years Old	95.3%	(93.1, 96.8)	94.3%	(91.9, 96.0)	-0.9	(-4.0, 2.2)	0.55
Children Who Are							
Boys	94.9%	(92.4, 96.7)	93.9%	(90.9, 95.9)	-1.0	(-4.0, 1.9)	0.48
Girls	95.6%	(93.2, 97.1)	94.8%	(91.8, 96.7)	-0.8	(-4.5, 2.9)	0.67
Children Who Are Reported to Be[4]							
White Non-Hispanic	98.1%	(96.4, 99.0)	97.6%	(95.1, 98.9)	-0.5	(-2.7, 1.7)	0.66
Black or African-American Non-Hispanic	86.8%	(81.3, 90.8)	85.3%	(79.7, 89.6)	-1.5	(-7.5, 4.6)	0.63
Asian Non-Hispanic	98.6%	(91.4, 99.8)	99.3%	(93.7, 99.9)	0.7	(-2.9, 4.4)	0.68
Other Non-Hispanic	92.3%	(81.6, 97.0)	96.4%	(88.2, 99.0)	4.1	(-4.8, 13.0)	0.35
Hispanic or Latino	96.5%	(94.2, 97.9)	91.4%	(82.4, 96.0)	-5.1	(-11.7, 1.5)	0.13
Children Reported to Be[4]							
Hispanic or Latino	96.5%	(94.2, 97.9)	91.4%	(82.4, 96.0)	-5.1	(-11.7, 1.5)	0.13
Neither Hispanic nor Latino	95.0%	(92.5, 96.7)	94.9%	(92.3, 96.7)	-0.1	(-3.2, 3.1)	0.96
Children Whose Height[4] Is							
Up to 36 Inches	95.4%	(93.2, 96.8)	95.1%	(92.7, 96.8)	-0.2	(-3.2, 2.7)	0.88
37 to 53 Inches	94.8%	(90.9, 97.1)	91.4%	(84.6, 95.3)	-3.5	(-9.4, 2.5)	0.24
54 to 56 Inches	NA	NA	NA	NA	NA	NA	NA
57 Inches or More	NA	NA	NA	NA	NA	NA	NA
Children Who Weigh[4]							
Up to 19 Pounds	97.5%	(92.7, 99.2)	100.0%	(100.0, 100.0)	2.5	(-0.4, 5.4)	0.08
20 to 40 Pounds	95.7%	(93.7, 97.1)	94.4%	(91.9, 96.1)	-1.3	(-4.6, 1.9)	0.42
41 to 60 Pounds	88.3%	(80.1, 93.4)	91.7%	(80.2, 96.8)	3.3	(-4.6, 11.2)	0.40
61 Pounds or More	NA	NA	NA	NA	NA	NA	NA
Children Surveyed at a							
Gas Station	91.8%	(87.9, 94.6)	90.5%	(83.0, 94.9)	-1.3	(-8.4, 5.7)	0.70
Fast-Food Restaurant	93.6%	(89.6, 96.2)	95.4%	(91.0, 97.7)	1.7	(-2.9, 6.4)	0.45
Day Care Center	96.4%	(93.8, 97.9)	96.2%	(92.9, 98.0)	-0.2	(-3.5, 3.1)	0.92
Recreation Center	96.0%	(89.0, 98.6)	93.8%	(81.5, 98.1)	-2.2	(-10.9, 6.4)	0.61

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Use of car seats (forward- or rear-facing), booster seats, and seat belts. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window.
3. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are reported to be Hispanic or Latino), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/(2(n_{EFF} + t^2))$, 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. Race, ethnicity, height, weight, and age of children are obtained by asking an adult occupant.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.
6. 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**.

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: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

