

Child Restraint Misuse in North Dakota

2010 Car Seat Checkups Summary and Comparison 2009-2010



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Introduction

Motor vehicle crashes are the leading cause of death and injury for North Dakota children ages 1 through 14. Educational campaigns and the state's child restraint law have helped increase the number of children riding in car seats and seat belts. Unfortunately, many of these children are still at risk because child restraints are not always used and installed correctly.

Several factors contribute to high rates of child restraint misuse, including:

- Incompatibility between child restraint and vehicles.
- Failure to read child restraint manufacturer instructions and vehicle owner's manuals.
- Confusion and inconsistencies between child restraint instructions and vehicle owner's manuals.
- The wide variety of child restraints available, each with specific age, weight and height requirements.
- Changes in technology, such as seat belt design, the Lower Anchors & Tethers for Children (LATCH) system, side impact air bags and head restraints.
- Inconsistent or incorrect information from health and safety professionals caused by changes in best practice guidelines, personal beliefs or gaps in state laws.

Methodology

This report captures data from forms completed for seats checked from January 1, 2010, to December 31, 2011, with the majority being done through organized car seat checkup events sponsored by the North Dakota Department of Health. A small portion of the seat checks were done individually at local sites. All seats were checked by certified child passenger safety technicians who had attended 32 hours of training for their initial certification and continuing education to renew it.

Child restraints were assessed in four general categories, including:

- Was the restraint appropriate for the age, weight and height of the child riding in it?
- Was the child secured correctly in the restraint?
- Was the car seat installed correctly in the vehicle?
- Was the car seat in good condition and free from recalls? Had the car seat been in a crash or was it expired?

Within each category, several items were assessed to determine correct use – according to the child restraint manufacturer's guidelines, vehicle owner's manual or best practice guidelines provided by the National Highway Traffic Safety Administration and the National Child Passenger Safety Board (which oversees the certification process).

General Information

Number of Seats Checked

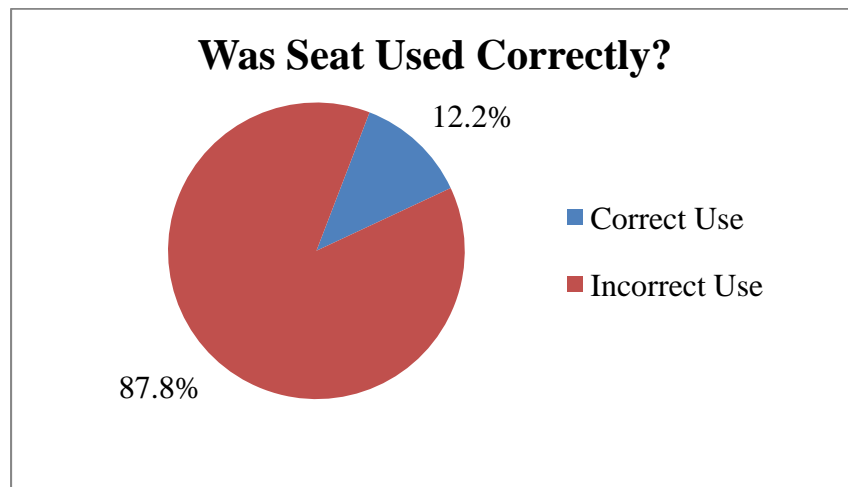
- Data was entered on *1,379 restraints*

Type of Restraint

- Infant seat – *37.7 percent*
- Rear-facing convertible – *12 percent*
- Forward-facing car seat – *30 percent*
- Backless booster – *8.9 percent*
- High-back booster – *7.9 percent*
- Seat belt – *3.5 percent*

Overall Misuse

- *12.2 percent* of the restraints were used correctly.
- *87.8 percent* had at least one error in use.



Incorrect Use by Type of Restraint

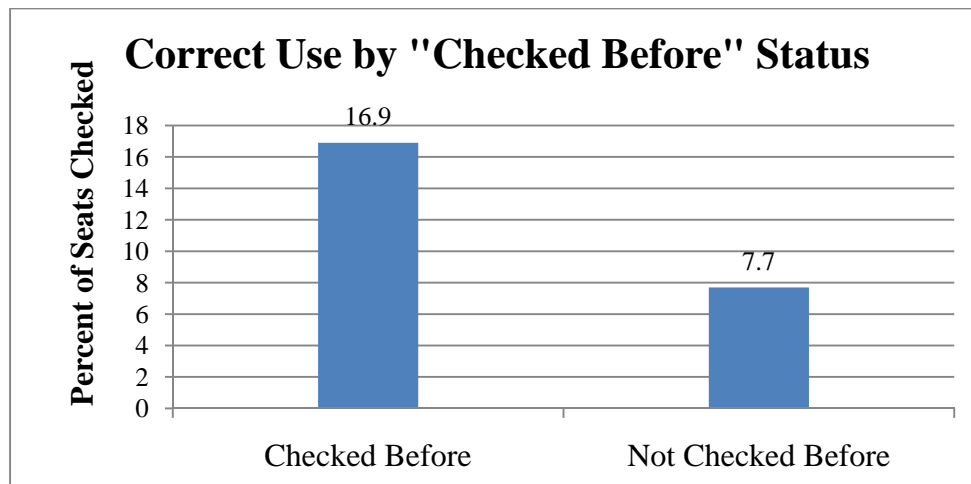
- Infant seat – *95.9 percent* were misused
- Rear-facing convertibles – *88.6 percent* were misused
- Forward-facing - *89.6 percent* were misused
- Booster seats – *66 percent* were misused
- Seat belts – *87.5 percent* were misused

Had Car Seat Been Checked Before?

