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MODEL FIREWORKS LAW



2006 EDITION

INTERNATIONAL FIRE MARSHALS ASSOCIATION
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Model Fireworks Law 2006

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Model Fireworks Law 2006 Edition

This edition of the *Model Fireworks Law* was prepared by the International Fire Marshals Association and published by NFPA. The NFPA Standards Council reviewed this model law at its October 2005 meeting for consistency with the policies of NFPA. This edition of the Model Fireworks Law supersedes all previous editions.

Origin and Development of the *Model Fireworks Law*

The National Fire Protection Association was among the pioneers who sought relief for the public from injuries and fires resulting from indiscriminate use of fireworks. Its efforts progressed from propagandizing during the early years of this century to a suggested municipal ordinance and then to a *Model State Fireworks Law*. The *Model State Fireworks Law* was first adopted by the NFPA in 1938. In 1949, the model law was amended to exclude from its provisions certain toy paper caps and devices for using them.

The *Model State Fireworks Law* found prompt acceptance in many states. Its basic philosophy, which is the restriction of the use of all fireworks, except toy paper or plastic caps, to authorized public displays, is incorporated in the laws of several states.

The *Model State Fireworks Law* was amended in 1972 and 1974. In 1978, its designation was changed from NFPA 494L to NFPA 1 121L. NFPA 1 121L was amended in 1982.

In 1988, the Board of Directors of the National Fire Protection Association transferred custody of the model law from the NFPA Committee on Pyrotechnics to the Fire Marshals Association of North America (now known as the International Fire Marshals Association). The model law was amended in 1991 to be readily adoptable by both state and local jurisdictions. Further changes include a provision that makes possession of fireworks by the general public illegal and violations of the law that result in a fire, personal injury, or death a felony offense.

The 2000 edition updated the law to reflect current fireworks classification, laws, and codes and standards.

The 2006 edition reaffirmed the 2000 edition.

Model Fireworks Law
2006 Edition

BE IT ENACTED BY THE (GOVERNING BODY)
OF THE (JURISDICTION)

1. No person, firm, or corporation shall possess, offer for sale, expose for sale, sell at retail, or use or explode any fireworks, except as herein provided.

2. Fireworks. Any composition or device for the purpose of producing a visible or an audible effect by combustion, deflagration, or detonation, and which meets the definition of "consumer (Explosive's 1.4G)", "theatrical and novelty (Explosives 1.4S)" or "display (Explosive's 1.3G)" fireworks as set forth in the U.S. Department of Transportation's (DOT) Hazardous Materials Regulation, Title 49, *Code of Federal Regulations (CFR)*, Parts 171-180.

Exception No. 1: Toy caps for use in toy pistols, toy canes, or toy guns, and trick noisemakers manufactured in accordance with DOT regulations, 49 CFR 173.100 (p),¹ and packed and shipped according to said regulations.

Exception No. 2: Model rockets and model rocket motors designed, sold, and used for the purpose of propelling recoverable aero models.

Exception No. 3: Propelling or expelling charges consisting of a mixture of sulfur, charcoal, saltpeter are not considered as designed to produce audible effects.

3. The authority having jurisdiction shall be permitted to adopt reasonable rules and regulations for the licensing of individuals or granting of permits for supervised displays of fireworks by municipalities, fair associations, amusement parks, and other organizations or groups of individuals. Such permits shall be permitted to be granted upon application to the authority having jurisdiction and approval in accordance with the regulations for the display and filing of a bond by the permit application. (*See NFPA 1123, Code for Fireworks Display and NFPA 1126, Standard for the Use of Pyrotechnics before a Proximate Audience.*)

4. Every such display shall be handled by a competent operator, licensed or certified as to competency by the authority having jurisdiction. Every such display shall be of such composition and character and shall be located, discharged, or fired so as, in the opinion of the authority having jurisdiction, after proper site inspection, not to be hazardous to any person or property. After such privileges have been granted, sales, possession, use, and distribution of fireworks for such displays shall be lawful for that purpose only. No permit granted hereunder shall be transferable.

5. Before any permit for a pyrotechnic display shall be issued, the person, firm, or corporation making application therefore shall furnish proof of financial responsibility to satisfy claims for damages to property or personal injuries arising out of any act or omission on the part of such person, firm, or corporation or any agent or employee thereof, in such amount, character, and form as this jurisdiction determines to be necessary for the protection of the public.

6. Nothing in this law shall be construed to prohibit any of the following:

(a) The sale, at wholesale, of any fireworks for supervised displays by any approved resident manufacturer, wholesaler, dealer, or jobber, in accordance with regulations of the U.S. Bureau of Alcohol, Tobacco, and Firearms (*see Title 27, Code of Federal Regulations, Part 181*) and the U.S. Department of Transportation.

- (b) The manufacture, transportation, or storage of fireworks at a manufacturing facility. The testing of fireworks under the direction of its manufacturer provided permission for such testing has been obtained from the authority having jurisdiction.
- (c) The sale, transportation, handling, or use of industrial pyrotechnic devices or fireworks, such as railroad torpedoes, fusees, automotive, aeronautical, and marine flares and smoke signals.
- (d) The sale and use of blank cartridges for use in a show or theater; for signal or ceremonial purposes; in athletics or sports; or legal power tools.
- (e) The transportation, handling, or use of any pyrotechnic devices by the armed forces of the United States.
- (f) The use of pyrotechnics in training by the fire service, law enforcement, or similar government agencies.
- (g) The use of fireworks for agricultural purposes under the direct supervision of the U.S. Department of the Interior or an equivalent state or local agency. [See *Title 16, Code of Federal Regulations, Part 1500.17(a)(8)*.]

7. The authority having jurisdiction shall seize, take, remove, or cause to be removed at the expense of the owner all stocks of fireworks offered or exposed for sale or stored or held in violation of the law.²

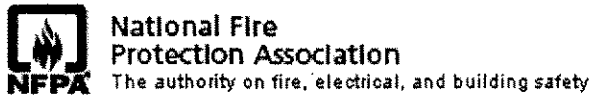
8. Any person, firm, or corporation violating the provisions of this law shall be guilty of a misdemeanor.

9. Any person, firm, or corporation violating the provisions of this law, which results in a fire, personal injury, or death, shall be guilty of a felony.

10. Any provisions of this law held to be unconstitutional shall not invalidate the remainder thereof. Any acts, laws, or parts of laws in conflict with any provision of this law are hereby repealed to the extent of the conflict.

¹ The regulations referred to limit the explosive content of each cap to not more than an average of 0.25 grains (16mg). Also, each package containing such caps must be labeled to indicate the maximum explosive content per cap.

² Where no provision in law already exists for the disposition of goods seized in violation of this law, appropriate provisions shall be enacted for the legal disposition of fireworks by the authority having jurisdiction following conviction for such violation.



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NFPA Journal

Support for NFPA's fireworks ban grows
The Alliance to Stop Consumer Fireworks aims to prevent injury and fire

NFPA Journal®, June 2005

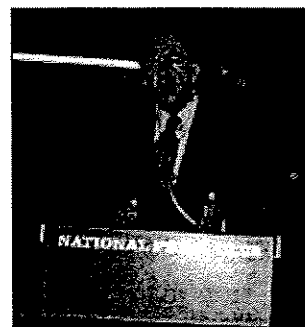
By Margie Coloian

Twenty health and safety advocacy organizations have joined the National Fire Protection Association in an effort to stop the consumer use of fireworks during this holiday season. The Alliance to Stop Consumer Fireworks, in a press conference at the National Press Club, in Washington, DC, on June 15 voiced strong opposition to the devices that every year injure and maim thousands of people, most of them children.

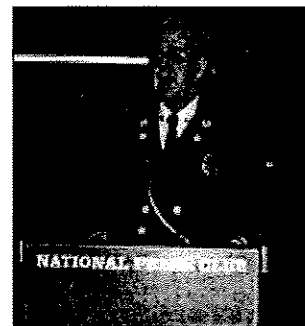
"Consumer fireworks are a significant public safety concern shared by doctors, nurses, other health care professionals and members of the fire service," said NFPA President James M. Shannon. Shannon and the other panelists described the devastation caused by consumer fireworks and urged consumers to attend public displays of fireworks orchestrated by professionals.

The alliance, started by NFPA in 2002 when it asked the American Academy of Pediatrics to join with them, grew to 21 member organizations this year and includes:

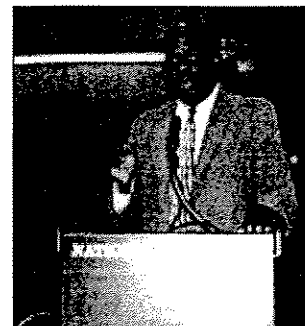
- [American Academy of Family Physicians](#)
- [American Academy of Ophthalmology](#)
- [American Academy of Pediatrics](#)
- [American Association for Hand Surgery](#)
- [American Association of Public Health Physicians](#)
- [American Burn Association](#)
- [American College of Emergency Physicians](#)
- [American Society of Plastic Surgeons](#)
- [Emergency Nurses Association](#)
- [Fire Department Safety Officers Association](#)
- [International Association of Arson Investigators](#)
- [International Association of Fire Chiefs](#)
- [International Association of Fire Fighters](#)
- [International Fire Marshals Association](#)
- [Metropolitan Fire Chiefs](#)
- [National Association of Pediatric Nurse Practitioners](#)
- [National Association of School Nurses](#)



NFPA President James M. Shannon addresses the media at the press conference. [See larger image.](#)



Chief Bill Killen of the IAFC relays his anecdotal experiences in relation to fires caused by fireworks. [See larger image.](#)



Joseph Wright, MD, MPH, from the American Academy of

National Association of State Fire Marshals

- National Fire Protection Association
- National Volunteer Fire Council
- Prevent Blindness America

Pediatrics talks about pediatric injuries caused by the devices. [See larger image.](#)



Reporters gather to hear about the destruction caused by consumer fireworks. [See larger image.](#)

In addition to Shannon, who also hosted the press conference, panelists were Chief Bill Killen, from the International Association of Fire Chiefs; Jon Mark Hirshon, MD, MPH, FACEP, from the American College of Emergency Physicians; Joseph Wright, MD, MPH, from the American Academy of Pediatrics, and Michelle Maloney of Chicago, the mother of 7-year-old Maddi de la Cruz, who was severely burned by a sparkler last year.

Maloney, fighting back tears, described how Maddi was injured during a Fourth of July celebration, attended by children and eight adults, when a lit sparkler hit her shoe, igniting it. The child suffered second- and third-degree burns to her foot and underwent skin graft surgery to help regain her ability to walk. Maddi was also present and answered reporters' questions after the conference.

"We know that sparklers cause the greatest amount of injury, especially among young children, followed by firecrackers," said Hirshon. "The toll of these injuries on a person's quality of life is immeasurable," he said.

In addition to injuries, every year thousands of fires are started by fireworks. In a typical year, on the Independence Day holiday, there are more fireworks-related fires than any other cause of fire. Damage from these fires to structures and vehicles totaled \$28 million in 2002.

Shannon said that only six states ban all consumer fireworks (Arizona, Delaware, Massachusetts, New Jersey, New York and Rhode Island). However, when the Alliance was formed in 2002, there were 10 states that banned them.

NFPA has crusaded against the use of consumer fireworks since 1910.

The press conference was covered by national media, including CNN, NBC, CBS, ABC, as well as Cox, Knight Ridder and Scripps Howard.

Margie Coloian is NFPA's Director of Public Affairs.

URL: <http://www.nfpa.org/publicJournalDetail.asp?categoryID=991&itemID=24832&src=NFPAJournal>

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NFFPA Leads Call for Consumer Fireworks Ban

NFFPA Journal, Jul/Aug 2004 by Nicholson, John

ADVOCACY

NFFPA, ALONG WITH other health and safety advocates have called for a ban on consumer fireworks. The announcement was made at an NFFPA-sponsored press conference July 1 at the National Press Club.

Because deaths, injuries, and fires occur too frequently when untrained consumers and children light fireworks, the 10 health and safety groups called for the ban just as the Independence Day celebrations began.

About half of all fireworks injuries occur among those under age 15. In a typical year, on the Independence Day holiday, fireworks cause more fires in the U.S. than all other causes of fire combined.

The groups involved are NFFPA, the American Academy of Ophthalmology, American Academy of Pediatrics, American Association of Hand Surgery, American Burn Association, American College of Emergency Physicians, International Association of Fire Chiefs, International Association of Fire Fighters, International Fire Marshals Association, and the National Association of State Fire Marshals.

Loss of vision, permanent scarring, even death: too often, these are the harsh realities of amateur fireworks use. Pyrotechnic devices ranging from aerial rockets to sparklers cause thousands of serious injuries and fires each year.

