



**LIANNA DEVELOPMENT CORPORATION**  
EPA - OHIO - OSHA Safety Provider

**650 Eva Ave. Akron Ohio 44306**

## Albert L. Smith

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[www.ldctp.com](http://www.ldctp.com)

**EPA - RRP**

## LDCTP'S STUDENT HANDBOOK

Training site location: 650 Eva Ave. Akron Ohio 44306, on the corner of Eva Ave. & Coventry

### Lianna Development Corporation



(4.6 out of 5 stars - **64 student reviews**)

Lianna Development Corporation has been providing lead hazard related consultant services since 1999. The owner/president has operated over nine Lead-Based Paint Hazard Control Programs. The company was accredited by EPA in August 2010 and approved by the State of Ohio Department of Health in October 2010 to provide the Renovation, Repair and Painting Certification courses Initial and Refresher. Approved by State of Ohio Department of Health in November 2014 to provide the Abatement Contractor Supervisor Initial and Refresher courses. Became an OSHA Outreach, General Industry November 2014 and Construction December 2014 authorized trainer. LDCTP is committed to providing the best learning experience, and has purchased a training center dedicated to enhancing students learning experiences.

**\*\* EPA \*\***

EPA RRP Initial Class ( 8 hours) — 8:00 am to 4:30 PM or two nights 6:00 to 10:00 PM

EPA RRP Refresher Class (4 hours) — 8:00 am to 12:00 PM or 6:00 to 10:00 PM

**\*\*OHIO\*\***

Ohio Abatement Worker Initial Class (32 hours) — 8:00 am to 4:30 PM

Ohio Abatement Contractor Supervisor Initial & Refresher Class (40 hours) — 8:00 am to 4:30 PM

Ohio Abatement Contractor Inspector Initial Class (24 hours) — 8:00 am to 4:30 PM

Ohio Abatement Contractor Risk Assessor Initial & Refresher Class (16 hours) — 8:00 am to 4:30 PM

**\*\*OSHA\*\***

OSHA Contractor Outreach 10 Hour Class — 9:00 am to 3:30 PM

OSHA Contractor Outreach 30 Hour Class — 8:00 am to 4:30 PM

OSHA General Industries Outreach 10 Hour Class— 9:00 am to 3:30 PM

OSHA General Industries Outreach 30 Hour Class— 8:00 am to 4:30 PM

**Register now! - Credit Card Links and class prices are listed on our web site [www.ldctp.com](http://www.ldctp.com) or call (330) 957-7145**



# LeadCheck<sup>®</sup>

RED MEANS LEAD

LeadCheck<sup>®</sup> Recordkeeping Forms



All required documentation:



[<<<Click on Red Box to get the Renovator Right Brochure](#)

- Pre-Renovation Education and Notification
- LeadCheck<sup>®</sup> Test Kit Documentation Form
- Non-Certified Workers Training Form
- Lead Safe Work Practices Check List
- Cleaning Verification Form

JOB NAME: \_\_\_\_\_

JOB DATE: \_\_\_\_\_

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\*—Indicates a copy of the form must be given to property owner

You must also keep a copy of a description of the scope of the work being done, proof of valid certification of the renovator and form on site, and you must bring a *Renovate Right Pamphlet* to give to property owner.



## Pre-Renovation Form

This form may be used by firms to document compliance with the requirements of the Federal Lead-Based Paint Renovation, Repair, and Painting Program.

### Occupational Confirmation

#### Pamphlet Receipt

I have received a copy of the lead hazard information pamphlet informing me of the potential risk of the lead hazard exposure from renovation activity to be performed in my dwelling unit. I received this pamphlet before the work began.

---

Printed Name of Owner-occupant

---

Signature of Owner-occupant

#### Renovator's Self Certification Option (for tenant-occupied dwellings only)

Instruction to Renovator: If the lead hazard information pamphlet was delivered but a tenant signature was not obtainable, you may check the appropriate box below.

**Declined**—I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below at the date and time indicated and that the occupant declined to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit with the occupant.

**Unavailable for Signature**—I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below and that the occupant was unavailable to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit by sliding it under the door or by (fill in how pamphlet was left)

---

Printed Name of Person Certifying Delivery

Attempted Delivery Date


---

Signature of Person Certifying Lead Pamphlet Delivery

---

Unit Address

Note regarding Mailing Option—As an alternative to delivery in person, you may mail the lead hazard information pamphlet to the owner and/or tenant. Pamphlet must be mailed at least 7 days before renovation. Mailing must be documented by a certificate of mailing from the post office

 is more than a product - we are a resource. Our call center is staffed with RRP certified advisors Monday-Friday 8am - 6pm. If you have questions or concerns regarding EPA's RRP Rule, we have the answers. Call **1-800-262-LEAD** and stay informed. Also, sign up for our newsletter or read our blog at [www.LeadCheck.com](http://www.LeadCheck.com).





**Renovation Notice**—For use in notifying tenants of renovations in common areas of multi-family housing.

The following renovation activities will take place in the following locations:

Activity (e.g., sanding, window replacement)

Location (e.g., lobby, recreation center)

The expected starting date is \_\_\_\_\_ and the expected ending date is \_\_\_\_\_.  
Because this is an older building built before 1978, some of the paint disturbed during the renovation may contain lead paint. You may obtain a copy of the pamphlet, Renovate Right, by telephoning me at \_\_\_\_\_. Please leave a message and be sure to include your name, phone number and address. I will either mail you a pamphlet or slide one under your door.