- 19.7 percent of the car seats had been checked at a prior event.
- 75.3 percent of them had not been checked prior to participation in this checkup.
- 5 percent did not have a response to this question, so data was entered as “Unknown.”

Correct Use of Restraint by “Checked Before” Status

- Of the 272 car seats that had been checked before, 16.9 percent were used correctly.
- Of the 1,038 car seats that had not been checked before, 7.7 percent were used correctly.



This crosstab is an indication of whether checkup participants have learned from the education they were provided at a prior checkup. It is expected that rates of correct use would be higher for parents who have had their car seats checked before.

Although correct use of seats that had been checked before is more than double for seats not checked before, some may question why correct use is not higher for car seats that had been checked before. Unknown factors include:

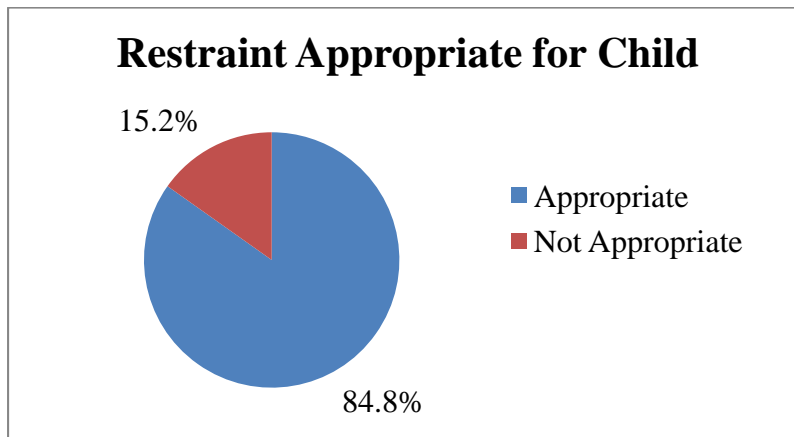
- The car seat may have been checked in a different vehicle with different occupant protection systems.
- The car seat may have been used for a different age/weight child and may have faced in a different direction.
- The car seat may have been recalled or expired between seat checks.
- A different caregiver may be using the car seat.

Was Restraint Appropriate for Child?

One of the first steps in checking a restraint is to determine if it is appropriate for the age, weight, height or special needs of the child riding in it. Appropriateness is based on the manufacturer's instructions, labels on the car seat and "best practice" guidelines from the National Child Passenger Safety Board or other reliable safety organizations.

Restraint Appropriate for Child

- 84.8 percent of the restraints were appropriate.
- 15.2 percent were not appropriate.



Not Appropriate by Type of Restraint

- 5.4 percent of infant seats were not appropriate for the child riding in them.
- 1.2 percent of rear-facing convertible seats were not appropriate for the child riding in them.
- 12.8 percent of forward-facing seats were not appropriate for the child riding in them.
- 22.1 percent of booster seats were not appropriate for the child riding in them.
- 79.2 percent of seat belts were not appropriate for the child riding in them.

Type of Errors with Seat Selection

The restraint was not appropriate for the child in 15.2 percent of the restraints checked. Of these:

- The child was too large (by weight or height) for the restraint in 45.9 percent of the cases. Of the restraints where the child was too large:
 - 50.7 percent were forward-facing seats – many of these were combination harness/booster seats where the child exceeded the weight limit allowed for harness use. These seats require removal of the harness for use as a booster. In other cases, the child was too tall with the child's shoulders being above the top set of harness slots.

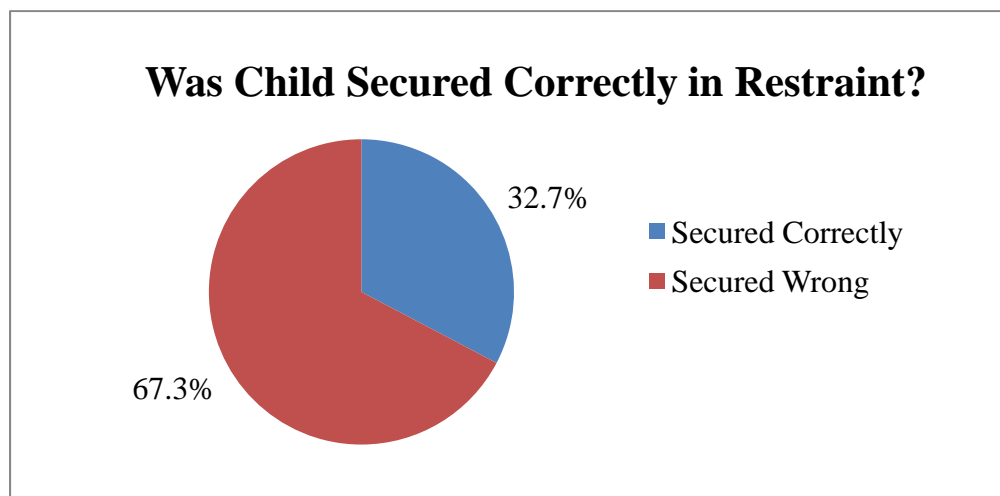
- *34.8 percent* were infant seats – many of these were babies who had outgrown their car seat, usually by a couple of pounds. In many cases, the baby arrived in the infant seat, but the parents had brought a convertible seat and were requesting assistance in installing the new seat.
- *14.5 percent* were rear-facing convertibles or boosters, where the child basically weighed too much or was too tall for the limits listed by the seat manufacturer.
- The child was too small (by weight or height) for the restraint in *45.3 percent* of the cases. Of the restraints where the child was too small:
 - *47.4 percent* were seat belts – these were children who were moved from a booster into a seat belt before they were tall enough for the seat belt to fit correctly.
 - *26.9 percent* were boosters – these children did not meet the minimum height or weight requirements of the booster seat or the seat belt did not fit correctly over the child riding in the booster.
 - *20.5 percent* were forward-facing seats – in many cases, the child met the minimum weight requirement, but did not meet the minimum height required by the manufacturer.
- The child was too young for the restraint in *39.5 percent* of the cases. Of the restraints where the child was too young:
 - *50 percent* were boosters – technicians used age 4 as the recommended guideline for age-appropriate use of a booster.
 - *41.2 percent* were seat belts – age 8 was used as the recommended guideline for age-appropriate use of a seat belt.
 - *8.8 percent* were forward-facing seats – one year is the minimum age for a child to ride in a forward-facing car seat.

