

*Weekly*

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# Homemade Chemical Bomb Events and Resulting Injuries --- Selected States, January 1996--March 2003

Homemade chemical bombs (HCBs), also known as acid bombs, bottle bombs, and MacGyver bombs, are explosive devices that can be made easily from volatile household chemicals (e.g., toilet bowl, drain, and driveway cleaners) purchased at a local hardware or grocery store. When these and other ingredients are combined and shaken in a capped container, the internal gas pressure generated from the chemical reaction causes the container to expand and explode. The subsequent explosion can cause injuries or death to persons in the immediate vicinity of the detonation. Since 1996, some of the states participating in the Agency for Toxic Substances and Disease Registry (ATSDR)'s Hazardous Substances Emergency Events Surveillance (HSEES) system have been documenting HCB events. This report describes examples of HCB events, summarizes all reported HCB events, discusses associated injuries\*, and suggests injury-prevention methods.

HSEES is an active multistate health department surveillance system for tracking acute morbidity and mortality resulting from the release of hazardous substances during emergency events<sup>†</sup>. To determine the frequency of HCB events, ATSDR searched the HSEES database for all years for which data were available (January 1, 1993--March 31, 2003)<sup>§</sup> from 17 participating states<sup>¶</sup>. An HCB event is defined as one that involves the release or threatened release of a hazardous substance(s) from any homemade chemical explosive device that requires (or would have required) removal, clean-up, or neutralization according to federal, state, or local law. Events at which nonexplosive devices (i.e., homemade smoke bombs) involving releases or threatened releases of hazardous substances were excluded from the analysis because the potential for injury is minimal.

## Case Reports

**Rhode Island.** In May 2000, two students were making bottle bombs on an elementary school playground by using hydrochloric acid. The two sustained eye irritation from detonation of one of the bombs. Both were transported to a hospital for treatment and released. The school was evacuated for 1 hour while a hazardous materials (HazMat) team conducted decontamination and debris removal.

**Rhode Island.** In October 2001, a high school student placed a chemical bomb in a vacant classroom. The bomb, made with sodium hypochlorite, released chlorine gas on explosion. A total of 23 persons (five teachers and 18 students) in the vicinity of the explosion sustained respiratory irritation and were transported to a hospital for treatment and released. The school was evacuated, and a HazMat team conducted decontamination and debris removal.

**New York.** In June 2002, a person aged 16 years sustained chemical burns after detonating a bottle bomb made of sodium hypochlorite in a friend's front yard. The juvenile was transported to a hospital for treatment and released.

### Summary of Surveillance Data

During January 1, 1993--March 31, 2003, a total of 29 HCB events were reported to HSEES. All 29 events occurred during 1996--2003; a total of 24 (83%) of these occurred during 2000--2003 ([Figure](#)). The 29 HCB events were reported from six states (Alabama [one], Iowa [one], New York [six], Rhode Island [two], Washington [14], and Wisconsin [five]). Explosions occurred in 24 (83%) of these events; five (17%) involved failed explosions. Three (10%) of the 29 HCB events resulted in injury to 26 persons. The injuries sustained included eye irritation, respiratory irritation, and chemical burns. No fatalities were reported. The chemicals involved in HCB events reported most frequently were sodium hypochlorite (17), sodium hydroxide (15), hydrochloric acid (five), and acid not otherwise specified (five). A total of 18 of these HCB events occurred on school property (college/university [14], high school [three], and elementary school [one]), 10 occurred in residential areas, and one occurred in a grocery store parking lot. In at least 22 (76%) of the 29 HCB events, bombs were made by juveniles (aged <18 years) or college/university students. The majority of events occurred during the summer (19) or immediately after school (three).

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### Editorial Note:

The HSEES data indicate that the number of HCB events has increased during the last several years. This increase might be attributed to enhanced surveillance from the participating HSEES states and/or to an actual increase in the number of events because bottle bomb recipes have become more available on the Internet. The results of this analysis suggest that HCBs are a rare cause of injury. However, the chemical reactions that occur within an HCB makes these devices highly unstable and unpredictable, which increases the risk for injury. Two of the three HCB events with injuries reported resulted in the person making the bomb becoming the unintended victim. Once the ingredients are combined, no timers or fuses are installed that could signal when detonation will occur. HCBs can detonate within seconds to hours after initial mixing. Sodium hypochlorite was the chemical used most frequently in the making of these bombs; however, other hazardous substances (e.g., ammonia, liquid nitrogen, and dry ice) also have been used to create explosive pressure devices (CDC, unpublished data, 2003). Because these devices are potentially deadly, the detonation of HCBs is a felony offense in several states.

