

Multnomah County 2001



Prevalence of Lead Dust Hazards Study:

A Report for the Community
February 2001



Multnomah County Health Department
Office of Planning and Development
Program Design & Evaluation Services
City of Portland
Water Bureau

Lead hazards in homes are serious problems that affect every community.



Summary of Findings

Indoor lead dust is a major cause of lead poisoning in children. In this study, a screening procedure was used to measure the amount of lead dust in 125 houses in North, Northeast, and Southeast Portland that were built before 1930. Seventy-one percent of the houses had composite lead dust levels that exceeded federal standards. These houses may contain amounts of lead dust that could be hazardous to children and adults.

71% of homes in this study had composite lead dust levels that exceed federal standards.

Introduction



Taking the lead out of gasoline greatly reduced the amount of lead found in children over the past 20 years. Recently, communities across the United States have become worried about health problems in children caused by lead dust in homes, which comes mostly from old paint that has lead in it. Lead dust is hard to see. It may still be present in homes that are dusted and cleaned often. Studies conducted in other states found that there can be lead dust from paint and other sources in houses and apartments built before 1978, but not much in homes built after that. In 1978, manufacturers were stopped from putting lead into house paint.

Health investigators have found that the more lead dust they find in homes, the more lead they find in the children living in those homes. Children between the age of 6 months and 6 years old are most likely to get lead into their bodies because they have more direct contact with the dust on floors, window sills, and furniture. Children of that age often put dusty hands and other objects in their mouths, and accidentally eat the lead.

Small children often put dusty hands and other objects in their mouths, accidentally eating the lead particles.

Sources of Lead in Dust

Lead dust in homes mostly comes from the lead in paint that has been used in older homes on windows and window frames, and from doors and door frames. Some lead dust inside homes may actually come from soil and dirt that has been blown in through windows and doors, or tracked in from outside on shoes or on pets. The lead in the soil comes from outdoor lead paint, lead from leaded gasoline, and air pollution.



Portland children have lead in their bodies:

In 1995, the Oregon Health Division found that 3 to 5 children out of every 100 screened for lead in the Portland area had lead levels in their finger blood that were too high (10 micrograms or higher¹). The federal Centers for Disease Control and Prevention (CDC) says that blood levels of **10 micrograms or above** can cause health problems in children, including lower intelligence, behavior problems, and problems with blood vessels, blood pressure, the liver, and kidneys.

The Multnomah County Health Department goes to the homes of children who have been tested and found to have venous blood lead levels that are above 15 micrograms. About 75% of the time, the high blood lead levels in the children were from lead dust in the homes. (Lead in earthenware cookery, lead in home remedies, hobbies that use lead, and lead dust brought home from the workplace have been found, but are less frequent sources of lead poisoning for adults and children in Portland.)

Lead dust may enter the house from open doors or windows, or tracked in from outside on shoes or on pets.

¹ Measuring the weight of the lead in a small sample of blood is the way health care workers estimate health problems. A microgram is very small amount (there are about 28 million micrograms in an ounce), but even tiny amounts of lead can cause health problems inside the body.

Efforts were begun to reduce home lead hazards in Portland:

In 1997, the City of Portland Bureau of Water, the Multnomah County Health Department, and the Oregon Health Division began the Home Lead Hazard Reduction Program (HLHRP). The goals of the program are to make communities aware of lead hazards in the home, to give information that can be used to reduce lead hazards for children, and to help residents reduce home lead hazards through the Portland Community Lead Education and Reduction Corps team (CLEARCorps, a part of AmeriCorps).



In 1997, there was no information about lead dust problems in Portland homes:

Despite the lead dust problems across the country and the children with elevated blood lead levels in Portland, there was no information on Portland homes with lead problems. The answers to these four important questions were needed:

1 **How many Portland homes have lead dust hazards?**

The answer to this question is important for deciding how large a program to develop, how it works to reduce lead hazards, and how long the program will need to last.

