NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES

Occupational Health Surveillance Update

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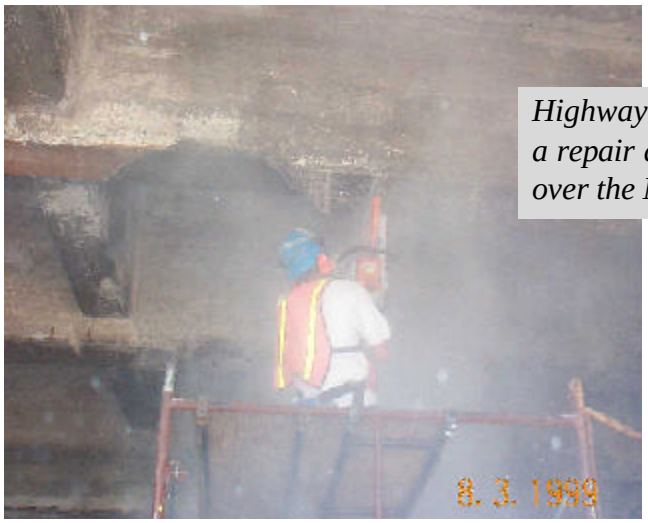
Division of Epidemiology, Environmental and Occupational Health

New Jersey Silica Partnership

The Occupational Health Surveillance Program of the New Jersey Department of Health and Senior Services (DHSS) has received funding since 1988 from the National Institute for Occupational Safety and Health (NIOSH), under their Sentinel Event Notification System for Occupational Risks (SENSOR) Program, to conduct disease surveillance for silicosis. Silicosis is a disabling, non-reversible, and sometimes fatal lung disease caused by breathing dust containing extremely fine particles of crystalline silica. In addition to silicosis, inhalation of crystalline silica particles has been associated with other lung diseases, such as bronchitis, tuberculosis, and lung cancer.

The DHSS maintains a register of reported silicosis cases, and collects the medical and occupational data necessary to determine if a case meets the epidemiologic case definition for silicosis. Industrial hygiene follow-up of identified worksites is conducted by DHSS staff who evaluate the potential for exposure to silica and recommend control measures to prevent exposure.



Highway worker sawcutting a repair area under a bridge over the New Jersey Turnpike.

In January, 1999, the Surveillance Program joined with other agencies and groups (see page 3 for list of participants) to form a partnership to address growing concerns about silica exposure to New Jersey road and highway construction workers. The DHSS SENSOR project had previ-

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Inside . . .

Glutaraldehyde in New Jersey Health Care Facilities

Glutaraldehyde is a chemical used extensively for the cold sterilization of medical, surgical, and dental equipment. It is used in health care facilities primarily for sterilizing endoscopy instruments, as well as respiratory therapy, ultrasound, and dialysis equipment. Glutaraldehyde is also used as a biocide in building cooling towers and air-conditioning units, as a tissue fixative in histochemistry and electron microscopy, and as a constituent of embalming fluids and X-ray developers. To be effective as a cold sterilant, glutaraldehyde must be activated by buffering it to an alkaline solution prior to use, typically at a concentration of 2%. Some of the sterilant products that contain glutaraldehyde include *Cidex,*® *Metricide,*® *Wavicide,*® *Procide,*®

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SILICA PARTNERSHIP
Continued from page 1

ously identified 11 cases of confirmed or probable silicosis among workers in the road construction and elevated highway construction industries (SICs 1611 and 1622, respectively). Road building materials such as concrete, asphalt, and masonry products contain silica sand, as well as other forms of crystalline silica. There are numerous job tasks with the potential for silica exposure in road construction and repair workers.

A typical bridge deck repair job proceeds as follows: 1) temporary traffic patterns are set up using traffic cones or concrete barriers, 2) the top layer of asphalt is removed using a milling machine, 3) the concrete surface is remilled to impart a smoother profile, 4) boundary areas where the milling machine can't reach are profiled with a scabbler, 5) millings and dust are cleaned up using a vacuum/sweeper/dust collector truck, 6) an inspector identifies and marks the areas in need of repair, 7) the perimeters of the repair areas are sawcut to the depth of the re-bar, 8) jackhammers are used to chip away the concrete from around the re-bar, 9) repair areas are cleaned out using compressed air, 10) repair areas are patched, 11) bridge deck is resurfaced with asphalt, 12) repaired bridge deck is reopened to traffic. Some repair jobs require that entire sections of the road be cut and removed. Replacing the sections requires that the road surfaces adjoining the repair area are drilled to accept reinforcement dowels.

