

Cleaning Chemical Use in Hospitals Fact Sheet

Chemical use in hospitals contributes to poor air quality and has been implicated in the increase of worker respiratory ailments such as asthma and Reactive Airway Dysfunction Syndrome (RADS). Exposure to and contact with cleaning chemicals can also cause eye, nose and throat irritation, skin rashes, headaches, dizziness, nausea and sensitization. According to the Massachusetts Department of Public Health (DPH), the most commonly reported occupational asthma-causing agent is poor indoor air **quality**.

Good air quality results in an environment where workers feel healthy and comfortable and as a result, are more productive. This decreases both costs and liabilities. Adequate ventilation in relation to environmental cleaning products and processes is a major factor in good air quality.¹ By carefully choosing environmentally sound cleaning chemicals, cleaning methods and cleaning equipment, U.S. businesses could realize a productivity gain of \$30 to \$150 billion annually and a 0.5% to 5% increase in worker performance.

According to the American Lung Association (ALA), asthma is the most prevalent occupational lung disease in developed countries.² Cleaning and disinfecting chemicals such as ammonia, chlorine, cleaning detergents, ethylene oxide, pesticides, and sodium hydroxide, are listed by the DPH as causing RADS.³ Nursing, teaching and office work are the occupations most likely to report problems with indoor air quality. DPH statistics from 1993-1998 note that nurses have the highest number of reported cases of work-related asthma, and indicate that health care is the industry with the most cases of work-related asthma. The most frequently reported exposures in health care were to latex, poor indoor air quality, and toxic cleaning products.⁴

Toxic cleaning chemicals contribute to poor indoor air quality and worker illnesses through a combination of the *product* selected and the *processes* utilized to apply the chemicals.

Product

Disinfectant chemicals

Disinfectants used in hospitals such as quaternary ammonium compounds, phenols, and bleach are registered with the EPA as pesticides. These toxic chemicals are used for routine cleaning on every surface in the hospital environment. Health effects from long-term exposure to quaternary ammonium compounds include occupational asthma and hypersensitivity syndrome.^{5,6}

Floor stripping and polishing chemicals

Floor strippers contain chemicals that can seriously harm the user and may also affect the building occupants. Chemicals in these products include diethylene glycol ethyl ether, aliphatic petroleum distillates and nonyl-phenol ethoxylate, ethanolamine (a known sensitizer), butoxyethanol, and sodium hydroxide (lye).

Health care workers and others exposed to floor stripping and floor polishing chemicals experience headaches, eye irritation, dizziness, nausea, difficulty concentrating, fatigue, wheezing, coughing, asthma attacks, respiratory infections, hypersensitivity pneumonitis, and nose, throat and skin irritation. If exposure continues, irreversible lung damage and the formation of fibrous tissue (fibrosis) may occur making breathing more difficult.

Scented cleaning chemicals

The use of unscented cleaning chemicals is recommended to improve indoor air quality. The Archives of Environmental Health note that some humans exposed to fragrance products might experience some combination of

eye, nose and/or throat irritation; respiratory difficulty; possibly broncho-constriction, or asthma-like reactions; and central nervous system reactions (e.g. dizziness, incoordination, confusion, fatigue).⁷

Process

Inadequate ventilation

Inadequate ventilation, reducing the frequency and volume of air exchanges, or climate controls designed to save energy, increases the concentration of chemicals in indoor air. Extensive and complex cleaning projects (floor stripping, burnishing, rug cleaning) are often carried out on the overnight shift in hospitals, when fewer people are around, but also when ventilation is reduced to save energy. Additions, newer hospitals or remodeled areas are often very tight buildings with little or no natural ventilation and may have windows that do not open to allow fresh air intake to dilute these chemicals. Ventilation and fresh air exchanges should be increased when these projects are carried out.

Mixing of Chemicals

Cleaning chemicals are often purchased in concentrated solutions that require mixing and/or dilution by the employee who is responsible for application. It has been noted that when adverse health effects are suffered by workers, the concentration (or mixtures) of these products is often incorrect. This may indicate a problem with training, language skills or worker supervision.

When certain cleaning chemicals are mixed together synergistic effects may occur. This means that the interaction of two or more of these chemicals produces a health effect greater than that of the individual chemical alone. For example, if a quaternary ammonium compound is used in combination with a bleach cleaner, a toxic gas called chloramine forms and is released into the air.

Application methods of cleaning chemicals

The use of spray bottles, aerosol cans, and mechanized equipment, such as floor burnishers, buffers, and carpet washers, increase the airborne concentration of cleaning chemicals as particulate matter becomes aerosolized and suspends in the breathing zone of operators and building occupants. Spray bottles should be replaced with a pour and wipe application process. Floor burnishers and buffers should have an enclosed system with a filter (scrubber) to capture chemical vapors and particulate matter that is generated during the burnishing process. These changes will contribute to the reduction of the aerosol concentration of these cleaning chemicals and their by-products. These changes decrease air contamination and contribute to improved indoor air quality and the health and comfort of all the building inhabitants.

Resources

The following articles and guidelines will assist you in modifying the use and selection of cleaning chemicals for improved indoor air quality and a safer healthier work environment.

- A detailed report, "Cleaning for Health: Products and Practices for a Safer Indoor Environment" is available from INFORM, Inc. at <http://www.informinc.org/cleanforhealth.php>.
- A list of environmentally preferable products, also noted as the best in class, The OSD Update, 99-31, can be obtained from the Massachusetts Operational Services Division, at One Ashburton Place, Room 1017, Boston, MA 02108. These products have been evaluated and accepted using a variety of environmental and health concerns as criteria.

- The Janitorial Pollution Prevention Project provides quick reference and worksheets on a variety of cleaning processes and materials focusing on safe and healthy work practices. www.westp2net.org/Janitorial/jp4.htm

References

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