Injuries and Deaths Associated with Nursery Products Among Children Younger than Age Five

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Executive Summary

In this report, U.S. Consumer Product Safety Commission (CPSC or Commission) staff presents statistics based on the most recently available information regarding injuries and deaths associated with nursery products among children younger than the age of 5 years.

Emergency Department-Treated Injuries:

- In 2016, there were an estimated 62,300 emergency department-treated injuries associated with (*i.e.,* in use at the time of incident), but not necessarily caused by, nursery products among children younger than age 5 years. This estimate of emergency department-treated injuries is based on the non-incidental injuries *only.*

- High chairs, cribs/mattresses, strollers/carriages, and infant carriers were associated with 70 percent of the total estimated injuries. Falls were the leading cause of injury; and the head, followed by the face, were the body parts injured most frequently. A diagnosis of internal organ injury, contusion/abrasion, or laceration was associated with a majority of the injuries.

- Non-incidental data-based analysis was completed for the first time using 2015 data. With the completion of this report, such analyses are now available for 2015 and 2016 injury data; two years of data, however, are not sufficient to complete a trend analysis. As such, none is presented in this report. As more years of data get added, future reports will present trend analyses. It is to be noted that the previous annual report, published in December 2016, showed that the annual estimates of injuries associated with nursery products—based on all in-scope data—did not display a statistically significant trend over the 5-year period from 2011 to 2015.

Fatalities:

- For the 3-year period from 2012 to 2014, CPSC staff has reports of 284 deaths—an annual average of 95 deaths—associated with (*i.e.,* in use at the time of incident), but not necessarily caused by, nursery products among children younger than age 5.

- Cribs/mattresses, bassinets/cradles, playpens/play yards, infant carriers, and baby bouncer seats were associated with 86 percent of the fatalities reported.

- Causes of death included positional asphyxia, strangulation, and drowning, among others. In some instances, the fatalities were attributed to the product; in other cases, the fatalities resulted from a hazardous environment in or around the product.[1]

For many durable infant and toddler products, CPSC staff has been evaluating the incidents characterized in the annual reports on nursery products, along with previously and subsequently reported incidents, to assess the efficacy of voluntary standards. These evaluations have supported the staff's briefing packages for notices of proposed rulemaking (NPRs) and final rules that are required by the Danny Keysar Child Product Safety Notification Act, section 104 of the Consumer Product Safety Improvement Act (CPSIA) of 2008.[2] In

[1] Not all of these incidents are addressable by an action the CPSC could take, however, it was not the purpose of this report to evaluate the addressability of the incidents, but rather, to update estimates of emergency department-treated injuries and to quantify the number of fatalities reported to CPSC staff.

[2] There is some overlap between the products covered by this report and the products subject to rules issued under section 104 of the CPSIA. However, this report covers some nursery products that do not fall under section 104.

calendar year 2017, the Commission issued NPRs for booster seats and infant inclined sleep products and issued final rules establishing new standards for sling carriers, infant bath tubs, infant bouncer seats, and children's folding chairs. In addition, new federal rules on infant bath tubs and a revised rule on toddler beds went into effect in 2017. Staff evaluations of voluntary standards for stationary activity centers, baby gates/barriers, crib bumpers, and crib mattresses, among others, are under way.

Introduction

This report presents nursery product-related injury estimates for 2016,[3] as well as comparisons with historic injury estimates. Detailed information on deaths associated with nursery products that reportedly occurred during the 3-year period from 2012 to 2014, is also presented; reporting is ongoing, and the number of reported fatalities may change.

Nursery Product-Related Emergency Department-Treated Injury Estimates

Beginning with the 2016 report, the injury estimates in annual nursery products reports are based on non-incidental emergency department-treated injuries.[4] The exclusion of incidental injury cases aligns more closely with the way that CPSC staff has prepared the CPSIA section 104 rulemaking packages for the Commission. Now that most of the nursery products discussed in this report have a mandatory rule in place, staff believes that estimates based on the non-incidental data will provide a better tool for gauging the efficacy of the various standards.

An estimated 62,300 nursery product-related injuries among children younger than 5 years old were treated in U.S. hospital emergency departments in 2016. This is an increase from the estimated total of 59,400 injuries treated in 2015. The increase, however, was not statistically significant. With only 2 years of data on non-incidental injuries, staff did not perform a trend analysis. As more years of non-incidental injury data become available, trend analyses will be resumed. More detail about the data-selection processes is described in the Methodology section of the attached Appendix.

