



United States  
**Consumer Product Safety Commission**

# **Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings, 2023 Report**

May 2023

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*This report was prepared by the CPSC staff.  
It has not been reviewed or approved by,  
and may not necessarily reflect the views of,  
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# Table of Contents

<b>Executive Summary</b> .....	<b>4</b>
<b>Emergency Department-Treated Injury Estimates</b> .....	<b>5</b>
<b>Table 1: Estimated Number of ED-Treated Nonfatal Pool or Spa Drowning Injuries</b> .....	<b>5</b>
<b>Table 2: Estimated Number of ED-Treated Nonfatal Pool or Spa Drowning Injuries by Product Type</b> .....	<b>6</b>
<b>Table 3: Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Gender</b> .....	<b>6</b>
<b>Table 4: Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Race and Ethnicity</b> .....	<b>8</b>
<b>Figure 1: Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Month of Treatment</b> .....	<b>9</b>
<b>Figure 2: Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Age</b> .....	<b>10</b>
<b>Table 5: Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Disposition</b> .....	<b>11</b>
<b>Table 6: Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Location</b> .....	<b>12</b>
<b>Reported Fatalities</b> .....	<b>13</b>
<b>Table 7: Drowning Deaths Associated with Pools or Spas</b> .....	<b>13</b>
<b>Table 8: Percentage of Drowning Deaths with Pools or Spas by Interval Between Incident &amp; Death</b> .....	<b>14</b>
<b>Table 9: Percentage of Drowning Deaths Associated with Pools or Spas by Product Type</b> .....	<b>15</b>
<b>Table 10: Percentage of Drowning Deaths Associated with Pools or Spas by Gender</b> .....	<b>15</b>
<b>Table 11: Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas by Ethnicity and Race</b> .....	<b>15</b>
<b>Figure 3: Average Annual Drowning Deaths Associated with Pools or Spas by Month of Death &amp; Age Category</b> .....	<b>18</b>

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**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)**

**Figure 4: Average Annual Drowning Deaths Associated with Pools or Spas by Age..... 19**  
**Table 12: Percentage of Drowning Deaths with Pools or Spas by Incident Location .....20**  
**Table 13: Percentage of Drowning Deaths with Pools or Spas by Specific Pool/Spa Type  
Product Category .....21**  
**Table 14: Percentage of Drowning Deaths with Pools or Spas by Scenario.....22**  
**Appendix A .....23**

---

**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report | May 2023 | [cpsc.gov](https://cpsc.gov)**

## Executive Summary

This report presents annual estimates of the number of emergency department-treated, pool- or spa<sup>1</sup>-related, nonfatal drownings or submersion injuries<sup>2</sup> that occurred between 2020 and 2022, involving children younger than 15 years of age. The report also sets forth the counts of reported pool- or spa-related fatal drownings or submersion fatalities<sup>3</sup> that happened between 2018 and 2020, to children younger than 15 years of age. In addition, the report details the subset of drowning injuries and fatalities involving children younger than 5 years of age, excluding cases involving suction entrapment.<sup>4</sup> The time periods for the injury estimates and the fatality statistics presented in this report differ due to a lag in fatality reporting.

There were, on average, an estimated 6,300 pool- or spa-related, hospital emergency department (ED)-treated, nonfatal drowning injuries each year for 2020 through 2022, and 371 pool- or spa-related fatal drownings reported per year for 2018 through 2020, involving children younger than 15 years of age. Additionally, an annual average of 76 percent of the ED-treated nonfatal drowning injuries from 2020 through 2022, and 75 percent of the reported fatal drownings from 2018 through 2020, involved children younger than 5 years of age.

For children younger than 15 years old, 45 percent of the victims of estimated ED-treated pool or spa drowning injuries for 2020 through 2022 were admitted to the hospital or treated and transferred to another hospital, compared to 5 percent for ED-treated injuries to children younger than 15 years old during the same period.<sup>5</sup> Overall, annual estimates of the number of children who were treated in hospital emergency departments for pool- or spa-related, nonfatal drowning injuries in 2022 (6,400 injuries), were not statistically different from those in 2021 (6,800 injuries).

The total number of fatal drownings in 2020 (340 fatalities) was lower than the total number of fatal drownings in 2019 (367 fatalities). For children younger than 5 years of age, the total number of fatal drownings in 2020 (279 fatalities), was higher than the total number of fatal drownings in 2019 (254 fatalities).

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<sup>1</sup> The term “spa” is used to refer to spas and hot tubs.

<sup>2</sup> The term “submersion injury” is used instead of “nonfatal drowning,” when comparing or additionally referring to injuries resulting from incidents involving non-pool- or non-spa-related products or hazards.

<sup>3</sup> The term “submersion fatality” is used instead of “drowning,” when comparing or additionally referring to fatalities resulting from incidents involving non-pool- or non-spa-related products or hazards. The periods for reported injury and fatality statistics differ due to the lag in fatality reporting. Incidents covered by this report were associated with a pool or spa, but the primary cause of the incident was not necessarily the pool or spa product.

<sup>4</sup> Note that circulation/suction entrapments in pools or spas are presented in a separate document: [“2014–2018 Reported Circulation/Suction Entrapment Incidents Associated with Pools, Spas, and Whirlpool Bathtubs, 2019 Report,” May 2019.](#)

<sup>5</sup> Source: U.S. CPSC: NEISS

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### Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

# Emergency Department-Treated Injury Estimates

For 2020 through 2022, an estimated annual average of 6,300 children younger than 15 years of age were treated in U.S. hospital emergency departments (EDs) for nonfatal injuries associated with pool or spa drownings. Estimates are shown in Table 1. Estimates are also provided for injured children younger than 5 years of age and children 5 to 14 years of age. Injury estimates are based on CPSC’s National Electronic Injury Surveillance System (NEISS) data, where sampling weights are used to project the cases from NEISS hospitals to national estimates. The corresponding annual average estimates for the years 2019 through 2021, were 6,300 children younger than 15 years of age and 5,000 children younger than 5 years of age treated in hospital emergency departments for nonfatal drowning injuries in pools or spas.

