Public Health Consequences of Acute Ammonia Releases

Agency for Toxic Substances and Disease Registry’s (ATSDR) Hazardous Substances Emergency Events Surveillance (HSEES) System, National Toxic Substance Incidents Program (NTSIP) 2005-2011

Natalia Melnikova, MD, PhD, Maureen Orr, MS
Agency for Toxic Substances and Disease Registry’s (ATSDR)

Abstract

Ammonia is an ingredient in many cleaning supplies, fertilizers, refrigerants and is also used in illicit methamphetamine (meth) production. Because of ammonia’s volatility, exposure can occur quickly and result in a large number of injuries and costly public health actions. The analysis of trends and public health consequences of these events is critical to identify areas to target for prevention.

NTSIP, and its predecessor HSEES, are ATSDR-funded state-based surveillance systems used to capture the public health impacts from toxic releases. HSEES/NTSIP data collected during 2005-2011 by 6 state health departments (LA, NC, NY, OR, UT, WI) were used to analyze the trends and public health consequences of acute ammonia releases.

Results indicate that ammonia was one of the three most commonly released chemicals. Of the 29,220 total events reported, 902 (3.1%) were related to ammonia. Over 87% (n=792) of the events occurred at fixed facilities and 13% (n=110) during transportation. Most of the incidents were attributed to the manufacturing and agricultural sectors, along with illicit meth production. The frequency of ammonia events increased slightly from 2.9% in 2005 to 3.4% in 2011. Evacuations were ordered in 17.9% of events and sheltering in place in 3.3% of events. Events with evacuations ordered increased from 12.7% events in 2005 to 24.8% in 2011. Events with sheltering in place ordered increased from 2.5% in 2005 to 8.6% in 2011. About 10% (n=89) of ammonia related events resulted in 261 persons being injured. Members of the general public and employees were the most common victims. Events with injuries increased from 8.9% (n=14) in 2005 to 15.2% (n=19) in 2009, but decreased to 4.8% (n=5) in 2011. Respiratory system problems were the most commonly reported symptoms associated with ammonia releases.

Because of the high number of incidents and public health impacts involving ammonia, they continue to be a priority for states to develop preventive strategies.