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 2015, two sets of estimates were derived for the emergency department-treated injuries. The first set of estimates was derived in a manner similar to prior years; the second set was based on a subset of the non-incidental injuries contained in the first set of data. The estimated totals were 65,800 and 59,400 injuries, respectively; these injuries were associated with, but not necessarily caused by, nursery products among children younger than age 5 years.

- The following findings held true under both set of estimates: Cribs/mattresses, infant carriers, strollers/carriages, and high chairs were associated with more than two-thirds 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.

- The annual estimates of injuries associated with nursery products did not display a statistically significant trend over the 5-year period from 2011 to 2015.

Fatalities:

- For the 3-year period from 2011 to 2013, CPSC staff has reports of 300 deaths—an annual average of 100 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. Reporting is ongoing, and the number of reported fatalities may change.

- Cribs/mattresses, bassinets/cradles, playpens/play yards, infant carriers, baby baths/bath seats/bathinettes, and baby bouncer seats were associated with 88 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 rulemakings (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. In calendar year 2016, the Commission issued NPRs for changing tables and issued final rules establishing new standards for infant bath tubs and hook-on chairs. In addition, a new federal rule on frame carriers, as well as hook-on chairs went into effect in 2016. Staff evaluations of voluntary standards for inclined sleep products, gates/enclosures, stationary activity centers, and booster seats, among others, are under way.

[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.

Introduction

This report presents nursery product-related injury estimates for 2015,[2] 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 2011 to 2013, is also presented; reporting is ongoing, and the number of reported fatalities may change.

Nursery Product-Related Emergency Department-Treated Injury Estimates

In 2015, CPSC staff derived two sets of estimates for the emergency department-treated injuries. First, following the historical process that has been used in prior years and presented in past nursery products annual reports, data with all in-scope product codes were used to derive one set of estimates. This also included a detailed comparative analysis, comparing prior years with the current year. Next, data with all in-scope product codes, *except* incidental[3] injury cases, were used to derive a second set of estimates. 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. While the methodology used was similar for both sets of estimates, 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 the latter set of estimates will provide a better tool for gauging the efficacy of the various standards. As such, injury estimates in future annual nursery products reports will continue to be based on non-incidental emergency department-treated injuries.

According to the first set of estimates, an estimated 65,800 nursery product-related injuries among children younger than 5 years old were treated in U.S. hospital emergency departments in 2015; based on the subset of non-incidental injury cases, the estimated total was 59,400 injuries. Table 1 shows the historical estimates for 2013 and 2014 along with the two sets of estimated injuries for 2015. The total estimated injuries decreased from 2014 to 2015. For the estimate based on all in-scope data (as done historically) the decrease was not statistically significant; compared with the subsetted non-incidental data only, the decrease was statistically significant. Staff did not, however, observe a statistically significant trend in injury estimates over the 2013 to 2015 period using either set of estimates. More detail about the data selection processes is described in the Methodology section of the attached Appendix. In addition, the attached Appendix also provides annual estimates for 2011 through 2015.

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 2015, regardless of whether the full or the subsetted data was used. In both cases, more than 70 percent of the total injuries involved the head and the face, which were the body parts injured most frequently. In both cases, internal organ injuries, contusions/abrasions, or lacerations were the diagnoses in about 75 percent of the NEISS-reported injuries.

[2] 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.

[3] See Methodology section in the attached Appendix for examples of incidental cases.

Table 1: Estimated Emergency Department-Treated Injuries to Children Younger than Age Five Associated with Nursery Products
2013–2015

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)
2013	74,900	---†
2014	69,300	---†
2015	65,800	59,400
2013–2015 Average	70,000	---†

Source: NEISS, CPSC.
* 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.

Table 2 shows the breakdown of injury estimates by different product categories for 2015 (using both sets of estimates), along with the injury estimates for 2014, for comparison purposes. As in 2014,[4] there were more than 30 product codes associated with the injury estimates in 2015. Similar to 2014, the associated products have been aggregated into 13 product categories that align with standards development activities. The top four categories, cribs/mattresses, infant carriers, strollers/carriages, and high chairs, were associated with over two-thirds of the estimated injuries under both sets of estimates.

Using the first set of estimates, based on all in-scope injury data (as was done for the 2014 estimates), there was a decrease from an estimated total of 69,300 injuries in 2014 to 65,800 injuries in 2015. The decrease, however, was not statistically significant. Among the notable changes in injury estimates in specific product categories between the 2 years were six increases and four decreases. The increases were relatively small compared to the decreases. The largest decrease was in infant carriers (decreased from 11,800 to 9,500), which was also statistically significant (p-value=0.024). The other notable decreases were in portable baby swings (decreased from 3,200 to 2,000), and "other" products (decreased from 3,300 to 2,000), but neither was statistically significant.

