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Consumer Product Safety Commission

2023 Fireworks Annual Report

Fireworks-Related Deaths, Emergency Department-Treated Injuries, and Enforcement Activities During 2023

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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 2023. The report also summarizes CPSC staff's fireworks-related enforcement activities during fiscal year 2023.¹

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 16, 2023, and July 16, 2023. 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 66 percent of the estimated annual fireworks-related, emergency department-treated injuries for 2023 occurred during that period.

Key findings of the report

Deaths and Injuries

- CPSC staff received reports of 8 non-occupational, fireworks-related deaths during 2023. Five of the deaths were associated with firework misuse; two deaths were associated with a device misfire/malfunction; and the circumstances surrounding one incident are unknown. Reporting of fireworks-related deaths for 2023 is not complete, and the number of deaths identified for 2023 should be considered a minimum.
- Fireworks were involved with an estimated 9,700 injuries treated in U.S. hospital emergency departments during calendar year 2023 (95 percent confidence interval = 7,400–12,000). The estimated rate of emergency department-treated injuries is 2.9 per 100,000 individuals in the United States, a decrease from 3.1 estimated injuries per 100,000 individuals in 2022.
- There is a statistically significant trend in estimated emergency department-treated, fireworks-related injuries from 2008 through 2023. This trend estimates an increase of 561 fireworks injuries per year (p-value = <0.0001).
- In 2023, there were proportionately slightly more white victims (5,700 estimated injuries, 77.0% of victims, 75.3% of the U.S. population identifies as white), proportionately slightly fewer black victims (1,000 estimated injuries, 13.5% of victims, 13.7% of the U.S. population identifies as black), proportionately slightly fewer victims associated with an "other" race (700 estimated injuries, 9.5% of victims, 11.1% of the U.S. population

¹ The 2023 federal fiscal year refers to the period of October 1, 2022, through September 30, 2023.

identifies as another race). These percentages are calculated using only the victims where race was collected.² There were 2,300 fireworks-related injuries where the race of the victim was unknown.

- In 2023, there were proportionately fewer injuries where the victim identified as Hispanic (700 estimated total injuries, 9.6% of victims, 19.3% of the U.S population identifies as Hispanic) and proportionately more injuries where the victim identified as non-Hispanic (6,600 estimated injuries, 90.4% of victims, 80.7% of the U.S population identifies as non-Hispanic). These percentages are calculated using only the victims for whom ethnicity was collected. There were 2,400 estimated fireworks-related injuries where the ethnicity of the victim was unknown.
- An estimated 6,400 fireworks-related injuries (or 66 percent of the total estimated fireworks-related injuries in 2023) were treated in U.S. hospital emergency departments during the 1-month special study period between June 16, 2023, and July 16, 2023 (95 percent confidence interval = 4,600–8,200).

Results from the 2023 Special Study

- Of the 6,400 estimated fireworks-related injuries sustained, 67 percent were to males and 33 percent were to females.
- Adults 25 to 44 years of age experienced about 31 percent of the estimated injuries, and children younger than 15 years of age also accounted for 31 percent of the estimated injuries. Seniors 65 years of age or older experienced a small percent of the estimated injuries at only 5 percent.
- Victims 15 to 19 years of age had the highest estimated rate of emergency department-treated, fireworks-related injuries (4.5 injuries per 100,000 children aged 15 to 19). Children 5 to 9 years of age had the second highest estimated rate (4.0 injuries per 100,000 children aged 5 to 9). Although there is a long-term trend of increase in the estimated number of injuries between 2008 through 2023, a general decrease is noted when comparing the 2023 rates to the 2022 rates except for children 5 to 9 years of age and young adults 20 to 24 years of age which saw an increase from 3.0 to 4.0 injuries per 100,000 children aged 5 to 9 years of age and 2.8 to 3.3 injuries per 100,000 young adults 20 to 24 years of age, respectively.
- There were an estimated 800 emergency department-treated injuries associated with firecrackers and 700 with sparklers.
- The parts of the body most often injured were hands and fingers (an estimated 35 percent of the treated injuries); followed by the head, face, and ears (an estimated 22

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 19 percent); trunk/other regions (an estimated 11 percent); legs (an estimated 8 percent); and arms (an estimated 5 percent).

- An estimated 42 percent of the emergency department-treated injuries were burns. Burns were the most common injury to hands and fingers; head, face, and ears; arm; and leg regions.
- Approximately 74 percent of the victims were treated at the hospital emergency department and then released. An estimated 18 percent of patients were admitted to the hospital, or they were treated and transferred to another hospital.
- CPSC staff conducted telephone follow-up investigations on a subsample 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 18 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 were five victims who reported that their injuries might be long-term.

Enforcement Activities

During fiscal year 2023 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, which requires precautionary labeling of hazardous substances to help consumers safely store, use, and respond to incidents.³

Approximately 18% percent of the selected and tested products were found to contain noncompliant fireworks. The violations consisted of fuse violations, presence of prohibited chemicals, burnout or blowout, and pyrotechnic materials overload. CPSC will continue to assess the test results of the products collected and data regarding injuries and deaths in order to best prioritize the types of fireworks to be sampled and tested.

³ More information on the Federal Hazardous Substances Act can be found at [Federal Hazardous Substances Act \(FHSA\) Requirements | CPSC.gov](#).

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1. Introduction

This report describes U.S. injuries and deaths during calendar year 2023 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-Fireworks1>.

This report is organized into seven sections. Section 1 describes the data and statistical methods used in this analysis. Section 2 summarizes the 2023 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 2023, and it compares that estimate to previous years. Section 4 analyzes emergency department-treated, fireworks-related injuries during the month around July 4, 2023. Section 5 summarizes the in-depth telephone 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 2023. The report concludes with a summary of the findings in Section 7. Appendix A depicts the relationship between fireworks-related injuries and fireworks imports between 2008 and 2023. Appendix B provides details on the completed telephone investigations.

Sources of Information

Staff obtained information on non-occupational, fireworks-related deaths during 2023 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 2022 or 2023 fireworks-related deaths at the time this report was prepared. Consequently, the number of deaths reported here 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.⁴ 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 characters⁵ 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 has conducted fireworks special studies during the month around July 4. Staff focus their efforts on fireworks incidents during this period because historically, 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 2023, the special study period lasted from June 16 to July 16.

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 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 2023 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 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

⁴ 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.

⁵ The maximum available number of characters changed from 142 to 400 characters on January 1, 2019.

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.⁶ Estimated injuries are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are shown with an

⁶ See Schroeder (2000).

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 2023

CPSC has reports of 8 non-occupational, fireworks-related deaths that occurred during 2023, five of which were associated with firework misuse, two with a device misfire/malfunction, and one with unknown circumstances.⁷ Reporting of fireworks-related deaths for 2023 is not complete, and the number of deaths in 2023 should be considered a minimum. Brief descriptions of the incidents, using wording taken from the incident reports, follow:

Misuse

- In July, a 17-year-old male was fatally injured in a fireworks explosion. During a party at a residential home, the victim was holding a mortar style firework in their hand while lighting it, leading to an explosion that burned the victim's hands, face, chest, and arms. The victim then fell back onto the deck of the residence. Emergency services were called and transported the victim to the hospital where the victim was pronounced dead. The official cause of death was recorded as "blunt force trauma to torso".
- In July, a 48-year-old male was fatally injured from a fireworks incident at home. The victim was attempting to light a modified commercial-grade firework. The firework was intended to be denoted electronically, but the victim had modified the firework to detonate via a homemade mortar tube. Before attempting to light the firework, the victim cut the wick in half, causing the firework to explode immediately after being lit.
- In July, a 20-year-old male was fatally injured after lighting fireworks with friends. The victim was with friends at a shopping center parking lot to use four illegal aerial fireworks. While attempting to light the first firework, the victim lit the firework inside the

⁷ CPSC staff exclude 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 directly responsible for the death.

launch tube and lifted the tube over his head. The firework exploded while still inside the launcher, causing the victim to fly backward and land on his back. The victim suffered from a serious head injury and was taken to a hospital where the victim was pronounced dead. The autopsy revealed the presence of alcohol and cocaine.

