



United States

Consumer Product Safety Commission

2022 Fireworks Annual Report

Fireworks-Related Deaths, Emergency Department-Treated Injuries, and Enforcement Activities During 2022

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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, the Commission.

Executive Summary

This report provides the results of U.S. Consumer Product Safety Commission (CPSC) staff's analysis of data on non-occupational, fireworks-related deaths and injuries during calendar year 2022. The report also summarizes CPSC staff's enforcement activities during fiscal year 2022.¹

Staff obtained information on fireworks-related deaths from news clippings and other sources in CPSC's Consumer Product Safety Risk Management System (CPSRMS). Staff also estimated fireworks-related injuries treated in hospital emergency departments from CPSC's National Electronic Injury Surveillance System (NEISS). Finally, CPSC staff conducted a special study of non-occupational, fireworks-related injuries between June 17, 2022, and July 17, 2022. The special study included collecting and analyzing more detailed incident information, such as the type of injury, the fireworks involved, the characteristics of the victim, and the incident scenario. About 73 percent of the estimated annual fireworks-related, emergency department-treated injuries for 2022 occurred during that period.

Highlights of the report

Deaths and Injuries

- CPSC staff received reports of 11 non-occupational, fireworks-related deaths during 2022. Five of the deaths were associated with firework misuse; three deaths were associated with a device misfire/malfunction; one death was associated with a device tip-over; and two incidents were associated with unknown circumstances. Reporting of fireworks-related deaths for 2022 is not complete, and the number of deaths identified for 2022 should be considered a minimum.
- Fireworks were involved with an estimated 10,200 injuries treated in U.S. hospital emergency departments during calendar year 2022 (95 percent confidence interval 7,800–12,500). The estimated rate of emergency department-treated injuries is 3.1 per 100,000 individuals in the United States, a decrease from 3.5 estimated injuries per 100,000 individuals in 2021.
- There is a statistically significant trend in estimated emergency department-treated, fireworks-related injuries from 2007 through 2022. This trend estimates an increase of 535 fireworks injuries per year (p-value = <0.0001).
- In 2022, there were proportionately fewer white victims (5,100 total injuries, 69.9% of victims, 75.6% of the U.S. population identifies as white), proportionately more black victims (1,500 total injuries, 20.5% of victims, 13.6% of the U.S. population identifies as black), and proportionately fewer victims associated with some other race (700 total

¹ The 2022 federal fiscal year refers to the period of October 1, 2021, through September 30, 2022.

injuries, 9.6% of victims, 10.8% of the U.S. population identifies with some other race).² There were 2,800 fireworks-related injuries where the race of the victim was unknown. These percentages are calculated using only the victims where race was collected.

- In 2022, there were proportionately fewer injuries where the victim identified as Hispanic (800 total injuries, 11.1% of victims, 19.1% of the U.S population identifies as Hispanic) and proportionately more injuries where the victim identified as non-Hispanic (6,400 total injuries, 88.9% of victims, 80.9% of the U.S population identifies as non-Hispanic). There were 3,000 fireworks-related injuries where the ethnicity of the victim was unknown. These percentages are calculated using only the victims where ethnicity was collected.
- An estimated 7,400 fireworks-related injuries (or 73 percent of the total estimated fireworks-related injuries in 2022) were treated in U.S. hospital emergency departments during the 1-month special study period between June 17, 2022, and July 17, 2022 (95 percent confidence interval 5,300–9,600).

Results from the 2022 Special Study

- Of the 7,400 estimated fireworks-related injuries sustained, 65 percent were to males and 35 percent were to females.
- Adults 25 to 44 years of age experienced about 36 percent of the estimated injuries, and children younger than 15 years of age accounted for 28 percent of the estimated injuries. Seniors 65+ years of age experienced a small percent of the estimated injuries at only 3 percent.
- Victims 15 to 19 years of age had the highest estimated rate of emergency department-treated, fireworks-related injuries (6.0 injuries per 100,000 people). Children, 10 to 14 years of age, had the second highest estimated rate (3.7 injuries per 100,000 people). A general decrease is noted comparing the 2022 rates to the 2021 rates, except for victims 15 to 24 years of age, which saw an increase from 4.0 injuries to 4.2 injuries per 100,000 people.
- There were an estimated 1,300 emergency department-treated injuries associated with firecrackers and 600 with sparklers.
- The parts of the body most often injured were hands and fingers (an estimated 29 percent); head, face, and ears (an estimated 19 percent); legs (an estimated 19

² The “other” race category contains Asian, Pacific Islander/Native Hawaiian, and American Indian/Alaskan Native individuals with more than one race.

percent); eyes (an estimated 16 percent); trunk/other regions (an estimated 12 percent); and arms (an estimated 5 percent).

- An estimated 38 percent of the emergency department-treated injuries were burns. Burns were the most common injury to hands and fingers. Contusions and lacerations, accounting for 30 percent of the emergency department-treated injuries, were the most common injury to the head, face, and ears.
- Approximately 88 percent of the victims were treated at the hospital emergency department and then released. An estimated 11 percent of patients were treated and transferred to another hospital, or they were admitted to the hospital.
- CPSC staff conducted telephone follow-up investigations on a selected sample of fireworks-related injuries reported in NEISS during the special study period, to clarify information about the incident scenario or fireworks type. A review of data from the 10 in-scope completed follow-up investigations showed that most injuries were associated with misuse or malfunction of fireworks. Most victims recovered or were expected to recover completely. However, there was one victim who reported that their injuries might be long-term.

Enforcement Activities

During fiscal year 2022, CPSC's Office of Compliance and Field Operations continued to work closely with other federal agencies to conduct surveillance on consumer fireworks and to enforce the provisions of the Federal Hazardous Substances Act.

Approximately 43% percent of the selected and tested products were found to contain noncompliant fireworks. These noncompliant fireworks devices had a combined estimated import value of \$443,000. The violations consisted of fuse violations, presence of prohibited chemicals, burnout or blowout, and pyrotechnic materials overload. Compared to previous years, the percentage of tested products determined to be violative was significantly higher; CPSC will closely monitor fireworks-related violations to determine if the rate of noncompliance during fiscal year 2022 was anomalous.

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1. Introduction

This report describes injuries and deaths during calendar year 2022 associated with fireworks devices, as well as kits and components used to manufacture illegal fireworks. Reports for earlier years in this series can be found at: <https://cpsc.gov/Research--Statistics/Fuel-Lighters-and-Fireworks>.

This report is organized into seven sections. Section 1 describes the data and statistical methods used in this analysis. Section 2 summarizes the 2022 fireworks-related incidents that resulted in deaths. Section 3 provides an annual estimate of fireworks-related, emergency department-treated injuries in the United States for 2022, and it compares that estimate to previous years. Section 4 analyzes emergency department-treated, fireworks-related injuries during the month around July 4, 2022. Section 5 summarizes the telephone in-depth investigations of a subsample of the injury incidents that occurred during that period. Section 6 describes enforcement activities of CPSC's Office of Compliance and Field Operations (EXC) during fiscal year 2022. The report concludes with a summary of the findings in Section 7. Appendix A is a table depicting the relationship between fireworks-related injuries and fireworks imports between 2007 and 2022. Appendix B provides details on the completed telephone investigations.

Sources of Information

Staff obtained information on non-occupational, fireworks-related deaths during 2022 from CPSC's CPSRMS. CPSRMS combines data from CPSC's Injury or Potential Injury Incident File (IPII), Death Certificate File (DTHS), and In-Depth Investigation File (INDP) into one incident database. Entries in IPII come from a variety of sources, such as newspaper articles, consumer complaints, lawyer referrals, medical examiners, and other government agencies. CPSC staff from the Office of Compliance and Field Operations conducted in-depth investigations of the deaths to determine the types of fireworks involved in the incidents and the circumstances that led to the fatal injuries.

Because the data in IPII are based on voluntary reports, and because it can take more than 2 years to receive all the death certificates from the various states to complete the DTHS, neither data source can be considered complete for 2021 or 2022 fireworks-related deaths at the time this report was prepared. Consequently, the number of deaths should be considered a minimum. Staff updates the total number of deaths for previous years when new reports are received. Total deaths for prior years may not coincide with the number in reports for earlier years because of these updates.

The source of information on non-occupational, emergency department-treated fireworks-related injuries is CPSC's NEISS. NEISS is a probability sample of the U.S. hospitals with emergency departments.³ Injury information is taken from the emergency department record. This information includes the victim's age and sex, the place where the injury occurred, the emergency department diagnosis, the body part injured, and the consumer product(s) associated with the injury. The information is supplemented by a narrative of 140 to 400 characters⁴ in length and that often contains a brief description of how the injury occurred.

To supplement the information available in the NEISS record, CPSC staff conducts a special study of fireworks-related injuries every year during the month around July 4. Staff focus their efforts on fireworks incidents during this period because, in most years, about two-thirds to three-quarters of the annual injuries occur then. During this period, hospital emergency-department staff shows patients pictures of several types of fireworks to help them identify the type of fireworks device associated with their injuries. The type of fireworks involved in the incident are then included in the NEISS narrative. In 2022, the special study period lasted from June 17 to July 17.

