

# SENSOR Occupational Lung Disease Bulletin

A project of the Massachusetts Department of Public Health's Occupational Health Surveillance Program, the Massachusetts Thoracic Society, and the Massachusetts Allergy Society

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Dear Health Care Provider:

I recently joined the occupational asthma surveillance project as the education and outreach coordinator, and am excited about the opportunity to promote awareness of such an important issue. I look forward to our continued partnership and welcome any comments or suggestions you may have about the asthma project or the *Occupational Lung Disease Bulletin*.

One area of concern that has come up in orienting myself to this project is the low rate of reporting. The literature is clear that the prevalence of asthma is increasing, and 15-21% of adult asthma may be attributable to work exposures. Please let me know if there is anything that we can do as a staff to reduce whatever barriers you face in reporting cases of occupational asthma.

This issue of the *Bulletin* is dedicated to updating you about glutaraldehyde exposure. I was prompted to write this article after NIOSH released a publication on the use of glutaraldehyde in hospitals in June 2001. Given the size of the health care industry in Massachusetts, glutaraldehyde exposure is of particular concern.

Sincerely,  
Rebecca M. Ray, MPH  
Occupational Asthma Surveillance Project

## Glutaraldehyde Exposure

### Case #1

*A 54-year-old technician worked in a chronic long-term care facility for over 14 years before developing symptoms of asthma at work. Her duties included sterilizing endoscopy and surgical equipment, which she did in an unventilated unit using a solution containing glutaraldehyde. The solution was stored in open 5-gallon buckets, and the worker did not use a respirator. The worker's symptoms have abated since the facility switched to a non-glutaraldehyde containing sterilizing solution and now provides a ventilated area.*

### Case #2

*After 13 years in other positions at the same hospital, a 43-year-old woman developed symptoms of asthma. This change occurred immediately upon being transferred to a new job as an X-ray mammographer. Glutaraldehyde is one of the processing chemicals used to develop X-ray film.*

*Although she used a respirator, the darkroom where she developed mammograms is unventilated. The patient reported that four other employees have experienced symptoms of asthma at work, including wheezing, coughing, chest tightness and shortness of breath. The patient's symptoms have not improved in the seven years since her diagnosis, and she also reported that she has developed increased sensitivity to other chemicals.*

Glutaraldehyde is a high level disinfectant widely used in the cold sterilization of heat-sensitive medical, surgical and dental equipment. Besides its use as a biocide, glutaraldehyde is also used to develop X-ray film and as a tissue fixative in histochemistry and electron microscopy. It is most often used in hospitals as a 1% to 50% aqueous solution. Some trade names of solutions containing glutaraldehyde include Cidex™, Sonacid™, Sporidicin™, Hospex™, Omnicide™, Metricide™, and Wavicide™. Some of these companies produce other high level disinfectants that do not contain glutaraldehyde.

Glutaraldehyde exposures in hospitals and dental offices may occur during manual cleaning of instruments, retrieval of instruments soaking in solution, during mixing and preparation of the activated solution, from evaporation of the solution from open containers to the ambient air, from application of the solution to countertops and other surfaces, from x-ray processing activities, and during disposal. Consequently, a variety of occupations in the health care industry may be at risk including: physicians and nurses, dentists and dental hygienists, central service employees, research technicians, lab workers, and x-ray technicians.

Glutaraldehyde has been found to be a strong irritant to the skin, eyes, and respiratory system. Contact with glutaraldehyde-containing solutions can cause skin sensitization, leading to allergic contact dermatitis. Headaches, nausea, epistaxis, and mucous membrane irritation have also been documented. Vapor inhalation may cause work-related asthma. Glutaraldehyde can also aggravate pre-existing asthma. Sensitized individuals may have asthmatic responses after exposure to minute quantities well below the legal exposure limits.

**Report November and December Cases Now**  
By January 31st, report all occupational lung disease cases seen for the first time in November and December, 2001. If you have NOT seen any cases, it is not necessary to return the reporting form.

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The best strategy for eliminating or avoiding problems associated with glutaraldehyde is to substitute a non-glutaraldehyde-containing product. In recent years, awareness of glutaraldehyde hazards and technological developments have led to the development of new, safer products (see the table for examples of alternatives to glutaraldehyde for high level disinfection).

