Shopping Cart Injuries to Children Under Five, 2003-2008

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Overview

In order to support work by the ASTM F15.56 Shopping Cart Subcommittee, U.S. Consumer Product Safety Commission (CPSC) staff performed an analysis of injuries to children under the age of five years associated with shopping carts. From 2006 to 2008 the estimated annual average of emergency department-treated injuries associated with shopping carts to children under the age of five years was 21,065. Injury estimates from 2003 through 2008 are stable, with no statistically significant increasing or decreasing trend (p = 0.4976). The majority of the injuries are falls from the shopping carts, resulting in injuries to the head and face area.

CPSC staff is aware of 76 other reports of injuries to children under the age of five years associated with shopping carts from 2003 to 2008. These reports represent a different distribution of hazard patterns, with children getting stuck in shopping carts and shopping cart tip overs being more commonly reported. The incidents reported are discussed in more detail on p. 7. There were no incidents reporting a death in either the emergency department data or the reported incidents.

Emergency Department-Treated Injuries

From 2003 to 2008 there were an estimated 121,989 emergency department-treated injuries associated with shopping carts to children under the age of five, as reported by the National Electronic Injury Surveillance System (NEISS). The 95% confidence interval for this estimate is 101,115-142,863 (C.V. = 0.0873). From 2003 to 2008 the estimated annual average of emergency department-treated injuries associated with shopping carts to children under the age of five was 20,332. From 2006 to 2008 the estimated annual average of emergency department-treated injuries associated with shopping carts to children under the age of five was 21,065. Table 1 and Figure 1 give the yearly estimates for emergency department-treated injuries associated with shopping carts to children under the age of five. An analysis of the data showed no statistically significant trend (p = 0.4976).

Table 1: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Year, 2003-2008

Year	Observations	Estimate	C.V.
2003	706	20,024	0.1113
2004	676	18,180	0.0878
2005	781	20,591	0.1044
2006	819	21,179	0.0940
2007	822	22,423	0.1084
2008	744	19,592	0.1070
Total	4,548	121,989	0.0873

Source: NEISS Database, August 2009
Estimates may not sum to total due to rounding

Figure 1: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Year, 2003-2008

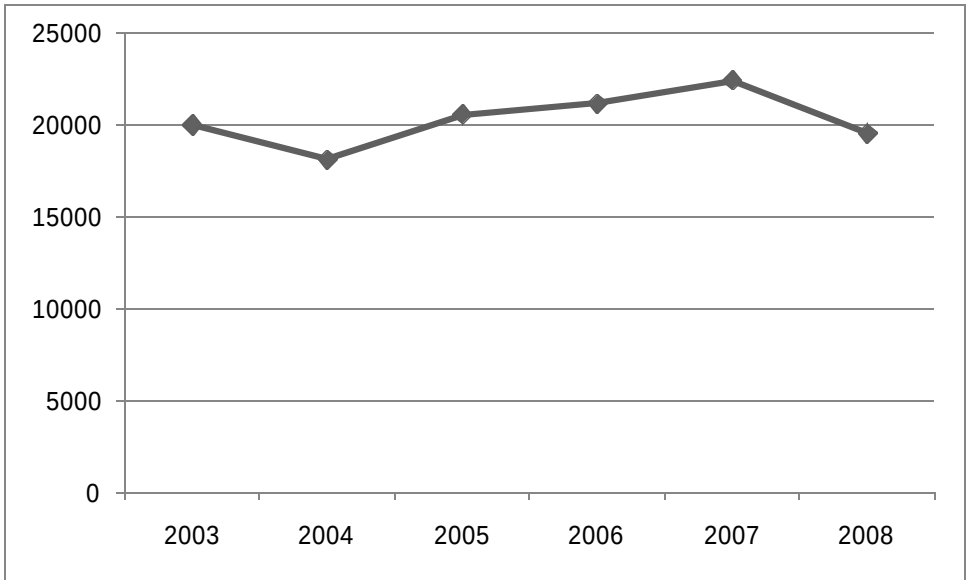

Table 2: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Age and Sex, 2003-2008

Age	Male	Female	Total[1]
<1	9,329	8,891	18,220
1	16,855	18,359	35,214
2	19,147	17,646	36,793
3	11,622	7,975	19,598
4	7,031	5,126	12,157
Total	63,984	57,967	121,981

Source: NEISS Database, August 2009
Estimates may not sum to totals due to rounding

Table 2 presents the estimated emergency department-treated injuries associated with shopping carts to children under the age of five. The majority of the incidents occurred to one and two year-old children, which combined accounted for 59% of the estimated injuries. Males accounted for 52% of the estimated injuries, but this is not consistent across age categories. There was one case involving a one year-old child of unknown sex which was not included in Table 2.

