



2004 Fireworks Annual Report

Fireworks-Related Deaths, Emergency Department-Treated Injuries, and Enforcement Activities During 2004

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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 fireworks-related deaths and injuries during 2004. The report also includes a summary of CPSC enforcement activities during that year.

We obtained information on fireworks-related deaths primarily from news clippings and other sources in CPSC's Injury/Potential Injury Incident (IPII) database. We estimated fireworks-related injuries from CPSC's National Electronic Injury Surveillance System (NEISS). More detailed analyses of injuries including the type of injury and the firework involved, and the characteristics of the victim were based on a special study conducted between June 19 and July 19, 2004. About 70 percent of the annual fireworks-related injuries for 2004 occurred during that period.

Highlights of the report are as follows:

- CPSC has reports of 8 deaths associated with fireworks during 2004. Two victims were killed in incidents involving aerial devices. In the first of these incidents, a man was killed when the device exploded in his face and his shirt caught on fire. In the second aerial device incident, part of a launching tube traveled about 150 feet and struck the victim. Two victims were killed in house fires where fireworks were thrown into the house. Firecrackers were involved in the first incident and an artillery shell type of firework in the second. Two people were killed with homemade devices. Shrapnel from one device traveled 60 or 70 feet at a Fourth of July party striking the victim in the chest. The other homemade device exploded while the victim was building it. Finally, two victims who were launching fireworks from their car were fatally burned when the interior of the car ignited. CPSC has reports of 6 people killed in 2003 in fireworks incidents.
- Fireworks devices were involved in an estimated 9,600 injuries treated in U. S. hospital emergency departments during calendar year 2004 (95 percent confidence interval 7,300 – 11,800). CPSC staff estimated that there were 9,300 injuries during 2003.
- An estimated 6,600 fireworks-related injuries were treated in U. S. hospital emergency departments during the one month special study period between June 19, 2004 and July 19, 2004 (95 percent confidence interval 4,900 – 8,400). CPSC staff estimated that there were 6,800 injuries during the 2003 special study period.

Results from the special study include the following:

- About three times as many males were injured as 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.
- Among different types of fireworks, firecrackers and sparklers were associated with the greatest number of estimated injuries at 1,100 each, followed by rockets at 900 estimated injuries. Sparklers accounted for almost half the injuries for children less than 5 years of age.
- We estimated that there were a small number of injuries (300) at public fireworks displays.
- The parts of the body most often injured were hands (estimated 2,200 injuries), eyes (1,400 injuries) and the head, face and ear (1,400 injuries).
- Almost two-thirds of the injuries involved burns. Burns were the most common injury to all parts of the body except the eyes, where contusions, lacerations, and foreign bodies occurred more frequently.

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. Serious injuries included eye and head injuries, finger and hand amputations. In addition, some cases were selected from the Fire Injury Project, a separate CPSC staff study involving follow-up of emergency department-treated cases for fire-related injuries that were likely to have been attended by fire departments.

A review of data from telephone follow-up investigations showed that the typical causes of injuries were (1) fireworks exploding earlier or later than expected, (2) errant flight paths of aerial fireworks and (3) debris or sparks from fireworks devices. According to the investigations, most victims already had recovered from their injuries or will recover completely. Several victims experienced serious eye and ear injuries.

During 2004, CPSC's Office of Compliance 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:

- CPSC and Customs staffs selectively sampled and tested 296 shipments of fireworks. Approximately 28 percent of the shipments were found to contain violative fireworks. These shipments accounted for more than 4.5 million units with violations serious enough to warrant seizure or other actions by Customs.

- CPSC staff also initiated and participated in several multi-state criminal investigations with the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), the Department of Justice and state and local law enforcement agencies.

Introduction

This report describes injuries and deaths associated with fireworks during 2004. The report also describes CPSC staff enforcement activities for 2004. Reports for earlier years in this series can be found on the internet at www.cpsc.gov/library/data.html.

The report is organized into 7 sections. Following the discussion of data and methods in this section, the next section describes fireworks-related deaths. Section 3 provides a national annual estimate of fireworks-related emergency department-treated injuries for 2004 and compares that estimate with estimates for previous years. Section 4 is based on a special study of emergency department-treated injuries during the month around July 4. That section presents tables of the number of injuries broken down by different categories. Section 5 summarizes the in-depth telephone investigations of fireworks injuries. Section 6 describes enforcement activities by CPSC's Office of Compliance. The main body of the report then concludes with a summary of the findings. Appendix A presents a table on the relationship between fireworks-related injuries and estimated fireworks consumption between 1996 and 2004. Appendix B contains more detail on the telephone investigations that were summarized in Section 5.

Sources of Information

Information on non-work-related fireworks deaths occurring during 2004 was obtained from the CPSC Injury/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. There may be multiple reports on a single death. We screened reports to eliminate duplicates. Then the CPSC field staff conducted in-depth investigations on these fireworks-related deaths. The purpose of that investigation is to determine the type of fireworks involved and the circumstances that led to the fatal injury.

Because IPII is based on voluntary reports and because it takes up to 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 2004 fireworks-related deaths at the time this report was prepared. As a result, the number of deaths might have been greater than the number reported here.

The source of information on fireworks-related injuries was 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 department record. This includes the victim's age and sex, where the injury occurred, the emergency department diagnosis, body part injured and the consumer product(s)

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 intervals is documented in Schroeder (2000).

associated with the injury. The information is supplemented by a 160 character narrative that often contains a brief description of how the injury occurred.

The NEISS record specifies one or two consumer products that are associated with the injury. Products are identified without drawing conclusions as to whether the injury was caused by the products, or, at the other extreme, if the product was present but incidental to the injury. In most cases there is not sufficient information to allow these conclusions to be made. To obtain additional information, especially about the role played by the consumer product, analysts may request an in-depth investigation (IDI) where the victim is telephoned or visited. Analysts may also conduct a special study where additional product or case information is added to the NEISS record for some injuries during a fixed time period.

