

PMCH 600 INDUSTRIAL HYGIENE

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WHAT IS INDUSTRIAL HYGIENE IDENTIFICATION, EVALUATION, & CONTROL OF TOXIC SUBSTANCES & HARMFUL PHYSICAL AGENTS IN THE WORKPLACE & IN THE ENVIRONMENT



Use of Surgical Masks and Respirators in Health Care Settings

Surgical mask and respirator use is one component of a system of infection control practices to prevent the spread of infection between infected and non-infected persons where pandemic influenza patients might receive health care services (e.g., hospitals, emergency departments, out-patient facilities, residential care facilities, emergency medical services, home health care delivery). During an influenza pandemic, surgical masks and respirators—along with other forms of personal protective equipment (e.g., gloves, gowns, and goggles)—should be used by health care personnel in health care settings in conjunction with Standard and Droplet Precautions, respiratory hygiene, cough etiquette, vaccination, and early diagnosis and treatment. Different types of surgical masks and respirators are described in Appendix B.

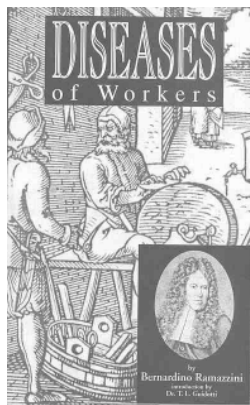
Recommendations

1. National Institute for Occupational Safety and Health (NIOSH)-certified respirators (N-95 or higher) are recommended for use during activities that have a high likelihood of generating infectious respiratory aerosols [a] including the following high-risk situations [a]:
 - Aerosol-generating procedures (e.g., endotracheal intubation, nebulizer treatment, and bronchoscopy) performed on patients with confirmed or suspected pandemic influenza
 - Resuscitation of a patient with confirmed or suspected pandemic influenza (i.e., emergency intubation or cardiac/pulmonary resuscitation)
 - Providing direct care for patients with confirmed or suspected pandemic influenza-associated pneumonia (as determined on the basis of clinical diagnosis or chest x-ray), who might produce larger-than-normal amounts of respirable infectious particles when they cough

In the event of actual or anticipated shortages of N-95 respirators:

- Other NIOSH-certified N-, R-, or P-class respirators should be considered in lieu of the N-95 respirator.
- If re-useable elastomeric respirators are used, these respirators must be decontaminated according to the manufacturer's instructions after each use.
- Powered air purifying respirators (PAPRs) may be considered for certain workers and tasks (e.g., high-risk activities). Loose-fitting PAPRs have the advantages of providing eye protection,

- TOXIC SUBSTANCES
 - CHEMICALS
 - MICROBIOLOGICAL AGENTS
- HARMFUL PHYSICAL AGENTS
 - NOISE
 - RADIATION
 - ERGONOMICS/REPETITIVE MOTION
 - HOT & COLD ENVIRONMENTS



Occupational Health Team

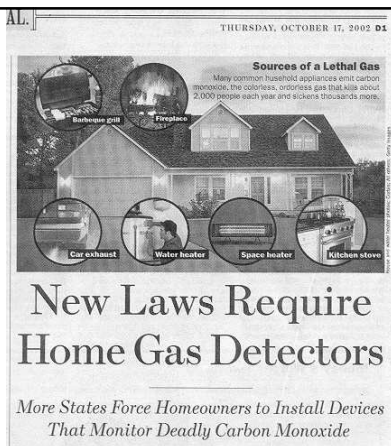
- Occupational Physicians - Dr. Compton
- Industrial or "occupational" Hygienists
- Occupational Health Nurse
- Microbiologist
- Engineers
- Safety Personnel
- Ergonomists
- Chemists & Lab Personnel
- radiation, toxicology, epidemiology

Industrial Hygiene Subject Matter

- What, How much, What is to be done???
- Identification of Hazards
 - experience
 - study
 - defined by client
- Evaluation of Hazards
 - Monitoring: sample collection & analysis
- Control of Hazards
 - engineering, admin., work practices, PPE

Typical IH Problems

- Survey flooded building for mold
- Health Hazard Survey in factory
- Indoor Air Quality (IAQ) evaluation
- Monitor asbestos/Pb removal at VCU
- Lead Inspection - adult/child protection
- Noise survey, printing plant
- OSHA/EPA Compliance consultation



Exposures to What

- Infectious agents
- Dusts
 - Asbestos, silica
- Volatile organic compounds
 - Benzene, ethylene oxide
- Metals
 - Pb, Hg
- Pesticides/herbicides
- Radiation



Exposure Limits

- OSHA PEL's (permissible exposure limits)
- OSHA STEL's (short term, 15 minutes)
- OSHA ceilings (instantaneous limits)
- OSHA BEI's (biological exposure indices)
- ACGIH TLV's (threshold limit values)