Was Child Secured Correctly in Restraint?

Correct use requires the child to be secured properly in the restraint. When checking car seats for a secure fit, technicians checked for harness tightness, retainer/chest clip position, harness slots and correct threading of harnesses. For children in boosters and seat belts, proper position of the lap and shoulder belt was assessed.

Secured Correctly – Of the restraints checked, 710 had a child secured in them, so an assessment of fit could be done. Of these:

- The child was secured correctly in *32.7 percent* of the restraints.
- There was at least one error in how the child was secured in *67.3 percent* of the restraints.



Not Secured Correctly by Type

- *72 percent* of infant seats had errors related to how the child was secured in them.
- *75.6 percent* of rear-facing convertible seats had errors related to how the child was secured.
- *77.5 percent* of forward-facing seats had errors related to how the child was secured.
- *31.2 percent* of booster seats had errors related to how the child was secured.
- *85.4 percent* of seat belts had errors related how the child was secured.

Types of Securing Errors – Infant, Rear-facing Convertible and Forward-facing Seats

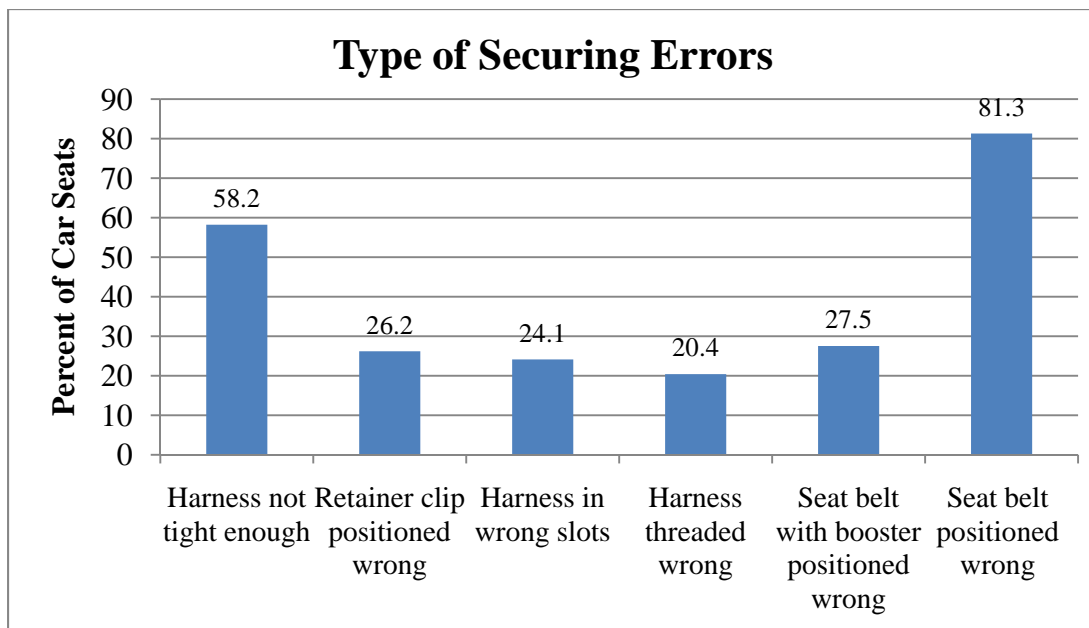
- 58.2 percent of the harness straps were not tight enough.
- 26.2 percent of the retainer/chest clips were positioned incorrectly.
- 24.1 percent of the harness straps were in the wrong slots for the child riding in the seat.
- 20.4 percent of the harness straps were threaded wrong.

Types of Securing Errors – Booster Seats

- 27.5 percent of the booster seats had errors related to how the seat belt was positioned over the child riding in the booster.

Types of Securing Errors – Seat Belt

- 81.3 percent of the children riding in seat belts had errors related to how the lap or shoulder belt was positioned over the child.

