



2008 Fireworks Annual Report

Fireworks-Related Deaths, Emergency Department-Treated Injuries, and Enforcement Activities During 2008

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This report was prepared by the CPSC staff, has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

Executive Summary

This report provides the results of the U. S. Consumer Product Safety Commission (CPSC) staff analysis of data on non-occupational fireworks-related deaths and injuries during 2008. The report also includes a summary of CPSC staff enforcement activities during 2008.

Staff obtained information on fireworks-related deaths from news clippings and other sources in CPSC's Injury and Potential Injury Incident (IPII) database. Staff estimated fireworks-related injuries from CPSC's National Electronic Injury Surveillance System (NEISS). More detailed analyses of injuries including the type of injury, the fireworks involved, and the characteristics of the victim were based on a special study conducted by CPSC staff between June 20 and July 20, 2008. About two-thirds of the annual fireworks-related injuries for 2008 occurred during that period.

Highlights of the report are as follows:

- CPSC staff has reports of 7 fireworks-related deaths during 2008. Two people were killed in incidents involving aerial and display fireworks. One person died in a fire where a firework was the ignition source. Three people were killed in incidents involving homemade fireworks. One person, on oxygen, suffered serious burns when a firecracker exploded near his face. He died 18 days later in the hospital. CPSC staff has reports of 11 fireworks-related deaths in 2007.
- Fireworks were involved in an estimated 7,000 injuries treated in U. S. hospital emergency departments during calendar year 2008 (95 percent confidence interval 5,200 – 9,000). CPSC staff estimated that there were 9,800 fireworks-related injuries during 2007.
- An estimated 5,000 fireworks-related injuries (or 70 percent of the total fireworks-related injuries) were treated in U.S. hospital emergency departments during the one-month special study period between June 20, 2008 and July 20, 2008 (95 percent confidence interval 3,400 – 6,500). CPSC staff estimated that there were 6,300 fireworks-related injuries (66 percent of the annual total) during the 2007 special study period.

Results from the special study include the following:

- Of the fireworks-related injuries sustained, 62 percent were to males and 38 percent were to females.
- Injuries to children were a major component of total fireworks-related injuries with children under 15 accounting for 40 percent of the estimated injuries. Children and young adults under 20 had 58 percent of the estimated injuries.

- There were an estimated 900 injuries associated with firecrackers. Of these, 500 were associated with small firecrackers, 100 with illegal firecrackers, and 300 where the type of firecracker was not specified.
- There were an estimated 800 injuries associated with sparklers and 300 with bottle rockets.
- The parts of the body most often injured were hands and fingers (estimated 1,400 injuries), eyes (1,000 injuries), and legs (900 injuries).
- More than half of the 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 eye occurred more frequently.
- Most patients were treated at the 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 some fireworks-related injuries reported at NEISS hospital emergency departments during the special study period. Most cases were selected for follow-up because they involved potentially serious injuries and/or hospital admissions. Thirty telephone interviews were completed.

A review of data from telephone follow-up investigations of those 30 incidents showed that most fireworks injuries were associated with misuse or malfunctions. Typical malfunctions included the following: fireworks exploding earlier or later than expected, errant flight paths and the launching tubes of aerial shells tipping over. Misuse included unsupervised children lighting fireworks, making homemade fireworks, and mischief. According to the investigations, most victims already had recovered from their injuries or were expected to recover completely, but several victims reported that the injuries could result in long-term effects.

During 2008, CPSC's Office of Compliance and Field Operations continued to work closely with other agencies to conduct surveillance on imported fireworks and to enforce the provisions of the Federal Hazardous Substances Act. Examples of these activities are as follows:

- With assistance from the Bureau of Customs and Border Protection, staff from CPSC selectively sampled and tested 211 shipments of fireworks in fiscal year 2008 to determine if they were in compliance with the Federal Hazardous Substances Act. Approximately 49 percent of those shipments were found to contain fireworks that were noncompliant.
- CPSC staff worked with other Federal agencies, including the Bureau of Alcohol, Tobacco, Firearms and Explosives, the Department of Justice's Office of Consumer Litigation, as well as state and local law enforcement agencies. Staff

provided legal, field, and technical support in cases involving the distribution of illegal explosive devices and the illegal diversion of professional fireworks to consumers.

Reflecting the international global economy, CPSC staff continues to work with our counterpart in China, the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ). The AQSIQ and the CPSC established four working groups on consumer products, one of which focuses on fireworks. According to 2008 statistics from the U. S. International Trade Commission, more than 97 percent of all fireworks imported into the United States were manufactured in China.

1. Introduction

This report describes injuries and deaths associated with fireworks during 2008. The report also describes CPSC staff enforcement activities for 2008. Reports for earlier years in this series can be found on the internet at www.cpsc.gov/library/data.html.

This report is organized into seven sections. Section 1 contains a description of the data and statistical methods used in the staff analysis. Section 2 summarizes fireworks incidents resulting in deaths. Section 3 provides a national annual estimate of fireworks-related emergency department-treated injuries for 2008 and compares that estimate with those for previous years. Section 4 analyzes emergency department-treated fireworks-related injuries occurring during the month around July 4th. Section 5 summarizes the in-depth telephone investigations of a subsample of the injuries during the July 4th period. Section 6 describes enforcement activities by CPSC's Office of Compliance and Field Operations during 2008. The main body of the report then 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 1996 and 2008. Appendix B contains more detail on the completed telephone investigations.

Sources of Information

Information on non-work-related fireworks deaths occurring during 2008 was obtained from the CPSC Injury and Potential Injury Incident file (IPII) and CPSC's Death Certificate File. Entries in IPII come from sources such as newspaper articles, consumer complaints, referrals by lawyers, 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 and the circumstances that led to the fatal injuries.

Because IPII is based on voluntary reports and because it can take more than two years to receive all death certificates from the various states to complete the Death Certificate File, neither data source can be considered complete for 2008 fireworks-related deaths at the time this report was prepared. As a result, the number of deaths for 2008 might have been greater than the number reported here. Staff updates the number of deaths for previous years when reports are received. Total deaths for previous years may not agree with numbers in reports for earlier years because of such updates.

The source of information on fireworks-related injuries is the National Electronic Injury Surveillance System (NEISS). NEISS is a probability sample of U.S. hospitals with emergency departments.¹ Injury information is taken from the emergency

¹ 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 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.

department record. This information includes the victim's age and sex, where the injury occurred, the emergency department diagnosis, 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 4th, CPSC staff conducts a special study of fireworks-related injuries. In 2008, the special study period was from June 20, 2008 to July 20, 2008. Staff efforts focus on fireworks during this period because in most years, about two-thirds of the annual injuries occurred then.² During this period, hospital emergency department staff shows patients pictures of different types of fireworks in order to help them identify the type of fireworks device associated with their injuries. The type of fireworks involved in the incident is then written in the NEISS narrative.

After reading the case records, including the narrative description of the firework and the incident scenario, CPSC staff may then assign cases for telephone investigations. Most cases were selected because they involved the most serious injuries and/or hospital admissions. Serious injuries included eye injuries, finger and hand amputations, and head injuries. Cases also may be assigned to obtain more information about the incident reported in the NEISS narrative. In most years, phone interviewers are able to collect information from between one-third and one-half of the cases assigned. Information on the final status of the telephone interviews is found in Section 5.

