

LEAD IN AND AROUND THE HOME: Identifying and Managing Its Sources

This chapter addresses sources of lead in and around the home and explains health hazards associated with exposure to lead. The chapter is divided into three parts:

1. *Identifying Lead Sources Inside the Home*
 - Lead-based paint in or on pre-1978 homes
 - Lead in drinking water from contact with lead pipes, lead-based solder, or other plumbing sources
2. *Identifying Lead Sources Outside the Home*
 - Leaded exterior paint
 - Automobile exhaust
 - Industry
3. *Health Effects of Lead on Children*
 - Avenues of exposure
 - Effects and symptoms of poisoning

Completing this chapter will help you identify and evaluate lead-related risks to your family's health. Tips are given for reducing those risks.

Why should you be concerned?

Lead is a soft metal that has been used in ammunition, ceramics, printer's ink, solder, paint, coins, leaded crystal, and water pipes; as a gasoline additive; and for many other purposes. Lead is dangerous because it is so widely used and lasts forever in the environment. It never breaks down into a harmless substance. You can take steps to reduce your exposure to lead, but you cannot completely avoid it. Reducing exposure is especially important for children.

Lead poisoning is a serious but preventable health problem. Many public health experts consider it the number one environmental health problem in the United States. Many homes have one or more sources of lead. An estimated one in 22 or 4.4 percent American preschool children has an elevated blood-lead level, and the chief suspect is lead-based paint from older homes. Families can also be exposed to lead from their drinking water and other sources.

Lead, depending upon the level, can have wide-ranging effects in humans. Even very low lead levels in children can slow mental development and cause learning and behavioral problems. Lead can also

cause high blood pressure in adults. Higher levels may cause damage to the nervous system and the reproductive system. Sadly, the effects of lead poisoning are frequently irreversible.

Where are the lead sources in and around your home?

The most common sources of lead are lead-based paint, household dust (which can contain lead dust from deteriorating lead-based paint or remodeling), soils contaminated by leaded gasoline exhaust and disintegrating lead-based paint, and drinking water delivered through lead pipes or in contact with lead solder. Over the years, lead has been eliminated by law in residential paint, gasoline, solder, and water pipes. However, many older homes contain lead paint, and even newer homes can contain lead from other sources. Unlike many chemicals, lead does not break down and can remain for long periods in paints, dusts, and soil.

PART 1—Identifying Lead Sources Inside the Home

Identifying and controlling sources of lead in and around your home is an important responsibility. To determine potential risks from sources inside your home, complete the assessment table at the end of Part 1. The information below will help you answer the assessment questions.

When was your home built?

According to the U.S. Department of Housing and Urban Development, 74 percent of all homes built before 1980 contain potentially dangerous levels of lead paint. Although lead has been banned from house paint since 1978, the majority of U.S. homes were built before then. Homes built before 1950 are very likely to have high lead levels, especially in paint used on windows and exterior surfaces. Levels as high as 25 to 35 percent lead by weight are common. Some pre-1950 paint was 50 percent lead.

Does your interior paint contain lead, and what is its condition?

Lead-based paint (LBP) is the most common source of high lead exposure for children. Most exposure, however, comes from contact with contaminated household dust rather than from eating paint chips. As paint ages or as painted surfaces rub against each other, lead-containing dust is created. If your LBP is perfectly intact, then the potential risk of accidental ingestion is greatly reduced. But if lead paint is cracking, chipping, flaking, or being rubbed by contact, then the danger of lead exposure is much higher.

Testing for lead

To find out if your paint contains lead—and if so, how much—have it analyzed by experts who test samples in a laboratory or who examine paint on site using a portable X-ray fluorescence (XRF) detector. Surface-wipe samples, which are used to test dust for lead contamination, may be taken by professional inspectors and sent to a lab for analysis. Some laboratories may analyze surface-wipe samples collected by the homeowner. Do-it-yourself home test kits are available in stores. They indicate the presence or absence of lead but do not indicate how much lead is present. Home test kits may not be reliable for testing surfaces in your home; it is best to have such tests done by a professional. Check with local health officials or state or national lead information resources to find available options. (See “For More Information” on page 69.)