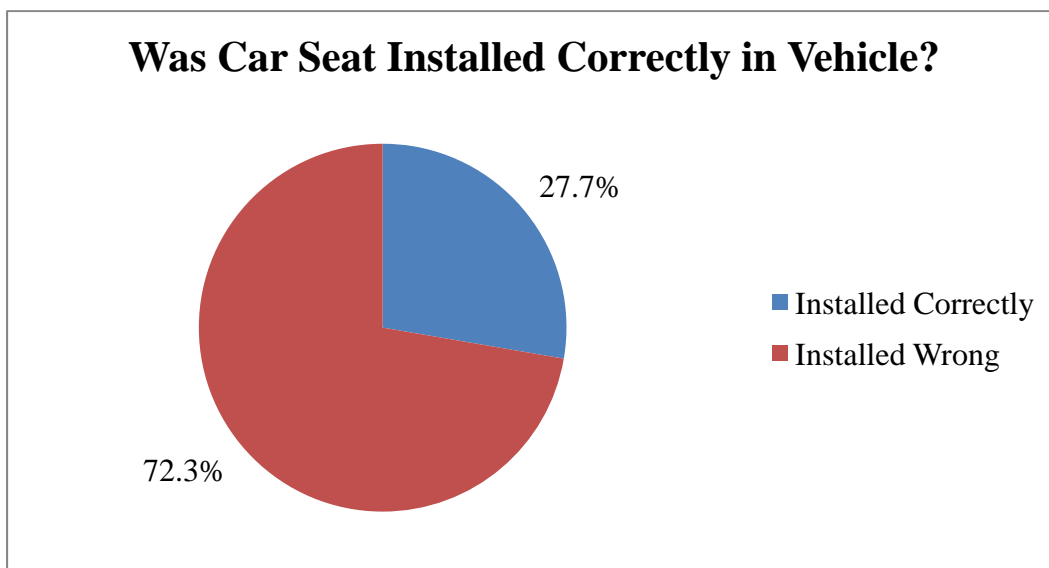


Was Car Seat Installed Correctly in Vehicle?

Before removing the car seat from the vehicle, technicians checked for correct installation. Items checked included how tight the seat was installed in the vehicle, how it was installed (seat belt or LATCH), correct use of the seat belt or LATCH, use of tether straps, correct belt path, recline position and handle position on infant seats.

Installed Correctly – Of the restraints checked, 776 were installed in the vehicle.
Of these:

- 27.7 percent were installed correctly.
- 72.3 percent had at least one error in how they were installed.

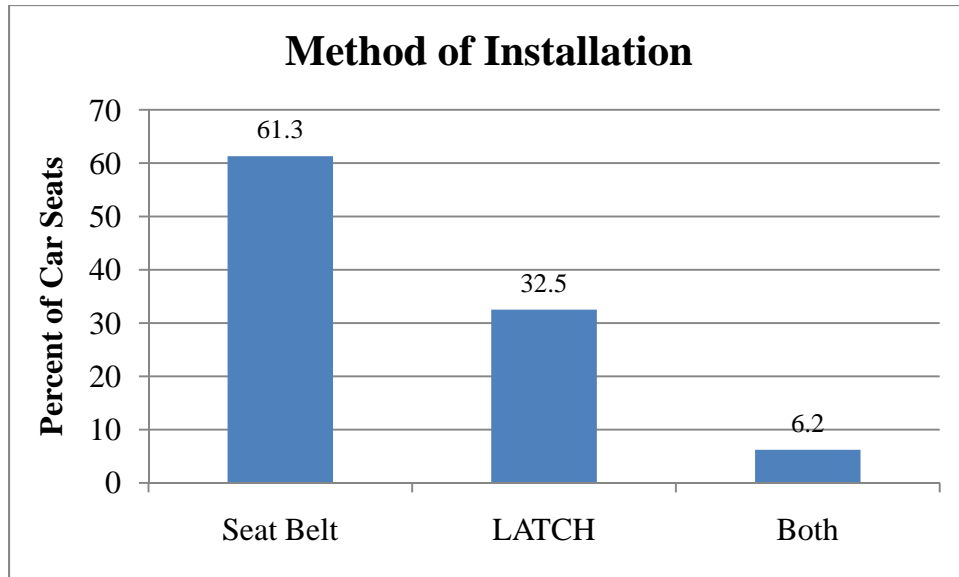


Installed Correctly by Type

- 84.8 percent of the infant seats had installation errors.
- 57.4 percent of rear-facing convertible seats had installation errors.
- 69.6 percent of forward-facing seats had installation errors.

How Car Seat Was Installed in Vehicle

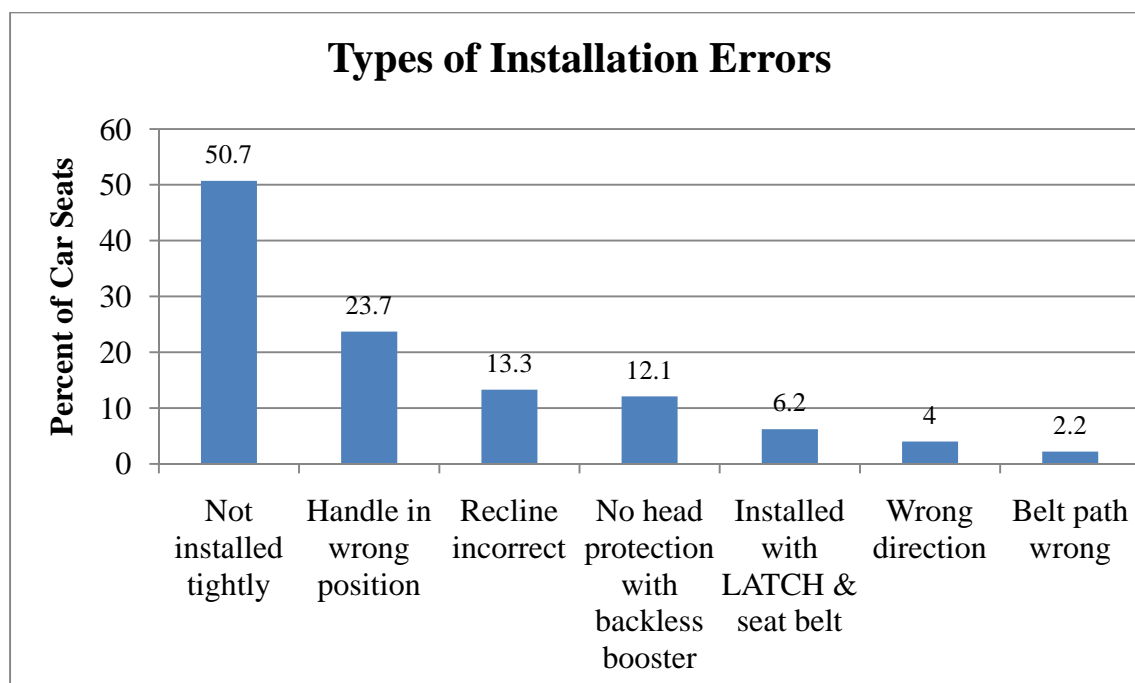
- 61.3 percent of the car seats were installed with the vehicle seat belt.
- 32.5 percent of the car seats were installed with the lower anchor and tether system.
- 6.2 percent of the car seats were installed with both the seat belt and the lower anchor and tether system.



