



2001 Fireworks Annual Report

Fireworks-Related Deaths, Emergency Department Treated Injuries, and Enforcement Activities During 2001

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Michael A. Greene
Division of Hazard Analysis
Directorate for Epidemiology
U.S. Consumer Product Safety Commission

Patrick M. Race
Office of Compliance
U.S. Consumer Product Safety Commission

Executive Summary

This report provides the results of the U. S. Consumer Product Safety Commission (CPSC) staff analysis of data on fireworks-related injuries and deaths during 2001. The report also includes a summary of CPSC enforcement activities during that year.

We obtained information on fireworks deaths primarily from news clips in CPSC's Injury/Potential Injury Incident (IPII) database. We estimated fireworks injuries from CPSC's National Electronic Injury Surveillance System (NEISS). More detailed analyses of injuries including the type of injury and the firework involved were based on a special study conducted between June 22 and July 22, 2001.

Highlights of the report are as follows:

- CPSC has reports of 4 deaths from fireworks in 2001. CPSC received reports of 10 deaths in 2000.
- Fireworks devices were involved in an estimated 9,500 injuries treated in U. S. hospital emergency departments during calendar year 2001. CPSC estimated that there were 11,000 injuries in 2000. The year 2000 had the highest annual injury totals since 1994, most likely related to increased fireworks sales associated with the millennium celebrations.
- An estimated 5,700 fireworks-related injuries were treated in U. S. hospital emergency departments during the one month special study period surrounding the Fourth of July, 2001 (June 22, 2001 – July 22, 2001). This was 900 fewer injuries than the year 2000 for the same period. Highlights of the special study were as follows:

Firecrackers were associated with the greatest number of injuries at 1,500, followed by rockets at 1,200.

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 about half the number of injuries.

In terms of per capita injuries, children 10-14 had the highest risk of injury at 6.5 emergency department treated injuries per 100,000 people, followed by children 15-19 (5.1 injuries) and 5-9 (4.0 injuries).

Sparklers accounted for about one third of the injuries to children under 5. Children 5-14 were injured about equally by firecrackers, rockets and other devices.

The parts of the body most often injured were hands (estimated 1,800 emergency department visits), eyes (1,600 visits), and the head/face/ear region (900 visits).

Over half the injuries involved burns. Burns were the most frequent injury to all parts of the body except the eyes, where contusions, lacerations, and foreign bodies were the most frequent types of injuries.

- CPSC conducted telephone follow-up investigations of some of the more serious fireworks injuries that occurred during the month surrounding the July 4th holiday. Findings from these investigations included the following:

Some of the causes of injuries included delayed or early fireworks explosions, errant flight paths of rockets, debris from aerial fireworks and mishandling of sparklers.

While most victims had recovered from their injuries before the telephone survey, a few injuries may have resulted in permanent loss of function. Some of these injuries led to blindness and blurring of vision, while another injury involved partial finger amputation.

Most victims who knew where the fireworks were obtained, reported that they came from a stand, rather than a store. No victims reported obtaining fireworks from mail order or over the internet.

- During 2001, CPSC's Office of Compliance and U. S. Customs Service surveillance ran at a high level due to the volume of fireworks entering the country for the July 4th holiday celebrations. About 400 shipments that were suspected to be in violation of CPSC's regulations were sampled. We found more than one-third of these shipments representing more than 1.7 million units were in violation of CPSC's fireworks regulations.
- CPSC staff also initiated and participated in several multi-state criminal investigations. These investigations led to the execution of several search warrants and the indictments of at least five people. As a result of these investigations, several criminal defendants will be prosecuted during 2002.

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Introduction

This report describes injuries and deaths associated with fireworks during 2001. The report also describes CPSC enforcement activities for 2001.

Fireworks deaths were obtained from the CPSC Injury/Potential Injury Incident file (IPII). Data for the IPII file come from news clips, consumer complaints and reports from government agencies. Because reporting is voluntary, there may have been fireworks deaths that were not reported to any of these sources, and are not included among the deaths in this report. As a result, the number of deaths from fireworks-related injuries might be greater than reported here.

Emergency department treated injuries for fireworks in 2001 were obtained from CPSC's National Electronic Injury Surveillance System (NEISS). NEISS is a probability sample of U. S. hospitals with emergency departments.¹ All estimates for the number of injuries in this report were obtained using the hospital totals and the sampling weights in NEISS. These estimates reflect emergency department treated injuries for the entire country.

The detailed analysis of injuries in hospital emergency departments in this report is based on a special study of fireworks injuries treated between June 22, 2001 and July 22, 2001. This special study focused on the types of fireworks involved in these injuries. Victims were shown illustrations of fireworks at emergency departments to help them identify the device associated with the injury. The type of fireworks device was not usually recorded during the rest of the year.

Also, during the special study period, CPSC initiated in-depth investigations of 62 fireworks injuries from the injuries treated at NEISS hospitals. These investigations focussed on injuries involving amputations, eye injuries, or injuries requiring hospital admissions. Victims were telephoned and read a questionnaire. These investigations were intended to determine how the most serious injuries occurred, the medical treatment involved and the long-term consequences of the injuries. Victims were also asked where the device was obtained.

