



2013 Fireworks Annual Report

Fireworks-Related Deaths, Emergency Department-Treated Injuries, and Enforcement Activities During 2013

June 2014

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Executive Summary

This report provides the results of the U.S. Consumer Product Safety Commission (CPSC) staff's analysis of data on nonoccupational, fireworks-related deaths and injuries during calendar year 2013. The report also includes a summary of CPSC staff's enforcement activities during 2013.

Staff obtained information on fireworks-related deaths from news clippings and other sources in the CPSC's Injury and Potential Injury Incident file (IPII) and the CPSC's Death Certificate File. Staff estimated fireworks-related injuries treated in hospital emergency departments from CPSC's National Electronic Injury Surveillance System (NEISS). CPSC staff conducted a special study of nonoccupational fireworks-related injuries occurring between June 21, 2013 and July 21, 2013. The special study included collection and analysis of more detailed incident information, such as the type of injury, the fireworks involved, and the characteristics of the victim and the incident scenario. About 65 percent of the estimated annual fireworks-related, emergency department-treated injuries for 2013 occurred during that period.

Highlights of the report follow:

Deaths and Injuries

- CPSC staff received reports of eight nonoccupational fireworks-related deaths occurring in six incidents during 2013. In the first incident, two victims—a 33-year-old male and a 49-year-old female—succumbed to a building fire that was ignited by fireworks powder. In the second incident, a 35-year-old male suffered massive trauma to his head when a 1.3G device¹ exploded in his face; the victim died from his injuries 5 days later. In the third incident, a 54-year-old male perished when he held a launching tube in his hand at chest level and ignited an altered mortar shell. The explosion blew the base out of the tube and impacted the victim's chest. In the fourth incident, another two victims—a 34-year-old male and a 35-year-old female—died in a house fire that was sparked by a cigarette and fireworks. In the fifth incident, a 46-year-old male was fatally injured when an explosion occurred in a trailer where he was making illegal fireworks. In the sixth incident, a 42-year-old male died of an explosive injury to his head when he leaned over to light a firework with a cigarette. Reporting of fireworks-related deaths for 2013 is not complete, and the number of deaths in 2013 should be considered a minimum.
- Fireworks were involved in an estimated 11,400 injuries treated in U.S. hospital emergency departments during calendar year 2013 (95 percent confidence interval 8,100–14,600).

¹ A 1.3G aerial fireworks device is a professional display firework device that requires a license from the Bureau of Alcohol, Tobacco, Firearms and Explosives.

- There is not a statistically significant trend in estimated emergency department-treated injuries from 1998 to 2013.
- An estimated 7,400 fireworks-related injuries (or 65 percent of the total estimated fireworks-related injuries in 2013) were treated in U.S. hospital emergency departments during the 1-month special study period between June 21, 2013 and July 21, 2013 (95 percent confidence interval 4,900–9,900).

Results from the 2013 special study

- Of the fireworks-related injuries sustained, 57 percent were to males, and 43 percent were to females.
- Children younger than 15 years of age accounted for approximately 40 percent of the estimated 2013 injuries. More than half of the estimated emergency department-treated, fireworks-related injuries were to individuals younger than 20 years of age.
- There were an estimated 2,300 emergency department-treated injuries associated with sparklers and 300 with bottle rockets.
- There were an estimated 800 emergency department-treated injuries associated with firecrackers. Of these, an estimated 28 percent were associated with small firecrackers, an estimated 19 percent with illegal firecrackers, and an estimated 53 percent with firecrackers for which there was no specific information.
- The parts of the body most often injured were hands and fingers (an estimated 36 percent); head, face, and ears (an estimated 22 percent); eyes (an estimated 16 percent); and legs (an estimated 14 percent).
- Sixty-two percent of the emergency department-treated injuries were burns. Burns were the most common injury to all parts of the body, except the eyes, where contusions, lacerations, and foreign bodies in the eyes occurred more frequently.
- Approximately 90 percent of the victims were treated at the hospital emergency department and then released. An estimated 8 percent of patients were treated and transferred to another hospital or admitted to the hospital.

CPSC staff conducted telephone follow-up investigations of fireworks-related injuries that were reported at NEISS hospital emergency departments during the 2013 special study period and that met certain criteria. Many of these cases were selected for follow-up interviews because they involved potentially serious injuries and/or hospital admissions. Cases were also selected to clarify information in the hospital record about the incident scenario or fireworks type. Thirty-nine telephone interviews were completed. After review, four of these cases were determined to be out of scope because the victim in one incident was injured by a punk—a stick used to ignite fireworks, and

the victims in the other three incidents were treated for injuries or illnesses that were not related to fireworks.

A review of data from telephone follow-up investigations of the 35 in-scope incidents showed that most injuries were associated with misuse or malfunctions of fireworks. Misuse included: igniting fireworks too close to someone or something; lighting fireworks in one's hand; setting off fireworks improperly; and playing with lit or used fireworks. Typical malfunctions included: errant flight paths; tip-over incidents; early or late ignitions; debris; and blowouts. According to the injury investigation reports, most victims recovered from their injuries or were expected to recover completely. However, several victims reported that their injuries might be long term.

Enforcement Activities

During 2013, CPSC's Office of Compliance and Field Operations continued to work closely with other federal agencies to conduct surveillance on imported fireworks and to enforce the provisions of the Federal Hazardous Substances Act (FHSA). Examples of these activities include:

- CPSC staff worked with the U.S. Department of Justice on cases involving companies and/or individuals that sold chemicals and components used to make illegal fireworks. It remains a priority for CPSC staff to investigate the sale of kits and components used to make illegal and dangerous explosive devices, such as M-80s and Quarter Sticks. CPSC staff continues to take an active role with industry to facilitate adequate understanding of the regulations and to maintain an open dialogue, if any issues should arise.
- The Compliance and Field Operations staff, in cooperation with U.S. Customs and Border Protection (CBP), continues to conduct surveillance on imported shipments of consumer fireworks. With assistance from CBP, CPSC staff selectively sampled and tested shipments of imported fireworks in fiscal year 2013, for compliance with the FHSA. Approximately 33 percent of the selected and tested shipments were found to contain fireworks that were noncompliant. The majority of violations centered on overloaded report composition. CPSC staff also found an increase in violations for the fuse burn time requirement under 16 C.F.R. § 1507.3(a)(2). CPSC staff requested corrective action on these noncompliant fireworks; and in most cases, firms voluntarily destroyed the noncompliant fireworks. Because CPSC's port surveillance program stops noncompliant fireworks at import, fewer violative and dangerous imported fireworks are reaching retail stores and roadside stands.

According to 2013 statistics from the U.S. International Trade Commission, China manufactures more than 98 percent of all fireworks imported into the United States. Recognizing the global economy, CPSC staff continues to work with our counterpart in China, the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ).

1. Introduction

This report describes injuries and deaths during calendar year 2013, associated with fireworks devices, as well as kits and components used to manufacture illegal fireworks. The report also describes CPSC staff's enforcement activities for 2013. Reports for earlier years in this series can be found at: <http://www.cpsc.gov/en/Research-Statistics/Fuel-Lighters-and-Fireworks1/Fuel-Lighters-and-Fireworks-Reports/Injury-Statistics/>.

This report is organized into seven sections. Section 1 contains a description of the data and statistical methods used in this analysis. Section 2 summarizes the 2013 fireworks incidents that resulted in deaths. Section 3 provides an annual estimate of fireworks-related, emergency department-treated injuries for the United States in 2013, and compares that estimate with the estimated injuries for previous years. Section 4 analyzes emergency department-treated, fireworks-related injuries occurring during the month around July 4, 2013. Section 5 summarizes the telephone in-depth investigations of a subsample of the injuries during that period. Section 6 describes enforcement activities of CPSC's Office of Compliance and Field Operations during 2013. The report concludes with a summary of the findings in Section 7. Appendix A presents a table on the relationship between fireworks-related injuries and fireworks imports between 1998 and 2013. Appendix B contains more detail on the completed telephone investigations.

Sources of Information

Information on nonoccupational fireworks-related deaths occurring during 2013 was obtained from the CPSC's Injury and Potential Injury Incident file (IPII) and the CPSC's Death Certificate File. 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. The purpose of these investigations was 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 death certificates from the various states to complete the Death Certificate File, neither data source can be considered complete for the number of 2012 or 2013 fireworks-related deaths at the time this report was prepared. As a result, the number of deaths should be considered a minimum. Staff updates the number of deaths for previous years when reports are received. Total deaths for previous years may not coincide with the numbers in reports for earlier years because of these updates.

The source of information on nonoccupational, emergency department-treated fireworks-related injuries is the National Electronic Injury Surveillance System (NEISS).

NEISS is a probability sample of U.S. hospitals with emergency departments.² 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 160-character narrative that often contains a brief description of how the injury occurred.

To supplement the information available in the NEISS record, every year, during the month around July 4, CPSC staff conducts a special study of fireworks-related injuries. Staff focuses its 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 staffs show patients pictures of different types of fireworks to help them identify the type of fireworks device associated with their injuries. The type of fireworks involved in the incident is written into the NEISS narrative. In 2013, the special study period lasted from June 21 to July 21.