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 it was obtained, how the injury occurred, and the medical treatment and prognosis. When the fireworks device reported is different from that 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 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 4th 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 usually contains the type of fireworks and additional details on the incident scenario. The most information is available for a subset of the special study cases where there are telephone investigations. These different levels of information about injuries correspond to different analyses in the report as follows:

- Estimated national annual fireworks-related 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

² For example, see Greene and Joholske (2008).

limited information on the incident scenario. 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 where 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 with previous years.³

- Detailed analyses of injury patterns. The tables in the 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 types are 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 where the fireworks device was not lit or no attempt was made to light the device.
- Information from the telephone investigations. Individual case injury descriptions and medical prognosis information from the telephone investigations are listed in Appendix B. These listings also exclude cases where 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.

Statistical Methods

Injuries reported by NEISS sample hospitals 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 4th. 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 rounded estimates. Totals may not add due to rounding.

The 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 with these tables. Because the estimates are based on subsets of the data, they have large relative sampling errors (i.e., larger coefficients of variation than the annual injury estimate or the special study month 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

³ The only exception to the practice of including all the cases was in 2003 where 9 cases representing an estimated 150 emergency department-treated injuries were excluded from the annual injury estimates. These cases resulted from the nightclub fire in West Warwick, Rhode Island, that also caused 100 deaths. For details see Greene and Joholske (2004).

⁴ See Schroeder (2000).

data, say 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 comes from real differences in national injury totals.

2. Fireworks-Related Deaths for 2008

CPSC has reports of 7 fireworks-related deaths that occurred during 2008. Brief descriptions of the incidents are as follows:

Two deaths involved aerial and display fireworks

- A 32 year-old Iowa male lit a display shell and dropped it in a launching tube. The device exploded before he could move away causing fatal injuries to his face and neck. The firework device was reported to be old and it was not known how the victim had acquired it.
- A 47 year-old Missouri man was attending a family gathering in a rural area. He was shooting fireworks during the day from a basketball court. During the evening, the victim was shooting large artillery shell fireworks from a launching tube. One shell struck the victim resulting in fatal head injuries.

One death occurred in a fire where fireworks were the ignition source

- A 23 year-old Illinois man and friends were shooting fireworks inside an apartment. According to fire officials, the fireworks were probably Roman Candles. One of the fireworks lodged in a bed, blanket, or mattress starting a fire. The victim was overcome by smoke inhalation. There was extensive smoke and structural damage to the property.

Three deaths resulted from the use of homemade fireworks

- One year before the incident, the 23 year-old South Dakota victim had constructed an explosive device by packing sparklers tightly together. The incident occurred when the victim attempted to install a fuse in the device. The device then exploded causing massive trauma. The victim was transported to a hospital where he was pronounced dead.

- In Wisconsin, a group of males ranging in age from 17 to 35 brought a 50 gallon metal barrel to the edge of a river along with a sparkler bomb (42 sparklers tied together, with one sparkler extending as a fuse). One man put the firework into the sand on the riverbank, and lit it. The two victims pushed the barrel over the top of the firework. The firework then exploded resulting in massive trauma to both men. The 17 year-old victim died at the scene and the 19 year-old died later in a hospital emergency room.

Burns from a firecracker contributed to one death.

- A firecracker exploded near the face of a 62 year-old Washington man who was on oxygen and had chronic obstructive pulmonary disease. The man suffered burns to his face and to his airways. The injury to his airways may have affected his ability to breathe. The man died in the hospital 18 days after the injury.

CPSC staff has reports on 67 fireworks-related deaths between 2000 and 2008 for an average of 7.4 deaths per year.⁵ According to the Centers for Disease Control and Prevention, there were 40 fireworks-related deaths (an average of 5.7 deaths annually) between 1999 and 2005.⁶

3. National Injury Estimates for 2008

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 1991 and 2008.

⁵ See previous reports in this series, e.g. Greene and Joholske (2008). The number of deaths ranged from 4 deaths in 2005 to 11 deaths in 2006 and 2007. Staff updates information on the number of deaths from previous year reports when new information is received.

⁶ Data from CDC for ICD 10 code W39 (1999-2005). See <http://wonder.cdc.gov/cmfi-icd10.html>. Unlike the statistics presented by CPSC staff, the CDC statistics include both work-related and non-work-related fireworks deaths.

Table 1
Estimated Fireworks-Related Injuries 1991-2008

Year	Estimated Injuries	Injuries per 100,000 People
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
1997	8,300	3.0
1996	7,300	2.7
1995	10,900	4.1
1994	12,500	4.8
1993	12,100	4.6
1992	12,500	4.9
1991	10,900	4.3

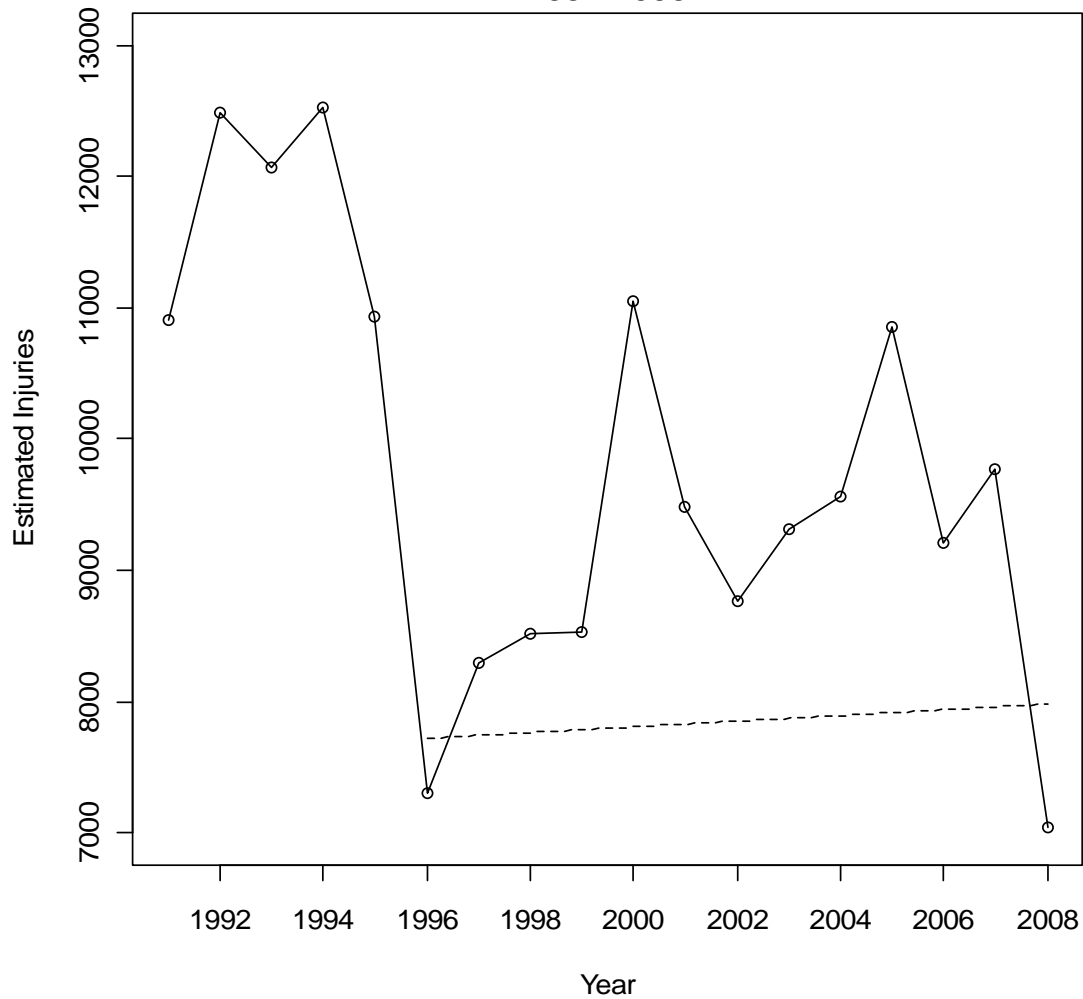
Source: NEISS, U.S. Consumer Product Safety Commission/EPHA. The estimate for 2003 excludes an estimated 150 emergency department-treated injuries following the nightclub fire in West Warwick, Rhode Island. Estimates for 1991-1996 were revised to adjust for the changed sampling frame and do not match values published during that period. Population estimates for 2000 to 2008 from Table 1: Annual Estimates of the Resident Population for the United States, Regions, States and Puerto Rico: April 1, 2000 to July 1, 2008. Population Division, U. S. Census Bureau. <http://www.census.gov/popest/national/asrh/NC-EST2008-sa.html> Estimates from earlier years at <http://www.census.gov/popest/archives/1990s/nat-total.txt>.