In this report, injury estimates derived from NEISS are rounded to the nearest 100 injuries. Estimates of less than 50 injuries are shown with an asterisk (*). Totals may not add due to rounding.

Although a number of different analyses are provided in this report for different categories of injuries, including the age distribution of victims and the types of fireworks involved in the injury, interpretation of these estimates should be made with caution. This is because estimates based on small sample sizes have relatively large amounts of

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).

sampling variability. For example, when comparing subsets of the data, say between injuries associated with two different types of fireworks, or between two different years, 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.

Fireworks-related Deaths for 2001

CPSC has reports of 4 non-work related deaths that occurred from fireworks during 2001.² This compares with reports of 10 deaths that occurred from fireworks during 2000.³ Brief descriptions of the 2001 incidents are as follows:

- A 36 year old Indiana man was killed from shrapnel when a firework that he had made exploded.
- Another Indiana man, 46 years old, sustained severe injuries to his face and neck when a lit aerial firework exploded while he was looking in the launching tube. His wife told CPSC investigators that he died from those injuries.
- A 30 year old Pennsylvania man twisted several fuses from explosive sticks together and lit them. He was killed from the blast.
- A Texas woman, 33 years old, died in a mobile home fire. Fireworks landing on a sofa outside her mobile home may have ignited the sofa and then the home, according to a newspaper article.

According to the Centers for Disease Control and Prevention, there were an average of 6.1 deaths per year from fireworks incidents between 1988 and 1999.⁴

² We originally reported 8 fireworks deaths for 2001 which included four deaths in a house fire in Texas. New information, gathered since CPSC's initial report, found that the cause of these deaths had been erroneously reported in the newspaper as fireworks.

³ See Greene MA and Race PM (2001), "2000 Fireworks Annual Report: Fireworks-Related Deaths, Emergency Department Treated Injuries, and Enforcement Activities During 2000," US Consumer Product Safety Commission, Washington, DC.

⁴ Data from Center for Disease Control and Prevention, CDC Wonder Compressed Mortality file for 1988-1999, for ICD 9 code 923.0 and ICD 10 code W39. See www.cdc.gov/wonder.

National Injury Estimates for 2001

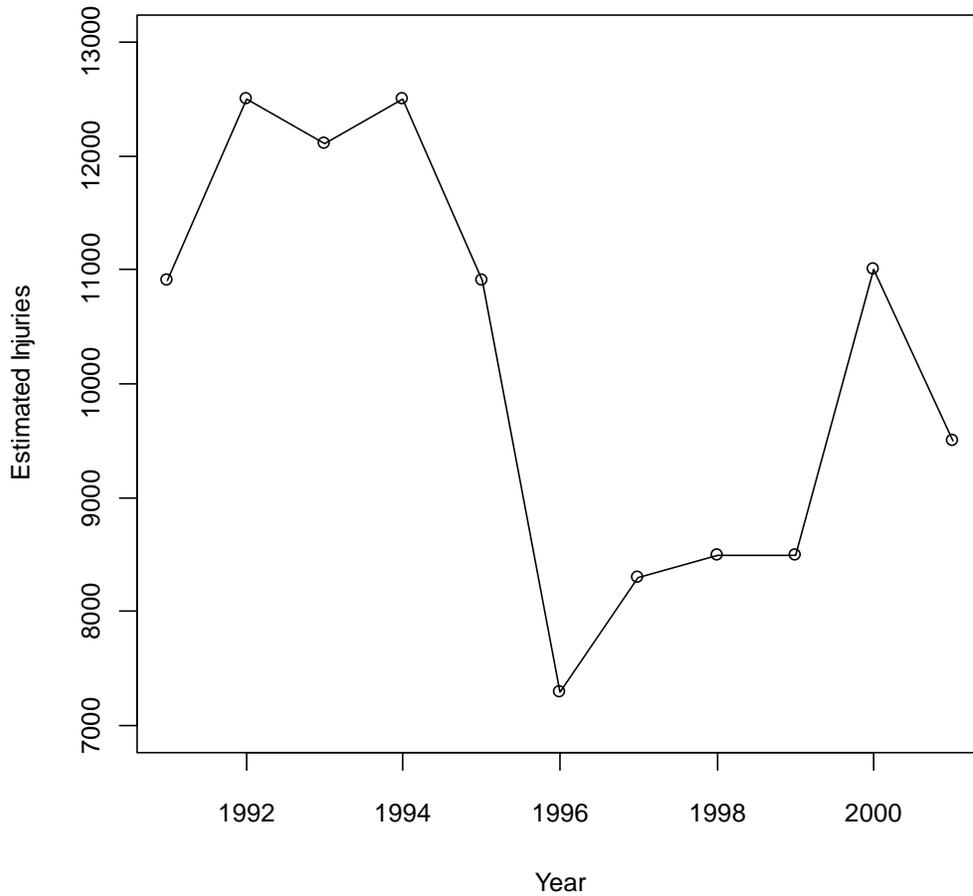
Table 1 and Figure 1 present the estimated number of fireworks-related injuries for 1991 through 2001 that were treated in U. S. hospital emergency departments.