## Table 1

### Estimated Number of ED-Treated Nonfatal Pool or Spa Drowning Injuries Children Younger than 15 Years of Age, 2020-2022

Year	Estimated Emergency Department-Treated Injuries		
	Younger than 5 Years	5-14 Years	Younger than 15 Years
<b>Average</b>	4,800	1,500	6,300
<b>2022</b>	4,500	1,900	6,400
<b>2021</b>	5,500	1,300	6,800
<b>2020</b>	4,400	1,300	5,800

Source: U.S. CPSC: NEISS. Appendix A details the methodology for data extraction.

Estimates for children under age 5 and ages 5 to 14 may not sum to the under age 15 total, due to rounding.

The estimates are rounded to the nearest hundred.

The 2022 estimates of children younger than 15 years of age and children younger than 5 years of age, who were treated in U.S. hospital EDs for pool- or spa-related nonfatal drownings, are not statistically different from the 2021 estimates. On average, from 2020 through 2022, 76 percent of children treated in EDs for pool- or spa-related, nonfatal drowning injuries were younger than 5 years of age. Children younger than 5 years of age comprised an estimated 77, 81, and 71 percent of the childhood pool- or spa- related ED-treated injuries in 2020, 2021, and 2022, respectively.

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**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report** | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Table 2 shows the percentages of the estimated totals for 2020 through 2022 that are associated with nonfatal pool or spa drowning injuries, by type of product. Spa-related drowning injuries constitute 5 percent of the estimated number of the pool or spa ED-treated, nonfatal drowning injuries for children younger than 15 years of age, and 7 percent of the estimated number of the pool or spa ED-treated, nonfatal drowning injuries for children younger than 5 years of age.

## Table 2

### Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries Children Younger than 15 Years of Age by Product Type, 2020-2022

Product Type	Estimated Emergency Department-Treated Injury Percentages		
	Younger than 5 Years	5-14 Years	Younger than 15 Years
Pool	93	100	95
Spa	7	0	5
Total	100	100	100

Source: U.S. CPSC: NEISS. Appendix A details the methodology for data extraction.

Percentages may not add up to 100 due to rounding or estimates of drowning injuries for children of unknown gender. In this table, 0 represents < 0.5%.

Table 3 shows the percentage of the estimated number of pool- or spa-related, nonfatal drowning injuries by victim gender. Male children are more frequently treated for pool- or spa-related, nonfatal drowning injuries than female children. This is true of all injured children younger than 15 and the subset of children younger than 5 years of age.

## Table 3

### Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries Children Younger than 15 Years of Age by Gender, 2020-2022

Gender	Estimated Emergency Department-Treated Injury Percentages		
	Younger than 5 Years	5-14 Years	Younger than 15 Years
Male	55	61	57
Female	45	39	43
Total	100	100	100

Source: U.S. CPSC: NEISS. Appendix A details the methodology for data extraction.

Percentages may not add up to 100 due to rounding or estimates of drowning injuries for children of unknown gender.

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## Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Table 4 shows the percentage of the estimated number of pool- or spa-related, nonfatal drowning injuries by the victim’s ethnicity and race. For more than 52 percent of estimated nonfatal drowning injuries involving children under 15 years of age, the victim’s ethnicity was unspecified, while 9 percent of estimated nonfatal drowning injuries involved Hispanic victims, and 39 percent of estimated nonfatal drowning injuries involved non-Hispanic victims. Focusing on injuries that exclusively involved children of known ethnicities, 18 percent of victims under 15 years of age were Hispanic (compared to 26 percent of the population for that age), and 82 percent of victims under 15 years of age were non-Hispanic (compared to 74 percent of the population for that age). The victim’s race was also unspecified for more than 50 percent of estimated nonfatal drowning injuries involving children under 15 years of age. Focusing on those injuries where race was known, 78 percent were White (compared to 71 percent of the population for that age), 14 percent were Black (compared to 15 percent of the population for that age), and 4 percent were Asian (compared to 6 percent of the population for that age) for children less than 15 years old.<sup>6</sup> However, these findings are not definitive, given the high proportion of unspecified ethnicities and races.

**Table 4**

**Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries Children Younger than 15 Years of Age by Ethnicity and Race, 2020-2022**

Ethnicity	Race	Estimated Emergency Department-Treated Injury Percentages		
		Younger than 5 Years	5-14 Years	Younger than 15 Years
<b>Hispanic<sup>7</sup></b>		<b>18</b>	<b>20</b>	<b>18</b>
	<b>Not stated</b>	41	22	35
	<b>White</b>	44	72	52
	<b>Black/African American</b>	2	4	3
	<b>Asian</b>	1	-	1
	<b>Other</b>	12	2	9
	<b>American Indian/Alaska Native</b>	0	-	0
	<b>Native Hawaiian/Pacific Islander</b>	-	-	-
<b>Non-Hispanic<sup>7</sup></b>		<b>82</b>	<b>80</b>	<b>82</b>
	<b>Not stated</b>	19	11	17
	<b>White</b>	70	57	66

<sup>6</sup> Demographic percentages are based on <https://www2.census.gov/programs-surveys/popest/datasets/2020-2021/national/asrh/nc-est2021-alldata-r-file02.csv>, <https://www2.census.gov/programs-surveys/popest/datasets/2020-2021/national/asrh/nc-est2021-alldata-r-file04.csv>, <https://www2.census.gov/programs-surveys/popest/datasets/2020-2021/national/asrh/nc-est2021-alldata-r-file06.csv>, and <https://www.census.gov/data/tables/time-series/demo/popest/2020s-national-detail.html>.

<sup>7</sup> These percentages exclude the percentage of estimated injuries involving victims of unknown ethnicity for the Younger than 5, 5-14, and Younger than 15 age groups (55, 45, and 52 percent, respectively).

**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)**

	<b>Black/African American</b>	8	22	12
	<b>Asian</b>	1	10	4
	<b>Other</b>	1	0	1
	<b>American Indian/Alaska Native</b>	-	-	-
	<b>Native Hawaiian/Pacific Islander</b>	-	-	-
<b>All</b>	<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>
	<b>Not stated</b>	54	38	50
	<b>White</b>	37	44	39
	<b>Black/African American</b>	5	12	7
	<b>Asian</b>	1	6	2
	<b>Other</b>	2	0	2
	<b>American Indian/Alaska Native</b>	0	0	0
	<b>Native Hawaiian/Pacific Islander</b>	-	-	-

Source: U.S. CPSC: NEISS. Appendix A details the methodology for data extraction. Percentages may not add up to 100, due to rounding: In this table, 0 represents < 0.5%. "-" denotes no data recorded.