After reading the incident case records, including the narrative descriptions of the fireworks device and the incident scenario, CPSC staff may assign a case for additional telephone investigation. Staff usually selects cases that involve the most serious injuries and/or hospital admissions. Serious injuries include eye injuries, finger and hand amputations, and head injuries. Cases also may be assigned to obtain more information about the incident than what is reported in the NEISS narrative. In most years, phone interviewers can collect information for one-fifth to one-half of the cases assigned. Information on the final status of the telephone interviews conducted during the 2022 special study is in Section 5 and Appendix B of this report.

In the telephone investigations, information is requested directly from the victim (or the victim's parent, if the victim is a minor) about the type of fireworks involved, where the fireworks were obtained, how the injury occurred, and the medical treatment and prognosis. When the fireworks device reported in the telephone investigation is different from what is reported in the NEISS emergency department record, the device reported in the telephone investigation is used in the data for this report.

As a result of this investigative process, three distinct levels of information may be available about a fireworks-related injury case. For cases that occur before or after the July 4 special study period, the NEISS record is almost always the only source of information. Many

³ For a description of NEISS, including the revised sampling frame, see Schroeder and Ault (2001). Procedures used for variance and confidence interval calculations and adjustments for the sampling frame change that occurred in 1997 are found in Marker, Lo, Brick, and Davis (1999). SAS® statistical software for trend and confidence interval estimation is documented in Schroeder (2000). SAS® is a product of the SAS Institute, Inc. Cary, NC. Lo, Brick, and Davis (1999). SAS® statistical software for trend and confidence interval estimation is documented in Schroeder (2000). SAS® is a product of the SAS Institute, Inc. Cary, NC.

⁴ The maximum available number of characters changed from 142 to 400 characters on January 1, 2019.

NEISS records collected outside the special study period do not specify the type of fireworks involved in the incident. Additional information is typically available during the special study period because the NEISS records collected by the emergency departments usually contain the type of fireworks and additional details on the incident scenario. Finally, the most information is available for the subset of the special study cases where staff conducted telephone investigations. These various levels of information about injuries correspond to these different analyses in the report:

- Estimated national number of fireworks-related, emergency department-treated injuries.

This estimate is made using NEISS cases for the entire year, from records where fireworks were specified as one of the consumer products involved. For cases outside the special study period, as noted above, there is usually no information on the fireworks type, and limited information is available on the incident scenario. Consequently, there is not enough information to determine the role played by the fireworks in the incident. Thus, the annual injury estimate may include a small number of cases in which the fireworks device was not lit, or no attempt was made to light the device. Calculating the annual estimates without removing these cases makes the estimates comparable to previous years.

- Detailed analyses of injury patterns

The tables are based on the special study period only, and they describe fireworks type, body part injured, diagnosis, age and sex of injured people, and other relevant information. Fireworks-type information is taken from the telephone investigation or the NEISS comment field when there was no telephone investigation. When computing estimates for the special study period, CPSC staff does not include cases in which the fireworks device was not lit, or no attempt was made to light the device.

- Information from telephone investigations

Individual case injury descriptions and medical prognosis information from the telephone investigations are provided in Appendix B. These summaries also exclude cases in which the fireworks device was not lit, or no attempt was made to light the device. These cases represent a sample of some of the most serious fireworks-related injuries and may not represent the typical emergency department-treated, fireworks-related injuries.

Statistical methods

Injuries reported by hospitals in the NEISS sample were weighted by the NEISS probability-based sampling weights to develop an estimate of total U.S. emergency department-treated, fireworks-related injuries for the year and for the special study month around July 4.

Confidence intervals were estimated, and other statistics were calculated using computer programs that were written to take the sampling design into consideration.⁵ Estimated injuries are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are shown with an asterisk (*). Percentages are calculated from the actual estimates. Percentages may not add to subtotals or to the total in the tables or figures, due to rounding.

This report also contains several detailed tables about fireworks-related injuries during the special study period. National estimates in these tables were also made using the sampling weights. To avoid cluttering the tables, confidence intervals are not included. Because the estimates are based on subsets of data, they have larger relative sampling errors (*i.e.*, larger coefficients of variation) than the annual injury estimate or the special study injury estimate. Therefore, interpretation and comparison of these estimates with each other, or with estimates from prior years, should be made with caution. For example, when comparing subsets of the data—such as between injuries associated with two different types of fireworks, or between two different age groups—it is difficult to determine how much of the difference between estimates is associated with sampling variability and how much is attributed to real differences in national injury totals.

2. Fireworks-Related Deaths for 2022

CPSC has reports of 11 non-occupational, fireworks-related deaths that occurred during 2022.⁶ Reporting of fireworks-related deaths for 2022 is not complete, and the number of deaths in 2022 should be considered a minimum. Brief descriptions of the incidents, using wording taken from the incident reports, follow:

- In January, a 21-year-old male was fatally injured from a fireworks blast outside of his home. The victim lit a mortar type firework when the device unexpectedly detonated early. The victim was struck in the right shoulder and was killed instantly. Emergency services were called and transported the victim to the hospital where the victim was pronounced dead. The official cause of death was not determined as the case is still under investigation.
- In January, a house explosion killed a 17-year-old male as well as one unidentified person. The two decedents were found dead at the scene. The blast also injured several others. The group of victims were utilizing explosives to create fireworks in the garage. The local fire chief stated that the ATF found numerous boxes (of materials) that the

⁵ See Schroeder (2000).

⁶ CPSC staff excludes incidents that are indirectly fireworks related. For instance, fireworks that start fires and lead to deaths are excluded based on the logic that the fire is solely responsible for the death.

victims ordered online. A neighbor was nearby and described the scene as “pure chaos.” The neighbor continued saying that she saw flames engulfing the home and a young boy and others running frantically. Investigators with the regional bomb and arson squad stated that the brick home’s garage was leveled and the home itself was a burned-out shell with a partial wall standing.

- In February, a 28-year-old male was fatally injured by an illegal mortar-style firework blast on a frozen lake. The victim was with friends celebrating the life of a friend who had passed away a year earlier. Four males went onto the ice to light the fireworks, two men stayed at a distance while the other two lit the fireworks. After the explosion, the victim was seen lying on the ice not moving. His friends tended to the victim while waiting for emergency services to arrive. The victim was pronounced deceased at the scene. Emergency services stated that the victim had major injuries on the right side of his upper torso extending from chest to the head. The official cause of death was “Traumatic Injuries of Head, Neck, Chest, and Right Upper Extremity” and ruled accidental. The victim’s friends admitted to consuming alcohol on the day of the event.
- In June, a 26-year-old male was fatally injured while shooting off rocket type fireworks on the shore of a bay. The victim was celebrating a friend’s graduation when he successfully shot a firework into the air. He then lit a second device which did not go off. The victim examined the malfunctioning device when it detonated. The victim collapsed immediately. One of the party goers picked up the victim, carried him to a car, and administered first aid in the back seat while another drove to the emergency room. At the hospital, another unexploded firework was found in the pocket of the victim’s pants. The victim remained in critical condition for over three days before being removed from life support and being pronounced dead.
- In July, an 11-year-old male was fatally injured while shooting off fireworks with a group of adults. The victim was holding a lit mortar-type device above his head. The shell exited the bottom of the mortar and entered the victim’s skull. The mother of the victim was present during the incident and stated that she held her son’s broken skull and brain in her hands. Emergency services arrived and were transporting the victim to a local high school parking lot for air transport. The victim was pronounced deceased before the air transport arrived. Detectives believe that the device was loaded correctly, and that the device malfunctioned. The official cause of death is listed as “Open head injuries due to fireworks mortar.”
- In July, a 43-year-old male was fatally injured when lighting off fireworks during a party. Eyewitnesses of the event indicated that the victim was lighting a mortar-style device when the tube tipped over and shot directly at the victim. A party attendee attempted lifesaving efforts. Emergency responders transported the victim to a local hospital where further lifesaving efforts were unsuccessful. The victim was pronounced dead with an

official cause of death of “Traumatic cardiac arrest due to explosive injuries to the head and neck due to unsafe firework use.”