In calendar year 2008, there were an estimated 7,000 fireworks-related emergency department-treated injuries (95 percent confidence interval 5,200 – 9,000). The estimated number of injuries was almost 30 percent lower than the estimated 9,800 injuries in 2007. The difference between the injury estimates for 2008 and 2007 was statistically significant ($z = -3.09$, $p = 0.0020$). Estimated injuries and per capita injuries were the lowest values in the last 18 years.

Figure 1 shows that the highest estimated numbers of annual injuries were between the years 1991 and 1995, followed by lower estimates between 1996 and 1999. Injuries rose to 11,000 in the millennium year (2000) and then decreased to 9,500 in 2001. Between 2002 and 2007 injuries fluctuated between 8,800 and 10,800. From the second lowest annual estimate of 7,300 in 1996 to the estimate of 9,800 in 2007, there

was a statistically significant upward trend. The regression equation from 1996 to 2008 also shows an upward trend, but the slope is greatly decreased and the slope is not statistically significant.⁷ The dashed line in Figure 1 (below) is the 1996-2008 regression line.

Figure 1
Estimated Fireworks-Related Emergency Department-Treated Injuries
1991-2008



Appendix A contains a table showing estimated fireworks-related injuries and fireworks imports between 1996 and 2008.

⁷ For 1996 to 2008 the estimated regression slope was 21.94 injuries per year (standard error 66.07, $t=0.33$ at 11 df, $p= 0.3730$ one tail). The statistical analysis of the trend for 1996 to 2007 is found in the 2007 Fireworks Annual Report (Greene and Joholske, 2008). For details on the regression method that incorporates the sampling design, see Schroeder (2000) and Marker et al (1999).

4. Injury Estimates for the 2008 Special Study

The injury analysis in this section presents the results of the 2008 special study of fireworks-related injuries that were treated in hospital emergency departments between June 20 and July 20, 2008. During this period, there were an estimated 5,000 fireworks-related injuries (95% confidence interval 3,400 – 6,500), accounting for a little more than 70 percent of the total estimated injuries for the year. In keeping with the decrease in the estimated number of injuries from calendar year 2007 to calendar year 2008, the estimated number of injuries during the special study period also decreased from the 2007 value of 6,300.

The remainder of this section contains estimates for fireworks-related injuries from this period broken down by different categories.

Fireworks Device Types and Estimated Injuries

Table 2 shows the number and percent of emergency department-treated injuries by fireworks device type.

Table 2
 Estimated Fireworks-Related Injuries
 By Type of Fireworks Device
 June 20-July 20, 2008

Fireworks Device Type	Estimated Injuries	Percent
Total	5,000	100
All Firecrackers	900	18
Small	500	10
Illegal	100	2
Unspecified	300	6
Bottle Rockets	300	6
All Other Devices	2,000	40
Sparklers	800	16
Fountains	100	2
Novelties	300	6
Multiple Tube	100	2
Reloadable Shells	400	8
Roman Candles	300	6
Helicopters	100	2
Homemade/Altered	200	4
Public Display	200	4
Unspecified	1,300	26

Source: NEISS, U.S. Consumer Product Safety Commission/EPHA. Based on 129 NEISS emergency department reported injuries between June 20, 2008 and July 20, 2008 and supplemented by 30 completed In-Depth Investigations (IDI). Fireworks types are obtained from the IDI, if available, otherwise are reported by victims to emergency department staff. Illegal firecrackers include M-80s, M-500s, Quarter Sticks, and other firecrackers that are banned under the Federal Hazardous Substances Act (16 CFR 1500.17). Other types of fireworks may be illegal under state and local regulations, but are not listed as illegal unless they violate the FHSA. Subtotals include categories listed directly below. Estimates rounded to nearest 100 injuries and percents computed from the rounded estimates. Totals may not add due to rounding.

As shown in Table 2, firecrackers accounted for an estimated 900 emergency department-treated injuries, which was 18 percent of the total fireworks-related injuries during the special study period. Most of these injuries involved small firecrackers. The estimate for illegal firecracker-related injuries was 100 injuries; however, some of the estimated 300 unspecified firecracker-related injuries and some of the estimated 1,300 unspecified fireworks-related injuries may have also involved illegal firecrackers. Also,

sparklers accounted for an estimated 800 injuries, 16 percent of the total. Bottle rockets accounted for an estimated 300 injuries, 6 percent of the total.

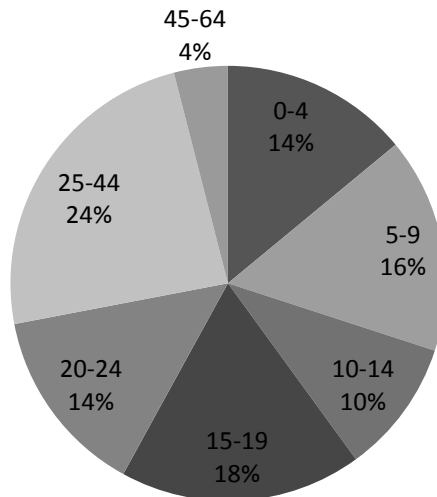
Reloadable shells, fountains, novelty fireworks, multiple tube devices, public display fireworks, Roman Candles, helicopters and homemade or altered devices, each accounted for less than 10 percent of the injuries. This is in keeping with previous years. While these devices are not involved in a large number of injuries, the larger load in these devices makes them disproportionately involved in serious injuries and deaths.

Age and Sex of Injured Persons

Children under 5 experienced an estimated 700 injuries (14 percent of all fireworks-related injuries during the special study period) as shown below in Figure 2. The injury rate was 3.3 injuries per 100,000 children in that age group. Children in the 5 to 14 year age group experienced an estimated 1,300 injuries (26 percent of all fireworks-related injuries). The injury rate for children 5 to 14 years old was 3.2 injuries per 100,000 children in that age group. Breaking that age group down further, children 5 to 9 years old had 4.0 injuries per 100,000 and children 10 to 14 years old had 2.5 injuries per 100,000. In the aggregate, children under 15 years old accounted for 40 percent of the fireworks-related injuries. Children and young adults under 20 had 58 percent of the fireworks-related injuries.