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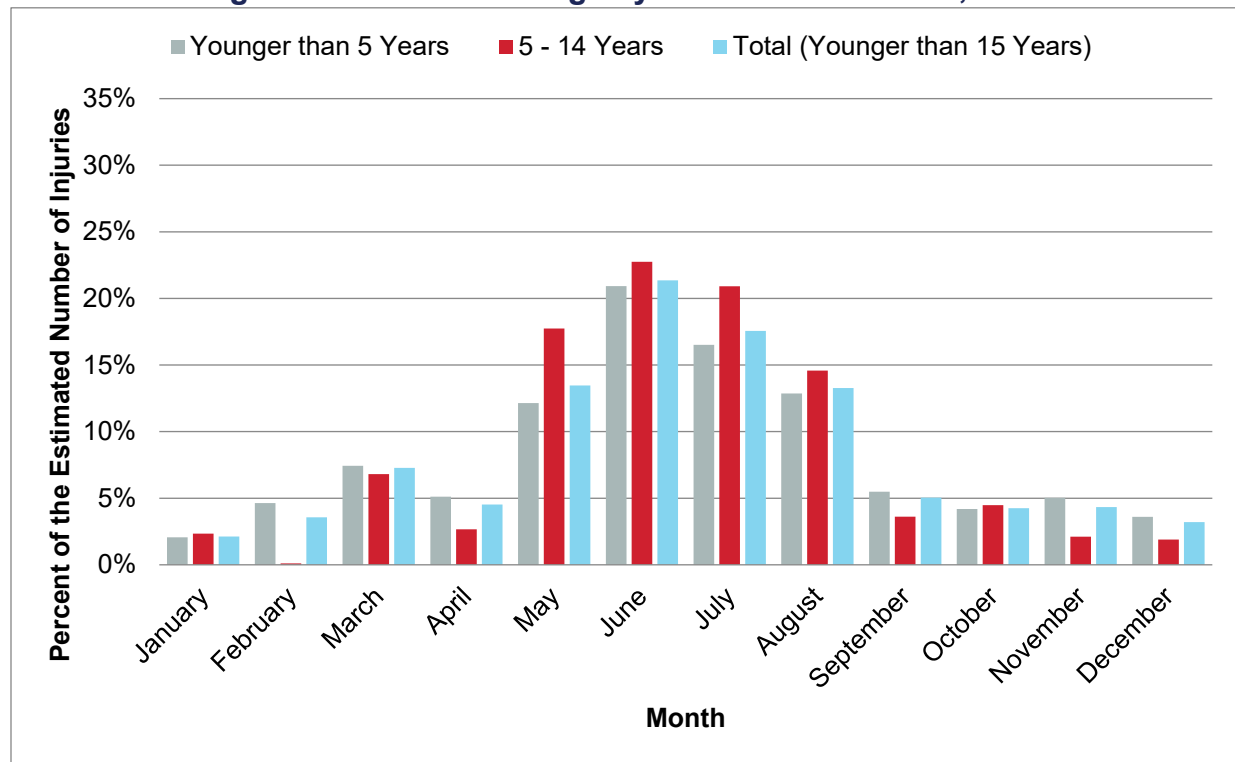
**2023 Report** | May 2023 | [cpsc.gov](https://www.cpsc.gov)



Figure 1 illustrates the monthly distribution of the percentages of the estimated ED-treated, nonfatal drowning injuries for each age group. The months of May, June, July, and August had the largest percentages.

## Figure 1

**Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries Children Younger than 15 Years of Age by Month of Treatment, 2020-2022**



Source: U.S. CPSC: NEISS.

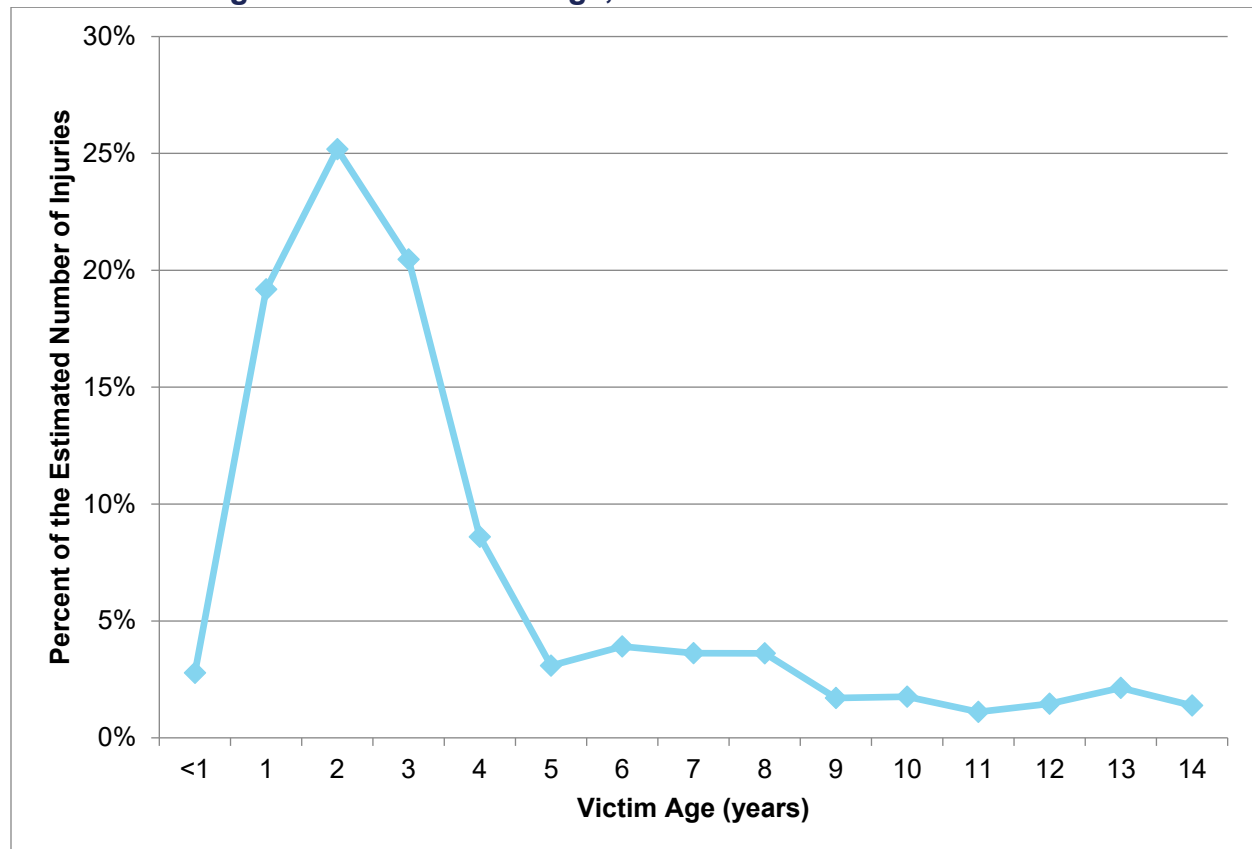
### Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Figure 2 plots the percentage of the estimated number of ED-treated, nonfatal drowning injuries as a function of the victim's age. Children younger than 1 year of age accounted for 3 percent of the estimated pool- or spa-related, nonfatal drowning injuries. Children between the ages of 1 and 3 years (12 to 47 months) comprised approximately 65 percent of the estimated number of children treated for pool- or spa-related, nonfatal drowning injuries. An additional 9 percent of the estimated childhood pool- or spa-related, nonfatal drowning injuries occurred in children 4 years of age (48 to 59 months). Children between the ages of 5 to 9 and 10 to 14 accounted for 16 and 8 percent, respectively, of the estimated ED-treated pool or spa-related, nonfatal drowning injuries.