If you find lead . . .

Remodeling or renovating in areas having LBP is especially risky. Scraping, sanding, or burning LBP creates extremely hazardous conditions, and strict precautions need to be taken—especially if children, pregnant women, or pets are present. If possible, homeowners should use the services of a certified lead inspector and lead-abatement contractor. Paint removal, replacement of lead-painted parts (such as windows, door jambs, and moldings), liquid encapsulants (special paint-like products that cover a

surface), and removal off-site of leaded surfaces are some of the options for dealing with lead paint. LBP removal by untrained workers who do not use the proper methods and equipment can create a much greater health hazard than leaving the paint alone.

Is there lead paint on windows and door frames, and what is its condition?

Lead was added to paint to inhibit the growth of mold on the surface of the paint. Thus, paints with higher lead levels were used where exposure to moisture is greatest: on windows, doors, and exterior walls. If high-lead LBP is intact, it poses little risk. But if it is chipping or chalking off, or is scraped or sanded during repairs, then the risk of exposure is great (Figure 6.1). Lead dust, which is the form most easily ingested, is likely to come from weathering (chalking) paint and especially from surfaces that rub or slide together, such as a window in its frame.

Is your drinking water lead free?

Although your drinking water is not usually a concentrated lead source like paint or soil, it can still pose risks to your family. Lead can enter your water from several points: lead pipes that bring water to the home, lead pipe connectors, lead-soldered joints in copper plumbing, and lead-containing brass faucets and pump components. In some private wells, under-water pumps with brass fittings can cause elevated lead concentrations in drinking water, especially with new pumps or if the water is soft. Water that is soft or acidic can be corrosive and tends to dissolve lead from pipes and fittings more easily. Home water softeners, though they do have other benefits, may increase the amount of lead leached into your drinking water if lead is present in your water system.

What can you do to minimize lead in your water?

Water testing will show if lead is present in your water and whether your water is “aggressive” (acidic or soft). Contact a state-certified laboratory or health agency for instructions on how to take a water sample

HOW MUCH LEAD IS IN YOUR PAINT?

Keep good records of any testing so you and future owners can properly manage painted surfaces. Write the results of lead tests here:

Location of paint sample	Amount of lead found (percentage by weight or milligrams/square centimeter)	Date of test

HOW ELSE CAN LEAD ENTER THE HOME?

1. In consumer products. Lead is present in such products as lead-crystal glassware and leaded wine bottle neck wraps made before 1990. It may also be in some foreign-made products such as toys (which may have leaded paint), miniblinds, chalk, crayons, and food cans (which may be made with lead solder). Although lead is now less common in printing inks, it may be present in food packaging labels and newspaper print.

2. From the workplace. Do you work in construction, bridge building, sandblasting, shipbuilding, plumbing, battery manufacturing, auto radiator repair, furniture refinishing, or foundry casting? If so, lead-contaminated dust from your work site can be carried unknowingly into your home on your clothing or skin. Workers exposed to leaded dusts should shower and change clothes before entering their homes.

3. In hobby and recreation supplies. If your hobbies include stained glass, furniture refinishing, pottery (using lead glazes), or collecting pewter or lead figurines, you may be exposing yourself and others to lead. Hunters and fishers who use or make lead bullets and lead sinkers also come in contact with lead. Exposure can also occur at indoor firing ranges.

4. In ethnic medicinals or cosmetics. Various Hispanic and Asiatic communities utilize mixtures that contain high levels of lead. Some of the stomach preparations are actually quite toxic.

(Figure 6.2). If lead levels are greater than 15 parts per billion (ppb), action is recommended. If a city or other public water supply provides your water, contact that office for results of the most recent water tests.