After reading the incident case records, including the narrative description of the fireworks device and the incident scenario, CPSC staff may assign a case for telephone investigation. Cases are usually selected because they 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 are able to collect information for one-third to one-half of the cases assigned. Information on the final status of the telephone interviews conducted during the 2013 special study is found 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, there are three different levels of information that may be available about a fireworks-related injury case. For the 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. During the special study period, more information is available for analysis because the NEISS record collected by the emergency department usually contains the type of fireworks and additional details on the incident scenario. The most information is available for the subset of the special study cases where staff conducted telephone investigations. These

² For a description of NEISS, including the revised sampling frame, see Kessler and Schroeder (1998). 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.

different levels of information about injuries correspond to different analyses in the report, as follows:

- 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 on the incident scenario is available. Consequently, there is not enough information to determine the role played by the fireworks in the incident. This means that the annual injury estimate includes 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.³
- Detailed analyses of injury patterns. The tables in this report that describe fireworks type, body part injured, diagnosis, age and sex of injured people, and other such information, are based on the special study period only. 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, 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 listed in Appendix B. These listings 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 be representative of 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 into account the sampling design.⁴ 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.

³ The only exception to the practice of including all of the cases occurred in 2003, when nine cases representing an estimated 150 emergency department-treated injuries were excluded from the annual injury estimates. These cases resulted from a nightclub fire in West Warwick, RI, which also caused 100 deaths. For details see Greene and Joholske (2004).

⁴ See Schroeder (2000).

This report also contains a number of 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 the data, they have larger relative sampling errors (*i.e.*, larger coefficients of variation) than the annual injury estimate or the special study injury estimate. As a result, 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 2013

CPSC has reports of eight nonoccupational, fireworks-related deaths that occurred during 2013. Reporting of fireworks-related deaths for 2013 is not complete, and the number of deaths in 2013 should be considered a minimum. Brief descriptions of the incidents, using wording taken from the incident reports, follow:

- Two victims—a 33-year-old male and a 49-year-old female—from Arkansas, succumbed to a building fire that was ignited by fireworks powder on July 6, 2013. Just before the incident, a witness observed the two victims apparently removing the powder from mortar shells and placing the powder in a pile to fill other mortars. Both victims were smoking cigarettes at the time, according to the witness. The fire destroyed the building and the small living quarters where the victims were living.
- On July 4, 2013, a 35-year-old male from Michigan suffered massive trauma to his head when a 1.3G firework (display firework) exploded in his face. According to a witness, the victim bent over the firework just before the explosion; it is not clear whether the victim was attempting to check the firework or light the firework. The victim was rushed to a hospital and later placed on life support. The victim died from his injuries 5 days later.
- A 54-year-old male from South Carolina bought some consumer fireworks on July 4, 2013. The victim and his son had some beers and started shooting fireworks on the covered porch of their house. The victim lit a mortar shell but the shell failed to ignite. The victim slid the “dummy” shell out of the launching tube and cut a hole into the shell using a pocket knife. Then the victim stuffed the fuse into the hole in the “dummy” shell and inserted the shell into the tube. The victim ignited the new fuse and held the tube at chest level in his hand. The firework exploded, blowing the base out of the tube and impacting the victim in the chest. The victim sustained a 2-inch hole in his chest and died en route to a hospital.

- On June 3, 2013, two victims from Virginia—a 34-year-old male and a 35-year-old female—died in a house fire that was sparked by a cigarette and fireworks. According to the medical examiner’s report, the male victim was making larger fireworks in his home, and a cigarette ignited the fireworks, causing the explosion and fire.
- On June, 30, 2013, a 46-year-old male from Virginia was fatally injured after an explosion occurred in a trailer located next to his home. Officials from the sheriff’s department determined that the victim had been working on fireworks inside the trailer. The victim was known to manufacture his own fireworks using pre-made fireworks, fireworks components, and chemicals. The victim was airlifted to a hospital and died of thermal injuries later that day. The officials found and seized a large amount of commercial-grade fireworks and black powder in the trailer.
- A 42-year-old male from Virginia was found dead on a beach on July 7, 2013. The victim suffered an explosive injury to his head. The police officer found a large PVC pipe that was placed 11 inches into the sand next to the victim, as well as a video camera that was set up near the pipe. Based on the video recorded on that camera, the victim leaned over the pipe with his head and reached around the fireworks device to light the fuse with a cigarette that he was smoking. The video shows that the device exploded, and the screen went blank for the duration of the recording. The death was accidental, according to the medical examiner’s report.

Including the eight deaths described above, CPSC staff has reports of 94 fireworks-related deaths between 2000 and 2013, for an average of 6.7 deaths per year.⁵

⁵ See previous reports in this series (*e.g.*, the report for 2012: Tu and Granados (2013)). In the most recent 3 years, the number of deaths included four deaths in 2010, five deaths in 2011, and six deaths in 2012.

3. National Injury Estimates for 2013

Table 1 and Figure 1 present the estimated number of non-occupational, fireworks-related injuries that were treated in U.S. hospital emergency departments between 1998 and 2013.

Table 1
Estimated Fireworks-Related Injuries: 1998–2013

Year	Estimated Injuries	Injuries per 100,000 People
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
2006	9,200	3.1
2005	10,800	3.7
2004	9,600	3.3
2003	9,300	3.2
2002	8,800	3.1
2001	9,500	3.3
2000	11,000	3.9
1999	8,500	3.1
1998	8,500	3.1

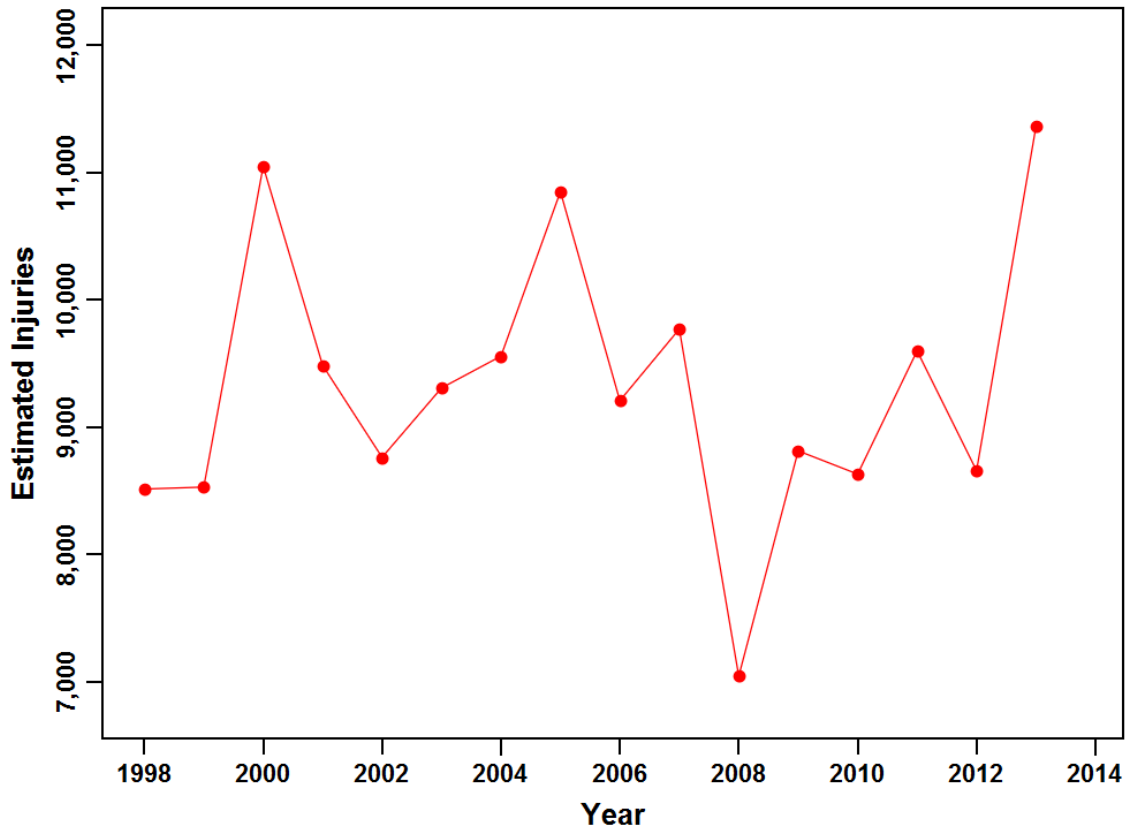
Source: NEISS, U.S. Consumer Product Safety Commission. The estimate for 2003 excludes an estimated 150 emergency department-treated injuries following the nightclub fire in West Warwick, RI. Population estimates for 2010, 2011, 2012, and 2013 are from Table 1. Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2013 (NST-EST2013-01), and estimates for 2000 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-EST2009-01). Population Division, U.S. Census Bureau. Estimates from earlier years are available at: <http://www.census.gov/popest/data/national/totals/1990s/tables/nat-agesex.txt>.

In calendar year 2013, there were an estimated 11,400 fireworks-related, emergency department-treated injuries (95 percent confidence interval 8,100–14,600). There were an estimated 8,700 injuries in 2012. The difference between the injury estimates for 2013 and 2012 is statistically significant.

Figure 1 shows that the highest estimated number of annual fireworks-related injuries was 11,400 in 2013, followed by 11,000 estimated injuries in 2000, and 10,800 estimated injuries in 2005. For the other years, the estimated number of injuries fluctuated between 7,000 and 9,800. In 2008, the estimated number of fireworks-related injuries was 7,000, which was the lowest between 1998 and 2013. There is not a

statistically significant trend detected in the fireworks-related injury estimates from 1998 to 2013.⁶

Figure 1
Estimated Fireworks-Related, Emergency Department-Treated Injuries
1998–2013



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

Appendix A contains a table showing estimated fireworks-related injuries and fireworks imports between 1998 and 2013.

⁶ For details on the method to test a trend that incorporates the sampling design, see Schroeder (2000) and Marker et al. (1999).