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To keep the public safe from fireworks-related injuries and deaths, NFFPA urges everyone to treat fireworks, legal or not, as suitable for use only by trained professionals. Amateur fireworks use endangers not only the users, but bystanders and surrounding property.

Fireworks have been a leading cause of injuries, typically to the eyes, head, and hands, serious enough to require hospital emergency room treatment, particularly in states where they are legal. Sparklers, considered a harmless child's toy by many, reach temperatures of more than 1,000°F (537°C).

"The few seconds of pleasure those fireworks may bring are not worth the risk of injury, permanent scarring, or even death," says Judy Comoletti, NFFPA assistant vice president of Public Education.

There are safer alternatives to using fireworks on the Fourth of July. Public fireworks displays conducted by trained professionals are the smartest and safest fireworks alternative for anyone because they are established under controlled settings and regulations.

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April 15, 2007

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Group calls for ban on all consumer fireworks

August 1, 2005

By Megan Skupien

Another July 4th has come and gone, but for some who were injured by fireworks, the scars of the holiday's tradition may last the rest of their lives.

Many in the fire service are trying to put a stop to unnecessary injuries and death caused by improper use of fireworks. On June 15, 21 national organizations convened in Washington, D.C., for a press conference that called for a ban on consumer fireworks.

Michelle Maloney spoke to the media about the horror that her daughter, Maddi de la Cruz, experienced from playing with sparklers in her backyard. Joining Maloney was Chief Bill Killen of the International Association of Fire Chiefs (IAFC); Jon M. Hirshon, MD, of the American College of Emergency Physicians; James Shannon of National Fire Protection Association; and Joseph Wright, MD, of the American Academy of Pediatrics.

Shannon opened the forum discussing how Americans should enjoy the season with public displays of fireworks. "Nothing has made these devices safer to consumers," he said.

Killen discussed the effects that fireworks have had during his 49 years of fire service. "I've had more experience with firework injuries that I would like to for the rest of my life," he told the audience. Hirshon added that many firework injuries are preventable and said, "the only way to avoid these mishaps is to ban the use of fireworks." Hirshon also pointed to the detrimental effects that firework injuries can cause on a victim's lifestyle.

Maloney, Maddi's mother, told the story of how her then six-year-old daughter was celebrating the Fourth of July in her backyard when another young child dropped her sparkler onto Maddi's shoe, causing her shoe to ignite. Michelle heard the commotion "then when I saw her foot, the skin hanging off and her screaming, I fainted," she said.



IAFC 1st Vice President Chief Bill Killen, talks with Maddi de la Cruz, who was injured by a July 4th sparkler, at a press conference at the National Press Club. Killen joined other leading authorities in calling for a ban on consumer fireworks.

Photo: Lisa Silverboard

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Maddi was rushed to the emergency room, where she was treated for her burns. She also needed treatment from specialists at the burn clinic. Maloney said the clinic was packed due to the Fourth of July and that there were even worse cases than of her own daughter. Maddi underwent painful treatment and had to receive skin grafts from her hip.

"Her foot looked like something out of a horror movie. I didn't know a sparkler was that hot. Had I known that, I would have stayed away from them. No mother wants to see their child in pain like that," Maloney said. Maddi has had to undergo therapy to walk normally since that day and, although she is doing well physically, she is still traumatized by any kind of flame.

The coalition against consumer fireworks finished the conference by answering questions from the audience. As Joseph Wright commented, "We prepare for the busiest weekend in the emergency room. Fireworks are one of the saddest and frustrating injuries that we treat in the ER. I truly hope one day I will not have to make these recommendations and that they will be banned."

Megan Skupien is a senior at George Mason University and an intern with the IAFC's communications department.

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First Word

by James M. Shannon



Fireworks: We are sticking to our position

NFPA Journal®, *July/August 2006*

Every year NFPA warns the public about the dangers of consumer fireworks as the Fourth of July approaches. Our position has been unequivocal on fireworks since 1910. We believe that fireworks are too dangerous to be used by consumers. We believe that the proper way to enjoy fireworks displays and celebrate our nation's birthday is to attend public fireworks displays where only trained personnel will be involved in their use.

The large number of injuries, deaths, and fires caused by consumer use of fireworks around the Fourth of July year in and year out proves the wisdom of our long held position. The most recent report issued by the NFPA Fire Analysis and Research Division shows how serious a problem this is.

In 2004, 9,600 fireworks-related injuries were treated in U.S. hospital emergency rooms. The trend in fireworks-related injuries has been mostly up since 1996.

In 2003, an estimated 2,300 structure or vehicle fires were started by fireworks. These fires resulted in five deaths, 60 injuries, and \$58 million dollars in property damage.

Between 1998 and 2002, eight people per year were killed in fires started by fireworks and six people per year were killed directly by fireworks. As in most years, the majority of those injured by fireworks in 2004 were under age 20. The highest injury rates were for children aged five to nine.

In 2004, 85 percent of emergency room fireworks injuries involved fireworks that Federal regulations permit consumers to use.

Even though the use of fireworks by consumers has been identified by a wide range of safety and public health groups that include NFPA, the American Academy of Pediatrics, and the American Burn Association as a major public health concern, the problem is getting worse. In fact, now only five states ban the use of fireworks by individuals.

In response to requests from fire officials, NFPA has developed a new chapter of NFPA's pyrotechnics code, [NFPA 1124, Code for the Manufacture, Transportation, Storage, and Retail Sale of Fireworks and Pyrotechnic Articles](#), which provides minimum requirements for retail facilities that sell consumer fireworks. Our development of these requirements reflects the fact that in most parts of the country, retail sales are allowed but in no way shows a weakening resolve on the issue of whether they should be allowed. We believe strongly that fireworks are too inherently dangerous to be used by consumers and that retail sales of fireworks should be banned everywhere.

From time to time, when NFPA and other groups have warned the public about the dangers of fireworks before the Fourth of July, we have been accused of being "unpatriotic." There is nothing patriotic about the deaths and serious injuries caused by fireworks every year. Anybody who has talked to a person seriously injured by fireworks at a Fourth of July celebration or listened to the physicians who have treated them, knows that there are far better ways for people to show their love of this country.

FROM THE ARCHIVES

May - June 2006

[New Coalition and a call to action](#)

March - April 2006

[High-rise buildings and life safety](#)

January - February 2006

[Q&A with NFPA President Jim M. Shannon](#)

November - December 2005

[The choice is simple](#)

September - October 2005

[Fire-safe cigarettes: The time has come](#)

July - August 2005

[Saving firefighters' lives](#)

That is why we are sticking to our position and urge people to attend public displays of fireworks organized by professionals and not use them themselves. That is the only way we can prevent these needless deaths, injuries, and fires.



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Fireworks

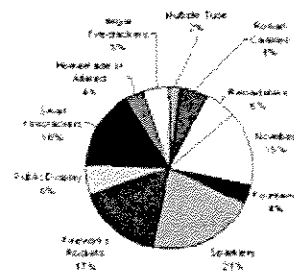
Use of consumer fireworks can lead to devastating burns, other injuries, fires and even death. NFPA does not endorse the use of consumer fireworks and instead encourages the public to enjoy displays of fireworks conducted by trained professionals.

- [Facts & figures](#)
- [Download a free copy of NFPA's report on fireworks](#) (PDF, 89 KB)
- [Download a handout of fireworks facts](#) (PDF, 170 KB)
- [NFPA model fireworks law](#)
- [Fire investigation reports](#)
- [NFPA Journal® articles on fireworks](#)

Facts & figures

- In 2003, an estimated 2,300 reported structure or vehicle fires were started by fireworks. These fires resulted in 5 civilian deaths, 60 civilian injuries, and \$29 million in direct property damage.*
- In addition, 100 people were killed in a Rhode Island night club fire ignited by the indoor use of pyrotechnics in a small, crowded room with wall linings that promoted rapid flame spread. The facility had no sprinkler protection.
- In 2004, 9,600 people were treated at hospital emergency rooms for fireworks-related injuries. Burns were the leading type of fireworks injury (62%). Contusions and lacerations were second (20%), and were equal in share to burns when the injury was to any part of the head or face, including the eye. Hands or fingers were the part of the body injured in 33% of the incidents. In 21% of the cases, the eye was involved; other parts of the face or head accounted for 21% of the injuries.
- Children aged 5-9 face the highest risk of fireworks injuries. In 2004, 55% of people injured by fireworks were under the age of 20, with 40% of the injuries incurred by those under age 15. The highest injury rate relative to population was for ages 5 to 9, with 2.2 times the risk for the entire population.
- Males accounted for three-fourths (75%) of fireworks injuries.
- From 1998 to 2002, eight people per year, on average, were killed in fires started by fireworks. Six people per year, on average, were killed directly by fireworks.
- In 2003, fires started by fireworks caused \$58 million in direct property damage to structures.
- Based on the amount of time and quantities in use, fireworks pose a higher risk of fire death than any other consumer product. Although cigarettes are the leading cause of fire death, the risk that someone will die from fire when fireworks are being used is

**2004 fireworks injuries
by type of fireworks**
(See larger image.)



Based on injuries during the month around July 4.

three times the corresponding risk when cigarettes are burning.

- On Independence Day in a typical year, fireworks cause more reported outdoor fires in the United States than all other causes of outdoor fire combined.
- Five states ban the use of fireworks by consumers (DE, MA, NJ, NY, and RI). The other 45 states and the District of Columbia permit some or all consumer fireworks. [The American Pyrotechnics Association has compiled a helpful map and directory of state-by-state fireworks control laws.](#)

* These numbers exclude the Station nightclub fire.

Source: NFPA's *Fireworks*, by John R. Hall, Jr., June 2006

One-Stop Data Shop report

Fireworks

John R. Hall, Jr., June 2006

Injury patterns and trends, including shares by type of fireworks, and fire patterns and trends, based on reports to hospital emergency rooms, and trends in fireworks-related fires.

Unpublished annual report.

All visitors: [Download this report for free.](#) (PDF, 80 KB)

NFPA model fireworks law

For more than half a century, NFPA has led the charge to protect the public from injuries and fires resulting from indiscriminate use of fireworks. The International Fire Marshals Association (IFMA) offers a [model fireworks law](#) (PDF, 35 KB) which reflects NFPA's zero-tolerance policy on amateur use of fireworks.

Fire investigation reports

- Firework manufacturing, Jaffrey, NH, 8/14/88
NFPA members: [Download this report for free.](#) (PDF, 249 KB)
- Explosion, Jennings, OK, 6/25/85, 21 fatalities.
NFPA members: [Download this report for free.](#) (PDF, 771 MB)

NFPA Journal® articles on fireworks

- [Support for NFPA's fireworks ban grows - The Alliance to Stop Consumer Fireworks aims to prevent injury and fire, *NFPA Journal*®, May/June 2005](#)
- [A long road back - A story about fireworks in untrained hands, *NFPA Journal*®, September/October 2004](#)
- [The sale of legal consumer fireworks prompts NFPA to develop a standard protecting retail consumer fireworks facilities, *NFPA Journal*®, May/June 2001 \(PDF, 114 KB\)](#)

> [A long road back](#)

> [Fireworks are too risky](#)

URL: <http://www.nfpa.org/categoryList.asp?categoryID=297&URL=Research%20&%20Reports/Fact%20sheets/Seasonal%20safety/Fireworks>

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Fireworks

A Long Road Back

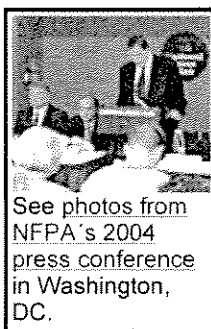
A story about fireworks in untrained hands.

NFPA Journal®, September/October 2004

by Margie Coloian

Editor's Note: This online article was updated in November 2004.

Stacy Miller of Douglassville, Pennsylvania, was a 22-year-old nurse when a 9-inch (23-centimeter) mortar shell exploded in her face during a fireworks display at a picnic, blinding her for life. The explosion took off part of her skull and her left eye was enucleated (removed) days after the accident because it imploded. She has no sense of smell or taste because the impact caused her sinus cavity to explode. The rehabilitation that followed tells only part of the story of how quickly destructive fireworks in consumers' hands can turn a vibrant life upside down.



Stacy Miller in the last photo taken before her accident; Ms Miller recovering in the hospital.

The shell involved in this incident was not a legal consumer firework, but instead a display firework device used illegally by an untrained individual. The purpose of this article is to highlight that fireworks of any classification in the hands of anyone but professionals can have disastrous consequences.

"It took off my face," Stacy, now 26, told attendees at an NFPA-sponsored press conference on July 1 at the National Press Club in Washington, D.C. Bravely, she relived the moment the soccer-ball-sized shell knocked her down after traveling more than 100 yards (91 meters).