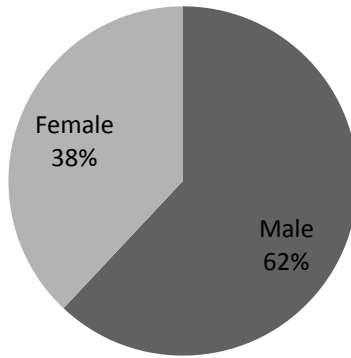
The age group 15 to 24 years old had about 32 percent of the fireworks-related injuries (1,600), somewhat more than the 25 to 44 years age group that had 24 percent (1,200 injuries). The per capita injury rate was 3.8 injuries per 100,000 for 15 to 24 and 1.4 for 25 to 44 year-old people. In most years, the per capita injury rate has been highest in the 15 to 19 years age group.

Figure 2
Injuries by Age Group



Males had 3,100 fireworks-related injuries, representing 62 percent of the total injuries. Males experienced 2.1 fireworks-related emergency department-treated injuries per 100,000 during the special study period. Females experienced 1.2 injuries per 100,000 people. The concentration of injuries among males and people under 25 has been typical of fireworks-related injuries for many years. Figure 3 shows the distribution by sex.

Figure 3
Injuries by Sex



The detailed breakdown by age and sex is shown in Table 3.

Table 3
Estimated Fireworks-Related Injuries
By Age and Sex
June 20-July 20, 2008

Age Group	Total	Per 100,000	Male	Female
Total	5,000	1.6	3,100	1,800
0 to 4	700	3.3	300	400
5 to 14	1,300	3.2	900	400
5 to 9	800	4.0	600	200
10 to 14	500	2.5	300	200
15 to 24	1,600	3.8	1,100	500
15 to 19	900	4.2	600	300
20 to 24	700	3.3	600	200
25 to 44	1,200	1.4	600	600
45 to 64	200	0.3	200	*

Sources: NEISS, U.S. Consumer Product Safety Commission/EPHA, U.S. population from <http://www.census.gov/popest/national/asrh/NC-EST2008-sa.html>. Estimates of less than 50 injuries are denoted with an asterisk (*). See notes for Table 2.

Age and Sex of the Injured Person 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 accounted for the largest number of estimated injuries at 200 injuries, which was almost one-third of the total in that age group. Children 5 to 14 years old also had an estimated 200 injuries from sparklers.

No clear relationship between age and fireworks type stand out in Table 4. It is worth remembering that the number of injuries does not completely represent usage patterns 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, etc.) that can injure people at some distance from where they were launched.

Table 4
 Estimated Fireworks-Related Injuries
 By Device Type and Age Group
 June 20-July 20, 2008

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

Source: NEISS, U.S. Consumer Product Safety Commission/EPHA. Estimates of less than 50 injuries are denoted with an asterisk (*). See notes for Table 2.

As mentioned previously, males experienced 62 percent of the fireworks-related injuries and females had 38 percent. Males had all of the estimated injuries from illegal firecrackers, fountains, homemade or altered fireworks, and helicopters. Males also had about three-fourths of the injuries associated with small firecrackers, bottle rockets, novelty fireworks, multiple tube devices, and reloadable aerial shells. Females had more injuries than males in incidents involving sparklers and in incidents where the firework type was not specified.

Injury Diagnosis and Body Part Injured

Figure 4 presents the distribution of estimated injuries by specific parts of the body where the injury occurred. Hands and fingers, with an estimated 1,400 injuries, accounted for 28 percent of the total injuries, followed by an estimated 1,000 eye injuries, 900 leg injuries, and 800 injuries to the head/face/ear region.

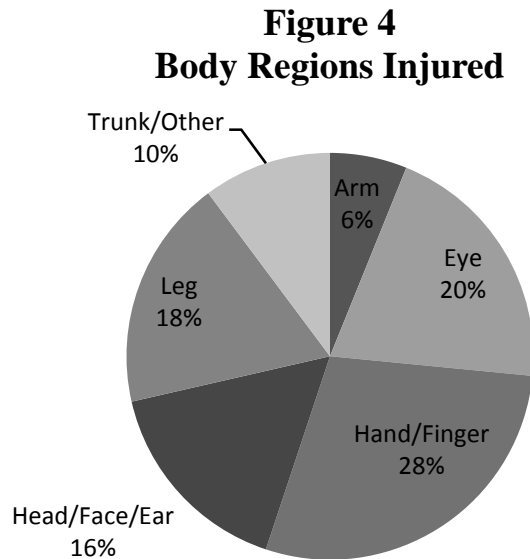
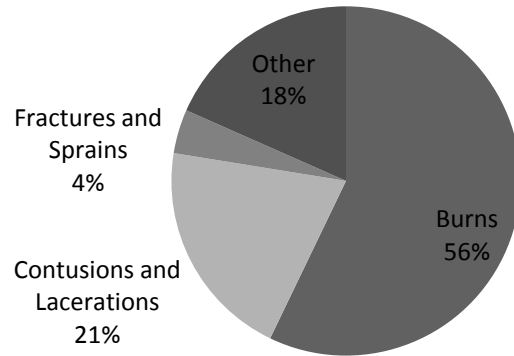


Figure 5 shows the types of injuries. Burns, with 2,800 estimated injuries (56 percent) was the most frequent injury diagnosis. Contusions and lacerations, at 1,000 injuries was the second most frequent.

Figure 5
Types of Injuries



Injuries to hands and fingers, leg injuries, and injuries to the trunk were most often burns, while more than half the injuries to the head and face were burns. Most eye injuries were contusions and 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 20-July 20, 2008

Body Region	Total	Burns	Diagnosis		
			Contusions Lacerations	Fractures Sprains	Other Diagnoses
Total	5,000	2,800	1,000	200	900
Arm	300	100	100	*	100
Eye	1,000	*	600	*	500
Hand/Finger	1,400	1,100	200	100	100
Head/Face/Ear	800	500	100	*	100
Leg	900	700	100	100	*
Trunk/Other	500	400	*	*	100

Source: NEISS, U.S. Consumer Product Safety Commission/EPHA. See notes for Table 2. Fractures and sprains also includes dislocations. Other diagnoses include all other injury categories. Arm and shoulder region 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 does not include the eyeball. Leg includes upper leg, knee, lower leg, ankle, foot, and toe. Trunk/other region includes chest, abdomen, pubic region, all parts of body, internal, and 25-50% of body. Estimates of less than 50 injuries are denoted with an asterisk (*).

Type of Fireworks Device and Body Region Injured

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

Table 6
 Estimated Fireworks-Related Injuries
 By Type of Fireworks Device and Body Region
 June 20-July 20, 2008

Fireworks Type	Total	Region of the Body					
		Arm	Eye	Head/Face	Hands/Fingers	Leg	Trunk/Other
Total	5,000	300	1,000	800	1,400	900	500
All Firecrackers	900	*	100	100	200	200	200
Small	500	*	100	*	*	100	100
Illegal	100	*	*	*	100	*	*
Unspecified	300	*	*	100	100	100	*
Bottle Rockets	300	*	100	100	*	*	100
Other Devices	2,000	100	300	400	800	200	200
Sparklers	800	*	100	100	400	100	*
Fountains	100	*	*	100	*	*	*
Novelties	300	*	100	*	100	*	100
Multiple Tube	100	*	*	*	100	*	*
Reloadable	400	*	100	100	200	*	*
Roman Candles	300	*	*	*	100	100	100
Helicopters	100	100	*	*	*	*	*
Homemade/Altered	200	100	*	*	*	*	*
Public Display	200	*	200	*	*	*	*
Unspecified	1,300	100	300	200	300	400	100

Source: NEISS, U.S. Consumer Product Safety Commission/EPHA. See notes for Table 2 and Table 5.