During the month around July 4th (in 2004, June 19 to July 19, 2004) CPSC staff conducts a special study of fireworks injuries. Staff efforts focus on fireworks during this period because historically about two-thirds of the annual injuries occur then. During this period, hospital emergency department staff show pictures of different types of fireworks to patients and ask them to identify the type of fireworks device associated with the injury. After reading the case records, staff may then assign cases for telephone investigations. The investigator requests information from the victim or the victim's parent about the type of fireworks involved, where it was obtained, how the injury occurred, the medical treatment and prognosis.

During 2004, approximately half of these special study period cases were selected 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. Some cases were selected by other staff projects because of overlapping interests. In 2004, two cases were selected from the Fire Injury Project, a separate CPSC staff study involving follow-up of emergency department-treated cases with fire-related injuries that were likely to have been attended by fire departments.² As a result of these criteria, most cases selected for the telephone investigation tended to have more serious injuries than cases not selected. Of the cases selected, about half the telephone investigations were completed. The most frequent reasons why investigations were not completed were difficulty contacting the victim or refusal to participate.

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 outside the July 4th special study period, the NEISS record is almost always the only information. During the special study period, the NEISS record contains additional information on the type of fireworks and the incident scenario. In addition, there is a subset of the special

² The information collected by the Fire Injury Project included almost all the information required for the fireworks special study. The Fire Injury questionnaire was used first during the telephone interview, followed by an abbreviated form of the fireworks questionnaire. This allowed collection of data on many additional fireworks-related injuries at a relatively low cost.

study cases for which we have 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 all NEISS cases for the entire year, 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. 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, we remove 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 exclude cases where the fireworks device was not lit or the victim was not attempting to light the device. These cases represent a sample of the most serious fireworks-related injuries.

Statistical Methods

Injuries reported by NEISS sample hospitals were multiplied by the associated sampling weights to develop an estimate of total fireworks-related injuries for the year and for the special study month around July 4th. Confidence intervals were estimated and hypothesis tests were performed using computer programs that were written to take into account the sampling design.⁴ Results are rounded to the nearest 100 injuries.

³ The only exception was in the 2003 report where 9 cases representing an estimated 150 injuries were excluded from the annual estimates. These cases were treated in participating emergency departments for injuries in the nightclub fire in West Warwick, Rhode Island. Also, we did not count the deaths occurring in that incident as fireworks-related deaths. For details see Greene and Joholske (2004).

⁴ See Schroeder (2000).

The report also contains a number of detailed tables about fireworks-related injuries during the special study period. Estimates were made using the sampling weights. To avoid cluttering the tables, we do not include confidence intervals and hypotheses tests 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 should be made with caution. For example, when comparing subsets of the 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. Estimates in the tables are also rounded to the nearest 100 injuries. Estimates of less than 50 injuries are shown with an asterisk (*). Totals may not add due to rounding.

Fireworks-related Deaths for 2004

CPSC has reports of 8 non-work fireworks-related deaths that occurred in 2004. Brief descriptions of the 2004 incidents are found below.

- A 4-year-old Missouri child was attending a party at her house where several people had brought fireworks. The victim was standing on a porch in front of the house. About 150 feet from her a person ignited a reloadable aerial shell device. The victim was struck in the face with a piece from the device's launching tube. She was taken to the hospital immediately and removed from life support two days later.
- Two Florida males, one 23 and the other 27, were lighting and launching bottle rockets from a moving car. At some point the interior of the car ignited. Both men were severely burned and eventually died from their injuries.
- A 45-year-old California male was at a Fourth of July block party. Several people at the party assembled a homemade device from the contents of several consumer fireworks and then ignited the fuse. Shrapnel from the device traveled 60 or 70 feet and struck the victim in the chest. The victim was taken to the hospital where he died.
- A 52-year-old Iowa man was making fireworks by mixing explosive materials and pouring them into cardboard tubing. The explosion blew out almost all the windows of his house. He was transported to the hospital where he died.
- A 52-year-old Oklahoma man lit an artillery shell type of firework that had a large fuse. Either he did not move away from it in time, or he came back to check it after it was lit. The device exploded near the victim's face and his shirt caught on fire. The victim experienced first and second degree burns to about 40 percent of

his body. He was taken to the hospital and later developed an infection. He died almost three weeks after the incident.

- A juvenile tossed firecrackers in the mail slot of a house in Illinois causing a fire. The occupant, a 76-year-old woman was overcome by smoke. She was transported to the hospital and never regained consciousness. She died 11 days after the incident.
- An 80-year-old Missouri man died from injuries in a residential home fire. A large artillery shell type firework that had been lit and thrown into his home. According to news reports, four juvenile suspects were identified in this case.

We reported on 6 fireworks-related deaths in 2003, 4 deaths in 2002 and 4 in 2001. According to the Centers for Disease Control and Prevention, there were 89 fireworks-related deaths (an average of 6 deaths annually) between 1988 and 2002.⁵

⁵ Data from CDC for ICD 9 code 923.0 (1988-1998) and ICD 10 code W39 (1999-2001). See <http://wonder.cdc.gov/mortsql.html>. CDC statistics include work-related fireworks deaths.

National Injury Estimates for 2004

Table 1 and Figure 1 present the estimated number of fireworks-related injuries for 1991-2004 that were treated in U. S. hospital emergency departments.

Table 1
Estimated Fireworks-Related Injuries 1991-2004

Year	Estimated Injuries	Injuries per 100,000 people
2004	9,600	3.3
2003	9,300	3.2
2002	8,800	3.0
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