Using the subsetted non-incidental injury data for 2015, the estimated total dropped from 69,300 injuries in 2014 to 59,400 injuries in 2015. This decrease was statistically significant (p-value=0.018). This was expected, given the substantial change in the data-inclusion process. However, these changes should *not* be interpreted as meaningful; it is more of a break in the time series; and only analysis of data from future years, using non-incidental injury data only, will indicate if any meaningful changes and/or trends emerge.

[4] R. Chowdhury, "Injuries and Deaths Associated with Nursery Products Among Children Younger than Age Five," CPSC, December 2015, http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Toys/NurseryProductsAnnualReport2015.pdf

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

PRODUCT CATEGORY	ESTIMATED EMERGENCY DEPARTMENT-TREATED INJURIES		
	2014	2015	
	All In-Scope Data	All In-Scope Data	Non-Incidental Data Only
TOTAL	69,300	65,800	59,400
Cribs/Mattresses	11,900	12,100	10,600
Infant Carriers (Excludes Motor Vehicle Incidents)	11,800	9,500	8,700
Strollers/Carriages	11,200	11,200	10,700
High Chairs	11,000	11,100	10,700
Changing Tables	3,500	3,800	3,600
Baby Bouncer Seats	3,300	3,700	3,300
Baby Walkers/Jumpers/Exercisers	2,900	3,200	2,900
Playpens/Play Yards	2,600	3,200	2,700
Baby Gates/Barriers	2,800	2,500	2,000
Portable Baby Swings	3,200	2,000	1,700
Baby Bottles/Warmers/Sterilizers	1,400	---[5]	---[5]
Bassinets/Cradles	---[5]	---[5]	---[5]
Baby Baths/Bath Seats/Bathinettes	---[5]	---[5]	---[5]
Other[6]	3,300	2,000	1,900

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.

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 99 percent complete for each year in the period from 2011 through 2013. As done in annual nursery product reports from earlier years, the deaths reported here are from 2011 through 2013, the latest 3-year time frame with sufficiently available information.[7]

CPSC staff has received reports of a total of 300 deaths—an annual average of 100 deaths—associated with nursery products during this time period. About 36 percent (108 total, or an annual average of 36) were associated with cribs/mattresses. Bassinets/cradles accounted for 20 percent (59 total, or an annual average of 20) of the reported deaths. Playpens/play yards were associated with 16 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 baths/bath seats/bathinettes and baby bouncer seats each accounted for four percent (a total of 13 or an annual average of 4) of the reported fatalities. The remaining 36 reported fatalities were associated with a range of products, including strollers, baby gates/barriers,

[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 2014 and 2015, the "Other" category included: pacifiers/teething rings, diapers (excluding diaper rash cases), diaper pails, diaper fasteners, rattles, night lights, potty chairs/training seats, baby scales, crib mobiles, and safety pins. In 2015, the "Other" category also included harnesses.
[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 2011–2013 period. However, they do provide at least a minimum number for deaths associated with nursery products during that time.

portable baby swings, 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 2011 through 2013, along with data previously reported for 2010 through 2012, 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.

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 88 percent of the reported fatalities.

Between 2011 and 2013, 108 deaths were associated with cribs/mattresses. The majority of these deaths were associated with a cluttered sleep environment (the presence of extra bedding, pillows, blankets, crib bumpers, and/or comforters, for example) in the crib, which led to asphyxiation of the infant. Approximately 10 percent of the 108 deaths resulted from a range of hazards associated with the crib, including incomplete assembly; missing, broken, or nonfunctioning components; or ineffective crib repairs. Some of these incidents occurred in, or on, older, reassembled, recalled, or secondhand cribs. 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.

There were 59 deaths reported in bassinets/cradles between 2011 and 2013, the majority of which were associated with extra bedding. Many of the suffocation deaths from bedding involved pillows. A few of the 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 2011 and 2013. Most of the deaths were asphyxiations, in which 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 placing improvised covers on the play yard and using ill-fitting mattresses and sofa cushions in the play yards, were associated with some of the deaths. A few of the fatalities involved faulty products as well.

There were 24 deaths identified during 2011 to 2013, which were associated with infant carriers. Hazardous placement of the infant in the carrier or hazardous placement of the carrier itself with 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, which resulted 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. A few fatalities resulted from infant carriers tipping over when placed on nonrigid surfaces.

Finally, the product groups of baby baths/bath seats/bathinettes and baby bouncer seats were associated with 13 deaths each between 2011 and 2013. For baby baths/bath seats/bathinettes, all of the deaths occurred when parent or caregiver attention was diverted away from the infant. In the majority of these incidents, the

infant was left unattended in the tub, sometimes with an older sibling in the tub, and was described as having slipped out of bath seats, fallen out of baby bath tubs, or tipped forward or sideways into the water. For baby bouncer seats, 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.