4. Injury Estimates for the 2013 Special Study: Detailed Analysis of Injury Patterns

The injury analysis in this section presents the results of the 2013 special study of fireworks-related injuries that were treated in hospital emergency departments between June 21, 2013 and July 21, 2013. During this period, there were an estimated 7,400 fireworks-related injuries (95 percent confidence interval 4,900–9,900), accounting for 65 percent of the total estimated fireworks-related injuries for the year, which is statistically different from the estimated 5,200 fireworks-related injuries in the 2012 special study period.

The remainder of this section provides the estimated fireworks-related 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 2 shows the estimated number and percent of emergency department-treated injuries by type of fireworks device during the special study period of June 21, 2013 to July 21, 2013.

Table 2
 Estimated Fireworks-Related Injuries
 By Type of Fireworks Device
 June 21–July 21, 2013

Fireworks Device Type	Estimated Injuries	Percent
Total	7,400	100
All Firecrackers	800	11
Small	200	3
Illegal	200	2
Unspecified	400	6
All Rockets	800	11
Bottle Rockets	300	4
Other Rockets	500	7
All Other Devices	3,700	50
Sparklers	2,300	31
Fountains	200	3
Novelties	100	2
Multiple Tube	200	3
Reloadable Shells	500	6
Roman Candles	400	6
Homemade/Altered	200	2
Public Display	100	2
Unspecified	1,800	24

Source: NEISS, U.S. Consumer Product Safety Commission. Based on 179 NEISS emergency department-reported injuries between June 21, 2013 and July 21, 2013, and supplemented by 35 completed In-Depth Investigations (IDIs). Fireworks types are obtained from the IDI, when available; otherwise, fireworks 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 the Federal Hazardous Substances Act (FHSA) (16 C.F.R. § 1500.17). Fireworks that may be illegal under state and local regulations are not listed as illegal, unless they violate the FHSA. Subtotal estimates are presented below the estimates for firework type. Estimates are rounded to the nearest 100 injuries. Percentages are calculated from the actual estimates, and they may not add to subtotals or the total due to rounding.

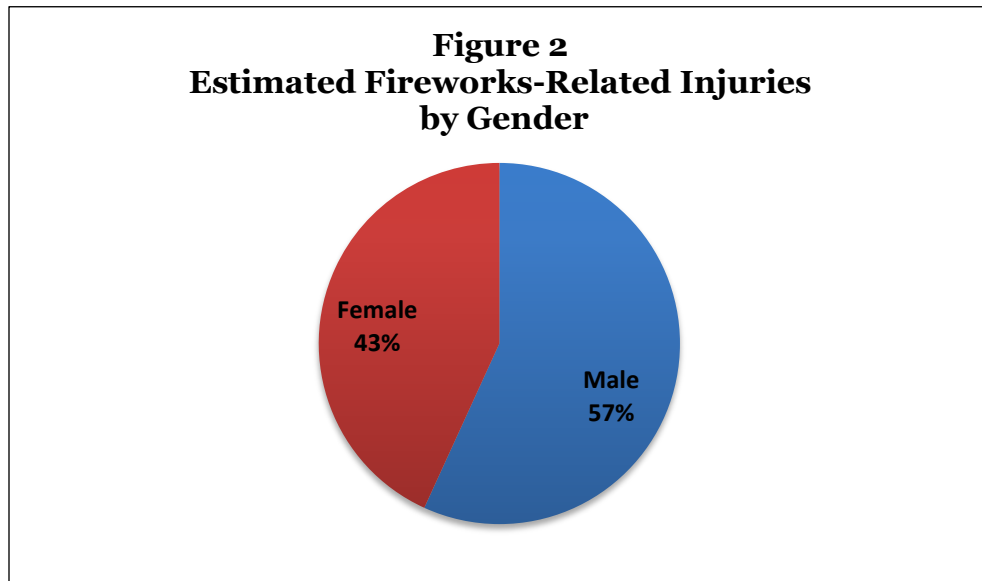
As shown in Table 2, sparklers accounted for an estimated 2,300 emergency department-treated injuries, which represents 31 percent of the total fireworks-related injuries during the special study period. Firecrackers were associated with 800 estimated injuries, 11 percent of the total. Small firecrackers were involved in 200 injuries. The estimate for illegal firecracker-related injuries was 200, as well. However, some of the estimated 400 unspecified firecracker-related injuries, and some of the estimated 1,800 unspecified fireworks-related injuries also may have involved illegal firecrackers. Rockets were involved in 800 estimated injuries, 11 percent of the total. Among the injuries from rockets, 300 injuries were related to bottle rockets. Reloadable shells were

associated with 500 estimated injuries, 6 percent of the total. Roman candles accounted for 400 injuries, 6 percent of the total estimated fireworks-related injuries during the special study period.

Fountains, multiple tube devices, novelty fireworks, public display fireworks, and homemade or altered devices each accounted for 3 percent or less of the estimated injuries in the special study. This is consistent with previous years. While public display, homemade, or altered devices are not associated with a large number of injuries, the larger load in these devices makes them involved disproportionately in serious injuries and deaths.

Gender and Age of Injured Persons

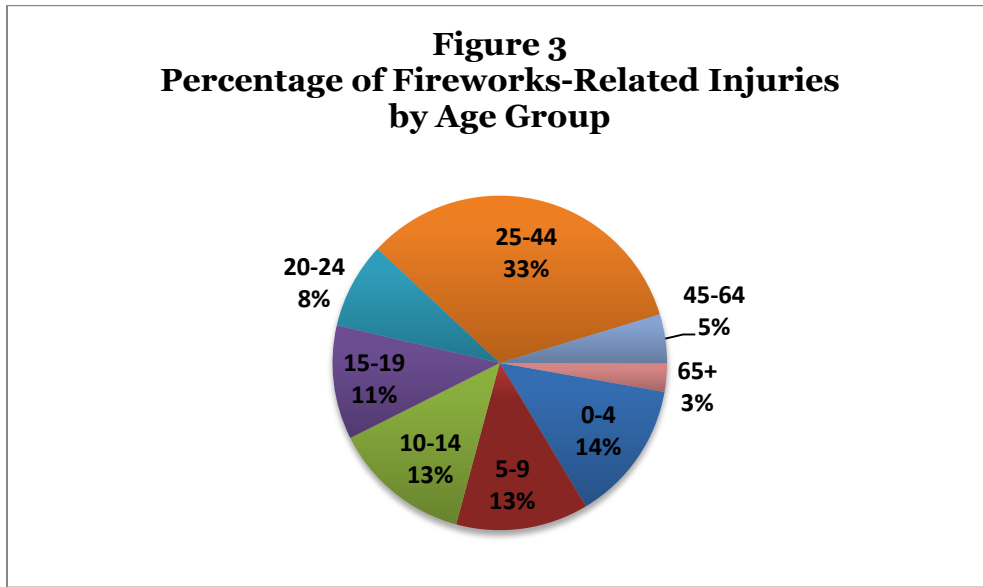
Some 4,200 of the estimated fireworks-related injuries were to males, representing 57 percent of the total injuries. Males experienced an estimated 2.7 fireworks-related, emergency department-treated injuries per 100,000 individuals during the special study period. Females, with an estimated 3,200 emergency department-treated injuries, had 2 injuries per 100,000 people. Figure 2 shows the distribution of estimated fireworks-related injuries by gender.



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

Children and young adults under age 20 constituted 51 percent of the fireworks-related injuries. Children under 5 years old experienced an estimated 1,000 injuries (14 percent of all fireworks-related injuries during the special study period), as shown in Figure 3 and Table 3. Children in the 5- to 14-year-old age group experienced an estimated 1,900 injuries (26 percent of all fireworks-related injuries). Breaking down that age group further, children 5 to 9 years old had an estimated 900 injuries and

children 10 to 14 years old accounted for 1,000 injuries. In the aggregate, children under 15 years old accounted for 40 percent of the estimated fireworks-related injuries.



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

The detailed breakdown by age and gender is shown in Table 3. The concentration of injuries among males and people under 25 has been typical of fireworks-related injuries for many years.

Table 3
Estimated Fireworks-Related Injuries
By Age and Gender
June 21–July 21, 2013

Age Group	Total	Per 100,000 People	Male	Female
Total	7,400	2.4	4,200	3,200
0–4	1000	5.0	500	500
5–14	1,900	4.7	1,100	800
5–9	900	4.6	500	400
10–14	1,000	4.8	600	400
15–24	1,400	3.3	800	600
15–19	800	3.8	600	200
20–24	600	2.7	200	400
25–44	2,500	3.0	1,300	1,200
45–64	400	0.4	300	100
65 +	200	0.5	200	*

Sources: NEISS, U.S. Consumer Product Safety Commission. Annual Estimates of the Resident Population for Selected Age Groups by Sex for the United States, States, Counties, and Puerto Rico Commonwealth and Municipios: April 1, 2010 to July 1, 2012, Source: U.S. Census Bureau, Population Division, Release Date: June 2013. The oldest victim was 72 years old. Estimates are rounded to the nearest 100 injuries. Age subcategory estimates may not sum to the category total due to rounding. Estimates of fewer than 50 injuries and per capita injury rates based on such estimates are denoted with an asterisk (*).

When considering per capita injury rates, children had higher estimated rates of injury than the other age groups during the 2013 special study period. Children younger than 5 years of age had the highest estimated per capita injury rate at 5 injuries per 100,000 population. This was followed by children 10 to 14 years old at 4.8 injuries per 100,000 people and children 5 to 9 years old at 4.6 injuries per 100,000 people.