Types of Installation Errors

- 50.7 percent of the car seats were not installed tightly.
- 23.7 percent of the infant seats had the handle in an incorrect position for travel.
- 13.3 percent of the car seats were not reclined correctly for their direction or the age/weight of the child riding in them.
- 12.1 percent of the children riding in backless boosters had no head protection in the seating position where they were riding.
- 6.2 percent of the car seats were installed with both LATCH and seat belt.
- 4 percent of the seats were facing the wrong direction for the child riding in them.
- 2.2 percent of the seats had the seat belt or lower anchor strap threaded through the wrong belt path.

Note: Errors related to children in boosters and seat belts were recorded as securing errors, with the exception of head protection for children riding in backless boosters.



Errors Related to LATCH Installation

- 27.2 percent of forward-facing seats that were installed with LATCH were using the lower anchors without the top tether.
- 9.7 percent of the seats installed with LATCH had the hooks facing upward.
- 11.4 percent of the seats installed with LATCH were using the center lower anchor hooks when it was not approved by the vehicle owner's manual.
- 4 percent of the seats installed with LATCH had other errors related to use of the LATCH system.

Errors Related to Seat Belt Installation

- *4.8 percent* of the seat belts were not locked for pre-crash positioning.
- *1.6 percent* had incorrect use of a locking clip.

Use of Tether Straps

- 295 of the installed forward-facing car seats had tether straps on them and the vehicles had tether anchors in them; *47.5 percent* of these were using the tether strap.
- Of those using the tether strap, *27.1 percent* were using it incorrectly.

Condition of Restraint

Car seats were checked for general condition, missing parts, torn or frayed harnesses and missing labels. Seats were checked for recalls and expiration dates and parents were questioned regarding the crash history of the seat.

Was Car Seat Recalled?

- *2.3 percent* of the car seats had unrepaired recalls.
- *1.7 percent* of the seats had missing labels, so the seat could not be checked for recall.

Was Car Seat in a Crash?

- *5.7 percent* of the car seats had been in a crash or the parent/caregiver was unsure of the history of the seat.

Was Car Seat Outdated?

- *5.2 percent* of the car seats were outdated or the seat was missing labels, so the age of the car seat could not be verified.

Removal of Unregulated Products from Car Seat or Vehicle

Car seat manufacturers advise against using accessories (head pads, toys, mirrors) that did not come with the seat.

- *20 percent* of the restraints had an unregulated product attached to it or in the vehicle.
- In *57.5 percent* of the cases, the unregulated product was removed with permission of the parent/caregiver. In *42.6 percent* of the cases, the caregiver chose to continue using the product after being told it was not safe to use.

Comparison 2009-2010

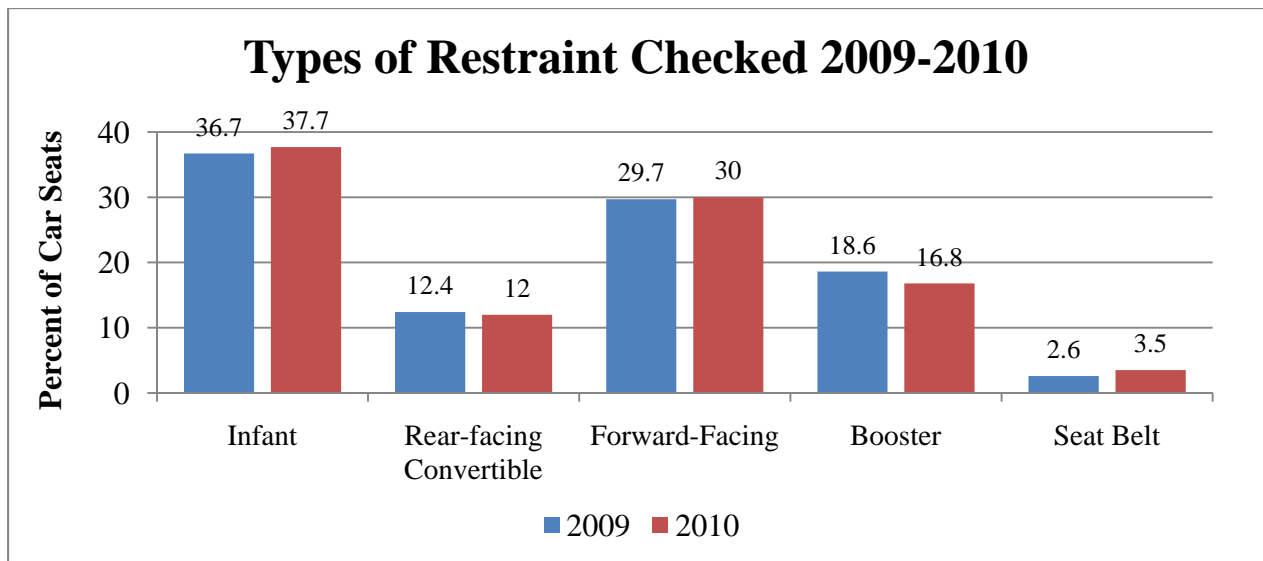
Car seat checkups were done in 2009 and 2010 using the same guidelines and checkup form for inspecting the restraints. Data for both years was entered by two certified child passenger safety instructors who had assisted with many of the checkups. For both years, data entry was the same with the exception of a few minor clarifications for consistency. Following are comparisons between results for 2009 and 2010 checkups.