Table 8. Restraint Use Among Children 4 to 7 Years Old

Subgroup of Children 4 to 7 Years Old[1,4]	2017		2019		2017-2019 Change		
	Estimated Restraint Use[2]	95% Confidence Interval[3]	Estimated Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
All Children 4-7	89.4%	(85.6, 92.3)	86.2%	(80.0, 90.7)	-3.3	(-10.1, 3.5)	0.34
Children Who Are							
Boys	89.3%	(85.3, 92.3)	83.8%	(76.7, 89.0)	-5.5	(-13.0, 2.0)	0.14
Girls	89.6%	(85.8, 92.6)	88.8%	(83.2, 92.7)	-0.9	(-7.2, 5.4)	0.78
Children Who Are Reported to Be[4]							
White Non-Hispanic	94.6%	(92.4, 96.2)	92.1%	(85.6, 95.8)	-2.5	(-8.0, 3.1)	0.37
Black or African-American Non-Hispanic	75.8%	(65.9, 83.6)	66.3%	(55.3, 75.7)	-9.6	(-23.2, 4.0)	0.16
Asian Non-Hispanic	99.8%	(99.0, 100.0)	95.9%	(87.0, 98.8)	-4.0	(-9.2, 1.3)	0.13
Other Non-Hispanic	90.9%	(83.0, 95.3)	88.1%	(77.4, 94.1)	-2.7	(-14.4, 8.9)	0.63
Hispanic or Latino	87.0%	(79.6, 92.0)	83.2%	(71.8, 90.6)	-3.8	(-14.4, 6.9)	0.48
Children Reported to Be[4]							
Hispanic or Latino	87.0%	(79.6, 92.0)	83.2%	(71.8, 90.6)	-3.8	(-14.4, 6.9)	0.48
Neither Hispanic nor Latino	89.9%	(85.9, 92.9)	86.8%	(80.2, 91.5)	-3.1	(-10.6, 4.4)	0.40
Children Whose Height[4] Is							
Up to 36 Inches	88.9%	(83.6, 92.6)	84.9%	(74.1, 91.7)	-4.0	(-14.6, 6.7)	0.45
37 to 53 Inches	89.7%	(86.1, 92.4)	86.5%	(80.3, 90.9)	-3.2	(-9.9, 3.5)	0.34
54 to 56 Inches	89.6%	(80.2, 94.8)	78.8%	(60.0, 90.2)	-10.7	(-28.9, 7.5)	0.24
57 Inches or More	NA	NA	93.8%	(73.6, 98.8)	NA	NA	NA
Children Who Weigh[4]							
Up to 19 Pounds	NA	NA	NA	NA	NA	NA	NA
20 to 40 Pounds	90.1%	(85.5, 93.4)	89.0%	(82.9, 93.1)	-1.1	(-7.8, 5.6)	0.73
41 to 60 Pounds	89.8%	(86.6, 92.3)	87.1%	(81.2, 91.4)	-2.7	(-8.7, 3.3)	0.37
61 Pounds or More	85.4%	(78.3, 90.5)	73.0%	(58.0, 84.1)	-12.4	(-29.1, 4.3)	0.14
Children Surveyed at a							
Gas Station	82.2%	(74.9, 87.8)	80.1%	(70.8, 87.1)	-2.1	(-12.3, 8.2)	0.68
Fast-Food Restaurant	84.3%	(77.1, 89.6)	85.2%	(74.5, 91.9)	0.9	(-10.8, 12.7)	0.87
Day Care Center	93.6%	(89.9, 96.0)	92.2%	(85.0, 96.2)	-1.4	(-7.7, 5.0)	0.66
Recreation Center	88.9%	(80.0, 94.2)	84.2%	(73.7, 91.0)	-4.8	(-16.5, 6.9)	0.41

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Use of car seats (forward- or rear-facing), booster seats, and seat belts. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window.
3. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are reported to be Hispanic or Latino), which is in the form: $\left\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\right\}/(2(n_{EFF} + t^2))$, 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. Race, ethnicity, height, weight, and age of children are obtained by asking an adult occupant.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.
6. 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**.

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: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