2 **Where are the Portland homes that contain lead dust hazards?**

The answer to this question will inform residents and communities about lead hazards and hazard reduction, and tell the CLEARCorps team where they should be working.

3 **How large are the hazards in homes with lead dust?**

Do most homes have only small amounts of lead dust, or do some homes have really large amounts of lead dust that are more likely to poison a child?

4 **Can a way be developed to identify a home with lead hazards without doing expensive testing?**

This information would be helpful to residents and for targeting and evaluating the efforts of the CLEARCorps team.

A study was done to measure lead dust hazards in homes:



To answer these 4 questions, the Multnomah County Health Dept. conducted a study to find out the locations and amounts of lead dust hazards in older Portland homes. The study was begun in 1998 and completed in 1999.

This report describes how the study was done, describes the study findings, and describes what the findings mean for Portland.

Measurement and Definitions

How lead dust was measured:

Lead dust on floors, in window wells, and on window sills of homes was collected by using the “wet wipe” screening method described by U.S. Dept. of Housing and Urban Development (HUD). This method involves wiping a measured section of floor with a moist towelette to remove as much dust as possible. The towelette (or “wipe”) was then put in a clean plastic tube. Two or three other towelettes that had been used to wipe sections of floors in other rooms of the home were added to the tube. In a similar way, three to four wipes from

window wells were put into a second tube, and three or four wipes from window sills were put into a third tube. The tubes were sent to a laboratory who measured how much lead was in each tube. The laboratory sent the results back as the total number of micrograms of lead in the total area wiped by the towelettes. This number of micrograms is called the “composite lead loading,” because the amounts of lead from each of the three or four wipes in the tube are combined.

Federal limits on the amount of lead dust in homes:

The U.S. Environmental Protection Agency (EPA) and HUD have set “limits” on the amount of lead dust that can be found during a screening. In 1998, when the study was done, a screening lead loading that was more than 50 micrograms of lead in each square foot of floor or 400 micrograms of lead in each square foot of window well was potentially hazardous. (The window sill was not a part of the HUD screening method in 1998.) Lead loadings that are equal or greater than these limits may indicate the presence of too much lead.

We used a screening method to find lead hazards:

We used a “screening” method to estimate the levels of lead dust in homes. The screening method is designed to quickly find out if the home might have a lead problem. The screening method can’t tell the residents where the lead is coming from, only if the levels are too high or not. Also, because it is designed to find all homes that *might* have a lead problem, the screening method uses lead loading limits that are one-half the limits used for a full home lead risk assessment. EPA and HUD recommend that if a home has screening lead loadings over the limits, a full home lead risk assessment should be done to confirm the presence of lead hazards.

Confirmation of screening findings:

If a full risk assessment is done to confirm the screening findings, most of the time it confirms the presence of a lead dust hazard and finds the likely sources of the lead.

Sometimes the full risk assessment does not confirm the presence of a lead dust hazard. This is called a screening “false positive.” Some false positive homes will be found during screening for lead hazards because the screening method uses lead loadings that are smaller than the loadings used in the full risk assessment. The loadings are intentionally smaller in the screening so that homes with some lead hazards will not be overlooked (false negatives).

Locations of lead dust in homes:

In the study, we measured the amounts of lead in dust in window wells, on window sills, and on non-carpeted floors. HUD believes that the lead loadings these locations will be similar to lead dust loadings elsewhere in the home. If a certain amount of lead dust is found on floors and window sills and in window wells, it is likely that a similar amount of lead dust is also on furniture, toys, beds, kitchen counters, and other objects that dust may settle on.