- In July, an 18-year-old male was fatally wounded when lighting of a mortar-style fireworks device at a park. One of the victim’s friends had lit a couple of artillery style fireworks while holding the tube in his hand with no incident. Witnesses stated that the victim held the tube in both hands near his face and chest when the mortar exploded in his hands. Following the explosion, the victim made a groaning noise and immediately fell to the ground. The victim’s friends called emergency services and began performing CPR. Emergency services arrived at the scene and transported the victim to the hospital where he was pronounced deceased on arrival. The victim and friends were consuming alcohol at the time of the event.
- In July, a 42-year-old male was killed while lighting a mortar-style firework device at a celebration at a friend’s house. The victim was holding the launching tube in his hand and lifted the lit device above his head when a huge explosion occurred. The victim fell to the ground and was unconscious immediately. The victim sustained a large hole in the side of his neck and body cavity. Nearby family members attempted to stop the bleeding while waiting for emergency services to arrive. Emergency responders transported the victim to the hospital where he was declared deceased on arrival. The arson chief believes it is a possibility that the victim inadvertently loaded the mortar canister upside down in the launch tube. The victim was consuming alcohol at the time of the event.
- In July, and 18-year-old male was fatally wounded after lighting a mortar style firework in a park. Police reported that the victim was struck by the mortar which killed the victim instantly. The medical examiner listed the official cause of death as “Multiple blast-related injuries to the head and neck, decapitation, avulsion of brain, multiple calvarial and basilar skull fractures, facial fractures, and cervical vertebrae fractures. Fractures of maxilla and mandible, multiple lacerations of the tongue, cutaneous abrasions, contusions, and lacerations. Injuries to the torso, bilateral rib fractures and fracture of the sternum and cutaneous abrasions, contusions, and lacerations of extremities.” No other information regarding the incident was provided.
- In July, a 42-year-old male was killed when lighting off fireworks in the street near his home. Nearby witnesses claimed that the victim lit a mortar-style device and placed the mortar tube on top of his own head. When the device detonated the victim instantly fell to the ground. A witness checked on the victim and noticed that he had severe wounds to his hands and head. When emergency personnel arrived at the scene the victim was pronounced deceased. Alcohol was being consumed at the time of the incident.
- In July, a 41-year-old male was killed by a lit firework device which struck the victim in the torso, causing severe abdominal injuries at his home. Emergency services were

contacted, and the victim was transported to the local hospital. Doctors pronounced the victim deceased a brief time after his arrival.

Including the 11 deaths described above, CPSC staff has reports of 162 fireworks-related deaths between 2007 and 2022, for an average of 10.1 deaths per year.⁷

3. National Injury Estimates for 2022

Table 1 and Figure 1 present the estimated number of non-occupational, fireworks-related injuries treated in U.S. hospital emergency departments between 2007 and 2022.

⁷ See previous reports in this series (e.g., the report for 2021: Smith, Marier and Timian (2022)). In the most recent three years, the number of deaths included 20 deaths in 2019, 24 deaths in 2020, and 15 deaths in 2021. The data from 2019 to 2021 have been updated based on new incident reports received by CPSC staff during 2022 and may differ from previous reports.

Table 1

Estimated Fireworks-Related, Emergency Department-Treated Injuries: 2007-2022

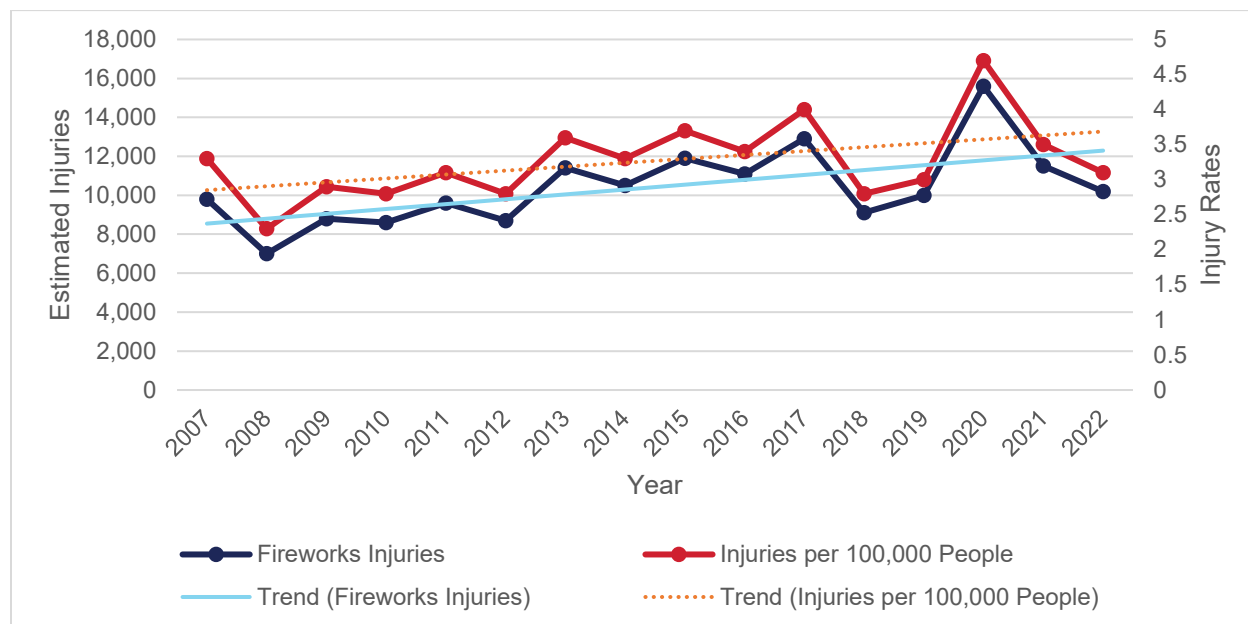
Year	Estimated Injuries	Injuries per 100,00 People
2022	10,200	3.1
2021	11,500	3.5
2020	15,600	4.7
2019	10,000	3.0
2018	9,100	2.8
2017	12,900	4.0
2016	11,100	3.4
2015	11,900	3.7
2014	10,500	3.3
2013	11,400	3.6
2012	8,700	2.8
2011	9,600	3.1
2010	8,600	2.8
2009	8,800	2.9
2008	7,000	2.3
2007	9,800	3.3

Source: NEISS, U.S. Consumer Product Safety Commission. [Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020, to July 1, 2022 \(NST-EST2022-POP\)](#). Population Estimates for 2010 to 2020 are from [Annual Estimates of the Resident Population for the United States, Regions, States, the District of Columbia, and Puerto Rico: April 1, 2010 to July 1, 2019; April 1, 2020; and July 1, 2020 \(NST-EST-2020\)](#). Population estimates for 2007 to 2009 are from Table 1. [Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000, to July 1, 2009 \(NST-EST2009\)](#). Population Division, U.S. Census Bureau

There is a statistically significant increasing trend in the fireworks-related injury estimates from 2007 through 2022 ($p\text{-value} < 0.0001$).⁸ The slope of the fitted trend line shows an increase of about 535 injuries per year. In calendar year 2022, there were an estimated 10,200 fireworks-related, emergency department-treated injuries (95 percent confidence interval 7,800 – 12,500). There were an estimated 11,500 such injuries in 2020. The difference between the injury estimates for 2021 and 2022 is not statistically significant ($p\text{-value} = 0.2871$).

⁸ For details on the method to evaluate a trend that incorporates the sampling design, see Schroeder (2000) and Marker et al. (1999).

Figure 1: Estimated Fireworks-Related, Emergency Department-Treated Injuries: 2007-2022



Source: NEISS, U.S. Consumer Product Safety Commission. [Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020, to July 1, 2022 \(NST-EST2022-POP\)](#). Population Estimates for 2010 to 2020 are from [Annual Estimates of the Resident Population for the United States, Regions, States, the District of Columbia, and Puerto Rico: April 1, 2010 to July 1, 2019; April 1, 2020; and July 1, 2020 \(NST-EST-2020\)](#). Population estimates for 2007 to 2009 are from Table 1. [Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000, to July 1, 2009 \(NST-EST2009\)](#). Population Division, U.S. Census Bureau

Appendix A contains a table showing estimated fireworks-related, emergency department-treated injuries and fireworks imports between 2007 and 2022.

Table 2 shows that each year, the number of victims treated are mostly white, followed by victims of an unknown race, Black victims, and victims of some other race. The “other” race category contains Asian, Pacific Islander/Native Hawaiian, and American Indian/Alaskan Native individuals and multiracial individuals. CPSC began collecting ethnicity information in 2018, which includes information about whether a victim is Hispanic; as a result, ethnicity information cannot be included at this time for the full 2007-2022 period. However, for 2022 alone, there were 6,400 injuries where the victim did not identify as Hispanic (62.7% of total), 800 injuries where the victim identified as Hispanic (7.8% of total), and 3,000 injuries where the victim’s ethnicity was unknown (29.4% of total).

Figure 2 shows the trend by race across years; there is a statistically significant upward trend for both white victims ($p = 0.0019$) as well as Black victims ($p = 0.0132$), but not for “other” race victims ($p = 0.9549$). Between the years 2021 and 2022, there was no significant change in

the number of white victims ($p=0.5913$) and neither Black nor “other” race victims experienced a significant change.

When comparing the proportion of victims with a known race to the US population,⁹ there were proportionately fewer white victims (69.9% of victims, 75.6% of the U.S. population identifies as white), proportionately more black victims (20.5% of victims, 13.6% of the U.S. population identifies as black), proportionately less victims associated with an “other” race (9.6% of victims, 10.8% of the U.S. population identifies as another race). These percentages are calculated using only the victims where race was collected. Victims with unknown race values accounted for over 27.5% of all fireworks incidents in 2022.

