Traffic Safety Facts
Research Note

NHTSA
www.nhtsa.gov

DOT HS 810 796

April 2025 (Revised)

Booster Seat Use in 2006

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In the first-ever probability-based survey of booster seat use in the United States based on the observation of children in vehicles, NHTSA found that 41 percent of 4- to 7-year-old children were restrained in booster seats in 2006. This result is from the National Survey of the Use of Booster Seats (NSUBS). The NSUBS is conducted by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration.

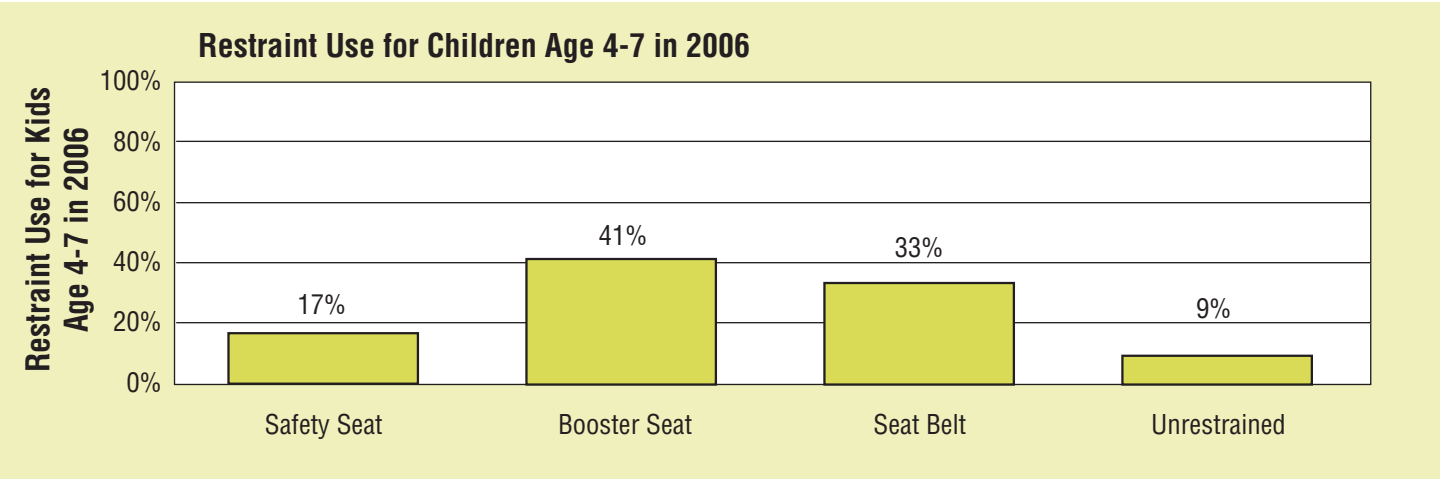
A Milestone Estimate

About 350 children age 4 to 7 die in traffic crashes each year, and about 50,000 are injured. Half of those who die are not in any type of restraint (child safety seats, booster seats, or seat belts). In response to figures such as these, Congress passed the Transportation Recall Enhancement, Accountability, and Documentation Act of 2000 (Pub. L. 106-414; November 1, 2000), which directed the Department of Transportation to develop a five-year strategic plan to reduce by 25 percent deaths and injuries among 4- to 7-year-olds caused by failure to use booster seats. Therefore, there was a need for reliable data on who is not using booster seats in order to direct outreach programs where they are most needed.

Prior to the NSUBS, various entities had attempted to estimate booster seat use in the United States. Unfortunately these efforts were hampered by methodologies, involving either non-probability samples or telephone interviews, that might not yield representative results.

In contrast, the NSUBS is the first effort to yield demonstrably representative results on a certain population of children. The population of children captured by the NSUBS comprises the children who are conveyed by passenger vehicle to gas stations, fast food restaurants, day care centers, or recreation centers. The 2006 NSUBS survey data is based on the results of 5,300 children observed in 3,500 vehicles at about 400 establishments across the country.

The appropriate restraint system for children 4 to 7 is either a front-facing safety seat or a booster seat, depending on the child's height and weight. However, the NSUBS found that in 2006, 41 percent of children in this age group were using booster seats (whether high-backed or backless), 17 percent were restrained in child safety seats, 33 percent were in seat belts, and 9 percent were unrestrained.