Lead in soil:

On the property of some homes were areas of bare soil where children might play. If we saw bare soil areas, we took a soil sample and had it analyzed for lead. Many soil areas near houses and apartments are contaminated with lead because of flaking paint from houses and from lead that used to be in gasoline. The EPA has set limits on the amount of lead in soil. The EPA limit at the time of the study was 400 micrograms in each gram of soil where a child might play.²

² The outdoor soil lead is measured differently than dust lead from inside the home. In soil, it is the weight of the lead in a known weight of soil (called the lead concentration). In indoor dust, it is the weight of the lead in a known surface area that has been wiped (the lead loading). Lead concentrations and lead loadings cannot be directly compared with each other.

How Was This Study Carried Out?

This study was designed and conducted by Program Design and Evaluation Services, which is a part of the Division of Health Planning and Development, Multnomah County Health Dept., and the Center for Disease Prevention and Epidemiology, Oregon Health Division. Assistance was also provided by the Environmental Health Program of the Oregon Health Division. The study was funded by the City of Portland, Bureau of Water.

How the homes were selected for the study:

We selected homes in Portland that were built before 1930 for the study. Homes of this age were included because they were built and painted when paint contained high amounts of lead. We wanted to see how large the lead dust problems were in homes that were likely to have lead paint in them. Because home lead problems mostly affect children, the homes in the study also had to contain at least one child that was 6 years old or under.