"I hate fireworks," she says.

The press conference was the second held in as many years by the fireworks coalition NFPA formed with the American Academy of Pediatrics in 2002 to ask the public not to use these devices, most of which are deployed during the Independence Day holiday. At this year's conference, NFPA was joined by nine other fire and health advocate organizations, up from six last year.

Today, the coalition also includes the American Academy of Ophthalmology, the American Association for Hand Surgery, the American Burn Association, the American College of Emergency Physicians, the International Association of Fire Chiefs, the International Association of Fire Fighters, and the National Association of State Fire Marshals.

Stacy's remarks began to etch out the long road back to the life she knew. As she began, every reporter was glued to her, eager to learn about the lesser-known side of fireworks, devices once believed to be harmless symbols for patriotic celebration. Safety advocates know better.

"I don't think that serious injury is as American as apple pie, especially when it's avoidable," says Jim Shannon,



Stacy Miller today. Photo: John Slavin, Philadelphia Inquirer

NFPA president. "We have studied the relevant statistics, looking at injuries and death. For decades, we have known these devices are unsafe."

Since 1910, NFPA has crusaded against the use of consumer fireworks, urging everyone to attend public displays of fireworks put on by trained professionals.

Every year, consumer fireworks maim and kill thousands of adults and children. The day before NFPA's press conference, the Consumer Product Safety Commission (CPSC) issued its fireworks injury statistics for 2003, showing injuries to be up from 8,800 in 2002 to 9,300.

In 1999, the last year for which data is available, NFPA counted 24,200 fires caused by fireworks, resulting in 12 deaths and 55 injuries. NFPA has collected the data on fires caused when consumers use fireworks year after year, says Shannon.

While groups such as CPSC offer consumers safety tips for fireworks use, the coalition stands firm in condemning any use of fireworks by the public—under any circumstance.

Shannon continued by pointing out the legal ages for buying fireworks in some states.

"In certain states—among them Texas, North Dakota, Mississippi, and Arkansas—children as young as 12 are permitted to buy these things—without parental permission," he says. "And if you think that's bad, Tennessee will let your 10-year-old buy them."

Also speaking was Virginia State Fire Marshal Ed Altizer, representing the International Fire Marshals Association (IFMA), who referred to devices from an inert fireworks board, discussing the power of the individual items.

Joseph Wright, MD, MPH, from the American Academy of Pediatrics, who works at Children's National Medical Center in Washington, D.C., says that the Fourth of July weekend poses for he and the emergency room "the busiest weekend of the year." In particular, he said, sparklers, which burn in excess of 1,000°F (538°C), will injure many children under the age of five. In fact, he said, about half of the 1,500 people injured by sparklers in 2002 were children younger than five years old.

Dr. Stuart Dankner, from the American Academy of Ophthalmology, a pediatric ophthalmologist and Assistant Professor of Ophthalmology at Johns Hopkins University in Baltimore, grew frustrated with the yearly injury count.

"Why can't we just ban these devices once and for all?" he asks.

After the press conference, the participants went home to ready for the long holiday weekend. The 2004 count was just beginning. The question was just how many would be injured or killed by fireworks this year?

Stacy Miller is adjusting to her new life. But she'll never be a nurse again. She will never be able to clearly see her six-year-old son. She will never be as independent as she once was. All because someone's idea of fun went horribly wrong.

Fireworks statistics

The U. S. Consumer Product Safety Commission (CPSC) staff's annual analysis of data on fireworks-related deaths and injuries includes a summary of CPSC enforcement activities during that year. CPSC has reports of 6 deaths associated with fireworks during 2003. Four deaths were associated with aerial fireworks. The other deaths occurred in fires that were started by fireworks.

In addition, an estimated 6,800 fireworks-related injuries were treated in U. S. hospital emergency departments during the one month study period surrounding the Fourth of July, 2003 (June 20, 2003 – July 20, 2003). CPSC staff estimated that there were 5,700 injuries during 2002.

CPSC also reports that injuries to children were a major component of total fireworks-related injuries with children under 15 accounting for almost half the estimated injuries.

According to NFPA statistics, from 1995 to 1999, an annual average of seven people were killed directly by fireworks, and an annual average of nine people died in fires started by fireworks. In fact, based on the amount of time they are used and quantities in which they are used, fireworks pose a higher risk of fire death than any other consumer product used in the United States.

Fireworks damage property, as well. In 1999, fires started by fireworks caused \$17.2 million in direct property

damage, and fireworks-related fires have caused at least \$15 to \$20 million in property loss each year in the past decade. On the Independence Day holiday in 1999, fireworks caused more outdoor fires in the United States than all other causes of outdoor fire, combined.

Margie Coloian is the director of NFPA's Public Affairs Division.

URL: <http://www.nfpa.org/itemDetail.asp?categoryID=297&itemID=28463&URL=Research%20%20Reports/Fact%20sheets/Seasonal%20safety/Fireworks>

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NFPA Fact Sheets

Fireworks

Here is NFPA's latest information on fireworks, including links to a model state law, NFPA's fireworks injury report, a *Risk Watch*® lesson plan for children, and an opportunity to build your own virtual fireworks display.

The dangers of amateur use of fireworks

Fireworks injuries reported to U.S. hospital emergency rooms jumped by 29% in 2000, from 8,500 in 1999 to 11,000 in 2000. Two-fifths of the increase (1,000 additional injuries) were associated with fireworks use in January 2000, presumably related to the celebration of the new millennium. Most of the change—the other three-fifths (1,500 additional injuries)—occurred around and after Independence Day 2000. These new figures underscore the fact that the risk of fireworks use -- measured as a rate of serious injuries per hour of exposure -- ranks with the highest risks of any known product. Any increase in the very limited (one day a year) typical usage pattern results in a large increase in injuries. Meanwhile, the share of fireworks injuries occurring at public displays remained low (around 3%) for Independence Day 2000. You really must leave fireworks to the professionals. Their shows are spectacular but safe. Amateur displays are unacceptably dangerous, especially to children, whose injury rates, as always, were several times those of adults.

—John R. Hall, Jr., Assistant Vice President, Fire Analysis and Research

"Only safe way to enjoy fireworks is at a distance"

Dear Abby" runs [a letter from NFPA President George Miller](#) on July 1, 2001.

"Start a Prairie Fire of Public Opinion"

NFPA President George Miller [says that fireworks should be left to the professionals](#) in his editorial from the May/June 2001 issue of *NFPA Journal*.

Legal or not, fireworks are too risky for amateurs

Permanent scarring, loss of vision, dismemberment – these are too often the harsh realities of amateur fireworks use. [NFPA urges everyone to treat fireworks, whether legal or illegal for consumers, as suitable only for use by trained professionals.](#)



FIREWORKS FACT: Most fireworks-related injuries do not involve fires that are reported to fire departments. In 1998, for example, an estimated 44 civilians were injured in reported fires caused by fireworks, but fireworks-related injuries reported to hospital emergency rooms alone totaled 8,500 the same year. Source: [NFPA report on "Fireworks-Related Injuries, Deaths, and Fires in the U.S."](#)

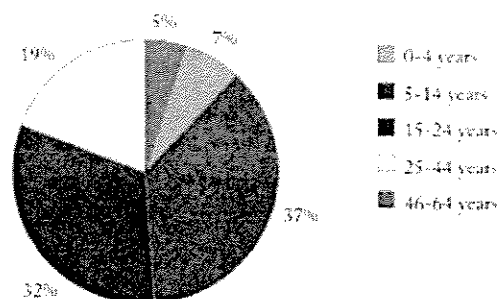
Fireworks facts and figures

In 1998, an estimated 21,700 fires involving fireworks were reported to fire departments. There was \$15.6 million in direct property damage as a result of these fires. Fireworks-related fires have typically caused at least \$20 million in property loss (not adjusted for inflation) each year in the past decade. [Download the latest fireworks report](#) (March 2001) prepared by NFPA's Fire Analysis & Research Division.

Fireworks state-by-state

While 10 states ban the use of all fireworks by consumers, 34 states and the District of Columbia allow some or all types of consumer fireworks. [Here's a state-by-state breakdown](#) compiled by the American

1999 Fireworks Injuries* by Age of Victim



Source: CPSC National Electronic Injury Surveillance System (NEISS) *June 23 to July 23 only



Pyrotechnics Association.

NFPA model fireworks law

For more than half a century, NFPA has led the charge to protect the public from injuries and fires resulting from indiscriminate use of fireworks. The International Fire Marshals Association (IFMA) has prepared a [model fireworks law](#) which reflects NFPA's zero-tolerance policy on amateur use of fireworks.

Partnership with Atlantic Mutual Companies

[Atlantic Mutual Companies](#) has partnered with NFPA to deliver fireworks safety information in the spirit of the Risk Watch® philosophy of injury protection.

"Fireworks are pretty to look at, but very dangerous"

Sparky the Fire Dog® knows that real fireworks should only be handled by trained professionals. That's why NFPA's official spokesdog invites children of all ages to [create their own virtual fireworks display](#). Or, if you prefer doing things the old-fashioned way, you can make "fireworks" on paper using [Sparky's fireworks art project](#). [Visit Sparky's Web site](#) for other safety tips and fun activities.

Risk Watch® - Fireworks safety role playing

"While walking through a park, you and some friends discover fireworks that someone has left behind. What should you do?" This [NFPA Risk Watch lesson plan](#) presents situations involving fireworks and asks students to plan and present skits demonstrating decisions that could result in risky situations.

NFPA Online Catalog

NFPA publishes [several codes and standards on fireworks](#), all of which are available for immediate purchase and download in PDF format, as well as [an educational brochure on "Fire Safe Holidays."](#)

FIREWORKS FACT: On a typical 4th of July, fireworks cause more fires in the U.S. than all other causes combined. But because most people encounter the risk of fireworks only once a year, many Americans do not realize how great that risk is.
Source: NFPA report on "[Fireworks-Related Injuries, Deaths, and Fires in the U.S.](#)"

Safety first in Boston

Every year, the city of Boston has an impressive fireworks display, but never once is entertainment put ahead of safety. [Read this fascinating article](#) from the May/June 2000 issue of [NFPA Journal](#).

FAQs

NFPA's technical staff has answered some "[Frequently Asked Questions](#)" about dusts, explosion venting, and pyrotechnics.

FIREWORKS

**John R. Hall, Jr.
Fire Analysis & Research Division
National Fire Protection Association**

June 2006

Abstract

In 2004, 9,600 fireworks-related injuries were treated in U.S. hospital emergency rooms. The trend in fireworks-related injuries has been mostly up since 1996, with a sharp spike in 2000-2001, primarily due to celebrations around the advent of a new millennium. The highest injury rates were for children aged 5 to 9, only slightly higher than the rates for children aged 10 to 14 and individuals aged 15 to 19.

In 2004, five out of six (85%) emergency room fireworks injuries involved fireworks that Federal regulations permit consumers to use. The risk of fire death relative to exposure shows fireworks as the riskiest consumer product.

Keywords: Fireworks, fire statistics, NFIRS, NEISS

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS. And we appreciate the important work done by the U.S. Consumer Product Safety Commission to develop, maintain, and support analysis of the National Electronic Injury Surveillance System (NEISS) and the National Center for Health Statistics and the National Safety Council for maintenance and analysis of the U.S. death certificate data base.

For more information about the National Fire Protection Association, visit www.nfpa.org or call 617-770-3000. To learn more about the One-Stop Data Shop go to www.nfpa.org/osds or call 617-984-7450.

Copies of this report are available from:

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Executive Summary

In 2004, 9,600 fireworks-related injuries were treated in U.S. hospital emergency rooms. The trend in fireworks-related injuries has been mostly up since 1996, with a sharp spike in 2000-2001, primarily due to celebrations around the advent of a new millennium. Injuries were higher in 1984-1995 than in recent years but lower in the mid-1970s and earlier.

In 2003, an estimated 2,300 reported structure or vehicle fires started by fireworks. These fires resulted in 5 reported civilian deaths, 60 civilian injuries, and \$58 million in direct property damage.

In 2003, 100 people were killed in a Rhode Island nightclub fire ignited by the indoor use of pyrotechnics in a small, crowded room with wall linings that promoted rapid flame spread. The facility had no sprinkler protection. These deaths were not included in the national estimates.

In 1998-2002, 8 people per year were killed in fires started by fireworks, while 6 people per year were killed directly by fireworks.

As in most years, the majority of victims of fireworks injuries in 2004 were under age 20. The highest injury rates were for children aged 5 to 9, only slightly higher than the rates for children aged 10 to 14 and individuals aged 15 to 19. Males accounted for nearly three-fourths (75%) of fireworks injuries.