Table 9. Restraint Use Among Children 8 to 12 Years Old

Subgroup of Children 8 to 12 Years Old[1,4]	2017		2019		2017-2019 Change		
	Estimated Restraint Use[2]	95% Confidence Interval[3]	Estimated Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[7]	95% Confidence Interval[5]	P-value[6]
All Children 8-12	86.5%	(82.6, 89.7)	87.2%	(81.8, 91.2)	0.7	(-5.9, 7.3)	0.83
Children Who Are							
Boys	85.1%	(80.9, 88.5)	86.3%	(79.1, 91.3)	1.3	(-6.8, 9.3)	0.75
Girls	88.0%	(83.7, 91.2)	88.1%	(83.3, 91.6)	0.1	(-6.0, 6.1)	0.98
Children Who Are Reported to Be[4]							
White Non-Hispanic	91.1%	(86.2, 94.4)	89.4%	(81.2, 94.3)	-1.7	(-10.3, 6.9)	0.69
Black or African-American Non-Hispanic	79.9%	(73.7, 85.0)	79.3%	(72.3, 84.9)	-0.6	(-10.8, 9.5)	0.90
Asian Non-Hispanic	90.7%	(73.1, 97.2)	94.6%	(75.5, 99.0)	3.9	(-11.7, 19.6)	0.61
Other Non-Hispanic	**82.9%**	**(75.0, 88.6)**	**97.8%**	**(93.6, 99.3)**	**14.9**	**(7.6, 22.3)**	**< 0.01**
Hispanic or Latino	82.2%	(75.2, 87.6)	84.6%	(77.8, 89.6)	2.4	(-6.2, 11.0)	0.57
Children Reported to Be[4]							
Hispanic or Latino	82.2%	(75.2, 87.6)	84.6%	(77.8, 89.6)	2.4	(-6.2, 11.0)	0.57
Neither Hispanic nor Latino	87.4%	(83.5, 90.5)	87.9%	(81.3, 92.3)	0.4	(-7.2, 8.1)	0.91
Children Whose Height[4] Is							
Up to 36 Inches	NA	NA	NA	NA	NA	NA	NA
37 to 53 Inches	85.3%	(81.6, 88.4)	83.6%	(76.6, 88.8)	-1.7	(-9.6, 6.1)	0.66
54 to 56 Inches	88.7%	(84.2, 92.0)	88.3%	(79.0, 93.8)	-0.4	(-7.7, 6.9)	0.91
57 Inches or More	87.4%	(81.5, 91.5)	90.6%	(85.8, 93.9)	3.3	(-3.6, 10.1)	0.34
Children Who Weigh[4]							
Up to 19 Pounds	NA	NA	NA	NA	NA	NA	NA
20 to 40 Pounds	82.2%	(62.9, 92.6)	NA	NA	NA	NA	NA
41 to 60 Pounds	85.0%	(79.6, 89.2)	88.0%	(82.3, 92.1)	3.0	(-3.7, 9.7)	0.37
61 Pounds or More	87.0%	(83.0, 90.3)	87.6%	(81.8, 91.8)	0.6	(-6.5, 7.7)	0.87
Children Surveyed at a							
Gas Station	82.2%	(77.5, 86.1)	85.0%	(77.5, 90.3)	2.8	(-5.5, 11.0)	0.50
Fast-Food Restaurant	87.5%	(81.5, 91.8)	91.3%	(82.2, 95.9)	3.7	(-6.5, 14.0)	0.46
Day Care Center	88.9%	(84.3, 92.2)	90.4%	(81.1, 95.4)	1.6	(-6.6, 9.7)	0.70
Recreation Center	89.9%	(84.7, 93.4)	84.5%	(76.2, 90.3)	-5.4	(-12.6, 1.8)	0.14

1. Survey data is obtained on children newborn to 12 years old in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.
2. Use of car seats (forward- or rear-facing), booster seats, and seat belts. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window.
3. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are reported to be Hispanic or Latino), 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. Race, ethnicity, height, weight, and age of children are obtained by asking an adult occupant.
5. 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. The degrees of freedom in 2019 is different from that used in 2017.
6. 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**.

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: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

5. Occupants Traveling With Children

Although its primary purpose is to estimate booster seat use among 4- to 7-year-olds, the NSUBS also collects information on the race and ethnicity of other occupants traveling with children. This section reports the restraint use, by race and ethnicity, of occupants traveling with children from the 2019 NSUBS.

The NSUBS data collectors approach passenger vehicles appearing to have child occupants under 13, observe the restraint use of up to nine occupants in the first three rows of seats, and conduct interviews to obtain the race and ethnicity of all occupants. The approximate ages of non-child occupants (expressed as an age range, such as 16 to 24 years old) and the sexes of all occupants are subjectively assessed by the data collectors. Since race and ethnicity of all occupants are obtained through interviews instead of subjective assessment of data collectors as in NOPUS and most other observational surveys, NSUBS provides more accurate estimates on race and ethnicity of passenger vehicles occupants. However, it should be noted that by design and necessity, the NSUBS survey only collects restraint use of vehicle occupants who are transporting or riding with children under 13 to a restricted set of sites such as gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains, not of all vehicle occupants on the road.