Low to medium exposure to sodium hypochlorite, such as that found in bleach, can cause irritation of the eyes, skin, and respiratory and gastrointestinal tract. High levels can result in severe corrosive damage to the eyes, skin, and respiratory and gastrointestinal tissues and can be fatal (2). Exposure to other bottle bomb chemicals such as hydrochloric acid can cause irritation to the nose, throat, and larynx; cough; choking; dermatitis; eye and skin burns; laryngeal spasm; and pulmonary edema (3,4).

The findings in this report are subject to at least three limitations. First, reporting of any event to HSEES is not mandatory; for this reason, participating state health departments might not be

informed about every event. Second, these data were reported events from 17 participating states and do not reflect data from non-HSEES states. Finally, the HSEES system does not have a category specific to HCB events; for this reason, some events might have been omitted inadvertently from the analysis.

HSEES data illustrate the potential dangers associated with HCBs. Public health strategies to prevent injuries resulting from bottle bombs include making communities aware of bottle bombs and educating juveniles about the dangers and legal ramifications of manufacturing and detonating these devices. Parents should be particularly vigilant about monitoring the activities of their children during nonschool hours.

Persons who observe suspicious activity or an unusual item, such as a bottle filled with a white or gray liquid with a possible cloudy appearance, should notify school officials or law enforcement officers. If a suspected or actual bottle bomb is discovered, the surrounding area should be evacuated immediately (to a minimum of 200 feet from the device), and local law enforcement should be notified (5). Only trained bomb squad personnel should approach, handle, or attempt to neutralize these devices.

Persons who come into contact with the contents of a detonated bomb should remove contaminated clothing immediately. If dermal contact with the contents occurs, the affected area should be rinsed with large amounts of water (5). If severe adverse health effects (e.g., trauma, chemical burns, or respiratory irritation) occur, medical attention should be sought immediately.

## References

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\*Includes illnesses and other adverse health effects.

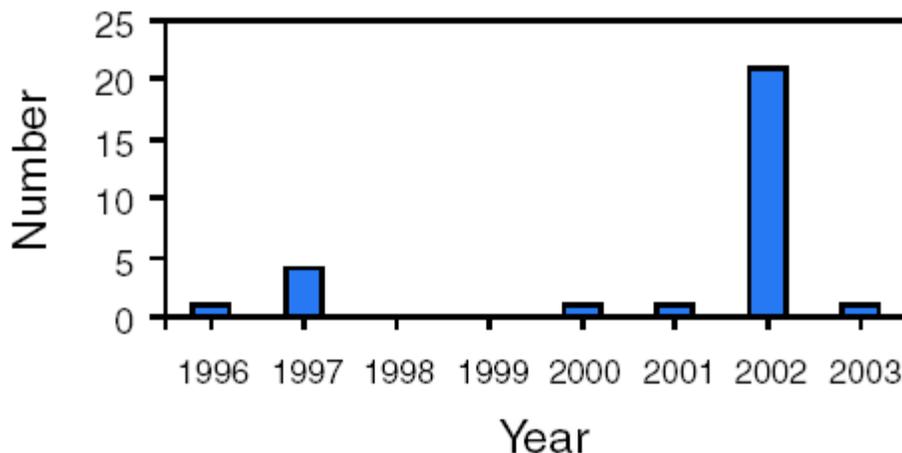
†An event is the release or threatened release of a hazardous substance(s) into the environment in an amount that requires (or would have required) removal, clean-up, or neutralization according to federal, state, or local law (1). A hazardous substance is one that can reasonably be expected to cause an adverse health effect.

§Data for 2003 are preliminary.

<sup>¶</sup>During 1993--2003, a total of 17 state health departments participated in HSEES. State health departments in Alabama, Colorado, Iowa, New York, North Carolina, Oregon, Texas, Washington, and Wisconsin participated during the entire reporting period. Eight state health departments participated during portions of this period: Louisiana (2001--2003), Minnesota (1995--2003), Mississippi (1995--2003), Missouri (1994--2003), New Hampshire (1993--1996), New Jersey (2000--2003), Rhode Island (1993--2001), and Utah (2000--2003).

## Figure

**FIGURE. Number of homemade chemical bomb events, by year — Hazardous Substances Emergency Events Surveillance (HSEES) system, United States, January 1, 1996–March 31, 2003**



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