Number of Restraints Checked

- In 2009, data was entered on 1,519 restraints.
- In 2010, data was entered on 1,379 restraints.

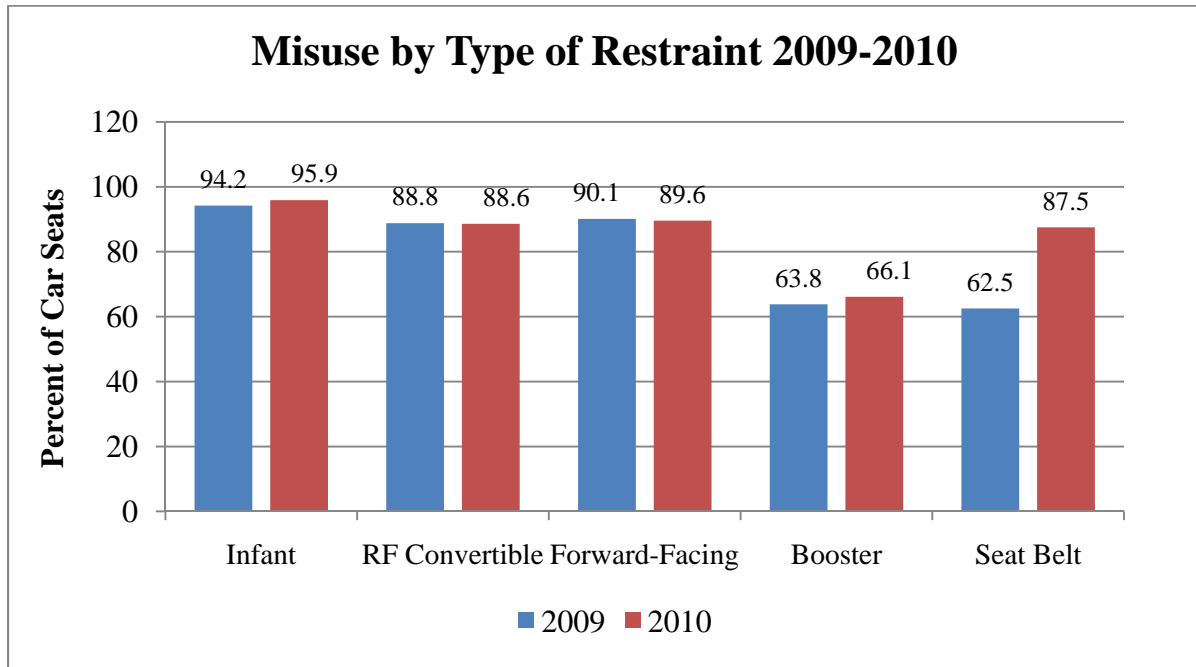
Type of Restraint Checked

	2009	2010
Infant	36.7	37.7
Rear-facing Convertible	12.4	12
Forward-facing	29.7	30
Backless Booster	9.6	8.9
High-back Booster	9	7.9
Seat Belt	2.6	3.5



Overall Misuse

- In 2009, 85.9 percent of the seats checked were used incorrectly.
- In 2010, 87.8 percent of the seats checked were used incorrectly.



Overall misuse by type of restraint did not change significantly between 2009 and 2010, except in the seat belt category, where misuse increased from 62.5 percent to 87.5 percent.

Had Restraint Been Checked Before

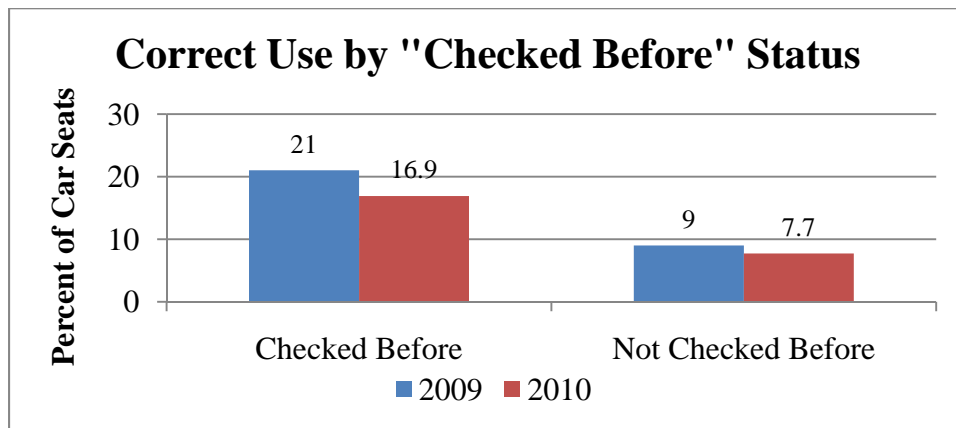
- In 2009, 16.4 percent of the restraints had been checked prior to participation in this checkup. In 2010, 19.7 percent of the restraints had been checked before.

