

# Traffic Safety Facts

## Research Note

DOT HS 810 798

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## Child Restraint Use in 2006 – Use of Correct Restraint Types

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In the first-ever probability-based study of whether children in the United States are using restraints appropriate for their height and weight, NHTSA found that almost half (44%) of children between 20 and 40 pounds were not in front-facing child safety seats in 2006, the appropriate child restraint for this weight group. 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.

The NSUBS provides the best information to date on the extent to which children are “prematurely graduated” to restraints inappropriate for their height and weight. This is because the NSUBS is a probability-based national survey that not only observes child restraint use, but also records the ages, heights, and weights of children via face-to-face interviews.

The 2006 survey found substantial evidence of premature graduation for all restraint types. In the following sections, we present the 2006 findings in three areas:

- Premature graduation out of rear-facing safety seats;
- Premature graduation out of front-facing safety seats; and
- Premature graduation into seat belts.

### Premature Graduation Out of Rear-Facing Safety Seats

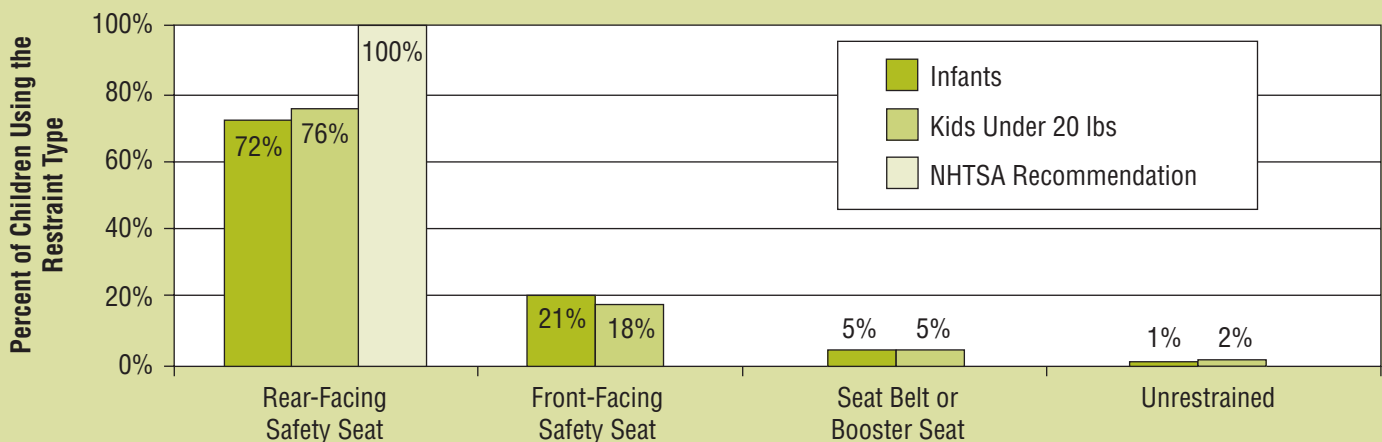
NHTSA recommends that for the best possible protection, infants should be kept in the back seat, in rear-facing child safety seats, as long as possible up to the height or weight limit of the particular seat. At a minimum, infants should be kept rear-facing until a minimum of age 1 and at least 20 pounds (source: [www.boosterseat.gov](http://www.boosterseat.gov)).

In particular, children who are under age 1 or less than 20 pounds should be in rear-facing safety seats. However, the 2006 NSUBS found that

- Over one quarter (28%) of infants (less than 1 year) were not in rear-facing safety seats; and
- About one quarter (24%) of children less than 20 pounds (age 0 to 12) were not in rear-facing safety seats.

Most of the premature graduation for these children was to front-facing safety seats.

Distribution of Restraint Types in 2006



Note: Percentages may not total to 100% due to rounding

Source: The National Survey of the Use of Booster Seats, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, 2006