Table 1
Estimated Fireworks-Related Injuries 1991-2001

Year	Estimated Injuries	Injuries per 100,000 people
2001	9,500	3.3
2000	11,000	3.9
1999	8,500	3.0
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	12,000	4.7
1992	12,500	4.9
1991	10,900	4.3

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. There were 291 fireworks-related injuries recorded in NEISS hospital emergency departments during 2001. 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. Injury estimates rounded to nearest 100 injuries. Cases were weighted by the NEISS sampling weights. U. S. Population estimates from eire.census.gov/popest/data/counties/tables/CO-EST2001-12/CO-EST2001-12-00.php for 1991-2000 and from eire.census.gov/popest/data/national/tables/NA-EST2001-01.php for 2001.

Figure 1. Fireworks Injuries 1991-2001



In 2001, there were an estimated 9,500 fireworks injuries for the calendar year (95% confidence interval 7,100 – 11,900 injuries).

Total emergency department treated injuries and per capita injuries declined in 2001 from the higher levels experienced during the millennium year of 2000. Table 2 shows that much of the difference in total injuries resulted from differences in the months of January and July. In typical years, there are relatively few injuries in January. The year 2000 with celebrations marking the millennium was not typical.

Table 2
Comparison of 2001 Fireworks Injuries with 2000 Fireworks Injuries by Month

Month	2001	2000	Change ⁵
Total Injuries	9,500	11,000	-1,600
January	400	1,400	-1,000
February	100	*	100
March	200	100	100
April	200	200	0
May	100	100	-100
June	1,000	1,000	0
July	6,000	6,900	-800
August	200	400	-200
September	300	300	0
October	200	200	0
November	400	100	300
December	300	400	0

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Estimates rounded to the nearest 100 injuries. Totals may not add due to rounding.

Injury Estimates for the 2001 Special Study

The remainder of the injury analysis in this report presents the results of the 2001 study of hospital emergency department treated fireworks injuries that occurred between June 22 and July 22, 2001. During this period, there were an estimated 5,700 fireworks-related injuries (95% confidence interval 3,800 – 7,500). Estimates are derived from the actual number of visits and sampling weights. There were 177 visits to NEISS hospital emergency rooms for fireworks related injuries during the special study period.

Fireworks Device Types and Injury Dispositions

Table 3 shows the number of injuries by fireworks device type.

⁵ Both 2001 and 2000 monthly totals and the change in injuries are rounded to the nearest 100 injuries. This makes the change column look wrong for May, July and December. Unrounded estimates for May are 126 (2001), 73 (2000) and 53 (Change). All these numbers round to 100. Rounding also produces the apparent addition mistakes in July and December.

Table 3
 Estimated Fireworks-Related Injuries
 By Type of Fireworks Device
 June 22-July 22, 2001

Fireworks Device Type	Estimated Injuries
Total	5,700
Firecrackers	1,500
Small	600
Illegal	200
Unspecified	700
Rockets	1,200
Bottle Rockets	1,000
Other, Unspecified	200
Other Consumer Devices	1,300
Sparklers	600
Fountains	100
Reloadable Aerial Shells	200
Roman Candles	300
Helicopters	100
Homemade/Altered	100
Unspecified	1,600

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Based on 177 reported emergency department visits between June 22, 2001 and July 22, 2001. See notes for table 1. Totals may not add due to rounding. Estimates rounded to nearest 100 injuries.

As shown in Table 3, firecrackers accounted for about 25 percent (1,500) of all injuries that occurred during this period. Among firecrackers, illegal, large firecrackers, such as M-80's were involved in 200 estimated injuries. This was less than 5 percent of the total injuries. Among legal consumer devices, rockets (1,200 injuries) and sparklers (600 injuries) were most often found as the fireworks type. Bottle rockets accounted for 1,000 of the 1,200 rocket injuries.

Age and Sex of Injured Persons

Children under 5 experienced 10 percent (600 injuries) of all fireworks-related injuries as shown in Table 4. Children in the 5 to 14 age group accounted for 35 percent (estimated 2,100) of the fireworks-related injuries. Together, children under 15 accounted for about half the fireworks injuries.

The age groups 15 to 24 had 25 percent of the injuries (1,300) as did the 25 to 44 age group (1,400 injuries). People over 45 experienced about 5 percent of the injuries.

Males had 4,400 injuries, representing about 75% of the total.

The injury rates per 100,000 population were highest among children aged 10 to 14 with 6.5 injuries per 100,000 people. Children between 5 and 14 years of age had 5.3 injuries per 100,000 people, followed by children under 5 with 3.0 injuries per 100,000 people. Young adults 15 to 19 had 5.1 injuries per 100,000 people.