A simple way to reduce lead concentrations is to flush your plumbing system. You must, however, test a sample from flushed water to be sure it is below the lead level of 15 ppb. If your water system has not been used for more than four hours,

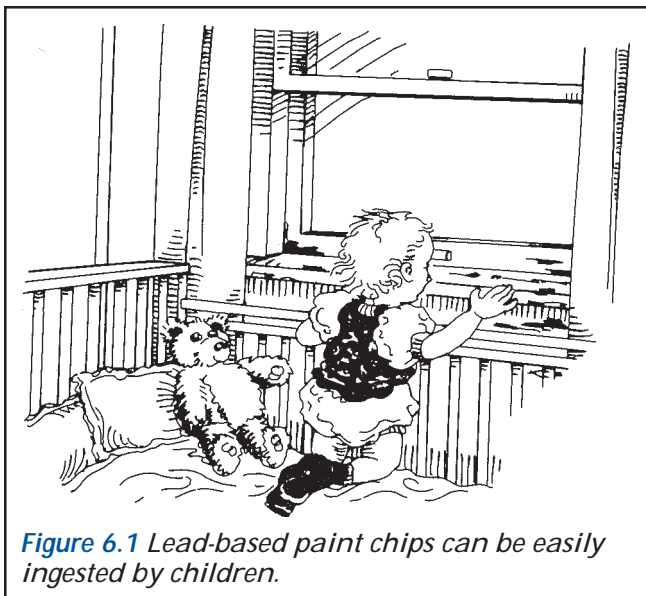


Figure 6.1 Lead-based paint chips can be easily ingested by children.

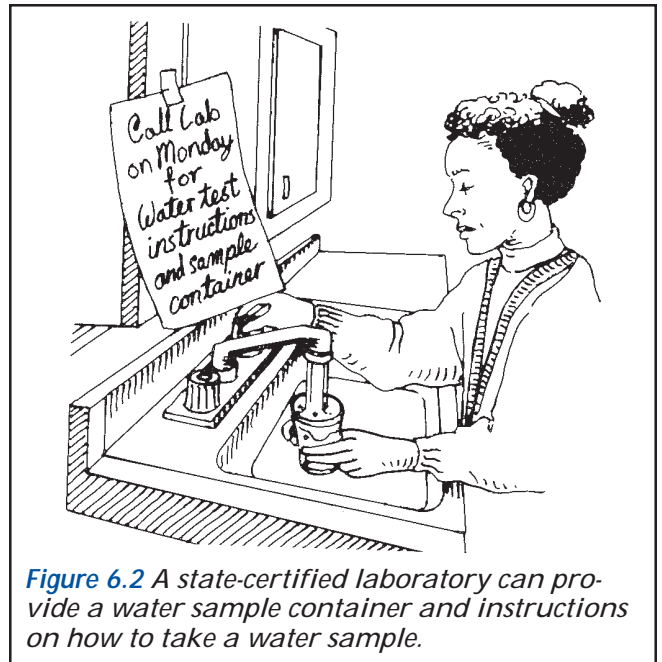


Figure 6.2 A state-certified laboratory can provide a water sample container and instructions on how to take a water sample.

flush the system by letting the cold water run for a minute or two before using it for drinking or cooking.

Also, always use cold tap water for cooking and drinking; hot water is more likely to dissolve lead. Never use water with high lead levels (over 15 ppb) to mix infant formula. For severe lead contamination, you may need to install a water treatment device, such as a reverse osmosis system, a distillation system, or an activated carbon filter. Buying bottled water for drinking and cooking may be the easiest and least expensive option for dealing with severe lead contamination (Figure 6.3). Be aware, however, that bottled water is not necessarily lead free; call or write to the company and request a copy of their most recent water test results.