- In July, a 20-year-old male was fatally injured after lighting fireworks. The victim was lighting fireworks in the street at his home. The victim lit a mortar and tube/mine and shell device, lifting the firework at chest height with the device facing away from himself. However, when the device detonated, the victim fell to the ground unresponsive. Emergency services were called, and the victim was transported to the local hospital where he was declared deceased. The cause of death was listed as “blunt force chest trauma”.
- In July, a 26-year-old male was fatally injured in a fireworks explosion. The victim was drinking and socializing at a friend’s home and came across a firework in the homeowner’s shed. The victim placed the mortar-style firework against his chest before igniting it. The firework exploded, leaving a hole in the victim’s chest. Emergency services were called, but the victim succumbed to his injury and was pronounced dead at the scene. The cause of death was ruled as “blunt force injuries due to a firework explosion”.

Misfire/Malfunction

- In June, a 20-year-old male was fatally injured while setting off fireworks during a gathering behind a residence. While the victim was lighting a firework, one firework unexpectedly went off while in a mortar tube. The victim sustained both hand and chest injuries and was transported to the hospital where he succumbed to his injuries.
- In July, a 15-year-old male was fatally injured while leaning over a lit mortar-style firework at a public park. The mortar shell allegedly ignited from the tube and struck the victim’s chest. The police department was called, and life-saving measures were attempted before the victim was transported to a local hospital a where he was pronounced dead.

Unknown

- In January, a 51-year-old male was fatally injured in an explosion while manufacturing fireworks in the basement of his home for an annual neighborhood fireworks show. The victim had purchased raw materials to produce fireworks, including powder, bindings, pellets, etc. An explosion occurred that was likely caused by an electric match or “fireware initiator” [sic] that feeds a shell. Homes nearby were evacuated as a precaution while investigations into the hazardous materials took place. The official cause of death was determined to be “blunt force and thermal traumatic injuries from explosion”.

Including the 8 deaths described above, CPSC staff has reports of 159 fireworks-related deaths between 2008 and 2023, for an average of 9.9 deaths per year.⁸

3. National Injury Estimates for 2023

Table 1 and Figure 1 present the estimated number of non-occupational, fireworks-related injuries treated in U.S. hospital emergency departments between 2008 and 2023.

⁸ See previous reports in this series (e.g. the report for 2022: Smith and Pledger (2023)). In the most recent three years, the number of deaths included 24 deaths in 2020, 15 deaths in 2021, and 13 deaths in 2022. The data from 2020 to 2022 have been updated based on new incident reports received by CPSC staff during 2023 and therefore may differ from previous reports.

Table 1

Estimated Fireworks-Related, Emergency Department-Treated Injuries: 2008-2023

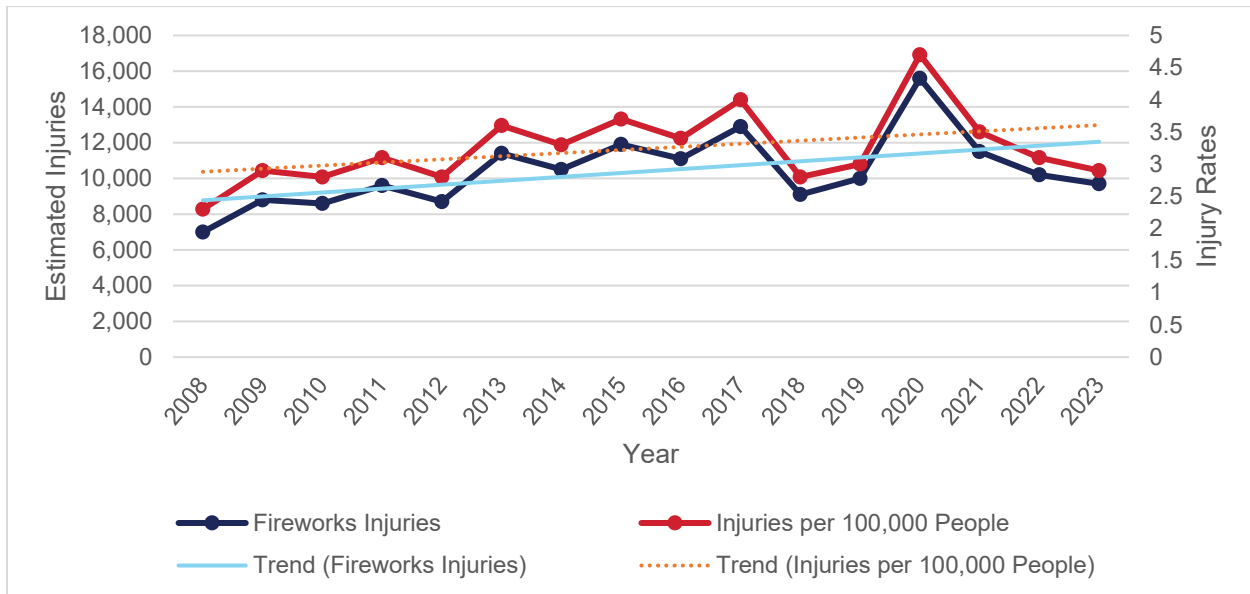
| Year | Estimated Injuries | Injuries per 100,00 People |
|------|--------------------|----------------------------|
| 2023 | 9,700 | 2.9 |
| 2022 | 10,200 | 3.1 |
| 2021 | 11,500 | 3.5 |
| 2020 | 15,600 | 4.7 |
| 2019 | 10,000 | 3.0 |
| 2018 | 9,100 | 2.8 |
| 2017 | 12,900 | 4.0 |
| 2016 | 11,100 | 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 |

Source: NEISS, U.S. Consumer Product Safety Commission. Population estimates for 2023 are from [Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020, to July 1, 2023 \(NST-EST2023-POP\)](#). Population estimates for 2020-2022 are from [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 2008 through 2023 (p-value < 0.0001).⁹ The slope of the fitted trend line shows an increase of about 561 injuries per year. In calendar year 2023, there were an estimated 9,700 fireworks-related, emergency department-treated injuries (95 percent confidence interval = 7,400 – 12,100), compared to an estimated 10,200 such injuries in 2022. The difference between the injury estimates for 2022 and 2023 is not statistically significant (p-value = 0.7144).

⁹ 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: 2008-2023



Source: NEISS, U.S. Consumer Product Safety Commission. Population estimates for 2023 are from [Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020, to July 1, 2023 \(NST-EST2023-POP\)](#). Population estimates for 2020-2022 are from [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 2008 and 2023.

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 2008-2023 period. However, for 2023 alone, there were 6,600 injuries where the victim did not identify as Hispanic (68.0% of total), 700 injuries where the victim identified as Hispanic (7.2% of total), and 2,400 injuries where the victim’s ethnicity was unknown (24.7% of total).

Figure 2 shows the trend by race across years; there is a statistically significant upward trend for both white victims ($p = 0.0007$) as well as Black victims ($p = 0.0161$), but not for “other” race victims ($p = 0.2888$). Between the years 2022 and 2023, there was no significant change in

the number of white victims ($p = 0.4163$), Black victims ($p = 0.2012$), or “other” race victims ($p = 0.9010$).