Source: National Survey of the Use of Booster Seats, NHTSA's National Center for Statistics and Analysis, 2006.

These results indicate that as many as 42 percent of children 4 to 7 were not being properly protected (33% in seat belts and 9% unrestrained). However, the 17 percent of 4- to 7-year-olds who were in child safety seats could be using an appropriate restraint type. Please see section "Who Should Be in Booster Seats" below for information on appropriateness of booster seat use.

In addition to this data, the NSUBS collects a wealth of information including the types of restraints used and a myriad of demographic information (age, race, ethnicity, sex, and, for children only, height and weight) for up to nine child and adult occupants in each participating vehicle. The purpose of this Research Note is to highlight the survey's results on booster seat use (see the table on the next page) for all booster seat use estimates computed from the survey data. Additional Research Notes that present results from the NSUBS in other topic areas, such as on the degree to which children are restrained in restraint types appropriate for their size (height and weight) and on race/ethnicity breakouts of restraint use, are available at the Web site http://www-nrd. nhtsa.dot.gov/CMSWeb/ViewCatalogbyCategory.aspx.

Who Should Be in Booster Seats?

NHTSA's recently updated official guidance[1] on booster seats is: Once children outgrow their front-facing seats (usually around age 4 and 40 pounds), 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 lays across the upper thighs and the shoulder belt fits across the chest (usually at age 8 or when they are 4'9" tall).

Ages Considered in This Publication

Many 4- to 7-year-olds have outgrown their front-facing safety seats, so many entities study booster seat use among this age group. However, in this Research Note, we present information on all children age 0 to 12, as the NHTSA recommendation involves more than age alone.

Evidence of Premature Graduation in Our Booster Seat Use Data

A cursory search of child safety seats on the market finds a wide variation in height and weight limits. Many height limits range between 36 and 54 inches, and many weight limits range from 40 to 60 pounds. Thus we will consider these various limits in applying the NHTSA recommendation to assess the survey results.

From the booster seat use estimates presented in the table on the next page, we see some evidence of premature graduation. For instance, 25 percent of children age 0-12 who weigh between 20 and 40 pounds were using booster seats. However, most front-facing safety seats allow weights above 40 pounds. Therefore, many (if not most) of these children should have been in front-facing safety seats (unless they have outgrown the seat's height limits).

Likewise, 20 percent of children age 0-12 who were at most 36 inches tall were using booster seats. However, most front-facing safety seats allow heights above 36 inches. Therefore, many (if not most) of these children should have been in front-facing safety seats (unless they have outgrown the seat's weight limits).

In fact, the NSUBS provides the best data to date on the premature graduation of children age 0 to 12 to restraint types that are inappropriate for their height or weight. Please see the companion publication "Child Restraint Use in 2006—Use of Correct Restraint Types" referenced below for detailed discussions on this topic.

[1] http://www.boosterseat.gov

Booster Seat Use in 2006, by Age, Weight, and Height

Booster Seat Type[1]	Percentage[2] of Children[3] Using the Booster Seat Type	Standard Error
Children Age 0 (Less Than 1 Year Old)		
Booster Seat (Overall)	NA	
High-Backed Booster Seat	NA	NA
Backless Booster Seat	NA	NA
Children Age 1-3		
Booster Seat (Overall)	19%	
High-Backed Booster Seat	12%	5%
Backless Booster Seat	6%	5%
Children Age 4-7		
Booster Seat (Overall)	41%	
High-Backed Booster Seat	25%	7%
Backless Booster Seat	16%	5%
Children Age 8-12		
Booster Seat (Overall)	8%	
High-Backed Booster Seat	4%	1%
Backless Booster Seat	4%	3%
Children Age 0-12 Who Weigh Less Than 20 Pounds		
Booster Seat (Overall)	NA	
High-Backed Booster Seat	NA	NA
Backless Booster Seat	NA	NA
Children Age 0-12 Who Weigh Between 20 and 40 Pounds		
Booster Seat (Overall)	25%	
High-Backed Booster Seat	16%	7%
Backless Booster Seat	9%	5%
Children Age 0-12 Who Weigh Between 41 and 60 Pounds		
Booster Seat (Overall)	39%	
High-Backed Booster Seat	23%	6%
Backless Booster Seat	16%	5%
Children Age 0-12 Who Weigh More Than 60 Pounds		
Booster Seat (Overall)	8%	
High-Backed Booster Seat	4%	1%
Backless Booster Seat	4%	2%
Children Age 0-12 Who Are at Most 36 Inches Tall		
Booster Seat (Overall)	20%	
High-Backed Booster Seat	12%	7%
Backless Booster Seat	8%	6%
Children Age 0-12 Who Are Between 37 and 53 Inches Tall		
Booster Seat (Overall)	34%	
High-Backed Booster Seat	20%	4%
Backless Booster Seat	13%	3%
Children Age 0-12 Who Are Between 54 and 56 Inches Tall		
Booster Seat (Overall)	13%	
High-Backed Booster Seat	9%	5%
Backless Booster Seat	4%	5%
Children Age 0-12 Who Are Taller Than 56 Inches		
Booster Seat (Overall)	1%	
High-Backed Booster Seat	1%	1%
Backless Booster Seat	NA	NA