The major findings from the 2019 survey on the demographic characteristics of occupants traveling with children include the following:

- Seat belt use continued to be lower for Hispanics, Black non-Hispanic or African-Americans than White non-Hispanics, Asian non-Hispanics, and Other non-Hispanics among passenger vehicle occupants 25 to 69 years old traveling with children (**Figure 18**).

- There was no significant difference between seat belt use by Hispanics and non-Hispanics (**Figure 19**).

- Among occupants 13 to 15 years old, restraint use for Hispanic occupants increased from 80.2 percent in 2017 to 90.8 percent in 2019 (Table 10).

- Among occupants 16 to 24 years old, restraint use for Black non-Hispanic occupants increased from 80.2 percent in 2017 to 87.1 percent in 2019 (Table 10).

Please note that if a column corresponding to a data series or a data category is missing from a figure or a table in this section, it means that there is not sufficient data to produce a reliable estimate for the data category. Also note that sometimes estimates might not sum to totals due to rounding.
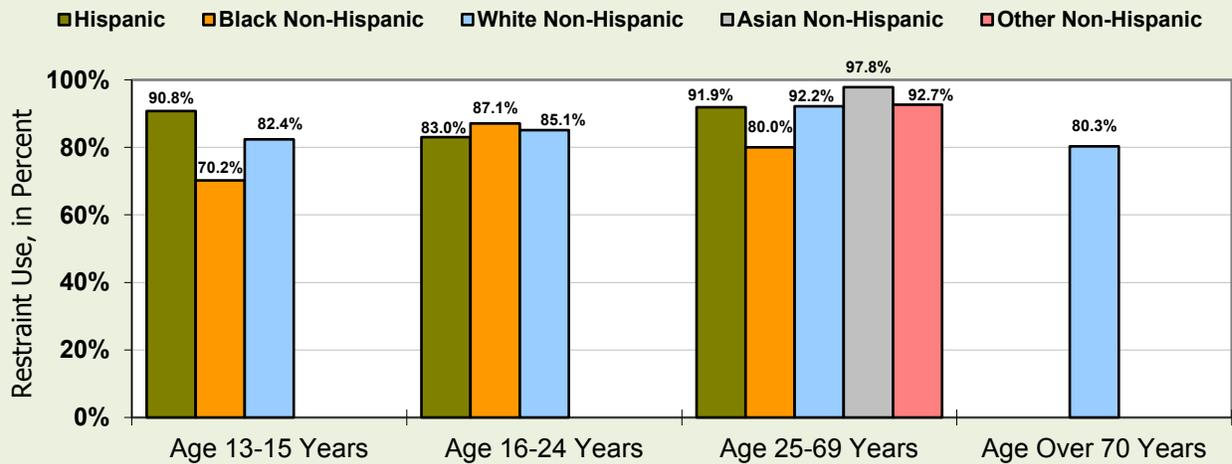
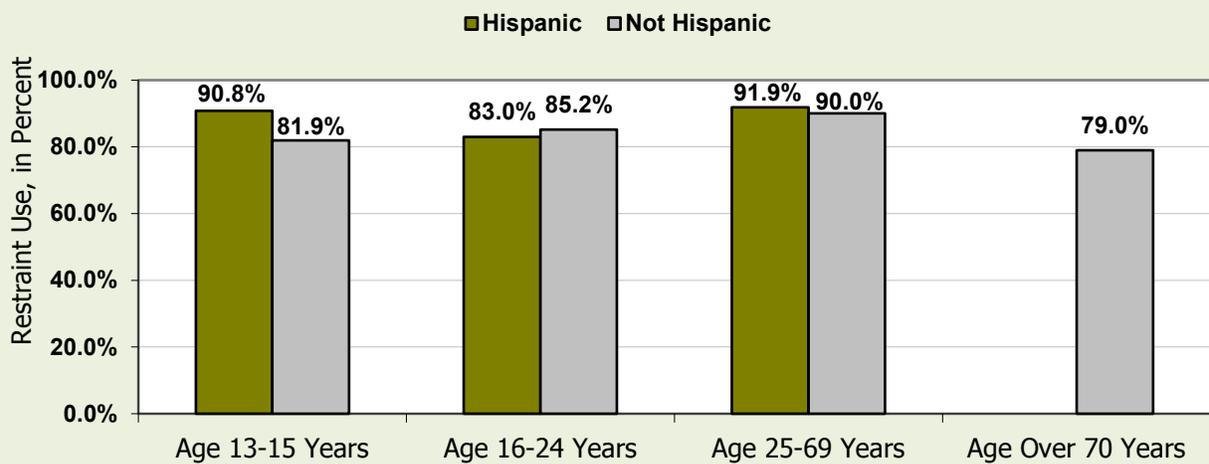*Figure 18. Restraint Use by Age and Race/Ethnicity for Occupants Traveling With Children in 2019.*

Figure 19. Restraint Use by Age and Hispanic Origin for Occupants Traveling With Children in 2019.