Goals of New Jersey Silica Partnership

- Quantify silica exposures on silica dust-producing tasks during road construction and repair work
- Develop cost-effective and protective contract language for inclusion into NJDOT contracts
- Evaluate effectiveness of existing engineering control technology and identify new effective engineering controls
- Raise industry awareness of silica hazards and control measures through educational outreach
- Reduce silica exposure and eliminate silicosis in New Jersey.

TABLE 1
Task-based Silica Exposure Data

TASK	NO. OF SAMPLES	SILICA CONTENT AS AVG. PERCENT	NO. OF SAMPLES > PEL (%)	AVG. EXPOSURE AS PERCENT OF OSHA PEL	RANGE
Concrete Milling	2	15%	2 (100%)	1215%	1137-1293%
Concrete Sawing	6	20%	6 (100%)	384%	167-547%
Jackhammerin Concrete	25	17%	22 (88%)	309%	31-694%
Concrete Clean-up	6	25%	4 (67%)	166%	26-286%
Dowel Drilling	2	6%	2 (100%)	143%	69-217%
Asphalt Milling	8	7%	0 (0%)	54%	1-92%
Asphalt Clean-up	3	8%	0 (0%)	6%	3-13%

A major component of the New Jersey Silica Partnership was the collection of air sampling data to evaluate exposures associated with various tasks (See photos on page 4) performed in road construction and repair. The DHSS, as the lead partner, developed a sampling strategy to be used at the worksites of the ten partner contractors. Samples were collected according to NIOSH Method 7500 and analyzed by the Occupational Safety and Health Administration's (OSHA) accredited laboratory according to OSHA Method ID-142.

Eleven sets of samples were collected at nine different worksites involving seven of the ten partner contractors. A total of 53 samples were collected for seven different work tasks, namely, jackhammering, concrete sawing, concrete milling, concrete clean-up, dowel drilling, asphalt milling, and asphalt clean-up. The sample results were compared to the OSHA Permissible Exposure Limit (PEL) to determine if overexposures were occurring. The percentage of silica contained in the dust of an air sample is used to calculate the PEL for each respective sample. Air sampling results and percent silica content associated with the road-repair tasks are presented in Table 1.

Engineering controls, such as water or local exhaust ventilation with filtration, were not used on any of the sampled tasks, except for asphalt milling, where water from a built-in reservoir was applied to the cutter drum. Sampling that has been performed by other researchers on various concrete, stone, and masonry jobs involving drilling and sawing have demonstrated the efficacy of water use in reducing dust levels to which workers are exposed. Various reasons cited by contractors for not using water for dust control include difficulty in clean-up, hazard of slippage, and difficulty in control of runoff.

It is important to note that the OSHA PEL for crystalline silica is

New Jersey Silica Partnership - Participants

- Occupational Safety and Health Administration (OSHA)- Parsipanny, NJ Area Office
- New Jersey Department of Transportation (NJDOT)
- New Jersey Department of Labor, On-site Consultation Service
- National Institute for Occupational Safety and Health (NIOSH), Division of Respiratory Disease Studies
- NIOSH, Division of Engineering Control Technology
- Laborer's Safety and Health Fund of North America
- Laborer's International Union Locals 172 and 472
- New Jersey State Safety Council
- Utility and Transportation Contractors Association
- Ten (10) New Jersey highway construction contractors
- New Jersey Department of Health and Senior Services, Occupational Health Surveillance Program

based on toxicological information dating back to the late 1960's. However, OSHA is currently involved in rulemaking procedures that will eventually result in a comprehensive standard regulating work with silica. The American Conference of Governmental Industrial Hygienists (ACGIH) publishes a list of exposure limits, the Threshold Limit Values (TLVs), that are updated annually. In 2000, the ACGIH reduced the TLV for respirable crystalline silica to 0.05 mg/m^3 which is, in effect, one-half of the current OSHA PEL. The Recommended Exposure Limit (REL) established by NIOSH has been set at 0.05 mg/m^3 since 1974.