[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] Children observed at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in five fast food chains.
NA: Data not sufficient to produce a reliable estimate.
Source: The National Survey of the Use of Booster Seats, NHTSA's National Center for Statistics and Analysis, 2006

Survey Methodology

The National Survey of the Use of Booster Seats obtains its data by sending trained data collectors to a probability sample of gas stations, day care centers, recreation centers, and restaurants in five national fast food chains across the U.S. The choice of these types of data collection sites stems from the necessity of observing restraint use from a close range in a slow-moving or stopped vehicle (as is required in order to distinguish a seat belt being used in conjunction with a backless booster seat from a seat belt being used alone), combined with the desire to capture large numbers of children.

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 (obtained in compliance with OMB standards for such data) and the heights, weights, and ages of child occupants appearing to be under age 13. (The approximate ages of other occupants (expressed as an age range, such as 16-24 years), and the sexes of all occupants, are subjectively assessed by the data collectors.)

In order to capture restraint usage before children unfasten the restraints, restraint use is observed by the 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.

In order to reach as wide an audience as possible, the NSUBS uses some Spanish-speaking data collectors.

The 2006 survey data is based on the observation of 10,000 occupants, 5,300 of whom were under age 13, in 3,500 vehicles at 28 day care centers, 107 fast food restaurants, 205 gas stations, and 43 recreation centers nationwide. The survey interviews covered 4,431 children under age 13, including 197 infants under 1 year old, 1,061 children 1 to 3 years old, 1,685 children 4 to 7 years old, and 1,488 children 8 to 12 years old. The data was collected between July 17 and July 29, 2006.

The NSUBS uses a complex multistage probability sample, statistical data editing, imputation of unknown values, and complex estimation and variance estimation procedures. See the NHTSA Technical Report referenced below for more information on these procedures, as well as for more information on the survey's data collection protocols.

The design of the survey, survey preparation activities, data collection, estimation, and variance estimation for the NSUBS were conducted by Westat, Inc., under the direction of the National Center for Statistics and Analysis in NHTSA under Federal contract number DTNH22-07-D-00057. The OMB clearance number for the NSUBS is 2127-0644.

What Do the Survey Results Tell Us? Are the Results Representative?

By design and necessity, the NSUBS survey data is obtained from a restricted set of site types, namely gas stations, day care centers, recreation centers, and restaurants in five fast food chains. However the survey uses a probability sample of these site types, and so its results are representative of children who frequent these types of sites.

For instance, the survey result of 41 percent booster seat use among 4- to 7-year-olds means that among children in this age range who were taken by passenger vehicles to gas stations, day care centers, recreation centers, fast food restaurants in 2006, 41 percent were in booster seats. Whether or not the booster seat use rate for 4- to 7-year-olds who do not frequent these site types is an open question, and not one that the NSUBS (or any other survey we know of) can answer. The next section offers a brief summary of booster results from other surveys.

How Does the NSUBS Result Compare With Other Studies of Booster Seat Use?

Prior to the NSUBS, a small number of studies shed some light on booster use nationwide. However none of these was able to estimate booster seat use in a demonstrably representative fashion, as each used either a non-probability sample or collected its data via telephone interviews. These studies are summarized in the table below.