When comparing the proportion of estimated victims with a known race to the US population,¹⁰ there were proportionately slightly more white victims (77.0% of victims, 75.3% of the U.S. population identifies as white), proportionately slightly fewer black victims (13.5% of victims, 13.7% of the U.S. population identifies as black), proportionately slightly fewer victims associated with an “other” race (9.5% of victims, 11.1% 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 23.7% of all fireworks incidents in 2023.

¹⁰ [Total U.S. Population race estimates obtained from US Census Population Estimates for Year 2023](#)

Table 2

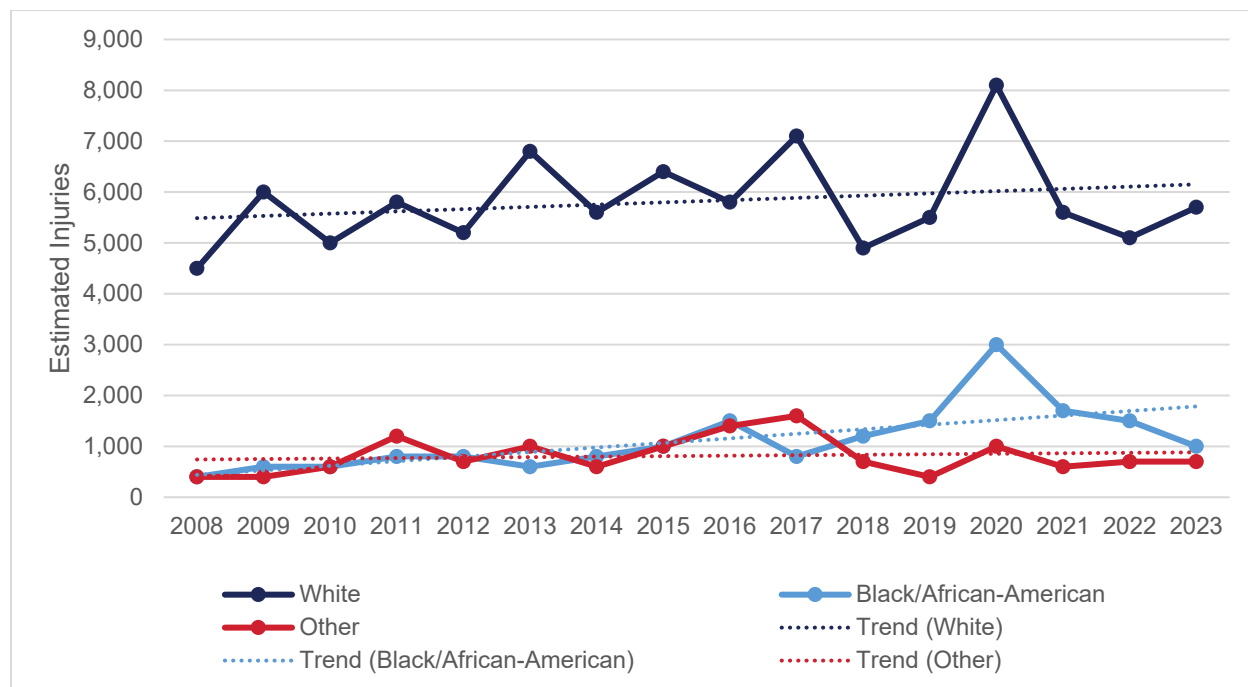
Estimated Fireworks-Related, Emergency Department-Treated Injuries by Race: 2008-2023

| Year | White | | Black/African American | | Other | | Unknown | | Total |
|------|----------|------|------------------------|------|----------|------|----------|------|--------|
| | Estimate | % | Estimate | % | Estimate | % | Estimate | % | Est. |
| 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 |
| 2023 | 5,700 | 58.8 | 1,000 | 10.3 | 700 | 7.2 | 2,300 | 23.7 | 9,700 |

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: 2008-2023



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

4. Injury Estimates for the 2023 Special Study: Detailed Analysis of Injury Patterns

The injury analysis in this section presents the results of the 2023 special study of fireworks-related injuries treated in hospital emergency departments between June 16, 2023, and July 16, 2023. During this period, there were an estimated 6,400 fireworks-related injuries (sample size = 166, 95 percent confidence interval = 4,600 – 8,200) accounting for 66 percent of the total estimated fireworks-related injuries for the year, which is not statistically lower than the estimated 7,400 fireworks-related injuries in the 2022 special study period (p-value = 0.3885).¹¹

¹¹ There were 171 NEISS emergency department-reported injuries between June 16, 2023, and July 16, 2023, but the final analytic sample for fireworks-related injuries during this special study period was 166 because 5 incidents were omitted as they were zero-weighted due to data completeness concerns. Section 5: Telephone Investigations of Fireworks-Related Injuries includes all 171 incidents as the zero-weighting is related only to injury estimates.

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 16, 2023, to July 16, 2023.

Table 3

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Device Type: June 16–July 16, 2023

| Fireworks Device Type | Estimated Injuries | Percent |
|-----------------------|--------------------|---------|
| Total | 6,400 | 100% |
| All Firecrackers | 800 | 12% |
| Small | 200 | 4% |
| Illegal | 100 | 2% |
| Unspecified | 500 | 7% |
| All Rockets | 500 | 8% |
| Other Rockets | 400 | 6% |
| Bottle Rockets | 100 | 2% |
| Other Devices | 2,000 | 31% |
| Multiple Tube | 400 | 6% |
| Reloadable | 400 | 6% |
| Roman Candles | 300 | 5% |
| Novelties | 200 | 2% |
| Sparklers | 700 | 12% |
| Fountains | * | * |
| Homemade/Altered | 200 | 3% |
| Public Display | * | * |
| Unknown | 2,900 | 46% |

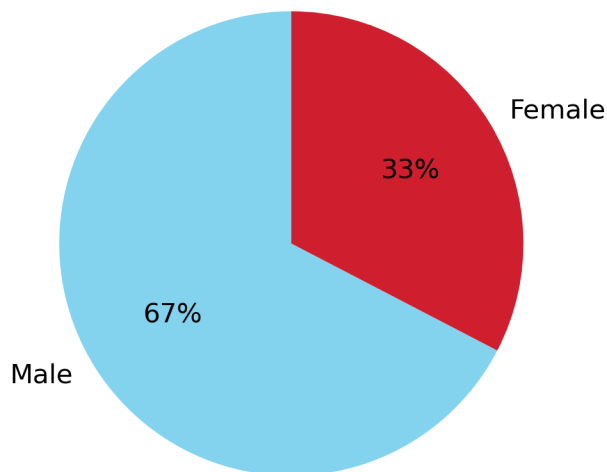
Source: NEISS, U.S. Consumer Product Safety Commission. Based on 166 NEISS emergency department-reported injuries between June 16, 2023, and July 16, 2023 and supplemented by 18 completed In-Depth Investigations. Firework types are obtained from the in-depth investigation, when available; otherwise, 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 under 50 estimated fireworks-related injuries that took place at public firework displays during 2023. Unknown fireworks devices were associated with the most injuries during the 2023 special study period. Homemade/altered devices were involved in approximately 3 percent of the total estimated injuries during the 2023 special study period.

Gender and Age of Injured Persons

Males experienced an estimated 2.6 fireworks-related, emergency department-treated injuries per 100,000 males during the special study period. Females had 1.2 injuries per 100,000 females. Figure 3 shows the distribution of estimated fireworks-related injuries by gender.