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

Table 4 shows the ages of those injured by the type of fireworks device associated with the injury. For children under 5 years old, sparklers (79 percent) and firecrackers (11 percent) accounted for 90 percent of the total estimated injuries for that specific age group.⁷

⁷ The percentages are calculated from the actual injury estimates.

No clear relationship between age and fireworks type is suggested by the data in Table 4. 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.*, fountains, multiple tube, and reloadable devices), which can injure people located some distance away from where the fireworks are launched.

Table 4
Estimated Fireworks-Related Injuries
By Device Type and Age Group
June 21–July 21, 2013

Fireworks Type	Total	Age Group					
		0–4	5–14	15–24	25–44	45–64	65+
Total	7,400	1,000	1,900	1,400	2,500	400	200
All Firecrackers	800	100	200	200	200	*	*
Small	200	*	200	*	*	*	*
Illegal	200	*	*	100	*	*	*
Unspecified	400	100	*	100	200	*	*
All Rockets	800	*	300	100	300	100	100
Bottle Rockets	300	*	300	*	*	*	*
Other Rockets	500	*	*	100	200	100	100
Other Devices	3,700	800	900	800	1,000	200	*
Sparklers	2,300	800	600	400	500	100	*
Fountains	200	*	*	100	100	*	*
Novelties	100	*	100	*	100	*	*
Multiple Tube	200	*	*	100	*	*	*
Reloadable	500	*	100	100	100	100	*
Roman Candles	400	*	100	100	100	*	*
Homemade/Altered	200	*	*	100	100	*	*
Public Display	100	*	*	100	*	*	*
Unspecified	1,800	100	500	200	900	*	100

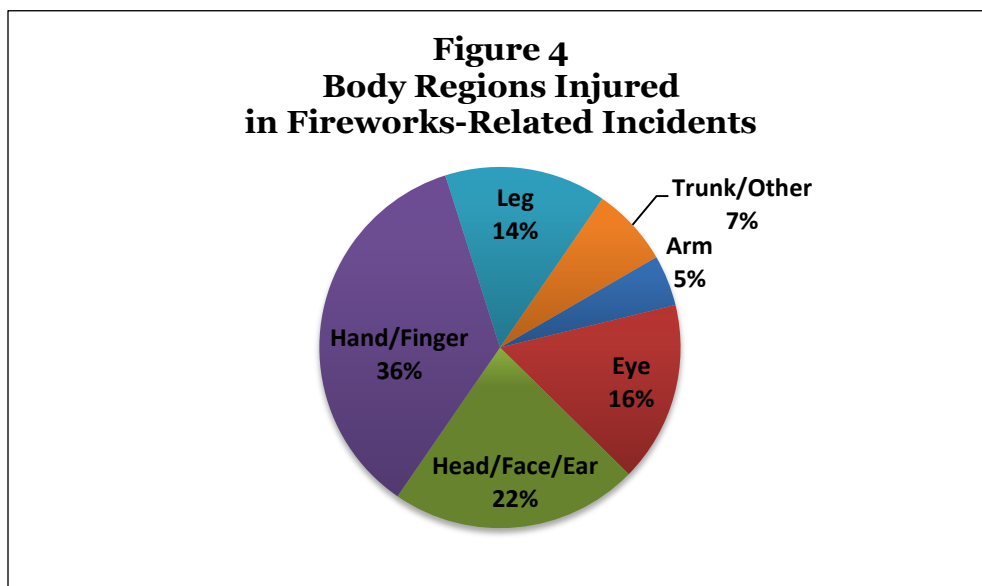
Source: NEISS, U.S. Consumer Product Safety Commission. Estimates are rounded to the nearest 100 injuries. Estimated injuries may not sum to subtotals or totals due to rounding. Estimates of fewer than 50 injuries are denoted with an asterisk (*).

As shown previously in Figure 2, males accounted for 57 percent of the estimated fireworks-related injuries, and females comprised 43 percent. Males accounted for a

majority of the estimated injuries from firecrackers, all rockets, fountains, Roman candles, and unspecified devices. Furthermore, males were associated with all injuries from novelty and homemade devices. Females were involved in more estimated injuries from sparklers, multiple tube devices, reloadable devices, and public display fireworks.

Body Region Injured and Injury Diagnosis

Figure 4 presents the distribution of estimated emergency department-treated injuries by the specific parts of the body to which the injury occurred. Hands and fingers, with an estimated 2,600 injuries, accounted for 36 percent of the total injuries. These were followed by an estimated 1,600 injuries to the head/face/ear region (22 percent); 1,200 eye injuries (16 percent); 1,100 leg injuries (14 percent); 500 injuries to the trunk/other category (7 percent); and 300 arm injuries (5 percent).

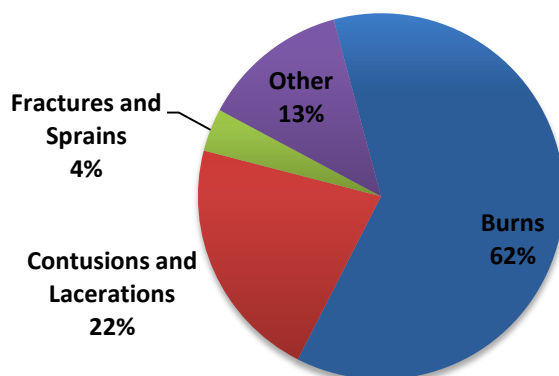


Source: NEISS, U.S. Consumer Product Safety Commission.

Figure 5 shows the diagnoses of the estimated injuries associated with fireworks devices. Burns, with 4,600 estimated injuries (62 percent), were the most frequent injury diagnosis. Contusions and lacerations were associated with 1,600 estimated injuries (22 percent), and fractures and sprains were associated with 300 estimated injuries (4 percent). The remaining 1,000 estimated injuries (13 percent) were attributed to other diagnoses.⁸

⁸ Percentages are calculated from actual injury estimates and do not sum to 100 due to rounding.

Figure 5
Type of Injuries
in Fireworks-Related Incidents



Source: NEISS, U.S. Consumer Product Safety Commission. Percentages do not sum to 100 due to rounding.

The most frequent injuries to the head, face, hands, fingers, legs, arms, and trunk were burns. Most eye injuries were contusions, lacerations, and other diagnoses that included foreign bodies in the eye. This detail is shown in Table 5.

Table 5
 Estimated Fireworks-Related Injuries
 By Body Region and Diagnosis
 June 21–July 21, 2013

Body Region	Total	Burns	Diagnosis		
			Contusions Lacerations	Fractures Sprains	Other Diagnoses
Total	7,400	4,600	1,600	300	1,000
Arm	300	300	*	*	*
Eye	1,200	300	600	*	300
Head/Face/Ear	1,600	800	400	100	300
Hand/Finger	2,600	2,000	300	200	200
Leg	1,100	800	200	*	100
Trunk/Other	500	400	100	*	100

Source: NEISS, U.S. Consumer Product Safety Commission. Fractures and sprains also include dislocations. Other diagnoses include all other injury categories. 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 include chest, abdomen, pubic region, all parts of body, internal, and 25–50 percent of body. Estimates are rounded to the nearest 100 injuries. Estimated injuries may not sum to subtotals or totals due to rounding. Estimates of fewer than 50 injuries are denoted with an asterisk (*).

Type of Fireworks Device and Body Region Injured

Table 6 presents estimated injuries by the type of fireworks device and body region injured.

Table 6
 Estimated Fireworks-Related Injuries
 By Type of Fireworks Device and Body Region Injured
 June 21–July 21, 2013

Fireworks Type	Total	Region of the Body Injured					
		Arm	Eye	Head/Face/Ear	Hand/Finger	Leg	Trunk/Other
Total	7,400	300	1,200	1,600	2,600	1,100	500
All Firecrackers	800	*	*	200	500	*	*
Small	200	*	*	100	100	*	*
Illegal	200	*	*	*	100	*	*
Unspecified	400	*	*	100	300	*	*
All Rockets	800	*	100	300	100	200	100
Bottle Rockets	300	*	100	100	*	100	*
Other Rockets	500	*	*	300	100	100	100
Other Devices	3,700	*	700	500	1,700	700	200
Sparklers	2,300	*	400	200	1,300	300	100
Fountains	200	*	*	*	100	*	100
Novelties	100	*	*	*	100	*	*
Multiple Tube	200	*	*	100	*	*	*
Reloadable	500	*	*	100	*	300	*
Roman Candles	400	*	200	100	100	*	*
Homemade/Altered	200	*	*	100	*	*	100
Public Display	100	*	100	*	*	*	*
Unspecified	1,800	300	200	600	300	200	100

Source: NEISS, U.S. Consumer Product Safety Commission. Estimates are rounded to the nearest 100 injuries. Estimated injuries may not sum to subtotals or totals due to rounding. Estimates of fewer than 50 injuries are denoted with an asterisk (*).

Fifty-eight percent of the estimated sparkler injuries involved the hands and fingers. Fireworks devices that fly or emit sparks were primarily associated with eye, head, and face injuries. These included sparklers, rockets, Roman candles, and public display fireworks.

Hospital Treatment

An estimated 91 percent of the victims of fireworks-related injuries were treated at the emergency department and then released; about 5 percent of victims were treated and transferred to another hospital; approximately 3 percent were admitted to the hospital; and the remaining 2 percent of victims left without being seen.⁹ The treat-and-release percentage was the same as that for all consumer products in 2013.¹⁰

5. Telephone Investigations of Fireworks-Related Injuries

CPSC staff conducted telephone in-depth investigations of some fireworks incidents that occurred during the 1-month special study period surrounding the 4th of July holiday (June 21, 2013 to July 21, 2013). 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 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 199 emergency department-treated, fireworks-related injuries during the special study period, staff selected 111 cases for telephone investigations, of which 35 were completed and determined to be in scope; four were completed and found to be out of scope; and 72 were incomplete. Table 7 shows the final status of these investigations, including the reasons why some investigations were incomplete.