Another factor to consider is the carcinogenicity of crystalline silica. The International Agency for Research on Cancer (IARC) has designated respirable crystalline silica as "carcinogenic to humans," the National Toxicology Program has designated it as a "known human carcinogen," and the ACGIH designated it as a "suspected human carcinogen" in 2000. Prudent industrial hygiene practice dictates that exposures to known and suspected carcinogens be maintained at levels as low as reasonably achievable.

The air sampling data collected in this project indicate that there is a significant risk of overexposure to silica for workers peforming all road repair tasks that involve concrete. The data also indicate that there is a potential for overexposure to workers performing asphalt milling.

Exposure levels can be significantly influenced by various environmental and physical factors. In the case of asphalt milling, these factors include the following: 1) asphalt ingredients, 2) aggregate type, 3) aggregate condition, 4) climatic conditions, and 5) machinery operation parameters, such as speed of cut, depth of cut, use of water, and condition of cutters. The sampling data demonstrated that it is possible that a set of conditions could exist where asphalt milling would also result in exposures in excess of the OSHA PEL.

On the basis of air sampling results collected as part of the New Jersey Silica Partnership, as well as toxicity and silicosis surveillance data that have been developed in recent years, it is clear that road repair and construction workers in New Jersey are at serious risk of developing silicosis. Until feasible engineering controls can be developed and/or effectively used, these workers must rely on appropriate respiratory protection to control their exposures to silica dust. The DHSS Occupational Health Surveillance Program has recommended to participating contractor partners that workers performing concrete work and asphalt milling be required to wear half-mask air-purifying respirators fitted with high-efficiency (P-100) filters. Because measured exposures for concrete milling workers exceeded the protection factor for half-mask air-purifying respirators, it was recommended that these workers wear full-face air-purifying respirators or powered air-purifying respirators.

The New Jersey Silica Partnership proved to be beneficial and useful in a number of ways. It facilitated the collection of data important to the establishment of silica exposure hazards in highway construction. OSHA is using the aggregate data in the development of a comprehensive standard for crystalline silica. A consortium was formed between partner contractors and the union locals to provide laborers with training and medical evaluations needed to ensure compliance with the *OSHA Respiratory Protection Standard*.

Perhaps most importantly, the New Jersey Silica Partnership proved that a variety of groups including employers and government agencies, along with industry and labor organizations, can work together to successfully implement public health initiatives particularly in the area of worker protection.

For more information, please contact Donald Schill, MS, CIH, at (609) 984-1863 or dschill@doh.state.nj.us. SU

Examples of Highway Repair Tasks Sampled During Silica Partnership

a. concrete sawing
b. concrete milling
c. asphalt milling
d. dowel drilling
e. jackhammering

Reporting Regulations: Why Do We Have Them? Why Have We Changed Them?

Changes in the New Jersey Department of Health and Senior Services (DHSS) occupational disease and injury reporting regulations went into effect September 2000. Physicians, hospitals and clinical laboratories are important, knowledgeable sources of information about cases of work-related injuries and illnesses. That is why all three groups have been required to report individuals diagnosed with selected occupational diseases and fatal injuries to the DHSS Occupational Health Surveillance Program since the 1980s. (See back of newsletter for trend data) Similar reporting has long been required for communicable and infectious diseases nationwide.

New Reporting

Physicians are now being asked to report **dermatitis** in addition to the occupational diseases that were already reportable. Dermatitis has been added because the Surveillance Program is undertaking surveillance of natural rubber latex-related diseases.

Clinical laboratories involved in blood lead analysis are now required to report **all levels of lead in blood** for individuals 16 years old and older and, as before, elevated levels of lead in urine. The requirements for reporting elevated levels of arsenic, cadmium, and mercury in blood and urine remain unchanged. DHSS is requesting copies of all blood lead reports in order to establish a central database containing the total number of adults being tested and all blood lead elevations, no matter how small.

Changes in Reporting

The most dramatic change deals with **hospital** reporting of occupational illness and injuries. Previously, hospitals were asked to complete a paper report on each case. Now the DHSS will use summary hospital discharge data for initial surveillance and data analysis and require additional paper reporting only if necessary for follow-up purposes. Also, new diagnoses have been added to those previously reportable. These include poisoning by **carbon monoxide and alcohols**, excluding alcoholism.