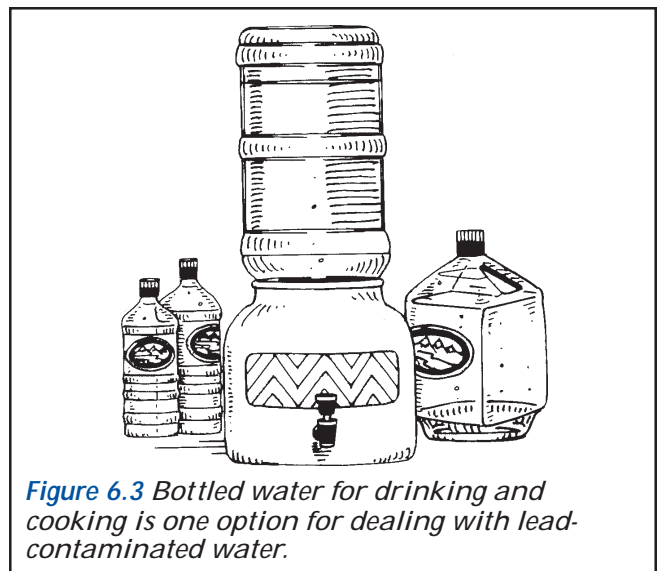


Figure 6.3 Bottled water for drinking and cooking is one option for dealing with lead-contaminated water.

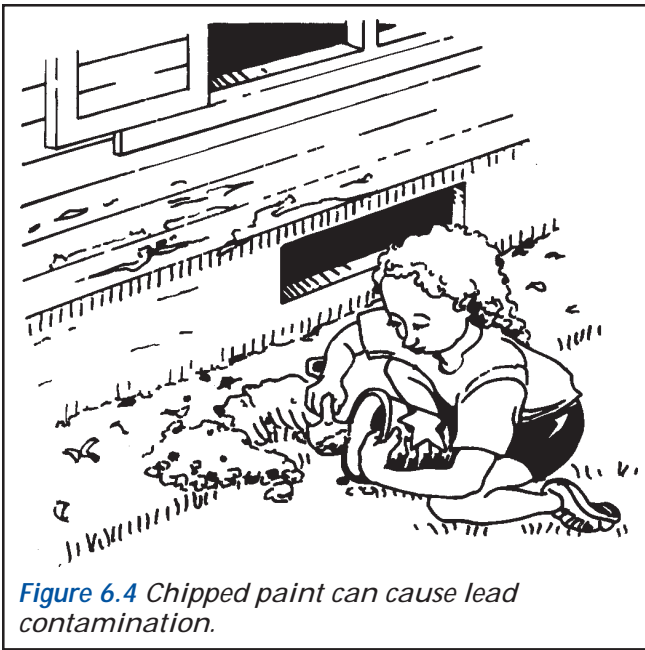


Figure 6.4 Chipped paint can cause lead contamination.

Assessment 1—Identifying lead sources inside the home

Use the assessment table below to rate your lead-related indoor health risks. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits. Refer to the information in Part 1 if you need help completing the table.

Responding to risks

Your goal is to lower your risks. Turn to the action checklist on page 70 to record the medium- and high-risk situations. Plan actions to help reduce your risks.

ASSESSMENT 1—Identifying Lead Sources Inside the Home

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Age of home	Built after 1978.	Built between 1950 and 1978.	Built before 1950	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Interior paint	Testing revealed no lead-based paint.	Testing revealed lead-based paint present, but intact.	No testing—or—Defective lead-based paint identified: it is chipping, peeling, or chalking—or—recent remodeling has disturbed the paint.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Windows and doors	No lead-based paint, or windows and doors with lead-based paint have been replaced.	Lead-based paint present but intact.	Defective lead-based paint: it is chipping, peeling, or chalking or untrained workers have recently removed the paint.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Water supply	No lead water pipes, leaded solder, or brass fixtures used in plumbing.	Lead present in plumbing, but water has been tested and precautions have been taken.	Lead likely to be present in plumbing, but water has not been tested and no precautions have been taken.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Water acidity or corrosiveness	Hardness is around 80 milligrams/liter. pH = 7.5–8.5	Hardness is 60–80 milligrams/liter. pH = 6–7.5	Hardness is 60 milligrams/liter or less. pH = less than 6	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

PART 2—Identifying Lead Sources Outside the Home

Is your family tracking lead into the home?