About one-half of the estimated sparkler injuries involved the hands and fingers. Fireworks devices that fly or emit sparks were associated with eye, head, and face injuries. These included novelties, fountains, reloadable shells, public display fireworks, and sparklers.

Hospital Treatment

An estimated 90 percent of the victims of fireworks-related injuries were treated at the emergency department and then released, 4 percent of victims were treated and transferred to another hospital, and another 4 percent were admitted to the hospital. An estimated 1 percent of injuries involved patients who left the emergency department before being seen. The treat and release percentage was about the same as for all consumer products for 2008.⁸

5. Telephone Investigations of Fireworks-Related Injuries

CPSC staff assigned telephone investigations of some fireworks injuries that occurred during the one-month special study period surrounding the July 4th holiday (June 20 to July 20, 2008). Completed telephone investigations provide more detail about the incident and injury than the emergency department information summarized in the NEISS hospital record. In the telephone questionnaire, respondents were asked about how the injury occurred (hazard pattern), the medical care following the emergency department treatment, and the long-term effects, if any, of the injury. Also, respondents were asked about the source of the fireworks that were associated with the injury.

Most of the cases selected for telephone investigations were chosen because the injuries were among the most severe that were reported by the NEISS hospitals. From the point of view of learning how to prevent the most serious injuries, staff assigned these cases to determine the scenarios where such injuries occurred. This was not the only reason for selecting cases. Cases were also selected when the details of the incident were unclear in the NEISS hospital narrative record. Several cases that involved fireworks igniting children's clothing were also selected. Because injury severity was one of the selection criteria, these cases are representative of the most serious injuries, not typical fireworks-related injuries.

From the 129 emergency department-treated fireworks-related injuries during the special study period, CPSC staff assigned 54 incidents for telephone investigations, of which 30 (56 percent) were completed. Table 7 shows the final status of these investigations.

⁸For all injuries in 2008, 93 percent of patients were treated and released, 1 percent were transferred to other hospitals, 5 percent were admitted to the hospital, and 1 percent had other dispositions including left without being seen, held for observation, and dead on arrival.

Table 7
Final Status for Telephone Investigations

Final Case Status	Number of Cases	Percent
Total Assigned	54	100
Completed Investigation	30	56
Incomplete Investigations	24	44
Failed to Reach Patient	4	7
Questionnaire Mailed but Not Returned	5	9
Victim Name Not Provided by Hospital	9	17
Victim Refused to Cooperate	6	11

Note: Totals may not add due to rounding.

Short descriptions of the 30 completed cases are found in Appendix B. The cases are organized in order of emergency department dispositions with Admitted (to the hospital) first, followed by Treated and Transferred (to another hospital), and then Treated and Released. Within each disposition, cases are in order of increasing age of the victim.

Summary Statistics

Of the 30 completed cases, 26 (87 percent) involved males and 4 (13 percent) involved females. There were 15 victims (50 percent) age 15 years or younger, 12 (40 percent) between 16 and 40 years of age, and three (10 percent) over 40. Seven victims were admitted to the hospital (23 percent), three were treated at the emergency department and transferred to another hospital (10 percent), one was held for observation (3 percent), and 19 (63 percent) were treated and released.

The most frequently used fireworks device in these incidents was aerial shells (9 cases, 30 percent), followed by seven incidents involving firecrackers (23 percent).⁹ Of the firecracker incidents, three involved large firecrackers and four involved small firecrackers. Two victims were involved in the same incident involving homemade or modified fireworks and a third victim was injured in a separate incident using homemade fireworks. Two people were injured in incidents from bottle rockets and two from sparklers. There was only one victim associated with each of the remaining fireworks

⁹ The category “aerial shells” includes multiple tube and reloadable mortars and rockets, but does not include bottle rockets.

types. Homemade fireworks, large firecrackers, and aerial shells were associated with the most serious injuries.

Note that both the distribution of the types of fireworks devices in the telephone investigations and the emergency department dispositions differ from the special study data in Section 4. For example, in Table 2, there were an estimated 500 injuries or 10 percent associated with aerial shells (multiple tube and reloadable shells), whereas in the telephone investigations, 30 percent of the incidents involved aerial shells. Also in the special study, 8 percent of victims were admitted or transferred to another hospital in contrast to 33 percent in the telephone investigations. These differences reflect the focus on the more serious injuries in cases selected for telephone investigations.

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 descending order of occurrence in Table 8.

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

Hazard Pattern	Number of Cases	Percent
All	30	100
Misuse	15	50
Homemade Fireworks	3	10
Mischief	3	10
Too Close	2	7
Unsupervised Child	2	7
Other	5	17
Malfunction	15	50
Errant Flight Path	6	20
Tipover	3	10
Other	6	20

Note: Totals may not add due to rounding.

Misuse (15 victims injured, 50 percent)

Fifteen victims were injured when fireworks were used in ways that depart from how they are typically used. Three victims were injured while they were making fireworks, three from mischief, two who were too close to the device, two unsupervised children were injured while playing with fireworks, and there were five incidents with various other hazard patterns. Note that the person misusing the fireworks was not necessarily the victim.

Homemade and Modified Fireworks. Three individuals were injured while constructing or using homemade fireworks. Two 16 year-old males, in Case 2 and Case 3, made a sparkler bomb from several hundred sparklers using instructions they found on the internet. These devices have substantial power and, in fact, were associated with three fatal injuries in 2008. The device exploded almost immediately after it was lit before the victims could take cover. Both victims were admitted to the hospital for skin grafts and other medical treatment. In another case of manufacturing fireworks, a 13 year-old male, in Case 19, combined several fireworks into a single device in order to make a more powerful explosive. The powder exploded during the process, resulting in burns to the victim's hand and face. This victim was treated and released.

Mischief. Three victims were injured as the result of mischievous acts by others. In Case 5, a 27 year-old male jumped into a swimming pool to shield some children from an exploding firework that somebody had thrown toward the pool. The victim suffered a contusion to his chest that was sufficiently serious to require hospital admission. In another incident, two juveniles threw small firecrackers into the back window of a car that was stopped at a traffic light. Two children, one 14 months old and the other 3 years old, suffered burns in this incident. Both children were transferred to a burn unit after treatment at the emergency department. These incidents are shown as Cases 8 and 9.

Too Close to the Fireworks. Two victims were too close to the firework when it was lit. In Case 12, a 5 year-old male was too close to a sparkler that was held by another child. A spark went into his eye. He was treated and released in the emergency department. In Case 28, a 40 year-old male was too close to a bottle rocket that he lit. The rocket passed very close to his eyes and some powder from the rocket got into his eyes causing an abrasion. He was also treated and released.

Unsupervised Child. Two unsupervised children were injured by fireworks. In Case 1, a 4 year-old child found an M-80 (large) firecracker in his house. He took it outside and lit it. He may have been holding it when it exploded. Part of his thumb and three fingers were amputated. The victim had surgery and was in the hospital for 16 days. In Case 13, a 6 year-old male victim was playing with a Roman Candle firework. He turned it upside down and the device began to emit sparks, which resulted in second degree burns to his fingers. The victim was treated and released.