Information such as **name and address of the employer of the diagnosed individual** is required in the report. This information is crucial for surveillance and will allow follow-up with workplaces. This can lead to reduction in harmful workplace exposures and prevention of new cases of occupational disease. The DHSS greatly appreciates the efforts put forth by physicians, hospitals, and clinical laboratories in obtaining this information which may not be part of available records. SU

See below to obtain copies of reporting regulations:

- **Clinical Laboratories - N.J.A.C. 8:44-2.11**
- **Hospitals - N.J.A.C. 8:57-3.1**
- **Physicians - N.J.A.C. 8:57-3.2**

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Occupational Health Surveillance Update

A newsletter of the Occupational Health Surveillance Program, Occupational Health Service (OHS), Division of Epidemiology, Environmental and Occupational Health, New Jersey Department of Health and Senior Services.

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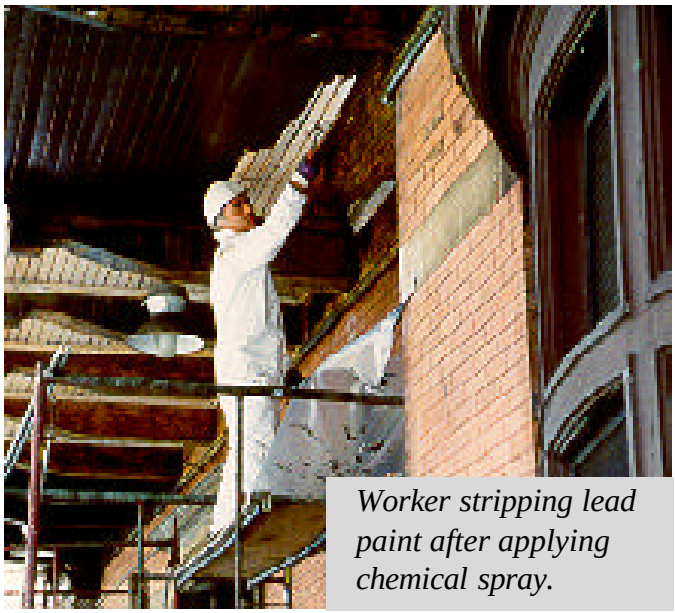
Lead Abatement in Non-Residential Buildings

In 1997, the New Jersey Department of Community Affairs (DCA) amended the **Lead Hazard Evaluation and Abatement Code** (N.J.A.C. 5:17) that governs work practice standards for the abatement of lead-based paint to include steel structures and commercial buildings. DCA has the responsibility to certify lead abatement and lead evaluation contractors and enforce work practice standards. DCA adopted, by reference, work practices contained in Trimber's *Industrial Lead Paint Removal Handbook*.

Under this rule, DCA shares responsibility with Consumer and Environmental Health Services (CEHS) in the New Jersey Department of Health and Senior Services (DHSS). CEHS regulates the training and licensing of individuals working in the lead field pursuant to N.J.A.C. 8:62. CEHS issues work permits to lead abatement workers and supervisors who have completed their training requirements.



Worker stripping lead paint after applying chemical spray.

In 1997, DHSS entered into an agreement with DCA to be notified of new lead abatement jobs. Upon notification from DCA, an industrial hygienist from the DHSS Occupational Health Surveillance Program conducted industrial hygiene evaluations at selected sites. The size and duration of lead abatement jobs were the main criteria for site selection.

TABLE 1
Methods of Abatement Used by Contractors

Method of Abatement	*Site Description*	*n*
Needle gun	water tank, chemical plant, chemical factory, lighthouse, elementary school	5
Dry scraping	church, lighthouse, old prison, health facility, chemical tank	5
Abrasive blasting	overhead bridge, water tank	4
Stripping using "peel away"	apartment building, lighthouse, abandoned building	4
Power washing	railway station, chemical tank, armory	3
Stripping using chemical spray	railway station, juvenile center, elementary school	3
Wet scraping	railway station, chemical tank	2

A major goal of the DHSS lead abatement industrial hygiene evaluation project was to help New Jersey lead abatement contractors reduce employee lead exposure and conduct lead abatement in a safe manner. The objectives of this project were to conduct industrial hygiene evaluations, determine compliance with the *OSHA Lead Standard*, and provide training, technical consultations, and educational materials to contractors and workers.