The soil around your home can be a significant source of lead exposure, and levels are highest where house walls meet the ground (Figure 6.4). Lead-contaminated soil is a problem when children play outdoors, when soil is tracked inside the home, and when vegetables grown in contaminated soil are not thoroughly washed. Soils may be contaminated by flaking, peeling, or chalking lead-based paint that follows the “drip line” of the house.

In high auto traffic areas, leaded gasoline exhaust has been responsible for high levels of lead in soil, with levels highest near major roadways. Unleaded gasoline reduces this risk, but after years of contamination, lead levels can remain high.

If you live near industrial sources such as incinerators, lead smelters, and battery recyclers, you should be concerned about lead in your soil. Urban residents should consider having their soil tested before planting a vegetable garden.

If you live in the counties of the southeast corner of Kansas, you may have a greater potential for lead contamination due to the lead mining and smelting activities of the past. Lead mining and smelting activities were conducted from the late 1800s to the 1970s in this area. These activities left large volumes of abandoned mine tailings containing elevated levels of lead, and many mine shafts and pits that have contributed to ground water and surface water contamination in the areas.

Gravel roads in this part of Kansas may contain high levels of lead. Because of this and the mine tailings, you may need to clean more often to keep

the dust levels in the home low, especially on windy days. Test the soil around the home and test your drinking water supply to confirm lead contamination.

What can soil tests reveal?

Testing your soil is the only way to detect a lead problem. Many laboratories can provide this testing. Parents of children identified as having elevated blood lead levels (above 10 micrograms/deciliter) should contact their county health department for environmental lead testing services. If high lead levels are found, there are several steps you can take. Planting grass or covering soil with mulch can keep your family from tracking the soil indoors or breathing soil dust. In some cases, removal and replacement of heavily contaminated topsoil may be recommended.

What level is safe?

Relatively safe background levels in soils range from non-detectable to 200 parts per million (ppm). Soils with lead levels of 500 ppm or more should not be used for growing vegetables unless the top 6 to 8 inches are replaced with non-contaminated topsoil. In undisturbed soil, lead is usually found in the top 2 to 3 inches.

Lead levels in soil within 85 feet of busy roadways are typically 30 to 2,000 ppm higher than natural levels, and some soils have as much as 10,000 ppm. Soils adjacent to houses with leaded exterior paint may also have lead levels as high as 10,000 ppm. Levels near industrial sources can be dangerously high, especially in areas downwind. Old orchards may also have high lead levels due to lead-containing pesticides applied in the 1940s.

ASSESSMENT 2—Identifying Lead Sources Outside the Home

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Lead-based paint (LBP) on exterior of house	No LBP, or LBP is present but intact. There is a lawn or dense landscape plantings around the side of the home.	LBP is weathered or chalking. There is LBP in the soil around the home, but foot traffic is kept away.	LBP is chipping, peeling, or chalking. There is bare soil or foot traffic below painted walls.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Major roadways	No major roadway nearby.		Major roadway within 85 feet.	<input type="checkbox"/> Low <input type="checkbox"/> High
Lead-related industry	No lead-related industry or incinerators in the area.		Lead mine/smelter, battery manufacturer or recycler, or other lead related industry.	<input type="checkbox"/> Low <input type="checkbox"/> High

ASSESSMENT 3—Health Effects of Lead on Children

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Blood test results	Blood-lead level is under 10 µg/dL.	Blood-lead level is 10–19 µg/dL.	Blood-lead level is 20 µg/dL or higher.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

Assessment 2—Identifying lead sources outside the home

Use the assessment table on the previous page to rate your health risks due to lead outdoors. For each question, indicate your risk level in the right-hand column. Although some choices may not correspond exactly to your situation, choose the response that best fits. Refer to the information in Part 2 if you need help completing the table.

Responding to risks

Your goal is to lower your risks. Turn to the Action Checklist on page 70 to record medium- and high-risk situations. Plan actions to help reduce your risks.

PART 3—Health Effects of Lead on Children

If children live in or visit your home, have they been tested for lead?