As in previous years, falls were the leading cause of all nursery product-related injuries reported through the National Electronic Injury Surveillance System (NEISS) for 2016. About 75 percent of the total injuries involved the head and the face, which were the body parts injured most frequently. Internal organ injuries, contusions/abrasions, or lacerations were the diagnoses in about 77 percent of the NEISS-reported injuries.

Table 1: Estimated Emergency Department-Treated Injuries to Children Younger than Age Five Associated with Nursery Products: 2015–2016

Calendar Year	Estimated Emergency Department-Treated Injuries	
	All In-Scope Data (as used historically for annual nursery products reports)	Non-Incidental Data Only (as used in CPSIA section 104 rulemaking)
2015	65,800	59,400
2016	---	62,300
Two-Year Average	---	60,800

Source: NEISS, CPSC. Note: Estimates rounded to the nearest 100. The average calculation is based on unrounded injury estimates. 2015 is the first year that an estimate was derived based on non-incidental data only.

[3] The source of the injury estimates is the National Electronic Injury Surveillance System (NEISS), a statistically valid injury surveillance system. NEISS injury data are gathered from the emergency departments of hospitals selected as a probability sample of all the U.S. hospitals with emergency departments. The surveillance data gathered from the sample hospitals enable CPSC staff to make timely national estimates of the number of injuries associated with specific consumer products.

[4] In the 2016 annual report, staff presented two sets of estimates for the emergency department-treated injuries for the year 2015, for comparison purposes. For one estimate, data consisting of all in-scope product codes were used; for the second estimate, data with all in-scope product codes, *except* incidental injury cases, were used. Cases where a nursery product was present in the incident scene but played an insignificant role in the sequence of events that led to the injury were considered incidental. The methodology used was similar for both sets of estimates. See R. Chowdhury, "Injuries and Deaths Associated with Nursery Products Among Children Younger than Age Five," CPSC, December 2016, https://www.cpsc.gov/s3fs-public/Nursery%20Products%20Annual%20Report%202016.pdf.

Table 2 shows the breakdown of injury estimates by different product categories for 2016, along with the injury estimates for 2015, for comparison purposes. As in 2015, there were more than 30 product codes associated with the injury estimates in 2016. Similar to 2015, the associated products have been aggregated into 13 product categories that align with standards development activities. The top four categories, high chairs, cribs/mattresses, strollers/carriages, and infant carriers, were associated with 70 percent of the total estimated injuries.

There was an increase from an estimated total of 59,400 injuries in 2015 to 62,300 injuries in 2016. The increase, however, was not statistically significant. Among the notable changes in injury estimates in specific product categories between the 2 years were four increases and four decreases. The increases were in high chairs (increased from 10,700 to 13,400), cribs/mattresses (increased from 10,600 to 11,300), baby gates/barriers (increased from 2,000 to 2,900), and portable baby swings (increased from 1,700 to 2,800). None of the increases, however, were statistically significant. The notable decreases were in strollers/carriages (decreased from 10,700 to 10,000), baby bouncer seats (decreased from 3,300 to 2,200), playpens/play yards (decreased from 2,700 to 1,700), and baby walkers/jumpers (decreased from 2,900 to 2,200). The decreases were statistically significant for baby bouncer seats and playpens/play yards (p-values of 0.044 and 0.012, respectively).

Table 2: Estimated Emergency Department-Treated Injuries to Children Younger than Age Five By Type of Nursery Product: 2015-2016

PRODUCT CATEGORY	ESTIMATED EMERGENCY DEPARTMENT-TREATED INJURIES (Non-Incidental Data Only)	
	2015	2016
TOTAL	59,400	62,300
High Chairs	10,700	13,400
Strollers/Carriages	10,700	10,000
Cribs/Mattresses	10,600	11,300
Infant Carriers (Excludes Motor Vehicle Incidents)	8,700	9,000
Changing Tables	3,600	3,900
Baby Bouncer Seats	3,300	2,200
Baby Walkers/Jumpers/Exercisers	2,900	2,200
Playpens/Play Yards	2,700	1,700
Baby Gates/Barriers	2,000	2,900
Portable Baby Swings	1,700	2,800
Baby Bottles/Warmers/Sterilizers	---[5]	---[5]
Bassinets/Cradles	---[5]	---[5]
Baby Baths/Bath Seats/Bathinettes	---[5]	---[5]
Other[6]	1,900	2,000

Source: NEISS, CPSC. Estimates are rounded to the nearest 100.
Note: The injury estimates may not add up to the total due to rounding and because two or more nursery products are sometimes associated with a single injury.