In 2009, the status of the question, “Was the Seat Checked Before?” was unknown in 26.7 percent of the seats. This decreased to 5 percent in 2010, most likely because of a reminder to technicians and instructors to be sure this section of the form was completed.

Correct Use by “Checked Before” Status

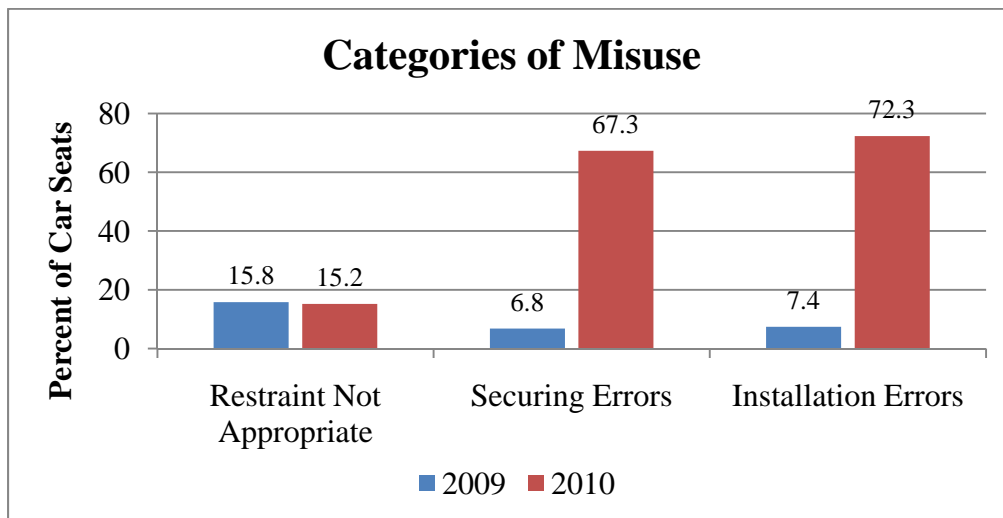
In both years, correct use was higher when the restraint had been checked before, compared to restraints that had not been checked before. This is an indication that participants are learning from their previous experience at a checkup.

	2009	2010
Correct Use When Seat “Checked Before”	21 percent	16.9 percent
Correct Use When Seat “Not Checked Before”	9 percent	7.7 percent



Overall Misuse by General Category

Restraints were assessed for misuse in four general categories, including: Appropriateness for Child; How Child Was Secured in Restraint; How Car Seat Was Installed in Vehicle; and General Condition.



Restraint Not Appropriate for Child

- In 2009, *15.8 percent* of the restraints were not appropriate for the weight, height, age or special needs of the child riding in them.
- In 2010, *15.2 percent* of the restraints were not appropriate for the child riding in them.

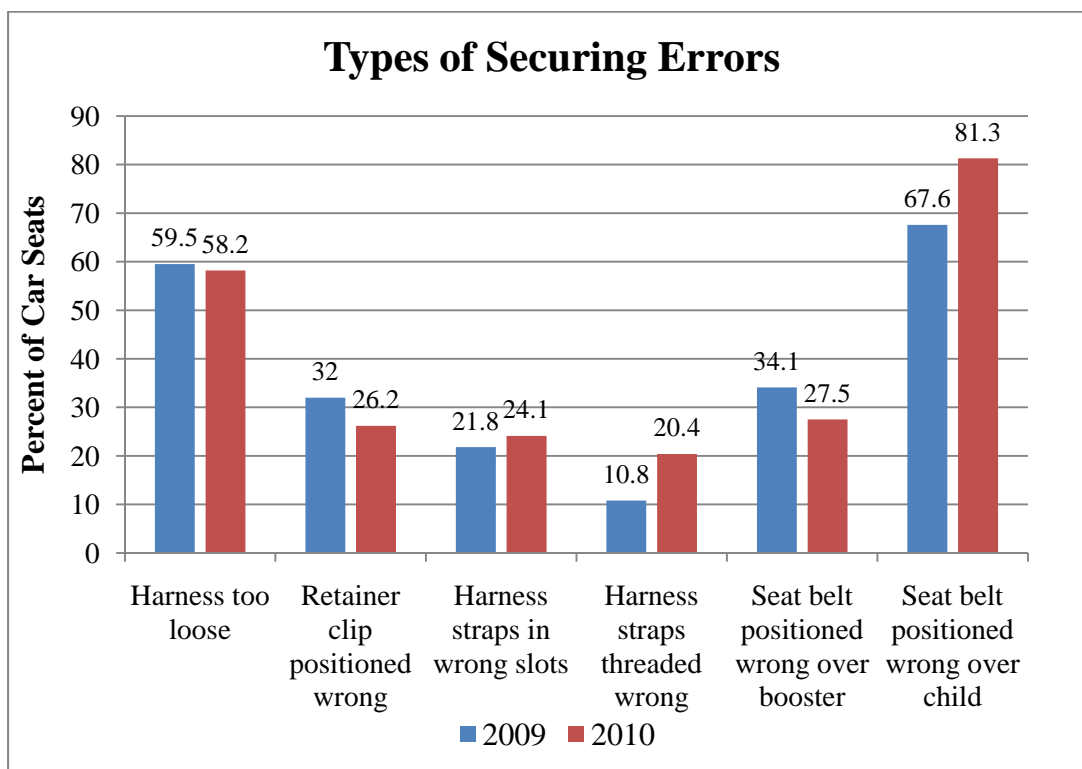
Reason Restraint Not Appropriate	2009	2010
Child Too Large - Weight or Height	44.3	45.9
Child Too Small - Weight or Height	31.3	45.3
Child Too Young	41.3	39.5

There is an increase in percentage of children who were too small by weight or height for the restraint in which they were riding. This is most likely due to a desire by parents to move their child to the “next step” before they are ready. Examples: Moving a child into a booster before age 4 and 40 pounds. Moving a child from a booster into a seat belt before they are 4’ 9” tall or when the seat belt fits properly.