Children 6-years-old and younger are much more likely to be affected by lead than adults. Because they naturally engage in hand-to-mouth activities, they are more likely to accidentally ingest lead. Children are at greatest risk from lead because their bodies are developing and they absorb up to 50 percent of the lead they ingest. Adults absorb only about 10 percent.

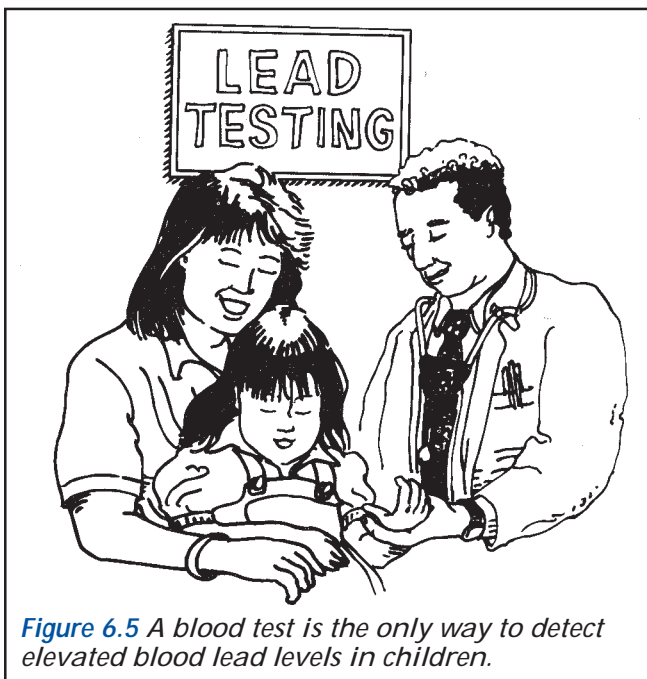


Figure 6.5 A blood test is the only way to detect elevated blood lead levels in children.

Most children with elevated blood-lead levels do not show visible symptoms. A blood test is the only way to detect the problem (Figure 6.5). The lowest levels of lead poisoning have no outward symptoms but can damage the brain. At higher levels of poisoning, symptoms may include tiredness, a short attention span, restlessness, poor appetite, constipation, headache, sudden behavior change, vomiting, and hearing loss. Many of these symptoms may be mistaken for other illnesses.

Since lead is widespread in our environment, it is almost impossible to have a zero level in the blood. Lead levels are measured in micrograms per deciliter (µg/ dL) of blood. Levels of 10 µg/dL or higher are considered elevated in children and are likely to cause negative effects. Many county health departments can test for blood lead level. Elevated blood lead levels should be followed by an environmental lead survey and information to reduce exposure.

Assessment 3—Health effects of lead in children

Use the table above to rate your children's health risks due to lead. Indicate the risk level in the right-hand column. Refer to the information above if you need help completing the table.

Responding to risks

Your goal is to lower your risks. Turn to the Action Checklist on page 70 to record the medium- and high-risk situations you identified. Plan actions to help reduce your risks.

ACTION CHECKLIST

Go over the three assessment tables to make sure you have recorded all high and medium risks in the action checklist on the following page. Next, write the actions or improvements you plan to make. Use the information provided in this chapter to help pick an action you are likely to complete. Write down a date for carrying out your plan. You do not have to do everything at once, but try to eliminate the most serious risks as soon as you can. Often it helps to tackle the inexpensive actions first.

For More Information

Blood tests

Contact your family physician or pediatrician or county public health department.

Testing of paint samples and drinking water

Contact your county health department or private testing laboratories.

If you pay a water bill, call the office number on the bill for water test results.

Educational information for parents and others

Contact your county K-State Research and Extension office or the Kansas Department of Health and Environment (KDHE).

National Lead Information Center

To order a packet of materials about lead, including information specific to your state and locality, call the center toll-free at (800) LEAD-FYI. For personal assistance on a lead-related question, call (800) 424-LEAD.

