

New study examines effects of Graniteville, S.C., chlorine gas disaster

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A new study examining the aftereffects of a chlorine gas disaster in a South Carolina town gives larger metropolitan areas important insight into what to expect and how to prepare emergency response systems for an accidental or terrorist release of the potentially deadly gas. The study is now available in the January 2009 issue of the *American Journal of Emergency Medicine*.

"This is one of the largest community exposures to chlorine gas since World War I," said David Van Sickle, Ph.D., a Robert Wood Johnson Foundation (RWJF) Health & Society Scholar at the University of Wisconsin and lead author of the report. "It was a tragic disaster that shows us what a significant challenge a large-scale chlorine gas release poses to health care facilities."

Van Sickle added that hospitals need to be able to quickly recognize the signs of chlorine exposure, and have a plan to provide a sufficient number of mechanical ventilators in the event of another massive chlorine disaster.

Van Sickle was part of a team from the Centers for Disease Control and Prevention (CDC) and the South Carolina Department of Health and Environmental Control (DHEC) that investigated the resulting health effects.

In January 2005, a freight train carrying three tanker cars—each loaded with 90 tons of chlorine—collided with a parked locomotive in the

center of Graniteville, S.C., a 7,000-person town located 15 miles from Augusta, Ga. The 2 a.m. train collision ruptured one tank, releasing between 42 and 60 tons of chlorine gas that infiltrated a large textile mill, where 180 people were working the overnight shift.

On the night of the South Carolina disaster, eight people died at the scene. At least 525 people were treated in emergency rooms and 71 were hospitalized, at nine hospitals in South Carolina and Georgia.

Chlorine gas is an irritating, fast-acting and potentially deadly inhalant. It is also one of the most universal toxic chemicals, widely used in water treatment and industrial manufacturing. Much of the 13 million to 14 million tons produced in the United States each year is transported by rail, often through densely populated areas.

New federal regulations on the transport of rail cargo seek to prevent a similar disaster in a major metropolitan area. In addition, the U.S. Department of Homeland Security has identified a deliberate attack on a chlorine storage tank as a top concern. According to agency estimates, as many as 100,000 people would be hospitalized and 10,000 would die if a chlorine storage tank was attacked in an urban area. In 2007, terrorists used chlorine gas in at least seven attacks on U.S. troops.

While small accidental and occupational exposures to chlorine gas occur regularly, the South Carolina disaster was one of the largest community exposures in modern history. As a result, CDC and South Carolina DHEC scientists sought to learn as much as possible about the health effects from this widespread chlorine gas exposure.

"We also wanted to understand how physicians treated the patients, how quickly they recovered, and what resources hospitals would need to respond effectively in the future," Van Sickle said.

According to the report, many hospitalized patients showed evidence of severe lung damage. More than a third were admitted to intensive care, and 10 percent required mechanical ventilation. But despite the severity of their injuries, the majority recovered quickly and was discharged within a week.

"Public health agencies and hospitals across the country can learn a lot from this disaster and be better prepared to help in the next emergency" said James J. Gibson, M.D., M.P.H., state epidemiologist and director of the Bureau of Disease Control at the South Carolina DHEC and a co-author of the report. "We continue to monitor area residents for any possible long-term health effects."

The DHEC has established a registry of persons potentially exposed to chlorine gas and/or traumatic stress during the chlorine gas release and has offered free standardized medical screenings with referral for follow-up evaluation when necessary.

The paper is available at
www.sciencedirect.com/science/journal/07356757 .

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