## Figure 2

**Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries by Age Children Younger than 15 Years of Age, 2020-2022**



Source: U.S. CPSC: NEISS.

**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)**

Table 5 gives a breakdown of estimated ED-treated pool or spa drowning injuries by disposition. From 2020 through 2022, children younger than 15 years of age were admitted to the hospital or treated and transferred to another hospital 45 percent of the time. In 2022 alone, children younger than 15 years of age were admitted to the hospital or treated and transferred to another hospital 41 percent of the time. By contrast, for *all* ED-treated injuries to children, only 5 percent of children in the younger than 15 years of age category were admitted to the hospital or treated and transferred.<sup>5</sup> For Dead on Arrival (DOA), or Died in Emergency Department percentages, drowning victims younger than 5 years of age comprised most of all child drownings (see Table 7). The deaths recorded in NEISS are also included in the fatality count in the section on reported fatalities discussed later in this report.

## Table 5

### Percent of Estimated ED-Treated Pool or Spa Drowning Injuries Children Younger than 15 Years of Age by Disposition, 2019-2021 vs. 2020-2022

Disposition	Estimated Emergency Department-Treated Injury Percentages					
	Younger than 5 Years		5–14 Years		Younger than 15 Years	
	2019-2021	2020-2022	2019-2021	2020-2022	2019-2021	2020-2022
Examined or Treated and Released	53	48	55	54	53	49
Admitted to Hospital	40	42	27	26	38	38
Treated and Transferred	3	4	14	15	6	7
DOA or Died in Emergency Department	2	3	2	2	2	3
Held for Observation	1	2	2	2	2	2
Left Without Being Seen	0	2	0	0	0	1
<b>Total</b>	100	100	100	100	100	100

Source: U.S. CPSC: NEISS. Appendix A details the methodology for data extraction. Percentages may not add up to 100, due to rounding: In this table, 0 represents < 0.5%.

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### Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Table 6 shows the percentages of the estimated number of injuries for each age group by the location of the drowning incident. Overall, 43 percent of the incidents involving injuries that led to emergency department visits occurred at a residence. Injured children younger than 5 years of age had the largest percentage (49%) of incidents in a residential location. For injured children 5 to 14 years of age, 46 percent of incidents occurred in public locations. In 2022 alone, for all children younger than 15 years of age, 36 percent of the incidents involving ED-treated injuries occurred at a residence, a decrease of 5 percent from 2021 (41%).

## Table 6

### Percent of Estimated ED-Treated Nonfatal Pool or Spa Drowning Injuries Children Younger than 15 Years of Age by Location, 2020-2022

Location	Estimated Emergency Department-Treated Injury Percentages		
	Younger than 5 Years	5–14 Years	Younger than 15 Years
Residential	49	22	43
Undisclosed Location	33	32	32
Public	18	46	25
<b>Total</b>	100	100	100

Source: U.S. CPSC: NEISS. Appendix A details the methodology for data extraction. Percentages may not add up to 100, due to rounding.

## Reported Fatalities

On average, 371 fatalities associated with pool or spa drownings involving children younger than 15 years of age were reported to CPSC staff annually from 2018 through 2020. The years for the injury estimates in the previous section and the fatality statistics presented here differ due to the lag in fatality reporting.

Reported fatality frequencies by year and age category are shown in Table 7. Seventy-five percent of the victims of the reported pool- or spa-related, childhood drowning fatalities were younger than 5 years of age. As noted in the NEISS injury estimates section, victims in this age category also accounted for an average of 76 percent of the childhood drowning injuries related to pools or spas between 2020 and 2022. Cases in NEISS that were classified as DOA, or died in the ED, are included in fatality case counts for their respective years.

The 1,106 reported drowning incidents from 2018 through 2020 resulted in the deaths of 1,113 children. Of those fatal incidents 1,095 (99 percent of the incidents) involved one victim, 7 incidents involved two victims, and 4 incidents involved one victim who was included in the count, plus additional victims who were 15 years of age and older, and therefore, excluded from the counts.

The numbers of fatal drownings related to pools or spas presented in this section are based on all incidents reported to CPSC staff. These numbers are considered minimum counts only derived from anecdotal data and cannot be used as generalized estimates for determining trends in the U.S. population.

### Table 7

**Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas  
Children Younger than 15 Years of Age, 2018-2020**

Year <sup>8</sup>	Reported Fatality Frequencies			
	Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
<b>Average<sup>9</sup></b>	278	69	23	371
<b>2020</b>	279	45	15	340
<b>2019</b>	254	83	29	367
<b>2018</b>	302	78	26	406
<b>Totals 2018-2020</b>	835	206	70	1,113

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction.

<sup>8</sup> Since reporting is ongoing, the number of reported fatalities may change in the future.