Figure 3: Estimated Injuries by Gender: June 16 – July 16, 2023

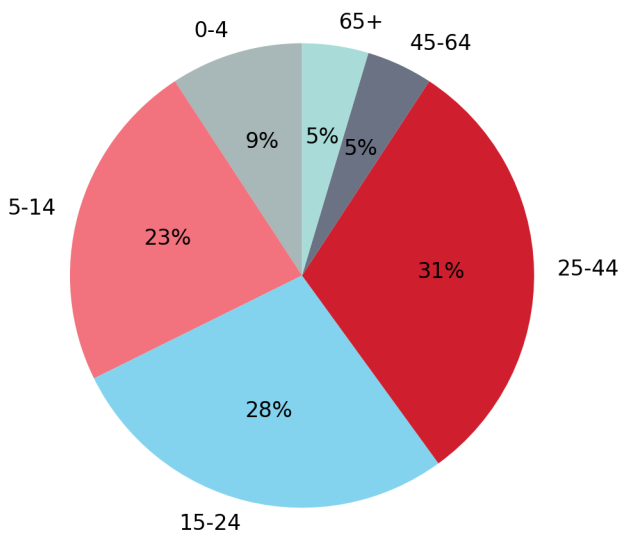


Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 16, 2023, and July 16, 2023.

Children under 5 years of age experienced an estimated 600 injuries (9 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 1,500 injuries. Breaking

down that age group further, children 5 to 9 years of age had an estimated 800 injuries and children 10 to 14 years of age accounted for 700 injuries.¹²

Figure 4: Percentage of Injuries by Age Group: June 16 – July 16, 2023



Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between July 16, 2023, and July 16, 2023.

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.

¹² 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 16–July 16, 2023

| Age Group | Total | Per 100,000 People | Male | Female |
|-----------|-------|--------------------|-------|--------|
| Total | 6,400 | 1.9 | 4,300 | 2,100 |
| 0-4 | 500 | 3.1 | 300 | 200 |
| 5-14 | 1,500 | 3.8 | 1,000 | 500 |
| 5-9 | 800 | 4.0 | 500 | 300 |
| 10-14 | 700 | 3.5 | 500 | 200 |
| 15-24 | 1,700 | 3.9 | 1,200 | 600 |
| 15-19 | 1,000 | 4.5 | 700 | 300 |
| 20-24 | 700 | 3.3 | 500 | 300 |
| 25-44 | 2,000 | 2.2 | 1,500 | 500 |
| 45-64 | 400 | 0.4 | 300 | * |
| 65+ | 300 | 0.5 | 100 | 200 |

Sources: NEISS, U.S. Consumer Product Safety Commission. [NC-EST2022-ALLDATA: Monthly Population Estimates by Age, Sex, Race, and Hispanic Origin for the United States: April 1, 2020 to July 1, 2022 \(With short-term projections to December 2023\)](#). Based on the special study between June 16, 2023, and July 16, 2023. The oldest victim was 78 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 2023 special study period. Children aged 15 to 19 had the highest estimated injury rate at 4.5 injuries per 100,000 children aged 15 to 19. This was followed by 4.0 injuries per 100,000 children 5 to 9 years of age and 3.5 injuries per 100,000 children between 10-14. A general decrease is noted when comparing the 2023 rates to the 2022 rates, except for children 5 to 9 years of age and young adults 20 to 24 years of age which saw an increase from 3.0 to 4.0 injuries per 100,000 children aged 5 to 9 and 2.8 to 3.3 injuries per 100,000 young adults 20 to 24 years of age respectively.

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 51 percent of the total estimated injuries for that specific age group.¹³ Unknown fireworks devices accounted for 46 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 necessarily 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.

¹³ 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 16–July 16, 2023

| Fireworks Type | Age Group | | | | | | |
|------------------|-----------|-----|-------|-------|-------|-------|-----|
| | Total | 0-4 | 5-14 | 15-24 | 25-44 | 45-64 | 65+ |
| Total | 6,400 | 600 | 1,500 | 1,700 | 2,000 | 400 | 300 |
| All Firecrackers | 800 | * | 100 | 400 | 200 | * | * |
| Small | 200 | * | * | 100 | * | * | * |
| Illegal | 100 | * | * | * | 100 | * | * |
| Unspecified | 500 | * | 100 | 300 | 100 | * | * |
| All Rockets | 500 | * | 100 | 200 | * | * | 100 |
| Other Rockets | 400 | * | * | 200 | * | * | 100 |
| Bottle Rockets | 100 | * | 100 | * | * | * | * |
| Other Devices | 2,000 | 400 | 500 | 400 | 700 | * | * |
| Multiple Tube | 400 | 100 | * | 100 | 100 | * | * |
| Reloadable | 400 | * | * | 200 | 100 | * | * |
| Roman Candles | 300 | * | 100 | 100 | 200 | * | * |
| Novelties | 200 | * | 100 | * | * | * | * |
| Sparklers | 700 | 300 | 300 | * | 200 | * | * |
| Fountains | * | * | * | * | * | * | * |
| Homemade/Altered | 200 | * | * | 100 | 100 | 100 | * |
| Public Display | * | * | * | * | * | * | * |
| Unknown | 2,900 | 100 | 800 | 700 | 1,000 | 300 | 200 |

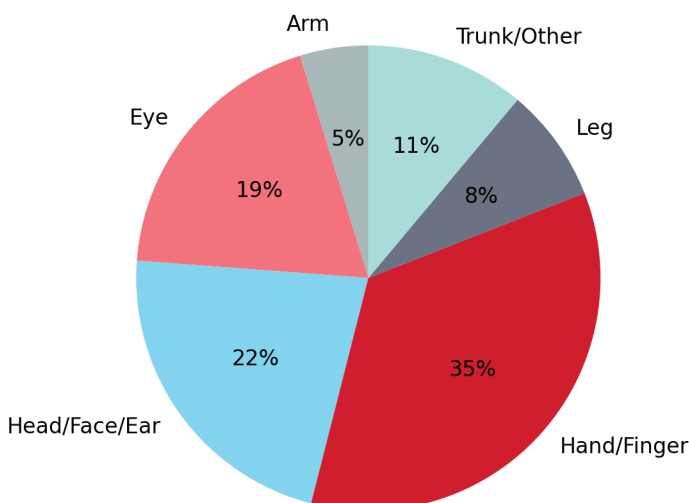
Sources: NEISS, U.S. Consumer Product Safety Commission, based on the special study between June 16, 2023, and July 16, 2023. Estimates are rounded to the nearest 100 injuries. Estimates of fewer than 50 injuries are denoted with an asterisk (*). Age subcategory estimates may not sum to the category total due to rounding.

As shown in Figure 3, males accounted for 67 percent of the estimated fireworks-related injuries, versus 33 percent by females. Both males and females were most often injured by an unknown fireworks device (42 percent for males, 54 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 the head/face/ear region; 1,200 eye injuries; 700 trunk/other injuries; 500 injuries leg region; and 300 arm injuries.

Figure 5: Body Regions Injured: June 16 – July 16, 2023

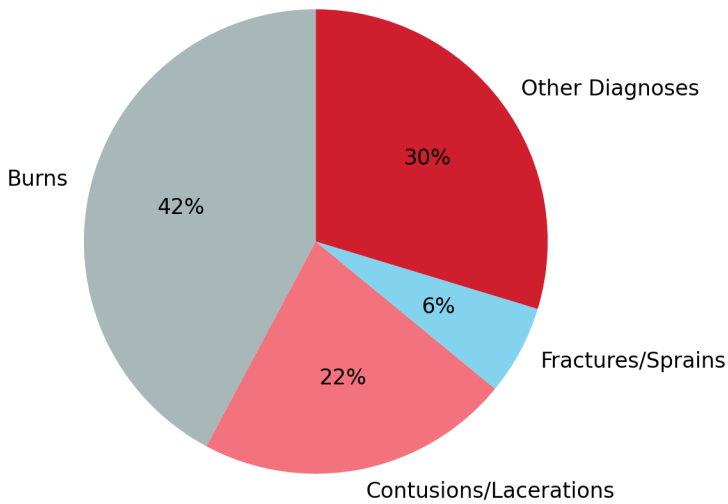


Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 16, 2023, and July 16, 2023. Arm includes NEISS codes for upper arm, elbow, lower arm, shoulder, and wrist. Head/Face/Ear regions include eyelid, eye area, nose, neck, and mouth but not the eyeball. Leg includes 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 2,700 estimated injuries and was the most frequent diagnosis. Contusions, lacerations, and abrasions were associated with 1,400 estimated injuries. Fractures and sprains accounted for 400 estimated injuries. All other diagnoses accounted for 1,900 estimated injuries.¹⁴

¹⁴ Estimated injuries may not sum to the total due to rounding. Percentages are calculated from the actual injury estimates.