From June 1997 to July 1999, the Surveillance Program conducted industrial hygiene workplace evaluations of 16 companies at 22 lead abatement sites. These sites included six public buildings, six steel

superstructures, and ten commercial buildings. Table 1 describes methods of abatement used by the contractors at sites evaluated by the Surveillance Program during this time period. In some instances, more than one method of abatement was used at a particular site.

Based on our findings, it was determined that employers should focus greater efforts on respiratory protection, air monitoring, and hygiene facilities. These major areas of deficiency are described in Table 2. It was also found that there is a need to address safety and health training needs for non-English speaking employees at one of the sites. Each workplace evaluation was followed up with a report containing findings and recommendations. Table 3 (See page 8) provides a summary of the recommendations provided by the DHSS to the 16 contractors.

Overall, evaluated employers responded positively to the recommendations provided by the DHSS. This high level of employer participation and cooperation was realized probably because this was a non-regulatory agency intervention. In some cases, where an employer was revisited at a new site, deficiencies noted previously had been addressed according to DHSS recommendations. Information on resources available for New Jersey lead evaluation and abatement contractors is listed below.

For more information specific to this project, please contact Devendra P. Singh, CIH at (609) 984-1863 or dsingh@doh.state.nj.us.

TABLE 2

Major Areas of Deficiency

[No. of recommendations issued]

Respiratory Protection **[n=23]**
respirators left unprotected in work area, improper respirator, not cleaning respirators, stored while wet, not wearing properly, not individually assigned

Air Sampling **[n=14]**
pump not calibrated, no pump calibration data, filter cassettes not positioned properly, log of calibration data not available

Hygiene Facitilities **[n=7]**
not conveniently located, not provided, not adequate, food and drink consumed in work area

Peeling lead paint on a chemical tank.

Lead Resources for Building Owners, Inspectors, Contractors, and Workers

Lead abatement worker training, abatement contractors, and worker permits

Call the New Jersey Department of Health and Senior Services, Lead and Asbestos Program, at (609) 984-2193 or visit their web site at *www.state.nj.us/health/eoh/leadasb/index.html.*

List of certified lead evaluation and abatement contractors

Call the New Jersey Department of Community Affairs, Lead Hotline at 1-877-DCA-LEAD or visit their web site at *www.state.nj.us/dca/codes/leadhom.htm.*

Training and refresher courses for inspectors

Environmental and Occupational Health Sciences Institute (EOHSI)-CET(Centers for Education and Training), Rutgers University/UMDNJ, (732) 235-9450; offers a variety of publications and training courses including lead inspector and assessor courses. *Web: www.eohsi.rutgers.edu/cet*

TABLE 3
Summary of DHSS Recommendations for Lead Abatement

CATEGORY	DESCRIPTION
Air Monitoring	1. When air lead results exceed the OSHA Permissible Exposure Limit (PEL), 50 µg/m^3 of air, air monitoring should be conducted as specified in the *OSHA Lead Standard*. 2. All air sampling pumps should be calibrated before and after the sampling by a primary calibration standard. A log of calibration data should be available on-site for review. 3. Area air samples should be taken outside the containment area to ensure that there is no leaking of lead dust. 4. Filter cassettes for personal lead air samples should be properly located near the worker's breathing zone.
Engineering Controls	1. Performance of abatement equipment should be evaluated and improved to increase their efficiency. 2. Results exceeding the OSHA PEL should be reduced by improving engineering controls and work procedures.
Respiratory Protection	1. Respirators should not be left unprotected in the lead work area because they can become contaminated with lead. 2. Employees should not share their respirators with co-workers. 3. Respirators should be seal-checked each time they are donned. 4. Respirator straps should be in contact with the skin to provide a proper fit and to avoid breakage of the respirator seal. 5. Specified respirator cartridges should be provided to protect workers from particulates and organic vapors when applicable. 6. Respirators should be cleaned daily and put in an assigned bag after they are properly dried to avoid trapped moisture. 7. A written respiratory protection program should be established.
Hygiene Facility and Personal Protective Equipment	1. Work shoes should not be worn outside the work area or used as street shoes. 2. Separate lockers or bags should be provided to keep personal belongings away from work attire, shoes, etc. 3. Lockers should be wet-wiped to reduce lead contamination. 4. Public rest rooms should not be used by lead abatement workers unless they wash up and remove their protective clothing and respirator before entering. 5. A decontamination unit should be available to employees for wash-up and showering. 6. If possible, shower facilities should be available on the job site so that employees do not have to travel a significant distance to the decontamination trailer. This avoids the possibility of contaminating the vehicle used to transport employees to the trailer. 7. Wipe samples should be collected inside the clean area of the decontamination unit to determined if there is any lead contamination. 8. The decontamination trailer should be routinely decontaminated using detergent and warm water.
Eating Facility	1. No food or drink should be brought to the lead work area.
Housekeeping	1. Dry sweeping should not be used in lead work areas. 2. Lead debris should be misted with water before removal.
Signs	1. Lead warning signs should be posted at key locations.
Fall Protection	1. A competent person should determine the feasibility of providing fall protection. 2. Personal fall arrest system such as full body harness should be provided when working at least 6 ft. above ground.
Training	1. Interactive training should be provided to employees.
Work Certificates	1. Employees should keep their DHSS-issued work permits with them at all times when they are at the work site.
Incentive Program	1. An incentive program may be used to help lower blood lead levels.
Language Problem	1. Translation should be provided for employees who do not speak and understand English. This is important for safe implementation of the project during normal operations and emergencies.