<sup>9</sup> Row averages may not add to total, due to rounding. Totals for 2019 and 2020 reflect inclusion of two incidents that involved an unknown victim under 15 years of age.

Table 8 provides information on the interval between the drowning incident and the time of death for pool- or spa-related drownings. In some instances, a great deal of time may lapse from the drowning incident to death. In a few cases, the lapse may be years. For most of the fatalities (72 percent), the date of death was either the same as the date of the incident, or one day later. Across all age groups, the percentage of children who died on the same day as the date of the incident or one day later (72 percent) was approximately the same.

## Table 8

**Percentage of Drowning Deaths Reported to CPSC Staff with Pools or Spas  
Children Younger than 15 Years by Days Between Incident and Death, 2018-  
2020<sup>10</sup>**

Days Between Incident & Death	Percentage of Reported Fatalities			
	Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
0 days	65	63	66	64
1 day	8	9	6	8
2–7 days	21	22	23	21
8–31 days	4	4	4	4
> 31 days	3	2	1	3
<b>Total</b>	100	100	100	100

Source: U.S. CPSC: CPRMS. Appendix A details the methodology for data extraction.

Percentages may not add up to 100, due to rounding and refer to percentages within each age group.

<sup>10</sup> Note that the age at time of death is used to determine the appropriate age category. In most cases, the difference between the date of incident and date of death is not sufficient to change the age category. There were 33 fatalities where the difference was more than 31 days.

Reported fatal drownings occurred predominantly in pools. A small number of fatal drownings (37) were associated with spas. Children younger than 5 years of age comprised almost all the reported spa-related drownings. Table 9 presents these percentages by product type.

## Table 9

### Percentage of Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Involving Children Younger than 15 Years by Product Type, 2018-2020

Product	Percentage of Reported Fatalities			
	Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
Pool	96	100	100	97
Spa	4	-	-	3
Total	100	100	100	100

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction.

"-" denotes no data recorded.

Percentages may not add up to 100, due to rounding and refer to percentages within each age group.

Table 10 gives the percentages of pool or spa drownings by victim age and gender. For all age groups under age 15, there were more reported male drowning victims than reported female drowning victims. This is consistent with the injury data, which show that more male children were treated in emergency departments for pool- or spa-related drowning injuries.

## Table 10

### Percentage of Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Involving Children Younger than 15 Years of Age by Gender, 2018-2020

Gender	Percentage of Reported Fatalities			
	Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
Male	66	69	71	66
Female	34	31	29	34
Total	100	100	100	100

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction.

Percentages may not add up to 100, due to rounding and refer to percentages within each age group.

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**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Reported fatality frequencies by ethnicity and race are shown in Table 11. More than 54 percent of drowning deaths for children under 15 years of age involved victims of unknown ethnicity, 10 percent of drowning deaths involved Hispanic victims, and 36 percent of drowning deaths involved non-Hispanic victims. Among victims with known ethnicity, 22 percent of the drowning deaths involved Hispanic victims, which is less than their proportion in the U.S. population (26 percent). For drowning deaths involving all children under 15 years of age, 37 percent involved victims whose race was unspecified. Out of the 63 percent of all drowning deaths involving children of known races under 15 years of age, white victims comprised the highest percentage of all victims, at 66 percent (compared to 71 percent of the population for that age), and Black/African American victims made up the second highest percentage of all victims, at 21 percent (compared to 15 percent of the population for that age). For drowning deaths involving all children under 5 years of age, victims whose race was unspecified were 35 percent of the victims. Out of the 65 percent of all drowning deaths involving all children under 5 years of age, white victims comprised the highest percentage of all victims at 73 percent (compared to 70 percent of the population for that age), and Black/African American victims made up the second highest percentage of all victims, at 15 percent (compared to 16 percent of the population for that age).<sup>11</sup>

## Table 11

### Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Children Younger than 15 Years of Age by Ethnicity and Race, 2018-2020

Ethnicity	Race	Reported Fatality Frequencies			
		Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
Hispanic		94	12	5	111
	Not stated	1	0	0	1
	White	64	8	3	75
	Black/African American	2	0	0	2
	Asian	0	0	0	0
	Other	27	4	2	33
	American Indian/Alaska Native	0	0	0	0

<sup>11</sup> Demographic percentages are based on <https://www2.census.gov/programs-surveys/popest/datasets/2010-2020/national/asrh/NC-EST2020-ALLDATA-R-File18.csv>, <https://www2.census.gov/programs-surveys/popest/datasets/2010-2020/national/asrh/NC-EST2020-ALLDATA-R-File20.csv>, and <https://www2.census.gov/programs-surveys/popest/datasets/2010-2020/national/asrh/NC-EST2020-ALLDATA-R-File22.csv>.



	<b>Native Hawaiian/Pacific Islander</b>	0	0	0	0
<b>Non-Hispanic</b>		<b>295</b>	<b>81</b>	<b>24</b>	<b>400</b>
	<b>Not stated</b>	1	1	0	2
	<b>White</b>	225	34	10	269
	<b>Black/African American</b>	46	38	13	97
	<b>Asian</b>	6	4	0	10
	<b>Other</b>	14	3	1	18
	<b>American Indian/Alaska Native</b>	1	0	0	1
	<b>Native Hawaiian/Pacific Islander</b>	2	1	0	3
<b>All<sup>12</sup></b>	<b>Total</b>	<b>835</b>	<b>206</b>	<b>70</b>	<b>1113</b>
	<b>Not stated</b>	293	87	32	414
	<b>White</b>	395	51	18	464
	<b>Black/African American</b>	79	55	16	150
	<b>Asian</b>	13	5	1	19
	<b>Other</b>	48	7	3	58
	<b>American Indian/Alaska Native</b>	4	0	0	4
	<b>Native Hawaiian/Pacific Islander</b>	3	1	0	4

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction.

<sup>12</sup> Includes 602 drowning deaths involving victims of unknown ethnicities.