Other Forms of Misuse. There were five incidents in this category, each with a different type of misuse. In Case 4, a 22 year-old male was holding a dozen sparklers in his hand attempting to light one. The sparkler that was lit then lit the others. The victim experienced first degree burns to his hand and was admitted to the hospital. A 45 year-old male, in Case 7, was admitted to the hospital for surgery for a fractured pelvis. After attending a party, he lit a large round firecracker while in his truck, intending to throw it out of the window. However, the firecracker hit the side of the window and exploded on the floor inside the truck, seriously injuring the victim. In Case 11, a 15 year-old male lit a firecracker, but then was distracted because an adult called to him. He put the lit firecracker in his back pocket where it exploded. He experienced second degree burns. In Case 20, a 14 year-old male picked up a mortar shell that he did not realize had been lit. The shell exploded immediately resulting in burns to the victim's forehead and hand. He was treated and released, but sought additional medical treatment after release. A 24 year-old male lit an M-80 large firecracker and put it in a soda can in Case 26. The firework exploded immediately producing metal fragments from the can that lodged in the victims hand, arms, and legs. The shrapnel was removed at the emergency department and the victim's cuts were sutured. He had additional medical treatment and physical therapy following the emergency department visit.

Malfunction (15 victims injured, 50 percent)

Fifteen victims were injured when fireworks malfunctioned. Errant flight paths were associated with six injuries and tipovers of aerial fireworks were associated with three injuries. The remaining six injuries had various hazard patterns all involving malfunctions.

Errant Flight Path. A mortar shell in Case 6 launched by a neighbor landed on a car next to the 32 year-old male victim instead of going into the air. The victim pushed the shell away, which then exploded damaging the victim's right hand. The victim's thumb, index finger and part of his middle finger were amputated. An 18 year-old female in Case 10 was struck in the eye by a bottle rocket that went sideways instead of into the air. The victim was transported from the emergency department to an eye hospital. In Case 15, an 8 year-old male was struck by a helicopter device that his father lit. The helicopter was supposed to go up, but went sideways striking the victim. The victim was treated for burns and had stitches to close a wound. A 15 year-old male was injured by an aerial shell that traveled sideways, in Case 22. He was struck above the left eye and required 11 stitches to close the wound. Case 27 is about a 29 year-old male who was struck by a mortar shell that exploded about six feet off the ground. There was shrapnel in the victim's hand that was removed at the emergency department. Finally a 44 year-old male in Case 29 ignited a Roman Candle that bounced off the ground instead of going into the air. The victim was hit in the legs and burned. He required additional medical treatment after release from the emergency department.

Tipover. The 10 year-old male victim in Case 18 was standing 10 feet from the location where aerial shells were being launched. One launching tube tipped over and the shell

struck the victim in the face. The victim was treated for abrasions to his eyes at the emergency department. In Case 21, a 15 year-old female victim was attending a family fireworks show that was presented by a relative who was a licensed display operator. During the show, a professional display grade Roman Candle tipped over after it was lit, hitting the victim in the neck and chest. She was treated for burns at the emergency department and released. Finally, an 18 year-old female was injured by an aerial shell in a tipover incident in Case 24. One launching tube tipped over and then knocked over the second launching tube. The shell from the second tube hit the victim in the eye. She was treated for burns, abrasions and swelling of her eye.

Other Types of Malfunctions. In Case 14, a 7 year-old male was watching a public fireworks display, where debris from the exploding fireworks got into his eye. He was treated for abrasions to the eye and a corneal scratch at the emergency department. An 8 year-old male lit a smoke bomb that exploded while he was holding it (Case 16). The victim was treated for burns at the emergency department. In Case 17, a 9 year-old male was near an aerial firework that emitted sparks when it was lit by his friend. One spark went into the victim's eye causing a corneal abrasion. In Case 23, the 17 year-old victim lit a mortar type firework that exploded in the launching tube. The explosion burned the victim's hand. A 24 year-old male lit an aerial shell that exploded in front of him (Case 25). The victim received burns to his hand. Finally, in Case 30, the 55 year-old male victim lit a firecracker that was at least a year old. The device broke open causing first degree burns to the victim's fingers.

Long-Term Consequences of Fireworks-Related Injuries

Victims were asked if there were any long-term consequences of their injuries. Most (22 of 30 or 73 percent) expected complete recoveries with no long term effects. Some victims who thought they might experience long-term effects of the injuries were as follows:

- In Case 1 and Case 6, the fireworks-related injuries involved amputation of the victim's fingers. The 4 year-old victim in Case 1 was hospitalized for 16 days. The 32 year-old victim was hospitalized for 6 days.
- The 16 year-old victim in Case 3 stayed in the hospital for three weeks after admission for skin grafts. He has lost some range of motion and some feeling in his foot.
- It was reported that the injury might result in scarring for several victims as follows: 1 year-old male victim in Case 8, 3 year-old female in Case 9, 29 year-old male in Case 27, and the 44 year-old male victim in Case 29.
- The 18 year-old female who was hit in the eye by a bottle rocket reported that she might suffer some permanent vision impairment from the injury (Case 10).

Where Fireworks Were Obtained

Of the 30 respondents to the telephone survey, 20 (67 percent) knew where the devices were obtained. The largest responses were as follows: “a stand that sells only fireworks” (13 respondents), “a friend or relative” (4 respondents), a store (2 respondents), and at a public display (1 respondent). The difference between a store and a stand is often that the stand is only in operation around the July 4 holiday.

Victims reported that they did not know the source of the fireworks in 10 incidents (33 percent). That typically is the situation when the victim did not purchase or light the fireworks device that caused the injury.

6. Enforcement Activities

CPSC’s Office of Compliance and Field Operations enforces regulations for fireworks devices that are sold to consumers under provisions of the Federal Hazardous Substances Act. CPSC staff’s enforcement activities are focused on reducing the number of fireworks-related deaths and injuries. A variety of enforcement techniques and both national and international initiatives were utilized in 2008 to keep unsafe fireworks from consumers.

CPSC staff continues to work closely with the Bureau of Customs and Border Protection (Customs) to conduct surveillance on imported shipments of fireworks. Fireworks were selected for testing based on the past violation history of the type of device, whether the item had been sampled previously, and other factors. With assistance from Customs, staff from CPSC selectively sampled and tested 211 shipments of imported fireworks in fiscal year 2008 for compliance with the Federal Hazardous Substances Act. Approximately 49 percent of those shipments were found to contain fireworks that were noncompliant.

Another enforcement activity that continues to remain a priority for CPSC staff is the investigation into firms and individuals that offer kits and components to make illegal and dangerous firecracker type explosives, such as M-80s and Quarter Sticks. Since 2006, CPSC staff continues to work with the Department of Justice on cases involving companies and/or individuals involved in selling the chemicals and components used to make illegal fireworks.

CPSC staff participated in several multi-state criminal investigations. Staff worked with other Federal agencies, including the Bureau of Alcohol, Tobacco, Firearms and Explosives, the Department of Justice’s Office of Consumer Litigation, as well as state and local law enforcement agencies. Staff provided legal, field, and technical support in cases involving the distribution of illegal explosive devices and the illegal diversion of professional fireworks to consumers.