⁹ Percentages may not sum to 100 due to rounding.

¹⁰For all injuries in 2013, 91 percent of patients were treated and released; 1 percent was transferred to other hospitals; 6 percent were admitted to the hospital; and 2 percent had other dispositions, including left hospital without being seen, held for observation, or dead on arrival.

Table 7
Final Status of Telephone Investigations

Final Case Status	Number of Cases	Percent
Total Assigned	111	100
Completed Investigation	39	35
In Scope	35	32
Out of Scope	4	4
Incomplete Investigations	72	65
Failed to Reach Patient	37	33
Victim Name Not Provided by Hospital	20	18
Victim Refused to Cooperate	15	14

Note: Percentages may not add to subtotals or the total due to rounding.

Four cases were found to be out of scope after receiving information in the telephone investigation. Of these four out-of- scope incidents, the victim in one case was injured by a punk (a stick used for lighting a firework fuse), and the victims in the other three cases were treated for injuries or illnesses that were not related to fireworks. Short descriptions of the remaining 35 completed 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 Transferred, and Treated and Released. Within dispositions, cases are in order of increasing age of the victim.

Summary Statistics¹¹

Of the 35 completed cases that were in scope, 19 (54 percent) involved males, and 16 (46 percent) involved females. There were three victims (9 percent) younger than 5 years of age; nine victims (26 percent) ages 5 to 14 years old; 11 victims (31 percent) ages 15 to 24 years old; eight victims (23 percent) ages 25 to 44 years old; and four victims (11 percent) ages 45 to 64 years old. As for emergency department dispositions, one victim (3 percent) was admitted to the hospital; two (6 percent) were treated at the emergency department and transferred to another hospital; and 32 (91 percent) were treated and released.

The most frequently used fireworks devices in these incidents were aerial shells,¹² which were associated with 14 incidents (40 percent). Roman candles were associated with five (14 percent) incidents. Sparklers, public display, and unspecified devices each accounted for four (11 percent) incidents. Firecrackers were associated with three (9 percent) incidents, one (3 percent) was related to large illegal firecrackers, and two (6

¹¹ Percentages may not add to 100 due to rounding.

¹² The category “aerial shells” includes multiple tube, reloadable mortars and rockets, but excludes bottle rockets.

percent) were related to firecrackers of unspecified size. Fountain-type fireworks were involved in one (3 percent) incident.

Note that 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 investigation on more serious injuries and incompletely specified NEISS records. Note also that only 35 percent of the victims selected for the telephone investigations responded.

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 has two or more hazard patterns, the hazard pattern most likely to have caused the injury was selected. Hazard patterns are presented in Table 8, below, and a detailed description of the incidents follows Table 8. Case numbers refer to the case numbers shown in Appendix B.

Table 8
Hazard Patterns, as Described in Telephone Investigations of Fireworks-Related Injuries

Hazard Pattern	Number of Cases	Percent
All	35	100
Misuse	17	49
Igniting Fireworks Too Close to Someone	6	17
Holding (Multiple) Fireworks in Hand	5	14
Being Too Close to Lit Fireworks	2	6
Setting Fireworks Improperly	2	6
Playing with Used Fireworks	1	3
Igniting Fireworks Too Close to a Tree	1	3
Malfunction	17	49
Errant Flight Path	6	17
Tipover	4	11
Early or Late Ignition	4	11
Debris	2	6
Blowout	1	3
Other	1	3
Ash	1	3

Percentages may not add to subtotals or the total due to rounding.

Misuse (17 victims injured, 49 percent).

Seventeen victims were injured when fireworks were used in ways that departed from proper usage.

Igniting Fireworks Too Close to Someone.

- In Case 5, a 4-year-old male sat by a lake with his mother to watch fireworks set off by his family. A Roman candle was lit, and debris from the Roman candle landed on the victim's forearm. As a reaction, the victim closed his arm and suffered second-degree burns to his arm.
- In Case 6, a 4-year-old female was visiting her paternal grandparents and father at their home. Her father set off fireworks from the driveway, and the victim was standing in the garage. One of the fireworks, which might have been a Roman candle, was ignited, and then fell sideways. The firework exploded and started shooting sparks toward the garage. Some of the sparks hit the victim. The victim suffered first-degree burns to the left side of her face.
- In Case 18, a 19-year-old female and her friends were watching fireworks on a dry lake bed. Some of the victim's friends were lighting their own mortars next to the victim. One of the mortars exploded in the tube and hit the victim's leg. The victim sustained a laceration and burns to her leg.
- In Case 24, a 24-year-old female was at an Indian reservation where people were buying and setting off fireworks and partying. The victim was watching fireworks when she heard a boom behind her. When she turned around to look, she was hit in the face by an unspecified firework. The victim sustained second-degree burns to her face and neck. Her eye was swollen shut for 3 days, and her eye lashes and brows were burned off.
- In Case 27, a 34-year-old male watched as a neighbor set off fireworks on a driveway. Several teenagers did not pay attention and knocked over a box of mortars that had been lit already. The mortars started to fire towards the victim, and one mortar exploded in front of him. The victim suffered a corneal abrasion.
- In Case 34, a 48-year-old male was standing on a sidewalk to watch fireworks set off by his neighbor. He looked down, saw a spark, and suddenly was hit in the face by a mortar. The victim suffered a laceration to his cheek and bruised retina.

Holding (Multiple) Fireworks in Hand.

- In Case 3, a 24-year-old male was lighting a sparkler for his son. He had three sparklers in his hand. When he lit one sparkler, it caught others on fire and they fired up in his hand. The victim sustained second-degree burns to his hands.
- In Case 14, a 13-year-old male held an unspecified firework in his hand and ignited it. The victim's mother, who witnessed the incident, said that the victim held onto the firework for too long and it burned his hand. The victim suffered first-degree burns to his hand.
- In Case 15, another 13-year-old male was walking down a street and found an unspecified firework. The victim picked it up and lit it. The firework exploded in his hand. The victim suffered burns to his hand and arm.

- In Case 28, a 34-year-old male was lighting a firework that he described as an M-80 type. When the fuse sparked, the victim got scared and threw his hand back. As a result, the victim hit his hand on an old broken porcelain toilet that was used as a shield in the yard. The victim suffered a laceration to his hand.
- In Case 31, a 39-year-old female ignited a fountain-type firework while holding it in her hand. The firework backfired and burned the victim's hand.

Being too Close to Lit Fireworks.

- In Case 11, a 7-year-old female lit a sparkler, twirled the sparkler around, and moved it in circles. A piece of spark flew off and went into her eye. The victim suffered a corneal abrasion to her eye.
- In Case 7, a 5-year-old female and her mother were lighting sparklers on their driveway. The child's mother had a sparkler lit, and the victim walked in front of her. A spark from the sparkler went into the victim's eye. The victim suffered an abrasion to her eyeball.

Setting Fireworks Improperly.

- In Case 29, a 34-year-old female was in the front yard of a neighbor's house. A 10-year-old child just laid a bottle rocket on the ground and ignited it. The rocket went into the victim's foot, and the victim sustained a puncture wound to her foot. The victim stated that the child did not set up the rocket correctly by just laying it on the ground.
- In Case 10, a 7-year-old boy was in the back yard where his mother was setting off fireworks. His mother held a stick rocket in her hand and ignited it. The rocket went sideways instead of upward. The rocket hit the victim on the side of his face, causing a first-degree burn.

Playing with Used Fireworks.

- In Case 21, a 22-year-old female was sitting around a bonfire on the beach. Someone threw a used Roman candle into the bonfire. The tube of the used Roman candle exploded, and the plastic on the firework flew off. The plastic hit the victim in her cheek and caught her hair on fire. The victim suffered a second-degree burn to her cheek.

Igniting Fireworks Too Close to a Tree.

- In Case 33, a 45-year-old male was doing a fireworks show at his house for the 4th of July. A teenager set off a mortar, but the firework did not shoot high enough into the sky before it exploded. The firework lit a tree on fire. The victim tried to put out the fire, but he sustained second-degree burns to both his hands as a result.

Malfunction (17 victims injured, 49 percent).

Seventeen victims were injured when fireworks reportedly malfunctioned. These injuries resulted from errant flight paths, tipovers, early or late ignitions, debris, and blowout. Note that some of the errant flight path injuries may have involved tipovers, but victims may have been unable to observe the tipover if they were far from the fireworks.

Errant Flight Path.

- In Case 2, a 20-year-old male was at a public fireworks display set up by the local community. A firework was ignited and went “haywire.” The firework went into the victim’s eye. The victim sustained a blunt trauma to his eye. At least four other people were injured in the same incident.
- In Case 4, a 17-month-old baby girl was sitting on her mother’s lap watching fireworks in the front yard. One of the fireworks came out of the sky and landed on the baby’s legs. The victim suffered a second-degree burn to her leg.
- In Case 17, a 17-year-old female was watching fireworks set off by a neighbor. When a multiple-shot firework went off, it shot sideways instead of up in the air. The firework hit the victim on her side. The victim sustained first- and second-degree burns to her neck, shoulder, arm, and hand.
- In Case 26, a 32-year-old male was igniting missile (rocket) fireworks on the street outside of his home. As he lit one missile, the missile shot sideways instead of going upward. The victim ran to get out of the way, and he fell and sprained his neck.
- In Case 30, a 37-year-old female was watching a fireworks display set up by neighbors in their yard. One firework that was supposed to go into the air shot into the crowd of people who were watching. The firework exploded on the victim’s leg. The victim sustained first-, second-, and third-degree burns to her arm and leg.
- In Case 35, a 50-year-old female was at a friend’s house and they were setting off artillery shells from a table. The last tube was ignited, and the shell went sideways instead of upward. The shell got caught between the straps of the victim’s shoe. The victim suffered second- and third-degree burns to the side of her right foot.