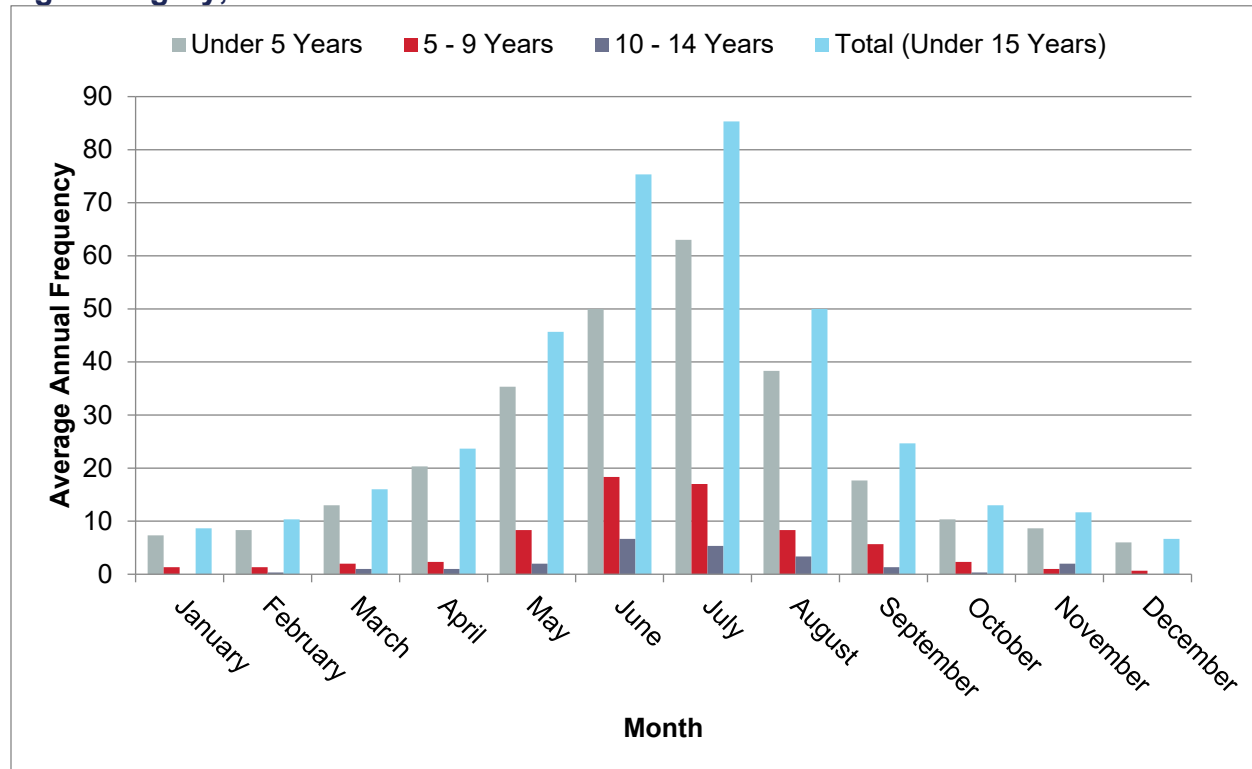
## Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Figure 3 illustrates the monthly distribution of reported pool- or spa-related childhood drownings categorized by age groups of victims. As expected, the U.S. summer months of May, June, July, and August had the largest annual fatality frequencies for all age groups.

## Figure 3

**Average Annual Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Involving Children Younger than 15 Years of Age by Month of Death and Age Category, 2018-2020**



Source: U.S. CPSC: CPSRMS.

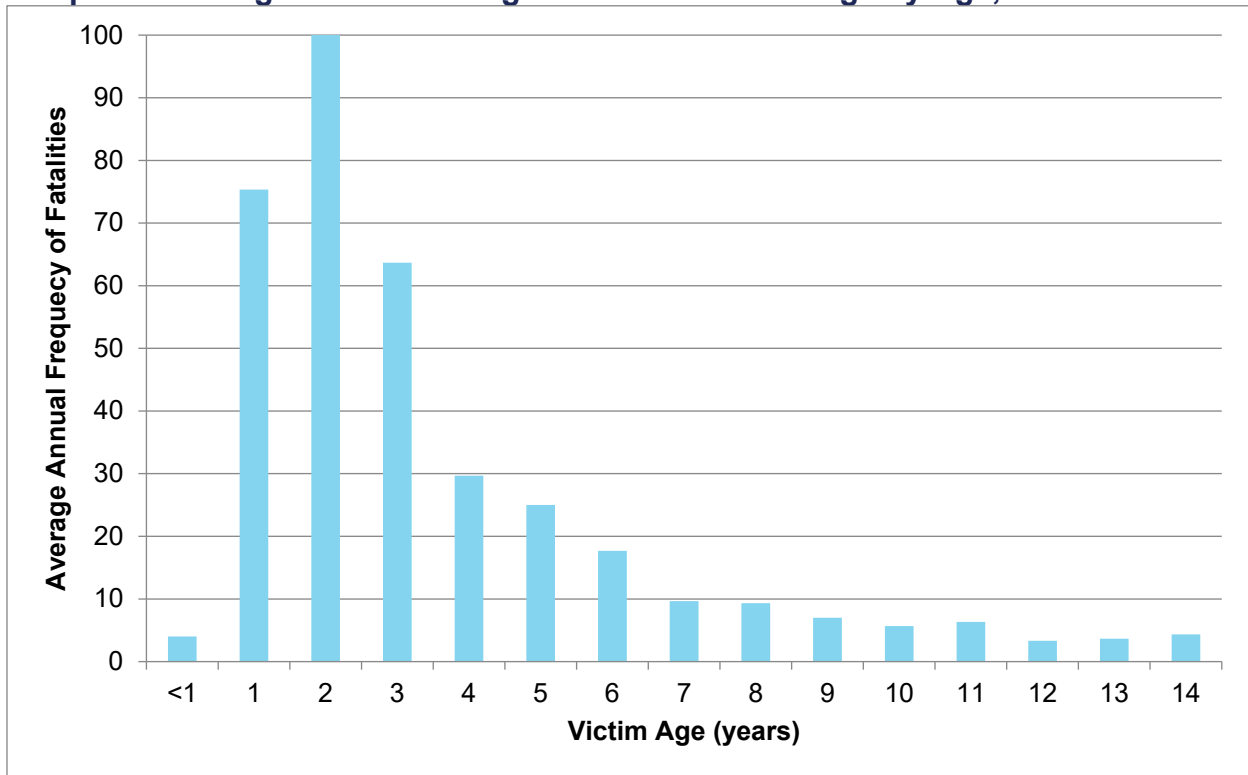
### Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Figure 4 shows the annual average of reported pool or spa drownings in children younger than 15 years old as a frequency distribution of the victim’s age. Children between the ages of 1 and 3 years (12 to 47 months) comprised approximately 66 percent of the reported pool or spa drowning fatalities. The graph shows a sharp decrease after age 2 (less than or equal to 35 months).