⁹ [*Total U.S. Population race estimates obtained from Monthly Population Estimates for the United States: April 1, 2020 to December 1, 2023 \(NA-EST2022-POP\)*](#);

Table 2

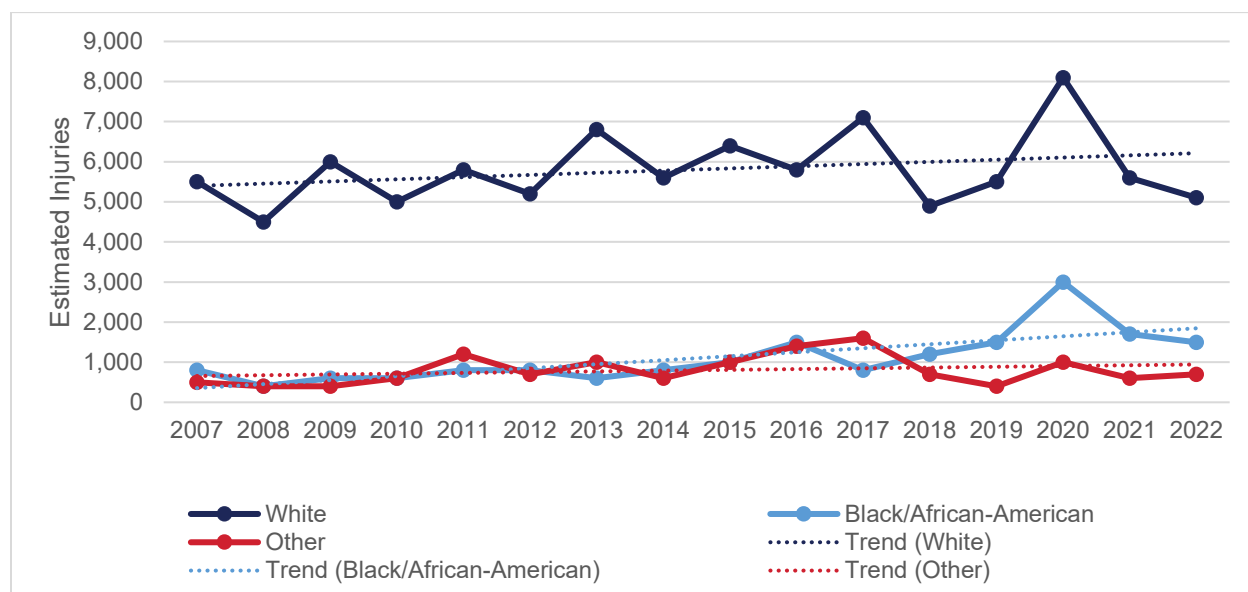
Estimated Fireworks-Related, Emergency Department-Treated Injuries by Race: 2007-2022

Year	White		Black/African American		Other		Unknown		Total
	N	%	N	%	N	%	N	%	N
2007	5,500	56.8	800	8.6	500	5.6	3,000	29.0	9,800
2008	4,500	63.8	400	6.4	400	5.9	1,700	23.9	7,000
2009	6,000	68.6	600	7.4	400	4.9	1,700	19.1	8,800
2010	5,000	58.4	600	7.1	600	6.6	2,400	27.9	8,500
2011	5,800	60.8	800	8.7	1,200	12.6	1,700	17.9	9,600
2012	5,200	59.6	800	8.8	700	10.0	1,900	21.6	8,700
2013	6,800	60.0	600	5.4	1,000	9.2	2,900	25.4	11,400
2014	5,600	52.9	800	7.8	600	5.5	3,600	33.8	10,500
2015	6,400	53.7	1,000	8.3	1,000	8.5	3,500	29.5	11,900
2016	5,800	51.9	1,500	13.3	1,400	12.4	2,500	22.4	11,100
2017	7,100	54.9	800	6.3	1,600	12.5	3,400	26.4	12,900
2018	4,900	53.7	1,200	12.7	700	8.0	2,400	25.7	9,000
2019	5,500	54.7	1,500	14.9	400	3.8	2,700	26.6	10,000
2020	8,100	51.5	3,000	18.7	1,000	6.7	3,600	23.1	15,600
2021	5,600	49.1	1,700	14.7	600	5.2	3,600	31.0	11,500
2022	5,100	50.0	1,500	14.7	700	6.9	2,800	27.5	10,200

Source: NEISS, U.S. Consumer Product Safety Commission.

Race percentages do not match the previous paragraph's values, as incidents with unknown race values are included in the calculations for Table 2.

Figure 2: Estimated Fireworks-Related, Emergency Department-Treated Injuries by Race: 2007-2022



Source: NEISS, U.S. Consumer Product Safety Commission.

4. Injury Estimates for the 2022 Special Study: Detailed Analysis of Injury Patterns

The injury analysis in this section presents the results of the 2022 special study of fireworks-related injuries treated in hospital emergency departments between June 17, 2022, and July 17, 2022. During this period, there were an estimated 7,400 fireworks-related injuries (sample size=168, 95 percent confidence interval 5,300 – 9,600) accounting for 73 percent of the total estimated fireworks-related injuries for the year, which is not statistically lower than the estimated 8,500 fireworks-related injuries in the 2021 special study period (p-value = 0.3876).

The remainder of this section provides the estimated fireworks-related, emergency department-treated injuries from this period, broken down by fireworks device type, victims’ demographics, injury diagnosis, and body parts injured.

Fireworks Device Types and Estimated Injuries

Table 3 shows the estimated number and percent of emergency department-treated injuries by type of fireworks device during the special study period of June 17, 2022, to July 17, 2022.

Table 3

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Device Type: June 17–July 17, 2022

Fireworks Device Type	Estimated Injuries	Percent
Total	7,400	100%
All Firecrackers	1,300	18%
Small	200	2%
Illegal	500	6%
Unspecified	700	9%
All Rockets	400	6%
Other Rockets	300	5%
Bottle Rockets	100	1%
Other Devices	1,500	20%
Multiple Tube	100	1%
Reloadable	100	2%
Roman Candles	400	6%
Novelties	200	2%
Sparklers	600	8%
Helicopters	100	2%
Homemade/Altered	*	*
Public Display	100	2%
Unknown	4,100	55%

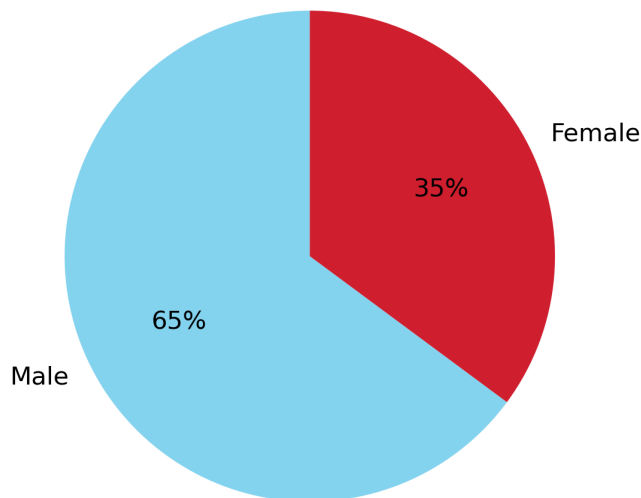
Source: NEISS, U.S. Consumer Product Safety Commission. Based on 168 NEISS emergency department-reported injuries between June 17, 2022, and July 17, 2022, and supplemented by 10 completed In-Depth Investigations. Firework types are obtained from the in-depth investigation, when available; otherwise, firework types are identified from information in victims' reports to emergency department staff that were contained in the NEISS narrative. Illegal firecrackers include M-80s, M-1000s, Quarter Sticks, and other firecrackers that are banned under CPSC's FHSA regulations (16 C.F.R. § 1500.17 (Banned hazardous substances)). Fireworks that may be illegal under state and local regulations are not listed as illegal unless they violate the CPSC's FHSA regulations. Estimates are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are denoted with an asterisk (*). Estimates may not sum to subtotal or total due to rounding. Percentages are calculated from the actual estimates, and they may not add to subtotals or the total due to rounding.

There were 100 fireworks-related injuries that took place at public firework displays during 2022. Unknown fireworks devices were associated with the most injuries during the 2022 special study period. Homemade/Altered devices were involved in less than 1 percent of the total estimated injuries during the 2022 special study period.

Gender and Age of Injured Persons

Males experienced an estimated 3.0 fireworks-related, emergency department-treated injuries per 100,000 individuals during the special study period. Females had 1.5 injuries per 100,000 people. Figure 3 shows the distribution of estimated fireworks-related injuries by gender.

Figure 3: Estimated Injuries by Gender: June 17 – July 17, 2022

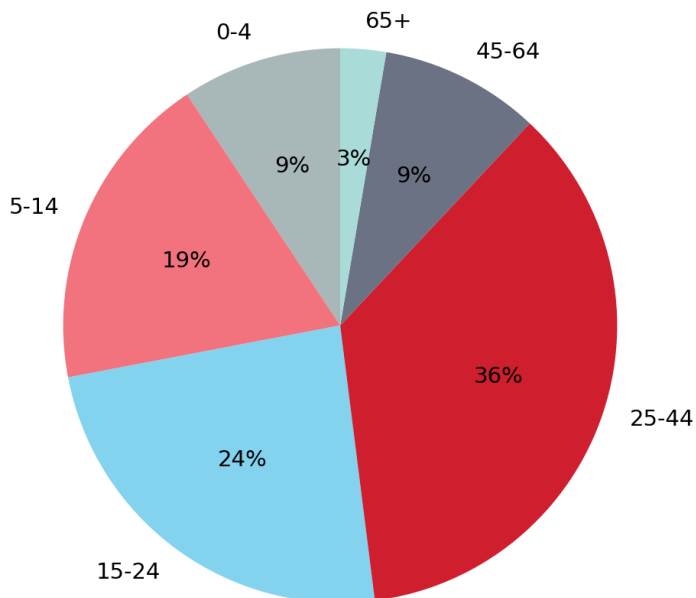


Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 17, 2022, and July 17, 2022.

