Occupational Lung Disease Bulletin for Healthcare Providers

Massachusetts Department of Public Health

Winter 2022

Work-Related Inhalation Injuries From Cleaning Products

Case Study

In 2019, a Massachusetts restaurant worker was tasked with cleaning the kitchen hallway floor. He poured two dishwashing products on the floor, one containing bleach and another containing strong acids. The mixing of these incompatible chemicals caused a reaction on the floor, giving off an irritating yellowish vapor. Recognizing something was wrong, the employee ran for help. Some employees left the building and others evacuated the customers in the dining area. The 32-year-old manager stayed behind and used a squeegee to move the foaming liquid out the rear door. He was quickly overcome by the toxic fumes. Emergency services responded and he was declared dead at the hospital.

Overview

Inhalation exposure to cleaning products is not uncommon in workplaces like restaurants. In 2016, OSHA investigated a death at the same chain restaurant in another state where an employee with chronic asthma died from possible work-related asthma shortly after using chemicals at the restaurant with no ventilation in temperatures above 110°F.[1] Public health surveillance data from five states, including Massachusetts, showed that cleaning chemicals are a leading exposure reported by cases of work-related asthma—12% of all work-related asthma cases in those states are from exposure to cleaning and disinfecting products.[2]

A recent study in the U.S. found that service industries, which included restaurants, had more than two times the number of inhalation injuries compared to other industry groups.[3] Across all industries, younger workers were particularly at risk with those aged 25-35 years making up the largest percentage of injuries and those under 25 years having the highest rate.[3] Chemical exposures, such as chlorine gas or chloramine compounds created from mixing bleach products with either an acid or ammonia, were responsible for the most injuries.[3] Inhalation injuries may be severe, may cause future chronic respiratory diseases, and affect workplace productivity. According to a 2022 study by Hendricks et al., 125,600 acute nonfatal occupational inhalation injuries were treated in U.S. hospital emergency departments from 2014 to 2017, for an injury rate of 2.2 per 10,000 full time employees. The 2019 inhalation injury case was a prime example of chemical cleaning products used incorrectly. Better guidance is needed on how to use cleaning chemicals safely and effectively, especially after the initial phase of the COVID-19 pandemic during which enhanced use of disinfecting products was promoted.

As part of COVID-19 mitigation in the U.S., public health guidance has recommended cleaning and disinfecting high-touch surfaces to prevent spread.[4,5] This may have contributed to an increase in use, overuse, and incorrect use of cleaning and disinfecting products during the pandemic, particularly in the early stages when less was known about how the virus was transmitted. A study of National Poison Data System (NPDS) data showed a substantial increase of poison center calls in early March 2020 for exposure to cleaners and disinfectants, particularly bleach, nonalcohol disinfectants, and hand sanitizers.[4] The corresponding exposure route with the greatest percentage increase between 2019 and 2020 was inhalation. A study from Michigan also showed an increase in poison center calls for exposure to disinfectants and related symptoms during the first months of the pandemic, underlining the importance of proper use of these chemicals.[4,6]

Remember to report cases of suspected work-related respiratory disease to us by mail, fax (617- 624-5696), or phone (617-624-5632). The confidential reporting form is available on our website at www.mass.gov/dph/ohsp.

Occupational Health Surveillance Program, 250 Washington St, 4th Floor, Boston, MA 02108
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Proper Usage of Cleaning Products

Cleaning products are categorized into cleaners and disinfectants. Cleaners remove soil, organic contamination, germs, and most microorganisms with a cleaning surfactant. Disinfectants (e.g., bleach) kill microorganisms. High touch areas (e.g., doorknobs, elevator buttons) should be regularly cleaned.[5] Other areas like food preparation and bathrooms should be regularly cleaned and disinfected to prevent infectious disease transmission. Other surfaces, such as floors, do not need to be disinfected. Mixing of cleaning chemicals could cause toxic gas to form and cause severe respiratory irritation or even death. For more information about mixing of cleaning chemicals, visit our 2013 bulletin "Disinfecting Surfaces and Asthma". The prevention goal is to balance the two needs—to reduce infectious disease transmission without causing chemical-related disease. The challenges in achieving this goal are to ensure that cleaning and disinfectant products are used effectively and not used incorrectly or overused.

Prevention Recommendations for Healthcare Providers

* Ask your patients what they do for work and how it affects their health.
  - → Ask patients with respiratory symptoms about their conditions at work that may affect their breathing and if they use cleaning products.
* Remind them that they are entitled to a safe workplace. Their employer is responsible for:
  - → Training workers on what chemicals are used, what they contain, what they are used for, how to use them, how to store them, what harm they can do, and emergency spill procedures.
  - → Ensuring the workplace is properly ventilated.
  - → Providing personal protective equipment when needed– gloves, goggles, masks, etc.
* Report suspected cases of work-related respiratory disease to the Massachusetts Department of Public Health.
* For more information, visit:
  - → Asthma and cleaning products at work | Mass.gov
  - → Protect Yourself: Cleaning Chemicals and Your Health (osha.gov)

Reminder: Report work-related respiratory diseases to the MDPH Occupational Health Surveillance Program, by mail (250 Washington St, 4th Floor, Boston MA, 02108), fax (617-624-5696), or phone (617-624-5632).

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