



# GLUTARALDEHYDE

## Occupational Hazards in Hospitals

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Centers for Disease Control and Prevention **NIOSH**  
National Institute for Occupational Safety and Health

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# GLUTARALDEHYDE

## Introduction

**G**lutaraldehyde is used as a cold sterilant to disinfect and clean heat-sensitive equipment such as dialysis instruments, surgical instruments, suction bottles, bronchoscopes, endoscopes, and ear, nose, and throat instruments. This chemical is also used as a tissue fixative in histology and pathology labs and as a hardening agent in the development of X-rays. Glutaraldehyde is a colorless, oily liquid with a pungent odor. Hospital workers use it most often in a diluted form mixed with water. The strength of glutaraldehyde and water solutions typically ranges from 1% to 50%, but other formulations are available. Trade names include Cidex®, Sonacide®, Sporidicin®, Hospex®, Omnicide®, Metricide®, and Wavicide®.

The purpose of this brochure is to

- make you aware of the adverse health effects of glutaraldehyde,
- describe how you can be exposed to glutaraldehyde, and
- provide and identify control methods and work practices to prevent or reduce your exposure to glutaraldehyde.

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## What health effects can exposure to glutaraldehyde cause?

The following health effects have been reported in hospital workers exposed to glutaraldehyde:

- Throat and lung irritation
- Asthma, asthma-like symptoms, and breathing difficulty
- Nose irritation, sneezing, and wheezing
- Nosebleed
- Burning eyes and conjunctivitis
- Rash—contact and/or allergic dermatitis
- Staining of the hands (brownish or tan)
- Hives
- Headaches
- Nausea

If you experience any of these symptoms when working with glutaraldehyde, report them to your supervisor or safety officer.

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## Who might be exposed to glutaraldehyde in hospitals?

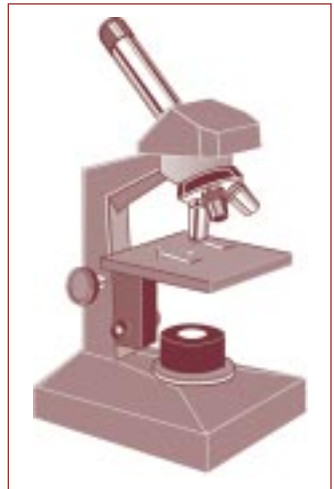
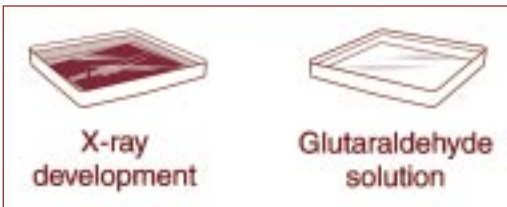
Workers in hospitals who might be exposed to glutaraldehyde include the following:

- Hospital staff who work in areas with a cold sterilizing procedure that uses glutaraldehyde (for example, gastroenterology and cardiology departments)
- Hospital staff who work in operating rooms, dialysis departments, endoscopy units, and intensive care units where glutaraldehyde formulations are used in infection control procedures
- Central service (supply) workers who use glutaraldehyde as a sterilant
- Research technicians, researchers, and pharmacy personnel who either prepare the alkaline solutions or fix tissues in histology and pathology labs
- Laboratory technicians who sterilize benchtops with glutaraldehyde solutions
- Workers who develop X-rays

# When are workers most likely to be exposed to glutaraldehyde in hospitals?

Workers can be exposed to glutaraldehyde by breathing it or by skin contact during the following procedures:

- Cold sterilization of instruments in endoscopy and surgical units
  - when glutaraldehyde solution is poured into or out of the sterilizing pans, and
  - when sterilized equipment is removed from the sterilizing pans
- Disinfection of histology/pathology laboratory table tops
- Mixing and activation of various glutaraldehyde solutions
- Tissue fixation in histology labs
- Development of X-rays



## How can I protect myself from exposure to glutaraldehyde?

You can protect yourself by using the following control methods and work practices:

- Use local exhaust ventilation (capture velocity of at least 100 feet per minute and at least 10 air exchanges per hour).
- Keep glutaraldehyde baths under a fume hood where possible.
- Use only enough glutaraldehyde to perform the required disinfecting procedure.
- Avoid skin contact: use gloves and aprons made of nitrile or butyl rubber (latex gloves do not provide adequate protection).
- Wash gloved hands after handling glutaraldehyde.
- Wear goggles and face shields when handling glutaraldehyde.
- Seal or cover all containers holding glutaraldehyde solutions.
- Attend training classes in safety awareness about use of and exposure to glutaraldehyde.