Sometimes, a substituted product is not available or is impractical. In such situations, adverse health effects from glutaraldehyde use can be avoided with proper controls around the use and storage of glutaraldehyde products and adequately trained and protected employees. Glutaraldehyde should be used in separate designated areas where ventilation can be provided. A local exhaust system should be in place at the point of glutaraldehyde vapor release. As seen in Case #1, glutaraldehyde solutions are sometimes kept in open containers in which equipment is soaked. Containers of glutaraldehyde solutions should be kept covered whenever possible. Workers should wear eye protection such as full face shields or splash proof goggles and protective lab coats or aprons to reduce skin contact. Hands should be protected with nitrile or butyl rubber gloves. Latex and neoprene do not provide adequate protection from glutaraldehyde. The American Council of Governmental Industrial Hygienists and the National Institute for Occupational Safety and Health have established recommended exposure limits of 0.05 ppm (0.2 mg/m<sup>3</sup>) and 0.2 ppm (0.8 mg/m<sup>3</sup>), respectively, which should not be exceeded during any part of a work-shift. Respiratory protection should be worn by all employees who may be exposed above this limit and during emergency work procedures.

The American Federation of State, County and Municipal Employees has a factsheet that provides a one-page summary of issues around glutaraldehyde exposure. It is available on their website at <http://www.afscme.org/health/faq-glut.htm>

*This article is an update of a 1997 article that was based on a glutaraldehyde factsheet from New Jersey. New information has been added from a NIOSH publication entitled "Glutaraldehyde: Occupational Hazards in Hospitals". A free copy of the publication can be obtained by calling 1-800-35-NIOSH or on the web at <http://www.cdc.gov/niosh/2001-115.html> For additional references, please call Rebecca Ray at 617-624-5638.*

### Work-Related Asthma Cases Reported to Massachusetts SENSOR

May 2001 – November 2001

Total cases from March 1992 to November 2001: **834**

May 2001	June 2001	July 2001	Aug 2001	Sept 2001	Oct 2001
0	4	9	6	0	11

*The following is a partial list of glutaraldehyde alternatives for use as high level disinfectants. This listing does not represent an endorsement of products by the Massachusetts Department of Public Health.*

#### Examples of Alternatives to Glutaraldehyde for Hospital High Level Disinfection (HLD) Tasks

Drop-in Liquid Chemical Alternatives to Glutaraldehyde	Comments
Peract™ 20 Minntech Corporation (800) 328-3345 <a href="http://www.minntech.com">http://www.minntech.com</a>	Contains 0.08% peroxyacetic acid and 1.0% hydrogen peroxide. High level disinfection in 25 minutes at 20° C.
Cidex™ PA Peracetic Acid Solution Advanced Sterilization Products 800-255-2500 <a href="http://www.sterrad.com">http://www.sterrad.com</a>	A stabilized .08% peracetic acid solution. High level disinfection in 25 minutes at 20° C.
EndoSpore™ plus Sterilizing and Disinfecting Solution Cottrell Limited	7.35% hydrogen peroxide and 0.23% peracetic acid. HLD in 15 minutes at 20°C.
Sporox™ Sultan Chemists (800)637-8582 <a href="http://www.sultanintl.com">http://www.sultanintl.com</a>	7.5% hydrogen peroxide. High Level Disinfection in 30 minutes at 20°C.
Cidex® OPA Advanced Sterilization Products 800-755-5900 <a href="http://www.sterrad.com">http://www.sterrad.com</a>	0.55% ortho-phthalaldehyde. High level disinfection in 12 minutes at 20°C.
Enclosed Systems that perform High Level Disinfection	Comments
Steris 20™ Sterilant Steris Corporation 800-JIT-4-USE 440-354-2600 <a href="http://www.steris.com/steris/health/index.htm">http://www.steris.com/steris/health/index.htm</a>	0.2% peracetic acid (diluted from 35%). Designed for sterilization. Sterilizes in 12 minutes at 50° - 55°C. Sterilant solution is cleared for use only with the STERIS System 1™ Processor. Instruments "patient ready" in <30 minutes.
Sterrad 50 and Sterrad 100S Advanced Sterilization Products 800-755-5900 <a href="http://www.sterrad.com">http://www.sterrad.com</a>	Enclosed system generates hydrogen peroxide gas plasma. (from 58% hydrogen peroxide). Effective for sterilization. Sterrad 50 sterilizes during a 45 minute cycle.
Sterilox 2501 Sterilox Technologies Inc. 215-369-3130 <a href="http://www.sterilox.com">http://www.sterilox.com</a>	The Sterilox system generates chemically activated water with strong oxidizing properties. Cycle time approx. 25-30 minutes. FDA Premarket (510K) Clearance anticipated in 2001. Contact manufacturer for more information.

*From "Glutaraldehyde Control in Hospitals", a publication of the Sustainable Hospitals Project organized by the UMass Lowell Center for Sustainable Production. Complete publication, available at: [http://www.sustainablehospitals.org/HTMLSrc/IP\\_Glutcontrol.html](http://www.sustainablehospitals.org/HTMLSrc/IP_Glutcontrol.html)*