Children under 5 years of age experienced an estimated 700 injuries (9.5 percent of all fireworks-related injuries during the special study period), as shown in Figure 4 and Table 4. Children in the 5- to 14-year-old age group experienced an estimated 1,400 injuries. Breaking

down that age group further, children 5 to 9 years of age had an estimated 600 injuries and children 10 to 14 years of age accounted for 800 injuries.¹⁰

Figure 4: Percentage of Injuries by Age Group: June 17 – July 17, 2022



Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between July 17, 2022, and July 17, 2022.

The detailed breakdown by age and gender is shown in Table 4. The concentration of injuries among males and people under 25 years of age has been typical of fireworks-related injuries for many years.

¹⁰ The percentages are calculated from actual injury estimates, and age subcategory percentages may not sum to the category percentage due to rounding.

Table 4

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Age and Gender: June 17–July 17, 2022

Age Group	Total	Per 100,000 People	Male	Female
Total	7,400	2.2	4,800	2,600
0-4	700	3.8	400	300
5-14	1,400	3.4	900	500
5-9	600	3.0	300	300
10-14	800	3.8	600	200
15-24	1,800	4.2	1,100	700
15-19	1,300	6.0	800	500
20-24	600	2.8	300	300
25-44	2,700	3.0	2,000	700
45-64	700	0.8	400	300
65+	200	0.4	100	100

Sources: NEISS, U.S. Consumer Product Safety Commission. [NC-EST2021-ALLDATA: Monthly Population Estimates by Age, Sex, Race, and Hispanic Origin for the United States: April 1, 2020 to July 1, 2021 \(With short-term projections to December 2022\)](#). Based on the special study between June 17, 2022, and July 17, 2022. The oldest victim was 79 years of age. Estimates are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are denoted with an asterisk (*). Age subcategory estimates may not sum to the category total due to rounding.

When considering injury rates (number of injuries per 100,000 people), children and young adults had higher estimated rates of injury than the other age groups during the 2022 special study period. Children aged 15 to 19 years had the highest estimated injury rate at 6.0 per 100,000 population. This was followed by 3.8 injuries per 100,000 people for both children 10 to 14 years of age and children ages 0 to 4 years. A general decrease is noted when comparing the 2022 rates to the 2021 rates, except for children 15 to 19 years of age which saw an increase from 2.9 injuries to 6.0 injuries per 100,000 people.

Age and Gender of the Injured Persons by Type of Fireworks Device

Table 5 shows the ages of those injured by the type of fireworks device associated with the injury. For children under 5 years of age, sparklers accounted for 29 percent of the total estimated injuries for that specific age group.¹¹ Unknown fireworks devices accounted for 55 percent of all injuries during the special study period.

No clear relationship between age and known fireworks type is suggested by the data in Table 5. It is worth noting that the number of estimated injuries does not completely represent the usage pattern because victims are often injured by fireworks used by other people. This is especially true for rockets and aerial shells (e.g., multiple tube and reloadable devices), which can injure people located some distance away from where the fireworks are launched.

¹¹ *The percentages are calculated from the actual injury estimates.*

Table 5

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Device Type and Age Group: June 17–July 17, 2022

Fireworks Type	Age Group						
	Total	0-4	5-14	15-24	25-44	45-64	65+
Total	7,400	700	1,400	1,800	2,700	700	200
All Firecrackers	1,300	*	200	400	600	100	*
Small	200	*	*	*	100	*	*
Illegal	500	*	*	100	300	100	*
Unspecified	700	*	200	300	200	*	*
All Rockets	400	*	*	100	300	100	*
Other Rockets	100	*	*	*	100	*	*
Bottle Rockets	300	*	*	100	200	100	*
Other Devices	1,500	300	600	200	300	*	*
Multiple Tube	100	*	*	*	100	*	*
Reloadable	100	*	100	*	*	*	*
Roman Candles	400	100	200	100	*	*	*
Novelties	200	*	100	100	*	*	*
Sparklers	600	200	300	*	100	*	*
Helicopters	100	*	*	*	100	*	*
Homemade/Altered	*	*	*	*	*	*	*
Public Display	100	100				100	
Unknown	4,100	300	600	1,100	1,500	400	100

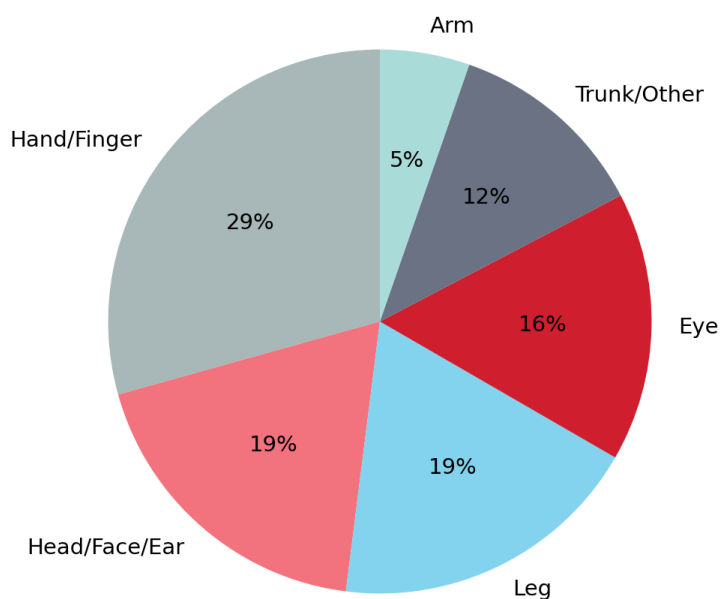
Sources: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 17, 2022, and July 17, 2022. Estimates are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are denoted with an asterisk (*). Age subcategory estimates may not sum to the category total due to rounding.

As shown previously in Figure 3, males accounted for 65 percent of the estimated fireworks-related injuries, and females comprised 35 percent. Both males and females were most often injured by an unknown fireworks device (57 percent for males, 51 percent for females).

Body Region Injured and Injury Diagnosis

Figure 5 presents the distribution of estimated emergency department-treated injuries by the specific parts of the body injured. Hands and fingers were associated with an estimated 2,200 injuries. These were followed by an estimated 1,400 injuries for both the head/face/ear region as well as the leg region; 1,200 eye injuries; 900 trunk/other injuries; and 400 arm injuries.

Figure 5: Body Regions Injured: June 17 – July 17, 2022

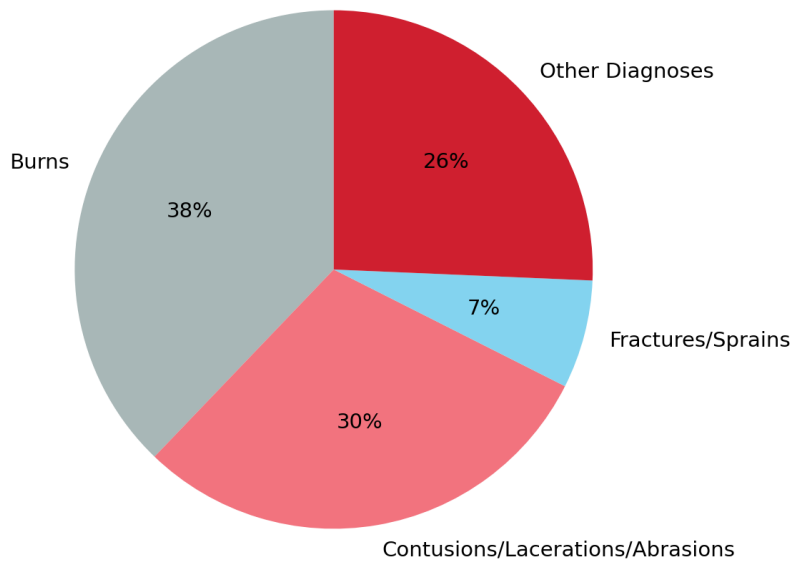


Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 17, 2022, and July 17, 2022. Arm includes NEISS codes for upper arm, elbow, lower arm, shoulder, and wrist. Head/Face/Ear regions include eyelid, eye area, nose, neck, and mouth but not the eyeball. Leg includes upper leg, knee, lower leg, ankle, foot, and toe. Trunk/other regions includes chest, abdomen, pubic region, "all parts of body," internal, and "25-50 percent of body."