Table 4
 Estimated Fireworks-Related Injuries
 By Age and Sex
 June 22-July 22, 2001

Age Group (years)			Total	Male	Female	Injuries per 100,000 people
Total			5,700	4,400	1,300	2.0
Less Than	5		600	500	100	3.0
5	To	14	2,100	1,700	400	5.3
5	To	9	800	700	100	4.0
10	To	14	1,300	1,000	300	6.5
15	To	24	1,300	1,200	100	3.3
15	To	19	1,000	1,000	*	5.1
20	To	24	300	200	100	1.4
25	To	44	1,400	1,000	400	1.9
45	To	64	300	100	200	0.5

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Notes: See Table 3. US population from www.census.gov/population/projections/nation/summary/np-t3-b.txt. People over 65 had less than 50 injuries. That row is not shown in the table, but the injuries are counted in totals.

Age of the Injured Person by Type of Fireworks Device

Table 5 presents the ages of those injured by the type of fireworks device involved in the injury. Sparklers were associated with the most injuries for children under 5. For 5-14 year olds and for 15-24 year olds, firecrackers, other devices (including sparklers) and rockets were the source of injuries. Young adults, 15-24 years old were more likely to be injured by firecrackers than any other device.

Table 5
 Estimated Fireworks-Related Injuries
 By Device Type and Age Group
 June 22-July 22, 2001

Fireworks Type	Totals	Age Group (Years)				
		<5	5-14	15-24	25-44	45-64
Total	5,700	600	2,100	1,300	1,400	300
Firecrackers	1,500	100	500	600	300	*
Small	600	100	300	200	*	*
Illegal	200	*	*	200	*	*
Unspecified	700	*	200	200	300	*
Rockets	1,200	*	500	300	400	100
Bottle	1,000	*	400	200	300	100
Other	200	*	100	*	100	*
Other Devices	1,300	300	500	100	500	100
Sparklers	600	200	200	*	100	100
Fountains	100	*	100	*	*	*
Various	600	100	100	100	300	*
Homemade/Altered	100	*	*	*	*	*
Public Display	*	*	*	*	*	*
Unspecified	1,600	200	600	400	300	100

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Notes: See Table 3. Other Devices: Various include fountains, novelties, multiple tube and shells, reloadable shells and Roman candles. People over 65 had less than 50 injuries. That column is not shown in the table, but the injuries are counted in totals.

Injury Diagnosis and Body Part Injured

Table 6 presents the types of injuries sustained to specific parts of the body. Hands and fingers with an estimated 1,800 injuries, accounted for 30 percent of the total injuries. There were almost as many eye injuries, at 1,600, as hand and finger injuries. With 900 total injuries, head and face injuries were about 15 percent of the total.

Burns with 3,300 estimated injuries and 60 percent of the total, were the most frequent diagnosis. Contusions and lacerations, at 1,100 injuries and 20 percent of the total were the second most frequent. Also, contusions/lacerations, and foreign bodies (the latter counted in other diagnoses) were the most common eye injuries. Head and facial injuries involved more burns than contusions or lacerations.

Table 6
Estimated Fireworks-Related Injuries
By Body Part and Diagnosis
June 22-July 22, 2001

Body Part	Total	Burns	Contusions Lacerations	Fractures Sprains	Other Diagnoses
Total	5,700	3,300	1,100	100	1,100
Arm	400	100	100	100	100
Eye	1,600	400	500	*	600
Hand/Finger	1,800	1,600	100	*	100
Head/Face/Ear	900	400	300	*	200
Leg	600	500	*	*	100
Trunk	500	300	100	100	*

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Notes: See Table 3. Fractures and sprains also included dislocations. Other diagnoses included all other injury categories. Arm 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 7 below presents estimated injuries by the fireworks device and body part involved. Firecracker injuries occurred most frequently to the hand (500 injuries) or the

head/face/ear region (also 500 injuries). Typically, victims sustained injuries from firecrackers while holding the device, or attempting to release it after ignition. Rockets were associated mainly with eye and hand injuries. Victims sustained injuries from erratic rocket flight patterns, or burning debris from the rocket. Sparkler injuries typically involved burns to the hands or sparks getting into the eyes.

Table 7
Estimated Fireworks-Related Injuries
By Type of Fireworks Device and Body Part Injured
June 22-July 22, 2001

Type of Fireworks Device	Total	Arm	Eye	Hands Fingers	Head Face/Ear	Leg	Trunk
Total	5,700	400	1,600	1,800	900	600	500
Firecrackers	1,500	*	200	500	500	100	200
Rockets	1,200	100	400	300	200	200	*
Sparklers	600	*	200	300	*	100	100
Homemade/Altered	100	*	*	*	*	*	*
Public Display	*	*	*	*	*	*	*
Other	700	*	300	300	*	*	*
Unspecified	1,600	200	500	400	100	200	200

Source: NEISS, U. S. Consumer Product Safety Commission/EPHA. Notes: See Table 3. Body parts are defined in table 6. Firecrackers include small, illegal and unspecified firecrackers; rockets include missiles, bottle rockets, stick rockets and unspecified rockets, other includes helicopters, Roman candles, reloadable aerial shells and fountains.