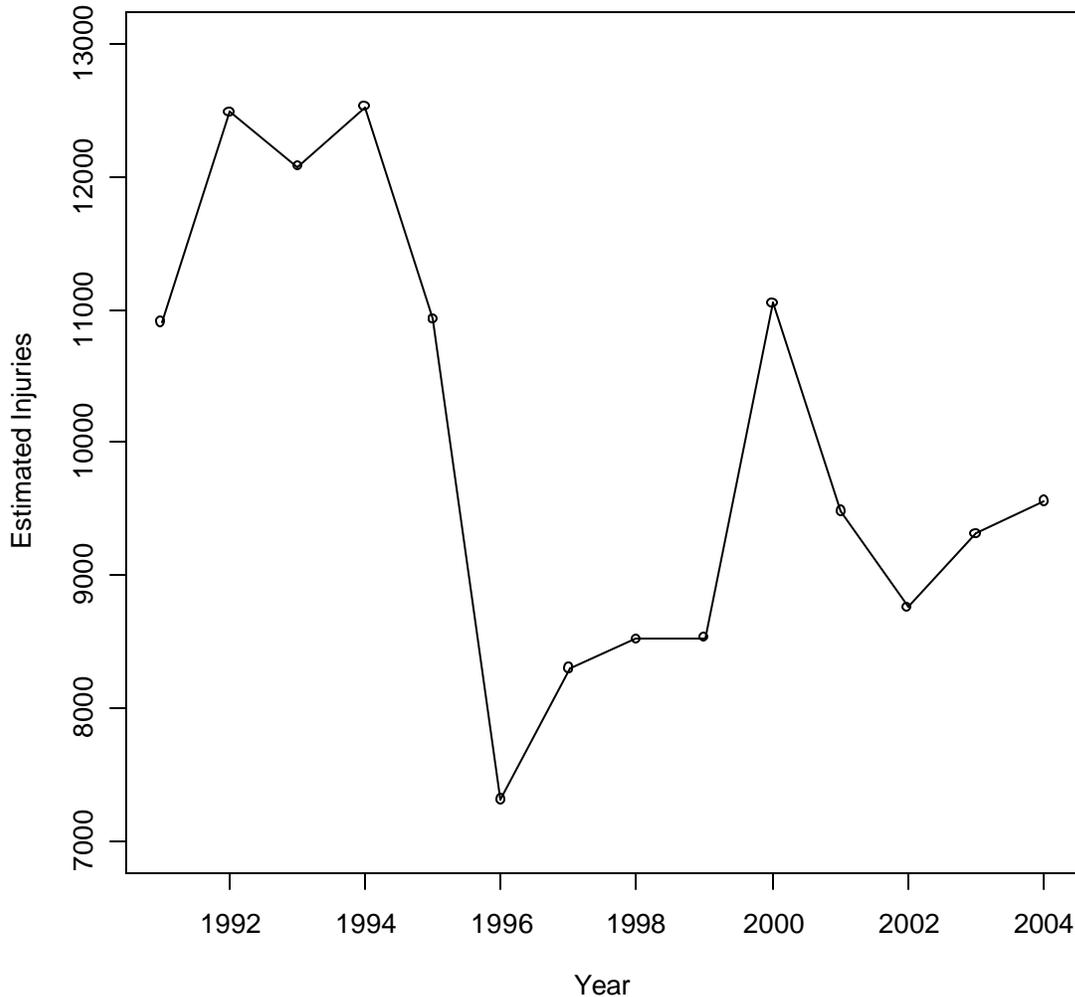
Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Based on 291 fireworks-related injuries recorded in NEISS hospital emergency departments during 2004. The estimate for 2003 excludes an estimated 150 injuries associated with cases treated in participating emergency departments following the nightclub fire in West Warwick, Rhode Island. Estimates for 1991-1996 were revised to adjust for the new sampling frame and do not match values published in reports for 1997 or earlier. U. S. population estimates from 1991-1999 were obtained from the U. S. Bureau of the Census at <http://www.census.gov/popest/archives/1990s/nat-total.txt> and population projections for 2000-2004 from <http://www.census.gov/popest/states/NST-ann-est.html>.

In calendar 2004, there were an estimated 9,600 fireworks-related injuries (95% confidence interval 7,300 – 11,800). Total emergency department-treated injuries and per capita injuries were larger than 2003, but the difference was not statistically significant.

Figure 1 below shows that the greatest annual estimated injuries were between the years 1991 and 1995, followed by a decline in 1996, and a relatively stable pattern between 1998 and 2004 that varied between 8,500 injuries in 1998 and 9,600 in 2004. The pattern was interrupted in 2000, where there were 11,000 estimated injuries. The

increased number of injuries was probably associated with increased fireworks activities during the millennium celebrations. Injuries in 2000 were statistically significantly greater than annual injury estimates for 1996-1999, but were not significantly different from annual injuries estimates for 2001-2004.

Figure 1. Fireworks Injuries 1991-2004



Appendix A presents a table showing estimated fireworks-related injuries and estimated fireworks consumed between 1996 and 2004.

Injury Estimates for the 2004 Special Study

The injury analysis in this section presents the results of the 2004 special study of fireworks-related injuries that were treated between June 19 and July 19, 2004. During this period, there were an estimated 6,600 fireworks-related injuries (95% confidence

interval 4,900 – 8,400), accounting for about 70 percent of the total injuries for the year. The remainder of this section presents estimates for fireworks-related injuries 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 19-July 19, 2004

Fireworks Device Type	Estimated Injuries	Percent
Total	6,600	100
All Firecrackers	1,100	17
Small	300	4
Illegal	100	2
Unspecified	700	10
All Rockets	900	14
Bottle Rockets	500	7
Other Rockets	500	7
All Other Devices	2,900	43
Sparklers	1,100	16
Fountains	200	3
Novelties	800	13
Multiple Tube	100	2
Reloadable	300	5
Roman Candles	300	5
Homemade/Altered	200	2
Public Display	300	5
Unspecified	1,200	19

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Based on 204 reported emergency department visits between June 19, 2004 and July 19, 2004. Subtotals include categories listed directly below. Estimates rounded to nearest 100 injuries. Estimates of less than 50 injuries shown with an asterisk (*). Totals may not add due to rounding.

As shown in Table 2, firecrackers accounted for an estimated 1,100 injuries, which was 17 percent of the total fireworks-related injuries. After firecrackers, sparklers accounted for about 1,100 injuries, 16 percent of the total. Rockets were associated with 900 injuries, 14 percent of the total. Half of the rocket injuries involved bottle rockets. In most years, firecrackers, sparklers and bottle rockets are associated with about the same proportions of the injuries.

Table 2 shows that the firecracker size could not be identified for about 700 injuries (10 percent of total) and the fireworks device could not be identified for 1,200 injuries (19 percent). Sometimes the victim does not know the type of device because the victim didn't purchase or light the firework. Estimates from previous years have shown a substantial number of injuries where fireworks types were unknown.