Figure 6 shows the diagnoses of the estimated injuries associated with fireworks devices. Burns were associated with 2,800 estimated injuries and was the most frequent diagnosis. Contusions, lacerations, and abrasions were associated with 2,200 estimated

injuries. Fractures and sprains accounted for 500 estimated injuries. All other diagnoses accounted for 1,900 estimated injuries¹²

Figure 6: Types of Injuries: June 17 – July 17, 2022



Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 17, 2022, and July 17, 2022. Fractures and sprains also include dislocations. “Other diagnoses” include all other injury categories. Percentages may not sum to 100 due to rounding.

As shown in Table 6, burns accounted for over half (59 percent) of the injuries to hands/fingers. As a single-diagnosis category, burns caused the most injuries to trunk/other regions, arm region, and Leg region. Contusions and lacerations were the most frequent injuries to the head/face/ear regions. Other diagnoses were most associated with injuries in the eye region.

¹² Estimated injuries may not sum to the total due to rounding. Percentages are calculated from the actual injury estimates.

Table 6

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Body Region and Diagnosis: June 17–July 17, 2022

Body Region	Total	Diagnosis			
		Burns	Contusions/ Lacerations	Fractures/ Sprains	Other Diagnoses
Total	7,400	2,800	2,200	500	1,900
Arm	400	300	200	*	*
Eye	1,200	*	500	*	700
Head/Face/Ear	1,400	200	800	100	200
Hand/Finger	2,200	1,300	200	200	500
Leg	1,400	600	300	100	300
Trunk/Other	900	400	200	*	200

Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 17, 2022, and July 17, 2022. Fractures and sprains also include dislocations. "Other diagnoses" include all other injury categories. Estimates are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are denoted with an asterisk (). Estimated injuries may not sum to subtotals or totals due to rounding.*

Types of Fireworks Devices and Body Regions Injured

Table 7 presents estimated injuries by the type of fireworks device and body region injured.

Table 7

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Type of Fireworks Device and Body Region Injured: June 17–July 17, 2022

Fireworks Type	Total	Region of the Body Injured					
		Arm	Eye	Head/Face/ Ear	Hand/Finger	Leg	Trunk/ Other
Total	7,400	400	1,200	1,400	2,200	1,400	900
All Firecrackers	1,300	100	200	100	500	200	100
Small	200	*		100	*	*	*
Illegal	500	100	100	*	200	100	*
Unspecified	700	*	100	*	300	100	100
All Rockets	400	*	*	100	100	200	*
Other Rockets	100	*	*	*	*	100	*
Bottle Rockets	300	*	*	100	100	100	*
Other Devices	1,500	*	200	100	800	200	200
Multiple Tube	100	*	*	*	*	100	*
Reloadable	100	*	100	*	*	*	*
Roman Candles	400	*	100	100	300	*	*
Novelties	200	*	*	*	200	*	*
Sparklers	600	*	*	*	300	100	100
Helicopters	100	*	*	*	*	*	100
Homemade/Altered	*	*	*		*	*	*
Public Display	100	*	*	100	*	100	*
Unknown	4,500	300	800	1,000	900	600	600

Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 17, 2022, and July 17, 2022. Estimates are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are denoted with an asterisk (*). Estimated injuries may not sum to subtotals or totals due to rounding.

Most injuries resulted from fireworks devices of an unknown type; this uncertainty results from victims' (or parent/guardians') inability to identify the firework device that injured them, when asked.

Hospital Treatment

An estimated 88 percent of the victims of fireworks-related injuries in the special study period were treated at the emergency department and then released; about 5 percent of the victims were admitted to the hospital. Approximately 5 percent of the victims were treated and then transferred to another hospital. The remaining 2 percent of victims had other dispositions (*i.e.*, left the hospital without being seen or were held for observation).¹³ The percentage of victims that were treated and admitted, held for observation, or left without being seen for fireworks-related injuries was lower than for all consumer products in 2022. The percentages of those “treated and released” and “treated and transferred” and were higher for the fireworks-related injuries in the special study period than those for all consumer products.

For all injuries associated with consumer products in 2022, 85 percent of patients were treated and released; 10 percent were admitted to the hospital; 1 percent of patients were transferred to other hospitals; and 4 percent had other dispositions, including left hospital without being seen, held for observation, or deceased on arrival.¹⁴

5. Telephone Investigations of Fireworks-Related Injuries

CPSC staff conducted in-depth telephone investigations of a sample of fireworks incidents that occurred during the 1-month special study period surrounding the 4th of July holiday (June 17, 2022, to July 17, 2022). Completed telephone investigations provided more detail about incidents and injuries than the emergency department information summarized in the narrative in the NEISS record. During the telephone interview, respondents were asked how the injury occurred (hazard pattern); what medical care they received following the emergency-department treatment; and what long-term effects, if any, resulted from their injury. Respondents were also asked detailed questions about the fireworks involved in the incident, including their type, markings, and where they were obtained.

¹³ The percentages are calculated from actual injury estimates and may not sum to 100 due to rounding.

¹⁴ Comparisons are calculated using actual injury estimates and differences may not appear due to rounding.

Cases were selected for telephone investigations based on the information provided in the NEISS narrative and coded information in the NEISS records. The selection criteria included: (1) unusual hazard patterns, (2) severity of the injury, and (3) lack of clear information in the narrative about the type of fireworks associated with the injury. For these reasons, and because many victims did not respond, the telephone investigation cases cannot be considered typical of fireworks-related injuries.

From the 171-emergency department-treated, fireworks-related injuries during the special study period, staff selected 91 cases for telephone investigations, of which 10 were completed and determined to be in scope, 1 was completed and determined to be out of scope, and 80 were incomplete. Table 8 shows the final status of these investigations, including the reasons why some investigations were incomplete.

Table 8
Final Status of Telephone Investigations

Final Case Status	Number of Cases	Percent
Total Assigned	91	100
Completed Investigation	11	12
In Scope	10	11
Out of Scope	1	1
Incomplete Investigation	80	88
Failed to Reach Patient	41	45
Victim Name Not Provided by Hospital	31	34
Victim Refused to Cooperate	8	9

Short descriptions of the 10 completed in-scope cases are found in Appendix B. The cases are organized in order of emergency department disposition, with Admitted (to the hospital) first, followed by Treated and Released, and Left without Being Seen by a Doctor. Within dispositions, cases are in order of increasing age of the victim.

Summary Statistics

Of the 10 completed in-scope cases, 7 involved males, and 3 involved females. There were four victims aged 5 to 14 years old; four victims aged 15 to 33 years old; and two victims

aged 34 to 59. Two victims were admitted to the hospital, seven victims were treated and released, and one victim left without being seen.

The fireworks devices consisted of four reloadable aerial shells,¹⁵ one roman candle, one small firecracker, one novelty device, and three unspecified devices.

The distribution of the types of fireworks and the emergency department dispositions differs from the special study data in Section 4. These differences reflect the focus in the telephone investigations into more serious injuries and incomplete NEISS records. Twelve percent of the victims selected for the telephone interviews completed the survey.

Hazard Patterns

The hazard patterns described below are based on the incident descriptions obtained during the telephone investigations and summarized in Appendix B. When an incident had two or more hazard patterns, staff selected the hazard pattern most likely to have caused the injury. Hazard patterns are presented in Table 9 below, and a detailed description of the incidents follows Table 9. Case numbers refer to the case numbers shown in Appendix B.

Table 9

Hazard Patterns as Described in Telephone Investigations for Fireworks-Related Injuries

Hazard Pattern	Number of In-scope Cases	Percent of Total
Total Cases	10	100%
Malfunction	5	50%
Misfire	3	30%
Errant Flightpath of Debris	2	20%
Misuse	5	50%
Improper Preparation	5	50%

¹⁵ The category “aerial shells” includes multiple tube, reloadable mortars, and rockets, but excludes bottle rockets.

Malfunction (5 Victims, 50 percent of total)

Misfire

- Case 1: A 19-year-old male victim was with friends when they decided to set off a roman candle-type device. Once the victim lit the device it immediately exploded hitting the victim in the face. The victim went back to his car and witnesses took him to the emergency department. Once arriving plans were made to transfer the victim to a nearby hospital that was better equipped for the emergency eye surgery the victim needed. The victim underwent eye surgery which involved the layers of his cornea being peeled back to clean out the debris. The victim also had a cut on his forehead that required stitches. The victim fully recovered from the eye surgery after two weeks and the injury to his forehead healed after 1 month. There are no long-term consequences expected because of the incident.
- Case 2: A 49-year-old male victim was lighting a mortar-style device when the firework shot out of the side of the tube. The victim was taken to the emergency department where he was treated for a grade 5 liver blast injury, right colon contusions, diaphragm injury, right lung contusions, blast injury to both hands, and hemorrhagic shock. The victim lost his right thumb, two ribs, and his spleen because of the event. The victim's wounds were cleaned, stitched, and cast by medical professionals. The victim reported that his wounds took 6 months to heal properly.
- Case 7: A 23-year-old male victim was lighting a multiple tube device when the firework immediately detonated. The device blew up in the victim's face and burned his hands and right arm. The victim attempted to treat himself with over-the-counter products but decided to go to the emergency department the next morning. Once there, emergency personnel cut the burns open and cleaned and bandaged the area. The victim saw a burn specialist three days later and was given cream and an antibiotic for the wounds. He was also supplied with bandages, wraps, and an arm band to protect the wound from sun exposure. The victim returned to the burn specialist weekly to change bandages, clean the wounds, and refill prescriptions. The victim fully recovered after 3 months. The victim has no long-term consequences besides a lighter complexion to the healed burn wounds.

