

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 Physicians:

Previous issues of the Bulletin have provided information on specific respiratory hazards known to cause asthma. This month, our focus is on glutaraldehyde, an ingredient commonly found in disinfectants and sterilants used in the health care industry. Since March 1992, Massachusetts SENSOR has received 4 case reports of occupational asthma in which the physician reported "glutaraldehyde" as the likely asthma causing agent.

We were prompted to write this article after learning about New Jersey's glutaraldehyde hazard surveillance project at the annual SENSOR conference in California last month. New Jersey SENSOR has identified specific worksites where glutaraldehyde is used and has prepared a fact sheet for dissemination to them.

The annual SENSOR conference provided us with an opportunity to hear about all of the unique and innovative work other SENSOR states are doing; particularly work involving worksite interventions to reduce employee exposures to potential respiratory hazards. Also included in this Bulletin is a brief description of an interesting project involving graffiti removers in California.

Sincerely,
Catharine M. Tumpowsky, MPH
Occupational Asthma Surveillance Project

Respiratory Effects of Glutaraldehyde Exposure

Case #1

A 27 year-old worked for six years as a dental hygienist without difficulty. She developed symptoms of asthma one year after beginning work in a new office where her duties included cleaning teeth, taking x-rays, and sterilizing instruments. The patient found she was particularly sensitive to a cold sterilizing solution and a glutaraldehyde-containing environmental disinfectant which she used 18-20 times daily to clean countertops and dental unit fixtures between patient visits. She also reported sensitivity to x-ray processing solutions and to fumes and vapors from "plastics being burned during denture fabrication." The patient's symptoms subsided when she left her position in this office.

Case #2

A 36 year-old office manager was diagnosed with asthma after working for 18 years in dental offices. The patient had previously worked as a dental assistant, with duties including disinfecting the dental unit and sterilizing instruments. She had been at her current place of employment for almost five years when she developed respiratory problems, attributed by the reporting physician, to the introduction of a cold sterilizing solution containing glutaraldehyde. As an office manager, she spent minimal time in the dental operator and her duties did not include room disinfection or instrument sterilization, but she mentioned that the dental office was small. Since the diagnosis, the dental office has switched to a new cold sterilizer which is free of glutaraldehyde. The patient has been able to continue working in the office and her symptoms have subsided.

Glutaraldehyde is a high level disinfectant widely used in the cold sterilization of medical, surgical, and dental equipment and as an ingredient in x-ray developers. It is usually supplied as a 2% aqueous solution which has to be activated by the addition of sodium bicarbonate. Once activated, it has biocidal properties for up to two weeks. Often, activated glutaraldehyde solutions are kept in open containers in which equipment is soaked.

Glutaraldehyde is also used as a biocide for contaminated water in cooling towers and air-conditioning units. Besides its use as a biocide, glutaraldehyde is also used as a tanning agent for leather, in the treatment of hyperhidrosis, as a tissue fixative in histochemistry and electron microscopy, as an embalming agent, and as a cross-linking agent in the preparation of microcapsules.

Given the extent of the health care industry in Massachusetts, glutaraldehyde exposure is of particular concern. Exposures in dental offices and hospitals 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,

REPORT APRIL AND MAY CASES NOW
By June 30th, report all occupational lung disease cases seen for the first time in April and May, 1997. If you have NOT seen any cases, it is not necessary to return the report form.

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from application of 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: dentists and dental hygienists, physicians and nurses, 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 solution 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 and inflammatory or fibrotic pulmonary disease. Sensitized individuals may have asthmatic responses after exposure to minute quantities well below the legal exposure limits.

Specific inhalation challenge with glutaraldehyde has been shown to provoke a late asthmatic response which suggests the underlying mechanism involves sensitization rather than an irritant effect. In general, workers develop symptoms after a latency period of several months to many years. In addition to specific airway reactivity to the sensitizing agent, occupational asthma may be associated with airway reactivity to a variety of nonspecific exposures. This is illustrated in Case #1, in which the patient developed airway reactivity to fumes and vapors from denture fabrication following her sensitization to the glutaraldehyde-based solutions.

Glutaraldehyde products may be used effectively without adverse health effects if proper controls are in place and workers are adequately trained and protected. Glutaraldehyde should be used in separate designated areas where ventilation can be controlled. A local exhaust system should be in place at the point of glutaraldehyde vapor release. Open containers containing activated glutaraldehyde solution 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 polyethylene and spun-bonded polypropylene coated with polypropylene gloves. Latex and neoprene do not provide adequate protection from glutaraldehyde. The National Institute for Occupational Safety and Health has established a recommended exposure limit of 0.2 ppm (0.8 mg/m³) 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 or during emergency work procedures.

This article is based on information from "Glutaraldehyde: Guidelines for Safe Use and Handling in Health Care Facilities", a New Jersey SENSOR fact sheet and information provided by Ruth Ann Jajosky, D.M.D., M.P.H. and Elizabeth Jennison, M.D., M.P.H. of NIOSH. To receive a copy of the New Jersey glutaraldehyde fact sheet or additional references, please call Catharine Tumpowsky at 617-624-5637.

Respiratory Hazards Associated with Graffiti Removal

California SENSOR has received 8 case reports of occupational asthma due to exposures faced by graffiti removers. There has been little research in this area and not much is known about exposures. California SENSOR staff is conducting field investigations to characterize risk factors and work practices that may be contributing to exposures. Graffiti removal may be part of the following occupations: custodians working in any number of industries including schools, building maintenance, park maintenance, transportation; laborers, and painters. Furthermore, these workers may include students, volunteers, welfare recipients or other temporary workers who are more likely to be inadequately trained. Graffiti removal may take place outdoors or indoors in confined areas with little ventilation such as in bathroom stalls, phone booths, subways, or inside buses. Review of Material Safety Data Sheets for commonly used graffiti removal products have identified chemicals such as acetone, amyl acetate, glycol ethers, methylene chloride, monoethanolamine, and toluene all of which have adverse effects on the respiratory system. Monoethanolamine has been reported to cause asthma. California SENSOR is in the process of writing a graffiti removal fact sheet which includes information on health hazards, safe work practices, non-chemical graffiti removal methods and appropriate protective equipment. If you are interested in receiving a copy once it is completed, please contact Catharine Tumpowsky at 617-624-5637.

Number of Lung Disease Cases Reported to MASS. SENSOR, March 1992-March 1997

	February 1997	March 1997	Total to Date (3/92-3/97)
Asthma	5	3	468
Silicosis	0	0	12
Asbestosis	0	0	122
Chemical Pneumonitis	0	0	15
Total Number of Lung Disease Reports	5	3	617