[1] Totals may not equal row and column sums due to rounding and the exclusion of one case of a child in the one year old age group of unknown sex.

Table 3: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Body Part, 2003-2008

Body Part	Estimate	Percentage
Head/Face	102,304	84%
Arm/Hand	10,404	9%
Leg/Foot	5,143	4%
Other/Unknown	2,835	2%
Torso	1,302	1%

Source: NEISS Database, August 2009
Columns may not sum to totals due to rounding

Table 3 presents the estimated emergency department-treated injuries associated with shopping carts to children under five by body part. The majority of the estimated injuries occurred to the head and/or face, accounting for 102,304 out of 121,989 estimated injuries (84%). A further examination of the head and face injuries shows that the majority of them were internal organ injuries (42,032 estimated injuries, 41%) and contusions or abrasions (35,458 estimated injuries, 35%).

Table 4: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Diagnosis, 2003-2008

Diagnosis	Estimate	Percentage
Internal Organ Injury	42,061	34%
Contusion/Abrasion	40,873	34%
Laceration	12,329	10%
Other/Unknown	8,271	7%
Fracture	7,639	6%
Concussion	5,610	5%
Hematoma	3,230	3%
Avulsion	1,976	2%

Source: NEISS Database, August 2009
Columns may not sum to totals due to rounding

Table 4 presents the estimated emergency department-treated injuries associated with shopping carts to children under five by diagnosis. The majority of the estimated injuries were either internal organ injuries or contusions and abrasions. Together the two categories accounted for 82,934 of the estimated injuries (68% of all estimated injuries). Almost all of the estimated internal organ injuries were head injuries (42,032 estimated injuries, 99.9%). Most of the 19,684 non-head/face injuries were contusions or abrasions (5,415 estimated injuries, 28% of all non-head injuries) and fractures (5,153 estimated injuries, 26% of all non-head injuries). The non-head injury category includes the other/unknown category.

Table 5: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Disposition, 2003-2008

Disposition	Estimate	Percentage
Treated and Released	117,917	97%
Hospitalized	4,072	3%

Source: NEISS Database, August 2009
Estimates may not sum to totals due to rounding

Table 5 presents the estimated emergency department-treated injuries associated with shopping carts to children under five by disposition. The majority of the injuries were treated and released. Only 3% (4,072 estimated injuries) were hospitalized. Most of the hospitalizations were fractures (2,039 estimated injuries, 50% of all hospitalizations) and internal organ injuries (1,086 estimated injuries, 27% of all hospitalizations).

Table 6: Estimated Emergency Department-Treated Injuries Associated with Shopping Carts to Children Under Five by Hazard Pattern, 2003-2008

Hazard Pattern	Estimate	Percentage
Fall	99,730	82%
Collision	6,749	6%
Tip Over	5,070	4%
Contact	4,164	3%
Incidental	3,807	3%
Entrapment	2,469	2%

Source: NEISS Database, August 2009
Columns may not sum to totals due to rounding

The majority of the incidents were falls from shopping carts, with 99,730 estimated emergency department-treated injuries, or 82% of the total estimate. Note that falls could also occur as part of another hazard pattern. For example, the cart could tip over and the child could fall from the cart while it was tipping over. Attempts were made to analyze the data by the location of the child before the fall, by age, and by whether or not the child was also in a child carrier or car seat, but the resulting estimates were too small to be considered reliable. The following definitions were used for the hazard patterns in Table 5:

- **Fall:** The child fell from the cart with no other hazard patterns involved. Typically this was just described in the data as "fell from cart," but it also involved scenarios such as standing up and falling out of the cart or falling while climbing out of the cart.
- **Collision:** The shopping cart was involved in a collision. Most often this was the shopping cart running into/over the child or the child running into the shopping cart. This also includes incidents where the cart collided with another object such as while the child was in the cart.
- **Tip Over:** The shopping cart tipped over while the child was inside. Sometimes this also involved the child falling out of the shopping cart. Incidents where the shopping cart fell over onto the child were coded as collisions.