Table 10. Restraint Use of Occupants Traveling With Children by Age and Race/Ethnicity

Subgroup of Children 13 Years and Older[1,4]	2017		2019		2017-2019 Change		
	Estimated Restraint Use[2]	95% Confidence Interval[3]	Estimated Restraint Use[2]	95% Confidence Interval[3]	Change in Percentage Points[8]	95% Confidence Interval[5]	P-value[6]
Occupants 13 to 15 Years Old							
Occupants Reported to Be[7]							
White Non-Hispanic	86.9%	(78.9, 92.1)	82.4%	(69.9, 90.4)	-4.5	(-16.1, 7.1)	0.44
Black or African-American Non-Hispanic	83.7%	(71.8, 91.3)	70.2%	(33.3, 91.8)	-13.5	(-50.6, 23.6)	0.46
Asian Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Other Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Hispanic or Latino	80.2%	(62.7, 90.7)	90.8%	(76.7, 96.8)	10.7	(-5.1, 26.5)	0.18
Occupants Reported to Be[7]							
Hispanic or Latino	80.2%	(62.7, 90.7)	90.8%	(76.7, 96.8)	10.7	(-5.1, 26.5)	0.18
Neither Hispanic nor Latino	85.8%	(80.4, 89.9)	81.9%	(69.4, 90.0)	-3.9	(-15.5, 7.7)	0.50
Occupants 16 to 24 Years Old							
Occupants Reported to Be[7]							
White Non-Hispanic	85.5%	(64.6, 95.0)	85.1%	(67.1, 94.1)	-0.4	(-16.4, 15.6)	0.96
Black or African-American Non-Hispanic	80.2%	(51.6, 93.9)	87.1%	(80.5, 91.7)	7.0	(-16.8, 30.8)	0.55
Asian Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Other Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Hispanic or Latino	84.2%	(62.6, 94.4)	83.0%	(63.2, 93.3)	-1.2	(-23.9, 21.5)	0.92
Occupants Reported to Be[7]							
Hispanic or Latino	84.2%	(62.6, 94.4)	83.0%	(63.2, 93.3)	-1.2	(-23.9, 21.5)	0.92
Neither Hispanic nor Latino	82.9%	(71.5, 90.4)	85.2%	(73.6, 92.3)	2.3	(-10.7, 15.2)	0.72
Occupants 25 to 69 Years Old							
Occupants Reported to Be[7]							
White Non-Hispanic	92.5%	(88.6, 95.1)	92.2%	(86.9, 95.5)	-0.3	(-5.8, 5.2)	0.91
Black or African-American Non-Hispanic	79.2%	(71.9, 85.0)	80.0%	(74.2, 84.8)	0.8	(-7.8, 9.4)	0.85
Asian Non-Hispanic	97.9%	(96.0, 98.9)	97.8%	(94.0, 99.2)	0.0	(-2.6, 2.6)	0.99
Other Non-Hispanic	90.4%	(84.0, 94.4)	92.7%	(84.6, 96.7)	2.3	(-6.7, 11.2)	0.61
Hispanic or Latino	89.6%	(84.2, 93.3)	91.9%	(87.3, 94.9)	2.3	(-3.6, 8.1)	0.44
Occupants Reported to Be[7]							
Hispanic or Latino	89.6%	(84.2, 93.3)	91.9%	(87.3, 94.9)	2.3	(-3.6, 8.1)	0.44
Neither Hispanic nor Latino	89.3%	(85.2, 92.3)	90.0%	(85.5, 93.3)	0.7	(-5.5, 7.0)	0.81
Occupants Over 70 Years Old							
Occupants Reported to Be[7]							
White Non-Hispanic	96.5%	(87.7, 99.1)	80.3%	(50.5, 94.2)	-16.2	(-40.5, 8.0)	0.18
Black or African-American Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Asian Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Other Non-Hispanic	NA	NA	NA	NA	NA	NA	NA
Hispanic or Latino	85.0%	(32.7, 98.5)	NA	NA	NA	NA	NA
Occupants Reported to Be[7]							
Hispanic or Latino	85.0%	(32.7, 98.5)	NA	NA	NA	NA	NA
Neither Hispanic nor Latino	94.8%	(87.3, 98.0)	79.0%	(56.4, 91.6)	-15.8	(-34.5, 2.9)	0.10