There were a small number of injuries associated with public displays and with homemade or altered devices. This is also in keeping with previous years.

Age and Sex of Injured Persons

Children under 5 experienced slightly more than 10 percent (700 injuries) of all fireworks-related injuries as shown in Table 3. The injury rate was 3.5 injuries per 100,000 for these children. Children in the 5 to 14 age group accounted for 30 percent (estimated 2,000) of the fireworks-related injuries. Their rate was 5.1 injuries per 100,000. This was composed of 5.5 injuries per 100,000 for children 5 to 9 and 4.7 injuries per 100,000 for children 10-14. Together, children under 15 accounted for about 40 percent of the fireworks injuries.

The age group 15 to 24 had about 25 percent of the injuries (1,700) slightly less than the 25 to 44 age group with 28 percent (1,900 injuries). Young adults 15 to 24 years old experienced 4.1 injuries per 100,000 people for the special study month. The injury rate declined for older people; for example people between 25 and 44 had 2.3 injuries per 100,000 and those 45 to 64 had 0.5 injuries per 100,000.

Males had 5,000 injuries, representing about 75 percent of the total. This pattern and the concentration of injuries among people under 25 has been typical of fireworks injuries for previous years.

Table 3
 Estimated Fireworks-Related Injuries
 By Age and Sex
 June 19-July 19, 2004

Age Group	Total	Male	Female	Per 100,000 People
Total	6,600	5,000	1,600	2.3
0 to 4	700	300	400	3.5
5 to 14	2,000	1,600	400	5.1
5 to 9	1,000	800	300	5.5
10 to 14	1,000	900	100	4.7
15 to 24	1,700	1,400	300	4.1
15 to 19	1,000	800	200	4.8
20 to 24	700	600	100	3.5
25 to 44	1,900	1,500	400	2.3
45 to 64	300	200	100	0.5
65+	100	*	100	0.2

Sources: NEISS, U. S. Consumer Product Safety Commission/EPHA, U. S. population from <http://www.census.gov/population/projections/nation/summary/np-t3-b.txt> 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. Almost half the estimated 700 injuries to children under 5 were from sparklers. For children ages 5-14, injuries were about equally divided between sparklers, novelty devices, rockets and firecrackers. Novelty devices include popper type fireworks, festival balls and smoke bombs.

Table 4
 Estimated Fireworks-Related Injuries
 By Device Type and Age Group
 June 19-July 19, 2004

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

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

The largest categories of fireworks types associated with injuries to females were unspecified (30 percent), sparklers (21 percent) and novelties (19 percent). For males the pattern was different. Unspecified were associated with 15 percent of injuries among males, sparklers 14 percent and novelties 11 percent. Male injuries were associated with firecrackers (19 percent) and rockets (17 percent). For females firecrackers were associated with 10 percent of the estimated injuries and rockets were associated with 3 percent.

Injury Diagnosis and Body Part Injured

Table 5 presents the types of injuries sustained to specific parts of the body. Hands and fingers with an estimated 2,200 injuries, accounted for 33 percent of the total injuries, followed by head/face/ear injuries at 1,400 and eye injuries also at 1,400.

Burns with 4,100 estimated injuries (62 percent), were the most frequent diagnosis. Contusions and lacerations, at 1,300 injuries and 20 percent of the total were the second most frequent. Head and facial injuries were predominately burns as were hand injuries and leg injuries. Most eye injuries were contusions and lacerations, and other diagnoses that included foreign bodies in the eye.

Table 5
Estimated Fireworks-Related Injuries
By Body Part and Diagnosis
June 19-July 19, 2004

Body Part	Total	Burns	Contusions Lacerations	Fractures Sprains	Other Diagnoses
Total	6,600	4,100	1,300	200	1,000
Arm/Shoulder	500	400	100	*	*
Eye	1,400	200	800	*	400
Hand/Finger	2,200	1,900	100	*	200
Head/Face/Ear	1,400	800	300	100	200
Leg	900	700	100	*	100
Trunk	300	100	*	*	100

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. See notes for Table 2. Fractures and sprains also include dislocations. Other diagnoses included all other injury categories. Arm and shoulder includes NEISS codes for upper arm, elbow, lower arm, shoulder and wrist. Head/ Face/Ear includes eyelid, eye area, nose, neck, and mouth. Leg includes upper leg, knee, lower leg, ankle, foot and toe. Trunk includes lower trunk, upper trunk, pubic region, all parts of body, internal and 25-50% of body.

Type of Fireworks Device and Body Part Injured

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

Table 6
 Estimated Fireworks-Related Injuries
 By Type of Fireworks Device and Body Part Injured
 June 19-July 19, 2004

Fireworks Type	Total	Arm	Eye	Head/Face	Hands/Fingers	Leg	Trunk
Total	6,600	500	1,400	1,400	2,200	900	300
All Firecrackers	1,100	200	300	100	200	300	*
Small	300	*	100	100	100	*	*
Illegal	100	*	*	*	100	*	*
Unspecified	700	100	200	*	*	300	*
All Rockets	900	*	100	300	500	*	*
Bottle Rockets	500	*	100	100	200	*	*
Other Rockets	500	*	*	200	200	*	*
Other Devices	2,900	100	500	800	1,000	400	*
Sparklers	1,100	100	100	200	500	100	*
Fountains	200	*	*	200	*	*	*
Novelties	800	*	200	200	300	200	*
Multiple Tube	100	*	*	100	*	*	*
Reloadable	300	*	200	*	100	*	*
Roman Candles	300	100	*	*	100	100	*
Homemade/Altered	200	*	*	100	*	100	*
Public Display	300	100	200	*	*	*	100
Unspecified	1,200	100	200	200	500	100	100

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

Almost half the sparkler injuries involved the hands and almost all sparkler injuries were burns. Injuries from rockets involved the eye and head/face areas usually from impact from the device or foreign bodies in the eye. With rockets, hand injuries usually occurred when people were lighting these devices. Firecracker injuries were distributed across all body regions; most also involved burns. Almost half the firecracker injuries resulted in lacerations and contusions. These are injuries that are characteristic of devices exploding while people are holding them.