Date

Printed name of renovator

Signature of Renovator

**Record of Tenant Notification Procedures**

Project Address \_\_\_\_\_

Street (apt #) \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Owner of multi-family housing

Number of dwelling units

Method of delivering notice forms (e.g. delivery to units, delivery to mailboxes of units)

Name of person delivering notices

Signature of person delivering notices

Date of Delivery



# Non-Certified Workers Training Log

## PARTICIPANTS PROGRESS LOG

Name of Trainee	Module 3 (15 min)	Module 4 (45 min)			Module 5 (10 min)	Module 6 (50 min)					
	Skill Set 1: Using LeadCheck® Test Kit	Skill Set 2: Setting up Barriers, Signs and Flapped Entry Doors	Skill Set 3: Cover or Remove Furniture	Skill Set 4: Establish Interior Containment	Skill Set 5: Establish Exterior Containment	Skill Set 6: Personal Protective Equipment	Skill Set 7: Interior Final Cleaning	Skill Set 8: Exterior Final Cleaning	Skill Set 9: Bagging Waste	Skill Set 10: Visual Inspection	Skill Set 11: Cleaning Verification Process

Date of Training: \_\_\_\_\_

Certified Renovator Name: \_\_\_\_\_

**Important**  
The Skill Sets shaded above are only things that a Certified Renovator can do! It is important for the Non-Certified Workers to understand the rules and guidelines but they cannot Test, Verify, Supervise Containment or place the signs and barriers



**LeadCheck® Test Kit Documentation Form**

**Owner Information**

Name of Owner/Occupant: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ Contact # : (\_\_\_\_) \_\_\_\_\_  
 Email: \_\_\_\_\_

**Renovation information**

Fill out all of the following information that is available about the Renovation Site, Firm, and Certified Renovator

Renovation Address: \_\_\_\_\_ Unit # \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Certified Firm Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ Contact # : (\_\_\_\_) \_\_\_\_\_  
 Email: \_\_\_\_\_

Certified Renovator Name: \_\_\_\_\_ Date Certified:    /    /

**Test Kit Information**

Use the following blanks to identify the test kit or test kits used in testing components

**Test Kit # 1** Manufacturer Date to (Job Start Date)  
 Manufacturer: Hybrivet Systems Test Date: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
 Model: LeadCheck® Swabs Serial #: \_\_\_\_\_  
 Expiration Date: N/A (Lot #)

**Test Kit #2** (Job Start Date)  
 Manufacturer: Hybrivet Systems Manufacturer Date: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
 Model: LeadCheck® Swabs Serial #: \_\_\_\_\_  
 Expiration Date: N/A (Lot #)

**Test Kit #3** (Job Start Date)  
 Manufacturer: Hybrivet Systems Manufacturer Date: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
 Model: LeadCheck® Swabs Serial #: \_\_\_\_\_  
 Expiration Date: N/A (Lot #)

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**LeadCheck® Test Kit Documentation Form**

Page \_\_\_\_ of \_\_\_\_

Renovation Address: _____ Unit # _____ City: _____ State: _____ Zip Code: _____
--

Test Location # ____ Test Kits Used: (Circle Only One) Test Kit #1      Test Kit #2      Test Kit #3 Description of Test Location: _____ _____ <b>Result: Is lead present? (Circle only one)</b> YES      NO      Presumed
---

Test Location # ____ Test Kits Used: (Circle Only One) Test Kit #1      Test Kit #2      Test Kit #3 Description of Test Location: _____ _____ <b>Result: Is lead present? (Circle only one)</b> YES      NO      Presumed
---

Test Location # ____ Test Kits Used: (Circle Only One) Test Kit #1      Test Kit #2      Test Kit #3 Description of Test Location: _____ _____ <b>Result: Is lead present? (Circle only one)</b> YES      NO      Presumed <small style="margin-left: 200px;">Require to work Lead Safe</small>
---

Test Location # ____ Test Kits Used: (Circle Only One) Test Kit #1      Test Kit #2      Test Kit #3 Description of Test Location: _____ _____ <b>Result: Is lead present? (Circle only one)</b> YES      NO      Presumed
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## Renovation Recordkeeping Checklist

Name of Firm: \_\_\_\_\_

Date and Location of Renovation: \_\_\_\_\_

Brief Description of Renovation: \_\_\_\_\_

Name of Assigned Renovator: \_\_\_\_\_

Name(s) of Trained Worker(s), if used: \_\_\_\_\_

Name of Dust Sampling Technician,  
Inspector, or Risk Assessor, if used: \_\_\_\_\_

\_\_ Copies of renovator and dust sampling technician qualifications (training certificates, certifications) on file

\_\_ Certified renovator provided training to workers on (check all that apply):

\_\_ Posting warning signs

\_\_ Setting up plastic containment barriers

\_\_ Maintaining containment

\_\_ Avoiding spread of dust to adjacent areas

\_\_ Waste handling

\_\_ Post-renovation cleaning

\_\_ LeadCheck® Kits used by certified renovator to determine whether lead was present on components affected by renovation (identify kits used and describe sampling locations and results):

---

\_\_ Warning signs posted at entrance to work area

\_\_ Work area contained to prevent spread of dust and debris

\_\_ All objects in the work area removed or covered (interiors)

\_\_ HVAC ducts in the work area closed and covered (interiors)

\_\_ Windows in the work area closed (interiors)

\_\_ Windows in and within 20 feet of the work area closed (exteriors)

\_\_ Doors in the work area closed and sealed (interiors)

\_\_ Doors in and within 20 feet of the work area are closed and sealed (exteriors)

\_\_ Doors that must be used in the work are covered to allow passage but prevent spread of dust

\_\_ Floors in the work area covered with taped-down plastic (interiors)

\_\_ Ground covered by plastic extending 10 feet from work area—plastic anchored to building and weighed down by heavy objects (exteriors)

\_\_ If necessary, vertical containment installed to prevent migration of dust and debris to adjacent property (exteriors)

\_\_ Waste contained on-site and while being transported off-site

\_\_ Work site properly cleaned after renovation

\_\_ All chips and debris picked up, protective sheeting misted, folded dirty side inward, and taped for removal