1. Survey data is obtained on drivers and passengers of passenger vehicles appearing to contain a child under 13 years old at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in seven fast-food chains.

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2. Restraint use is observed by trained data collectors prior to or just as the vehicle comes to a stop, except in the case of observation at fast-food drive-through lanes, where restraint use is observed prior to the vehicle reaching the drive-through window.

3. The Wilson Confidence Interval is used in the estimated percentages in the children group (e.g., children who are reported to be Hispanic or Latino), 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 degree of statistical confidence that the 2019 use rate is different from the 2017 rate.

5. 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. The degrees of freedom in 2019 is different from that used in 2017.

6. 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**.

7. Race and ethnicity of all occupants are obtained by interviewing an adult occupant in the vehicle (usually the driver).

8. 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 not sufficient to produce a reliable estimate.
Source: The National Survey of the Use of Booster Seats, NCSA, 2017, 2019.

6. NSUBS Methodology

This section discusses briefly the sample design, sample size, data collection, and estimation used in the 2019 NSUBS. For sample design prior to 2015 NSUBS, refer to *The 2006 National Survey of the Use of Booster Seats – Methodology Report* (Glassbrenner, 2009).

Sample Design

The 2013 and prior NSUBS surveys used a design that was based upon a subset of PSUs used for the NOPUS. In 2015 NSUBS was redesigned and became totally independent from NOPUS. The 2019 NSUBS uses a three-stage design.

The first stage sampling is selecting a sample of geographic areas, called PSUs. A PSU is a single county or a group of adjacent counties within State boundaries. There are 1,601 PSUs in the sampling frame, covering the continental United States excluding Alaska and Hawaii. These PSUs are then grouped into 8 strata by Census region (Northeast, Midwest, South, and West) and the status of whether or not the State of the PSU enacted a child restraint use law as of 2014 that covers children up to age 7 at the minimum. A PSU sample of 30 was selected from the sampling frame using the probability-proportional-to-size (PPS) sampling method with the measure-of-size (MOS) of the number of children up to 7 based on the 2012 Census population data.

The second stage of the design is selecting a sample of data collection sites within each PSU. The site sampling frame consists of gas stations, recreation centers, day care centers, and fast food restaurants in the NSUBS' 30 sampled PSUs. These four site types make four strata. A new site sample size was determined and allocated proportionally to each site type according to the site frame size. The total number of sites in the frame was 20,510 for the 30 selected PSUs. The NSUBS selected 705 sites using stratified systematic sampling within each site type after sorting the sites by ZIP Code for good geographic dispersion.

The third stage is the selection of all passenger vehicles with child occupants who are observed at the respondent sites.

Sample Size

The PSU sample size for the 2006 design was only 16, and it had been problematic because it caused unstable point and variance estimates. In the 2015 NSUBS redesign, an increase of the PSU sample size to 30 was achieved without substantially increasing the survey cost. The increased sample size of 30 PSUs eliminated the need of a special variance estimator and substantially simplified the variance estimation as well as improved the sampling efficiency.

To correct for the uneven distribution of PSU samples across the Census regions, the new design uses proportional allocation to the total MOS, which calls for selecting 5, 7, 11, and 7 PSUs from the Northeast, Midwest, South, and West regions, respectively.

Due to the nature of the survey, the NSUBS data collectors must obtain cooperation from the sample sites. Cooperation with recreation centers and day care centers is obtained in advance of visiting these sites via sending letters requesting cooperation followed by phone calls to secure

cooperation. For fast-food restaurants and gas stations, trained data collectors approach each establishment in person to secure cooperation.

For the 2019 NSUBS, data was collected in 436 out of 705 sampled sites. Out of the 705 sampled sites, 577 sites were eligible for the survey which equates to a response rate of 75.6 percent (436/577). Of the 436 data collection sites, 197 were gas stations, 81 fast-food restaurants, 114 daycare centers, and 44 recreation centers.