Tip-Over Incidents.

- In Case 1, a 30-year-old male was at a party for the 4th of July. People were lighting off mortars. A mortar tube fell over and exploded. The mortar shot out the bottom of the tube and hit the victim in his leg. The victim sustained a large laceration to his right thigh and multiple burns and cuts to his right leg and foot.
- In Case 8, a 6-year-old boy was in the yard watching fireworks being set off on the street. One of the fireworks tipped over and shot into the victim’s shoe. The shoe caught on fire and melted. As a result, the victim suffered first- and second-degree burns to his foot.
- In Case 16, a 16-year-old male was watching fireworks set off on the driveway by a neighbor’s friend. A Roman candle that was ignited, fell over and shot sideways instead of upward. One fire ball hit the victim’s chest and his T-shirt caught on fire. The victim sustained a 9-inch second- to third-degree burn on his chest.
- In Case 19, a 20-year-old female was watching fireworks being set off on the street. One of the multiple-shot fireworks fired off one shot and then fell over before shooting out the remaining shots. Some of the sparks from the firework hit the victim in her ear. The victim suffered second-degree burns to the inside of her ear.

Early or Late Ignition.

- In Case 12, an 8-year-old boy tried to set off a sparkler with a lighter. The sparkler would not ignite, so the victim kept the lighter in place, trying to light the sparkler. Suddenly, the sparkler flared up, and the victim suffered a burn to his thumb.
- In Case 13, a 9-year-old boy ignited a firecracker (size unspecified) and the firework did not go off as expected. The victim thought the firecracker was not lit and went to re-light it; the firecracker exploded in the victim's face. The victim sustained a corneal abrasion to his eyeball.
- In Case 23, a 23-year-old female held a firecracker (size unspecified) in her left hand and lit it. The victim stated that the firecracker exploded as soon as it was ignited and did not give her a chance to throw it. The victim suffered second-degree burns on her left hand, near the middle and little fingers.
- In Case 32, a 45-year-old male took a firework from the garage and put it on the ground. The firework could be a Roman candle, but the victim was not sure. The victim ignited the firework, and it exploded right away. Shrapnel from the firework went into the victim's chest and arms, causing lacerations; shrapnel also went up the victim's pant leg, causing a third-degree burn on the victim's upper leg.

Debris.

- In Case 9, a 6-year-old boy was watching a public fireworks display put on by a homeowner's association at a park. When the victim looked up at the fireworks in the sky, a piece of ash went into his eye. The victim suffered a scratch to his cornea.
- In Case 20, a 21-year-old female was at a public fireworks display. The victim was lying on the ground a good distance from where the fireworks were set off. A piece of firework (metal) went into her eye, and her eye became swollen shut. The victim sustained a corneal abrasion and a first-degree burn to her eye.

Blowout.

- In Case 22, a 23-year-old male and his friends were at a party setting off fireworks on a dock. One of the mortar tubes got too hot, and the firework got stuck and exploded in the tube. The pieces of firework shot out everywhere. Some landed on the victim's foot. The victim suffered second-degree burns to his right foot.

Other (one victim injured, 3 percent).

There was one victim whose injury was related to fireworks, based on the NEISS incident narrative and telephone in-depth investigation (IDI). However, the telephone IDI did not yield enough information to pinpoint definitively the hazard associated with the incident.

Ash.

- In Case 25, a 27-year-old female had attended a town's fireworks display. As she was leaving the area, the wind picked up. Some ash from the fireworks blew into her eye, causing a corneal abrasion.

Long-Term Consequences of Fireworks-Related Injuries

Victims were asked whether there were any long-term consequences of their injuries. Most (33 of 35, or 94 percent) expected complete recoveries with no long-term effects. A few victims reported that they have experienced or might suffer long-term effects of the injuries, as follows:

- In Case 2, the victim sustained blunt trauma to his eye. He still had no vision in his injured eye when he was interviewed and was not sure if the effect of the incident would be long term.
- In Case 18, the victim suffered nerve and muscle damage in her leg and could not walk for a month. The effect of her injuries could be long term.

*Where Fireworks Were Obtained*¹³

Of the 35 telephone survey respondents, 19 (54 percent) knew where the fireworks were obtained. Eleven respondents reported that the fireworks had been obtained from a stand; four stated that the fireworks were obtained from a store; three indicated that the fireworks were obtained from an Indian Reservation; and one said that the fireworks were acquired from a relative.

Eleven victims (31 percent) reported that they did not know the source of the fireworks. This is typically the situation when the victim did not purchase or light the fireworks device that caused the injury.

Four victims (11 percent) declared that they were injured at a public display of fireworks. The remaining victim (3 percent) stated that he found the firework on the ground while walking down a street.

6. Enforcement Activities

The Office of Compliance and Field Operations (Compliance) oversees enforcement activities related to the mandatory requirements for consumer fireworks outlined in 16 C.F.R. § 1507 under the FHSA, 15 U.S.C. §§ 1261-1278, and the banning provisions of the implementing regulation, 16 C.F.R. §§ 1500.17(a)(3), (8),(9),(11) and (12).

¹³ Percentages may not add to 100 due to rounding.

In 2013, Compliance staff continued enforcement of the fireworks regulations, through screening and sampling of fireworks devices arriving in shipments at port, and by surveillance of goods already in commerce for sale. Compliance staff conducted inspections at fireworks retailers that import and sell consumer fireworks devices. Inspections allowed CPSC staff to gather information regarding the business practices of firms, and to collect samples for analysis and testing for compliance with mandatory requirements.

CPSC staff continues to work closely with other federal partners that have an interest in fireworks devices, including the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), the Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), and U.S. Customs and Border Protection (CBP). CPSC staff continues to refer cases to the U.S. Department of Justice regarding businesses that sell fireworks devices found in violation of mandatory requirements under the FHSA and companies and/or individuals who are involved in the sale of chemicals and components used to make illegal fireworks.

Compliance staff maintains as a priority, the investigation of sales of kits and components to make illegal and dangerous explosive devices, such as M-80s and Quarter Sticks. Staff communicates actively with the industry to ensure adequate understanding of the mandatory requirements and to maintain an open dialogue to address any issues that might arise with products in commerce, incident investigation, and follow-up on trade complaints.

As in previous years, Compliance staff continues to monitor imported shipments of consumer fireworks and works closely with CBP on this endeavor. Compliance staff has developed triggers that may flag a shipment for examination. CPSC staff reviews the importation data provided by CBP and notifies the importer and broker when a shipment is selected for further examination. Follow-up correspondence is sent to the firm indicating which items, if any, will be sampled and tested. Fireworks may be selected for testing on a random basis or based upon a number of factors. These factors may include, but are not limited to, the past violation history of the type of device and whether the item had been sampled previously.

With assistance from CBP, CPSC staff sampled and tested shipments of imported fireworks for compliance with the FHSA in fiscal year 2013. Approximately 33 percent of the fireworks devices sampled and tested were found to be noncompliant with mandatory CPSC fireworks regulations. These violative fireworks devices had an estimated import value of \$978,000. The majority of violations found this year involved overloaded report composition. Section 2(q)(1)(b) of the FHSA bans fireworks devices that are intended to produce an audible effect under 16 C.F.R. §1500.17(a)(3) to contain more than 2 grains of pyrotechnic composition, with some exception. Compliance staff also found an increase in the number of violations for the fuse performance requirement under 16 C.F.R. § 1507.3 [Fuses]. In the FHSA there are mandatory standards for cautionary labeling under on fireworks devices (see 16 C.F.R. § 1500). Items that do not meet those standards are classified as misbranded hazardous substances. In 2013, CPSC staff found products that did not meet the cautionary labeling requirements, as well as, violations of other performance standards such as blowout, tipover, and pyrotechnic

leakage. Products that are stopped at import and found to not comply with mandatory requirements for fireworks cannot be distributed in commerce.

CPSC staff's enforcement effort continues to focus on reducing the number of fireworks-related deaths and injuries, by stopping the sale and distribution of consumer fireworks that violate mandatory regulations.

Most fireworks are manufactured outside of the United States. China (98 percent) and Hong Kong (1 percent) are the sources of most imported fireworks.¹⁴ CPSC staff continues to work closely with its counterpart Chinese agency, the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ).

¹⁴ These data are from 2013 statistics from the U.S. International Trade Commission. There were 180.1 million pounds of fireworks imported, with 176.2 million pounds from China (98 percent), and 1.6 million pounds from Hong Kong (1 percent). Staff believes that most fireworks imported from Hong Kong were actually manufactured in China. The next largest exporter was Thailand, with 1.3 million pounds.

7. Summary

In 2013, there were eight reported fireworks-related deaths. However, reporting for 2013 may not be complete at this time. Emergency department-treated injuries are estimated at 11,400 for 2013.

During the 1-month special study period from June 21, 2013 to July 21, 2013, there were an estimated 7,400 emergency department-treated injuries. In 2013, children under 15 years old experienced about 40 percent of the estimated injuries, and males of all ages experienced 57 percent of the estimated injuries.