\_\_ Work area surfaces and objects cleaned using HEPA vacuum and/or wet cloths or mops (interiors)

\_\_ Certified renovator performed post-renovation cleaning verification (describe results, including the number of wet and dry cloths used): \_\_\_\_\_

---

\_\_ If dust clearance testing was performed instead, attach of copy of report

\_\_ I certify under penalty of law that the above information is true and complete

---

Name and Title

Date

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## Cleaning Verification Post Renovation

Customer Name: \_\_\_\_\_  
Property Address: \_\_\_\_\_

- Exterior Verification**
  - Visual Inspection Passed.** No visible debris, paint chips, or residue on the horizontal surfaces or ground in or around the work areas.
- Interior Verification**—Non HUD Properties Only
  - Visual Inspection Passed.** No visible debris, paint chips, or residue on the horizontal surfaces (window sills, counter tops, un-carpeted floors) in or around the work areas.
  - Cleaning Verification Passed.** The following is EPA’s cleaning guidelines. Each horizontal surface and non-carpeted floors must be cleaned and then tested by wiping the surfaces with a wet cloth. When compared against the EPA’s Verification Card, if the cloth does not “pass” then the cleaning must be re-done and tested with another wet cloth. If the second cleaning does not pass the renovator must re-clean, wait one hour and wipe the surface with a dry electrostatic charged cloth.

Number of Cloths Used: \_\_\_\_\_ Number of Dry Cloths Used: \_\_\_\_\_

- Dust Clearance Testing**  
A Dust Sampling Technician, Lead Inspector or Risk Assessor was used to conduct the clearance testing. They are a disinterested and independent company and will be providing you with the results of the testing.

\_\_\_\_\_  
Testing Company Phone number of Testing Company

- Debris Disposal**  
Dust and Debris created during the renovation containment phase has been properly disposed of per RRP 40 CFR Part 745 rule.

Regardless of the type of Clearance Testing or Verification that has been used, the possibility of Lead Dust in your home from past renovations or maintenance projects may still remain. The only way to make certain that your home does not have Lead Dust levels exceeding EPA’s acceptable standards is to hire a certified testing firm to conduct a thorough investigation by taking test samples from your entire home.

\_\_\_\_\_  
Contractor Signature Date Customer Signature Date

\_\_\_\_\_  
Renovator Number

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## FOR PROPERTY OWNERS: AFTER THE WORK IS DONE

When all the work is finished, you will want to know if your home, child care facility, or school where children under six attend has been cleaned up properly.

### **EPA Requires Cleaning Verification.**

In addition to using allowable work practices and working in a lead-safe manner, EPA's RRP rule requires contractors to follow a specific cleaning protocol. The protocol requires the contractor to use disposable cleaning cloths to wipe the floor and other surfaces of the work area and compare these cloths to an EPA-provided cleaning verification card to determine if the work area was adequately cleaned. EPA research has shown that following the use of lead-safe work practices with the cleaning verification protocol will effectively reduce lead-dust hazards.

### **Lead-Dust Testing.**

EPA believes that if you use a certified and trained renovation contractor who follows the LRRP rule by using lead-safe work practices and the cleaning protocol after the job is finished, lead-dust hazards will be effectively reduced. If, however, you are interested in having lead-dust testing done at the completion of your job, outlined below is some helpful information.

#### **What is a lead-dust test?**

• Lead-dust tests are wipe samples sent to a laboratory for analysis. You will get a report specifying the levels of lead found after your specific job.

#### **How and when should I ask my contractor about lead-dust testing?**

• Contractors are not required by EPA to conduct lead-dust testing. However, if you want testing, EPA recommends testing be conducted by a lead professional. To locate a lead professional who will perform an evaluation near you, visit EPA's website at [epa.gov/lead/outreach](http://epa.gov/lead/outreach) or contact the National Lead Information Center at **1-800-424-LEAD (5323)**.

• If you decide that you want lead-dust testing, it is a good idea to specify in your contract, before the start of the job, that a lead-dust test is to be done for your job and who will do the testing, as well as whether re-cleaning will be required based on the results of the test.

• You may do the testing yourself. If you choose to do the testing, some EPA-recognized lead laboratories will send you a kit that allows you to collect samples and send them back to the laboratory for analysis. Contact the National Lead Information Center for lists of EPA-recognized testing laboratories.



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## LEAD-SAFE PRACTICES

Hot From: Tools of the Trade Winter 2011

Posted on: February 24, 2011

# Buyer's Guide to HEPA Vacuums for RRP Work

The price of the machine is just the starting point; you should also consider the cost of replacement bags and whether you need a tool-activated model

By Chris Kennel

- **What Is a HEPA Vacuum?**
- The first thing you'll notice when shopping for HEPA vacs is how much more they cost than the wet/dry models found at most big-box stores. You may be tempted to outfit one of those less-expensive models with an aftermarket HEPA filter – but the machine won't be EPA-compliant if it wasn't designed to be used with a HEPA filter.
- **EPA standard.** According to the EPA, a HEPA vacuum is one "designed with HEPA as the last filtration stage," where "all the air drawn into the machine is expelled through the filter with none of the air leaking past it." The definition is a little awkward, but the point is that general-purpose vacuums are not well-sealed and retrofit filters may not fit properly in them, which could allow lead dust to escape through gaps in the housing or come blasting out in the exhaust air.
- The EPA has adopted the industry standard for **HEPA filters, defining them as ones designed to stop 99.97 percent of particles down to 0.3 microns in size.** Some industrial vacuums can be equipped with ultra-low-particulate air (ULPA) filters. A ULPA filter traps a greater amount (99.999 percent) of even smaller particles than a HEPA filter does and is used in settings like cleanrooms and pharmaceutical labs.
- **Filter location. In vacuums designed for lead work, the filter is typically placed between the collection bag and the impeller that pulls air through the machine.** This negative-pressure location reduces the likelihood of leaks because the filter is pulled tightly against the gaskets. Locating the filter on the other side of the impeller (as is often the case in household vacuums) increases the chance of leaks because this arrangement puts the gaskets and housing under positive pressure.
- **Which models comply? The EPA does not provide a list of approved vacuums or refer to any testing standards, so it's impossible to certify any particular machine as "RRP-compliant."** Fortunately, though, there is some precedent for what kinds of vacuums are likely to be acceptable. The RRP is derived from OSHA standards that nuclear-, lead-, and asbestos-abatement contractors have followed for years. Any vacuum good enough for abatement work is good enough for the RRP. The table in the specifications section on the next page (and on magazine page 34) contains a number of vacuums that appear to meet EPA requirements. Some of the brands (Mastercraft, Minuteman, Nikro, Nilfisk, and Pullman-Holt) may be unfamiliar to general contractors, but they are well-known within the abatement industry