Q&A What is a B-Reader?

A B-Reader is a radiologist or physician who has achieved competency in interpreting chest x-rays of workers exposed to substances such as asbestos, silica, and coal dust.

Why B-Readers? For workers who suffer from pneumoconiosis (lung disease caused by dust inhalation), a key diagnostic tool is the patient's chest x-ray. A B-Reader can recognize on a chest x-ray the signs of the various pneumoconioses. Radiographic changes in workers exposed to crystalline silica, for example, are the most sensitive means of early detection of disease; that is, abnormalities are usually seen radiographically before pulmonary function loss can be detected by spirometry, or before symptoms appear.

Repeated classification of radiographs may vary considerably, not only from reader to reader, but also among multiple readings by the same reader. To improve the proficiency of readers and minimize the variability of readings, NIOSH grants B-Reader certification to physicians who demonstrate proficiency in the classification of chest x-rays for the pneumonoconioses using the International Labour Office Classification System. Recertification is required at four-year intervals. More details can be obtained from NIOSH by visiting their web site at www.cdc.gov/niosh/pamphlet.html or calling (304) 285-5724. A list of NIOSH certified B-Readers in New Jersey is provided below and is also available on-line at our website or the NIOSH website for nationwide listings.

List of NIOSH Certified B-Readers in New Jersey

Judith K. Amorosa, M.D.
RW Johnson Univ. Hospital
60 Prospect Street
Somerville, NJ 08876
(908) 722-9695

Donald Auerbach, M.D.
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www.state.nj.us/health/eoh/survweb/

The Occupational Health Surveillance Program Home Page

...describes surveillance activities for:

- fatal occupational injuries
- heavy metals
- silicosis
- occupational asthma
- initiatives for prevention of latex allergy

... summarizes occupational disease reporting requirements for:

- hospitals
- laboratories
- physicians

... lists our publications (most are available on-line):

- educational materials
- industrial hygiene fact sheets
- FACE* investigations reports
- FACE Facts and Hazard Alerts
- list of articles published in peer-reviewed journals
- special surveillance reports

... and provides links to related sites.

*FACE (Fatality Assessment and Control Evaluation)

Omnicide,® *Sonacide*,® *Aldesen*,® and *Hospex*.®

Glutaraldehyde is a strong irritant to the skin, eyes, and respiratory system. Contact with solution can cause skin sensitization, leading to allergic contact dermatitis. Vapor inhalation has been strongly implicated as a possible cause of occupational asthma. Glutaraldehyde can also aggravate pre-existing asthma and inflammatory or fibrotic lung disease.

In 1997, the American Conference of Governmental Industrial Hygienists (ACGIH) lowered the Threshold Limit Value (TLV) for glutaraldehyde from 0.2 ppm to 0.05 ppm, as a ceiling limit. They also designated this chemical as a "sensitizer." The Occupational Safety and Health Administration (OSHA) does not have a Permissible Exposure Limit (PEL) for glutaraldehyde. The agency had promulgated a PEL of 0.2 ppm (as a ceiling limit) in 1989, but this was vacated in 1993 for legal reasons. OSHA is currently involved in the promulgation of a new regulatory PEL.