Figure 6: Types of Injuries: June 16 – July 16, 2023



Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 16, 2023, and July 16, 2023. 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 (58 percent) of the injuries to hands and fingers. As a single-diagnosis category, burns caused the most injuries to the arm; head, face, and ear; hand and finger; and leg regions. Other diagnoses were most associated with injuries in the eye and trunk/other regions.

Table 6

Estimated Fireworks-Related, Emergency Department-Treated Injuries by Body Region and Diagnosis: June 16–July 16, 2023

| Body Region | Total | Diagnosis | | | |
|---------------|-------|-----------|----------------------------|-----------------------|--------------------|
| | | Burns | Contusions/ Lacerations | Fractures/ Sprains | Other Diagnoses |
| Total | 6,400 | 2,700 | 1,400 | 400 | 1,900 |
| Arm | 300 | 200 | 100 | 100 | * |
| Eye | 1,200 | 200 | 400 | * | 600 |
| Head/Face/Ear | 1,400 | 500 | 400 | 200 | 300 |
| Hand/Finger | 2,200 | 1,300 | 300 | * | 600 |
| Leg | 500 | 300 | 100 | * | 100 |
| Trunk/Other | 700 | 300 | 100 | * | 400 |

Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 16, 2023, and July 16, 2023. 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 16–July 16, 2023

| Fireworks Type | Total | Region of the Body Injured | | | | | |
|------------------|-------|----------------------------|-------|-------------------|-------------|-----|-----------------|
| | | Arm | Eye | Head/Face/ Ear | Hand/Finger | Leg | Trunk/ Other |
| Total | 6,400 | 300 | 1,200 | 1,400 | 2,200 | 500 | 700 |
| All Firecrackers | 800 | * | 100 | 200 | 400 | * | 100 |
| Small | 200 | * | * | 100 | * | * | * |
| Illegal | 100 | * | * | * | 100 | * | * |
| Unspecified | 500 | * | 100 | * | 200 | * | 100 |
| All Rockets | 500 | * | 200 | 200 | * | * | * |
| Other Rockets | 400 | * | 200 | 200 | * | * | * |
| Bottle Rockets | 100 | * | 100 | * | * | * | * |
| Other Devices | 2,000 | 100 | 200 | 300 | 1,000 | 100 | 100 |
| Multiple Tube | 400 | * | 100 | 100 | 100 | * | 100 |
| Reloadable | 400 | 100 | * | 100 | 100 | 100 | * |
| Roman Candles | 300 | * | 100 | 100 | 200 | * | * |
| Novelties | 200 | * | * | * | 100 | 100 | * |
| Sparklers | 700 | 100 | 100 | 100 | 500 | * | * |
| Fountains | * | * | * | * | * | * | * |
| Homemade/Altered | 200 | * | * | 100 | 100 | * | * |
| Public Display | * | * | * | * | * | * | * |
| Unknown | 2,900 | 200 | 600 | 700 | 700 | 300 | 600 |

Source: NEISS, U.S. Consumer Product Safety Commission. Based on the special study between June 16, 2023, and July 16, 2023. 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 regarding the type of fireworks device typically results from victims' (or parent/guardians') inability to identify the firework device that injured them, when asked.

Hospital Treatment

An estimated 74 percent of the victims of fireworks-related injuries in the special study period were treated in the emergency department and then released; about 10 percent of the victims were admitted to the hospital. Approximately 8 percent of the victims were treated and then transferred to another hospital. The remaining 8 percent of victims had other dispositions (*i.e.*, left the hospital without being seen or were held for observation).¹⁵

For *all* injuries associated with consumer products in 2023, 89 percent of patients were treated and released; 8 percent were admitted to the hospital; 1 percent of patients were transferred to other hospitals; and 2 percent had other dispositions, including leaving the hospital without being seen, held for observation, or deceased on arrival.¹⁶ In comparison, the percentage of victims who were treated and released was lower for the fireworks-related injuries in the special study period than those for *all* consumer products. The percentages of those treated and admitted, held for observation, treated and transferred, and who left the hospital were higher for the fireworks-related injuries in the special study period than those for *all* consumer products.

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 16, 2023 to July 16, 2023). 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.

Cases were selected for telephone investigations based on the information provided in the NEISS narrative and coded information in the NEISS records. The selection criterion was

¹⁵ The percentages are calculated from actual injury estimates and may not sum to 100 due to rounding.

¹⁶ Comparisons are calculated using actual injury estimates and differences may not appear due to rounding.

whether the firework type was unknown, and the goal of the investigation was to determine the type as well as the severity of the injury and any unusual hazard patterns. 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, there were 68 cases that met the criterion above that were therefore selected for telephone investigations, of which 18 were completed and determined to be in scope, 0 were completed and determined to be out of scope, and 50 were incomplete.¹⁷ 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 | 68 | 100 |
| Completed Investigation | 18 | 26 |
| In Scope | 18 | 26 |
| Out of Scope | 0 | 0 |
| Incomplete Investigation | 50 | 73 |
| Failed to Reach Patient | 27 | 40 |
| Victim Name Not Provided by Hospital | 18 | 26 |
| Victim Refused to Cooperate | 4 | 6 |
| Mailed | 1 | 1 |

Short descriptions of the 18 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.

¹⁷ Please refer to footnote 11 which describes why 171 incidents were described in this section.

Summary Statistics

Of the 18 completed in-scope cases, 11 involved males, and 7 involved females. There were six victims aged 5 to 14 years old; seven victims aged 15 to 33 years old; and five victims aged 34 to 65. Three victims were admitted to the hospital and fifteen victims were treated and released.

The fireworks devices consisted of four reloadable aerial shells,¹⁸ two multiple tube devices, one rocket or bottle rocket, and eleven unknown devices.

The distribution of the types of fireworks and the emergency department dispositions differ 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. Twenty-six 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 | 18 | 100% |
| Malfunction | 12 | 67% |
| Misfire | 4 | 22% |
| Tip over | 3 | 17% |
| Errant Flightpath of Device | 2 | 11% |
| Errant Flightpath of Debris | 3 | 17% |
| Misuse | 6 | 33% |
| Improper Preparation | 6 | 33% |

¹⁸ The category “aerial shells” includes multiple tube, reloadable mortars, and rockets, but excludes bottle rockets.