In 2004, five out of six (85%) emergency room fireworks injuries involved fireworks that Federal regulations permit consumers to use.

The risk of fire death relative to exposure shows fireworks as the riskiest consumer product.

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Size of the Fireworks Problem

In 2004, 9,600 fireworks-related injuries were treated in U.S. hospital emergency rooms.

The trend in fireworks-related injuries has been mostly up since 1996, except for a spike in 2000-2001, primarily due to celebrations around the advent of a new millennium. Injuries were higher in 1984-1995 than in recent years but lower in the mid-1970s and earlier. (See Figure 1.) These statistics are estimates based on the U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS) sample of hospital emergency rooms.

In 2003, an estimated 2,300 reported structure or vehicle fires were ignited by fireworks.

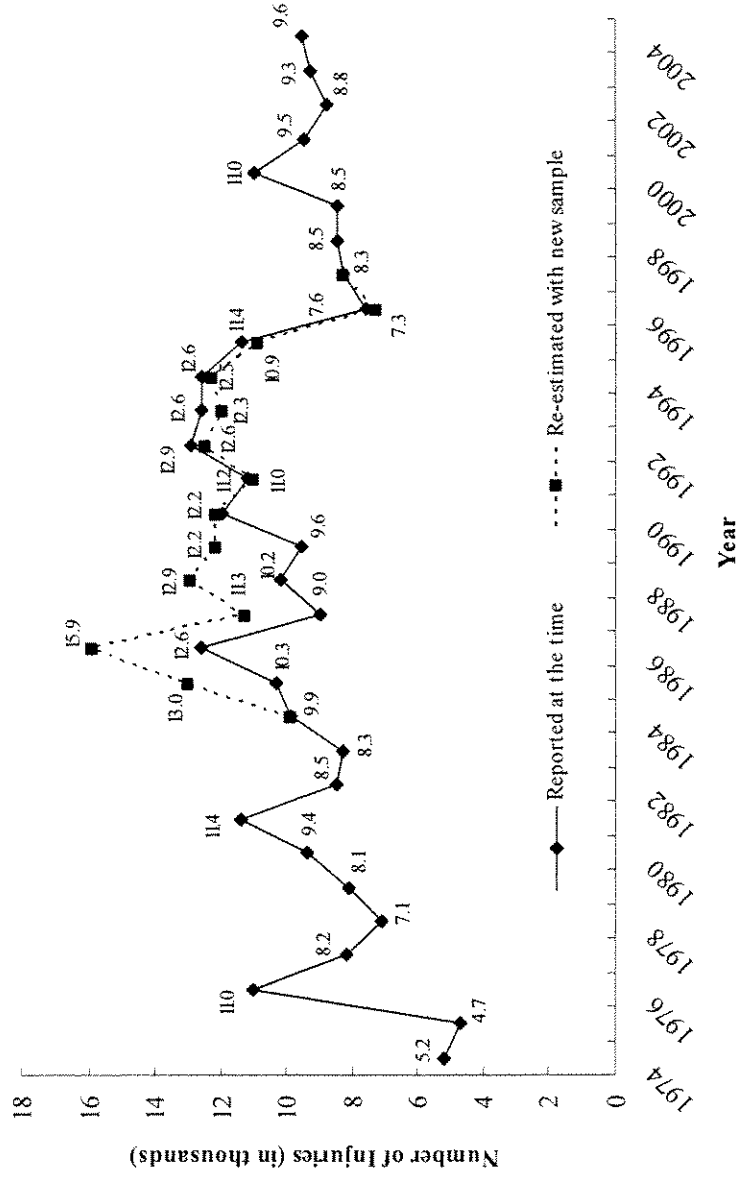
These fires resulted in 5 reported civilian deaths, 60 civilian injuries, and \$58 million in direct property damage, excluding the Station night club fire, which was not included in the sample. (In 2003, 100 people were killed in a Rhode Island nightclub fire ignited by the indoor use of pyrotechnics in a small, crowded room with wall linings that promoted rapid flame spread. The facility had no sprinkler protection.) (See Table 1.)

Each year, most fireworks-related fires begin in outdoor brush or refuse, but most of the loss occurs in fires with structures involved. These fires can start with outdoor use of fireworks, as when a bottle rocket, launched outside, lands on a roof or other location not easily accessed, where it can ignite combustibles before anyone can retrieve it. Because cause information is no longer required for outdoor refuse fires, statistics for outdoor refuse fires by cause cannot be calculated. Therefore, no outdoor-fire statistics are shown here.

In 1998-2002, an estimated 8 people per year were killed in reported fires started by fireworks, while 6 people per year were killed directly by fireworks.

Deaths involving fireworks are identified from two data sources, which may partially or largely overlap, because fireworks can kill directly and also start fires. (See Table 2.) The period of 1998-2002 is the latest 5-year period for which there is official data from death certificates. In both data bases, the death toll varies substantially from year to year, making trend analysis meaningless. As Figure 1 and Table 1 demonstrate, most non-fatal injuries due to fireworks do not occur in the context of a reported fire. For both fatal and non-fatal injuries, it is clear that fireworks can injure directly via a traumatic injury or indirectly via a fire injury from a fire initiated by the fireworks. As for non-fatal injuries, the available statistics also omit injuries that are treated in doctor's offices or are left untreated.

Figure 1.
Fireworks-Related Injuries Reported to
Hospital Emergency Rooms



Source: CPSC's NEISS

**Table 1. Fires and Losses Associated
With Fireworks, 1980-2003
Fires Reported to U.S. Fire Departments**

A. Fires

Year	Home Structures	Other Residential Structures	Nonresidential Structures	Total Structures	Vehicles
1980	2,900	100	1,100	4,000	500
1981	2,800	100	1,300	4,200	500
1982	1,700	100	1,000	2,700	500
1983	1,400	100	800	2,300	500
1984	2,400	100	1,200	3,700	1,000
1985	2,600	100	1,500	4,100	900
1986	2,300	100	1,200	3,600	1,000
1987	1,900	100	1,100	3,100	800
1988	2,300	100	1,400	3,700	900
1989	1,700	100	900	2,700	800
1990	1,600	100	800	2,500	800
1991	1,600	100	900	2,600	900
1992	1,400	0	900	2,300	700
1993	1,300	0	800	2,100	800
1994	1,300	0	900	2,200	700
1995	1,100	0	700	1,900	700
1996	1,100	0	600	1,700	600
1997	1,000	0	700	1,700	500
1998	800	0	500	1,400	500
1999	1,000	0	700	1,600	500
2000	1,000	0	600	1,600	600
2001	1,100	0	600	1,700	700
2002	1,000	0	700	1,700	800
2003	1,000	0	600	1,600	700

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest hundred. Figures reflect a proportional share of fires with heat source unknown.

Source: NFIRS and NFPA survey.

**Table 1. Fires and Losses Associated
With Fireworks, 1980-2003
Fires Reported to U.S. Fire Departments (Continued)**

B. Civilian Deaths

Year	Home Structures	Other Residential Structures	Nonresidential Structures	Total Structures	Vehicles
1980	0	0	0	0	0
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	3	0	0	3	0
1985	8	0	0	8	3
1986	4	0	0	4	0
1987	4	0	3	7	0
1988	20	0	0	20	0
1989	4	0	0	4	0
1990	3	0	0	3	0
1991	0	0	0	0	2
1992	0	0	0	0	0
1993	0	0	0	0	0
1994	12	0	0	12	0
1995	0	0	0	0	0
1996	9	0	18*	27	0
1997	0	0	0	0	0
1998	0	0	0	0	0
1999	5	0	6	11	0
2000	27	0	0	27	0
2001	0	0	0	0	0
2002	0	0	0	0	0
2003	5	0	0**	5**	0

*Inflated by statistical projection of one Ohio fire with nine deaths.

** Does not include 100 deaths in the Station night club fire.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Civilian deaths are expressed to the nearest one. Figures reflect a proportional share of fires with heat source unknown.

Source: NFIRS and NFPA survey.

**Table 1. Fires and Losses Associated
With Fireworks, 1980-2003
Fires Reported to U.S. Fire Departments (Continued)**

C. Civilian Injuries

Year	Home Structures	Other Residential Structures	Nonresidential Structures	Total Structures	Vehicles
1980	30	10	0	30	0
1981	30	0	20	50	0
1982	10	0	20	30	0
1983	50	0	0	50	0
1984	40	0	10	50	10
1985	70	10	10	80	30
1986	50	10	50	100	0
1987	50	10	10	70	0
1988	40	0	20	50	20
1989	50	0	0	50	20
1990	30	10	10	50	0
1991	50	10	10	70	10
1992	40	0	10	50	10
1993	20	0	20	40	0
1994	90	0	10	100	10
1995	50	0	0	50	0
1996	20	0	20	40	0
1997	20	0	10	30	20
1998	10	0	0	10	10
1999	10	0	10	20	10
2000	10	0	10	20	0
2001	30	0	10	40	10
2002	40	10	0	50	10
2003	50	0	0	60	0

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Civilian injuries are expressed to the nearest ten. Figures reflect a proportional share of fires with heat source unknown.

Source: NFIRS and NFPA survey.

**Table 1. Fires and Losses Associated
With Fireworks, 1980-2003
Fires Reported to U.S. Fire Departments (Continued)**

D. Direct Property Damage (in Millions)	Fires Reported to U.S. Fire Departments (Continued)				Total Structures in 2003 Dollars	Vehicles
	Year	Home Structures	Other Residential Structures	Nonresidential Structures		
1980	\$12	\$0	\$3	\$15	\$33	\$0
1981	\$12	\$0	\$6	\$18	\$36	\$0
1982	\$9	\$0	\$2	\$11	\$20	\$0
1983	\$7	\$0	\$5	\$12	\$22	\$0
1984	\$19	\$0	\$6	\$25	\$43	\$2
1985	\$22	\$1	\$7	\$30	\$51	\$1
1986	\$24	\$0	\$29	\$53	\$89	\$2
1987	\$17	\$0	\$7	\$24	\$39	\$1
1988	\$22	\$0	\$14	\$37	\$57	\$1
1989	\$56	\$0	\$3	\$59	\$88	\$1
1990	\$22	\$1	\$4	\$26	\$37	\$2
1991	\$17	\$0	\$5	\$21	\$29	\$2
1992	\$13	\$0	\$16	\$29	\$39	\$1
1993	\$12	\$0	\$6	\$19	\$24	\$1
1994	\$10	\$0	\$8	\$18	\$22	\$2
1995	\$21	\$1	\$9	\$30	\$36	\$2
1996	\$12	\$0	\$7	\$19	\$23	\$1
1997	\$13	\$0	\$8	\$21	\$24	\$1
1998	\$9	\$0	\$3	\$12	\$14	\$1
1999	\$12	\$1	\$3	\$16	\$18	\$1
2000	\$13	\$0	\$12	\$25	\$26	\$2
2001	\$19	\$1	\$11	\$31	\$32	\$3
2002	\$18	\$0	\$8	\$26	\$27	\$2
2003	\$42	\$2	\$11	\$55	\$55	\$3

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Direct property damage is rounded to the nearest million dollars. Figures reflect a proportional share of fires with heat source unknown. Inflation adjustment to 2003 dollars is done using the consumer price index.

Source: NFIRS and NFPA survey.

**Table 2. Deaths Associated With
Fireworks Incidents, 1980-2004**

Year	Estimated Civilian Deaths in Structure or Vehicle Fires Reported to U.S. Fire Departments	Recorded on U.S. Death Certificates
1980	0	10
1981	0	4
1982	0	5
1983	0	13
1984	3	7
1985	11	11
1986	4	8
1987	7	5
1988	20	4
1989	4	5
1990	3	5
1991	2	4
1992	0	2
1993	0	10
1994	12	4
1995	0	2
1996	27*	9
1997	0	8
1998	0	9
1999	11	7
2000	27	5
2001	0	6
2002	0	5
2003	5**	4***
2004	****	8***

* Inflated by statistical projection of one Ohio fire with nine deaths.

** Does not include 100 deaths in the Station night club fire.

*** Death certificate figures for 2003 and 2004 are preliminary based on reports to the U.S. Consumer Product Safety Commission and exclude fireworks-caused fires, most notably the Station fire in 2003.

**** Not yet available.

Note: In any year, the figures in these two columns may partially overlap if fireworks that directly kill also ignite a reported fire.

Sources: For death certificate tallies, *Injury Facts*, Chicago (1985-1992) and Itasca, IL (1993-2006): National Safety Council, 1985-2006. For national estimates of fire deaths, NFIRS and NFPA survey.

Characteristics of Fireworks Injuries

More than two-fifths (42%) of 2004 emergency room fireworks injuries were to the head, and more than half (53%) were to extremities.