Reflecting the international global economy, it is important to understand that most fireworks are manufactured outside the U.S. Most fireworks are imported from two places, China (97 percent of all fireworks) and Hong Kong (2 percent).¹⁰ CPSC's agreement and subsequent Work Plans with its counterpart Chinese agency, the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ), provide for extensive information exchange and cooperation.

7. Summary

In 2008, there were 7 reported fireworks-related deaths, a decrease from the 11 reported in 2007. However, reporting may not be complete at this time for 2008 deaths. Emergency department-treated injuries, estimated at 7,000 for 2008, were almost 30 percent less than 2007, a difference that was statistically significant.

During the one-month special study period of June 20 to July 20, 2008, there were an estimated 5,000 emergency department-treated injuries, somewhat lower than the 2007 estimate of 6,300 injuries. Similar to previous years, in 2008 children under 15 years old experienced about 40 percent of the injuries and males of all ages experienced 62 percent of the injuries.

Also similar to previous years, about half the injuries in 2008 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 (estimated 1,400 injuries), eyes (1,000 injuries), legs (900 injuries), and the head, face, and ear (800 injuries). Most injuries, 90 percent, involved treat and release dispositions. An estimated 8 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, firecrackers were associated with 900 estimated injuries (small firecrackers 500 injuries, large illegal firecrackers 100, and unspecified size 300). Sparklers were associated with 800 injuries and bottle rockets with 300 injuries.

A review of data from telephone follow-up investigations showed that the typical causes of injuries were as follows: (1) misuse of fireworks including mischief and improper use, (2) fireworks exploding earlier or later than expected, (3) errant flight paths, (4) aerial shell device tipovers, and (5) other malfunctions. At the time of the telephone investigation, typically one to two months after the injury, most victims already had recovered from their injuries. A small number of victims reported that the injuries were likely to have long-term effects.

¹⁰ This data is from 2008 statistics from the U.S. International Trade Commission. There were 208.3 million pounds of fireworks imported, with 201.7 million pounds from China (97 percent) and 4.4 million from Hong Kong (2 percent). Staff believes that most fireworks imported from Hong Kong were actually manufactured in China. The next largest exporter was Thailand with 1.2 million pounds.

Finally, in 2008, CPSC staff's enforcement activities remained at a high level. CPSC's Office of Compliance and Field Operations worked with the Bureau of Customs and Border Protection to sample imported fireworks and to seize illegal shipments. Staff provided legal, field, and technical support in cases involving the distribution of illegal explosive devices and the illegal diversion of professional fireworks to consumers. Staff also continued working with the General Administration for Quality Supervision, Inspection and Quarantine (AQSIQ) of the Government of the People's Republic of China. China is the world's largest exporter of fireworks, and most fireworks imported into the U.S. come from China. Fireworks is one of four product areas targeted by CPSC and AQSIQ for exchange of information on standards, increased inspection of high risk products, and tighter quality controls on components from parts suppliers.

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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 1997-2007, peaking in 2007 at 260.1 million pounds and then declining to 208.3 million pounds in 2008. Except for the millennium year of 2000, the number of estimated emergency department-treated injuries has fluctuated between 7,000 and 10,800. During this period, as shown in the table below, the number of injuries per 100,000 pounds of fireworks has declined from 8.0 injuries per 100,000 pounds in 1997 to 3.4 injuries per 100,000 pounds in 2006 and 2008.

Table A-1
Estimated Fireworks-Related Injuries and
Estimated Fireworks Imported into the U.S. 1997-2008

Year	Estimated Injuries	Estimated Fireworks Imports (millions of pounds)	Injuries Per 100,000 Pounds
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
1997	8,300	103.5	8.0
1996	7,300	108.6	6.7

Source: Injuries from NEISS, U.S. Consumer Product Safety Commission/EPHA. See Table 1 for further details. Estimated fireworks imports from the U.S. International Trade Commission using Harmonized Tariff Schedule (HTS code 3604.10). See http://dataweb.usitc.gov/scripts/user_set.asp. 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 10 percent of the total imports in 2008. In addition to imported fireworks used in the U.S., there are also a small amount of fireworks manufactured in the U.S. for domestic consumption, which are 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 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. Weight over-represents heavy devices and under-represents 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 other things than just the amount of explosive material.

International trade statistics do not provide weight by fireworks device types. These statistics do not indicate if the increase in the number of fireworks imported in recent years is across the board; greater in the larger and heavier display shells that historically have produced fewer but more serious injuries; or in firecrackers, sparklers, and small rockets that produce the majority of the injuries. 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 1996 and 2008 shown above may be due to different mixtures of types of fireworks imported over time or an overall decrease in injuries among all types of fireworks. The data do not provide enough information to determine the relative contribution of these two factors.

Appendix B
Completed Telephone Investigations

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
1	4	Male	Amputation	Admit	Finger	Large Firecracker	The victim found an M-80 firecracker in his house. He took it outside, lit it and may have been holding it when it exploded.	Part of the victim's thumb and three fingers were amputated. The victim had surgery and was in the hospital for 16 days. Aside from the loss of fingers, the victim has completely recovered.
2	16	Male	Laceration	Admit	Foot	Homemade	The victim and his friend made a sparkler bomb by taping together several hundred sparklers. The device exploded almost immediately after it was lit before the victims could run for cover. The victim had sparklers lodged in his foot, burns, lacerations and abrasions. This is the same incident as Case 3.	The victim was admitted to the hospital. He has had several skin grafts since the incident. He is expected to recover fully.
3	16	Male	Fracture	Admit	Foot	Homemade	The victim and his friend made a sparkler bomb by taping together several hundred sparklers. The device exploded almost immediately after it was lit before the victims could run for cover. The victim had sparklers lodged in his foot, burns, lacerations and abrasions. This is the same incident as Case 2.	The victim was admitted to the hospital and stayed for three weeks. He had three fractured toes, abrasions on his legs, on his face. He has had surgery to graft skin on his right foot.
4	22	Male	Burn	Admit	Hand	Sparkler	The victim was holding a dozen sparklers in his hand. When he attempted to light one, all sparklers ignited.	The victim had first degree burns to his right hand. He was admitted to the hospital. After discharge from the hospital, he recovered completely.

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
5	27	Male	Contusions Abrasions	Admit	Upper Trunk	Fountain	The victim jumped into a swimming pool to shield children in the pool from an exploding firework.	The victim suffered a contusion to his chest. He was admitted to the hospital after the emergency department visit. After release he sought further medical treatment. The victim had fully recovered by two weeks after the incident.
6	32	Male	Amputation	Admit	Finger	Aerial Shell	A mortar shell launched by a neighbor landed on a car next to the victim instead of going up into the air. Just as the victim pushed the shell away, it exploded causing serious damage to the victim's right hand.	The victim's thumb, index finger and part of the middle finger was amputated. He had surgery at the hospital and was admitted for six days. The victim does not expect to regain full use of his hand.
7	45	Male	Other	Admit	Lower Trunk	Large Firecracker	After attending a party, the victim lit a large round firecracker in his truck, intending to throw it out window. The lit firecracker hit the side of the window and fell on the floor where it exploded.	He was admitted to the hospital for surgery on a fractured pelvis. With additional medical follow-up, he expected a complete recovery within 3 months after the injury.
8	1	Male	Burn	Treat and Transfer	25-50% of Body	Small Firecracker	Juveniles at a stoplight threw small firecrackers into the back seat of the car in which two children (a 3 year-old female and a one year-old male) were riding. This is the same incident as Case 9.	The victim was treated at the emergency department for second degree burns to his lower leg. He was then transferred to a burn unit at another hospital. After discharge, he continued to be treated for the burn. Aside from some scarring, the victim was expected to have fully recovered by six weeks after the injury.