Hospital Treatment

Although most of these fireworks-related injuries were characterized as “treat and release,” an estimated 4 percent (300 estimated emergency department-treated injury cases) were treated and transferred to another hospital, admitted or held for observation.

Telephone Investigations of Fireworks-related Injuries

CPSC staff assigned telephone investigations of some fireworks injuries that occurred during the month surrounding the July 4 holiday. Completed telephone investigations provide a more detailed scenario of the incident involving the injury than the emergency department record in NEISS. Most of the cases were selected for telephone investigations on the basis of injury severity such as serious eye injuries, concussions, limb amputations or because the person was admitted to the hospital. Two cases were selected by the Fire Injury Project. Because these cases were selected on the basis of severity, they are only representative of scenarios associated with the most serious injuries.

In the telephone questionnaire, respondents were asked about the hazard patterns associated with the injury, the medical care following the emergency department treatment and about long term effects, if any, of the injury. Also, respondents were asked about the source of fireworks that caused the injury.

Summaries of the 46 completed investigations are found in Appendix B. The cases are organized in order of emergency department disposition representing decreasing injury severity as follows: Admitted, Treat and Transfer, Held for Observation and Treat and Release. Within disposition, cases are organized by the age of the victim.

Summary Statistics

Of the 46 cases, 78 per cent of the victims were males and 22 percent were females. Forty percent were 15 or younger and five victims were 40 or older. Three cases involved hospital admissions, a fourth involved transfer to another hospital and a fifth victim was held for observation. The remaining cases were treat and release dispositions.

Hazard Patterns

In 17 cases, the victims were injured when the fireworks exploded either earlier or later than expected. Four cases, 2, 27, 33 and 43, involved aerial fireworks, three that exploded immediately when lit and a fourth that launched too early. Case 2 resulted in the victim fracturing bones in both feet and spending a week in the hospital. Cases 4 and 34 involved fountains that exploded early. Other early explosions included case 12

involving a homemade firework, case 42 a novelty device and case 32 a rocket. In case 20, the Roman Candle went off before the victim could move away, while in case 22 also involving a Roman Candle, the device exploded when the victim put it in a pipe, while still holding it.

Five other cases with early explosions were associated with firecrackers. In case 44 an M-80 illegal firecracker exploded in the victim's hand, resulting in the loss of several fingertips. In cases 15 and 19, small firecrackers exploded in the victim's hand. A firecracker also exploded in the victim's hand in case 31. This victim said that he was drinking at the time he was setting off fireworks. In a slightly different scenario in case 39, the victim lit a firework then walked away. The firework exploded before the victim could move out of range.

The only late explosion among these incidents was case 24. After waiting a few minutes for the lit artillery shell to go off, the victim picked it up. It exploded in his hands resulting in second degree burns.

Seven scenarios involved aerial fireworks on errant flight paths. A Roman Candle in case 5 launched sideways striking the victim in the neck, chest and arm, resulting in burns to the 10-year-old victim. A victim in case 38 also was injured in a sideways flight scenario where an aerial firework hit her in the leg. In case 9, a public display firework that was emitting sparks shot across a field. Sparks from the firework burned the victim's arm. A rocket fired some distance from the victim, hit him in the mouth in case 25. In case 40, an aerial firework on an errant flight path struck a victim in the leg setting her clothing on fire. A bottle rocket in case 7 went up and then spiraled downward emitting sparks that injured a victim's eye. In case 23, the victim and his friends were shooting rockets, one of which bounced off a tree and hit the victim causing his hair to ignite.

Another six incidents resulted from debris or sparks from fireworks. In cases 10 and 21, sparks and debris from descending aerial fireworks resulted in eye injuries. In case 46, a friend lit a ground spinner, a fireworks device that rotates rapidly and emits sparks, which burned the victim's leg. Case 14 involved an eye injury from sparks emitted by a sparkler. The victim also experienced an eye injury in case 16 from a spark from an unknown type of firework that was launched 20 feet from the victim. In case 13, sparks from a Roman Candle burned the victim's arm.

Four incidents involved tipovers. In case 3, a multiple shot cake device tipped over during launch of several fireworks. The device was about 40 feet from the victim. This incident resulted in a serious eye injury to the victim. Case 26 also involved a multiple shot device which had been blown over by the wind. When the victim turned to look at it, it launched hitting him in the face. In case 6, the 4-year-old victim's mother lit an aerial firework which was blown over before launch. The firework rolled under their picnic table and exploded burning the victim in the leg. Finally, case 30 involved both tip over and a firework that exploded when not expected.

Three incidents involved modified fireworks. In case 18, the fireworks device consisted of several small firecrackers on a single wick. The victim took the device apart and lit one component which exploded immediately. In case 11, the victim took apart several cherry bomb type firecrackers and lit the powder. The powder exploded resulting in facial burns. In case 1, the 15-year-old victim found discarded aerial fireworks in the trash. Although these fireworks were designed to be launched from a tube, the victim instead put one on the ground and lit it. The device then exploded resulting in serious injuries that involved a 4 day stay in the hospital.

The remaining nine incidents involved unique scenarios. A victim slipped on the ground moving away from a firework, injuring his elbow in case 37 and another victim injured his knee while lighting a firework in case 41. In case 8, a victim held a smoke bomb, then let it fall between her fingers resulting in burns. At a public display, the victim in case 17 looked up a launching tube that immediately fired causing a corneal burn. Cases 28 and 36 involved ground spinners. In case 28, a ground spinner bounced off some wood then made contact with the victim's leg while in case 36, the ground spinner rose up into the air unexpectedly burning the victim's forehead. A firecracker was thrown at the victim in case 29. In case 35, the victim was holding 30 sparklers in his left hand and lighting them to give to children. Some of the sparklers exploded causing burns to his hand. Finally in case 45, the victim held the stick from the bottle rocket while lighting the rocket, rather than putting the stick in a bottle. The rocket burned the victim's hand.

