



CHAPTER 2

HEALTH EFFECTS: HOW LEAD AFFECTS THE BODY

Learning objectives	2-3
Instructor's notes	2-3
Training methods	2-3
Skit and discussion	2-4
Skit: Lunchtime on the job site	2-4
Discussion questions	2-5
Visualization: Health effects	2-7
Lecture/Slides	2-9
Discussion question guide	2-11
For more information	2-13



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Manual**



Learning objectives

In this chapter you will learn

- how lead enters and affects the body
- why lead is especially dangerous to children
- how lead levels in the body are measured
- how lead poisoning can be prevented.

Instructor's notes

This session provides the opportunity for workers to understand how lead can affect their bodies. As the instructor, it is vital that you emphasize the prevention of lead poisoning to workers and children by keeping lead exposures as low as possible.

Some states may require that you have a health professional with an occupational health background cover this section. If you are not a health professional and have decided to teach this section, make sure you have access to a health professional before the course starts. That way you can note any questions from trainees that you do not have answers for and get answers from the health professional. If you have a health professional cover this section, make sure the individual knows how to teach working adults.

Training methods

- | | |
|-------------------------------------|------------|
| A. Skit and discussion | 15 minutes |
| How much lead exposure is too much? | |
| B. Health visualization | 40 minutes |
| C. Lecture/slides | 20 minutes |
| D. Small group or class discussion | 20 minutes |

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Skit and discussion

Purpose: This exercise will get the class to think about the health effects of lead and how its symptoms can be confused with other health problems. It will also introduce some basic personal hygiene practices that must be followed to prevent lead poisoning.

Materials: Use the skit on page 2-4 in the student manual (reprinted below).

Directions: Ask for four volunteers from the class to do the skit. Give them a little time to review it before doing it. (Review your role as a facilitator on page Intro-14 in this manual.) Discussion questions are on the next page.

Skit: Lunchtime on the job site

Tanja, Al, Joe, and Walt are eating lunch on the back porch of a home they are renovating. They live in the community where the home is located. They have been renovating the houses in this community for nearly a month. Let's listen to them while they eat lunch:

Al: This porch is feeling like home. We've worked on these houses for a month now. We'll be done by next week.

Tanja: It'd feel more like home if we had a table and a few chairs to sit on. I'll be glad when this job is over. I'm tired. My body aches from all this work.

Joe: Women weren't made to work construction—that's why your body aches. I don't want a table or chairs. I want a clean bathroom and some cold water to drink. This porch is dirty. Maybe we could get some of that poly plastic and lay it on the porch . . . man, I'm dizzy.

Al: Tanja, I've seen you do twice as much work as Joe in a day. Are you sick?

Walt: Hey, Joe, too much partying last night? We've worked on these houses for almost a month. I won't miss this porch at all. I used to get real hungry by lunch time. I was eating two or three sandwiches. I'm working just as hard now, but I don't even want to finish one sandwich anymore.

Al: Walt, you usually eat like a horse. Ask your wife to fix your lunches again.

Walt: My wife made my favorite pot roast last night. I couldn't eat it. It tasted so good, but I wasn't hungry. My stomach hurt. All I wanted to do was go to sleep.

Joe: I wish I could get some sleep. The past week I got these headaches and people just bothered me. You know, people are getting on my nerves. The doctor says it's because I'm constipated.

Al: You all sound like you got the flu or some kind of bug. Stay away from me. I'm feeling just fine and I want to stay that way.



Discussion questions

1. **What is going on in this conversation?**

Some people will point out that three out of the four workers are complaining about not feeling well, though it is very possible for an illness like a flu to be spread among people who are working together.



2. **What were the workers' complaints? Circle them in the script. Is everyone feeling sick?**

You can list the complaints on a flip chart. At the very end of the discussion you can title the list, "Signs and Symptoms of Lead Poisoning."

Tanya: Tired, and body aches; Joe: Dizzy, headaches, people get on his nerves, wishes he could sleep, and constipated; Walt: Loss of appetite, stomach hurts, and wanted to sleep at dinner time; Al: No complaints.

You could use Al as an example that not everyone feels symptoms of lead poisoning. Students should understand that one can be affected by lead poisoning without feeling any symptoms.

3. **Do any of the workers share the same problems?**

Tanya, Joe and Walt all mention being tired or wanting to sleep.

4. **List some things that could be causing these complaints.**

You can also list these complaints on a flip chart and label them "Possible Misdiagnoses for Lead Poisoning."

- | | |
|----------------------|---------------|
| - Working too hard | - Flu |
| - Constipation | - Heat stress |
| - Some kind of "bug" | - Alcohol |
| - Not enough sleep | |

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5. What suggestions were made to fix the problems?