Malfunction (12 Victims, 67 percent of total)

Misfire

- Case 6: An 11-year-old male victim was at a local park with neighbors who were lighting firecrackers. One went off and hit the victim in his left eye. The victim was taken to the emergency department where he was treated with eyedrops and was discharged with instructions to continue to administer eyedrops until the redness disappears. The victim is not expected to suffer long-term consequences from the event.
- Case 12: A 27-year-old male victim had lined up 24 “Excalibur” mortar tubes that were secured to wood. Some were on the ground, and some were on the deck of the house. One mortar did not launch out of the tube but blew up on the ground, catching three buckets on fire, exploding about 180 ”mortars ”in 20 seconds, none with the tubes. The victim’s back looked like someone had shot him with gravel. The victim was taken to the emergency department but was not admitted. The victim is not expected to suffer long-term consequences from the event.
- Case 14: A 30-year-old male victim was lighting fireworks when one malfunctioned, blowing out the back of a “cake” style firework. The victim went to the emergency department for pain in his face and a small hole in his cheek. The victim was given a second medication for pain management after the first was not effective and received a CT scan. The victim was discharged with instructions to see his doctor, who sent him to a plastic surgeon. The plastic surgeon told the victim that he needed nerve medication due to the numbness in the cheek but hesitated to do surgery due to possibility of paralysis in the victim’s cheek. The victim is not expected to suffer long-term consequences from this event.
- Case 16: A 40-year-old male victim was on a picnic with friends and had drunk a few beers. The victim lit the first firework which exploded as expected, but when he lit the second firework he did not let go of it in time and it exploded in his left hand. The victim’s wife took him to the emergency department, where his hand was examined, x-rays were taken, and blood was cleaned from the damaged area. The victim was admitted and received surgery on his hand, requiring 7 stitches. The victim is not expected to suffer long-term consequences from the event.

Tip Over

- Case 7: A 13-year-old female victim was at a cookout when someone lit a reloadable aerial shell. The tube that the shell goes into fell over and shot it into the crowd, hitting the victim on the back of both of her calves. The victim went to the emergency

department but was not admitted; she was discharged with ointment to apply to the burned areas of her legs. The victim is not expected to suffer long term consequences from the event but may develop scarring at the burn sites.

- Case 8: A 14-year-old male victim was enjoying a fireworks display put on by friends and family when a box of fireworks fell over and started shooting out into the crowd. When the victim turned around, a firework hit him underneath his right eye. People brought water for the victim to wash his eye out with. The victim's father drove the victim to the hospital. Staff tried to examine the victim's eye to see what the injury was and put in eye drops and gave the victim medication to calm him down. The staff also put cream around his eye and gave him a patch. The victim was discharged with instructions to follow-up with an eye doctor, who gave the victim more eyedrops and determined that his eyeball was inflamed. The victim is not expected to suffer long term consequences from the event.
- Case 17: A 43-year-old female victim was watching a fireworks display. A box of fireworks tipped over and came directly into the crowd instead of shooting up into the air. The victim covered her daughter with her own body, and the victim was struck in her right leg and left hand a few times and lost her hearing. The victim asked her husband to take her to the emergency department. Staff started cleaning and treating her burns and assessed her pinky finger, which required staples. The victim had the staples removed but still suffers from limited mobility in her pinky finger, and the burns on her legs are still healing. The victim was discharged and followed up with her primary care physician, who removed her staples and assessed her burn. The doctor also wanted the victim to follow up with an orthopedic doctor. The victim continues to suffer from nerve damage.

Errant Flightpath of Device

- Case 13: A 27-year-old male victim was with friends and they were lighting a bottle rocket. The bottle rocket went out of the tube and it started to fall before it picked up speed again, spraying the victim in his right eye with exhaust when the bottle rocket popped. The victim flushed his right eye and then went to the emergency department, where he was examined for what the victim described as a burn to the right eyelid, eyeball, and eyelashes. Staff put some drops in his eyes and examined the eye with a light. The victim received a prescription for an eye cream and scheduled an eye doctor appointment. At the appointment, the victim was told that the injury was a corneal abrasion and that it would heal on its own. The victim is not expected to suffer long term consequences from the event.
- Case 15: A 38-year-old female victim was watching fireworks with her family from the garage. The victim's brother or cousin lit a firework and it went into the air before spinning out of control and landing on the victim's left ankle. Upon examination, the victim noted that it did not look like anything happened to her ankle, but she could feel a

“sizzle”. The victim’s cousin gave her ice to apply which made her pain worse, and then put Vaseline on the area which helped. The victim went to urgent care, where staff advised her to go to the emergency department due to an underlying condition (sickle cell anemia). The victim was transported to the emergency department via ambulance where she was told that the injury was a second degree burn and was given ointment. The victim also stayed overnight to receive a blood transfusion. The victim is not expected to suffer long-term consequences from the event.

Errant Flightpath of Debris

- Case 5: A 9-year-old female victim was sitting in her aunt’s yard watching her uncle shoot off fireworks when some debris got in her left eye. The victim’s mother flushed her eye with water, but the victim’s eye was still in pain. The victim’s mother took her to the emergency department, where staff flushed the victim’s eye and used a sterile eye to swab her eyelid to ensure that no debris remained. It was determined that no damage occurred. The victim is not expected to suffer long-term consequences from the event.
- Case 9: A 16-year-old male victim was in the downtown area watching a fireworks display put on by the city. Someone who was not a city employee was also lighting fireworks, and a spark from their display hit the victim in the eye. The victim held his eye and unable to open his eye but managed to drive home. The victim’s mother called 911 after giving the victim eyedrops that did not help. An ambulance arrived, and the paramedics were unable to see what the trauma was to the victim’s eye so they took him to the emergency department. The doctor saw that there was blood in the victim’s eye and that it was cut just above the eye, putting a cream over the victim’s eye to stop the pain until he could go to an eye doctor. After the victim was discharged, he was seen by a specialist who gave him 3 types of eye drops and referred him to an eye institute to get an ultrasound done as the doctor could not clearly see what was going on. At the eye institute, the victim was advised to continue with the drops until the eye was cleared up. When the victim went back to the ophthalmologist, the doctor saw that the victim’s eye was getting better. The victim is not expected to suffer long-term consequences from the event.
- Case 18: A 65-year-old female victim was at the gathering area of her condominium to enjoy fireworks that her grandson was planning to light when something hit the victim in her head that came from the direction of some adults who were shooting off fireworks. The victim was not sure of what hit her but, because she was bleeding, she had her husband take her to the emergency department where she received one staple on the top of her head. The victim was discharged and the staple was removed one week later. The victim is not expected to suffer long-term consequences from the event.

Misuse (6 Victims, 33 percent of total)

Improper Preparation or Positioning of Device

- Case 1: A 12-year-old male victim was with family in a car driving down a street when a group of men, who the parent assumed was a gang, were standing and shooting fireworks at their van while calling the family names. The victim was hit in the left eye, and the parents rushed the victim to the emergency department. Staff examined his eye and hospitalized him for 5 days. Afterwards, the victim went to see his eye doctor who recommended an operation to determine why his eye will not stay open. It is unknown if the victim is expected to suffer long-term consequences from the event.
- Case 2: A 20-year-old male victim was drinking in a friend's backyard when a friend put a reloadable "King Arthur" mortar firework in the victim's hand and lit it. The firework went off while in the victim's hand. The victim put water and ice on the injury to help with the pain, and the victim went to bed. The next morning, the victim wrapped his right hand before going to urgent care where staff wrapped his hand and put cream on it. He was then sent to the emergency department, where staff drained the blisters, and the burn team evaluated the burn. He was discharged with instructions on how to wrap his hand. The victim is not expected to suffer long-term consequences from the event.
- Case 3: A 43-year-old male victim found a firecracker on the ground and decided to light it. It immediately exploded in the victim's right hand, causing him to lose his thumb and index finger. Neighbors called 911, and the paramedics who arrived did not slow bleeding, which required the victim to receive a blood transfusion when he arrived at the emergency department. The victim received surgery and "hypobaric" [sic] chamber therapy for 4 days before being discharged with instructions to start physical therapy. The victim suffered from a loss of thumb and index finger on his right hand.
- Case 4: An 8-year-old male victim was with his family at his father's house shooting off fireworks. The victim's father handed the victim a firework that exploded in his right hand. When the victim's mother saw the damage to his hand, she took him to the emergency department. An x-ray was completed showing that nothing was broken. Staff cleaned and bandaged the inside of the victim's right hand. The victim was discharged with antibiotics and a glove to wear for two weeks. The victim's nails fell off, and it is unknown if they will grow back properly.
- Case 10: A 19-year-old female victim was at a family gathering when some teens threw what the victim's mother believed to be an M80 which landed on her foot, injuring her. Paramedics arrived and the victim was triaged before being brought to the emergency department. Staff stitched a wound on the victim's mouth and discharged her. The victim then saw an eye specialist and underwent surgery for a detached lens in her right eye. The victim expects to have lost their eyesight due to the event.