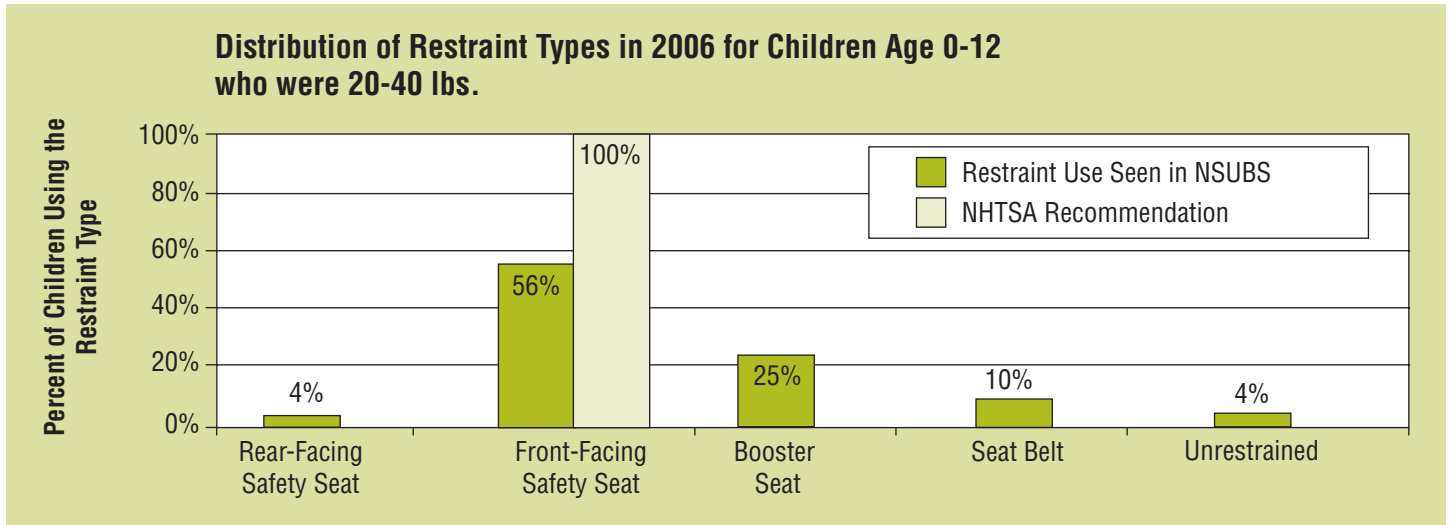
## Premature Graduation Out of Front-Facing Safety Seats

NHTSA recommends 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, until they reach the upper weight or height limit of the particular seat (usually at around age 4 and 40 pounds). (Source: [www.boosterseat.gov](http://www.boosterseat.gov))

However, the 2006 NSUBS found that:

- Almost half (44%) of children age 0 to 12 who are 20-40 pounds were not in front-facing safety seats.

Some of the premature graduation for these children was to booster seats and some to seat belts.