Hospital Disposition

Although most of these fireworks-related injuries were characterized as “treat and release,” an estimated 12 percent required hospital admission or transfer to another hospital for treatment. This was somewhat higher than the hospitalization and treat/transfer rate of 4 percent for all consumer product related injuries for 2001.

The 12 percent admit or transfer rate was consistent for all age groups except children under 5 who were admitted or transferred 5 percent of the time. People injured by rockets and unspecified fireworks types were admitted or transferred at higher rates (at 20 and 14 percent respectively) than other victims. People with a diagnosis of eye injuries also were admitted or transferred at 14 percent. These findings are connected because as shown in table 7, about one quarter of eye injuries were caused by rockets and about one

third were caused by unspecified types of fireworks. However, the number of cases with dispositions other than treat and release is relatively small so these conclusions are somewhat tenuous.

Investigations of Fireworks Injuries

CPSC conducted telephone investigations of the more serious fireworks injuries that occurred during the month surrounding the July 4 holiday. Injuries were selected for follow-up when they involved the eye, amputations, or when the victim was either admitted to the hospital or transferred to another facility for treatment. These injuries were selected to develop information on potential long-term health effects of the injury and on how serious incidents occurred. Investigations were also conducted when the injury was suspected to result from the use of illegal fireworks.

Victims were asked about the hazard patterns associated with the injury, their medical care following the emergency department treatment, and about long term consequences of the injury. They were also asked about the source of the fireworks that caused the injury.

There were 30 completed investigations and 32 other cases with investigations assigned that could not be completed. The main reasons for the incomplete investigations were that the victim could not be contacted or refused to cooperate.

Summaries of the investigations are found in the Appendix to this report. The investigations are organized in order of emergency department disposition: “Admit to Hospital” followed by “Treat and Transfer” followed by “Treat and Release.” Within disposition, cases are sorted by sex and increasing age. CPSC Task numbers are given in parentheses following the discussion of the case.

Hazard Patterns

Among investigated cases, errant flight paths for rockets were implicated in six cases (010712HEP9014, 010712HEP9001, 010713HEP9010, 010717HEP9002, 010720HEP9013 and 010829HEP5921). Other rocket-related injuries were associated with misaiming (010720HEP9014, 10720HEP9021, 10709HEP9025, and 010717HEP9017), a wick that flew off (10720HEP9017) and a bottle rocket that bent back after ignition (10729HEP9018). All these events resulted in eye or face injuries

Fireworks exploding earlier or later than expected by the victim also were associated with injuries. A ground spinner flashed back at a victim burning his face and hand (010905HEP9002), an unknown firework exploded in a victim’s hand resulting in finger amputation (010807HEP9001), sparks from a Roman candle burned another victim’s eyes (010706HEP9015), a firecracker of unknown type blew up while the victim

was trying to light it (010706HEP9013), and another exploded while the victim was holding it (010706HEP9014). Two similar injuries occurred with fountains. One fountain flashed when lit (010713HEP9011) and another fountain exploded while a man was lighting it (010709HEP9019).

Victims also experienced eye injuries from aerial fireworks in two cases (010731HEP9001 and 010717HEP9014).

Finally, mishandling of sparklers resulted in three injuries. Two young males got sparks in their eyes (010720HEP9011 and 010713HEP9009), while a teen-ager was injured when he lit a bag containing a number of sparklers that subsequently exploded (010717HEP9016).

Long Term Consequences of Fireworks-related Injuries

Victims were asked if there were any long term consequences of their injuries. Three of 30 victims told telephone investigators that full recovery was not expected. A 9 year old victim of a badly aimed bottle rocket suffered damage to the optical nerve and will be permanently blind in one eye (010720HEP9014). A 14 year old male who was struck by a bottle rocket, experienced a torn retina and will be legally blind in that eye (10720HEP9013). Finally, a 19 year old male who picked up a firework of unknown type experienced amputation of the tip of his index finger. The fractured bones in his index finger and thumb will heal (10807HEP9001).

For other victims, recovery is not certain or the victim could not estimate the time to recovery. One example was a 10 year old male with a lacerated cornea and bruised retina from the impact from a bottle rocket. He was treated by an eye specialist and might be partially blind (010712HEP9014). In another case, a 29 year old female had a firecracker blow up when trying to throw it. Her vision is expected to return, but the time period is uncertain (010706HEP9013). Also, a 13 year old male was injured when a fountain flashed when lit. Full recovery is expected but the time to recovery is uncertain (10713HEP9011).

Where Were Fireworks Obtained?

In the telephone interview, victims were asked where the fireworks that caused the injuries were obtained. Of the 30 victims with telephone interviews, the largest number, 16, did not know where the fireworks were acquired. In most cases, this is because the victim was not the person who lit or acquired the fireworks.

For the 14 victims who were aware of the source of the fireworks, most (9) reported that the fireworks came from a stand. Often the stand was on a highway or main road and was reported to be open only for the 4th of July season. Three other respondents said that fireworks were obtained from a store. Two respondents said that friends or

relatives gave them the fireworks, but they did not know further where the friends obtained the fireworks.