Since 1988, eleven cases of glutaraldehyde-related occupational asthma have been reported to the New Jersey occupational asthma surveillance project. As a result, the Surveillance Program initiated a hazard surveillance project for glutaraldehyde in New Jersey health care facilities in 1997. The purpose of the project was to identify health care facilities using glutaraldehyde, collect information on how it is used, perform exposure monitoring at selected facilities, and disseminate information on the safe use and handling of the chemical.

The Surveillance Program developed a survey to collect information regarding glutaraldehyde use in New Jersey health care facilities, including quantity used, number of employees potentially exposed, air monitoring results, and exposure control measures. An informational bulletin entitled *Glutaraldehyde - Guidelines for Safe Use and Handling in Health Care Facilities* (see sidebar) was also developed for distribution. The survey and bulletin were mailed to all New Jersey hospitals, ambulatory care facilities, and renal dialysis centers. Of 415 surveys mailed, 263 (57%) were returned, 122 of which reported use of glutaraldehyde. A total of 27,363 gallons per year were reportedly used by the facilities, with 2,432 workers being potentially exposed. A summary of survey responses, including in-house air monitoring results, reported by the 122 facilities is shown in Table 1.

In addition, the Surveillance Program conducted on-site industrial hygiene evaluations, with air monitoring, at 12 facilities where greater than 300 gallons of glutaraldehyde solution were used per year. Half of the selected facilities had previously conducted air monitoring and measured levels in excess of the ACGIH TLV, the other half had never conducted air monitoring. Air monitoring was conducted by the Surveillance Program in the following

TABLE 1
Summary of Survey Responses of Glutaraldehyde Users

	HOSPITALS n=91 (72%) *	AMBULATORY CARE FACILITIES n=29 (16%) *	RENAL DIALYSIS CENTERS n=2 (5%) *
No. of Exposed Workers	2,071	339	22
Total Amount of Glutaraldehyde Used (gal./yr)	20,338	4,685	2,340
Air Monitoring Conducted	50 (55%)	9 (31%)	2 (100%)
> OSHA PEL †	1 (2%)	0 (0%)	0 (0%)
> ACGIH TLV	18 (36%)	9 (31%)	1 (50%)
Employee Training	82 (90%)	24 (83%)	2 (100%)
Engineering Controls	77 (85%)	22 (76%)	2 (100%)
PPE Use	85 (93%)	26 (90%)	2 (100%)
Respiratory Protection	59 (65%)	16 (55%)	1 (50%)

* number (%) of survey respondents

† PEL (0.2 ppm) vacated in 1993

EDUCATIONAL BULLETIN

Glutaraldehyde - Guidelines for Safe Use and Handling in Health Care Facilities

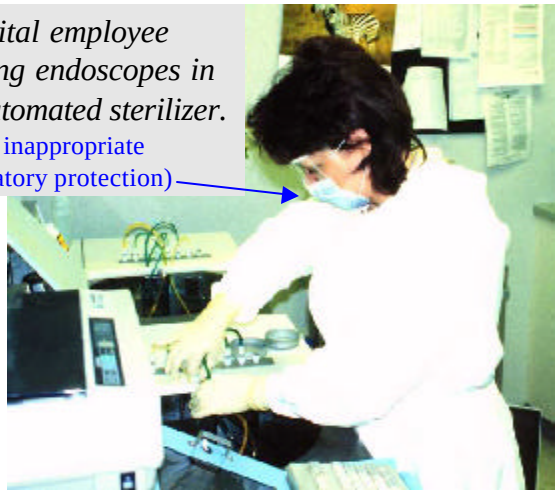
- Identification
- Health Effects
- Exposure Limits
- Storage
- Disposal
- Engineering Controls
- Personal Protective Equipment
- Spill Clean-Up
- First Aid
- Personnel Qualifications
- Vapor Monitoring
- Recordkeeping
- Medical Surveillance

Download this document from our website at www.state.nj.us/health/eoh/survweb/, or request a copy via fax (609-292-5677) or e-mail at surveillance@doh.state.nj.us.

departments where glutaraldehyde was used: Endoscopy, Ultrasound, Sterile Processing, Bronchoscopy, Operating Room, and Dialyzer Reuse. A total of 54 samples (34 personal and 20 area) were collected. Air sampling results are summarized in Table 2.

