AMERICAN ACADEMY OF PEDIATRICS

Committee on Injury and Poison Prevention

Fireworks-Related Injuries to Children

ABSTRACT. An estimated 8500 individuals, approximately 45% of them children younger than 15 years, were treated in US hospital emergency departments during 1999 for fireworks-related injuries. The hands (40%), eyes (20%), and head and face (20%) are the body areas most often involved. Approximately one third of eye injuries from fireworks result in permanent blindness. During 1999, 16 people died as a result of injuries associated with fireworks. Every type of legally available consumer (so-called "safe and sane") firework has been associated with serious injury or death. In 1997, 20 100 fires were caused by fireworks, resulting in $22.7 million in direct property damage. Fireworks typically cause more fires in the United States on the Fourth of July than all other causes of fire combined on that day. Pediatricians should educate parents, children, community leaders, and others about the dangers of fireworks. Fireworks for individual private use should be banned. Children and their families should be encouraged to enjoy fireworks at public fireworks displays conducted by professionals rather than purchase fireworks for home or private use.

ABBREVIATION. CPSC, US Consumer Product Safety Commission.

OVERVIEW

Fireworks are devices designed for the purpose of producing a visible or audible effect by combustion, deflagration, or detonation.[1] Every year, US residents celebrate the Fourth of July and other festive occasions with fireworks. As a result, in 1999, an estimated 8500 individuals, approximately 45% of them children younger than 15 years, sustained fireworks-related injuries requiring emergency medical treatment.[2,3] Since 1994, the annual number of people receiving emergency medical treatment for fireworks-related injuries has decreased by about one third.[3,4] The hands (40%), eyes (20%), and head and face (20%) are the body areas most often involved.[2] About one third of eye injuries from fireworks result in permanent blindness.[5] Burns account for more than half of fireworks-related injuries,[2] and lacerations, contusions, and abrasions are also common.[1,2,6–8] During 1999, 16 people died as a result of injuries associated with fireworks.[2]

Under regulations promulgated by the US Consumer Product Safety Commission (CPSC) in 1976, any firecracker containing more than 50 mg of explosive material is banned, although aerial devices may contain up to 130 mg of powder charge. In addition, CPSC regulations include fuse burn time limits, cautionary labeling requirements, and criteria to prevent tipover and blowout of devices. Additional regulations address requirements for certain reloadable tube and aerial shell fireworks and the stability of multiple-tube devices.[4]

Consumer fireworks, formerly known as "Class C" fireworks and often inappropriately referred to as "safe and sane" fireworks, include fountains and candles that shoot out sparks or flaming balls, rockets with sticks (called "bottle rockets," because it is customary to stand them in a soda bottle for ignition), other rockets, firecrackers, sparklers, and smoke devices. These are permitted under federal regulation, and their sale is regulated by state and local authorities.[7] At present, 10 states ban all consumer fireworks, and 5 additional states ban all consumer fireworks except sparklers, "snakes," or other novelty items.[9]

In addition to ongoing injury surveillance, the CPSC conducts a special study each year of fireworks-related injuries requiring emergency medical care that occur around the Fourth of July.[2,4,6] The 1999 CPSC study found that one third of the fireworks-related injuries were caused by firecrackers, approximately 10% of which were illegal. Almost 20% of the injuries were from rockets. Notably, sparklers, which are mistakenly believed to be safe by many consumers, caused 10% of these fireworks-related injuries.[2] Although most sparkler-related injuries are minor burns and corneal abrasions, sparklers can reach temperatures greater than 1000°F at the tip and can cause serious burns by igniting clothing.[1,5,8] One study found that two thirds of injuries from sparklers occurred among children 5 years and younger.[8] A case-control study designed to control for the popularity of various devices found firecrackers and aerial devices to be associated with the greatest risk of injury. It also found that the highest chance of injury requiring hospitalization occurred with illegal and homemade devices.[7] Half of the fireworks-related eye injuries and an even higher proportion of those resulting in permanent blindness or enucleation are caused by bottle rockets.[5] Every type of consumer firework has been associated with serious injury or death.[1,8]

Malfunctions of consumer fireworks account for only a small percentage of injuries. In one study, the injured child was a bystander in 26% of cases, and adult supervision was present in 54% of cases.[8] Therefore, not letting children ignite fireworks and

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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providing adult supervision while using fireworks are inadequate injury prevention strategies.

In addition to medical and related costs directly and indirectly attributable to fireworks injuries, fireworks cause significant property damage. In 1997, 20 100 fires, which resulted in $22.7 million in direct property damage, were caused by fireworks.[10] In a typical year, fireworks cause more fires in the United States on the Fourth of July than all other causes of fire combined on that day.[10] The considerable losses of life, health, and property are almost entirely preventable by the removal of all fireworks from the hands of everyone except professional pyrotechnicians. Injuries resulting from public fireworks displays are rare. States that ban all consumer fireworks have significantly lower rates of fireworks-related injuries and fires.[1,5] Where local jurisdictions ban fireworks, there is frequent crossover to nearby communities that permit them, so the effectiveness of such local regulation is limited.[8] Education does not appear to decrease the rate of injuries in states where consumer fireworks are permitted.[7]

RECOMMENDATIONS

1. Pediatricians should educate parents, children, community leaders, and others about the dangers of fireworks. Children and their families should be counseled to attend public fireworks displays rather than purchase fireworks for home use.
2. Public sales, including those by mail or Internet order, of all fireworks should be prohibited. Ideally, this should be done on a national level by federal law or CPSC regulation. International importation of fireworks for private use should also be banned. Sales to professional pyrotechnicians for the purpose of creating public displays would be exempt.
3. The private use of fireworks should be banned. Pediatricians should work to increase the number of communities and states that ban the private use of all fireworks.
4. Accurate surveillance and reporting of fireworks-related injuries, deaths, and fires must be continued.
5. Additional research should be conducted to identify factors that have contributed to the recent decrease in the number of fireworks-related injuries. This information would be helpful in efforts to promote continued improvement in this and perhaps other injury problems.

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