Enforcement Activities

CPSC's Office of Compliance took a multifaceted approach in its enforcement activities regarding fireworks in 2001. It used a variety of enforcement techniques and initiatives to keep dangerous and unsafe fireworks from consumers.

As part of this approach, the CPSC staff continued its work with the U.S. Customs Service to conduct surveillance on imported shipments of fireworks to ensure that those shipments met CPSC's regulations. From the thousands of fireworks shipments entering the U. S., CPSC and Customs sampled approximately 400 shipments, to determine if they complied with regulations. We found more than one-third of the shipments we sampled to contain fireworks that violated CPSC fireworks regulations. These shipments accounted for more than 1.7 million units with violations serious enough to warrant seizure or other actions by the U.S. Customs Service.

Another enforcement activity that was assigned priority was investigation into firms and individuals that offer kits and components used to make illegal and dangerous firecracker type explosives such as M80's and Quartersticks. Also, CPSC staff initiated investigations into pest control devices for sale via mail order or over the internet. These devices are offered as agricultural or wildlife control devices but are frequently sold in violation of Federal law. CPSC staff initiated several investigations into firms engaged in this business.

The Office of Compliance also initiated and participated in several multi-state criminal investigations. These investigations led to several search warrants during 2001 and the indictment of at least five individuals. CPSC staff worked cooperatively with other Federal agencies such as the Bureau of Alcohol, Tobacco and Firearms and state and local law enforcement agencies. CPSC staff provided legal, field and technical support in several cases involving the large-scale distribution of illegal explosive devices and illegal diversion of professional display fireworks to consumers. These criminal investigations led to the seizure of thousands of illegal firecracker-type explosive devices and illegally diverted professional fireworks. Several of the individuals who were the subjects of these investigations will be prosecuted in 2002.

Discussion

Both injuries and deaths decreased from 2000. There were 4 fireworks deaths reported in 2001, six fewer than reported in 2000. The total number of estimated fireworks injuries for 2001 was 9,500. This was 1,500 injuries less than in 2000, the year with the highest number of injuries since 1995. The per capita injury rate decreased

to 3.3 injuries per 100,000 people in 2001 from the 2000 rate of 3.9 injuries per 100,000 people.

During the one-month special study period of June 22 to July 22, there were an estimated 5,700 injuries, about 900 fewer than in 2000 and the same number as estimated in 1999. Children under 15 years old accounted for about half the number of injuries. Children aged 10-14 were at highest risk of injury (6.5 injuries per 100,000 people), followed by young adults 15-19 (5.1) and children 5-9 (4.0). Males were three times more likely to be injured as females.

Firecrackers caused the most injuries, followed by bottle rockets and sparklers. Sparklers were associated with about one third of the injuries to children under 5. Children 5-14 were injured about equally by firecrackers, rockets and other devices.

Over half the injuries involved burns. Parts of the body most often injured were the hands, eyes and head/face/ear region.

A review of data from a telephone follow up survey of people injured by fireworks showed that typical causes of injuries included (1) fireworks exploding earlier or later than expected by the user, (2) badly aimed rockets or rockets with errant flight paths, (3) mishandling of sparklers and (4) debris from aerial fireworks. We also discovered from the telephone survey that most victims already had or will recover from their fireworks injuries. But several victims experienced severe eye injuries that could result in permanent blindness.

Enforcement activities remained at a high level. CPSC's Office of Compliance worked with U.S. Customs to sample imported fireworks and seize illegal shipments. CPSC staff also initiated investigations of firms and individuals who offered kits and components to make illegal and dangerous firecrackers. Several of these sales involved use of the internet.

Also during 2001, 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. These investigations have led to seizures of tons of fireworks and will lead to prosecution of several individuals.

References

Greene MA (1999), "1998 Fireworks-Related Injuries," U. S. Consumer Product Safety Commission, Washington, DC.

Greene MA and Race P (2000), "1999 Fireworks Annual Report: Fireworks-Related Deaths, Emergency Department Treated Injuries, and Enforcement Activities During 1999," U. S. Consumer Product Safety Commission, Washington DC.

Greene MA and Race P (2001), "2000 Fireworks Annual Report: Fireworks-Related Deaths, Emergency Department Treated Injuries, and Enforcement Activities During 2000," U. S. Consumer Product Safety Commission, Washington DC.

Kessler E and Schroeder T (1998), "The NEISS Sample (Design and Implementation)," U. S. Consumer Product Safety Commission, Washington, DC.

Marker D, Lo A, Brick M and Davis W (1999), "Comparison of National Estimates from Different Samples and Different Sampling Frames of the National Electronic Injury Surveillance System (NEISS)," Final Report prepared for the U. S. Consumer Product Safety Commission, Westat. Rockville, MD.

Schroeder T (2000), "Trend Analysis of NEISS Data." U. S. Consumer Product Safety Commission, Washington, D. C.