Long Term Consequences of Fireworks-related Injuries

Victims were asked if there were any long term consequences of their injuries. Most expected a complete recovery. Some exceptions were as follows:

- Case 1. A 15-year-old male victim lit an aerial fireworks device on the ground instead of lighting it in the launching tube as it was designed. The firework exploded immediately. The victim had first degree burns to face, hand and chest. He was hospitalized for 4 days and expected 4 to 6 months would be needed to recover from the injury.
- Case 3. A 56-year-old female was shot in the eye by a multiple shot device that had tipped over. She was admitted to the hospital then transferred to a trauma center. The victim had two surgeries, the second to remove her eye.
- Case 26. A 17-year-old male had a broken nose, bruises, burns and some debris from the fireworks embedded in his cornea after being struck by a projectile from a multiple shot device. It was reported that the victim may be at increased risk of cataracts or glaucoma as a result of this incident.

- Case 29. A 20-year-old male experienced a ruptured eardrum when a firecracker thrown by his brother exploded near his ear. The victim may have lost some hearing.
- Case 31. This case also involved possibly permanent loss of hearing. A 21-year-old victim had a firework explode in his hand resulting in burns to the hand and a perforated eardrum.

Where Fireworks Were Obtained

In the telephone interview, victims were asked where the fireworks associated with their injuries were obtained. Of the 46 respondents, 33 knew the sources of the devices. Fifteen incidents involved fireworks that were sold from a stand, that is a temporary place to sell fireworks, usually only in operation during the period around July 4. Nine respondents reported that the devices came from friends or relatives. Seven reported that the fireworks were purchased at stores. Two of the injuries involved public display devices.

Enforcement Activities

CPSC's Office of Compliance enforces regulations for fireworks devices that are sold to consumers under provisions of the Federal Hazardous Substances Act. CPSC's enforcement activities are focused on reducing the number of fireworks-related deaths and injuries. A variety of enforcement techniques and initiatives were utilized in 2004 to keep unsafe fireworks from consumers.

CPSC 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 their past violation history, the type of device, and whether the item had been sampled previously. With assistance from Customs, staff from CPSC selectively sampled and tested 296 shipments of fireworks in fiscal year 2004 to determine if they were in compliance with CPSC regulations. Of those, approximately 28% were found to contain violative fireworks. These shipments accounted for more than 4.5 million units with violations serious enough to warrant seizure or other actions by Customs.

Another enforcement activity that continues to remain a priority for CPSC is the investigation into firms and individuals that offer kits and components to make illegal and dangerous firecracker type explosives, such as M-80s, Cherry Bombs and Quartersticks.

CPSC staff also participated in several multi-state criminal investigations. Staff worked with other Federal agencies, including the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATFE), the Department of Justice's Office of Consumer Litigation, and

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.

Summary

In 2004, both reported deaths and estimated injuries were at about the same level as 2001-2003. There were 8 fireworks deaths reported for 2004 as compared with 6 for 2003, 4 for 2002 and 4 for 2001. Annual injury estimates were 9,600 in 2004 as compared with 9,300 in 2003, 8,800 for 2002 and 9,500 for 2001. These injury estimates, developed from a sample, have some amount of sampling error. The differences in these estimates were not statistically significant.

During the one-month special study period of June 19-July 19, 2004, there were an estimated 6,600 emergency department-treated injuries, somewhat less than the 2003 estimate of 6,800 and more than the 2002 estimate of 5,700. Again the differences in estimates were not statistically significant. Consistent with previous patterns, in 2004 children under 15 experienced about half the injuries and males were about three times more likely to be injured than females.

Also consistent with previous years, in 2004 about two-thirds of the injuries involved burns. Burns were the most common injury to all parts of the body except the eyes, where contusions, lacerations, and foreign bodies occurred more frequently. The parts of the body most often injured were hands (estimated 2,200 injuries), eyes (1,400 injuries) and the head, face and ear (1,400 injuries). Most injuries involved treat and release dispositions. Only an estimated 4 percent (300 estimated emergency department-treated injury cases) were treated and transferred to another hospital, admitted or held for observation.

Among different types of fireworks, firecrackers and sparklers were associated with the greatest number of estimated injuries at 1,100 each, followed by rockets at 900 estimated injuries. Sparklers accounted for almost half the injuries for children under 5. We also estimated that there were a small number of injuries (300) at public fireworks displays.

A review of data from telephone follow-up investigations showed that the typical cause of injuries were (1) fireworks exploding earlier or later than expected, (2) errant flight paths of aerial fireworks and (3) debris or sparks from fireworks devices. According to the investigations, most victims already had recovered from their injuries or will recover completely. Several victims experienced serious eye and ear injuries.

CPSC's enforcement activities remained at a high level. CPSC's Office of Compliance worked with U.S. Customs to sample imported fireworks and to seize illegal shipments. Also during 2004, CPSC staff provided legal, field and technical support in

cases involving large-scale distribution of illegal explosive devices and illegal diversion of professional display fireworks to consumers.

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Appendix A Fireworks-Related Injuries and Consumption

Table A-1 below shows that during the last 9 years, the amount of fireworks (in weight) available in the U.S. has more than doubled. Except for the millennium year of 2000, the number of estimated emergency department treated injuries has fluctuated between 7,300 and 9,600 without any apparent trend. During this same period, as shown in the table below, the number of injuries per 100,000 pounds of fireworks consumed has declined steadily between 2000 and 2004 from 6.9 injuries per 100,000 pounds to 3.8 injuries per 100,000 pounds. This is a decrease of about 45 percent.

Table A-1
Estimated Fireworks-Related Injuries and
Estimated Fireworks Consumed 1996-2004

Year	Estimated Injuries	Estimated Fireworks Consumption (millions of pounds)	Injuries Per 100,000 Pounds
2004	9,600	253.4	3.8
2003	9,300	236.5	3.9
2002	8,800	189.8	4.6
2001	9,500	169.6	5.6
2000	11,000	159.0	6.9
1999	8,500	159.2	5.3
1998	8,500	134.9	6.3
1997	8,300	114.7	7.2
1996	7,300	120.3	6.1

Source: Injuries from NEISS, U. S. Consumer Product Safety Commission/EPHA. See table 1 for further details. Estimated fireworks consumption derived from data from the U. S. International Trade Commission and the U. S. Department of Commerce. Includes consumer and display fireworks. Consumption is calculated as reported imports less exports plus domestic shipments. This assumes that all fireworks imported into the U. S. and manufactured in the U. S. during the year are consumed during the same year. Domestic shipments are estimated as 11 percent of imports. The coding system for fireworks imports was different before 1996 making it impossible to obtain consistent estimates for imports before 1996.