Injuries to extremities were primarily to hand or finger (33% of total injuries). (See Figure 2.) One-fifth (21%) of injuries were to the eye, and one-fifth (21%) were to other parts of the head or face. The detailed U.S. statistics are based on injuries reported to hospital emergency rooms for CPSC's NEISS system during the month around July 4. A 1998 study of all Canadian fireworks injuries ever reported to the Canadian Hospitals Injury Reporting and Prevention Program found a large share of injuries occurred while the victim was holding the fireworks device, and the U.S. injury patterns are at least consistent with that pattern. (See Health Canada, "Injuries associated with ... fireworks," at <http://www.hc-sc.gc.ca>.)

More than three-fifths (62%) of 2004 fireworks injuries were burns.

Contusions and lacerations were second (20%). (See Figure 3.) Contusions and lacerations were roughly equal in number to burns when the injury was to any part of the head or face, including the eye.

Highest risks of fireworks injury are to school-age children.

As in most years, the majority of victims of fireworks injuries in 2004 were under age 20. (See Figure 4.) The highest injury rates were for children aged 5 to 9, only slightly higher than the rates for children aged 10 to 14 and individuals aged 15 to 19. The rates for children aged 0 to 4 and for young adults aged 20 to 24 were 50% higher than the average rate for all ages. (See Figure 5.) Males accounted for three-fourths (75%) of fireworks injuries.

Similar patterns in fireworks injuries were found in the Health Canada study cited above. The highest rates in that study were for the 10 to 14 and 15 to 19 age groups, followed closely by the 5 to 9 age groups. A Greek study (K. Vassilia, P. Eleni, and T. Dimitrios, "Fireworks-related childhood injuries in Greece: A national problem," *Burns*, Vol. 30, No. 2, 2004, pp. 151-153) found that young female victims were usually bystanders, while young male victims were usually involved in igniting fireworks.

In 2004, five out of six (85%) emergency room fireworks injuries involved fireworks that Federal regulations permit consumers to use.

The other 15% were large/illegal firecrackers, homemade or altered devices, and public display fireworks. Federal law permits public use of what are now referred to as "consumer fireworks" (formerly known as "common" or Class C fireworks), which are defined as "any small fireworks device designed primarily to produce visible effects by combustion" that comply with specific construction, chemical composition, and labeling regulations. These include a 50-mg maximum limit of explosive composition for ground devices and a 130-mg maximum limit of explosive composition for aerial devices. (See Figure 6.)

Some states further restrict the public's access to fireworks. The following five states have banned access by the public to all fireworks – Delaware, Massachusetts, New

Jersey, New York, and Rhode Island. Six states allow only sparklers and/or novelties, but these devices accounted for more than one-third of 2004 fireworks injuries.

“Safe and sane” fireworks caused more injuries than illegal fireworks, especially to preschool children.

The term “safe and sane” fireworks is used to refer to devices such as sparklers, fountains, snakes, party poppers, and ground spinners. Six states permit sale of sparklers and some other devices of comparable strength – Arizona, Illinois, Iowa, Maine, Ohio, and Vermont. As a promotional technique, the fireworks allowed under rules of this type have been labeled “safe and sane” fireworks by their advocates. Laws based on this approach allow considerable private use of fireworks, but exclude any explosive type devices that lift off the ground that are allowed under Federal law.

In 2004, sparklers, fountains, and novelties alone accounted for two-fifths (40%) of emergency-room fireworks injuries, including most injuries to pre-school children (ages 4 and under) where the type of fireworks device was specified. Here is a sample of NEISS incident narratives of pre-school child injuries from sparklers in 2004:

A 3-year-old boy was running with a burning sparkler, which somehow fell under the back of his shirt and burned his lower back.

A 3-year-old boy burned his fingers on a lighted sparkler.

A 3-year-old boy stepped on a hot sparkler and suffered a second degree burn to his right foot.

A 3-year-old girl playing with sparklers sustained a second degree burn when a burning sprinkler contacted the left side of her head.

A 3-year-old girl sustained a second degree burn when a burning sprinkler was dropped onto a toe on her right foot.

A 2-year-old girl sustained a second degree sparkler burn to her left shoulder and neck.

A 4-year-old boy stepped on a burning sparkler, sustaining a second-degree burn to his foot, which later developed a secondary infection.

And sparklers can also start very large fires, e.g.:

A fire started in the bedroom of a first-floor apartment when a lit sparkler ignited a combustible bed skirt. The apartment’s resident had placed the sparkler in a cupcake for her 10-year-old daughter’s birthday. After sparks ignited the bed skirt, flames spread to bedding and other combustibles. The occupants detected the fire before smoke alarms could operate and escaped.

Flames heavily damaged the bedroom of origin and other rooms in the apartment, while the structural steel elements sustained significant heat damage. Smoke extensively damaged the first floor and spread to the upper floors through a construction deficiency around a vertical ventilation shaft. Water damaged the lower floors. Damages were estimated at \$1.6 million.*

“Safe and sane” fireworks are neither. When things go wrong with fireworks, they typically go very wrong very fast, far faster than any fire protection provisions can reliably respond. And fireworks are a classic attractive nuisance for children. If children are present to watch, they will be tempted to touch. Children can move too fast and be badly hurt too quickly if they are close to fireworks, as they inevitably are at home fireworks displays.

State laws to restrict fireworks use by the public are very difficult to enforce.

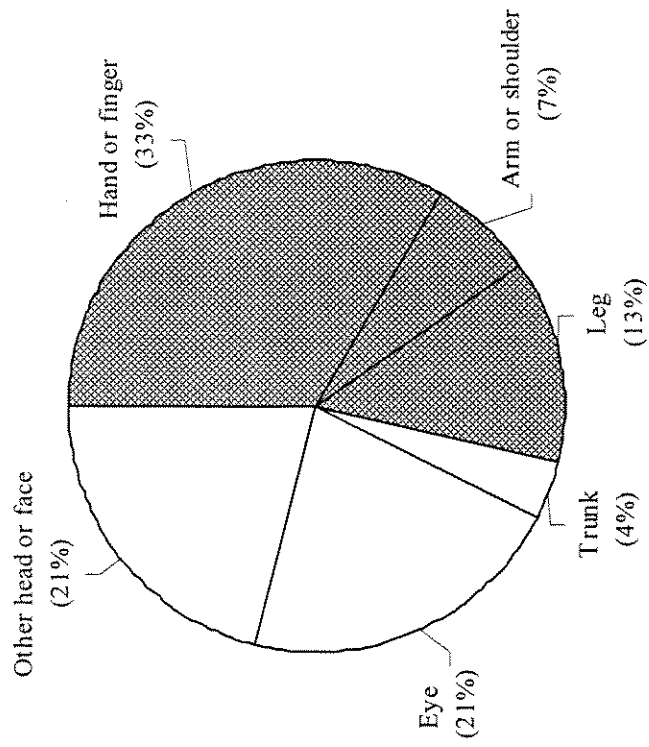
The other 39 states and the District of Columbia impose no restrictions beyond the Federal requirements. This patchwork approach meant that people determined to acquire fireworks though living in a state that prohibits them can often cross a state border to buy fireworks, thereby violating a state law that is difficult to enforce. Every year, for example, people from Massachusetts drive into neighboring New Hampshire – a trip of at most a couple of hours – and buy fireworks from rows of retail stands set up near the border for the convenience of the scofflaw trade.

It is possible that limited laws, such as the current Federal law, are actually more difficult to enforce than a broader law would be, because the existence of some legal fireworks for the public encourages a climate of acceptance and creates a distribution network, both of which make it easier for amateurs to obtain illegal fireworks.

Since at least 1910, NFPA has crusaded to stop the dangerous private use of fireworks, which as noted accounts for nearly all of the injuries from fireworks in most years. Many states still permit untrained citizens to purchase and use fireworks – objects designed to explode, throw off showers of hot sparks, or reach surface temperatures as high as 1,200°F. The thousands of serious injuries and extensive property loss nearly all arise from this misguided activity, rather than the only acceptably safe way to enjoy fireworks, which is in public fireworks displays conducted in accordance with NFPA 1123, *Code for Fireworks Display*. Anything else is a violation of IFMA's (International Fire Marshals Association's) *Model Fireworks Law*, which reflects NFPA's zero-tolerance policy for consumer use of fireworks.

*Adapted from Kenneth J. Tremblay, “Firewatch,” *NFPA Journal*, March/April 1997, p. 21.

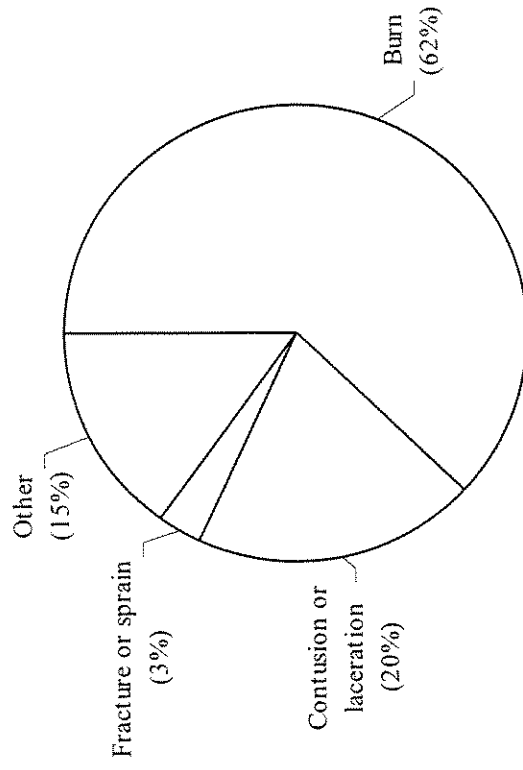
**Figure 2.
2004 Fireworks-Related Injuries*
by Part of Body Injured**



Source: CPSC's NEISS

*Based on injuries during the month around July 4.

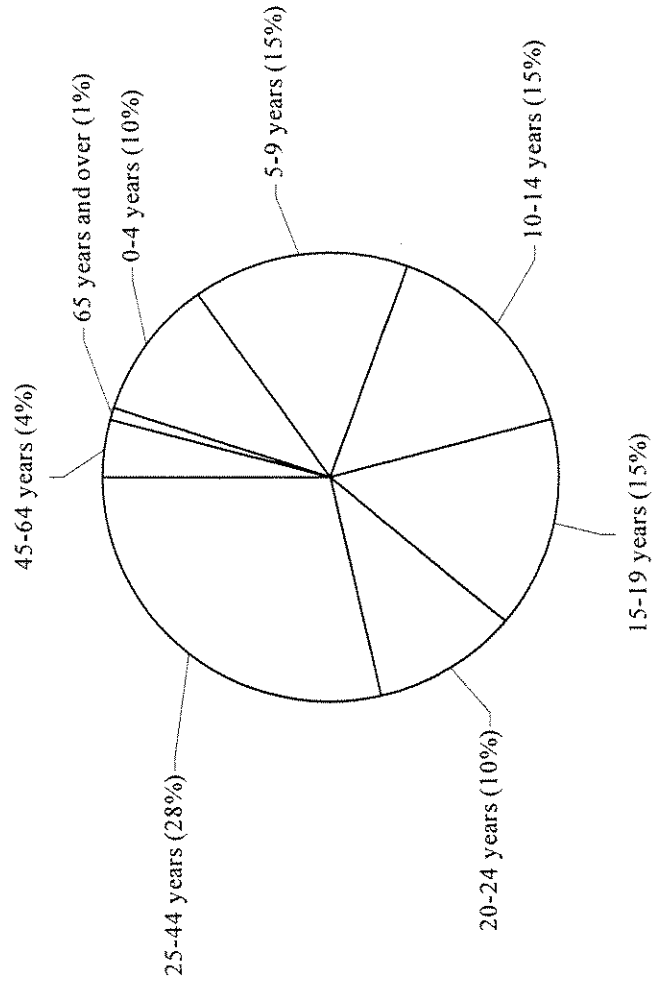
Figure 3.
2004 Fireworks-Related Injuries*
by Type of Injury



Source: CPSC's NEISS

*Based on injuries during the month around July 4.

