

Dangerous chemical eye burns common in young children

August 4 2016

One- and two-year-old children are at the highest risk of burning their eyes with chemicals, despite the long held belief that working-age adults were the most at risk from this type of severe eye injury, new Johns Hopkins Bloomberg School of Public Health-led research suggests.

The findings, published Aug. 4 in *JAMA Ophthalmology*, highlight the need to educate the public about what appear to be very avoidable - and potentially permanent - injuries. Factories and other businesses where dangerous chemicals are in use have in place precautions such as safety goggles and treatments such as eye-wash stations. This study is believed to be the first to point out that toddlers are actually at the greatest risk.

"These are terrible injuries; they occur most frequently in the smallest of children and they are entirely preventable," says study leader R. Sterling Haring, DO, MPH, a DrPH candidate in the Department of Health Policy and Management at the Bloomberg School. "These children do not deal with chemicals on the job. They are injured largely because they get into chemicals such as household cleaners that are improperly stored."

Chemical burns of the eye are among the most critical and serious [eye injuries](#), because they continue to burn into the eye after contact, and can damage internal structures irreparably.

The study is believed to be the first one to use a national sample across all age groups. For their research, Haring and his colleagues analyzed

four years of data from the Nationwide Emergency Department Sample, which includes information from roughly 30 million annual emergency room visits from more than 900 hospitals across the U.S. Between 2010 and 2013, there were more than 144,000 [emergency room visits](#) related to chemical eye burns nationwide. Injuries most commonly occurred at home, were more common among those in the bottom half of the income scale and were more likely to occur in the South.

Injuries were most common among one- and two-year-olds, with one-year-olds twice as likely to suffer eye burns than 24-year-olds, who had the highest rate among adults. The injuries in young people appeared to drop off substantially after children were old enough to understand the dangers, with one-year-olds 13 times more likely than seven-year-olds to burn their eyes.

Haring says a key to reducing these injuries is simply to keep [household cleaners](#) and other chemicals - most notably products in spray bottles - out of reach of [young children](#). He says a simple change to the design of spray bottles, one that locks them in place after each use without requiring someone to actively engage a lock by twisting, would also make a real impact.

He believes a cheap, easy-to-install child safety lock could go a long way toward making a dent in this problem.

"These injuries can occur in an instant," Haring says. "Making household chemicals and cleaners inaccessible to young children is the best way to put an end to this."

He says the most common type of injuries in the youngest group are from alkaline agents - commonly found in cleansers - rather than from acids, such as battery and sulfuric acids, and that alkaline agents tend to do the most damage because the burns continue to cause [injury](#) the

longer they stay on the eyes. If someone gets these chemicals in the eye, Haring says, they must be immediately flushed out with water, something that can be done by running tap water over the eye for many minutes.

While one- and two-year-olds have the highest rates of chemical eye burns by individual year of life, working-age people are still at high risk. When looking at decades of age instead of just single years, 20-29 year olds have the highest rates, followed by 30-39 year olds, 40-49 year olds and 0-9 year olds. This shows that there is still room for improvement at job sites, Haring says.

"Chemical eye burns are a sizeable problem in the United States," he says. "Our research shows that age-specific prevention strategies need to be put in place to keep people of all ages safe from what can be devastating injuries."

More information: "Epidemiology of chemical ocular burns in the United States" *JAMA Ophthalmology*, 2016.

Provided by Johns Hopkins University Bloomberg School of Public Health

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