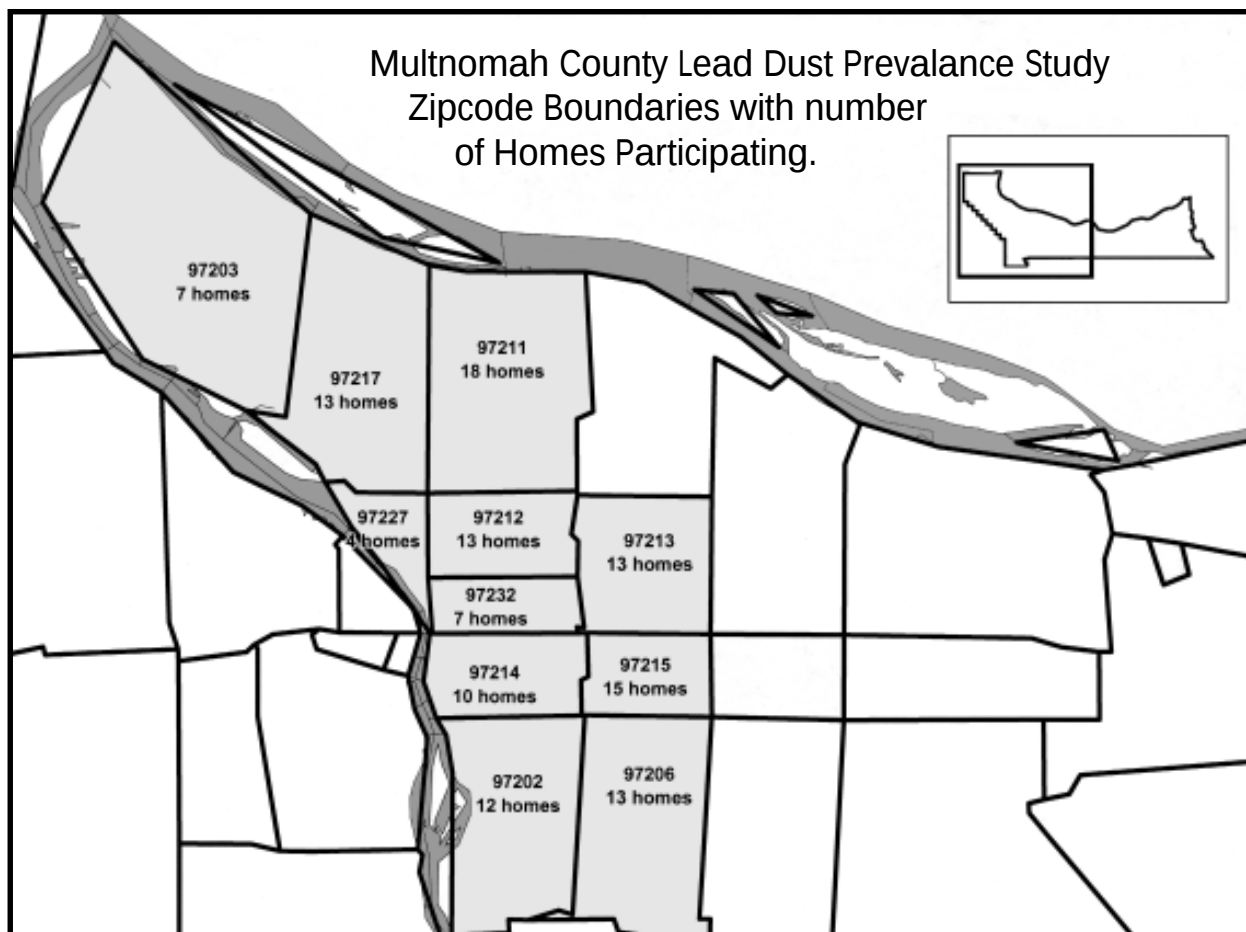


Most of the homes in the Portland area that were built before 1930 are located in 11 Zip Codes in North, Northeast, and Southeast parts of the city, so we did the study in those Zip Codes. To find homes in these areas, the Oregon Health Division gave us a list of dwellings built before 1930, which they extracted from the Multnomah County Tax Assessor information. Then the Health Division developed a list of births over the past 6 years and combined it with the list of dwellings to identify about 10,000 older homes that were likely to contain children 6 years old and younger. A

recruiting contractor (Gilmore Research, Inc.) was hired to obtain current telephone numbers for those homes, to randomize the list of addresses and phone numbers³, and to call the residents to see if they wanted to participate in the study. A total of 125 homes in those 11 Zip Codes agreed to participate in the study and were visited by the licensed lead risk assessor we hired to take the lead dust samples⁴.

³ Randomizing the addresses gives each household on the list in Zip Code an equal chance of being called.

⁴ We actually sampled dust from 127 homes, but two of those had recent work done on them that affected the results. The data from these two homes therefore were not included in the findings.



Area of the study

The table on this page shows the number of homes in each Zip Code that were in the study. The number of homes included in the study for each Zip Code was different.

If a Zip Code or more older homes and more children 6 and under, we visited more homes in that Zip Code than in those that had fewer older homes or children.



Visits to the homes were started in August 1998 and completed in December 1998.

Zip Code	Number of Homes
97202	12
97203	7
97206	13
97211	18
97212	13
97213	13
97214	10
97215	15
97217	13
97227	4
97232	7
Total:	125

Visits to the homes:

All 125 homes that were selected for the study were lived in by their owners. There were no rental houses or apartments in the study. When the risk assessor went to the house, he explained the study to the residents and obtained their consent to take dust and soil samples. He then took the composite indoor dust wipe and soil samples, and also examined the house for any deterioration and structural problems. He also asked whether anyone in the household had a hobby that involved lead, and asked similar questions about other lead hazards. The household was paid \$20 for their time and effort to be in the study.



Analyzing the wipe samples:

The wipe samples were mailed to METS Laboratory in Maryland, who did lead analysis by a very sensitive technique that could measure as little as 5 micrograms.⁵

The laboratory results were sent back to the Multnomah County Health Dept., and then were shared with the households.

⁵ Atomic absorption spectrometry.

Study Findings



Most of the homes in the study contained lead dust loadings above the federal screening limits.

The large percentage of homes in the study that had lead loadings above federal limits indicates that a significant number of Portland children are at risk for lead poisoning.

A significant number of Portland children may be at risk for lead poisoning.

Question 1:



How many Portland homes have lead dust hazards?