- Case 11: A 21-year-old female victim was watching fireworks when a mortar landed in her lap and blew up. An ambulance was called, and the victim was called to the emergency department, where an x-ray was taken and the victim was examined. Staff cleaned the site and sent the victim home with ointment and gauze for the burn. The victim is not expected to suffer long-term consequences from the event.

Long-Term Consequences of Fireworks-Related Injuries

Respondents were asked if there were any long-term consequences of their injuries. Thirteen of the 18 victims (72 percent of the total) experienced or expected complete recovery, with no long-term consequences. However, five victims described their expected long-term adverse consequences:

- Case 3: The victim lit an unknown firework he found. The victim lost his thumb and index finger on his right hand.
- Case 4: An unknown firework exploded in the victim's hand. The victim's nails fell off, although it is unknown if they grow back properly.
- Case 7: The victim was burned by an aerial device on both of her calves. The victim may suffer long-term scarring because of her burns.
- Case 10: A reloadable mortar firework landed near the victim's foot. The victim expects to suffer from loss of eyesight.
- Case 17: The victim was hit by unknown fireworks. The victim suffers from long-term nerve damage.

Where Fireworks Were Obtained

Of the 18 telephone survey respondents, six knew where the fireworks were obtained. Two respondents stated that the fireworks were purchased from a store and four respondents state that the fireworks were purchased from a stand that exclusively sells fireworks.

Twelve of the 18 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 2023 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, which requires precautionary

labeling of hazardous substances to help consumers safely store, use, and respond to incidents.¹⁹

Approximately 18% percent of the selected and tested products were found to contain noncompliant fireworks. The violations consisted of fuse violations, presence of prohibited chemicals, burnout or blowout, and pyrotechnic materials overload. CPSC will continue to assess the test results of the products collected and data regarding injuries and deaths in order to best prioritize the types of fireworks to be sampled and tested.

7. Summary

In the calendar year 2023, there were 8 reported non-occupational fireworks-related deaths. However, reporting for 2023 may not be complete at this time as a lag in reporting of fatalities is common for consumer products (e.g. due to delays in the receipt of death certificates by the CPSC). There were an estimated 9,700 fireworks-related emergency department-treated injuries for calendar year 2023.

During the 1-month special study period from June 16, 2023 – July 16, 2023, there were an estimated 6,400 emergency department-treated fireworks-related injuries. Adults aged 25 to 44 years of age experienced about 31 percent of the estimated injuries, and males of all ages experienced 67 percent of the estimated injuries, up from 65 percent in 2022.

Additionally, 30 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 35 percent. Forty-two 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 head, face, and ears. The parts of the body most often injured were hands and fingers (an estimated 35 percent); head, face, and ears (an estimated 22 percent); eyes (an estimated 19 percent); trunk/other regions (an estimated 11 percent); legs (an estimated 8 percent); and arms (an estimated 5 percent). Most of the estimated injuries (74 percent) were treated-and-released. An estimated 18 percent were treated and transferred to another hospital or admitted to the hospital where the emergency department was located. The remaining 8 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 11 percent of the estimated injuries during the special study period; this is an increase from 8 percent in 2022. Firecrackers were involved in 13 percent, rocket-type devices accounted for 8 percent of

¹⁹ More information on the Federal Hazardous Substances Act can be found at [Federal Hazardous Substances Act \(FHSA\) Requirements | CPSC.gov](#)

injuries, reloadable and multiple tube devices both accounted for 6 percent of injuries each, roman candles accounted for 5 percent of injuries, novelty devices accounted for 3 percent of injuries, and public displays and fountains were associated with 0 percent of injuries each. A plurality of fireworks-related injuries, 45 percent, were associated with firework devices for which the device type is unknown.²⁰

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. Five of the 18 respondents interviewed reported that the injury may or will be long term.

Finally, in fiscal year 2023, 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.

²⁰ 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, below, reports the total estimated number of injuries per 100,000 pounds of imported fireworks. Table 10 shows an average of 259.1 million pounds of fireworks were imported each year between 2008 and 2023, 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, spiking in 2021 to 415.9 million pounds of imports (surpassing the previous high of 277.5 million pounds in 2018 by 138.4 million pounds); and then peaking in 2022 with a gross weight import value of 449.1 million pounds. In 2023 the gross weight import value decreased to 265.6 million pounds.

As for the number of estimated emergency department-treated fireworks-related injuries, 2018, with 9,100 injuries, had the lowest since 2012. The highest three annual estimated fireworks-related injuries were 15,600 in 2020; 12,900 in 2017; and 11,900 in 2015. The 2023 total of 9,700 fireworks-related injuries was the tenth highest number of injuries in the 2008 to 2023 period.

As shown in Table 10 below, the estimated number of injuries per 100,000 pounds of fireworks imported was 3.7 in 2023, the highest since 2020. The three highest 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.

However, 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 depends on materials other than just the explosive material.

In addition, international trade statistics do not provide weight by fireworks device types, making it impossible 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 after 2020 may be due to different mixtures of types of fireworks imported over time or to an overall decrease in injuries among all types of fireworks. Similarly, the recent increase in injuries per 100,000 pounds in 2020 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 |
|------|--------------------|---|---|
| 2023 | 9,700 | 265.6 | 3.7 |
| 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 |

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 7.6 percent of the total imports in 2023. 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 April 2024. 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 | 12 | M | Foreign body | Face | Treated and admitted for hospitalization | Unknown | The victim and his family were in a car driving down a street when a group of men, who the parent assumed were in a gang, were standing and shooting fireworks at their van while calling them names. One hit the victim in his left eye. The parent took the victim to the emergency department where the victim's eye was examined and then hospitalized for five days. | Medical professionals examined the eye and surgery was recommended to determine why the eye would not stay open. | No long-term consequences | Misuse, improper preparation | Unknown |
| 2 | 20 | M | Burns, thermal | Hand | Treated and admitted for hospitalization | Reloadable mortar or aerial shell device | The victim had been drinking in a friend's backyard when a friend put a reloadable "King Arthur" mortar in the victim's hand, lighting it. The firework went off in the victim's hand, and the victim put water and ice on the injury, wrapping it the next day. The victim then went to urgent care where staff wrapped his hand and put cream on it before sending him to an emergency department. | Medical professionals drained the blisters and gave instructions on how to wrap the hand. | No long-term consequences | Misuse, improper preparation | Fireworks stand |
| 3 | 43 | M | Amputation | Finger | Treated and admitted for hospitalization | Unknown | The victim was coming home from work when he found a firecracker on the ground and decided to light it. The firecracker exploded in the victim's right hand, causing him to lose his thumb and index finger. | The victim was transported by paramedics to the emergency department where he required a blood transfusion. The victim Eye received surgery and | Loss of thumb and index finger on right hand | Misuse, improper preparation | Unknown |