## Figure 4

**Average Annual Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Involving Children Younger than 15 Years of Age by Age, 2018-2020**



Source: U.S. CPSC: CPRMS.

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### Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://www.cpsc.gov)

Table 12 records the percentages of reported pool or spa drownings by incident location. Most of the reported deaths (70 percent for pools or spas) occurred in residential settings, such as the victim’s home, the house of a family member/friend/acquaintance, or a neighbor’s residence. The victim’s home accounts for the largest percentage (46 percent) of all location categories for victims younger than 15 years of age. For children 5 to 9 years of age and children 10 to 14 years of age, the public/community/business location accounted for the largest percentage of reported drownings.

## Table 12

**Percentage of Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Involving Children Younger than 15 Years of Age by Incident Location, 2018-2020**

Location	Percentage of Reported Fatalities			
	Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
Home	57	13	17	46
Family/ Friend/ Acquaintance	19	6	9	16
Neighbor	8	4	3	7
Public/ Community/ Business <sup>13</sup>	8	43	49	17
Undisclosed Location	7	34	23	13
<b>Total</b>	100	100	100	100

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction. Percentages may not add up to 100, due to rounding and refer to percentages within each age group.

<sup>13</sup> Condominium and apartment complex pools are included in this category.

Table 13 presents the percentages of reported fatal drownings by pool/spa type. The in-ground product type accounted for the largest percentage of known pool/spa types (53 percent for victims younger than 15). This was followed by the above-ground pool category and outside home spa pool category for cases where pool/spa type was known.

## Table 13

### Percentage of Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Involving Children Younger than 15 Years of Age by Specific Pool/Spa Type Product Category, 2018-2020

Location	Percentage of Reported Fatalities			
	Younger than 5 Years	5–9 Years	10–14 Years	Younger than 15 Years
In-Ground (Pool Only)	51	55	64	53
Undisclosed Pool/Spa Type	16	39	33	21
Above-Ground (Pool Only)	25	5	3	20
Portable <sup>14</sup> (Pool Only)	3	1	-	3
Inside Home (Spa Only)	0	-	-	0
Outside Home (Spa Only)	4	-	-	3
<b>Total</b>	100	100	100	100

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction.

Percentages may not add up to 100 due to rounding and refer to percentages within each age group: In this table, 0 represents < 0.5%; “-” denotes no data recorded.

<sup>14</sup> A “portable pool” is defined as any pool that can be set up/taken down or moved to another location with relative ease.

Because the majority of reported fatal drowning victims were younger than 5 years of age, common scenarios for children younger than 5 years of age for pools or spas (835 reported drownings) were classified in Table 14. The highest percentage of the reports (64 percent) attributed the incident to a gap in adult supervision (an adult losing contact or knowledge of the whereabouts of the child, and during that period, the child managed to access the pool/spa). Ten percent of the reports indicated barrier compromise or circumvention. Another common scenario—9 percent of the reports—involved observation of the victim close to the pool/spa, with the victim last seen in the pool/spa, or near the pool/spa, before the incident occurred. Additionally, in 17 percent of the reports, there was insufficient information available to determine the scenario.

## Table 14

**Percentage of Drowning Deaths Reported to CPSC Staff Associated with Pools or Spas Children Younger than 5 Years of Age by Scenario, 2018-2020**

Scenario	Percentage of Reported Fatalities for Pools and Spas
Lost Contact or Knowledge of Whereabouts	64
Not Enough Information to Determine Scenario	17
Barrier Integrity or Circumvented Barrier	10
Observed Near Pool/Spa or In Pool/Spa Prior to Incident	9

Source: U.S. CPSC: CPSRMS. Appendix A details the methodology for data extraction.

# Appendix A

“Drowning” is defined as the process of experiencing respiratory impairment from submersion/immersion in liquid. Drowning outcomes can result in “death,” “no morbidity,” or “morbidity” (further categorized as “moderately disabled,” “severely disabled,” “vegetative state/coma,” and “brain death”).<sup>15</sup>

## Methodology for Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries

Injury estimates came from NEISS data extracted on April 17, 2023, for calendar year 2022. The NEISS product codes used for the data were 3251 (Built-in pools), 3221 (Above-ground pools), 5043 (Portable pools), 1284 (Pools, not specified), 3274 (Swimming, activity) and 698 (Hot tubs and Spas). Diagnoses codes of 69 (Submersions), 65 (Anoxia), and 42 (Aspirated on) were also used, along with the age constraint of “children younger than 15 years of age,” to restrict the extracted data. Cases involving the activity of swimming were reviewed for potential inclusion in the data set. NEISS data from 2020 and 2021 were also used from last year’s report to cover the 2020 through 2022 timeframe. NEISS data is from a probability-based sample. Sampling weights are used to project the cases from NEISS hospital-treated injury cases to national estimates. Because incidents in NEISS are unique, there were no duplicates.

The estimated numbers of emergency department-treated injuries are rounded to the nearest hundred. Because NEISS is a weighted sample, injury category percentages were based on the category weighted estimate (unrounded), divided by the total weighted estimate (unrounded); then the percentages are rounded to the nearest integer.

## Historical Estimates

Injury estimates used for trend analyses are based on NEISS data from 2013 through 2022. Figure 5 provides the estimated number of injuries for children younger than 5 years of age, the fitted trend line, as well as the 95 percent confidence level for prediction intervals (CLP) for the fitted line. The p-value associated with the slope of the fitted line in the figure below is 0.6454, which indicates that no statistically significant trend exists for injury estimates from 2013 through 2022. While the number of estimated injuries has fluctuated since 2016, the population of children under age 5 in the United States decreased approximately 7 percent from 2013 to 2022.<sup>16</sup> Since the coefficients of variation associated with the injury estimates exceed the

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<sup>15</sup> <https://pediatrics.aappublications.org/content/126/1/178> - avoid use of terms such as “near,” “wet,” “dry,” “active,” “passive,” “silent,” and “secondary” drowning.