Kansas Department of Health and Environment (KDHE), Bureau of Community and Local Health deals with lead-related health issues. They can offer advice and possibly assistance with testing and abatement. Contact KDHE at 109 SW 9th, Suite 604, Topeka KS 66612; phone (785) 296-0189.

Poison Control Centers phone number in Kansas is:

1 (800) 332-6633 Keep this number by your phone.

Publications

Bulletins available from your county K-State Research and Extension office:

- *Cleaning to Reduce Indoor Air Contamination.* MF2102.
- *Protect Children from Lead Poisoning.* MF2276.
- *For the Children, Lead Testing.* (video) SV401.

Brochures available from KDHE (address and phone listed above):

- *Screening Young Children for Lead Poisoning.* November 1997. Centers for Disease Control (CDC). U.S. Department of Health and Human Services.
- *Childhood Lead Poisoning Prevention Guidelines.* May 1995. KDHE.
- *Lead in Your Home.* Publication EPA/747-B-98-002, June 1998, U.S. Environmental Protection Agency (EPA).
- *Preventing Lead Poisoning in Young Children.* October 1991. Centers for Disease Control (CDC), U.S. Department of Health and Human Services. Contact the CDC at 4770 Buford Highway, Atlanta, GA 30341-3724; phone (770) 488-7330.
- *Lead in Your Drinking Water: Actions You Can Take to Reduce Lead in Drinking Water.* Publication EPA/810/F93/001. June 1993. U.S.

Environmental Protection Agency fact sheet. Available from the National Center for Environmental Publications and Information, P.O. Box 42419, Cincinnati, OH 45242-2419; fax (513) 489-8695.

- *Reducing Lead Hazards When Remodeling Your Home.* Publication EPA/747/R94/002. April 1994. U.S. Environmental Protection Agency. Available from the National Center for Environmental Publications and Information—see contact information above.

Kansas Home*A*Syst Helps Ensure Your Safety

This *Kansas Home*A*Syst* handbook covers a variety of topics to help homeowners examine and address their most important environmental concerns. See the complete list of chapters in the table of contents at the beginning of this handbook. The end of each chapter lists resources and other useful information. For more information about topics covered in *Kansas Home*A*Syst*, or for information about laws and regulations specific to your area, contact your county K-State Research and Extension office.

Contact the Kansas Farm*A*Syst/Home*A*Syst office at Biological and Agricultural Engineering, Seaton Hall, Manhattan, KS 66506-2917; phone: (785) 532-5418. Web page: www.engg.ksu.edu/enggext/ppi/homeasyst; or the National Farm*A*Syst/Home*A*Syst Office at: B142 Steenbock Library, 550 Babcock Drive, Madison, WI 53706-1293; phone: (608) 262-0024; e-mail: <HOMEASYST@MACC.WISC.EDU>.

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This chapter was based on original materials written by Karen Filchak, Extension Educator, University of Connecticut Cooperative Extension, Brooklyn, Connecticut.

Action Checklist

Lead In and Around the Home: Identifying and Managing Its Sources

Write all high- and medium-risks	What can you do to reduce the risk	Set a target date for action
Sample: House was built in 1935. Paint has not been tested for lead.	Arrange for inspection of the condition of the paint. Test for lead-contaminated dust.	One week from today: April 3
Interior paint has moderate levels of lead. Plan to remodel bedroom this spring.	Contact licensed lead-abatement contractor about project assessment and cost. Contact local or state health department for recommendations and information.	One month from today: April 22
High level of lead in soil around house.	Get information on best grass from County Extension agent and plant grass to reduce the dust (containing lead) entering my home.	One week from today: March 29

*Kansas Home*A*Syst*, an environmental risk-assessment guide for the home, is a cooperative project of the Pollution Prevention Institute, K-State Research and Extension Service, Kansas Department of Health and Environment, U.S. Environmental Protection Agency, and the Environmental Department, Conservation District, and Natural Resources Conservation Service of Johnson County, Kansas, and Johnson County/K-State Research and Extension Office.

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