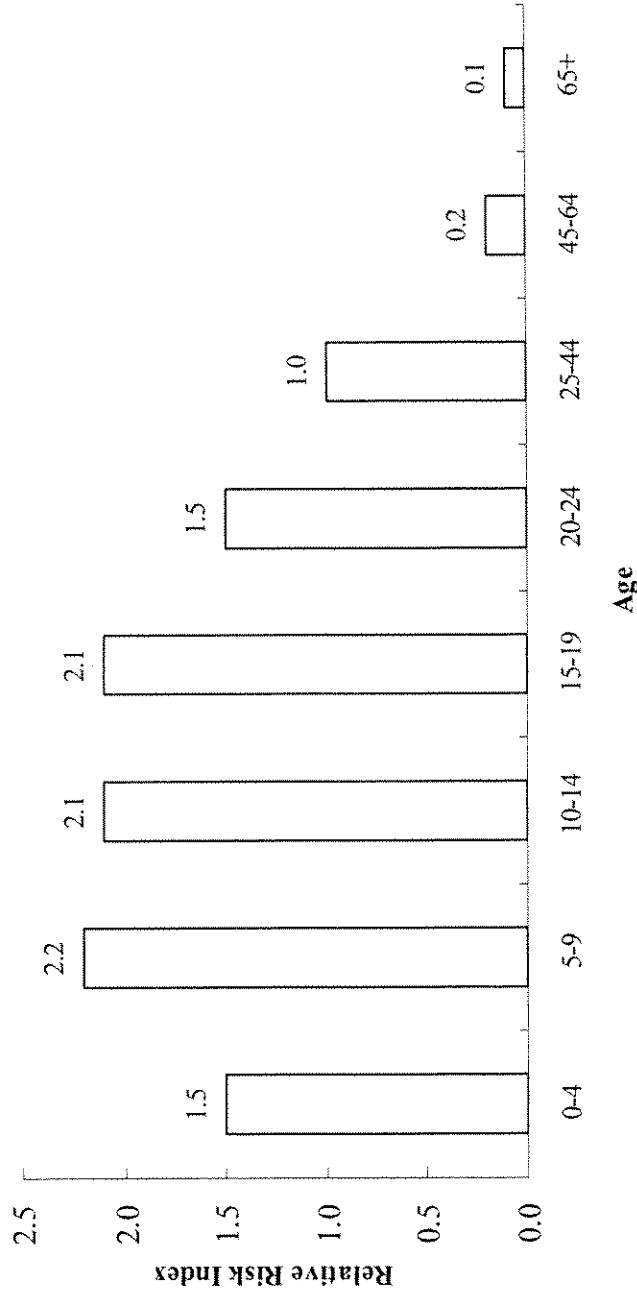
Figure 4.
2004 Fireworks-Related Injuries*
by Age of Victim



Source: CPSC's NEISS

*Based on injuries during the month around July 4.

Figure 5.
Risk of 2004 Fireworks-Related Injury*
by Age of Victim

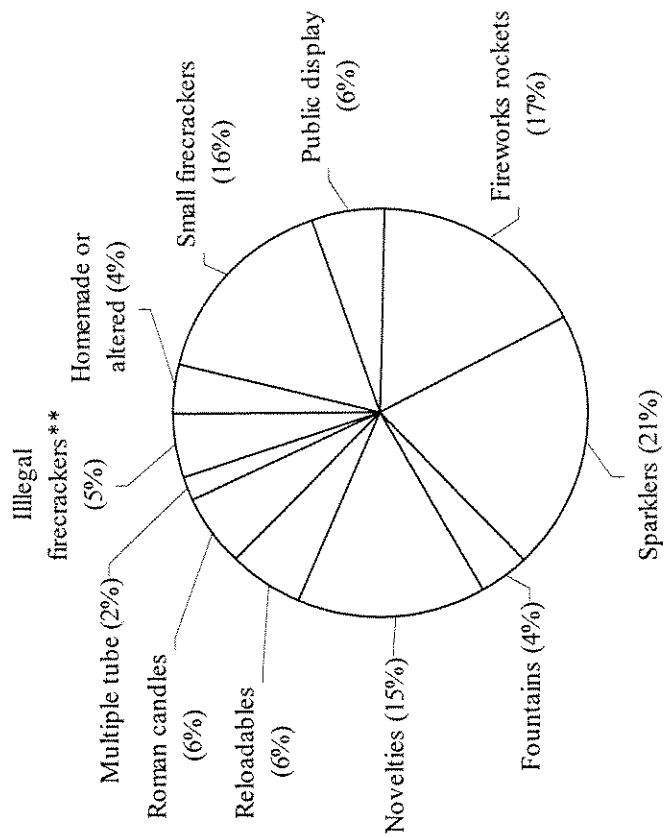


*Based on injuries during the month around July 4.

Note: Relative risk index is injuries per million population for the age group divided by injuries per million population for all ages combined.

Source: CPSC's NEISS

Figure 6.
2004 Fireworks-Related Injuries* by Type of Fireworks
(Unknowns Allocated)



Source: CPSC's NEISS

*Based on injuries during the month around July 4.
 **Illegal under Federal law.

Risks of Private Fireworks Use

The risks of fireworks are typically encountered for only a few days each year.

On the July 4 Independence Day holiday in a typical year, fireworks are the leading cause of reported fire, accounting for more outdoor fires in the U.S. than all other causes of outdoor fires combined. (This characterization, based on patterns in late 1990s data, has not been reconfirmed with more current data, because NFIRS Version 5.0 does not require cause reporting for outdoor trash fires.) But because most exposure to the risk of fireworks is limited to a few days around July 4, the actual toll of loss is relatively small, and so the risk may not impress itself upon the average person. Some areas may also see heightened fireworks use around New Year's Day, Chinese New Year, or Mardi Gras.

The same is true in some other countries. In the United Kingdom, a tradition exists for fireworks use on November 5, sometimes called "Bonfire Night," a date very near Halloween (October 31). In Canada, fireworks injuries peak on Halloween, Victoria Day (a Monday in late May), and Canada Day (July 1). Many countries see heightened fireworks use around Chinese New Year (late January or early February). Greeks see a jump in usage and injuries on Greek Orthodox Easter. But relatively few countries (China and Mexico may be among the exceptions) see substantial fireworks use year-round.

The risk of fire death relative to exposure shows fireworks as the most risky consumer product.

Risk estimates relative to exposure time are very rough, but even an estimate designed to give fireworks the benefit of the doubt supports the above conclusion.

Take, for example, cigarettes, the product associated with the largest number of fire deaths per year and the only other product likely to have the highest risk of fire deaths relative to exposure time. Recent figures indicate 425-435 billion cigarettes are smoked per year by a smoking population that constitutes about one-fourth of the adult population, who themselves constitute three-fourths of the total population of roughly 280 million people. This translates into roughly 28 cigarettes per smoker per day and 52.5 million smokers. Assuming it takes at least 5 minutes on average to smoke a cigarette, this translates into just over 2 hours per day of exposure to the fire risks associated with a lit cigarette. The latest death toll from fires started by lit tobacco products, nearly all of which are cigarettes, is in the range of 700 to 900. The risk is therefore estimated as $(700-900 \text{ deaths}) / (2 \text{ hours/day} \times 365 \text{ days}) / (52.5 \text{ million smokers}) = 1.8-2.3 \text{ deaths per hundred million person-hours of exposure.}$

Now, consider fireworks. Recent figures indicate 120-130 million pounds of fireworks are used per year. Fireworks are typically used by households, so we assume that, on average, 2.6 people (the average size of a household) are exposed in any use of fireworks. A pound of fireworks will translate into a varying number of devices, depending on the type of device, but assume that on average a pound of fireworks burns for no more than 20 minutes. (The longer the time, the longer the estimated exposure time, and so the lower the estimated risk.) In 1998-2002, fires started by fireworks averaged 7.8 deaths a

year. (See Table 2.) The risk is therefore estimated as $(7.8 \text{ deaths}) / (2.6 \text{ people/exposure} \times 1/3 \text{ exposure-hour/pound} \times 130 \text{ million pounds}) = 6.9 \text{ deaths per hundred million person-hours of exposure.}$

The cigarette calculation errs on the side of overestimating the risk, because 5 minutes is a low-end estimate of smoking time per cigarette, particularly if one factors in the long smolder time of imperfectly extinguished cigarettes, which are a common scenario for fire. The fireworks calculation errs on the side of underestimating the risk, because 20 minutes is a high-end estimate of the average burn time for a pound of fireworks, possibly high by a factor of two to four. Yet, even with these assumptions, the risk while fireworks are burning that a fire death will result is three to four times the corresponding risk when cigarettes are burning.

In recent years, the industry has asserted a risk-type argument based on the fact that fireworks consumption (in pounds) roughly doubled in the early to mid-1990s while hospital emergency-room injuries due to fireworks were declining. The above calculation shows the fallacy of this reasoning, which focuses on whether the risk is increasing or decreasing and not on how high the risk actually is.

The risks associated with fireworks are not limited to displays, public or private.

Risks also exist wherever fireworks are manufactured, transported or stored. Most but not all such losses in recent decades have occurred in other countries, where fireworks activity is not controlled as tightly – or kept as separate from highly populated areas – as it tends to be in the U.S. The following incident descriptions are taken from NFPA's Fire Incident Data Organization (FIDO) database:

- In 1983, two separate massive fireworks explosion incidents in Mexico killed 34 and 21 people, respectively, the latter reportedly coming when a fireworks display flare ignited fireworks stored in the back room of a church. Fireworks displays are a traditional part of a religious festival called the Feast of the Holy Cross.
- In 1996, nine people died in an Ohio fire when a customer ignited a fireworks device in the sales display area of a fireworks retail facility, and the resulting fire quickly spread to the entire store inventory. (See *NFPA Journal*, September/October 1997, p. 52.)
- In 2000, 18-20 people were killed in the Netherlands when a residential fire spread to a fireworks warehouse located next to the neighborhood.
- In 2002, three separate incidents in India involved explosions at fireworks storage facilities, killing 14, 13, and 12 people, respectively. The first incident involved storage at an ordinary home, while the last incident involved storage in a straw-thatched warehouse where a short circuit ignited a fire that then led to an explosion when fire spread to fireworks.
- In 2006, 36 people were killed in Linqi, China, when fireworks ignited an explosion at a fireworks warehouse, resulting in a pressure wave that flattened a nearby temple, leading to the casualties.

Data Sources

Changes in NFIRS pose opportunities and challenges in describing and tracking the problem.

The statistics in this report are national estimates derived from the US Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) in combination with NFPA's annual fire department survey. In Version 4.1, "fireworks" were usually understood to include two categories under form of heat of ignition – code 63 (fireworks) and code 64 (paper cap or party popper). In Version 5.0, these two groups of devices are combined into one – Heat Source code 54 (fireworks). Detailed information about NFIRS, including Version 4.1 and 5.0 codes and conversion tables, can be obtained from <http://www.usfa.fema.gov/>.

Data on injuries at hospital emergency rooms come from NEISS.

All fireworks-related injury statistics from hospital emergency rooms come from reports by the U.S. Consumer Product Safety Commission (CPSC) and private communications from Linda Smith and Michael Greene of the CPSC. Linda Smith also provided the rules for setting the range of fireworks injury estimates during the period from 1985 to 1989, reflecting the change in the sample, and in 1991 to 1996, reflecting the latest change in the sample. Reports referenced include Michael A. Greene and James Joholske, *2004 and 2003 Fireworks Annual Report*; Michael A. Greene and Patrick M. Race, *1999 Fireworks Annual Report*; Michael A. Greene, *1998 Fireworks-Related Injuries*; Ron Monticone and Linda Smith, *1997 Fireworks-Related Injuries*; Sheila L. Kelly, *Fireworks Injuries, 1994*; Dr. Terry L. Kissinger, *Fireworks Injuries - Results of a 1992 NEISS Study*; Linda Smith and Sheila Kelly, *Fireworks Injuries, 1990*; Deborah Kale and Beatrice Harwood, *Fireworks Injuries - 1981*; and the May/June 1974 issue of *NEISS News*. All were published by CPSC.

Appendix A: How National Estimate Fire Statistics Are Calculated

Estimates are made using the National Fire Incident Reporting System (NFIRS) of the Federal Emergency Management Agency's (FEMA's) United States Fire Administration (USFA), supplemented by the annual stratified random-sample survey of fire experience conducted by the National Fire Protection Association (NFPA), which is used for calibration.

Data Bases Used

NFIRS provides annual computerized data bases of fire incidents, with data classified according to a standard format based on the NFPA 901 Standard. Roughly three-fourths of all states have NFIRS coordinators, who receive fire incident data from participating fire departments and combine the data into a state data base. These data are then transmitted to FEMA/USFA. Participation by the states, and by local fire departments within participating states, is voluntary. NFIRS captures roughly one-third to one-half of all U.S. fires each year. More than one-third of all U.S. fire departments are listed as participants in NFIRS, although not all of these departments provide data every year.

The strength of NFIRS is that it provides the most detailed incident information of any national data base not limited to large fires. NFIRS is the only data base capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. (The NFPA survey separates fewer than 20 of the hundreds of property use categories defined by NFPA 901 and solicits no cause-related information except for incendiary and suspicious fires.) NFIRS also captures information on the avenues and extent of flame spread and smoke spread and on the performance of detectors and sprinklers.