Errant Flightpath of Debris

- Case 6: A 13-year-old female victim was with family watching neighbors set off fireworks. The victim was approximately 8 feet away from the device when she felt a "little pinch" on her left leg. It is believed that lit debris fell from the sky and landed on the victim's leg, although she had long sweatpants on. The victim was taken to the emergency department where medical professionals cleaned and wrapped the wound.

The victim's parents stated that it took 6 months for the injuries to fully heal. The victim is not expected to suffer long term consequences from the event.

- Case 10: A 33-year-old female victim was at a sporting event where they were performing a firework show after the game. The victim was looking up at the fireworks when debris landed into her eyes. The victim left the area and went to get help and water. Flushing the debris did not help and the victim went to the emergency department. Medical professionals dilated both eyes and gave numbing drops to the victim. The victim's eyeball lens was inspected for damage. Medical professionals prescribed medication for the damage to both corneas. The victim was discharged and was told not to rub their eyes and not to drive until the eye fully healed. The victim stated that it took them 5 days to recover from their injuries. The victim is not expected to suffer long term consequences from the incident.

Misuse (5 Victims, 50 percent of total)

Improper Preparation

- Case 3: A 5-year-old male victim was helping their father light an unknown firework device when a foreign body entered his eye from the sparks. The victim was taken to the emergency department where medical professionals flushed and examined the eye. It was determined that no damage occurred, and the victim was released. The victim's parents stated that the injury fully healed in less than 24 hours. The victim is not expected to suffer long term consequences from the incident.
- Case 4: A 6-year-old male victim was with an older sibling when they found small firecracker devices. The older child put two of the devices together and topped them with gunpowder and told the victim to light the devices. The parent, who was not present, saw the victim rubbing his face and saw the skin peeling off. The mother brought the child inside and threw cold water in his face and called 911. Paramedics arrived and took the victim to the emergency department. At the emergency department the victim was given pain medication as well as burn cream to apply to the wounds at home. The mother stated that it took about a week for the skin to heal and a month for the victim's eyelashes to grow back. The mother stated that the injuries are no longer visible, and no long-term consequences are expected.
- Case 5: A 14-year-old male victim lit a smoke bomb device in his hand when it exploded. The victim was in pain and immediately ran to his grandmother. The grandmother put cold water on the injury and called the victim's mother. When the mother arrived, she placed an ice pack on the injury and drove the victim to the hospital. At the hospital medical professionals gave the victim pain medication and cleaned the wound and was released. The victim attended physical therapy twice to "stretch" the skin around the

thumb to maintain full mobility. The victim is not expected to suffer long term consequences from the incident.

- Case 8: A 24-year-old male victim lit a rocket-type device and threw it on the ground. Upon detonation the device went “the wrong direction” and went up the victim’s pant leg. The victim suffered burns to his right leg between the knee and inner thigh. The victim went to the emergency department and was examined by medical professionals. Medical personnel determined that there was no obvious permanent damage, and the victim was released. The victim is not expected to suffer any long-term consequences.
- Case 9: A 42-year-old female was watching friend’s light fireworks and was walking around. While she was walking, she heard “Watch out!” but was not able to react quick enough. The unknown device struck the victim in the lower leg. The victim stated that the wound felt hot while in the shower. She rubbed a topical cream in the injury and went to the emergency department. Emergency personnel placed gel strips on the wound and instructed the victim to visit complex care the following day to receive treatment for her first- and second-degree burns. After visiting complex care, they instructed her to come in daily to change the bandage/dressing until it was fully healed, which took three weeks. The victim is not expected to suffer any long-term consequences besides the scarring on the injury site.

Long Term Consequences of Fireworks-Related Injuries

Respondents were asked if there were any long-term consequences of their injuries. Eight of the ten victims (80 percent of the total) experienced or expected complete recovery, with no long-term consequences. However, two victims described their expected long-term adverse consequences:

- Case 2: A reloadable aerial shell device struck the victim’s chest. The victim lost a thumb, two ribs and their spleen because of the incident.
- Case 9: An unknown device hit the victim in the lower leg. The victim suffered long-term scarring because of her first- and second-degree burns.

Where Fireworks Were Obtained

Of the 10 telephone survey respondents, four knew where the fireworks were obtained. Two respondents stated that the fireworks were purchased from a store and two respondents state that the fireworks were purchased from a stand that exclusively sells fireworks.

Six of the 10 respondents did not know the source of the fireworks. This is typically the case when the respondent did not purchase the firework that caused injury.

6. Enforcement Activities

During fiscal year 2022, CPSC's Office of Compliance and Field Operations continued to work closely with other federal agencies to conduct surveillance on consumer fireworks and to enforce the provisions of the Federal Hazardous Substances Act.

Approximately 43% percent of the selected and tested products were found to contain noncompliant fireworks. These noncompliant fireworks devices had a combined estimated import value of \$443,000. The violations consisted of fuse violations, presence of prohibited chemicals, burnout or blowout, and pyrotechnic materials overload. Compared to previous years, the percentage of tested products determined to be violative was significantly higher; CPSC will closely monitor fireworks-related violations to determine if the rate of noncompliance during fiscal year 2022 was anomalous.

7. Summary

In the calendar year 2022, there were 11 reported non-occupational fireworks-related deaths. However, reporting for 2022 may not be complete at this time. There were an estimated 10,200 fireworks-related emergency department-treated injuries for calendar year 2022.

During the 1-month special study period from June 17, 2022, to July 17, 2022, there were an estimated 7,400 emergency department-treated fireworks-related injuries. Adults aged 25 to 44 years of age experienced about 36 percent of the estimated injuries, and males of all ages experienced 65 percent of the estimated injuries, up from 59 percent in 2021.

Additionally, 26 percent of the estimated injuries during the special study period involved an injury diagnosis of "Other" which included debris landing in the eye, the device striking the eye, potential hearing loss, etc. The estimated injuries were evenly distributed with regards to the body part that was affected, although the hand/finger region accounted for the highest amount accounting for 29 percent. Thirty-eight percent of the estimated injuries during the special study period involved burns. Burns were the most common injury to hands/fingers, arms, legs, as well as the trunk/other region. The parts of the body most often injured were hands and fingers (an estimated 30 percent of the injuries); followed by head, face, and ears (19 percent);

legs (19 percent); eyes (16 percent); trunk/unspecified (12 percent); and arms (5 percent).¹⁶ Most of the estimated injuries (88 percent) were treated-and-released. An estimated 10 percent were treated and transferred to another hospital or admitted to the hospital where the emergency department was located. The remaining 2 percent of victims had other dispositions (*i.e.*, left the hospital without being seen or were held for observation).

Among the diverse types of fireworks, sparklers were involved in 8 percent of the estimated injuries during the special study period; this is a decrease from 13 percent in 2021. Firecrackers were involved in 18 percent, rocket-type devices as well as roman candles both accounted for 5 percent of injuries, novelties were associated with 3 percent of injuries, and reloadable tube devices, multiple tube devices, helicopters, and public displays were all associated with 1 percent of injuries each. Most fireworks-related injuries, 61 percent, were associated with unknown firework device types.¹⁷

A review of data from telephone follow-up investigations showed that the typical causes of injuries were due to both the malfunction and misuse of fireworks. At the time of the telephone investigation, which was conducted typically 1 to 2 months after the injury, most victims had recovered from their injuries. Two of the 10 respondents interviewed reported that the injury will be long term.

Finally, in fiscal year 2022, CPSC staff continued to actively monitor import shipments of fireworks and products in the marketplace. CPSC staff worked with the U.S. Customs and Border Protection agency to sample imported fireworks. Compliance staff conducted inspections at fireworks retailers to collect samples for analysis and testing for compliance with mandatory requirements.

¹⁶ *The percentages are calculated from actual injury estimates and may not sum to 100 due to rounding.*

¹⁷ *The percentages are calculated from actual injury estimates and may not sum to 100 due to rounding.*

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Appendix A

Fireworks-Related Injuries and Imported Fireworks

Table 10 reports the total estimated number of injuries per 100,000 pounds of imported fireworks. Table 10 shows an average of 258.7 million pounds of fireworks were imported each year between 2007 and 2022, with a standard deviation of 72.1 million pounds. Between 2007 and 2010, the number of imports declined from a peak of 260.1 million pounds in 2007 to a low of 199.6 million pounds in 2010. From 2011 to 2014, the number of imports was relatively steady with modest changes for some years. In 2015, fireworks imports reached their highest level since 2005, with an estimated 279.5 million pounds. Since 2015, the imports have remained relatively high compared to the 2008 to 2014 period. The year 2021 had 415.9 million pounds of imports. This 2021 value surpassed the previous high of 277.5 million pounds in 2018 by 138.4 million pounds. In 2022, the gross weight import value stands at 449.1 million pounds. This surpasses the previous high over the last 15 years (2021) by over 33 million pounds.