With the enactment last spring of the EPA's Renovation, Repair, and Painting (RRP) rule, contractors are facing a number of new requirements, one of which is to use a HEPA vacuum for cleanup whenever lead-based paint is disturbed. The rule also says that HEPA vacs need to be used with tools that sand or grind lead paint. Contractors should assume that any home built before 1978 contains lead paint unless testing shows it does not.

If you work on older buildings, you may be shopping for your first HEPA vacuum. I bought my first one in 2005, because as a remodeler I was unhappy with the amount of fine dust getting through the filters of my standard wet/dry models. Switching to a better grade of vacuum solved my problem with dust – and now the EPA hopes these vacuums will help solve the more serious problem of lead poisoning.

The RRP has been hotly debated in the building community, and it's not my intention to revive those arguments. The purpose of this article is to help contractors choose the HEPA vacuum that best suits their needs and provides good service over a period of years.

**Vacuums Suitable for RRP Work**

Model	Cost	Capacity (gallons)	Weight (pounds)	Static lift (inches H2O)	Airflow (cfm)	Cost of HEPA filter	Cost of paper bag	Cost of fleece bag	Wet capability	Cord length (feet)
<b>Tool-Activated Canister Models (with variable suction)</b>										
<a href="#">Bosch 3931A-PBH</a>	\$700	13	46	100	130	\$75	\$6.00	\$20.00	yes	25
<a href="#">DeWalt D27905H</a>	\$550	10	29	83	129	\$130	\$4.65	\$9.70	yes	21
<a href="#">Fein Turbo I (9 20 24 HEPA)</a>	\$410	6	18	90	116	\$120	\$4.65	n/a	yes	16
<a href="#">Fein Turbo II (9 20 25 HEPA)</a>	\$505	9	29	90	116	\$120	\$5.00	n/a	yes	16
<a href="#">Fein Turbo III (9 20 26 HEPA)</a>	\$555	14	36	99	126	\$120	\$5.35	n/a	yes	16
<a href="#">Festool CT 36 E</a>	\$550	6.9	29	96	137	\$60	n/a	\$6.20	yes	24
<a href="#">Festool CT 36 E</a>	\$600	9.5	30	96	137	\$60	n/a	\$7.10	yes	24
<a href="#">Metabo ASR2050 HEPA</a>	\$740	13	39	100	130	\$170	n/a	\$13.25	yes	24
<b>Standard Canister Models</b>										
<a href="#">Dustless Technologies HEPA Vacuum</a>	\$600	16	28	77	126	\$150	n/a	\$8.00	yes	15
<a href="#">Hilti VC20-U</a>	\$900	5.5	30	88	129	\$115	n/a	\$12.60	yes	25
<a href="#">Mastercraft Enviromaster CT-5</a>	\$545	5	39	84	94	\$255	\$4.00	n/a	no	30
<a href="#">Mastercraft Enviromaster 7</a>	\$560	7	38	84	94	\$190	\$4.00	n/a	no	30
<a href="#">Minuteman Lead Vac</a>	\$775	6	17	85	95	\$190 (ULPA)	\$3.50	n/a	no	50
<a href="#">Minuteman MicroVac</a>	\$530	4	16	85	95	\$150	\$3.50	n/a	no	40
<a href="#">Minuteman X-829</a>	\$875	6	27	85	95	\$190 (ULPA)	\$3.50	n/a	yes	50
<a href="#">Nikro LV 02</a>	\$325	2	13	110	114	\$160	\$2.15	n/a	no	25
<a href="#">Nikro LV10</a>	\$490	10	25	107	112	\$160	\$2.15	n/a	no	25
<a href="#">Nikro LV15</a>	\$650	15	53	114	119	\$195	\$3.00	n/a	no	25
<a href="#">Nikro LVW15</a>	\$750	15	65	114	119	\$195	\$3.00	n/a	yes	25
<a href="#">Nilfisk Eliminator 1</a>	\$670	5	20	95	130	\$180	n/a	\$7.50	yes	50
<a href="#">Nilfisk GD 930</a>	\$610	4	17	92	74	\$140	\$2.30	n/a	no	50
<a href="#">Nilfisk UZ 934</a>	\$535	2.6	13	92	69	\$220	\$2.90	n/a	no	30
<a href="#">Pullman-Holt 45HEPA-D</a>	\$530	10	33	105	110	\$265	\$4.00	\$18.00	no	50
<a href="#">Pullman-Holt 390ASB</a>	\$495	4	18	97	100	\$160	\$3.00	n/a	no	25
<a href="#">Pullman-Holt 86ASB5D4C</a>	\$765	5	41	85	96	\$235	\$4.00	\$18.00	no	25
<a href="#">Ridgid RV2400HF</a>	\$400	14	27	80	105	\$150	\$8.50	n/a	yes	25
<b>Backpack Models</b>										
<a href="#">Mastercraft 410SS-DAF</a>	\$790	4	31	84	94	\$190	\$5.00	n/a	no	30
<a href="#">Minuteman V10 Pro Plus Back Pack</a>	\$645	1.3	9	80	65	\$145	\$2.80	n/a	no	50
<a href="#">Nilfisk GD 10 Back</a>	\$610	1.3	9	99	144	\$80	\$3.60	n/a	no	50
<a href="#">Pullman-Holt 30ASB</a>	\$715	1.5	29	85	101	\$270	\$3.00	\$18.00	no	50