Answer: Most homes had lead dust loadings over federal limits:

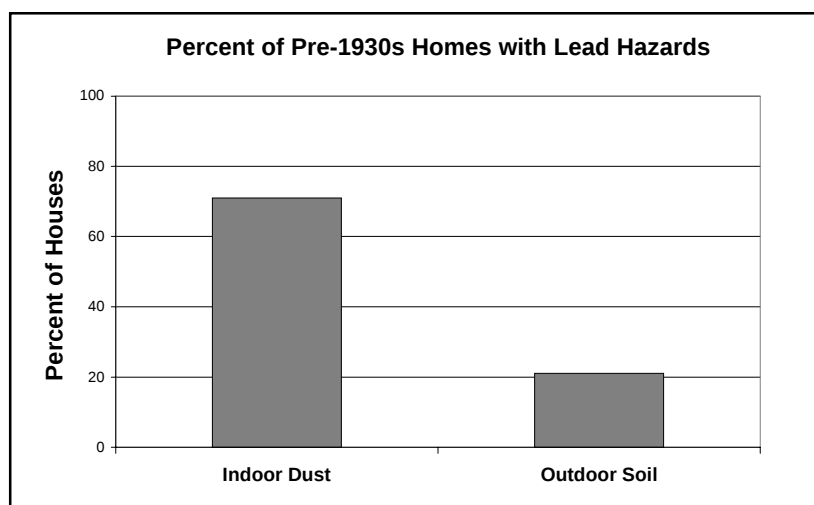
Eighty-nine of 125 homes (71%) had a composite screening lead loading in window wells or on floors, or both, that were above the HUD limits (see graph below). This means that most of the homes built before

1930 are likely to contain lead dust loadings in amounts that may be hazardous, especially to children. Currently, we don't know how many homes built after 1930 contain lead hazards.

Many homes had soil lead concentrations over federal limits:

Forty-eight of 125 homes (38%) had bare soil play areas (not including garden areas) in which children might play. Twenty-seven of those 48 soil areas (56%) had lead concentrations above the EPA limit of 400 micrograms

per gram of soil (see graph below). This means that about 21 percent of the homes built before 1930 also have bare soil that contains too much lead. Lead-contaminated soil that is tracked into the home on shoes, clothing, toys, or pets may add to indoor lead dust loadings.





Homes where window wells could be sampled:

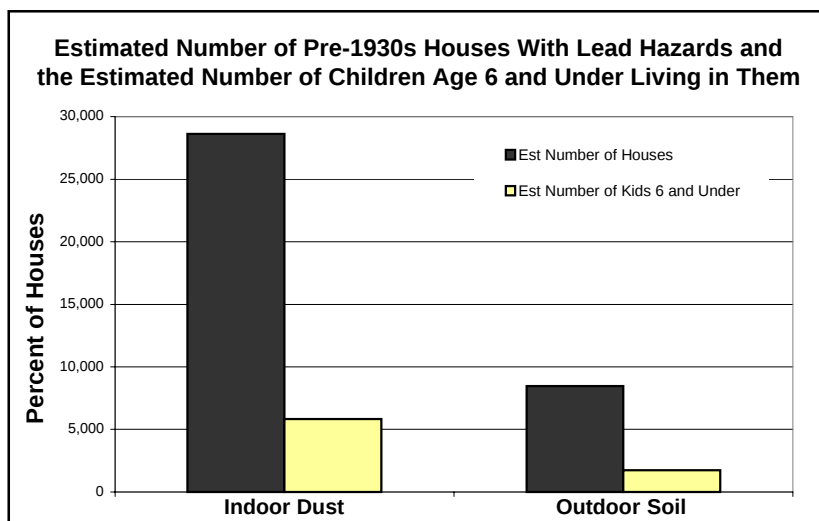
In twenty-eight homes, windows could not be opened to sample the wells or had newer replacement windows that did not contain wells. In the rest of the 97 homes that had double-hung windows that could be opened, eighty-nine of them (92%) had a composite screening loading that were above the HUD limits. This means that homes built before 1930 that contain the original windows that slide up and down are even more likely to have lead dust hazards.