During on-site evaluations, questionnaires were distributed to employees potentially exposed to glutaraldehyde. The anonymous self-administered questionnaire collected information that included employee demographics, frequencies and methods of glutaraldehyde use, exposure control methods, training, and work-related symptoms. Of 173 questionnaires distributed at the 12 facilities, 53 (31%) were completed and returned from 10 of the facilities. Seventy-four percent of the respondents reported that they could detect the odor of glutaraldehyde and 29% reported eye irritation while working with it.

The findings of this hazard surveillance project showed that each facility differed with respect to work practices, engineering controls, and the use of personal protective equipment. Particularly striking were the differences between departments within the same facility. This may be explained in terms of the rapidly evolving and nonuniform awareness of the hazards of glutaraldehyde, the differing availability of funds for engineering controls, historical work practices, disinfection activity levels, variable training of staff, and the attitudes of management and staff. For example, there was a wide variety of engineering controls ranging from no control to fully enclosed fume hoods with enclosed sink. There was also a common misconception that an OSHA PEL was in effect and that exposure levels up to 0.2 ppm were acceptable.



Hospital employee placing endoscopes in an automated sterilizer. (Note inappropriate respiratory protection)

Sampling data and observations at the evaluated facilities suggest that the use of local exhaust ventilation and good work practices are the most effective means by which to minimize glutaraldehyde exposure among health care workers. Air sampling results indicate that the activation and mixing of new glutaraldehyde solution pose the greatest risk of exposure. Many hospitals use special enclosed processors for sterilization of endoscopes. Although these systems are provided with an integral local exhaust ventilation system, some measured exposures were in excess of the current ACGIH TLV. Most measured exposures were, however, less than the TLV, probably due to the following reasons: 1) the areas in which glutaraldehyde was used were provided with enhanced general ventilation, and 2) the durations of procedures involving glutaraldehyde were short.

TABLE 2
Summary of Air Sampling Results
(N = 54)

Personal Samples (n=34)	
None detected	12 (35%)
< 0.025 ppm	12 (35%)
0.025-0.05 ppm	6 (18%)
> 0.05 ppm*	4 (12%)
Area Samples (n=20)	
None detected	6 (30%)
< 0.025 ppm	10 (50%)
0.025-0.05 ppm	3 (15%)
> 0.05 ppm*	1 (5%)

*ACGIH TLV=0.05 ppm

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Editor's Note: Aggregate data obtained from this project have been provided to OSHA, at their request, in order to support their rulemaking efforts for a new PEL for glutaraldehyde.

New Publication

Working Safely in the Cold

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Occupational Illness and Injury Reporting to the New Jersey Department of Health & Senior Services												
	Number of New Cases Reported[1]											
Condition	From beginning of reporting through 1989	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	Cumulative Total
Fatal injuries[2]	892	101	112	138	145	114	118	99	101	103	103	2,026
Occupational asthma[3]	78	65	66	47	70	41	57	39	72	22	9	568
Silicosis[4]	744	66	74	46	46	26	25	47	43	40	34	1,667
Other pneumoconioses[5]	2,684	760	609	676	624	474	655	611	498	417	1,609	9,107
Acute lung conditions[5]	425	115	76	65	75	57	68	82	59	32	140	1,194
Chemical poisonings[5]	1,151	248	293	217	207	141	216	150	129	145	289	3,186
Elevated blood lead levels[6]	2,677	541	318	286	416	308	225	244	208	177	239	5,639
Elevated blood and urine mercury levels[6]	217	78	55	24	17	24	23	34	11	35	20	538
Elevated blood and urine cadmium levels[6]	83	144	17	2	16	14	30	17	18	16	9	366

1 Includes confirmed and unconfirmed cases.
2 Data sources: death certificates, medical examiners' reports, OSHA, workers' compensation reports, FARs, news clippings. Reporting began in 1983.
3 Data sources: physicians, hospital reports. Reporting began in 1988.
4 Data sources: hospital reports, physician reports, death certificates. Reporting began in 1979. Incomplete reporting from hospitals in 1993 and 1994.
5 Data source: hospital reports. Reporting began in 1985. For 1999, data may include previously reported cases.
6 Data sources: physicians, laboratory reports. Reporting began in 1985.

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