- **Contact:** The child was injured through general contact with the shopping cart. This includes general lacerations from the shopping cart, and the child "bumping" into the shopping cart while in the shopping cart. In some cases it was not clear if the child was in or out of the shopping cart when they bumped into it. Those cases were coded as "contact."
- **Incidental:** The injury happened in or near a shopping cart, but did not directly involve the shopping cart. This includes falling and hitting a shopping cart, and being injured by another product while sitting in a shopping cart.
- **Entrapment:** The child got a limb or finger stuck in some part of the shopping cart. This includes getting fingers caught in the spokes of the shopping cart wheels.

Incidents Reported to CPSC Staff

From 2003-2008 CPSC staff is aware of 76 reports of incidents involved with shopping carts and children under the age of five. These reports are received through the Injury and Potential Injury Incident (IPII) database, the In-Depth Investigation (INDP) database, and the Death Certificate (DTHS) database. The number of reports per year is shown in Table 6. The average number of reports per year from 2003-2008 is 13. The average number of reported incidents per year from 2006-2008 is 10.

Table 7: Reported Incidents Associated with Shopping Carts to Children Under Five by Year, 2003-2008

Year	Reports	Percentage
2003	20	26%
2004	12	16%
2005	13	17%
2006	8	11%
2007	12	16%
2008	11	14%
Total	76	100%

Source: IPII, INDP, and DTHS databases, August 2009
Percentages may not sum to 100 due to rounding
Reporting ongoing for 2006-2008

Table 8: Reported Incidents Associated with Shopping Carts to Children Under Five by Age and Sex, 2003-2008

Age	Male	Female	Total
<1	19	18	37
1	13	6	19
2	4	3	7
3	4	5	9
4	2	2	4
Total	42	34	76

Source: IPII, INDP, and DTHS databases, August 2009
Reporting ongoing for 2006-2008

The majority of the reported incidents involved children under two years of age. Children under two years of age accounted for 56 out of 76 reported incidents, or 74% of all reported incidents.

Table 9: Reported Incidents Associated with Shopping Carts to Children Under Five by Disposition, 2003-2008

Disposition	Reports	Percentage
No Injury	23	30%
Injury	39	51%
Hospitalized	11	14%
Unknown	3	4%
Total	76	100%

Source: IPII, INDP, and DTHS databases, August 2009
Percentages may not sum to 100 due to rounding
Reporting ongoing for 2006-2008

Most of the reports involved injuries that did not require hospitalization, which includes 39 reported injuries, or 51% of all reported incidents. All of the reported injuries that required hospitalization were head injuries.

Table 10: Reported Incidents Associated with Shopping Carts to Children Under Five by Hazard Pattern, 2003-2008

Hazard	Reports	Percentage
Fall	30	39%
Entrapment	14	18%
Tip Over	13	17%
Other	10	13%
Collision	6	8%
Incidental	3	4%
Total	76	100%

Source: IPII, INDP, and DTHS databases, August 2009
Percentages may not sum to 100 due to rounding
Reporting ongoing for 2006-2008

Most of the reported incidents were falls or entrapments. Falls and entrapments accounted for 44 of the 76 reported incidents (58%). The incidents for each hazard pattern are discussed in more detail below.

Falls

These are falls with no other hazard involved. Of the 30 incidents reported as falls, 13 involved a car seat with the child in it falling from the shopping cart. Sixteen of the fall incidents did not involve a car seat. In these incidents the child fell from the cart or in the cart. In the final incident the child fell from a car seat which was in the shopping cart. Of the 16 incidents not involving car seats in shopping carts, five children fell from the basket of the cart, seven fell from the cart's seat, and four fell from unknown locations in the cart.

Entrapments

These are children getting a limb or finger stuck in some part of the shopping cart. This includes getting fingers caught in the spokes of the shopping cart wheels. None of the 14 reported entrapment incidents involved falls or car seats.