# Why Lead Poisoning May be Causing Your Health Problems

by [Dr Mark Hyman](#)

- September 28th, 2010
- [Articles](#)
- 60 Comments



WE ARE TOO HEAVY — and I don't mean overweight. We're heavy with metals, not fat. Nearly 40 percent of us have toxic levels of lead in our bodies. And we don't even know it. But that doesn't mean we don't have symptoms ...

You may have [headaches](#), [insomnia](#), irritability, a low sex drive, or tremors. You may have [mood problems](#), nausea, [depression](#), [memory difficulties](#), [trouble concentrating](#), poor coordination, or even constipation. Yet most of us attribute these symptoms to other problems. We don't recognize that they may be caused by lead poisoning.

I recently went to a medical conference on heavy metals and health. Although I have been treating toxicity from heavy metals for more than a decade (including in myself), I was surprised to hear about research that has been completely ignored by the media.

A study published in 2006 in the conservative medical journal *Circulation*, for example, should have been on the front page of the *New York Times*. Today I will tell you why the study was so important, and why you probably won't hear about it from your doctor. Then I will give you 6 tips to help get the lead out.

## Studies Show **Any Lead in Your Body May be Unsafe**

In the study I mentioned above, researchers **measured the blood lead levels of 13,946 adults** who were part of the Third National Health and Nutrition Examination Survey. **They were recruited from**



1988 to 1994 and were then followed up on for up to 12 years. The goal of the study was to track what diseases people developed and why they died.(i)

Now, it's important to remember that since lead was removed from gasoline and house paint several decades ago, the average person's blood lead level has dropped dramatically. But our levels of lead are still a great deal higher than those of people who lived before the industrial age. That's because we continue to be exposed to lead in our soil and water, as well as from our own bones, where it is stored once it's introduced into our system.

Nearly 40 percent of all Americans are estimated to have blood levels of lead high enough to cause serious health problems.

Fifty years ago, the average blood levels of lead were about 40 micrograms/deciliter. The level considered "safe" by the government has continued to fall and is now considered less than 10 micrograms/deciliter. But this new study and others like it question the idea that ANY level of this toxic metal is safe.

In this study, researchers found that a blood level of lead over 2 micrograms/deciliter (that's 2, not 10 or 40) caused dramatic increases in heart attacks, strokes, and death. In fact, after controlling for all other risk factors, including cholesterol, high blood pressure, smoking, and inflammation, the researchers found:

That the risk of death from all causes in people with a lead level that high increased by 25 percent,

Deaths from heart disease increased by 55 percent,

Risk of heart attacks increased by 151 percent, and

Risk of stroke increased by 89 percent.

What's even more remarkable is that nearly 40 percent of all Americans are estimated to have blood levels of lead high enough to cause these problems. This is potentially a greater risk for heart disease than cholesterol!! But this study is not the first indication we have of problems with lead.

A report in the Journal of the American Medical Association found that high blood pressure in postmenopausal women is strongly correlated to blood lead levels. This is because bones break

down faster during menopause releasing stored lead and injuring blood vessels, which leads to high blood pressure.(ii)

**High lead may also be responsible for kidney failure** as well. A study in *The New England Journal of Medicine* found that **using chelation therapy** with **EDTA** to reduce lead levels in patients with kidney failure could prevent further loss of kidney function, save billions in healthcare costs, and eliminate the need for dialysis in millions of people. (iii)

Wow! Take a moment to digest that. **Chelation therapy saves lives and billions of dollars.** But your doctor probably isn't offering this as standard treatment, because, as I have said many times, **doctors, don't learn two of the most important things in medical school: How to help people improve their nutrition and how to deal with environmental toxins.**

**Lead is not only linked to heart disease, high blood pressure, and kidney failure, it is also connected to the epidemic of children with ADHD, developmental and learning problems, and autism.** Even though the "safe" blood levels of lead has been set as 10 micrograms/deciliter, recent studies show that **the greatest drop-off in IQ scores in children occurs in those who have lead levels between just 1 and 10 micrograms/deciliter.** (iv) This is particularly **troubling, because more than 10 percent of poor and inner city children have lead exposure levels higher than 10 micrograms/deciliter!**

I recently treated a young boy with extremely high lead levels who had Asperger's syndrome, severe ADHD, and violent behavior. **He likely got the lead from his mother,** who had very low **vitamin D** levels and had developed osteoporosis, which **released a lot of lead from her bones during pregnancy.** This **lead got into the boy's body in the womb across his mother's placenta.** Thankfully, we got rid of his lead over time through chelation and nutritional support. Doing so dramatically improved his attention, behavior, and social skills.

This young boy is, unfortunately, not alone. We live in a sea of heavy metals. **Lead is still found in our soil and water. In areas with a history of industrial pollution, people track lead into their homes from contaminated soil. The sad result is that regular house dust often contains 17 times the level of lead it once did.** **In Washington, DC, the water was so contaminated with lead recently that the government had to provide free water filters for everyone in the city. Up to 20 percent of the city's tap water may be contaminated.**

So what can you do about this?