Estimates of the number of homes with lead hazards and the number of children and adults at risk:

In the 11 Zip Code study area, there are over 40,000 houses built before 1930. Based on 1990 Census data, there were about 2 children aged six and under living in every 10 of those houses.⁶ Therefore, over 28,000 homes in those 11 Zip Codes may have indoor lead dust hazards, and over 5,800 children live in those homes and are at risk for having an elevated blood lead level from lead dust. Based only on lead soil concentrations, about 8,400 homes in those 11 Zip Codes have outdoor lead hazards and over 1,700 children are at risk from lead in bare soil. But many homes had both problems – lead dust inside and lead in soil near the home.

Adults are also at risk for lead poisoning from household lead dust. However, because adults often have less contact with dusty surfaces their blood lead levels are often lower than children living in the same house. Adults can become lead poisoned from home repairs or renovations that disturb lead paint, or from home remedies that contain lead.

⁶ Data supplied by the Oregon Health Division.



Question 2:

Where are the Portland homes that contain lead dust hazards?

Answer: Wherever we found houses built before 1930, we found lead dust hazards.

There were no significant differences in lead loadings among pre-1930s homes located in North, Northeast, and Southeast Portland. Lead hazards are in many homes built before 1930 no matter where they are located in Portland.

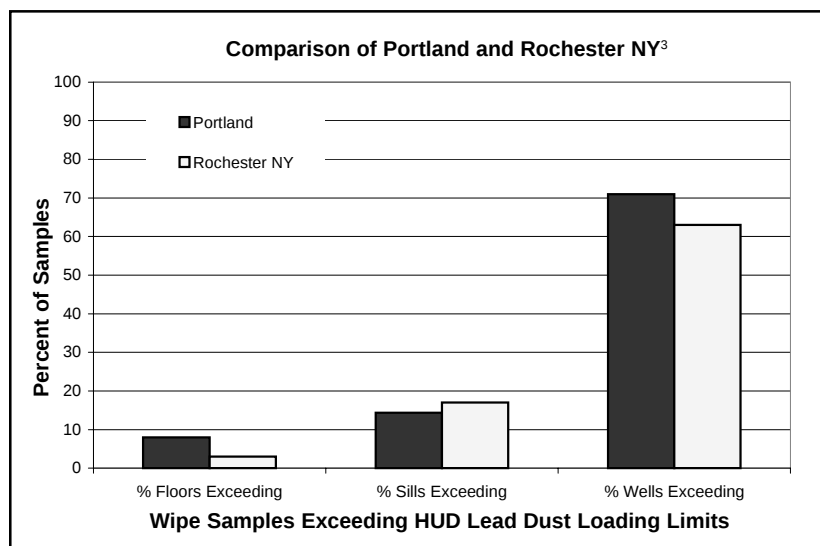


Question 3:

How large are the hazards in homes with lead dust?

Answer: As large as the problem in other cities.

The percentage of lead dust samples above the screening limit was similar to Eastern cities (e.g., Rochester, NY).⁷ Home lead hazards are not limited to the older cities of the East and Midwest; the lead problems in Portland are significant.



⁷ Lanphear, B.P., Weitzman, M., Winter, N.L., et. al. Lead-Contaminated House Dust and Urban Children's Blood Lead Levels. Am. J. Public Health, 86(10), 1416-1421, 1996.



Question 4:

Can a profile be developed to identify a home with lead hazards without doing expensive testing?

Answer: Not from the findings of this study.

We used the HUD Building Condition Form to describe any problems with the condition of the 125 owner-occupied homes that we visited. Twenty-nine of those homes (23%) had at least one problem with the structure – mostly problems with gutters and exterior or interior walls. Unfortunately, there was no pattern of problems that could serve as a profile for identifying homes that had elevated lead dust levels.