This table should be interpreted with caution. First, the logical unit of exposure is number of devices consumed instead of the weight of the fireworks, because a person is exposed to injury when a device is consumed (lit). Injuries per 100,000 fireworks devices consumed would be meaningful. Weight is a proxy for the number of fireworks devices consumed, but it may not be a good proxy. 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.

Second, we do not have data to break down consumption statistics in Table A-1 by fireworks device types. As shown above in Table 2, different fireworks devices have different number of injuries. As a result, we don't know if the increase in consumption in recent years is across the board, greater in the larger display shells that historically have produced few injuries, in firecrackers and sparklers or some mixture of these devices.

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Case	Age	Sex	Diagnosis	Disposition	Body Part	Fireworks Type	Incident Description	Medical Treatment and Prognosis
1	15	Male	Thermal Burns	Admitted	Hand	Aerial firework	Victim found aerial fireworks discarded in the trash. Although designed to be launched from a tube, victim placed a device on the ground and lit the fuse. The device then exploded.	Victim had 1st degree burns to the face, right hand and chest. He was hospitalized for 4 days for treatment. Recovery will take 4 to 6 months.
2	15	Male	Fracture	Admitted	Foot	Aerial firework	Victim lit a firework that immediately exploded.	Fractured bones in both feet in addition to burns. Hospitalized for a week, then additional follow up visits. Fully recovered.
3	56	Female	Puncture	Admitted	Eye	Multi shot cake device	Victim struck in the eye by a firework from a multiple shot device that had tipped during the launch of several fireworks. The device was about 40 feet from the victim.	Admitted to hospital, then transferred to a trauma center. Victim had two surgeries, the second to remove her eye. Three months after the incident, the victim had recovered from surgery.
4	21	Male	Thermal Burns	Treat and Transfer	Face	Fountain	Firework exploded immediately after it was lit.	Second and third degree burns to the face. Victim transferred to another hospital where he was admitted for one day. After two weeks, full recovery.
5	10	Male	Thermal Burns	Held for Observation	25-50% of body	Roman Candle	The victim's father lit a Roman Candle which launched sideways, striking the victim in the neck, chest and arm.	Victim treated for burns and held for observation in the hospital. Full recovery expected 40-50 days from the injury.
6	4	Male	Thermal Burns	Treat and Release	Lower Leg	Aerial firework	The wind knocked over some fireworks that the victim's mother had lit. One firework rolled under a picnic table where the victim was sitting and went off.	Victim was burned on the leg. Fully recovered.
7	4	Female	Contusions, Abrasions	Treat and Release	Eye	Bottle rocket	An adult lit a bottle rocket that went upward and then spiraled downward. One of the sparks went into the victim's right eye.	Treated for abrasion of the right eye. Victim fully recovered.
8	8	Female	Thermal Burns	Treat and Release	Hand	Smoke bomb	Victim lit a smoke bomb, then dropped it burning her fingers.	Victim treated for burns. Fully recovered.
9	8	Male	Thermal Burns	Treat and Release	Lower Arm	Public Display	At a public display, an aerial firework shot horizontally across a field. Sparks from the firework burned the victim's arm.	Treated for second degree burns to his hand. Fully recovered.

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10	9	Male	Burns Not Specified	Treat and Release	Face	Aerial firework	Sparks from a descending aerial firework burned victim above right eye.	Treated at emergency department. Fully recovered.
11	9	Male	Thermal Burns	Treat and Release	Face	Cherry bomb	Victim and friend removed powder from several cherry bombs, put the powder in a pile and lit it. Victim was burned on the face.	Fully recovered.
12	10	Male	Laceration	Treat and Release	Upper Arm	Homemade Firework	Victim and others assembled a firecracker. The device was lit and handed to the victim but it exploded before he could throw it. Shrapnel from the object cut the victim's arm.	Victim received stitches. Fully recovered in 10 days.
13	11	Male	Thermal Burns	Treat and Release	Upper Arm	Roman Candle	People near the victim were shooting Roman Candles. A spark from one hit the victim's arm.	Treated for burns. Fully recovered.
14	13	Male	Thermal Burns	Treat and Release	Eye	Sparkler	Victim's eye burned by sparks from a sparkler that was lit by another male.	Treated at emergency department. Fully recovered.
15	13	Male	Fracture	Treat and Release	Finger	Small firecracker	The victim lit a firecracker that exploded in his hand before he was able to throw it.	Fracture to middle finger and bruises to other fingers. Victim fully recovered.
16	14	Male	Contusions, Abrasions	Treat and Release	Eye	Unknown	Several people about 20 feet from the victim were lighting fireworks. A spark from one firework went into the victim's eye.	Victim treated for a corneal abrasion. Fully recovered.
17	14	Male	Thermal Burns	Treat and Release	Eye	Public Display	At a fireworks show, the victim looked up the launching tube of an aerial firework when it fired.	Burn to the victim's cornea. Fully recovered in three weeks.
18	15	Male	Contusions, Abrasions	Treat and Release	Hand	Small firecracker	Victim took apart assembled firecrackers and lit one. The firecracker exploded in the victim's right hand.	Victim's index finger and thumb had abrasions. Treated at emergency department and fully recovered.
19	15	Male	Fracture	Treat and Release	Finger	Small firecracker	Victim lit a firecracker that immediately exploded while he was holding it.	Treated for burn to one finger and released. Victim fully recovered.
20	15	Male	Thermal Burns	Treat and Release	Upper Leg	Roman Candle	Victim and friends were lighting Roman Candles. A firework went off earlier than expected hitting the victim in the leg.	Victim burned on the leg. Fully recovered.
21	16	Female	Contusions, Abrasions	Treat and Release	Eye	Public Display	At a public display, sparks and debris from descending aerial fireworks went into victim's eye.	Treated by Fire Department on the scene and at the emergency department. Fully recovered.