## Safety Tips

- Become familiar with and be able to recognize sources of glutaraldehyde exposure.
- In case of skin or eye contact, wash with water immediately.
- Clean up spills immediately.
- Refer to ANSI/AAMI [1996] for further information about emergency procedures in the event of a large spill.

**CASE REPORT**—Several nurses were working in an area where glutaraldehyde was stored in 1-liter baths on countertops and was used to disinfect bronchoscopes. They complained of hives, chest tightness, and watery eyes. Evaluation of the work area indicated that there was a separate (independent) recirculating ventilation system designed to provide 10% outside air. The nurses used no personal protective equipment (such as gloves). Measures were then taken to reduce exposures. These included changing glutaraldehyde containers to air-tight models, using appropriate gloves, and installing local ventilation hoods for glutaraldehyde stations. One month after the implementation of these measures, the nurses' symptoms subsided [Charney 1991].

## More information about glutaraldehyde

ANSI/AAMI [1996]. American national standard: safe use and handling of glutaraldehyde-based products in health care facilities. Arlington, VA: American National Standards Institute, Inc., and Association for the Advancement of Medical Instrumentation, ANSI/AAMI ST58-1996.

Babb JR, Bradley CR [1995]. Endoscope decontamination: where do we go from here? *J Hosp Infect* 30(Suppl):543-551.

Ballantyne B, Berman B [1984]. Dermal sensitizing potential of glutaraldehyde: a review and recent observations. *J Toxicol Cutaneous Ocul Toxicol* 3:251-262.

Beauchamp RO Jr., St. Clair MBG, Fennell TR, Clarke DO, Morgan KT [1992]. A critical review of the toxicology of glutaraldehyde. *Crit Rev Toxicol* 22(3,4):143-174.

Butt G, Greenley P, Herrick R, DiBerardinis L [1999]. Exposure to glutaraldehyde vapors during endoscopic sterilization processes in a large research and teaching institution. *Infect Control* 3(4):172-179.

Charney W [1991]. Hidden toxicities of glutaraldehyde. In: Charney W, Schirmer J, eds. *Essentials of modern hospital safety*. Chelsea, MI: Lewis Publishers, Inc., pp. 71-81.

Evans PF, Elliott-Minty C, Saleem A, Morris L, Groves J, Pedersen R [1997]. *Glutaraldehyde: Criteria document for an occupational exposure limit*. London, United Kingdom: Health and Safety Executive (HSE).

Finucane EW [1993]. Monitoring aldehydes in the hospital. In: Charney W, Schirmer J, eds. *Essentials of modern hospital safety*. Vol. 2. Boca Raton, FL: Lewis Publishers, Inc., pp. 191-210.

NIOSH [1997]. *NIOSH pocket guide to chemical hazards*. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 97-140.

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Norbäck D [1988]. Skin and respiratory symptoms from exposure to alkaline glutaraldehyde in medical services. *Scand J Work Environ Health* 14:366–371.

Pisaniello DL, Gun RT, Tkaczuk MN, Nitshcke M, Crea J [1997]. Glutaraldehyde exposures and symptoms among endoscopy nurses in South Australia. *Appl Occup Environ Hyg* 12(3):171–177.

Scobbie E, Dabill DW, Groves JA [1996]. Chemical pollutants in x-ray film processing departments. *Ann Occup Hyg* 40(4):423–435.

Stenton SC, Beach JR, Dennis JH, Keaney NP, Hendrick DJ [1994]. Glutaraldehyde, asthma, and work—a cautionary tale. *Occup Med* 44(2):95–98.

Waterman L [1992]. The hazards of health care—glutaraldehyde: a review of its clinical use and abuse. *The Safety & Health Practitioner*, June, pp. 15–17.

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