

Lead Hazards in the Workplace

Most adult exposures to lead are occupational and occur in lead-related industries such as lead smelting, refining, manufacturing, construction and painting. The probability of lead poisoning increases when workers inhale lead dust and lead fumes, or when they eat, drink, or smoke in or near contaminated areas. **Between 0.5 and 1.5 million workers are exposed to lead in the workplace.** Workers can accidentally expose family members by bringing lead dust home on their skin, shoes, and clothing. Lead brought home in this way is referred to as “take home lead.” People who work with materials that contain lead need to learn how they can protect themselves and their family.

What is lead?

Lead is a naturally occurring element that people have used almost since the beginning of civilization. Lead is bluish-gray in color and has no characteristic taste or smell. Lead has many different uses. A variety of human activities have spread lead widely throughout the environment, such as leaded gasoline. Efforts have been made to limit the use of lead containing products to minimize harmful effects on people and animals.

Who is at greatest risk for lead poisoning?

Employees working in a variety of occupational settings may be exposed to lead hazards. Some of these lead-related industries include:

- Painters and remodelers
- Battery manufacturing and recycling
- Automotive radiator manufacturing and repair
- Casting and machining lead, brass, bronze, pewter, and white metal



- Plating operations
- Manufacturing or the use of leaded paints, inks, dyes, glazes or pigments
- Lead soldering, such as in the electronics industry
- Gun firing ranges
- Ship building and repair
- Salvaging and recycling scrap metal
- Manufacturing ceramics
- Manufacturing leaded glass or crystal
- Manufacturing ammunition and explosives
- Compounding plastic resins
- Auto body repair
- Making stained glass



If you work with lead, your employer must inform you of the hazards and train you to safely work with lead.

If you think you are being exposed to harmful substances like lead at work, ask to see the Material Safety Data Sheets (MSDSs) for the products in your work area. These sheets will describe the dangers associated with harmful substances that you may work with.

How does lead get into your body?

Most human exposure to lead occurs through **breathing or eating**. You can breathe in lead dust, mist, or fumes, and swallow lead dust on food, drinks, cigarettes, or your hands and face.

Once lead gets into your body, it can stay there for a long time. Lead can build up in your body if you are in contact with even a small amount of lead for a long time.

The more lead in your body, the more likely that harm will occur. How much damage lead does to your body may differ from one person to another.

If you are exposed to lead, many factors determine whether you will be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with it. You must also consider your age, gender, diet, family traits, lifestyle, and general state of health.

What does lead do to your body?

Lead affects many important body systems. Lead can damage the brain and nervous system, red blood cells, kidneys and reproductive systems of men and women. Lead easily crosses the placenta in a pregnant woman and can harm the fetus. Lead exposure can cause headaches, dizziness, sleep disturbances, memory loss, depression, fatigue, irritability, joint and/or muscle pain, miscarriage, and other serious health problems. **Damage from lead exposure can be permanent.**



The signs and symptoms of lead poisoning are often vague and can easily be confused with symptoms of other conditions. The blood lead level at which symptoms occur varies greatly from person to person. **Some people are poisoned by lead yet have few or no obvious symptoms.**

Why you should have a blood lead test?

You should have your blood tested if you work with lead or are employed in a lead-related industry. A blood lead test measures how much lead is in your blood at the time of the test. The amount of lead in your blood is measured in micrograms of lead per deciliter of whole blood ($\mu\text{g}/\text{dl}$). This type of measurement in your blood is called your **Blood Lead Level**, or **BLL**. The typical BLL for U.S. adults is less than $5 \mu\text{g}/\text{dl}$.



What lead levels are considered elevated in adults?

The following list outlines some of the potential dangers of lead poisoning to health:

- From $1\text{-}20 \mu\text{g}/\text{dl}$, lead is building up in the body and health effects may be occurring.
- From $20\text{-}30 \mu\text{g}/\text{dl}$, regular exposure is occurring and there is evidence of potential health problems.
- At lead levels between 30 and $50 \mu\text{g}/\text{dl}$, health damage may be occurring, even if there are no symptoms.
- Between 50 and $80 \mu\text{g}/\text{dl}$, serious health damage may occur.
- At levels above $80 \mu\text{g}/\text{dl}$, serious, permanent health damage or death may occur.



Blood lead levels can rise quickly. With frequent monitoring, dangerous exposures can be quickly identified and corrected. A blood lead level over $20 \mu\text{g}/\text{dl}$ indicates a substantial exposure to lead. There is also increasing evidence that adverse health effects can occur at BLLs below $20 \mu\text{g}/\text{dl}$.