Table 11 shows the observed sample size of the 2019 NSUBS. A total of 15,198 occupants were observed in the 5,605 vehicles at the 436 data collection sites. Of these observed occupants, 8,313 were children newborn to 12 years old. The data on 7,373 children newborn to 12 years old was obtained by interviews with adult occupants who were traveling together with those children. There is a large drop in the number of observations for 2019. The reason for this is the 2017 NSUBS had more data collection days than previous years. In 2019 the usual data collection schedule was followed.

Table 11. Sites, Vehicles, Occupants, and Children Newborn to 12 Years Old in NSUBS

Numbers of	2017	2019	Percentage Change
Data Collection Sites	661	436	-34.0%
Vehicles Observed	7,490	5,605	-25.2%
Occupants Observed	21,360	15,198	-28.8%
Children Newborn to 12 Years Old Observed	11,430	8,313	-27.3%
Children Newborn to 12 Years Old Interviewed*	9,774	7,373	-24.6%

* Data obtained by interview with an adult occupant.

Data Collection

The 2019 NSUBS data collection was conducted between 7 a.m. and 6 p.m. during the period from July 13 to July 31, 2019. The data collection protocols had no major changes from the 2006 design to 2015 design.

Trained data collectors approach passenger vehicles appearing to have child occupants under the age of 13; observe the restraint use of up to nine occupants in the first three rows of seats; and conduct interviews to obtain the race and ethnicity of all occupants and the heights, weights, and ages of child occupants appearing to be under 13. The approximate ages of other occupants (expressed as an age range, such as 16 to 24 years old) and the sexes of all occupants are subjectively assessed by the data collectors. Starting in 2019, the exact age of the driver was obtained.

Note that the data on race/ethnicity in the NSUBS is collected via self-reporting in compliance with OMB standards. NHTSA obtained approval to collect race/ethnicity data for the 2019 and 2021 surveys under OMB clearance number 2127-0644. The notice of OMB review can be found in the Federal Register, Volume 84, Number 24, page 1819, February 5, 2019.

In order to capture restraint use before children unfasten the restraints, data collectors observe restraint use prior to or just as the vehicle comes to a stop, except at fast-food drive-through lanes. In that case, restraint use is observed prior to the vehicles reaching the drive-through window.

To reach as many respondents as possible, the NSUBS uses some Spanish-speaking data collectors.

Estimation

There was no change in weighting from the 2006 survey design to the 2015 survey design. However, there were substantial changes in the way to estimate the variance in the 2015 survey design as compared to the 2006 survey design.

Let C denote the characteristic of occupants and R denote restraint type. The NSUBS estimates the rate of occupants restrained in restraint type R among the occupants having characteristic C by the following 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 booster seat use among 4- to 7- year-old children is estimated using the above formula, where CR_{ijk} is the number of observed children 4 to 7 years old in booster seat and C_{ijk} is the number of observed children 4 to 7 years old at the site k in the stratum j of the PSU i.

The variance estimation method used for the 2006 design is very complex due to the small PSU sample size. The PSU sample size has been increased from 16 to 30, and we expect the commonly used variance estimators would be reasonably stable. We continue to use the Jackknife variance estimation method with modifications to reflect the new design.

Note that the NSUBS site sampling frame is restricted to the four site types: gas stations, day care centers, recreation centers, and fast-food restaurants as described in the sample design sub-section. Since the NSUBS uses a probability sample of these site types, the NSUBS estimates are nationally representative of children who frequently visit these types of sites. For instance, 37.0 percent booster seat use among 4- to 7-year-old children as shown in Figure 1 means that among children in 2019 in this age range who were taken by passenger vehicles to gas stations, day care centers, recreation centers, or fast-food restaurants, 37.0 percent were in booster seats.

NHTSA employed the following data reporting guidelines for the NOPUS and NSUBS publications: Estimates whose numerator is based on fewer than five observations in the sample, and/or whose denominator is based on fewer than 30 observations in the sample, or that are not

statistically different from zero percent are reported as "NA" in publications, including any related estimates (i.e., change in use and confidence estimates).

Please also note that "NA" estimates do not appear in the figures throughout this report (displayed as missing columns in the figures).

7. References

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