<sup>16</sup> Annual estimates are from <https://www2.census.gov/programs-surveys/popest/datasets/2010-2020/national/asrh/nc-est2020-agesex-res.csv>, <https://www2.census.gov/programs-surveys/popest/datasets/2020-2021/national/asrh/nc-est2021-alldata-r-file04.csv>, and <https://www2.census.gov/programs-surveys/popest/datasets/2020-2021/national/asrh/nc-est2021-alldata-r-file06.csv>

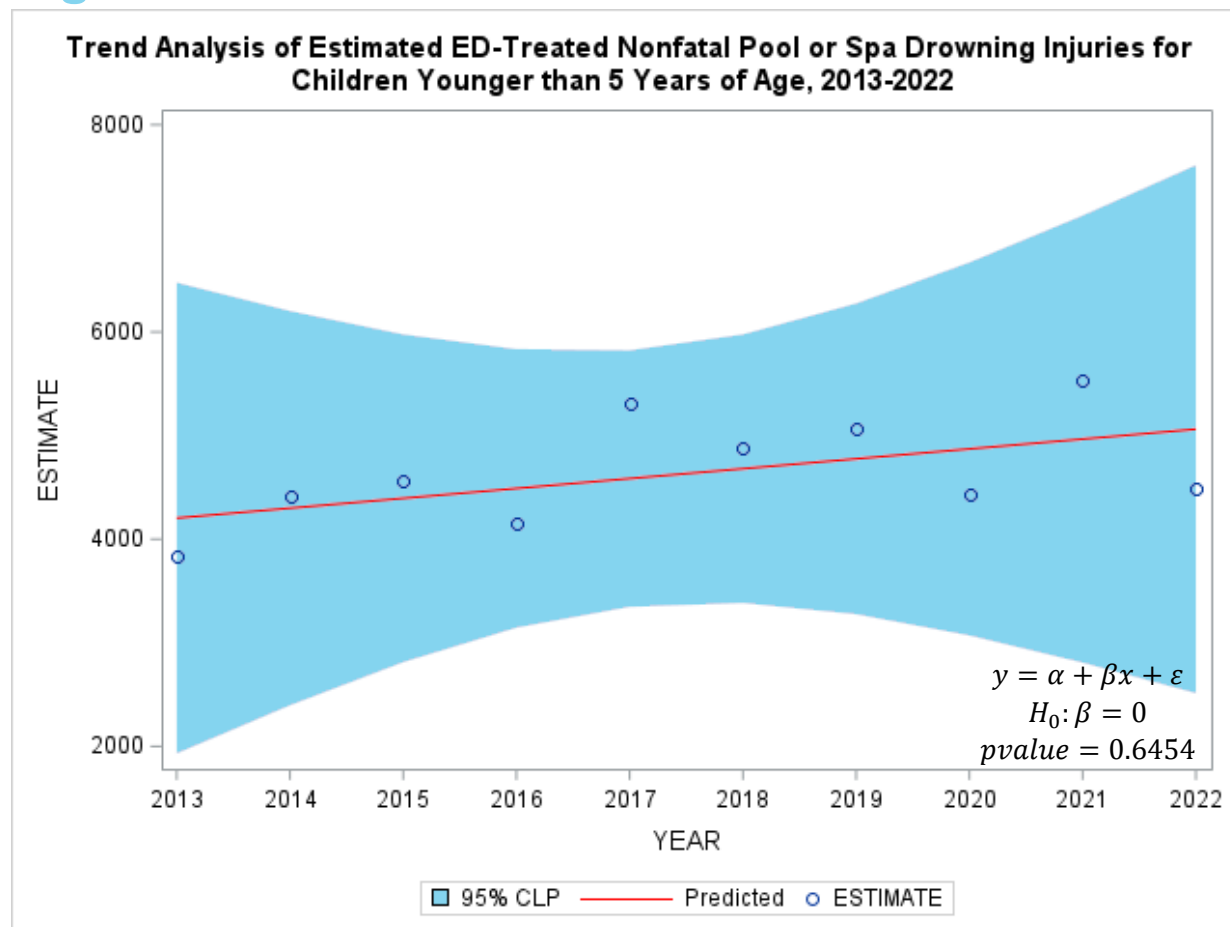
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## Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,

2023 Report | May 2023 | [cpsc.gov](https://cpsc.gov)

NEISS reliability threshold of 33 percent, trend analysis findings should be interpreted with caution.

**Figure 5**



**Methodology for Pool or Spa Submersion: Reported Drownings**

Data were extracted on March 29, 2023, from CPSC’s Consumer Product Safety Risk Management System (CPSRMS), for pool- or spa-related submersion deaths involving children younger than 15 years of age for the years 2018 to 2020. These data were merged with data from last year’s report for 2018 and 2019, to cover the 2018 through 2020, reporting period. It should be noted that for a given year, date of death was used to determine the appropriate year

**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report** | May 2023 | [cpsc.gov](http://cpsc.gov)



category, and incidents are included on an ongoing basis. Additional reports for several prior reported years are generally received during the most recent years. For the most recent period, no additional reports were received since publication of the last report.<sup>17</sup>

Fatal incidents associated with product codes 3251 (Built-in pools), 3221 (Above-ground pools), 5043 (Portable pools), 1284 (Pools, not specified), 3274 (Swimming, activity), and 698 (Hot tubs and Spas) were examined for inclusion in counts. Information from these cases was extracted into an Excel spreadsheet and sorted by date and incident location. CPSRMS contains various types of submitted voluntary information, including reports from consumers through the public-facing component [SaferProducts.gov](https://www.saferproducts.gov), newspaper clippings, state/local authorities, medical examiners, advocacy groups, as well as national death certificates. However, because of the voluntary and anecdotal nature of these reports, staff cannot be sure that information on all the deaths has been received. Additionally, since pool drowning incidents are notable events in the community where they occur, there were often multiple news reports, a medical examiner's report, a death certificate, an in-depth investigation, and less frequently, a hospital emergency department report (NEISS) for a single incident. As a result, source documents were checked to eliminate duplicate incident reports.

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<sup>17</sup> [Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings, 2022 Report](#)

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**Pool or Spa Submersion: Estimated Nonfatal Drowning Injuries and Reported Drownings,**

**2023 Report** | May 2023 | [cpsc.gov](https://www.cpsc.gov)