The NFPA survey is based on a stratified random sample of roughly 3,000 U.S. fire departments (or just over one of every ten fire departments in the country). The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, and the total estimated property damage (in dollars), for each of the major property use classes defined by the NFPA 901 Standard; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; and (3) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results.

The NFPA survey begins with the NFPA Fire Service Inventory, a computerized file of about 30,000 U.S. fire departments, which is the most complete and thoroughly validated such listing in existence. The survey is stratified by size of population protected to reduce the uncertainty of the final estimate. Small rural communities protect fewer people per department and are less likely to respond to the survey, so a large number must be surveyed to obtain an adequate sample of those departments. (NFPA also makes follow-up calls to a sample of the smaller fire departments that do not respond, to confirm that those that did respond are truly representative of fire departments their size.) On the other hand, large city departments are so few in number and protect such a large proportion of the total U.S. population that it makes sense to survey all of them. Most respond, resulting in excellent precision for their part of the final estimate.

Projecting NFIRS to National Estimates

To project NFIRS results to national estimates, one needs at least an estimate of the NFIRS fires as a fraction of the total so that the fraction can be inverted and used as a multiplier or scaling ratio to generate national estimates from NFIRS data. But NFIRS is a sample from a universe whose size cannot be inferred from NFIRS alone. Also, participation rates in NFIRS are not necessarily uniform across regions and sizes of community, both of which are factors correlated with frequency and severity of fires. This means NFIRS may be susceptible to systematic biases. No one at present can quantify the size of these deviations from the ideal, representative sample, so no one can say with confidence that they are or are not serious problems. But there is enough reason for concern so that a second data base - the NFPA survey - is needed to project NFIRS to national estimates and to project different parts of NFIRS separately. This multiple calibration approach makes use of the annual NFPA survey where its statistical design advantages are strongest.

There are separate projection formulas for four major property classes (residential structures, non-residential structures, vehicles, and other) and for each measure of fire severity (fire incidents, civilian deaths, and civilian injuries, and direct property damage).

For example, the scaling ratio for 2002 civilian deaths in residential structures is equal to the total number of 2002 civilian deaths in residential structure fires reported to fire departments, according to the NFPA survey (2,695), divided by the total number of 2002 civilian deaths in residential structure fires reported to NFIRS (1,029). Therefore, the scaling ratio is $2,695/1,029 = 2.62$.

The scaling ratios for civilian deaths and injuries and direct property damage are often significantly different from those for fire incidents. Except for fire service injuries, average severity per fire is generally higher for NFIRS than for the NFPA survey. Use of different scaling ratios for each measure of severity is equivalent to assuming that these differences are due either to NFIRS under-reporting of small fires, resulting in a higher-than-actual loss-per-fire ratio, or possible biases in the NFIRS sample representation by region or size of community, resulting in severity-per-fire ratios characteristic only of the oversampled regions or community sizes.

Note that this approach also means that the NFPA survey results for detailed property-use classes (e.g., fires in storage structures) may not match the national estimates of the same value.

Calculating National Estimates of Particular Types of Fires

Most analyses of interest involve the calculation of the estimated number of fires not only within a particular occupancy but also of a particular type. The types that are mostly frequently of interest are those defined by some ignition-cause characteristic. The six cause-related characteristics most commonly used to describe fires are: form of the heat that caused the ignition, equipment involved in ignition, form or type of material first ignited, the ignition factor that brought heat source and ignited material together, and area of origin. Other characteristics of interest are victim characteristics, such as ages of persons killed or injured in fire.

For any characteristic of interest in NFIRS, some reported fires have that characteristic unknown or not reported. If the unknowns are not taken into account, then the propensity to report or not report a characteristic may influence the results far more than the actual patterns on that characteristic. For example, suppose the number of fires remained the same for several consecutive years, but the percentage of fires with cause unreported steadily declined over those years. If the unknown-cause fires were ignored, it would appear as if fires due to every specific cause increased over time while total fires remained unchanged. This, of course, does not make sense.

Consequently, most national estimates analyses allocate unknowns. This is done by using scaling ratios defined by NFPA survey estimates of totals divided by only those NFIRS fires for which the dimension in question was known and reported. This approach is equivalent to assuming that the fires with unreported characteristics, if known, would show the same proportions as the fires with known characteristics. For example, it assumes that the fires with unknown ignition factor contain the same relative shares of child-playing fires, incendiary-cause fires, short circuit fires, and so forth, as are found in the fires where ignition factor was reported.

Rounding Errors

The possibility of rounding errors exists in all our calculations. One of the notes on each table indicates the extent of rounding for that table, e.g., deaths rounded to the nearest one, fires rounded to the nearest hundred, property damage rounded to the nearest hundred thousand dollars. In rounding to the nearest one, fractional values of 0.5 or more are rounded up and fractional values less than 0.5 are rounded down. For example, 2.5 would round to 3, and 3.4 would round to 3. In rounding to the nearest one, a stated estimate of 1 could be any number from 0.5 to 1.49, a roughly threefold range.

The impact of rounding is greatest when the stated number is small relative to the degree of rounding. As noted, rounding to the nearest one means that stated values of 1 may vary by a factor of three. Similarly, the cumulative impact of rounding error - the potential gap between the estimated total and the sum of the estimated values as rounded - is greatest when there are a large number of values and the total is small relative to the extent of rounding.

Suppose a table presented 5-year averages of estimated deaths by item first ignited, all rounded to the nearest one. Suppose there were a total of 30 deaths in the 5 years, so the total average would be $30/5 = 6$.

In case 1, suppose 10 of the possible items first ignited each accounted for 3 deaths in 5 years. Then there would be 10 entries of $3/5 = 0.6$, rounded to 1, and the sum would be 10, compared to the true total of 6.

In case 2, suppose 15 of the possible items first ignited each accounted for 2 deaths in 5 years. Then there would be 15 entries of $2/5 = 0.4$, rounded to 0, and the sum would be 0, compared to the true total of 6.

Here is another example: Suppose there were an estimate of 7 deaths total in 1992 through 1996. The 5-year average would be 1.4, which would round to 1, the number we would show as the total. Each death would represent a 5-year average of 0.2.

If those 7 deaths split as 4 deaths in one category (e.g., smoking) and 3 deaths in a second category (e.g., heating), then we would show $4 \times 0.2 = 0.8$ deaths per year for smoking and $3 \times 0.2 = 0.6$ deaths per year for heating. Both would round to 1, there would be two entries of 1, and the sum would be 2, higher than the actual rounded total.

If those 7 deaths split as 1 death in each of 7 categories (quite possible since there are 12 major cause categories), then we would show 0.2 in each category, always rounding to 0, and the sum would be 0, lower than the actual rounded total. The more categories there are, the farther apart the sum and total can -- and often do -- get.

Note that percentages are calculated from unrounded values, and so it is quite possible to have a percentage entry of up to 100%, even if the rounded number entry is zero.

U.S. Fire Administration/National Fire Data Center

The Dangers of Fireworks

Topical Fire Research Series, Volume 5 – Issue 4

June 2005



Homeland
Security





The Dangers of Fireworks

June 2005

Volume 5, Issue 4

Findings

- Injuries from fireworks—most of which occur around the 4th of July—increased from 8,800 in 2002 to 9,300 in 2003. Over the past 13 years, however, the injury rate has fallen 37%—from 4.3 to 3.2 injuries per 100,000 population.
- State laws regulating the sale of fireworks directly affect the occurrence of fireworks-related injuries.
- Children under the age of 15 suffered 45% of all injuries from fireworks. Most injuries (72%) are to males of all ages.
- Firecrackers were responsible for the greatest number of injuries (1,600) in 2003, followed by bottle rockets (1,000) and sparklers (700).
- Because most fires ignited by fireworks are to outside property, the dollar loss to these fires is substantially less than the dollar loss to structure fires.

It would be hard to imagine July 4th festivities in the United States without public displays of fireworks, and a number of other holidays, such as New Years, often call for big shows as well. But celebrations can become tragic when someone is injured by consumer fireworks. Despite federal and state regulations on the type of fireworks available for sale to the general public, even those fireworks that are sold legally carry an elevated risk of personal injury.

Fireworks are considered hazardous materials with the potential to cause serious injury. All fireworks are regulated by the Federal Hazardous Substance Act, which prohibits sale of the more dangerous types to the public to avoid injury and property damage. Among these banned products are large, reloadable mortar shells, cherry bombs, aerial bombs, M-80s, and large firecrackers with more than 2 grains of powder. Likewise, all mail order kits to construct fireworks are strictly prohibited.¹

The Consumer Product Safety Commission (CPSC) regulates fireworks that can be sold legally to consumers² and is responsible for setting minimum standards, such as requiring firecrackers to have fuses that burn at least 3 seconds but not more than 9 seconds, and that all devices be sealed to prevent leakage of pyrotechnic material. Further, all legal fireworks must have labels with instructions for safe use, as well as warnings and precautions.

Although these regulations and standards have helped make consumer fireworks safer, all fireworks are potentially hazardous.³ For example, sparklers, which are legal in the majority of states, burn at temperatures of approximately 2,000°F.⁴ Their colorful sparks belie the potential dangers, and yet sparklers are predominately used by young children.

Federal, state, and local laws govern the manufacture and sale of legal fireworks (Class C). As of March 1, 2004, 37 states and the District of Columbia allowed some or all types of consumer fireworks, an increase of five states since January 2001 (Figure 1). Meanwhile six states allow only sparklers or other such novelties. Seven states ban all fireworks, including those allowed and regulated by the CPSC.

FIGURE 1. STATE REGULATIONS OF
CONSUMER FIREWORKS

STATES THAT PERMIT CONSUMER FIREWORKS	
Alabama	Montana
Alaska	Nebraska
Arkansas	New Hampshire
California	New Mexico
Colorado	Nevada
Connecticut	North Carolina
District of Columbia	North Dakota
Florida	Oklahoma
Hawaii	Oregon
Idaho	South Carolina
Indiana	South Dakota
Kansas	Tennessee
Kentucky	Texas
Louisiana	Utah
Maryland	Virginia
Michigan	Washington
Minnesota	West Virginia
Mississippi	Wisconsin
Missouri	Wyoming
STATES THAT ALLOW ONLY SPARKLERS	
Illinois	Ohio
Iowa	Pennsylvania
Maine	Vermont
STATES THAT BAN ALL CONSUMER FIREWORKS	
Arizona	New York
Delaware	Massachusetts
Georgia	Rhode Island
New Jersey	

Source: Consumer Product Safety Commission

Previous studies have indicated that state laws regulating the sale of fireworks directly affect the occurrence of fireworks-related injuries. In one state, the number of injuries seen in emergency departments more than doubled following the legalization of fireworks.⁵

INJURIES FROM FIREWORKS

In 2003, firework devices caused approximately 9,300 injuries, an increase from 8,800 injuries in 2002.^{6,7} The vast majority of these injuries are associated with Independence Day celebrations. CPSC estimated that 6,800 people were treated in hospital emergency departments for fireworks-related injuries during the 1-month period surrounding July 4th (June 20–July 20, 2003). There were six deaths from consumer fireworks reported that year.⁸

According to National Electronic Injury Surveillance System (NEISS) survey data, CPSC estimated that nearly half of all fireworks-related injuries (45%) were suffered by children under age 15.⁹ Males were disproportionately injured by fireworks (72%) with almost three times as many males as females (28%) injured. The large majority of fireworks injuries occurred with consumer products. CPSC also reported that of the estimated 9,300 fireworks injuries in 2003, only a small number of injuries—100—occurred at public fireworks events.

Burns were by far the most common form of injury. Burn injuries typically occurred to all parts of the body (Figure 2). Hands are the body parts most often injured, accounting for 1,800 of the hospital visits in the 1-month NEISS study period around July 4th, 2003. Eyes followed with 1,400 visits, and then heads/faces/ears and legs with 1,200 emergency visits each.

FIGURE 2. ESTIMATED FIREWORKS-RELATED INJURIES
BY BODY PART AND DIAGNOSIS (JUNE 20–JULY 20, 2003)

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

Notes: Other diagnoses includes all injury categories.
Estimates rounded to nearest 100 injuries.
Estimates of less than 50 injuries shown with an asterisk (*).
Totals may not add due to rounding.

Source: U.S. Consumer Product Safety Commission, "2003 Fireworks Annual Report," NEISS.

PRODUCTS ASSOCIATED WITH INJURIES

Of all consumer fireworks, firecrackers were responsible for the greatest number of injuries. In 2003, CPSC estimated 1,600 injuries from firecrackers associated with Independence Day celebrations. Bottle rockets injured 1,000 persons, and sparklers injured another 700.