## 6 Tips to Help You Get the Lead Out

Luckily there are steps you can take to help you heal from lead poisoning if you have been exposed. Try the following:

1. **Find out if you are lead-toxic.** The easiest test is a **simple blood lead test**. Be sure the lab can measure VERY low levels of lead accurately. **Anything higher than 2 micrograms/deciliter is toxic and should be treated.** Unfortunately, **the blood test only checks for current or ongoing exposures**, so you must also take a **heavy metal challenge test** with DMSA, EDTA, or DMPS, which can be administered by a doctor trained in **heavy metal detoxification**. (See [www.functionalmedicine.org](http://www.functionalmedicine.org) or [www.acam.org](http://www.acam.org) to find a qualified doctor.) Consider undergoing chelation therapy if your lead levels are high.
2. **Reduce your exposures by having a “no shoes in the house” policy.** A great deal of lead can be tracked **into your house in the dust on the soles of shoes**. Leaving your shoes at the door helps reduce the amount of contamination in your home.
3. **Test your water for heavy metals.** There are a number of home test kits available online. If you prefer to have a professional test your water, call your city water provider or look for labs in your area that will perform this kind of test.
4. **Buy a carbon or reverse osmosis water filter for your drinking water.** These filters remove lead and other toxic substances like PCBs. They are my favorite kind of filter and the type I use in my home.
5. **Take 1,000 milligrams of buffered ascorbic acid (vitamin C) a day.** This helps remove lead from the body.
6. **Take 2,000 to 4,000 IU of vitamin D3 a day** to prevent your bones from releasing lead into your bloodstream.

Even though many of us have toxic levels of lead in our bodies, **there is a lot we can do to prevent it and treat it**. Doing so is an essential step to healing your body and achieving **lifelong vibrant health**.

Now I'd like to hear from you...

Do you suffer from any of the symptoms of lead toxicity?

Have you been tested for lead poisoning? Do you plan to be?

Which of the other steps have you tried?

Please let me know your thoughts by leaving a comment.

To your good health,

Mark Hyman, M.D.

P.S. For more information on this and other blogs, please go to

<http://www.ultrawellness.com/blog>.

## References

- (i) Menke, A., Muntner, .P, Batuman, V., et al. (2006). Blood lead below 0.48 micromol/L (10 microg/dL) and mortality among US adults. *Circulation*. 114(13):1388–94.
- (ii) Nash, D., Magder, L., Lustberg, M., et al. (2003). Blood lead, blood pressure, and hypertension in perimenopausal and postmenopausal women. *JAMA*. 289(12):1523–32.
- (iii) Lin, J.L., Lin-Tan, D.T., Hsu, K.H., and C.C. Yu. (2003) Environmental lead exposure and progression of chronic renal diseases in patients without diabetes. *New England Journal of Medicine*. 348(4):277–86
- (iv) Canfield, R.L., Henderson, C.R. Jr., Cory-Slechta, D.A., et al. (2003). Intellectual impairment in children with blood lead concentrations below 10 microg per deciliter. *New England Journal of Medicine*. 348(16):1517–26.

## DATA SHEET

### LEAD: Effects on Adults & Children

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We are all exposed to small amounts of lead from before birth (from our mother's blood through the placenta) and every day of our lives after birth from pollution in the air, water, soil, and home environment. If we also are exposed to lead on the job, the risk of health damage increases. We should have regular lead tests and be able to interpret these tests if we work with lead.

**CANCER.** In 2004, the National Toxicology Program's *Report on Carcinogens*<sup>1</sup> listed "Lead and Lead Compounds as "R" (reasonably anticipated to be human carcinogens). Two lead compounds, lead phosphate and lead acetate have been listed as "R" since the early 1980s. Now there is enough data from human and animal studies on many lead compounds to list them all.

**POLLUTION LEAD LEVELS.** The average (geometric mean) blood lead level in the U.S. is about 1.5 micrograms/deciliter ( $\mu\text{g}/\text{dL}$ ).<sup>2</sup> Doctors used to consider blood lead levels up to 10  $\mu\text{g}/\text{dL}$  to be "normal." Now the Centers for Disease Control suggests sending information to any adult whose blood is found to be at 10  $\mu\text{g}/\text{dL}$  on how to find and reduce daily exposures to lead. For example, they can test tap water, old paint, soil near the house, or substance used in hobby activities.

A study has shown a significant risk of mortality in adults associated even with rather low lead levels.<sup>3</sup> The study reported in the *Journal of the American Heart Association*, 2006 was the Third National Health and Nutrition Examination Survey Mortality Follow-Up Study. It involved 13,946 adults whose blood lead levels were collected and measured between 1988 and 1994. When researchers studied those who died by December 31, 2000, they found that death from any cause, cardiovascular disease, heart attack and stroke increased progressively at higher lead levels.

Compared to participants with blood lead below 1.9  $\mu\text{g}/\text{dL}$ , participants with blood lead between 3.6  $\mu\text{g}/\text{dL}$  and 10  $\mu\text{g}/\text{dL}$  had:

- a 25% higher risk of death from any cause;
- a 55% higher risk of death from cardiovascular diseases;
- an 89% higher risk of death from heart attack; and
- a two and a half times the risk of death from stroke.

Then studies<sup>4</sup> in the *Journal of Epidemiology* in 2007 and in a follow up study in 2009, showed that lead levels in bone, rather than blood, are an even more accurate indicator of mortality. Researchers found the risk of death from cardiovascular disease was almost six times higher in study participants with the highest levels of bone lead and death from all causes was related to bone lead levels.

Dr. Marc Weisskopf, the lead researcher in these studies also concluded that by the time the lead has deposited in the bone, the damage has been done. He questions the benefit of chelation treatments to remove the lead. It may also be that mobilizing bone lead back into the blood stream may actually cause additional damage.