Securing Errors - Child Not Secured Correctly in Restraint

- In 2009, *68 percent* of the restraints had errors related to how the child was secured.
- In 2010, *67.3 percent* of the restraints had errors related to how the child was secured.

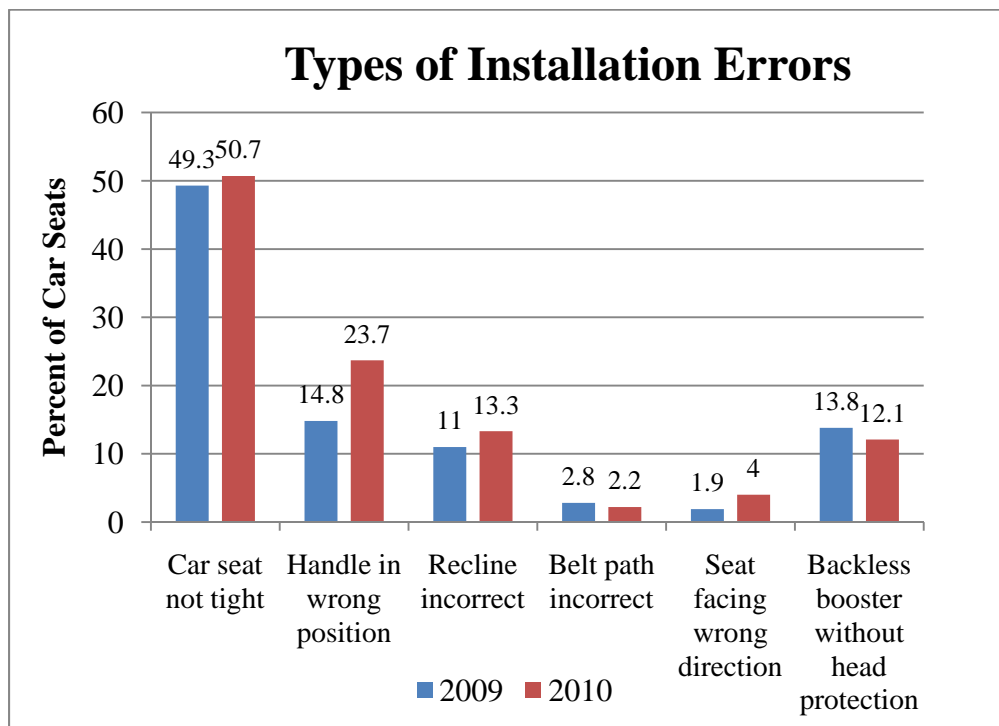
Types of Securing Errors	2009	2010
Harness too loose	59.5	58.2
Retainer clip positioned wrong	32	26.2
Harness straps in wrong slots	21.8	24.1
Harness straps threaded wrong	10.8	20.4
Seat belt positioned wrong over booster	34.1	27.5
Seat belt positioned wrong over child	67.6	81.3



Installation Errors – Car Seat Not Installed Correctly in Vehicle

- In 2009, 74 percent of the car seats had errors related to how they were installed in the vehicle. This included infant seats, rear-facing convertible seats and forward-facing seats. Booster and seat belt errors are assessed in the securing section of this report (page 16-17).
- In 2010, 72.3 percent of the car seats had installation errors.

Types of Installation Errors	2009	2010
Car seat not tight	49.3	50.7
Handle in wrong position	14.8	23.7
Recline incorrect	11	13.3
Belt path incorrect	2.8	2.2
Car seat facing wrong direction	1.9	4
Backless booster without head protection	13.8	12.1



How Was Car Seat Installed?

How Car Seat Was Installed	2009	2010
Car seat installed with seat belt	69	61.3
Car seat installed with LATCH	25.6	32.5
Car Seat installed with both seat belt and LATCH	5.5	6.2
Tether strap used on FW seat when available	50.5	47.5
Tether strap used incorrectly	18.9	27.1

Condition of Restraint

	2009	2010
Car seats recalled or missing labels	5	4
Not original owner of car seat or unsure	9.9	5.3
Car seat in a crash or unsure of history	9.5	5.7
Car seat outdated or unsure	7.4	5.2
*Unregulated products on restraint	17.8	20
Unregulated products removed	55	57.4
Unregulated products not removed per participant choice	45	42.6

* Unregulated products are car seat accessories, such as head pads, toys, mirrors, etc., that did not come with the car seat. Manufacturers warn against using these products because their car seat has not been crash-tested with them. There is concern that the products may interfere with how the car seat will perform in a crash.

Worth noting is the decrease in car seats where the checkup participant was not the original owner, the car seat had been in a crash or the history of the seat was unknown. This could be because of public information campaigns that discourage the use of second-hand car seats or car seats that had been in a crash.