Of the estimated 700 fireworks injuries to children under 5 years of age, 400 (57%) were caused by sparklers between June 20 and July 20, 2003. Among children 5–14 years of age, firecrackers and bottle rockets resulted in 800 of the 2,400 injuries (33%). Rockets (bottle and other types) alone accounted for 500 of the 1,800 (28%) injuries to persons aged 15–24.

Fireworks sales have been increasing according to the American Pyrotechnics Association. In 2000, fireworks sales totaled \$610 million and by 2004 had increased to \$775 million.¹⁰ Meanwhile, with the exception of a spike in injuries in 2000, which is likely explained by more extensive celebrations associated with the millennium, the firework injury rate has declined since 1991 (Figure 3). Overall, the injury rate has fallen 37% since 1991 and appears to have recently leveled off at about 3 per 100,000 persons each year. It is possible that this trend is due to the increasing popularity of large, public, professionally executed fireworks displays, which use thousands of pounds of fireworks and rarely cause injuries.

FIGURE 3. ESTIMATED FIREWORKS-RELATED INJURIES

Year	Estimated Fireworks-Related Injuries	Fireworks Injury Rate
1991	10,900	4.3
1992	12,500	4.9
1993	12,100	4.6
1994	12,500	4.8
1995	10,900	4.1
1996	7,300	2.7
1997	8,300	3.0
1998	8,500	3.1
1999	8,500	3.1
2000	11,000	3.9
2001	9,500	3.3
2002	8,800	3.0
2003	9,300	3.2

*Injuries per 100,000 people

Notes: Estimates based on 291 fireworks-related injuries recorded by NEISS in 2003.

Sources: Consumer Product Safety Commission, "2003 Fireworks Annual Report," NEISS.

U.S. Consumer Product Safety Commission, U.S. population estimates from 1991-1999

from <http://eire.census.gov/popest/data/national/tables/intercensal/US-EST90INT-04.php>;

population projections for 2000-2003 from <http://eire.census.gov/popest/data/states/tables/NST-EST2003-01.xls>

Even declining trends cannot mask the issue that fireworks remain dangerous. Each year, many people are injured and some are killed by fireworks. The following 2003 deaths illustrate the problems:¹¹

- A 2-year-old child died in Florida from smoke inhalation from a fire that was started in the laundry room of a mobile home. The fire started when a 3-year-old child lit combustibles with a sparkler.
- Leaning over a pipe where he placed a commercial-type firework projectile, a 38-year-old man in Iowa was killed when he lit the fuse.
- Attempting to block the wind around a launching tube, an 18-year-old man was fatally injured in Michigan when lighting a mortar-type firework.

FIRES CAUSED BY FIREWORKS

The following discussion is based on 2002 National Fire Incident Reporting System (NFIRS, version 5.0) data and reflects injuries, fatalities, and fire loss associated only with the fires caused by fireworks. These losses differ from the figures presented earlier that reflect injuries, fatalities, and property loss caused directly by fireworks.

An estimated 23,200 fireworks fires in 2002 caused approximately \$35 million in property loss and injured 75 persons.^{12, 13} No deaths were reported in the NFIRS data. Most fires are clustered around Independence Day, New Year's Eve, and other holidays or celebrations.

Fifty-nine percent of fires caused by fireworks occur around the Independence Day holiday on July 4th (Figure 4), often in open fields or vacant lots. As such, the materials most commonly ignited (68%) by fireworks are organic materials such as grass and trees. Grass alone was the first material ignited in 47% of all fireworks fires.¹⁴ Because these types of fires are located outdoors, they have a relatively low property loss (Figure 5).

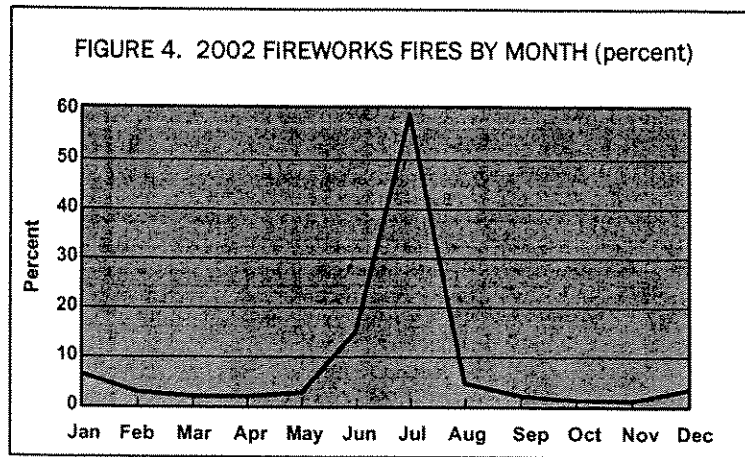


FIGURE 5. 2002 LOSS MEASURES FROM FIREWORKS

Loss Measure	All Fires	Fireworks Fires
\$ Loss/Fire	\$7,447	\$1,841
Injuries/1,000 Fires	20.8	5.1
Fatalities/1,000 Fires	2.8	0.0

Note: Estimates based on fires with heat sources reported.
 Source: NFIRS 5.0

Property loss is substantially less in fireworks fires than in other types of fires because most fireworks fires occur outside, where the fires do less damage and cause lower dollar replacement value than structure fires.

Given the high number of children injured by fireworks, it is not surprising that the most common ignition factor for fires related to fireworks is playing with the heat source (42%). Playing with the heat source is the ignition factor in one-third of the property losses due to fireworks fires and 50% of fireworks-related injuries. The larger ignition factor category of misuse of the heat of ignition includes abandoned materials, heat source too close to combustibles, as well as playing with the heat source, and accounts for the vast majority of fires (86%), injuries (90%), and property loss (89%).¹⁵

CONCLUSION

Fireworks account for a substantial number of preventable injuries and fires. Because fireworks can be dangerous and deadly, the safest way to enjoy them is through public displays conducted by professional pyrotechnicians hired by communities over July 4th or at other times during the year. Parents need to be especially vigilant during this period in assuring that children do not possess dangerous fireworks or mishandle legal ones.

To request additional information or comment on this report, visit
<http://www.usfa.fema.gov/applications/feedback>

Notes:

1. Fireworks Publication #12, Consumer Product Safety Commission, March 2004, <http://www.cpsc.gov/CPSC/PUB/PUBS/012.pdf>.
2. U.S. Consumer Product Safety Commission, Office of Compliance, Summary of Fireworks Regulations, 16 C.F.R. Part 1500 & 1507.
3. Fireworks Publication #12, loc. cit.
4. "CPSC Holds Fireworks Safety Press Conference on Mall in Washington," Press Release, CPSC, June 28, 2000, <http://www.cpsc.gov/cpscpub/prereel/prhum101/01179.html>.
5. Centers for Disease Control and Prevention, "Serious Eye Injuries Associated With Fireworks, United States 1990–1994," *Morbidity and Mortality Weekly Report*, 1995; 44: 449–452.
6. Michael A. Greene and James Joholske, "2003 Fireworks Annual Report, Fireworks-Related Deaths, Emergency Department-Treated Injuries, and Enforcement Activities During 2003," Consumer Product Safety Commission.
7. One hundred people died and 200 were injured in a nightclub fire in West Warwick, RI, ignited by nonconsumer fireworks. These numbers are not included in this report.
8. Michael A. Greene, loc. cit.
9. Idem.
10. Monique Stuart, "Fireworks Sales," *The Washington Times*, <http://washtimes.com/culture/20040616-094306-2607r.htm>.
11. Michael A. Greene, loc. cit.
12. Loss estimates are based on 2002 National Fire Incident Reporting System (NFIRS) data and national residential structure fire loss estimates from the National Fire Protection Association's (NFPA's) *Fire Loss in the United States During 2002*. Fireworks fire loss estimates are rounded as follows: fires to the nearest 100 fires; injuries to the nearest 25 injuries, and dollar loss to the nearest \$million.
13. Fireworks fire loss estimates are based on the total number of NFIRS fires in 2002 for which the heat source was known and on NFPA's *Fire Loss in the United States During 2002*. Approximately 42% of fires in NFIRS reported a heat source. If the fireworks estimates were based on all reported fires, including those with unknown heat sources, the estimates of firework fire losses would decrease to 9,700 fires, 50 injuries, and \$19 million in dollar loss.
14. Distribution statistics are based on data from the NFIRS 2002. At the time of this report, NFIRS continues to transition from version 4.1 to 5.0. Due to issues related to accurately converting version 4.1 data to version 5.0, this report is based on data reported only in version 5.0.
15. Statistics for ignition factors reflect those fires for which a factor was noted as contributing to the ignition of the fire. Sixty-five percent of firework-related fires have a factor contributing to ignition, 18% indicate that no factor contributed to ignition, and 17% had no factor specified.

Video clip of sparkler demonstration available at www.nfpa.org

Consumer fireworks risks exposed by leading health and safety advocates

Washington, D.C., *June 22, 2006* – Each July Fourth, thousands of people, most often children and teens, are injured while using consumer fireworks. Despite the dangers of fireworks, few people understand the associated risks. To prevent future tragedies, a group of 21 health and safety organizations – the Alliance to Stop Consumer Fireworks – urged the public, at a press conference today in Washington D.C., to avoid any use of consumer fireworks, including sparklers, as this year's Independence Day celebrations get underway.

"Every year nearly 10,000 people have to go to emergency rooms because of fireworks injuries," said James M. Shannon, president and CEO of the National Fire Protection Association (NFPA), who along with the American Academy of Pediatrics (AAP), founded the alliance four years ago. "Consumer fireworks hurt thousands of people and if we continue to use them, we are simply continuing a holiday tradition of causing serious injuries. We cannot keep putting these dangerous devices in the hands of our children."

In 2004, sparklers, fountains, and novelties accounted for 40 percent of all emergency room fireworks injuries. And, the damage from fireworks goes beyond injuries. In a typical year, during the Independence Day holiday, fireworks cause more fires in the U.S. than all other causes of fire combined.

Also speaking at the event were Ed Altizer, Virginia State Fire Marshal representing the International Fire Marshals Association, Dr. Mary Pat McKay, from George Washington University Medical Center and Dr. Stephen Baker, a plastic surgeon Georgetown University Hospital.

As a part of the group's efforts, NFPA released a detailed report outlining consumer fireworks' destruction across the U.S.

Injuries: In 2004, five out of six (85 percent) of the 9,600 fireworks injuries reported to emergency departments involved fireworks that federal regulations permit consumers to use. Total injuries were up from 9,300 in 2003. More than two-fifths (42 percent) of the 2004 fireworks injuries in emergency

rooms were to the head, and more than half (53 percent) were to the extremities. About 21 percent of injuries involved the eyes. Nearly two-thirds (62 percent) of all injuries were burns.

Health and safety advocates urge consumers to stop use of fireworks

As in most years, the majority of victims of fireworks injuries in 2004 were under age 20. The highest injury rates were for children aged five to nine, only slightly higher than the rates for children aged 10 to 14 and individuals aged 15 to 19. The rates for children age four and younger and for young adults aged 20 to 24 were 50 percent higher than the average rate for all ages. Males accounted for three-fourths (75 percent) of all reported fireworks injuries.

Fires: In 2003, the latest year for which national fireworks-related fire statistics are available, fire departments responded to an estimated 2,300 structure and vehicle fires started by fireworks.

Each year, most fireworks-related fires begin in outdoor brush or refuse, but most of the loss occurs in fires with structures involved. These fires can start with outdoor use of fireworks, as when a bottle rocket, launched outside, lands on a roof or other location not easily accessed, where it ignites combustibles before anyone can retrieve it.

Fires started by fireworks caused \$58 million in property damage to structures and vehicles in 2003.

Laws: There are currently only five states that ban all consumer fireworks. They are: Delaware, Massachusetts, New Jersey, New York, and Rhode Island.

Because of the dangers of fireworks, members of the Alliance are urging Americans to attend professional fireworks displays this July Fourth season. The Alliance includes NFPA, and the AAP, along with the American Academy of Family Physicians, American Academy of Ophthalmology, American Association for Hand Surgery, American Association of Public Health Physicians, American Burn Association, American College of Emergency Physicians, American Society of Plastic Surgeons, Emergency Nurses Association, Fire Department Safety Officers Association, International Association of Arson Investigators, International Association of Fire Chiefs, International Association of Fire Fighters, International Fire Marshals Association, Metropolitan Fire Chiefs, National Association of Pediatric Nurse Practitioners, National Association of School Nurses, National Association of State Fire Marshals, National Volunteer Fire Council, Prevent Blindness America

NFPA has been a worldwide leader in providing fire, electrical, building, and life safety to the public since 1896. The mission of the international nonprofit organization is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. Visit NFPA's Web site at www.nfpa.org.

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NEWS RELEASE

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