As for the number of estimated emergency department-treated fireworks-related injuries, 2018, with 9,100 injuries, had the lowest since 2013. The highest three annual estimated fireworks-related injuries were 15,600 in 2020, 12,900 in 2017, and 11,900 in 2015. The 2022 total of 10,200 fireworks-related injuries was the eighth highest number of injuries in the 2007-2022 period.

As shown in Table 10 below, the estimated number of injuries per 100,000 pounds of fireworks imported was 2.3 in 2022. The 2022 value is the smallest estimated number of injuries per 100,000 pounds of fireworks in the 15-year period. The highest three estimated number of injuries per 100,000 pounds of fireworks were 6.3 injuries in 2013, 6.1 in 2020, and 5.2 injuries in 2017. The large decrease in injuries per 100,000 pounds of fireworks for 2022 stemmed from the substantial increase in overall imports. 2022 experienced the largest number of fireworks imports in the 15-year period with 33.7 million pounds of imports more than the second largest (2021) and 169.6 million pounds of imports more than the third largest (2015).

Table 10 should be interpreted with caution. First, while there may be a relationship between the number of fireworks devices and estimated injuries resulting from fireworks, the number of imported fireworks is not available. Table 10 uses the total import weight as an approximation for the number of fireworks devices.

Second, the total import weight over-represents heavy devices and under-represents light devices. A heavy device may not be more dangerous than a light device because a firework's weight includes things other than just the amount of explosive material.

In addition, international trade statistics do not provide weight by fireworks device types. It is not possible to associate injuries with the weight of distinct types of imported fireworks. As shown in Table 2 earlier in this report, different fireworks devices are associated with different numbers of injuries. Thus, the decrease in injuries per 100,000 pounds between 2014 and 2016 may be due to different mixtures of types of fireworks imported over time or an overall decrease in injuries

among all types of fireworks. Similarly, the increase in injuries per 100,000 pounds in 2013 may have resulted from different fireworks mixtures, a decrease in importation of fireworks, or just statistical variation. The data do not provide enough information to determine the relative contribution of these factors.

Table 10

Estimated Fireworks-Related Injuries and Estimated Fireworks Imported into the United States by Weight: 2007-2022

Year	Estimated Injuries	Estimated Fireworks Imports (millions of pounds)*	Injuries Per 100,000 Pounds of Fireworks Imported
2022	10,200	449.1	2.3
2021	11,500	415.4	2.8
2020	15,600	255.0	6.1
2019	10,000	256.5	3.9
2018	9,100	277.5	3.3
2017	12,900	247.0	5.2
2016	11,100	262.4	4.2
2015	11,900	279.5	4.3
2014	10,500	219.6	4.8
2013	11,400	180.2	6.3
2012	8,700	201.0	4.3
2011	9,600	228.1	4.2
2010	8,600	199.6	4.3
2009	8,800	200.2	4.4
2008	7,000	208.3	3.4
2007	9,800	260.1	3.8

Source: Injuries from NEISS, U.S. Consumer Product Safety Commission. See Table 1 for further details. Estimated fireworks imports data from the U.S. International Trade Commission (ITC), using Harmonized Tariff Schedule (HTS code 3604.10). Imports include consumer fireworks (1.4G HTS codes 3604.10.90.10 and 3604.10.90.50) and display fireworks (1.3G HTS code 3604.10.10.00). Display fireworks were about 4.1 percent of the total imports in 2022. In addition to imported fireworks used in the United States, there is also a small number of fireworks manufactured in the United States for domestic consumption; the data for these fireworks is not available from ITC and is not shown in this table.

*Fireworks imports data were downloaded from the ITC website in May 2023. Fireworks imports data subject to change by ITC. These changes have typically been minor.

Appendix B

Telephone Investigations

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Narrative	Medical Treatment and Prognosis	Long Term Consequences	Hazard	Source
1	19	M	Laceration	Face	Treated and admitted for hospitalization	Roman Candle	The victim was with friends when they decided to set off a roman candle-type device. Once the victim lit the device it immediately exploded hitting the victim in the face. The victim went back to his car and witnesses took him to the emergency department. Once arriving plans were made to transfer the victim to a nearby hospital that was better equipped for the emergency eye surgery the victim needed.	The victim had emergency eye surgery involving the layers of the Cornea being peeled back for cleaning. The victim was also given stitches for the cut on their forehead.	No long-term consequences.	Malfunction , Misfire	Unknown
2	49	M	Internal Organ Injury	Upper Trunk	Treated and admitted for hospitalization	Reloadable Aerial Shell	The victim was lighting a mortar-style device when the firework shot out of the side of the tube. The victim was taken to the emergency department where he was treated for a grade 5 liver blast injury, right colon contusions, diaphragm injury,	The victim's wounds were cleaned, stitched, and casted by medical professionals.	The victim lost a thumb, two ribs, and their spleen.	Malfunction , Misfire	Fireworks Stand

							right lung contusions, blast injury to both hands, and hemorrhagic shock.				
3	5	M	Foreign Body	Eyeball	Treated and released	Reloadable Aerial Shell	The victim was helping their father light reloadable aerial shell firework device when a foreign body entered his eye from the sparks. The victim was immediately taken to the emergency department.	Medical professionals flushed and examined the eye. It was determined that no damage occurred.	No long-term consequences.	Misuse, improper preparation	Fireworks Stand
4	6	M	Burns, thermal	Face	Treated and released	Firecracker, Small	The victim was with an older sibling when they found small firecracker devices. The older child put two of the devices together and topped them with gunpowder and told the victim to light the devices. The parent, who was not present, saw the victim rubbing his face and saw the skin peeling off. The mother brought the child inside and threw cold water in his face and called 911. Paramedics arrived and took the victim to	The victim was given pain medication as well as cream for the burns.	No long-term consequences.	Misuse, improper preparation	Store

							the emergency department.				
5	14	M	Burns, Thermal	Hand	Treated and released	Ground Spinner or Novelty Device	The victim lit a smoke bomb device in his hand when it exploded. The victim was in pain and immediately ran to his grandmother. The grandmother put cold water on the injury and called the victim's mother. When the mother arrived, she placed an ice pack on the injury and drove the victim to the hospital.	The victim was given pain medication and the wound was cleaned and wrapped by medical professionals. The victim attended physical therapy to "Stretch the skin" around the thumb.	No long-term consequences	Misuse, Improper preparation	Unknown
6	13	F	Burns, Thermal	Lower leg	Treated and released	Unknown	The victim was with family watching neighbors set off fireworks. The victim was approximately 8 feet away from the device when she felt a "little pinch" on her left leg. It is believed that lit debris fell from the sky and landed on the victim's leg, although she had long sweatpants on.	The victim's wounds were cleaned and wrapped by medical professionals and then discharged.	No long-term consequences	Malfunction, errant flightpath of debris	Unknown

7	23	M	Burns, thermal	Lower arm	Treated and released	Multiple tube device	The victim was lighting a multiple tube device when the firework immediately detonated. The device blew up in the victim's face and burned his hands and right arm. The victim attempted to treat himself with over-the-counter products but decided to go to the emergency department the next morning.	Emergency department personnel cut the burn marks open and cleaned the area. The victim visited a burn specialist three days later. The victim was then given cream and an antibiotic. The victim was given bandages, wraps, and an arm band to protect the burn from sun damage.	No long-term consequences	Malfunction, misfire	Store
8	24	M	Burns, Thermal	Upper leg	Treated and released	Rocket	The victim lit a rocket-type device and threw it on the ground. Upon detonation the device went "the wrong direction" and went up the victim's pant leg. The victim suffered burns to his right leg between the knee and inner thigh.	The victim was examined by the emergency department and was released with no obvious permanent damage.	No long-term consequences	Misuse, improper preparation	Unknown
9	42	F	Burns, Thermal	Lower leg	Treated and released	Unknown	The victim was watching friend's light fireworks and was walking around. While she was walking, she heard "Watch out!" but was not able to react quick enough. The unknown device struck the victim in the lower leg. The victim stated that the	The victim was given gel strips and instructed to follow up with complex care as they suffered both first- and second-degree burns.	No long-term consequences besides the scarring at the burn site	Misuse, improper preparation	Unknown

							wound felt hot while in the shower. She rubbed a topical cream in the injury and went to the emergency department.				
10	33	F	Other/Not stated	Eyeball	Left without being seen	Unknown	victim was at a sporting event where they were performing a firework show after the game. The victim was looking up at the fireworks when debris landed into her eyes. The victim left the area and went to get help and water. Flushing the debris did not help and the victim went to the emergency department.	Medical professionals dilated both eyes and gave numbing drops to the victim. The victims eyeball lens was inspected for damage. Medical professionals prescribed medication for the damage to both corneas. The victim was discharged and was told not to rub their eyes and not to drive until the eye fully healed.	No long-term consequences	Malfunction , errant flightpath of debris	Unknown