Additionally, similar to previous years, more than half the estimated injuries during the special study period in 2013 involved burns. Burns were the most frequent injury to all parts of the body, except the eyes, where contusions, lacerations, and other diagnoses (mainly foreign bodies in the eye) occurred more frequently. The parts of the body most often injured were hands and fingers (an estimated 36 percent of the injuries); followed by the head, face, and ears (22 percent); eyes (16 percent); legs (14 percent); trunk (7 percent); and arms (5 percent). Most of the estimated injuries (91 percent) involved treat-and-release dispositions. An estimated 7 percent were treated and transferred to another hospital or admitted to the hospital where the emergency department was located.

Among the different types of fireworks, sparklers were involved in 31 percent of the estimated injuries. Firecrackers were associated with 11 percent of the injuries; reloadable shells and Roman candles each accounted for 6 percent of the injuries; and bottle rockets were associated with 4 percent of the injuries.

A review of data from telephone follow-up investigations showed that the typical causes of injuries were as follows: (1) misuse of fireworks; (2) errant flight paths; (3) tipovers; (4) early or late ignitions; and (5) debris associated with eye irritations. 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 victims reported that the effect of their injuries might be long term.

Finally, in 2013, CPSC staff continued to actively monitor import shipments of fireworks and products in the marketplace. CPSC staff worked with CBP to sample imported fireworks and to seize illegal shipments. Compliance staff conducted inspections at fireworks retailers to collect samples for analysis and testing for compliance with mandatory requirements. Staff also continued working with the Chinese government's AQSIQ. China is the world's largest exporter of fireworks, and almost all fireworks imported into the United States come from China.

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Appendix A Fireworks-Related Injuries and Fireworks Imported

Table A-1 shows that fireworks imports have generally risen over the period 1998–2007, peaking in 2005 at 275.1 million pounds. From 2008 to 2012, fireworks imports have been relatively steady, except for 2011. In 2011, fireworks imports increased to 227.9 million pounds from the 199.6 million pounds imported in 2010. In 2012, fireworks imports decreased to 201.2 million pounds. In 2013, fireworks imports declined further to 180.1 million pounds. The number of estimated emergency department-treated injuries in 2013 was 11,400, which was the highest since 1998. The second highest estimated injuries were 11,000 in 2000. The injury estimates have fluctuated between 7,000 and 10,800 for the other years. As shown in Table A-1 below, the number of injuries per 100,000 pounds of fireworks has declined from 7.5 injuries per 100,000 pounds in 2000, to 3.4 injuries per 100,000 pounds in 2006 and 2008. From 2009 to 2012, the number of injuries per 100,000 pounds of fireworks was noticeably stable at about 4.3 injuries per 100,000 pounds. However, the estimated injuries per 100,000 pounds of fireworks imported were 6.3 in 2013, which was an increase of 47 percent from the previous year.

Table A-1
Estimated Fireworks-Related Injuries and
Estimated Fireworks Imported into the U.S. 1998–2013

Year	Estimated Injuries	Estimated Fireworks Imports (millions of pounds)	Injuries Per 100,000 Pounds
2013	11,400	180.1	6.3
2012	8,700	201.2	4.3
2011	9,600	227.9	4.2
2010	8,600	199.6	4.3
2009	8,800	199.3	4.4
2008	7,000	208.3	3.4
2007	9,800	260.1	3.8
2006	9,200	272.1	3.4
2005	10,800	275.1	3.9
2004	9,600	230.0	4.2
2003	9,300	214.6	4.3
2002	8,800	175.3	5.0
2001	9,500	155.3	6.1
2000	11,000	146.2	7.5
1999	8,500	146.7	5.8
1998	8,500	123.8	6.9

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, using Harmonized Tariff Schedule (HTS code 3604.10). Imports include consumer fireworks (1.4G HTS code 3604.10.90.10 and 3604.10.90.50) and display fireworks (1.3G HTS code 3604.10.10.00). Display fireworks were about 9.1 percent of the total imports in 2013. In addition to imported fireworks used in the United States, there is also a small amount of fireworks manufactured in the United States for domestic consumption; the data for these fireworks is not available from the International Trade Commission and is not shown in this table.

Although the table suggests a relationship between weight and the number of injuries, it should be interpreted with caution. First, the logical unit of exposure is the number of fireworks devices used, instead of the collective weight of the devices because a person is exposed to injury when a device is consumed (*i.e.*, lit). Injuries per 100,000 fireworks devices imported might be more meaningful, but the number of devices imported is not available. Moreover, using weight overrepresents heavy devices and underrepresents light devices. There is no reason to assume that a heavy device is inherently more dangerous than a light device because the weight of the device includes things other than just the amount of explosive material.

In addition, international trade statistics do not provide weight by fireworks device types. Thus, it is not possible to associate injuries with the weight of different types of fireworks imported. As shown in Table 2 earlier in this report, different fireworks devices have different numbers of injuries. Thus, the decrease in injuries per 100,000 pounds between 1997 and 2008 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.

Appendix B
Completed Telephone Investigations

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
1	30	Male	Laceration	Upper Leg	Admit	Aerial Shell	The victim was at a party for the 4 th of July. People were lighting off mortars. The mortar tube fell over, and the lit mortar inside exploded. The mortar shot out the bottom of the tube and hit the victim in his leg. The victim sustained a large laceration to his right thigh and multiple burns and cuts to his right leg and foot.	The victim was admitted to the hospital for 5 days. After discharge, the victim had additional medical visits because he thought that the wounded area had become infected. The victim fully recovered in a month.
2	20	Male	Other	Eye	Treat and Transfer	Public Display	The victim was at a fireworks display set up by a local community. A firework was ignited and went "haywire." The firework went into the victim's eye. The victim sustained blunt trauma to his eye. At least four other people were injured in the same incident.	The victim called his grandparents, and they got him to the emergency department (ED). He was transferred to another hospital for one night. After discharge from the hospital, the victim saw a specialist every other day. The victim still had no vision in his injured eye when he was interviewed for this report.
3	24	Male	Thermal Burns	Hand	Treat and Transfer	Sparkler	The victim was lighting a sparkler for his son. He had three sparklers in his hand. When he lit one sparkler, the other sparklers caught on fire in his hand. He sustained second-degree burns to his hand.	The victim went to the ED where he was treated and transferred. He was hospitalized for 1 day. The victim had follow-up medical visits to make sure his hand healed correctly after discharge from the hospital. He fully recovered in 2-and-a-half weeks.
4	17 months	Female	Thermal Burns	Knee	Treat and Release	Unspecified	The victim was sitting on her mother's lap watching fireworks in the front yard. A firework came out of the sky and landed on their legs. The victim sustained a second-degree burn to her leg.	The victim recuperated fully in 3 weeks.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
5	4	Male	Thermal Burns	Elbow	Treat and Release	Roman candle	The victim sat by a lake with his mother to watch fireworks set off by his family member. A Roman candle was lit, and debris from one of the shots came down and landed on the victim's forearm. The victim reacted by closing his arm. The victim sustained second-degree burns to his arm.	The victim recovered in 2 weeks.
6	4	Female	Thermal Burns	Face	Treat and Release	Roman candle	The victim was visiting her paternal grandparents and father at their home. The victim's father was setting off fireworks from the driveway, and the children, including the victim, were standing in the garage. One of the fireworks, which might have been a Roman candle, was ignited on the ground and then fell sideways. The firework exploded and started shooting sparks toward the garage. Some of the sparks hit the victim on the left side of her face, causing first-degree burns.	The victim recovered completely in 2 days.
7	5	Female	Contusions Abrasions	Eye	Treat and Release	Sparkler	The victim and her mother were lighting sparklers on their driveway. The mother had a sparkler lit and the victim walked in front of her. A spark from the sparkler went into the victim's eye. The victim suffered an abrasion to her eye ball.	The victim recovered in 3 days.
8	6	Male	Thermal Burns	Foot	Treat and Release	Multiple Tube Device	The victim was standing in the yard watching fireworks being set off on the street. One of the lit fireworks tipped over and shot into the victim's shoe and set the shoe on fire. The victim's shoe melted and the victim sustained first- and second-degree burns to his foot.	The victim had not recovered when the interview was conducted. His parent thought it might take a month for him to fully recover.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
9	6	Male	Contusions Abrasions	Eye	Treat and Release	Public Display	The victim was watching a public fireworks display set up by the home owner's association at a park. When he looked up at the fireworks in the sky, a piece of ash from the fireworks went into his eye. The victim sustained a scratch to his cornea.	The victim recuperated the next day.
10	7	Male	Thermal Burns	Face	Treat and Release	Stick Rocket	The victim was in the backyard where his mother was setting off fireworks. His mother held a stick rocket in her hand and ignited it. The rocket went sideways instead of upward. The firework hit the victim on the side of his face, causing a first-degree burn.	The victim recovered in a week.
11	7	Female	Contusions Abrasions	Eye	Treat and Release	Sparkler	The victim lit a sparkler, twirled it around, and moved it in circles. A piece of the spark flew off and went into her eye. The victim suffered a corneal abrasion to her eye.	The victim saw an eye doctor to check her vision and to get eye drops after treatment in the ED. She fully recovered in 1 to 2 days.
12	8	Male	Thermal Burns	Finger	Treat and Release	Sparkler	The victim tried to set off a sparkler with a lighter. The sparkler would not ignite so the victim kept the lighter in place trying to light it. Suddenly, the sparkler flared up, and the victim suffered a burn to his thumb.	The victim recuperated in 1 to 2 days.
13	9	Male	Contusions Abrasions	Eye	Treat and Release	Firecracker, Size Unknown	The victim ignited a firecracker but the firecracker did not go off as expected. The victim thought that the firecracker was not lit and went to re-light it, and the firecracker exploded into his face. The victim sustained a corneal abrasion to his eyeball.	The victim fully recovered in 2 days.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
14	13	Male	Thermal Burns	Hand	Treat and Release	Unspecified	The victim held an unspecified firework in his hand and ignited it. The victim's mother, who witnessed the incident, stated that the victim held onto the firework for too long and it burned his hand. The victim suffered first-degree burns to his hand.	The victim recovered fully in 2 weeks.
15	13	Male	Thermal Burns	Hand	Treat and Release	Unspecified	The victim was walking down the street and found an unspecified firework. He picked it up and lit it. The firework exploded in his hand. The victim sustained burns to his hand and arm.	The victim recuperated in a few days.
16	16	Male	Thermal Burns	Upper Trunk	Treat and Release	Roman candle	The victim and his father were watching their neighbor's friend set off fireworks on their driveway. When a Roman candle was ignited, it fell over and shot sideways instead of upward. One fire ball hit the victim's chest and his T-shirt caught on fire. The victim sustained a second- and third-degree burn that was about 9 inches on his chest.	The victim had additional treatments to see if the burn was healing properly. The victim had not recovered when the interview was conducted, and he may have a skin graft later. His parent stated that it might take 4 months for him to recover fully.
17	17	Female	Thermal Burns	Hand	Treat and Release	Multiple Tube Device	The victim was watching a neighbor set off fireworks on the street. When a multiple-shot firework went off, it shot out sideways instead of up in the air. The firework hit the victim on her side. The victim sustained first- and second-degree burns to her neck, shoulder, arm and hand.	The victim followed up with her primary care physician the next day. She recovered fully in 2 weeks.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
18	19	Female	Laceration	Knee	Treat and Release	Aerial Shell	The victim and her friends were watching fireworks at a dry lake bed. A lot of people brought their own fireworks and were lighting them off as well. Some of the victim's friends were lighting off mortars right next to the victim. One of the mortars exploded in the tube and hit the victim in her leg. The victim sustained a laceration and burns to her leg.	The victim had an additional medical treatment to remove stitches. She had nerve and muscle damages in her leg and could not walk for a month. The victim had not recovered when she was interviewed.
19	20	Female	Thermal Burns	Ear	Treat and Release	Multiple Tube Device	The victim was watching fireworks being set off on the street. One of the multiple-shot fireworks fired out one shot and then fell over before shooting out the remaining shots. Some of the sparks from the fireworks hit the victim in her ear. The victim sustained second-degree burns to the inside of her ear.	The victim had not recovered when she was interviewed, and it had been 2 weeks since she was injured. The victim hoped that it would not take much longer for her to recuperate fully.
20	21	Female	Thermal Burns	Eye	Treat and Release	Public Display	The victim was at a public display of fireworks set up by the town. She was lying on the ground a good distance from where the fireworks were ignited. A piece of the firework (metal) went into her eye, and her eye became swollen shut. The victim also sustained a corneal abrasion and first-degree burn to her eye.	The victim recovered fully in a month.
21	22	Female	Thermal Burns	Face	Treat and Release	Roman candle	The victim was sitting by a bonfire on a beach area. Someone threw a Roman candle that had already been fired off into the bonfire. The tube of the used Roman candle exploded and the plastic flew off. It hit the victim in her cheek and caught her hair on fire. The victim sustained a second-degree burn to her cheek.	After being treated at the ED, the victim saw a dermatologist to check for infection of her wound. The victim recovered fully in 2-and-a-half weeks