Appendix

Completed Telephone Investigations

Task Number	Age	Sex	Treatment Date	Fireworks Type	Diagnosis	Disposition	Body Part	Apparent Cause	Medical Treatment and Prognosis
010829HEP5921	2	Male	7/4/01	Unknown	Burns, Thermal	Admit to Hospital	Upper Trunk	Firework on errant flight path	2nd degree burns on chest and right thigh, skin grafts. Clothing ignited
010706HEP9014	10	Male	6/29/01	Small Firecracker	Burns, Thermal	Admit to Hospital	Face	Victim held firework too long	Burned eye, blurred vision, Continuing visits to ophalm. Full recovery expected.
010905HEP9002	37	Male	7/5/01	Ground Spinner	Burns, Thermal	Admit to Hospital	Face, Hand	Firework flashed back at victim burning face and hand	Treated for 2nd degree burns and released next day. Recovered
010712HEP9014	10	Male	7/4/01	Bottle Rocket	Lacerated cornea, bruised retina	Treat and Transfer	Eye	Errant flight path	Treated by eye specialist. Might be partial blindness. Full recovery uncertain
010717HEP9016	13	Male	7/4/01	Sparkler	Burns, Thermal	Treat and Transfer	Hand	Sparkler lit bag containing other sparklers that blew up in victims hand	2nd and 3rd degree burns to fingers and palm. Recovered.
010712HEP9001	15	Male	7/7/01	Bottle Rocket	Other	Treat and Transfer	Eye	Errant flight path	Following treatment in ER, victim recovered
010807HEP9001	19	Male	6/30/01	Unknown	Amputation, Fracture	Treat and Transfer	Finger	Victim picket up lit firework to throw away from crowd, when it exploded in his hand	Amputation of index finger tip, fractured bones in index finger and thumb. Expect recovery in 4 months.
010709HEP9021	37	Male	7/4/01	Missile	Burns, Thermal	Treat and Transfer	Hand	Aerial firework exploded in launching tube already containing another lit firework.	Stitches for cuts on hand, burn treatment. Recovered
010720HEP9011	2	Male	7/4/01	Sparkler	Corneal abrasion	Treat and Release	Eye	Spark in eye	Victim recovered
010713HEP9009	3	Male	7/5/01	Sparkler	Burns, Thermal	Treat and Release	Eye	Spark in eye	Sparkler ash removed from under eyelid. Recovered.
010713HEP9010	5	Male	6/30/01	Fountain	Dermatitis/Conjunctivitis	Treat and Release	Eye	Errant flight path	Following treatment for flash burn in ER, victim recovered.
010723HEP7812	7	Male	7/12/01	Unknown Firecracker	Burns, Thermal	Treat and Release	Lower Trunk	Firecracker exploded near victim's back causing burn	Recovered

010731HEP9001	7	Male	7/5/01	Aerial Shell	Burned Eyelid, Corneal Abrasion	Treat and Release	Eye	Debris from aerial fireworks fell into eye.	Recovered
010720HEP9014	9	Female	7/3/01	Bottle Rocket	Optical Nerve Damage	Treat and Release	Eye	Misaimed bottle rocket	Victim permanently blind in one eye
010720HEP9021	9	Female	7/5/01	Bottle Rocket	Contusions, Abrasions	Treat and Release	Face	Victim got in way of rocket	Recovered
010709HEP9016	9	Male	6/27/01	Unknown Firecracker	Contusions, Abrasions	Treat and Release	Eye	Hit in eye with fireworks	Recovered
010713HEP9008	9	Male	7/4/01	Unknown	Corneal burns	Treat and Release	Eye	Firework blew up near victim's eye.	Following treatment by eye specialist, full recovery expected
010706HEP9015	10	Male	6/29/01	Roman Candle	Corneal Abrasion	Treat and Release	Eye	Victim held firework too long Sparks burned eyes.	Full recovery expected
010709HEP9025	12	Male	7/4/01	Bottle Rocket	Burns, Thermal	Treat and Release	Eye	Bottle Rocket flew into victim's eye.	Drops in eyes, recovered.
010713HEP9011	13	Male	7/4/01	Fountain	Corneal abrasions and burns	Treat and Release	Eye, Cornea, Face	Fountain flashed when lit.	Treated at ER, debris removed from eye. Full recovery expected but time uncertain.
010717HEP9002	13	Male	7/4/01	Bottle Rocket	Other	Treat and Release	Eye	Errant flight path	One week hospital stay following eye surgery. Victim recovered.
010717HEP9014	14	Female	7/5/01	Aerial Shell	Contusions, Abrasions	Treat and Release	Eye	Debris from aerial fireworks fell into eye.	Eye flushed in ER removing ash. Recovered
010720HEP9013	14	Male	7/4/01	Bottle Rocket	Torn Retina	Treat and Release	Eye	Errant flight path	Followed up with eye specialist. Victim is legally blind in one eye
010720HEP9018	15	Male	7/5/01	Bottle Rocket	Contusions, Abrasions	Treat and Release	Eye	Bottle rocket bent back after ignition and hit victim	Recovered
010710HEP9021	16	Male	7/4/01	Unknown	Corneal Abrasion	Treat and Release	Eye	Black Cat firework thrown at victim, exploded, part in victim's eye.	Blister under eyelid, corneal abrasion. Recovered
010720HEP9017	18	Male	7/6/01	Bottle Rocket	Burn	Treat and Release	Face, Near eye	Hit by wick of bottle rocket that shot off before the rocket launched	Burn to face near eye. Full recovery.
010706HEP9013	29	Female	7/1/01	Unknown Firecracker	Other	Treat and Release	Eye	Firecracker blew up while victim was trying to throw it.	Burn in eye leaving scar. Vision blurred. Full recovery expected but time period unknown.
010723HEP9017	33	Female	7/5/01	Bottle Rocket	Contusions, Abrasions	Treat and Release	Face	Victim leaned over lit firework	Recovered