**Note:** Percentages may not total to 100% due to rounding

**Source:** The National Survey of the Use of Booster Seats 2006, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

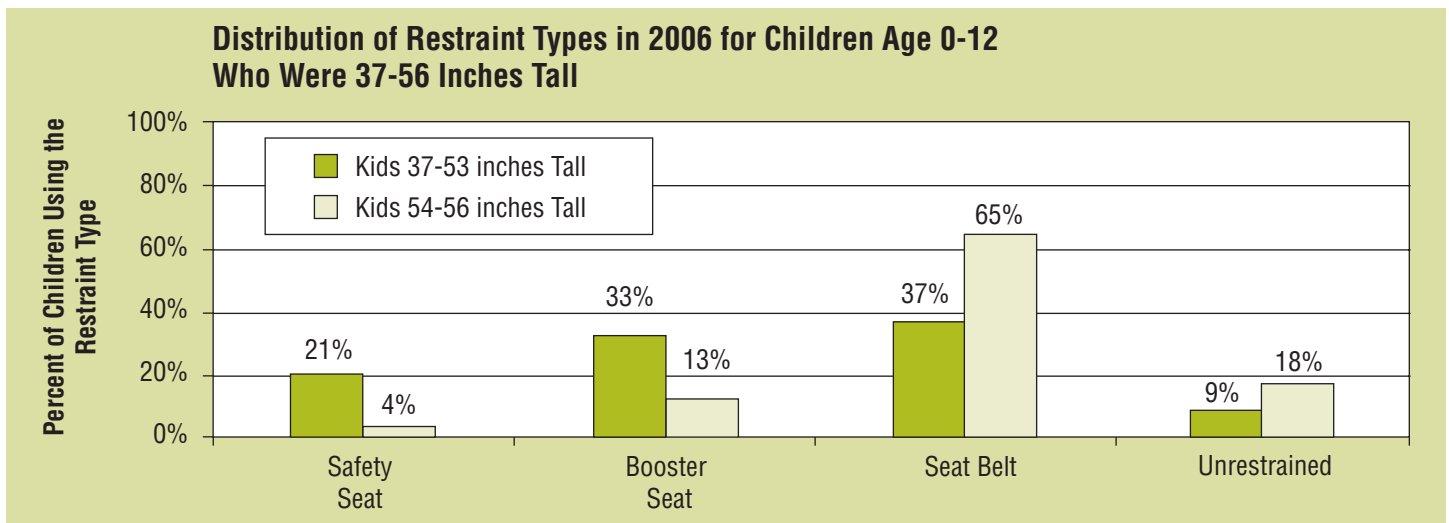
## Premature Graduation to Seat Belts

NHTSA recommends 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. 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). (Source: [www.boosterseat.gov](http://www.boosterseat.gov))

However, the 2006 NSUBS found that:

- About half (46%) of children (age 0-12) who are 37 to 53 inches tall were not in safety seats or booster seats;
- About 8 in 10 (83%) of children (age 0-12) who are 54 to 56 inches tall were not in safety seats or booster seats.

Many of these children were in seat belts and a fair number were unrestrained.



**Source:** The National Survey of the Use of Booster Seats 2006, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

## The Types of Restraints Used by Children Age 0-12, by Weight

Restraint Type <sup>1</sup>	Percentage of Children Observed Using the Restraint Type in 2006 <sup>2</sup>	Standard Error
<b>Children Who Weigh Less Than 20 Pounds</b>		
Rear-Facing Child Safety Seat	76%	15%
Front-Facing Child Safety Seat	18%	13%
High-Backed Booster Seat	NA	NA
Backless Booster Seat	NA	NA
Seat Belt	4%	4%
No Restraint Observed	2%	1%
<b>Children Who Weigh Between 20 and 40 Pounds</b>		
Rear-Facing Child Safety Seat	4%	1%
Front-Facing Child Safety Seat	56%	5%
High-Backed Booster Seat	16%	7%
Backless Booster Seat	9%	5%
Seat Belt	10%	3%
No Restraint Observed	4%	1%
<b>Children Who Weigh Between 41 and 60 Pounds</b>		
Rear-Facing Child Safety Seat	NA	NA
Front-Facing Child Safety Seat	14%	6%
High-Backed Booster Seat	23%	6%
Backless Booster Seat	16%	5%
Seat Belt	35%	8%
No Restraint Observed	11%	3%
<b>Children Who Weigh More Than 60 Pounds</b>		
Rear-Facing Child Safety Seat	NA	NA
Front-Facing Child Safety Seat	0%	0%
High-Backed Booster Seat	4%	1%
Backless Booster Seat	4%	2%
Seat Belt	77%	4%
No Restraint Observed	15%	3%

<sup>1</sup> Survey data was obtained on children age 0 to 12 in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in five fast food chains.

<sup>2</sup> 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.

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

**Source:** The National Survey of the Use of Booster Seats, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

## The Types of Restraints Used by Children Age 0-12, by Height

Restraint Type <sup>1</sup>	Percentage of Children Observed Using the Restraint Type in 2006 <sup>2</sup>	Standard Error
<b>Children Who Are at Most 36 Inches Tall</b>		
Rear-Facing Child Safety Seat	14%	3%
Front-Facing Child Safety Seat	55%	4%
High-Backed Booster Seat	12%	7%
Backless Booster Seat	8%	6%
Seat Belt	6%	2%
No Restraint Observed	5%	1%
<b>Children Who Are Between 37 and 53 Inches Tall</b>		
Rear-Facing Child Safety Seat	0%	0%
Front-Facing Child Safety Seat	21%	5%
High-Backed Booster Seat	20%	4%
Backless Booster Seat	13%	3%
Seat Belt	37%	5%
No Restraint Observed	9%	3%
<b>Children Who Are Between 54 and 56 Inches Tall</b>		
Rear-Facing Child Safety Seat	NA	NA
Front-Facing Child Safety Seat	NA	NA
High-Backed Booster Seat	9%	5%
Backless Booster Seat	4%	5%
Seat Belt	65%	9%
No Restraint Observed	18%	5%
<b>Children Who Are Taller Than 56 Inches</b>		
Rear-Facing Child Safety Seat	NA	NA
Front-Facing Child Safety Seat	NA	NA
High-Backed Booster Seat	1%	1%
Backless Booster Seat	NA	NA
Seat Belt	84%	4%
No Restraint Observed	13%	4%

<sup>1</sup> Survey data was obtained on children age 0 to 12 in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in five fast food chains.

