

## Characterizing Chemical Terrorism Incidents Collected by the Global Terrorism Database, 1970-2014

Cynthia Santos<sup>1,2</sup>, Mehruba Anwar<sup>1,2</sup>, Jessica Weiland<sup>1,2</sup>, Joshua Schier<sup>1,2</sup>

<sup>1</sup>*Emory University Hospital, Atlanta, GA, USA*, <sup>2</sup>*Centers for Disease Control and Prevention, Atlanta, GA, USA*

**Background:** The Global Terrorism Database (GTD) is an open-source database on terrorist incidents around the world since 1970 and is maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism, a Department of Homeland Security Center of Excellence.

**Objective:** We characterized chemical terrorism incidents reported to the GTD from 1970 through 2014 to address the following: What kinds of chemical terrorism agents were used among the incidents reported in the GTD? Where did they occur? How much morbidity and mortality were associated with these events?

**Methods:** We included incidents that were categorized as "chemical" when searching the GTD database and excluded all others. We reviewed each incident to create subtypes based on agent similarities: corrosives, chemical explosives, cyanide, metals, nerve gas, pesticides, tear gas, gas (unspecified), and unknown. We analyzed the total number of chemical terrorism incidents between 1970 and 2014 and calculated the mean number of injuries, fatalities, and frequencies by region and agent subtype.

**Results:** Of the 156,745 terrorism events reports during 1970-2014, chemical terrorism incidents consisted of <0.2% (n=267). The most commonly reported chemical terrorism subtypes were: unknown (n=81, 30.3%); corrosives (n=65, 24.3%); tear gas/mace (n=31, 11.6%); unknown gas (n=26, 9.7%); cyanide (n=24, 9.0%); pesticides (n=15, 5.6%); metals (n=19, 7.1%); and nerve gas (n=6, 2.2%). On average, 53 injuries (range 2.5-1622) and 8 deaths (range 0.0-224.3) resulted per chemical terrorism incident. Nerve gases (n=6) had the highest reported mean number of fatalities (224) and mean number of injuries (1622) per incident. Tear gas was the most commonly reported agent in South America (n=8, 29.6%) and North America (n=3, 20.0%) while corrosives were the most common in the Middle East (n=14, 48.3%) and South Asia (n=19, 27.5%).

**Discussion:** In this dataset, tear gas and corrosives were the chemical agents implicated most often while nerve agents were the most lethal. However, more than a third of the agents were unknown, suggesting a lack of reliable data. The wide variety of chemical agents used suggests that a broad education for preparedness may be needed.

**Conclusions:** Our data suggest that morbidity and mortality vary by chemical subtype and by region. Results may be helpful in developing regional chemical terrorism preparedness activities.