**LEAD LEVELS IN YOUR BLOOD.** If you are exposed to lead at work or at home, your blood lead level is likely to rise considerably above the amounts expected from pollution. Some adult levels of concern are in the table below:

**ADULT BLOOD LEAD LEVELS (BLL) IN MICROGRAMS/DECILITER (µg/L)**

BLL (µg/L)	significance
~1.5	The geometric mean level in the U.S. is: women aged 20-59=1.2; men aged 20-59=2.0; children aged 1-5=1.9). If your levels are higher, exposure to lead in your daily life is above average. Look for and eliminate those sources.
≥ 5	Intervention for pregnant women is recommended to <b>lessen fetal effects</b> .*
0-10	These levels are considered "normal" for adults. A study indicates adults with levels from <b>3.6-10 µg/dL have higher mortality</b> from many causes (see above). If your levels are 5 µg/dL or higher, have young children living in your home tested.
25-30	These levels are ones at which about half of the states require labs to report results to health departments. <b>May cause reproductive problems in men and women.</b>
30	<b>OSHA's 1978 Lead Standard</b> suggests that men and women planning families <b>keep below this level</b> . <sup>7</sup> The Standard has not been properly updated since.
40-50	<b>OSHA allows these levels in workers</b> in lead industries and construction. OSHA proposed lowering this level. <b>Almost all experts believe these levels are harmful.</b>

\* Assoc. of Occupational & Environmental Clinics, see: [http://www.aocc.org/documents/positions/mmg\\_final.pdf](http://www.aocc.org/documents/positions/mmg_final.pdf)

**SYMPTOMS OF LEAD POISONING IN ADULTS.** Most people know that lead poisoning causes vomiting, diarrhea, coma and death. But these symptoms only occur at extremely high levels. **Low and moderate levels produce no symptoms at all** in many people. For others, the early symptoms may include irritability, indigestion, fatigue, headaches, and/or hypertension. These symptoms are so common that physicians often misdiagnose their cause. **Even when there are no symptoms, permanent damage may be occurring.** For example, **brain and kidney damage can occur silently until the damage is significant and irreversible.** Lead probably **also causes cancer**.<sup>5</sup> Lead can interfere with almost **every phase of male and female reproduction.**

**SYMPTOMS IN CHILDREN.** **Lead causes devastating effects on children** including retardation, hearing loss, and kidney damage depending on the amounts the child takes in. The effects that occur at the lowest doses are subtle effects on mental acuity. Studies have shown a measurable reduction in IQ in children whose blood lead levels are at 10 µg/dL. For years, experts thought that reduction of mental acuity probably occurs at even lower lead levels. Now this has been shown to be true.

In 2003, a study in the *New England Journal of Medicine* **confirmed that significant effects occur below 10 µg/dL**.<sup>6</sup> The researchers found that for blood-lead concentrations **between 1 and 10 µg/dL, the total decrease in IQ averaged 7.4 points, a drop of 0.82 points for each 1 µg/dL.** However, the decrease in IQ associated each increase of 10 µg/dL at levels above 10 µg/dL was only 4.6 points, that is, 0.13 points lost for each additional 1 µg/dL.

This data demonstrates a dose-response for lead at levels lower than 10 µg/dL and establishes lead as causative at these lower levels rather than merely an association. **It also shows that microgram for microgram, lead at levels below 10 µg/dL causes damage in greater increments than above.** **It is now clear that there is no known level of lead that does not have some degree of adverse effect on the mental acuity of children.**

**POLICY FOR TESTING CHILDREN.** The Centers for Disease Control and Prevention considers children at "high risk" of having high blood lead levels if their parents are exposed to lead on the job or through hobbies (e.g., stained glass or ceramics). It is well-known that people working with lead bring small amounts of lead home on their clothing, shoes, hair and skin and can contaminate the house. The worst effects are seen in the children of parents who work with lead materials in the home.

For this reason, the Centers for Disease Control recommends that children of lead-using parents be tested several times between the ages of six months and six years. Depending on the results of these tests, you should follow the guidelines in the table below.<sup>7</sup>

### TESTING STRATEGIES FOR CHILDREN OF LEAD-EXPOSED PARENTS

BLL( $\mu\text{g}/\text{dL}$ ) Strategy

---

$0 \leq 9$  Retest within two years—small loss of IQ at all levels.

10-14 Loss of IQ significant in children at  $10\mu\text{g}/\text{dL}$  and higher. Retest every 3 to 4 months and observe the child's habits and environment to look for ways to reduce exposure.

15-19 Retest every 3 to 4 months and obtain help in reducing the child's environmental sources of lead. In some states, tests this high will result in home visits and assistance from local health departments case workers.

20-44 Have a complete medical evaluation of the child and eliminate environmental sources. Health Department case workers will probably be in contact to help you.

45-69 Begin medical treatment and environmental assessment within 48 hours. Health Department case workers will almost surely be in contact to help you.

$\geq 70$  Begin medical treatment immediately.

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**WORKPLACE SAFETY STANDARDS.** The Occupational Safety and Health Administration (OSHA) requires workers' blood lead levels to be between 50 and  $40\mu\text{g}/\text{dL}$  or lower. However, this level will not protect your reproductive abilities. OSHA makes this clear in the preamble to their Lead Standard. It is worth while reading OSHA's exact words:

*OSHA believes that the evidence overwhelmingly indicates the blood lead level of workers who wish to plan pregnancies should be maintained below  $30\mu\text{g}/100\text{g}$ \* in order to prevent adverse effects from lead on the worker's reproductive abilities. To minimize the risk of genetic damage, menstrual disorders, interference with sexual function, lowered fertility, difficulties in conception, damage to the fetus during pregnancy, spontaneous miscarriage, stillbirth, toxic effect on the newborn, and problems with the healthy development of the newborn or developing child [,] blood lead levels should be kept below  $30\mu\text{g}/100\text{g}$  in both males and females exposed to lead who wish to plan pregnancies.<sup>8</sup>*

\*  $\mu\text{g}/100\text{g} = \mu\text{g}/\text{dL}$

OSHA wrote statement this over 30 years ago. Now, the Association of Occupational and Environmental Clinics recommends intervention for pregnant women at  $5\mu\text{g}/\text{dL}$ .