| | | | | | | | | | | | | |
|---|----|---|----------------|--------|----------------------|---------|---|--|---|--|-----------------|--|
| | | | | | | | | | "hypobaric" [sic] chamber therapy for 4 days before being discharged with instructions to start physical therapy. | | | |
| 4 | 8 | M | Burns, thermal | Finger | Treated and released | Unknown | The victim was with family and neighbors outside, who throwing fireworks. The father of the victim gave the victim fireworks of an unknown type, and the fireworks exploded while the victim was holding them in his right hand. The victim screamed and ran into the house. The mother of the victim followed and took the victim to the emergency department. | The victim was given pain medication and the wounds were cleaned and wrapped by medical professionals. | Nails fell off; will wait to see if they grow back properly | Misuse, improper preparation | Unknown | |
| 5 | 9 | F | Foreign body | Eye | Treated and released | Unknown | The victim was sitting in chairs with family outdoors while watching a fireworks display, and some debris entered the victim's left eye. After flushing with water, the victim still felt pain. The guardian took the victim to the emergency department. | Medical professionals flushed, swabbed, and examined the eye. It was determined that no damage occurred. | No long-term consequences | Malfunction, errant flightpath of debris | Fireworks stand | |
| 6 | 11 | M | Burns, thermal | Eye | Treated and released | Unknown | The victim was at a local park while others were lighting fireworks when one went off and hit the victim in the left eye. The victim was taken to the emergency department. | Medical professionals examined the eye and provided eyedrops. | No long-term consequences | Malfunction, errant flightpath of device | Unknown | |

| | | | | | | | | | | | |
|----|----|---|------------------|------------|----------------------|--|--|--|---------------------------------|--|---------|
| 7 | 13 | F | Burns, thermal | Leg, lower | Treated and released | Reloadable mortar or aerial shell device | The victim was at a cookout when a reloadable aerial shell fell over and shot into the crowd, which landed behind the victim and burned both of her calves. The victim went to the emergency department but was not admitted. | Medical professionals examined the wounds and provided an ointment to apply. | Possible scarring at burn sites | Malfunction, tip over | Unknown |
| 8 | 14 | M | Other/Not Stated | Eye | Treated and released | Unknown | The victim was enjoying a fireworks display put on by his friends and family when a box of fireworks fell over and started shooting into the crowd. When the victim turned around, a firework hit the victim underneath his right eye. The victim's father brought him to the emergency department. | Medical professionals examined the eye, applied a cream, and covered the eye. An eye doctor provided eyedrops at a separate appointment. | No long-term consequences | Malfunction, tip over | Unknown |
| 9 | 16 | M | Laceration | Face | Treated and released | Unknown | The victim was in the downtown area watching a fireworks display put on by the city. When the victim stood up to get a better look, a spark from a firework lit by someone other than a city employee hit the victim in the eye. Paramedics arrived to examine the wound, but they could not determine what the trauma was and brought the victim to the emergency department. | Medical professionals examined the eye, applied a cream, and provided eye drops. | No long-term consequences | Malfunction, errant flightpath of debris | Unknown |
| 10 | 19 | F | Fracture | Face | Treated and released | Reloadable mortar or aerial shell device | During a family gathering, some teens threw what the victim's mother believed to be an M80 which landed near the victim's foot. Paramedics arrived and the victim was triaged before being brought to the emergency department. | Medical professionals examined the eye and wounds, stitching the lip. An eye doctor completed one of three surgeries to the eye at a | Loss of eye sight | Misuse, improper preparation | Unknown |

| | | | | | | | | | | | | |
|----|----|---|-----------------------|--------------|----------------------|--|--|--|---------------------------|--|-----------------|--|
| | | | | | | | | | separate appointment. | | | |
| 11 | 21 | F | Burns, thermal | Leg | Treated and released | Multiple tube device | The victim was sitting in the grass watching fireworks when one of the mortars landed in her lap and blew up. The victim was taken to the emergency department where an x-ray was taken and her wounds were examined. | Medical professionals examined and examined wound and provided ointment and gauze. | No long-term consequences | Misuse, improper preparation | Unknown | |
| 12 | 27 | M | Burns, thermal | Not recorded | Treated and released | Reloadable mortar or aerial shell device | The victim had 24 mortar tubes lined up and secured to wood. Some were on the ground in the gravel and some were on the deck of the house. One mortar did not launch out of the tube but blew up on the ground, catching three buckets on fire. About 180 "mortars" exploded in 20 seconds, none of which had tubes. The victim was taken to the emergency department but was not admitted for his back, which looked like someone had shot him with gravel. | The victim was examined by the emergency department and was released with no obvious permanent damage. | No long-term consequences | Malfunction, misfire | A store | |
| 13 | 27 | M | Contusions, abrasions | Eyeball | Treated and released | Rocket or bottle rocket | The victim lit a bottle rocket when it started to fall. When it picked back up, it sprayed the victim's eye with exhaust. The victim went to the emergency department and was examined for a burn to the right eyelid, eyeball, and eye lashes. | Medical professionals examined and cleaned the eye, and provided an eye cream. The victim also scheduled an eye doctor appointment | No long-term consequences | Malfunction, errant flightpath of device | Fireworks stand | |

| | | | | | | | | | | | | |
|----|----|---|----------------|------|----------------------|---|--|---|--|--|-----------------|--|
| | | | | | | | | | where the victim as told that the injury was a corneal abrasion. | | | |
| 14 | 30 | M | Foreign body | Face | Treated and released | Multiple tube device, "cake", or multiple shot repeater | The victim was lighting fireworks when one malfunctioned, blowing out the back of a "cake" style firework. The victim was about 25 feet away and felt the impact, with one piece in his face still sparking. The victim went to the emergency department for pain in his face and a small hole inside his cheek. | Medical professionals examined his wound and was given medication for pain management. The victim also was sent to a plastic surgeon and received nerve medication. | No long-term consequences | Malfunction, misfire | A store | |
| 15 | 38 | F | Burns, thermal | Leg | Treated and released | Unknown | The victim was watching fireworks when a family member lit a firework that spun out of control and hit the victim's left ankle. The victim applied ice and Vaseline before going to an urgent care facility, who suggested the victim go to the emergency department due to an underlying condition (sickle cell anemia). The victim went to emergency department via ambulance. | Medical professionals examined the burn, providing ointment and a blood transfusion. | No long-term consequences | Malfunction, errant flightpath of device | Fireworks stand | |
| 16 | 40 | M | Laceration | Hand | Treated and released | Unknown | The victim was on a picnic with friends drinking beer. While lighting fireworks, the second one exploded in the victim's left hand. | Medical professionals examined the hand, taking x-rays and cleaning the damaged area before receiving surgery. | No long-term consequences | Malfunction, misfire | Unknown | |

| | | | | | | | | | | | |
|----|----|---|-----------------------|--------|----------------------|---------|--|--|---------------------------|--|---------|
| 17 | 43 | F | Laceration | Finger | Treated and released | Unknown | The victim was watching a fireworks display when a box of fireworks tipped over and came directly into the crowd instead of shooting up into the air. The victim covered her daughter with her body, causing her to be struck in her right leg and left hand. The victim lost hearing for a day and went to the emergency department after seeing how much blood she was losing. | Medical professionals cleaned the burns, treated them, and administered staples to the hand. The victim was discharged with instructions to follow up with her primary care physician and orthopedic doctor. | Nerve damage | Malfunction, tip over | Unknown |
| 18 | 65 | F | Internal organ injury | Head | Treated and released | Unknown | The victim was at the gathering area for her condominium to watch fireworks that her grandson was planning on firing. The victim was hit in the head by something that came from the direction of others shooting fireworks. The victim was bleeding from the top of her head, and was driven to the emergency department by her husband | Medical professionals examined the wound and received a staple at the top of her head. | No long-term consequences | Malfunction, errant flightpath of debris | Unknown |