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
22	23	Male	Thermal Burns	Foot	Treat and Release	Aerial Shell	The victim and his friends were at a party setting off fireworks on a dock. One of the mortar tubes got too hot, and the firework got stuck and exploded in the tube. The pieces of the firework shot out everywhere. Some landed on the victim's foot. The victim sustained second-degree burns to his right foot.	The victim recovered fully in a month.
23	23	Female	Laceration	Hand	Treat and Release	Firecracker, Size Unknown	The victim held a firecracker (size unspecified) in her left hand and lit it. The victim stated that the firecracker exploded as soon as it was ignited and did not give her a chance to throw it. The victim sustained second-degree burns on her left hand near the middle and little fingers.	The victim had not recovered when she was interviewed for this report. She expected to recover fully in approximately 2 months.
24	24	Female	Thermal Burns	Face	Treat and Release	Unspecified	The victim was at an Indian reservation where people were buying, lighting off fireworks, and partying. The victim was watching the fireworks when she heard a boom behind her. When she turned around to look, she was hit in the face by an unspecified firework. The victim sustained second-degree burns to her face and neck. Her eye was swollen shut for three days, and her eye lashes and brows were burned off.	The victim saw an eye doctor to check her vision after the treatment at the ED. The victim still had face burns, her eye lashes and eye brows had not grown back, and she had not recovered when she was interviewed.
25	27	Female	Contusions Abrasions	Eye	Treat and Release	Public Display	The victim had attended a display of fireworks. She was leaving the area when the wind picked up. Some ash from the fireworks blew into her eye causing a corneal abrasion.	The victim had an additional medical visit to see how her eye was healing. She recuperated fully in 21 days.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
26	32	Male	Strain/Sprain	Neck	Treat and Release	Missile Rocket	The victim was igniting missile (rocket) fireworks outside of his home on the street. As he lit one missile, it shot sideways instead of going upward. The victim ran to get out of the way, and he fell and sprained his neck.	The victim recovered fully in 2 days.
27	34	Male	Contusions Abrasions	Eye	Treat and Release	Multiple Tube Device	The victim was standing and watching fireworks being set off by a neighbor on a driveway. A couple of teenagers did not pay attention and knocked over a box of mortars that had already been lit. The mortars started to fire towards the victim and one exploded in front of him. The victim sustained a corneal abrasion.	The victim had a follow-up visit with an ophthalmologist after the treatment at the ED. He fully recovered in 1 to 2 weeks.
28	34	Male	Laceration	Hand	Treat and Release	Large Firecracker	The victim was lighting a firework that he described as an M-80 type. When the fuse sparked, the victim got scared and threw his hand back. As a result, the victim hit his hand on an old broken porcelain toilet that was used as a shield in the yard. The victim sustained a laceration to his hand.	The victim recuperated in a few days.
29	34	Female	Puncture	Foot	Treat and Release	Rocket	The victim was in the front yard of a neighbor's house. A 10-year-old child just put a bottle rocket on the ground and ignited it. The rocket went into the victim's foot causing a puncture. The victim stated that the child did not set up the rocket correctly by just laying it on the ground.	The victim recovered in 3 days.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
30	37	Female	Thermal Burns	Upper Leg	Treat and Release	Aerial Shell	The victim was watching a firework display set up by neighbors in their yard. A firework that was supposed to fire into the air shot into the crowd of people who were watching instead. The firework exploded on the victim's leg. The victim sustained first-, second- and third-degree burns to her arm and leg.	The victim had additional medical visits to make sure that she cared for her wounds properly. She recovered fully in 2 to 3 weeks.
31	39	Female	Thermal Burns	Hand	Treat and Release	Fountain	The victim ignited a fountain type of firework while holding it in her hand. The firework backfired and the victim sustained second-degree burns on three fingers of her right hand.	The victim fully recovered in 2 weeks.
32	45	Male	Laceration	Upper Trunk	Treat and Release	Roman candle	The victim was at a friend's house. He took a firework—might be a Roman candle, but he was not sure—from the garage and put it on the ground to ignite it. The firework exploded right away when it was lit. Shrapnel from the firework went into the victim's chest and arms causing lacerations, and some shrapnel went up to his pant leg causing a third-degree burn on his upper leg.	After the treatment at the ED, the victim went to see his doctor twice to make sure that the wounds were healing. He recovered fully in 2 weeks.
33	45	Male	Thermal Burns	Hand	Treat and Release	Aerial Shell	The victim was having a party and doing a fireworks show at his house for the 4th of July. One teenager got hold of a mortar and set it off. The firework did not shoot high enough into the sky before it exploded, and it caught a tree on fire. The victim tried to put the fire out, and as a result he sustained second-degree burns to both of his hands.	The victim had four additional follow-up treatments after the ED visit. He had not recovered when he was interviewed. It might take three months for him to recuperate fully.

Case	Age	Sex	Diagnosis	Body Part	Disposition	Fireworks Type	Incident Description	Medical Treatment and Prognosis
34	48	Male	Laceration	Face	Treat and Release	Aerial Shell	The victim was standing on a sidewalk and watching fireworks set off by his neighbor. All of a sudden, he looked down and saw a spark. He was hit in the face by a mortar. The victim sustained a laceration to his cheek and a retinal bruising.	After the treatment at the ED, the victim saw an eye doctor and followed up with his primary doctor as well. He fully recovered in 1 to 2 weeks.
35	50	Female	Thermal Burns	Foot	Treat and Release	Aerial Shell	The victim was at a friend's house and they were setting off artillery shells from a table. The last tube was ignited and the shell went sideways instead of upward. The shell got caught between the straps of the victim's shoe. The victim sustained a second- to third-degree burn on the side of her right foot. The burn was about the size of a golf ball.	After the treatment at the ED, the victim saw her family doctor every two weeks to ensure that the burn was healing properly and there was no infection. The victim was still recovering when she was interviewed, and she expected to recover fully in less than 3 months.