Other study findings:

- ▶ Window well lead loadings were responsible for most homes being above the screening limit; many of the wells contained visible paint chips in addition to dust.
- ▶ There was no seasonal change in lead dust loadings - the lead loadings found in August were similar to those found in December, 1998.
- ▶ There were no significant differences in lead loadings among houses built in each decade between 1890 and 1929.

Study limitations:



- ▶ Only owner-occupied houses were included in the study. Because other studies⁷ have shown that rental housing often contains more lead hazards than owner-occupied housing, our study may underestimate the number of Portland homes with lead dust problems.

- ▶ We only looked at houses that were built before 1930. Our findings will only apply to dwellings in that age range. Houses that are younger may also contain lead hazards. The number of younger dwellings in Portland with lead dust problems is unknown.

- ▶ The recruiting contractor we used was able to call only English-speaking residents. We therefore can't use these study findings to estimate the number of homes of non-English speaking Portland residents with lead dust problems.

- ▶ We did not get blood samples from residents. Therefore, we cannot estimate the number of children with elevated blood lead levels who live in Portland dwellings built before 1930. We also cannot identify household lead dust loadings that may be associated with elevated blood lead levels in children.





What do the findings of the study mean for Portland?

This study shows that Portland shares similar home lead hazards with other parts of the country. Seventy-one percent of 125 houses built before 1930 in 11 Zip Codes in North, Northeast, and Southeast Portland had composite lead dust levels that exceeded federal standards. These houses may contain amounts of lead dust that could be hazardous to children and adults. Children who live in older homes across the country and in Portland are at risk for elevated blood levels from exposure to lead dust in homes.

What is Currently Being Done?

The City of Portland and Multnomah County have already started to raise awareness of home lead hazards.

The Home Lead Hazard Reduction Program was started in 1997, and has been educating household residents, doing outreach to community organizations, working on lead hazards in housing, working with health care providers to increase blood lead screening in children, and doing studies to understand lead problems in our community. Also, the Portland Lead Hazard Control Program (PLHCP) was started in 1998. The PLHCP provides grant funds and loans to dwelling owners for renovating lead-contaminated homes.

While these programs are important and helpful, the resources are not enough. With current resources it would take more than 1,600 years to control lead hazards in these pre-1930s homes with lead problems by repairing or remediating affected houses in the 11 Zip Code study area. And the older homes in the study area are only a small portion of the homes with lead hazards in the Portland metro area - there are many more houses that have lead dust problems. Clearly, fixing up old houses will not protect vulnerable

children soon enough. Training for home owners, residents, and parents on specific ways to control the lead dust hazards in their homes (such as damp dusting and mopping) should be widely available, so that more immediate protection can be provided to the 5,000 to 10,000 children that live in them.

Resources

The following resources and programs are currently available to residents and homeowners for reducing home lead hazards.

Multnomah County Health Department

Lead Information Line: 503-988-4000

Blood Lead Screening: The Lead Information Line provides information in several languages about lead hazards and the effects of lead. The Lead Line also provides information about programs that can help reduce lead poisoning and where children can be screened for lead. For blood lead screening, contact your individual county health clinics if you are a client. Blood lead screening is also offered through county immunization clinics. You can find out when and where immunization clinics are being held in your neighborhood by calling 503-988-4000 or by using a computer to visit the Multnomah County Web Site:

<http://www.multnomah.lib.or.us/health/immunizations.html>

For a copy of this report: <http://www.co.multnomah.or.us/health/lead/>

City of Portland Bureau of Housing and Community Development

Portland Lead Hazard Control Program

Grants and loans for lead remediation work on houses:

Mr. Don Graves-Highsmith 503-823-3416

Information and Community Education:

Ms. Andrea Matthiessen: 503-823-2379

City of Portland Water Bureau - Lead Hazard Reduction Program

Lead in Water Testing Program: Customer Service 503-823-7770

CLEARCorps Team (Community Lead Education and Reduction)

The CLEARCorps is a component of AmeriCorps that has provided community lead education, in-home evaluations for lead hazards, and training on lead dust control for residents. The CLEARCorps program is currently inactive in Portland, but may re-start in 2001. Please contact the Lead Information Line (503-988-4000) to inquire about the current status of the team.