[5] The injury estimates are not presented because they fail to meet standard reporting criteria for NEISS that the estimated number of injuries be 1,200 or higher, the sample size 20 or larger, and the coefficient of variation less than 33 percent.
[6] In both 2015 and 2016, the "Other" category included: pacifiers/teething rings, diapers (excluding diaper rash cases), rattles, night lights, potty chairs/training seats, baby scales, crib mobiles, harnesses, and safety pins. In 2015, the "Other" category also included diaper pails and diaper fasteners.

Deaths Associated with Nursery Products

Although all of the Commission's databases are used to identify nursery product-related deaths, death certificates are a major source of information for this analysis. As this report was being written, the Commission's death certificates database was at least 96 percent complete for each year in the period from 2012 through 2014. As done in annual nursery product reports from earlier years, the deaths reported here are from 2012 through 2014, the latest 3-year time frame with sufficiently available information.[7]

CPSC staff has received reports of a total of 284 deaths—an annual average of 95 deaths—associated with nursery products during this time period. About 38 percent (109 total, or an annual average of 36) were associated with cribs/mattresses. Bassinets/cradles accounted for 19 percent (53 total, or an annual average of 18) of the reported deaths. Playpens/play yards were associated with 17 percent (a total of 47 or an annual average of 16) of the reported deaths, while infant carriers were associated with eight percent (a total of 24 or an annual average of 8) of the reported deaths. Baby bouncer seats accounted for four percent (a total of 10 or an annual average of three) of the reported deaths. The remaining 41 reported fatalities were associated with a range of products, including baby bath/bathinettes, strollers, portable baby swings, baby gates/barriers, and a variety of alternative sleep-products, such as inclined sleepers and nappers, travel beds, and other shared-sleep products.

For certain incident scenarios in which direct product involvement or failure was not evident, consultation with staff from the CPSC's Directorate for Engineering Sciences was necessary to determine the most appropriate product category to place the fatalities. Details of the methodology are provided in the attached Appendix.

Table 3 provides a summary of nursery product-related reported deaths (total and average annual) for 2012 through 2014, along with data previously reported for 2011 through 2013, for comparison purposes. Reporting is ongoing, and the number of reported fatalities may change. Moreover, these reports are anecdotal and do not constitute a statistical sample or a complete count of nursery product-related deaths. As such, CPSC staff strongly discourages drawing any inferences based on the year-to-year increase or decrease shown in the reported data.

[7] These deaths do not constitute a statistical sample of known probability and do not necessarily include all nursery product-related deaths that occurred during the 2012–2014 period. However, they do provide at least a minimum number for deaths associated with nursery products during that time. Furthermore, the number of reported incidents may change in the future should staff receive additional reports.

Table 3: Reported Deaths Among Children Younger than Age Five
By Type of Nursery Product

PRODUCT CATEGORY	TOTAL DEATHS		AVERAGE ANNUAL DEATHS	
	2011-2013	2012-2014	2011-2013	2012-2014
TOTAL	300	284	100	95
Cribs/Mattresses	108	109	36	36
Bassinets/Cradles	59	53	20	18
Playpens/Play Yards	47	47	16	16
Infant Carriers (Excludes Motor Vehicle Incidents)	24	24	8	8
Baby Bouncer Seats	13	10	4	3
Baby Baths/Bath Seats/Bathinettes	13	8	4	3
Strollers/Carriages	7	6	2	2
Portable Baby Swings	3	5	1	2
Baby Gates/Barriers	3	2	1	1
High Chairs	1	2	<1	1
Changing Tables	1	1	<1	<1
Baby Walkers/Jumpers/Exercisers	0	0	0	0
Other[8]	21	17	7	6

Source: CPSC epidemiological databases: Consumer Product Safety Risk Management System (CPSRMS) and NEISS from 2012 to 2014 for reported deaths.
Note: The average annual deaths do not add up to the total due to rounding.

A closer look at the top product categories with the largest numbers of reported deaths provides some insight into the hazard patterns. These product categories were associated with 82 percent of the reported fatalities.