In addition to these studies, a long-standing NHTSA survey has shed light on the use of one class of booster seats, namely high-backed booster seats. The National Occupant Protection Use Survey (NOPUS) has estimated high-backed booster seat use since 2002. (The most recent NOPUS survey result estimated that 3% of 4- to 7-year-old children were using high-backed booster seats in 2006.) However, as the NOPUS survey results are obtained from the observations of data collectors stationed at roadsides from which one cannot reliably discern backless boosters, NOPUS cannot provide an estimate of the percentage of children using booster seats. For more information on the 2006 NOPUS results, see the publication referenced below.

Booster Seat Use Estimates for Children Age 4-7 From a Variety of Sources

Survey (Study)	Research Sponsors	Most Recent Estimate	Sample Information	Study Types	Comments
The National Survey of the Use of Booster Seats (NSUBS)	NHTSA	41% of 4-7-year-olds were observed in booster seats. (2006)	Probability sample of 627 sites (fast food restaurants, gas stations, etc.), of which 383 participated. Observed 5,339 children age 0-12 and interviewed drivers of 4,431 of these children, of whom 1,685 were age 4-7.	Observational survey and interviews conducted at the vehicle	The first ever official booster use estimate of NHTSA
The National Occupant Protection Use Survey (NOPUS)	NHTSA	3% of 4-7-year-olds were observed in high-backed booster seats, and an additional 59% in belts or backless boosters. (2006)	Probability sample of 1,200 sites (intersections controlled by a stop sign or stoplight). Observed 2,300 children age 0-7.	Observational survey	Age assessed subjectively by data collectors. No backless booster data.
The Motor Vehicle Occupant Safety Survey (MVOSS)	NHTSA	21% of 4-7-year-olds were reported to be in boosters at least on occasion in 2003.	Probability sample of 6,000 telephone interviews; had data from 669 4-7-year-olds.	Telephone survey	People might be reluctant to report their children were not restrained, and hence use might be overestimated. The survey was conducted in 2003.
Child Passengers at Risk in America: A National Study of Restraint Use	Safe Kids	37% of 4-7-year-olds over 40 pounds were observed in boosters in 2001-2002.	Non-probability sample of 174 gas stations, fast food restaurants, and shopping malls	Observational survey	The survey uses a convenience sample. In particular, sampling error cannot be measured. The survey was conducted in 2001-2002.
The Partners for Child Passenger Safety study	The Children's Hospital of Philadelphia and State Farm Insurance Company	27% of 4-7-year-olds in crashes of insured vehicles were reported in boosters in 2004	Probability sample of 25,000 interviews	Telephone survey	Use tends to be lower in vehicle in crashes than in vehicles not in crashes, but use might be higher in insured vehicles than non-insured ones. The survey was conducted in 2004.

Sources: National Survey of the Use of Booster Seats, NHTSA, 2006; National Occupant Protection Use Survey, NHTSA, 2006; Motor Vehicle Occupant Safety Survey, NHTSA, 2003; Child Passengers at Risk in America: A National Study of Restraint Use, National SAFE KIDS Campaign, 2002; Partners for Child Passenger Safety, Fact and Trend Report, The Children's Hospital of Philadelphia, 2005.

Restraint Types and Definition of Use

The NSUBS uses the following definitions of restraint use:
Rear-Facing Child Safety 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 might be secured or not.

Front-Facing Child Safety 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 front of the vehicle, and with harness straps that are across the child's front.

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.

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.

Seat Belt - Child (or adult) is sitting on the vehicle seat and the seat belt is across the front of the body (includes lap belts).

Unrestrained - All other cases.

For More Information

The NSUBS, although its primary purpose is to estimate booster seat use among 4- to 7-year-olds, has very rich information on the restraint use of all children under age 13 and on race/ethnicity results on restraint use among all ages. In particular, the NSUBS provides the best data to date on the premature graduation of children age 0-12 to restraint types that are inappropriate for their height or weight. This publication is part of a series that presents overall results from the survey on these topics. Please see companion publications such as "Child Restraint Use in 2006—Demographic Results" and "Child Restraint Use in 2006—Use of Correct Restraint Types" for the latest data on these topics. Detailed information on the NSUBS survey design and analysis procedures are provided in the NHTSA Technical Report "The 2006 National Survey of the Use of Booster Seats— Methodology Report." These publications will be available at the Web site http://www-nrd.nhtsa.dot.gov/CMSWeb/ViewCatalogbyCategory.aspx in 2007.

For more information on the campaign by NHTSA to increase child restraint use, see www.nhtsa.gov.

References

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8. Public Law 106-414 [H.R. 5164] Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act. November 1, 2000.

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