- Table and chairs
- Clean bathroom
- Cold water
- Laying plastic on the porch

What would you suggest?

Some possibilities include: all of the above; no eating or drinking on the porch; washing hands and face before eating or drinking; all of them seeing their doctor to check for lead poisoning; use of personal protective equipment.

Write the trainees' suggestions down on a flip chart. Label this page "Possible Solutions."



Visualization: Health effects

Purpose: This exercise will get the class to think about the different ways lead can affect different parts of the body.

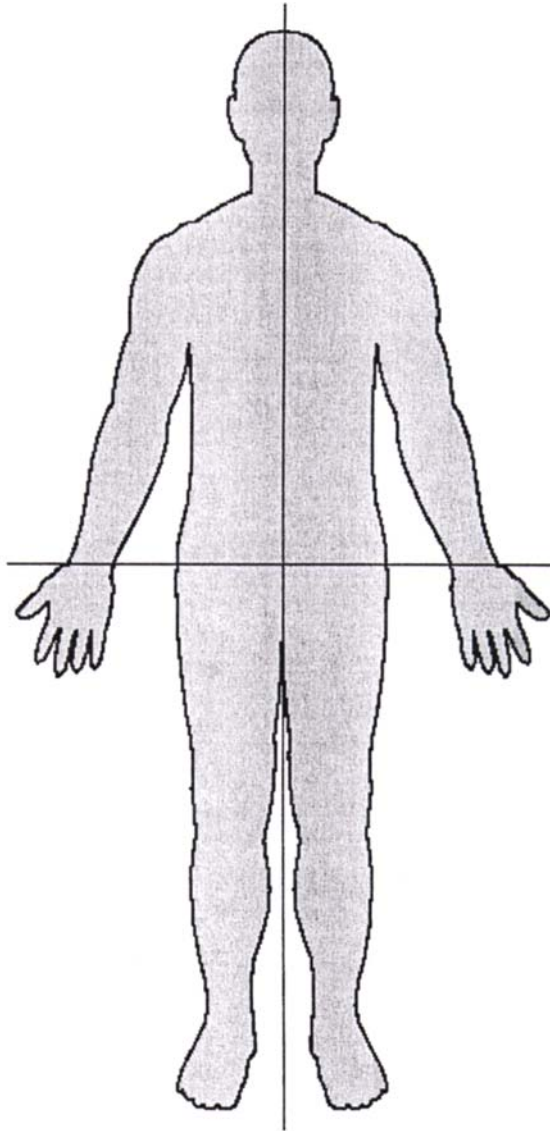
Materials: Flip chart, note paper, markers and pens

Directions:

1. Break the class down into small groups (no more than four per group).
2. Tape four sheets of flip chart paper together and tape it to the wall. It needs to be big enough to trace a person on it.
3. Ask for two volunteers—one will trace the person onto the sheets of paper and the other person will have his/her body traced.
4. Have the class give the drawing a name. This will make it easier to refer to the drawing and make it more real that lead affects people.
5. Brainstorm body parts with the entire class. List the body parts on a flip chart.
6. Have each group choose a body part or body system that is listed on pages 2-9 through 2-12 in the student manual. The heart and kidneys can go together.

Have them draw the body part on sheets of note pad paper.

They should then refer to the manual and look up how lead affects these body parts. Give the groups 10 minutes to prepare. If students are embarrassed to draw the reproductive organs, tell them they have the option to write out “female reproductive organs” and “male reproductive organs.” Do not allow embarrassment to prevent discussion of the effects lead poisoning can have on both the male and female reproductive systems.



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7. Each small group will report on their body parts and their drawing will be placed on the big drawing.
8. Allow for discussion as each body part gets posted. Encourage the participants to cover the information in detail. When the group has finished, ask the class if there are any questions. Assist the group in answering questions. Add any information from the student manual that the participants forgot. Clarify any information that may be inaccurate. Applaud the groups' efforts.

**Lecture/Slides****(20 minutes)**

Purpose: To provide basic, background information on health and medical monitoring to the class. This foundation on health is vital for the rest of the course. It provides the concrete reasons to be motivated to work more safely.

Materials: Slide projector, slides

Directions: Make sure you involve the class in the slide presentation. Ask questions of the class to keep them involved.

Try not to read from the supplied notes about each slide. Using your own words will make it more interesting for the class. You can add any relevant personal experience that you may have. Notes are supplied for slides that are a part of this training kit. The notes include a copy or description of each slide.