Physicians for Social Responsibility/Coalition of Black Men

Free blood lead screening is provided the second Saturday of each month at Common Bond, 4919 NE 9th Ave, Portland (503-280-1616) [corner of NE Alberta Street and 9th Ave] between 10 AM and 2 PM. For more information, call 503-274-2720.

Health care providers and clinics

Your child's doctor, nurse practitioner, or health clinic can screen your child's blood for lead and examine your child for signs of lead poisoning. All children up to age six on Medicaid or in the Oregon Health Plan are legally required to be tested. Many other insurance plans provide coverage for lead screening.

Community Based Organizations and Neighborhood Associations

Organizations such as the Environmental Justice Action Group (EJAG) (503-283-7841), and various Neighborhood Associations are involved in lead hazard issues. To obtain contact information about your Neighborhood Association, call 503-823-4519.

Other Local Lead Resources

The Oregon Health Division's Lead Based Paint Program.

The Lead Based Paint Program can answer questions for do-it-yourselfers about lead-safe remodeling, or about finding a contractor who can work lead-safe. They can also give information about lead poisoning prevention, and provide lists of certified inspectors and risk assessors to test for lead paint and certified contractors trained to remove or control lead-paint hazards in an environmentally safe manner. 503-731-4500.

The Oregon Health Division's Elevated Blood Lead Surveillance Program:

The Blood Lead Surveillance Program can answer your questions about blood lead screening, sources of lead exposure for both children and adults, and also workplace lead exposures. 503-731-4025

U.S. Environmental Protection Agency (EPA) Lead Hotline:

The Oregon office of the EPA maintains a Lead Hot Line. The EPA can provide information about lead hazards, prevention of lead poisoning, and on lead safe remodeling. Information on other resources, and on the Title X 'Disclosure Rule' is also available. 503-326-4006

National/Internet Lead Resources:

Alliance to End Childhood Lead Poisoning:

<http://www.aecclp.org/index.html>

Phone: 202-543-1147

National Lead Information Center (EPA):

<http://www.epa.gov/opptintr/lead/nlic.htm>

(1-800-424-LEAD)

HUD Office of Lead Hazard Control:

<http://www.hud.gov/lea/leahome.html>

Centers for Disease Control and Prevention (CDC) Lead Poisoning Prevention Program:

<http://www.cdc.gov/nceh/lead/lead.htm>

National Center for Lead-Safe Housing (NCLSH):

<http://www.lead-safehousing.org>

Community Lead Education and Reduction Corps (CLEARCorps/USA Office):

<http://www.clearcorps.org>

Appendix

September 2000 HUD Screening Lead Loading Limits:

In September 2000, HUD changed the lead dust screening procedure and loading limits. The wipe sampling locations were changed to include only window sills and floors (instead of window wells and floors that were required in 1998 for this study). Also, the screening lead dust loading limits were lowered to 125 micrograms for sills and 20 micrograms for floors.

In our study described in this report, we also took window sill samples, so we can see how the findings would have changed if the study were

repeated after September 2000. Using the new sampling locations and lead dust loading limits, forty-nine of the 125 homes (39%) would have been considered to have a potential lead hazard.

This means that with the new screening procedure, over 15,700 homes may contain indoor lead dust hazards and over 3,200 children might be at risk in the 11 Zip Codes of the study.

In our study, we found that 71% of sampled homes had potential lead dust hazards using 1998 procedures.



Most of the lead dust problems were found in window wells. Therefore, some public health workers are concerned that because the new procedure does not require samples to be taken from window wells, it may underestimate potential lead hazards in homes.

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*For information about Lead Hazards or
for a copy of this report, contact:*

LEAD INFORMATION LINE

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<http://www.co.multnomah.or.us/health/lead/>