Tip Overs

These incidents involve the shopping cart tipping over while the child is inside the cart. Seven of the tip over incidents also involved the child falling out of the cart. Most of the falls from tip overs were from unknown locations, but one was from the seat area, and one was from a separate seating area attached to the cart and designed to be like a play car. In two of the falls from tip overs, the child was in a car seat that fell out of the cart. There was a third tip over involving a car seat where the car seat did not fall out of the cart. The remaining five tip over incidents did not involve either a car seat or the child falling out of the cart.

Other

The incidents coded as "other" cover a range of hazards. Three of the reports concerned children able to unfasten or slip out of the restraints in the shopping cart seat. Three of the reports concerned shopping carts that were broken or that were missing restraint straps. Two reports complained that advertisements attached to the shopping carts prevented securing car seats to the carts. One report complained at the lack of brakes on shopping carts. The final report involved a child who choked on a toy book attached to the shopping cart. The choking incident was the only injury in this hazard category. None of these reports involved a child carrier or car seat.

Collisions

These were collisions of the shopping cart with the child or with another object while the child was inside the shopping cart. One case was a simple collision where a sharp metal piece above the shopping cart's wheel hit a child's ankle. In two cases the children pulled the shopping cart down on top of themselves. In one case an anti-theft device caused the shopping cart to stop suddenly, jarring the child inside. In two cases the shopping cart hit a bump and the child fell out of the shopping cart. None of these reports involved a child seat.

Incidental

Incidental reports involved injuries sustained while the child was in the shopping cart, but which did not directly involve the shopping cart. All three of the incidental reports involved the child getting access to a hazardous chemical while in a shopping cart.

Appendix: Methodology

The product code searched for this memo was 1679 (Grocery or shopping carts). The databases searched for reports were the Death Certificates Database and the Injury and Potential Injury Incident Database.

Deaths

CPSC staff purchases death certificates from all 50 states, New York City, the District of Columbia, and some territories. Only those certificates in certain E-codes (based on the World Health Organization's International Classification of Diseases ICD-10 system) are purchased.

These are then examined for product involvement before being entered into CPSC's death certificate database. The result is neither a statistical sample nor a complete count of product-related deaths, nor does it constitute a national estimate. The database provides only counts for product-related deaths from a subset of E-codes. For this reason, these counts tend to be underestimates of the actual numbers of product-related deaths. Death certificate collection from the states also takes time. As of June 2009, the Death Certificates database was considered 99% complete for 2005, 98% complete for 2006, 73% complete for 2007, and 32% complete for 2008.

Injury or Potential Injury Incident Database (IPII)

IPII is a CPSC database containing reports of injuries or potential injuries made to the Commission. These reports come from news clips, consumer complaints received by mail or through CPSC's telephone hotline or web site, Medical Examiners and Coroners Alert Program (MECAP) reports, letters from lawyers, and similar sources. While the IPII database does not constitute a statistical sample, it can provide CPSC staff with guidance or direction in investigating potential hazards. Since cases in this database may come from a variety of sources, some cases may be listed multiple times. To obtain a more accurate count of the number of reported incidents associated with each product, the cases were reviewed to eliminate duplicates.

National Electronic Injury Surveillance System (NEISS)

The estimate of emergency department-treated injuries was derived from NEISS, which is a probability sample of approximately 100 U.S. hospitals having 24-hour emergency departments (EDs) and more than six beds. NEISS collects injury data from these hospitals. Coders in each hospital code the data from the ED record and the data is then transmitted electronically to CPSC. Because NEISS is a probability sample, each case collected represents a number of cases (the case's *weight*) of the total estimate of injuries in the U.S. Different hospitals carry different weights, based on stratification by their annual number of emergency department visits (Schroeder and Ault, 2001).

A coefficient of variation is the ratio of the standard error of the estimate (i.e., variability) to the estimate itself. This is generally expressed as a percent. A C.V. of 10% means the standard error of the estimate equals 0.1 times the estimate. Large C.V.'s alert the reader that the estimate has considerable variability. This is often due to a small sample size.[2] Estimates and confidence intervals are usually not reported unless the number of cases is 20 or more, the estimate is greater than 1,200, and the C.V. is less than 33%.

[2] Schroeder T, Ault K. *The NEISS Sample (Design and Implementation)*. U.S. Consumer Product Safety Commission. 2001.