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22	16	Male	Thermal Burns	Treat and Release	Hand	Roman Candle	Victim lit a Roman Candle and put it in a pipe. The pipe exploded in the victim's hand.	Victim treated for burns to the hand. Physical therapy. Victim fully recovered in two weeks.
23	17	Male	Thermal Burns	Treat and Release	Head	Rocket, type unknown	Victim and friends shooting fireworks. One bounced off a tree, hitting the victim in the head causing his hair to ignite.	Unknown
24	17	Male	Thermal Burns	Treat and Release	Hand	Artillery Shell	Victim picked up a lit artillery shell after waiting several minutes for it to go off. Then it exploded in his hands, burning several fingers.	Treated for first degree burns. Fully recovered.
25	17	Male	Laceration	Treat and Release	Mouth	Rocket, type unknown	Victim hit in the mouth by a rocket that was launched some distance from him.	Victim's lip was cut. Recovered in a month.
26	17	Male	Thermal Burns	Treat and Release	Eye	Multi shot cake device	Victim placed the device on a flat surface, lit it and ran about 20 feet. He turned to look at the firework, which had then been blown over by the wind. The device then launched, firing a projectile that struck the victim in the face.	Victim had a broken nose, bruises, burns and some debris from the fireworks embedded in his cornea. Victim may be at increased risk of cataracts or glaucoma.
27	19	Female	Thermal Burns	Treat and Release	Face	Aerial firework	Victim lit a firework that was supposed to shoot into the air. Instead, the firework exploded, shattering the lens of her glasses and burning the skin around her eyes.	No information on treatment. Fully recovered.
28	19	Male	Thermal Burns	Treat and Release	Lower Leg	Ground spinner	Victim's friend lit the device that was expected to spin then shoot up into the air. The device bounced off a piece of wood, then the victim's leg.	Victim had second and third degree burns to his leg. Fully recovered.
29	20	Male	Other	Treat and Release	Ear	Small firecracker	Victim's brother threw a lit firecracker that exploded near the victim's ear.	Victim has ruptured eardrum and has lost hearing. Full recovery uncertain.
30	21	Female	Thermal Burns	Treat and Release	Hand	Small firecracker	Victim lit several firecrackers that she had lined up on the ground. When she picked up a firecracker that had tipped over, it exploded in her hand.	Treated for second degree burns to her hand. Fully recovered.
31	21	Male	Other	Treat and Release	Ear	Small firecracker	Victim was drinking and lighting fireworks, when one exploded in his hand.	Burns to the victim's hand and a perforated eardrum. Full recovery of victim's hearing is uncertain.
32	21	Male	Thermal Burns	Treat and Release	Finger	Rocket, type unknown	Victim was lighting a firework that exploded in his hand.	Victim's fingers were burned. Fully recovered.

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33	22	Male	Burns Not Specified	Treat and Release	Hand	Aerial firework	Firework that was supposed to shoot upwards exploded instead when lit. Victim was burned on hand, and had lacerations.	Victim was treated for burns and received stitches for the wound. Fully recovered in less than two months.
34	22	Male	Laceration	Treat and Release	Mouth	Fountain	Victim and friends lighting fireworks. One went off earlier than expected hitting the victim in the lip.	Victim treated for a cut on the lip. Fully recovered.
35	27	Male	Thermal Burns	Treat and Release	Hand	Sparkler	Victim was holding about 30 sparklers in his left hand and lighting them one at a time to give to kids in the neighborhood. Some of the sparklers exploded.	Victim's had 1st degree burn to hand. Fully recovered.
36	28	Male	Laceration	Treat and Release	Face	Ground spinner	A ground spinner shot into the air instead of spinning on the ground. The device hit the victim in the forehead.	Victim treated for burns and received stitches for the forehead wound. Fully recovered.
37	29	Male	Contusions, Abrasions	Treat and Release	Upper Trunk	Rocket, type unknown	Victim lit a rocket, then slipped on the ground when he moved away quickly, resulting in an injury to his elbow.	Unknown
38	33	Female	Thermal Burns	Treat and Release	Upper Leg	Aerial firework	An aerial firework went sideways instead of vertically, hitting the victim in the leg.	Victim received first and second degree burns. Fully recovered after three weeks.
39	34	Male	Thermal Burns	Treat and Release	Lower Trunk	Unknown	Victim lit a firework then walked away. The device went off hitting the victim in the back.	Victim burned on the back. Fully recovered.
40	35	Female	Thermal Burns	Treat and Release	Lower Trunk	Aerial firework	Victim hit in the leg by aerial firework traveling horizontally rather than upward. Victim's pants caught on fire and her chair was destroyed.	Victim had first and second degree burns. Fully recovered in two weeks.
41	38	Male	Strain/Sprain	Treat and Release	Knee	Small firecracker	Victim kneeled to light fireworks and injured his knee.	Sprained knee. Fully recovered.
42	38	Male	Thermal Burns	Treat and Release	Finger	Novelty	Firework exploded immediately after it was lit.	Second degree burns to the hand, treated at emergency department. Victim fully recovered.
43	42	Female	Thermal Burns	Treat and Release	Hand	Aerial firework	Victim lit an aerial firework that launched before she could move her hand away.	Fully recovered after treatment for burns to the hand.
44	45	Male	Laceration	Treat and Release	Hand	M-80	Victim lit an M-80 that exploded in his hand.	Victim lost the tips of several fingers in the explosion. He expects full recovery in nine months or more. Receiving physical therapy.

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45	46	Male	Thermal Burns	Treat and Release	Hand	Bottle rocket	Victim held the bottle rocket's stick in his hand while lighting rather than putting the stick into a bottle. The rocket exploded and burned the victim's hand.	Fully recovered after treatment for a second degree burn on the hand.
46	48	Female	Thermal Burns	Treat and Release	Ankle	Ground spinner	A friend of the victim lit a ground spinner. Sparks emitted by the firework burned the victim's lower leg.	Treated at the emergency department. Fully recovered.