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**Discussion question guide****(30+ minutes)**

(Time may vary depending on whether you break the class down into small groups.)

Purpose: To provide the class with an opportunity to give their own answers to these questions and to generate discussion.

You can do this in two ways:

- A. Break the class into small groups of 4-6 individuals and make sure each group has a notetaker that records the answers to each question. Trainees can use their manual. Allow time for the small groups to report back to the entire class. You can save time by having each group report back on just some of the questions.
- B. Conduct a discussion with the entire class using the questions as a guide.

1. How does lead enter your body? What is the main route of exposure for adults? For children?

Lead can enter your body primarily by ingestion or inhalation. The lead that was previously used in gasoline could enter your body through your skin. (This is not usually a route for lead-based paint.) The main routes of entry for adults are ingestion and inhalation, and for children it is ingestion.

2. What parts of the body can lead affect?

Lead can affect almost every organ system in the body except the lungs. It can affect the nervous system (including the brain), kidneys, cardiovascular system and reproductive system.

3. Can you get poisoned by lead without any symptoms?

Yes! Although, the higher your blood lead level, the more likely it is that you will suffer from symptoms. There are individuals who can be poisoned without suffering from symptoms or whose symptoms are mild and do not obviously point to lead poisoning. It is very important to have blood lead levels taken to find out if lead is affecting you.

4. Is there a safe level of lead exposure?

We know that lead does not serve any purpose in the body. It has been found that some degree of harm can be caused by smaller amounts of lead than previously thought. The lower the amount of lead exposure, the less chance for lead to get into the body.

Another concern is that lead is stored in the body, especially in the bones. This means that even a small amount of lead exposure over time will build up in our bones. Lead buildup may be harmful if the lead is released from the bones later on. Lead can be released from bone tissue whenever the body is under stress. Your body can be under stress when you are sick or if you get pregnant. We are still learning about this.

The bottom line is: Keep the amount of lead exposure as low as possible.

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5. **Why is it important to have a medical exam and tests before you begin working as a lead abatement worker?**

It is important for two reasons:

- a. To provide a baseline for how much lead is now in your body. It will allow a doctor to monitor whether the amount of lead in your body goes up as you work with lead-based paint.
- b. To make sure that you don't already have too much lead in your body from recent exposures. If the level of lead in your system is too high, it can be harmful for you to do lead abatement work. An exam also determines whether you have any medical condition that would be adversely affected by additional lead exposure (e.g., rise in blood pressure, kidney problems, pregnancy, etc.)

6. **How are reproductive systems affected by lead, male and female? Can women be banned from jobs with lead exposure by their employer?**

Both men and women can have their reproductive systems seriously affected by lead. If a woman is pregnant, she must be extremely careful because her body will absorb more lead than usual and the lead in her blood can cross the placenta and enter the baby's blood stream. There is also a concern that since lead can be stored in the bone, some of this lead can be released into the bloodstream of the pregnant woman and affect the developing fetus.

Men who are lead poisoned can have odd-shaped sperm that cannot penetrate the egg. The ability of the sperm to move is also decreased. Men lose interest in sex and have difficulty getting an erection.

In the past, many companies developed what were called "fetal protection policies." The stated purpose behind these policies was to protect the fetus from the effects of workplace hazards, including lead. In practice, women who wanted to keep jobs where they risked exposure to lead and other hazardous materials were forced to prove that they could not have children. In some cases, women had to be sterilized to keep their jobs. Often the jobs under such fetal protection policies were higher-paying jobs. In 1991, the Supreme Court struck down "fetal protection policies" as unconstitutional. Such policies discriminate against women, the Court reasoned. Men's reproductive health is also affected by lead. The Supreme Court ruled that women can not be barred from jobs with lead exposure. The employer must provide a safe workplace for both female and male workers. (Refer trainees to the student manual, page 2-12.)



For more information

These publications have more information on the topics covered in this chapter. You should have a copy of the publications marked with a star (*). You can order your own copy by calling 1-800-424-LEAD.

* CDC, *Preventing Lead Poisoning in Young Children* (October 1991).

* Environmental Defense Fund, *Legacy of Lead: America's Continuing Epidemic of Childhood Lead Poisoning* (March 1990).

* EPA, HUD, and CPSC, *Protect Your Family from Lead in Your Home* (June 2003).

Murphy, J. "Fetal Protection v. Women's Jobs: Case Is Before the Supreme Court," *The Nation's Health: Official Newspaper of the American Public Health Association* (November 1990).

National Association of Demolition Contractors, *Lead Safety in the Demolition Industry* (video), 800-541-2412.

National Lead Information Center, "Lead Poisoning and Your Children."

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