The Legal Framework OSHA Standards

- PEL Permissible Exposure Limit
- STEL Short Term Exposure Limit
- Monitoring
- Methods of Control
- Respirators
- Hazard Communication
- Medical Surveillance
- Recordkeeping

OSHA BENZENE STANDARD

- Permissible Exposure Limits
 - 1 ppm; 8 hour TWA
 - 5 ppm 15 min. STEL
- Monitoring
- Methods of Control
- Respirators
- Medical Surveillance
 - Next slide
- Hazard Communication
- Employee Notification
- Recordkeeping

A detailed occupational history which includes:

1910.1028(f)(2)(i)(A)(1)
Past work exposure to benzene or any other hematological toxins,

1910.1028(f)(2)(i)(A)(2)
A family history of blood dyscrasias including hematological neoplasms;

1910.1028(f)(2)(i)(A)(3)
A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;

1910.1028(f)(2)(i)(A)(4)
A history of renal or liver dysfunction;

1910.1028(f)(2)(i)(A)(5)
A history of medicinal drugs routinely taken;

1910.1028(f)(2)(i)(A)(6)
A history of previous exposure to ionizing radiation and

1910.1028(f)(2)(i)(A)(7)
Exposure to marrow toxins outside of the current work situation.

1910.1028(f)(2)(i)(B)
A complete physical examination.

1910.1028(f)(2)(i)(C)
Laboratory tests. A complete blood count including a leukocyte count with differential, a quantitative thrombocyte count, hematocrit, hemoglobin, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC). The results of these tests shall be reviewed by the examining physician.

OSHA Benzene Standard on Web

osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&

MONITORING

- Air Monitoring
 - personal
 - area
 - real time
 - Laboratory Analysis
- Noise
- Lead - XRF
- Radiation
- Hot & Cold



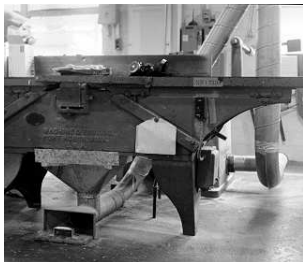


*Companies Hire
Private Firms
For Anthrax Tests*

Methods of Control

- Engineering Controls
- Administrative Controls
- Work Practices
- Personal Protective Equipment

Engineering Controls



Negative pressure containment



Administrative Controls

- Employee Rotation
- Ergonomic Hazards
- Noise
- Lead
- Carcinogen Issue - Prohibition

Work Practices



Personal Protective Equipment

- Respirators
- Protective Clothing
- Protective eyeglasses, shoes, etc.
- Hardhats

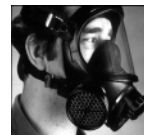
Respirators



Quarter Mask



Half Mask



Full Facepiece



Mouthpiece/Nose Clamp
(no fit test required)

RESPIRATORS

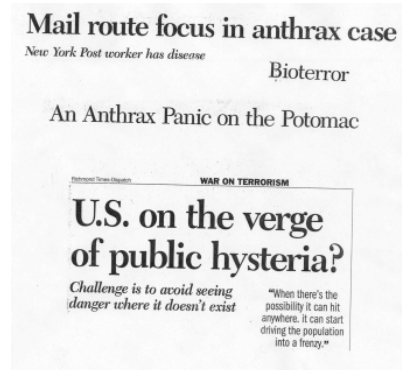
- Use & Limitations
- Selection
- Protection Factors
- IDLH Atmospheres
- Fit testing, Fit factors
- Written Respirator Program

Hazard Communication

- Placarding & Labeling
- Material Safety Data Sheets
- Training & Education
- Chemical List

Medical Surveillance

- Done by MD, nurse, audiologist
- need to know
 - what exposed to
 - levels of exposure - IH role
- various medical tests
 - pulmonary function tests
 - blood lead levels, etc.



Hot & Cold Environments



ETHICS

IH WORKS FOR, REPORTS TO, &
IS PAID BY EMPLOYER.

DUTY: PROTECT WORKERS

CONFLICTS INEVITABLE

Issues

- Who will determine whether to sample
- who will sample
- where will samples be collected
- who will analyze
- who will determine what is to be done
- methods of control

Why Learn about IH

- Prevent injury and illness!
- Why learn about public health?
- Protect Safety & Health of Workers/Public
- Deal with public concerns/hysteria
- Avoid Liability
- Promote better relations among
 - workers
 - management
 - community
 - government

References

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- www.abih.org
- www.osha.gov
- [www.cdc.gov.niosh](http://www.cdc.gov/niosh)
- **The Occupational Environment - Its Evaluation, Control, and Management**; DiNardi, S. R. , Ed.; AIHA, 2003; "White Book"