010709HEP9019	37	Male	7/4/01	Fountain	Corneal Abrasion, Burns	Treat and Release	Eye, Neck, Face	Firework exploded in face while lighting	Recovered
010717HEP9017	49	Female	7/4/01	Bottle Rocket	Eye punctured	Treat and Release	Eye	Misaimed bottle rocket	Bruise on eyeball, temporary blindness but full vision restored.

Incomplete Telephone Investigations

Task Number	Age	Sex	Treatment Date	Fireworks Type	Diagnosis	Disposition	Body Part
010904HEP9001	0.42	Male	7/11/01	Unknown	Burns, Thermal	Admit to Hospital	Face
010724HEP9016	4	Male	6/27/01	Unknown	Burns, Thermal	Admit to Hospital	Unknown
010711HEP5361	8	Male	7/4/01	Bottle Rocket	Burns, Thermal	Admit to Hospital	Upper Leg
010814HEP7814	8	Male	7/26/01	Bottle Rocket	Burns, Thermal	Admit to Hospital	Upper Leg
010814HEP7813	10	Male	7/5/01	Unknown	Burns, Thermal	Admit to Hospital	Upper Leg
010724HEP9017	12	Male	6/29/01	Bottle Rocket	Fracture	Admit to Hospital	Lower Arm
010904HEP9002	14	Male	7/4/01	Unknown	Burns, Thermal	Admit to Hospital	Upper Leg
010717HEP9003	16	Male	7/4/01	Unknown	Burns, Thermal	Admit to Hospital	25-50% of Body
010720HEP9010	21	Male	7/5/01	Unknown	Burns, Thermal	Admit to Hospital	Mouth
010709HEP9022	48	Male	7/5/01	Rocket	Burns, Thermal	Admit to Hospital	Hand
010905HEP9005	49	Male	7/3/01	Illegal Firecracker	Burns, Thermal	Admit to Hospital	Hand
010717HEP9001	13	Male	6/29/01	Bottle Rocket	Other	Treat and Transfer	Eye
010713HEP9012	36	Male	7/6/01	Unknown	Burns, Thermal	Treat and Transfer	Eye
010702HEP8213	3	Female	6/10/01	Sparkler	Burns, Thermal	Treat and Release	25-50% of Body
010806HEP9007	5	Male	7/4/01	Unknown Firecracker	Burn, Scald	Treat and Release	Unknown
010720HEP9016	6	Female	7/4/01	Unknown	Burn, Scald	Treat and Release	Eye
010724HEP9018	6	Male	7/4/01	Roman Candle	Contusions, Abrasions	Treat and Release	Eye
010720HEP9015	7	Male	7/6/01	Unknown	Contusions, Abrasions	Treat and Release	Eye
010720HEP9020	7	Male	7/5/01	Bottle Rocket	Contusions, Abrasions	Treat and Release	Eye
010727HEP3041	8	Male	7/16/01	Small Firecracker	Burns, Thermal	Treat and Release	Lower Leg
010717HEP9018	9	Male	7/4/01	Unknown	Burns, Thermal	Treat and Release	Eye
010717HEP9015	10	Male	7/5/01	Bottle Rocket	Burns, Thermal	Treat and Release	Face
010801HEP9001	11	Male	7/5/01	Bottle Rocket	Other	Treat and Release	Eye
010711HEP9017	12	Male	7/5/01	Bottle Rocket	Other	Treat and Release	Eye
010703HEP7812	13	Male	6/25/01	Bottle Rocket	Burns, Thermal	Treat and Release	Lower Leg
010704HEP5761	15	Male	6/28/01	Small Firecracker	Burns, Thermal	Treat and Release	Upper Leg
010711HEP9016	15	Male	7/9/01	Unknown	Burns, Thermal	Treat and Release	Upper Trunk
010709HEP9024	21	Male	7/4/01	Bottle Rocket	Other	Treat and Release	Eye
010718HEP9021	37	Male	7/7/01	Small Firecracker	Contusions, Abrasions	Treat and Release	Eye
010905HEP9004	37	Male	7/3/01	Bottle Rocket	Contusions, Abrasions	Treat and Release	Eye
010706HEP9016	43	Male	7/4/01	Ground Spinner	Contusions, Abrasions	Treat and Release	Eye
010709HEP9020	47	Male	7/5/01	Bottle Rocket	Hemorrhage	Treat and Release	Eye