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
9	3	Female	Burn	Treat and Transfer	25-50% of Body	Small Firecracker	Juveniles at a stoplight threw small firecrackers into the back seat of the car in which two children (a 3 year old female and a one year old male) were riding. This is the same incident as Case 8.	The victim had second degree burns to her leg. The victim was transferred to a burn unit. After release, a visiting nurse came to the home to change bandages and check on the burns. Aside from some scarring, the victim expects to have a full recovery.
10	18	Female	Other	Treat and Transfer	Eye	Bottle Rocket	Some friends of the victim were launching bottle rockets. The victim was hit in the eye by a bottle rocket that went sideways instead of up into the air.	Following treatment at the emergency department, the victim was transported to a hospital that specialized in eye care. The victim is unsure if her vision will completely recover. She reported that she may have some permanent impairment.
11	15	Male	Burn	Held for Observation	Lower Trunk	Small Firecracker	The victim lit a firecracker. He was then distracted and put the firecracker into his back pocket. It exploded while in his pocket.	The victim experienced second degree burns to his buttocks. Victim has fully recovered.
12	5	Male	Fracture	Treat and Release	Eye	Sparkler	The victim was at the beach with his parents and some other children. A spark from a sparkler held by another child went into the victim's eye.	Victim was treated and released at the emergency department. There was a follow-up visit with a specialist. There were no long-term effects of the injury from this incident.
13	6	Male	Burn	Treat and Release	Hand	Roman Candle	The victim was playing with a Roman Candle. He turned it upside down and it started emitting sparks.	The victim had second degree burns to his hand and superficial burns to his fingers. He was treated and released with no long-term effect from the injury.

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
14	7	Male	Contusions Abrasions	Treat and Release	Eye	Public Display	The victim was watching a public fireworks display in a school parking lot. Some debris from the exploding fireworks was blown into his eye.	The victim was treated for abrasions to the eye and a corneal scratch with no additional complications. A complete recovery was expected.
15	8	Male	Avulsion	Treat and Release	Lower Arm	Helicopter	The victim and his father were outside, lighting helicopter type fireworks that were designed to go upward. One firework instead traveled sideways hitting the victim.	In addition to burns on his forearm, the victim's skin was torn. Following the emergency department treatment, the victim went back to the doctor for removal of stitches. He was fully recovered in four weeks.
16	8	Male	Burn	Treat and Release	Hand	Smoke Bomb	The victim lit a smoke bomb that exploded while he was holding it.	The victim's right hand was burned. No additional treatment was required after the emergency department visit.
17	9	Male	Foreign Body	Treat and Release	Eye	Aerial Shell	The victim's friend lit an aerial firework in the backyard. The firework emitted a spark that went into the victim's eye.	The victim suffered a corneal abrasion. He went to an eye specialist to check his vision. There were no long-term effects reported.
18	10	Male	Contusions Abrasions	Treat and Release	Eye	Aerial Shell	The victim was standing about 10 feet from a place where people were launching aerial shells. The launching tube for a shell tipped and the shell struck the victim in the face.	He sustained abrasions to his eyes. After the emergency department visit, no further treatment was required. He has completely recovered.
19	13	Male	Burn	Treat and Release	Hand	Homemade	The victim purchased several fireworks that he opened to combine the powder into a single unit to make a large explosive. During the process of making the firework, the powder exploded resulting in burns to the victim's face and hand.	The victim had first degree burns. After treatment in the emergency department he has completely recovered.

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
20	14	Male	Burn	Treat and Release	Face	Aerial Shell	The victim and his parents were lighting mortar type fireworks. The victim picked up a firework that he did not realize had been lit. It exploded almost immediately resulting in burns to his forehead and hand.	The victim was treated for burns to his hand and forehead, and debris was removed from his forehead. The victim later consulted his personal physician. Two weeks after the incident he had completely recovered.
21	15	Female	Burn	Treat and Release	Upper Trunk	Roman Candle	The victim was attending a family fireworks show that was being operated by a person with an ATF license. During the show, a professional display grade Roman Candle tipped over after it was lit. It hit the victim in the face, neck, and chest.	The victim was treated for first, second and third degree burns and then released. No additional treatment was required and the victim has completely recovered.
22	15	Male	Laceration	Treat and Release	Head	Aerial Shell	An aerial shell launched at a family gathering traveled sideways instead of into the air. The shell struck the victim above the left eye.	The victim received 11 stitches to close the wound. After further medical treatment for three weeks he has completely recovered without any long-term effects.
23	17	Male	Burn	Treat and Release	Finger	Mortar	The victim lit a mortar type firework that exploded in the launching tube. The device produced flames that burned the victim's left hand.	No additional medical treatment was required. The victim has completely recovered after emergency department treatment.
24	18	Female	Fracture	Treat and Release	Eye	Aerial Shell	Fireworks were launched from two tubes that were next to each other. The first tube tipped over and then knocked over the second tube. The shell from the second tube hit the victim in the right eye.	The victim had burns, abrasions and swelling in her right eye. She has fully recovered after treatment at the emergency department.

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
25	24	Male	Burn	Treat and Release	Hand	Aerial Shell	The victim lit an aerial shell that exploded five feet in front of him after becoming airborne.	The victim received second and second degree burns to his right hand. Following some additional medical treatment and physical therapy, the victim recovered completely in 10 days.
26	24	Male	Laceration	Treat and Release	Hand	Large Firecracker	The victim lit an M-80 and placed it in a soda can. According to the victim, the firework was at least three years old. The firework exploded almost immediately causing the can to fragment. The victim got shrapnel in both hands, his arms and legs.	At the emergency department shrapnel was removed and the victim's cuts were sutured. He has had continuing medical treatment and physical therapy. The victim expects to have recovered completely eight to ten weeks after the incident.
27	29	Male	Puncture	Treat and Release	Hand	Aerial Shell	Three and four inch shells were being launched from a reusable mortar tube at the end of a dock that extended over the water. The victim was standing about 5 feet from the mortar when someone launched a shell. Instead of going into the air, the shell ascended about six feet and then exploded. Shrapnel from the shell lodged in the victim's left hand.	The shrapnel was removed from the victim's hand at the emergency department. The victim later consulted a specialist. He has completely recovered from the injury.
28	40	Male	Foreign Body	Treat and Release	Eye	Bottle Rocket	The victim lit a bottle rocket and was too close to it. The rocket passed very close to his eyes. Some of the powder from the firework got in his eyes.	The victim had a slight abrasion to his eye. After treatment at the emergency department, no further treatment was required. He has fully recovered.

Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
29	44	Male	Burn	Treat and Release	Upper Leg	Roman Candle	The victim ignited a Roman Candle which bounced off the ground instead of going up into the air. The victim was hit in the legs by the firework.	After additional medical treatment, the victim expected to recover completely in a month from the incident.
30	55	Male	Burn	Treat and Release	Finger	Small Firecracker	The victim lit a firecracker that was at least a year old. After ignition, the device broke open and burned his fingers.	The victim experienced first degree burns to his fingers. He went to the doctor later to check how they were healing. After 20 days he had fully recovered.