Between 2012 and 2014, 109 deaths were associated with cribs/mattresses. The majority of these deaths were associated with a cluttered sleep environment (the presence of extra bedding such as pillows, blankets, and/or comforters, among others) in the crib, which led to asphyxiation of the infant. The next most common cause of crib fatalities involved the presence of hazardous crib surroundings. Examples include: wedging entrapments between extra mattresses/cushions and the crib frame; strangulations resulting from nearby cords or strings; and suffocations from plastic bags located in close proximity to the crib. Approximately 10 percent of the 109 deaths resulted from a range of hazards associated with the crib, including incomplete assembly; missing, broken, or nonfunctioning components; ill-fitting mattress; or ineffective crib repairs. Some of these incidents occurred in, or on, older, reassembled, recalled, or secondhand cribs.

There were 53 deaths reported in bassinets/cradles between 2012 and 2014, the majority of which were associated with extra bedding. Many of the suffocation deaths from bedding involved pillows. A few of the

[8] Of the 17 deaths in this category in 2012–2014, 14 deaths were associated with products used in the sleep environment that are not among the product categories listed in Table 3. Among the 14, a bedside sleeper, a portable youth bedrail, and a collapsible, fabric travel bed were involved in one death each; toddler beds (product code 4082) were involved in two deaths; three deaths involved a cloth-covered, shared-sleep product; and six deaths involved an inclined sleeper, such as a foam sleep product or a rocking sleeper. In addition to the 14 deaths, there was one drowning death when an infant was left unattended on a non-bathing baby seat (product code 4074) in a water-filled tub; one death due to a pacifier (product code 1525) getting lodged in the infant's mouth the wrong way; and one death due to blunt force trauma to the head, from a backwards fall from a children's chair (product code 4074).
See: https://www.cpsc.gov/s3fs-public/Nursery%20Products%20Annual%20Report%202016.pdf, p.8, for a list of products associated with deaths in the "Other" category in 2011–2013.

bassinet-related deaths involved product failure and/or the presence of hazardous surroundings around the bassinet.

Playpens/play yards were associated with 47 deaths between 2012 and 2014. A majority of the deaths was due to asphyxiation, whereby the infant suffocated on a blanket/pillow/other soft bedding placed inside the play yard. The presence of a hazardous environment in or around the product, such as placement of improvised covers on the play yard, easy access to window covering or baby monitor cords, and use of ill-fitting non-original mattresses and sofa cushions in the play yards, were associated with some of the deaths. A few of the fatalities involved faulty products.

There were 24 deaths identified during 2012 to 2014, which were associated with infant carriers. Hazardous manner of placement of the infant in the carrier was the most common scenario. Examples include an unrestrained infant left unsupervised for an extended period of time, often on top of a blanket/pillow/other soft bedding, who subsequently got into a compromising position, resulting in death; an infant, partially restrained in the seat with shoulder straps only, who slid forward in the seat and strangled at the chest clip; and an infant positioned improperly in a carrier on the caregiver's body, which led to suffocation.

Finally, baby bouncer seats were associated with 10 deaths between 2012 and 2014. Incident reports described infants rolling over to a prone position; bouncer seats tipping over due to placement on a soft surface; and falls from the bouncer seats, leading to death.

The hazard patterns above indicate that although a nursery product was involved, many of the fatalities were not caused directly by failures of the product.

Appendix

Methodology

Injuries (Non-Incidental Data Only)

- Database: NEISS from 01/01/2016 through 12/31/2016.
- Product codes: 1500–1558, excluding 1550.[9]
- Age of victim: 0 through 4 years.
- Screened to ensure that no motor vehicle incidents were included.
- All cases of diaper rash were excluded.
- All cases associated with in-scope product codes were included; however, if the official diagnosis indicated that no injury had been sustained, the case was excluded.
- If the product's involvement was incidental, such as a child getting stung by a bee or getting bitten by a dog while in an infant stroller, the case was excluded.
- If a child suffered a medical crisis (for *e.g.*, choking on food) while seated in a high chair or gained access to adult medication by climbing on a crib, the case was excluded.
- If a child was injured by other young children (for *e.g.*, pulled out of an infant swing by a young sibling), the case was excluded.

No trend analyses were done for 2015-2016 non-incidental injury data. With the addition of more years, trend analyses will resume in future reports.

Past analyses *based on all in-scope data*, presented in 2016 annual report, showed there was no statistically significant trend observed over the 5-year period from 2011 to 2015 (p-value= 0.890).

For readers interested in nursery product-related, ED-treated injuries per 100,000 children under age 5, the population data for the denominator is available at the Census Bureau website: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=PEP_2016_PEPAGESEX&prodType=table

Deaths:

- Databases: CPSRMS and NEISS from 01/01/2012 through 12/31/2014.