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

PRODUCT CATEGORY	TOTAL DEATHS		AVERAGE ANNUAL DEATHS	
	2010-2012	2011-2013	2010-2012	2011-2013
TOTAL	311	300	104	100
Cribs/Mattresses	123	108	41	36
Bassinets/Cradles	60	59	20	20
Playpens/Play Yards	44	47	15	16
Infant Carriers (Excludes Motor Vehicle Incidents)	26	24	9	8
Baby Baths/Bath Seats/Bathinettes	14	13	5	4
Baby Bouncer Seats	10	13	3	4
Strollers/Carriages	4	7	1	2
Baby Gates/Barriers	4	3	1	1
Portable Baby Swings	4	3	1	1
High Chairs	1	1	<1	<1
Changing Tables	0	1	0	<1
Baby Walkers/Jumpers/Exercisers	0	0	0	0
Other[8]	21	21	7	7

Source: CPSC epidemiological databases: Consumer Product Safety Risk Management System (CPSRMS), and NEISS from 2011 to 2013 for reported deaths.
Note: The average annual deaths do not add up to the total due to rounding.

[8] Of the 21 deaths in this category in 2011–2013, 17 deaths were associated with products used in the sleep environment that are not among the product categories listed in Table 3. Among the 17, one death involved a bedside sleeper; two deaths involved a portable youth bedrail; three deaths involved a cloth-covered, shared-sleep product; toddler beds (product code 4082) and collapsible, fabric travel beds were involved in three deaths each; and five deaths involved an inclined sleeper, such as a foam sleep product or a rocking sleeper. Additionally, there were two drowning deaths when an infant was left unattended on a non-bathing baby seat (product code 4074) in a water-filled tub or shallow pool and one death due to a pacifier (product code 1525) getting lodged in the infant's mouth the wrong way. Blunt force trauma to the head, due to a backwards fall from a children's chair (product code 4074), resulted in an additional death. See: http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Toys/NurseryProductsAnnualReport2015.pdf, p.7, for a list of products associated with deaths in the "Other" category in 2010−2012.

Appendix

Methodology

Injuries

For all in-scope data (as done historically for annual nursery products reports):

- Database: NEISS from 01/01/2015 through 12/31/2015.
- Product codes: 1500–1558, excluding 1550.
- 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.

Additionally, for non-incidental data only:

- 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.

After adding additional years of data (2011 through 2014), statistical tests were performed to determine if any trends exist. There was no statistically significant trend observed over the 5-year period from 2011 to 2015 (p-value= 0.890 using all in-scope data for 2015; p-value=0.717 using non-incidental data only for 2015).

Deaths:

- Databases: CPSRMS and NEISS from 01/01/2011 through 12/31/2013.

  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; 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 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 objects on top of the play yard to keep the child inside 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

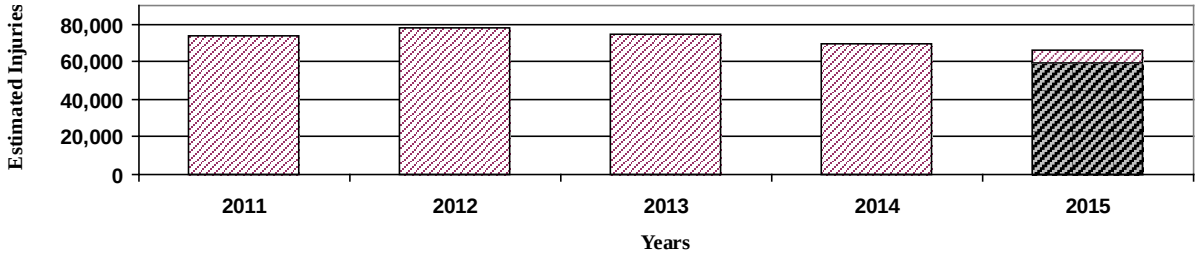
Injury estimates for the last five years, for which data is available, are presented in the table and chart below.

Table 4: Nursery Product-Related Emergency Department-Treated Injury Estimates 2011–2015

Calendar Year	Estimated Injuries	95% Confidence Interval
2011	74,100	58,300–90,000
2012	77,900	61,400–94,400
2013	74,900	57,100–92,600
2014	69,300	48,900–89,600
2015	65,800	46,800–84,900
2015 (Non-Incidental Data Only)	59,400	41,200–77,500

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

Figure 1: Nursery Product-Related Emergency Department-Treated Injury Estimates: 2011-2015



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.