<sup>2</sup> 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.

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

**Source:** The National Survey of the Use of Booster Seats, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

## The Types of Restraints Used Children Age 0-12, by Age

Restraint Type <sup>1</sup>	Percentage of Children Observed Using the Restraint Type in 2006 <sup>2</sup>	Standard Error
<b>Children Age 0 (Less Than 1 Year Old)</b>		
Rear-Facing Child Safety Seat	72%	10%
Front-Facing Child Safety Seat	21%	7%
Booster Seat	NA	NA
Seat Belt	2%	3%
No Restraint Observed	1%	1%
<b>Children Age 1-3</b>		
Rear-Facing Child Safety Seat	4%	2%
Front-Facing Child Safety Seat	69%	4%
Booster Seat	19%	3%
Seat Belt	5%	2%
No Restraint Observed	3%	1%
<b>Children Age 4-7</b>		
Rear-Facing Child Safety Seat	NA	NA
Front-Facing Child Safety Seat	17%	4%
Booster Seat	41%	6%
Seat Belt	33%	6%
No Restraint Observed	9%	2%
<b>Children Age 8-12</b>		
Rear-Facing Child Safety Seat	NA	NA
Front-Facing Child Safety Seat	0%	0%
Booster Seat	8%	3%
Seat Belt	75%	4%
No Restraint Observed	16%	3%

<sup>1</sup> Survey data was obtained on children age 0 to 12 in passenger vehicles at a nationwide probability sample of gas stations, day care centers, recreation centers, and restaurants in five fast food chains.

<sup>2</sup> 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.

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

**Source:** The National Survey of the Use of Booster Seats, National Highway Traffic Safety Administration, National Center for Statistics and Analysis

## 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 United States. 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 to 24 years old), and the genders 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 interviewed the drivers of 4,431 children under age 13, including 197 infants, 1,061 children age 1 to 3 years old, 1,685 children age 4 to 7 years old, and 1,488 children age 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 procedure. 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 that 37 percent of children between 37 and 53 inches tall were in seat belts means that among children in this height range who were taken by passenger vehicles to gas stations, day care centers, recreation centers, and fast food restaurants in 2006, 37 percent were in seat belts. Whether or not the seat belt use rate for children in this height range 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.

## How Do These Results Compare With NOPUS?

NHTSA conducts another survey, the National Occupant Protection Use Survey, which examines some aspects of premature graduation. The NOPUS observes children in vehicles stopped at stop signs and stop lights on a probability sample of roadways, and, as necessitated by roadside observation, assesses age subjectively, does not collect height nor weight, and its data collectors do not attempt to decipher whether a child in a shoulder belt is in a backless booster seat. Thus the NOPUS is conducted at a set of sites that is representative of U.S. roadways, but its age data is subject to observer misjudgment, its restraint type data is less complete, and it cannot provide restraint use distributions by height or weight.

The restraint use distributions NOPUS can provide (the distributions by age) are sometimes comparable to those in NSUBS, and sometimes not. Differences between the NOPUS and NSUBS estimates could be due to the different populations of vehicles captured by the two surveys (stemming from the different site types used) and/or different sources of age information (which is visually estimated in NOPUS versus obtained by interview in NSUBS). For more information on the NOPUS data, see the publication "Child Restraint Use in 2006" available at <http://www-nrd.nhtsa.dot.gov/CMSWeb/ViewCatalogbyCategory.aspx>.

## 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 front of the body (includes lap belts).

*Unrestrained* - All other cases

## For More Information

The NSUBS has very rich information on the restraint use of all children under age 13. In particular, the NSUBS provides the agency's estimate of booster seat use among 4- to 7-year-olds and provides the best data to date on child restraint use by race and ethnicity. This publication is part of a series that presents overall results from the survey on these topics. Please see the companion publications "Booster Seat Use in 2006" and "Child Restraint Use in 2006—Demographic Results" 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/ViewCatalogby-Category.aspx> in 2007.

For more information on NHTSA's recommended child restraint types for children of various heights and weights, and for information on the campaign by NHTSA to increase child restraint use, see [www.nhtsa.gov](http://www.nhtsa.gov).



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