  Information available from CPSRMS and NEISS on incidents that have not been investigated is often incomplete or provides insufficient information on the hazard scenario. If these incident reports are investigated at a later date, or as other associated reports come in, the initial information is corroborated or contradicted, and the fatality numbers reported may change.

- Product codes: 1500–1558 excluding 1550;[9] 4074 for *children's chairs*, 4075 for *portable youth bed rails*, and 4082 for *toddler beds*.
- Age of victim: 0 through 4 years.
- Screened to ensure no duplicates were included; all records of the same incident that were reported through different data sources were associated.
- Miscoded products were recoded correctly. A common example was a play yard miscoded as a crib.
- Careful screening was performed to determine if cases were in scope or out of scope. An example of an out-of-scope case would be an incident where no direct or circumstantial information was

[9] Product code 1550 (*Infant and Toddler Play Centers excluding Jumpers, Bouncers, and Exercisers)* represents a toy, not a nursery product.

available to determine *how* the death occurred or if Sudden Infant Death Syndrome was mentioned in the official report.
In some cases that were considered in scope, the death was not associated directly with the nursery product. However, hazards in the vicinity of the product, often created inadvertently by caregivers, led to the deaths. For instance, extra bedding inside the crib or plastic bags which were within easy reach of the crib, have led to some deaths. These deaths have been included with crib deaths. Similarly, clutter and extra bedding inside the play yard or placement of the play yard within easy reach of a window blind cord have led to some fatalities. These have been counted with play yard deaths. While these deaths were not due strictly to product failure, they highlight some common misconceptions and oversights in the use of these products, and therefore, were included.

Any report to the CPSC of a nursery product-related incident that occurred outside of the United States was excluded.

- As with the emergency department-treated injuries, deaths involving certain products were grouped together. For instance, baby baths and bathinettes were counted together with bath seats; exercisers were counted with baby walkers and jumpers; and as noted above, any extra-bedding-in-crib incidents were counted with cribs, while extra-bedding-in-play yard incidents were counted with play yards.

Historical Data

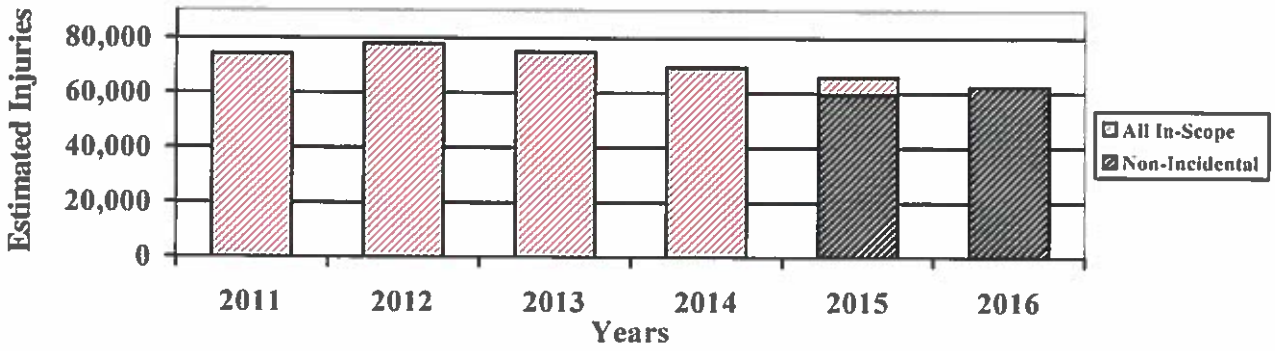
Table 4 presents the estimates based on non-incidental data only (2015-2016), while figure 1 presents the estimates for both all in-scope data (2011-2015) and non-incidental data (2015-2016).

Table 4: Nursery Product-Related Emergency Department-Treated Injury Estimates: 2015-2016 (Non-Incidental Injury Data Only)

Calendar Year	Estimated Injuries	95% Confidence Interval
2015	59,400	41,200–77,500
2016	62,300	41,700–82,800

Source: NEISS, CPSC. Estimates rounded to nearest 100.

Figure 1: Nursery Product-Related Emergency Department-Treated Injury Estimates: 2011-2016



Source: NEISS, CPSC. Estimates are rounded to nearest 100.
Note: The darker shaded portion of the 2015 bar represents the injury estimate using only the non-incidental data.