How can lead poisoning be prevented?

The best way to prevent lead poisoning is to remove the poisoned worker from lead exposure. This will allow the body to begin removing the lead. Sometimes adults with very high BLLs and serious symptoms will be treated with a drug to help the body remove lead. This is called “chelation therapy.” The need for chelation therapy is extremely rare. **Only a licensed medical doctor (MD) with experience treating adult lead poisoning should make decisions regarding chelation for an individual.**

Engineering Controls:

Another way to prevent lead poisoning is to prevent contact. Proper engineering controls (a local exhaust ventilation system, for example) are often the best way to control lead contact. Other ways of controlling lead exposure in your workplace include:

- **Lead safety training**
- **Using lead safe work practices**
- **Switching to lead-free materials and/or controlling lead at the source**



Using Respiratory Protection:

When engineering controls cannot reduce lead exposures to a safe level, you must wear a respirator. Your employer should have a respiratory protection program that includes fit-testing to make sure your respirator will protect you properly. You must also be trained to use and take care of your respirator. **Using the respirator correctly will protect you from breathing in lead.**



For more information regarding respiratory protection and fit-testing you can contact the Occupational Safety and Health Administration (OSHA) at 1-800-321-OSHA.

Lead Safe Work Practices:

Following these simple rules when working with lead can help protect you and your family from lead poisoning.

(1) Do not eat, drink or smoke in lead-contaminated work areas.



(2) Wash your hands before eating, smoking, or touching your face after working with lead.



(3) Wear your protective equipment over your clothing whenever you work with lead.



(4) Shower, wash your hair and change into clean clothes (including shoes) before leaving the workplace. “Take home lead” can contaminate your vehicle, home, and potentially harm your family, especially young children.



(5) Store street clothes in a separate area from your work clothes.



(6) Eating a well-balanced diet with proper nutrition, can help reduce lead levels.



Other Sources of Lead Poisoning:

Adults can also be exposed to lead during certain hobbies and activities where lead is used, such as during renovation or removal of lead paint, or from certain lead-containing cosmetics (non-Western) and home health remedies. Hobbies that may involve lead exposure include:

- Artistic painting
- Ceramics/pottery making
- Jewelry making
- Indoor firing range use
- Stained glass making
- Home renovations
- Making homemade products (like fishing sinkers and ammunition)



Who can I call for help?

Connecticut Department of Public Health (DPH)
Division of Environmental Health
Occupational Health Program
410 Capitol Ave, MS#11OSP
PO Box 340308
Hartford, CT 06134-0308
(860) 509-7744; Fax (860) 509-7785
<http://www.dph.state.ct.us>

US Department of Labor
Occupational Safety and Health Administration
(OSHA)
1-800-321-OSHA or <http://www.osha.gov>

Occupational Health Clinics:

*University of Connecticut Division of Occupational
and Environmental Medicine*
UCONN Health Center
263 Farmington Ave.
Farmington, CT 06030-6210
(860) 679-2893
www.oehc.uhc.edu/clinser/oemc.htm

Yale Occupational and Environmental Medicine
135 College St.
New Haven, CT 06510
(203) 785-4197
www.info.med.yale.edu/intmed/cardio/occmcd



Where can I find more information?

How to Prevent Lead Poisoning on Your Job! A Worker's Guide to Lead Safety in General Industry - California Dept. of Health Services at (510) 622-4332

Lead on the Job – A Guide for Workers
<http://www.health.state.ny.us/nysdoh/lead/worker.htm>

Lead Exposure in Adults – A Guide for Health Care Providers: <http://www.health.state.ny.us/nysdoh/lead/hlthcare.htm>

Lead on the Job – A Guide for Employers
<http://www.health.state.ny.us/nysdoh/lead/employer.htm>

Lead in the Workplace: A Guide for Employers in General Industry – California Dept. of Health Services: <http://www.dhs.ca.gov/ohb>

ATSDR/Case Studies in Environmental Medicine: Lead Toxicity: <http://www.atsdr.cdc.gov/HEC/CSEM/lead/index.html>

Clinical Evaluation and Management of Lead-Exposed Construction Workers. American Journal of Industrial Medicine 37:23-43 (2000).

Medical Surveillance Guidelines for Construction Industry (Standard 29 CFR) 1926.62 App C: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10033

Medical Surveillance Guidelines for Non-Construction Industry (Standard 29 CFR) 1910.1025 App C: http://www.osha.gov/pls/oshaweb/owadisp.show_document?

Editor's Note: The information in this article was compiled in part from the sources listed above and the California Department of Health, New York Department of Health and the Massachusetts Department of Labor and Industry.