**SPECIAL ADVICE FOR PREGNANT WOMEN.** Maternal and fetal BLLs are nearly identical because lead crosses the placenta unencumbered.<sup>9</sup> So if the blood lead level of the fetus of a pregnant woman whose blood lead level is  $5\mu\text{g}/\text{dL}$  would also be at  $5\mu\text{g}/\text{dL}$ —a level known to impair mental acuity in young children.

Since studies also show that lead is more damaging to younger children, it is likely that the fetus would be most vulnerable of all. However, it is impossible to prove this because IQ can't be tested in the womb. For this reason, it remains a highly informed speculation. More over, the reduction in IQ seen in the studies is a statistical average and may not apply to an individual child. The question remains: is pregnancy the time to challenge these data by exposing women to lead?

**EXPOSURES IN THE PAST.** A mother's lead exposures, even when she was a child, also may affect her baby. A significant amount of the lead we ingest or inhale is stored in our bones. Some of this lead is released back into the blood stream during pregnancy.<sup>10</sup> If you have been exposed to lead in the past, talk to your obstetrician. Your doctor may suggest additional tests and dietary calcium to reduce uptake of lead by the fetus.

If all this causes you to worry: welcome to motherhood! Worry is about to become permanent. But it is counter-productive to obsess about the problem. Stress is known to be bad for you and the fetus! Instead, understand how dangerous lead is and take positive actions to keep your own and your baby's exposure as low as possible.

**POSITIVE ACTIONS.** Past exposures to lead cannot be undone. Instead, focus your attention on minimizing further exposure to lead with the following actions:

1. If you know there is lead on the job, make sure the employer is following the OSHA lead regulations. If the regulations are being followed you should see posters about lead, be attending mandatory training meetings, see some workers being personally monitored (an air pump attached to their belt), and see other precautions. If these things are not happening, talk to your Union Representative.
2. Never remove untested old paint from walls or stay at a job site where such paints are being removed by ordinary workers. If any layer of paint on the walls could have been applied prior to 1980, the law requires that it be tested for lead before it is disturbed. And workers must be shown a copy of this test. If the paint contains lead, the OSHA Lead in Construction Standard requires that only workers with special training can remove it. In many states, only Certified Lead Abatement Workers are allowed to remove lead paint.
3. All cleaning in the workplace should be done by wet mopping or with specially filtered (HEPA) vacuums. Never sweep. If lead dust is present at home, also clean by wet mopping or HEPA vacuuming. HEPA vacuums can be purchased or rented for home or shop use.
4. Never eat, smoke, drink, apply cosmetics, or even store your food in an area where lead dust may be present. Wash hands carefully before eating or performing any hygiene activity.
5. If there are no provisions for showering and changing clothes on site, do this as soon as you get home. Bag your work clothes and wash them separately from other laundry. Make every effort to keep lead dust particles from contaminating your home.
6. If the employer is not providing blood lead tests, get one on your own. In fact, the ideal time to get a baseline blood lead test is just before or very shortly after you start on a job where there may be a problem. Otherwise, the employers may try to claim later that you had a high blood lead before you came to their job.
7. Never allow children to visit the workplace. If you have young children at home, have them tested.



8. **Never work at home with lead-containing hobby/craft materials.** If you must use lead in your hobby, set up a studio separate from your home and use all the same precautions you would on the job to avoid bringing the dust home.

9. Employ experts for home remodeling if old paint is present.

10. If you are pregnant and exposed to lead or have had lead exposure in the past, get a blood lead test. If your blood lead level is above 2 µg/dL (the level for unexposed adults), it is either because 1) you are still being exposed to lead or 2) lead stored in your bones from previous exposures is re-entering your blood. **Some physicians increase calcium supplements** in such patients to reduce the amount of lead taken up by the fetus.

10. If you have any questions about lead exposures at work or at home, don't hesitate to call your union Safety Officer.

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1. *11th Report on Carcinogens*, US DH&HS, NTP, 2004, released 1/05

2. *Mortality and Morbidity Weekly Report*, Centers for Disease Control and Prevention, Blood Lead Levels -- United States, 1999-2002, Vol. 54 No. 20, 2005, pp. 513-516. The 1.6µg/dL level is the geometric mean average for all ages who are not work or hobby lead-exposed. Children aged 1-5 are a little higher (1.9µg/dL).

3. Andy Menke; MPH, Paul Muntner, PhD; Vecihi Batuman, MD; Elen K. Silbergeld, PhD; Eliseo Guallar, MD, DrPH, *Circulation: Journal of the American Heart Association*, 2006; 114:1388-1394

4. Weisskopf, M; Jain, N; Nie, H; Sparrow, D; Schwartz, J; Hu, H. Bone Lead and Death From All Causes, Cardiovascular Diseases, and Cancer: The Normative Aging Study. *Epidemiology*, 2007; Vol 18, Issue 5, p S151, and updated in *Epidemiology and Prevention* in 2009 (2009;12:1056-1064)

5. Lead and lead compounds are listed as "reasonably anticipated to cause cancer" by the National Toxicology Program in their *11th Report on Carcinogens* (2005).

6. *New England Journal of Medicine*, Vol.348:1517-1526, Apr. 17, 2003, No.16

7. Table 4 is modified and adapted from advice in "Preventing Lead Poisoning in Young Children," a statement by the Centers for Disease Control, October 1991.

8. *Federal Register* [43 FR 52960] November 14, 1978, Final Lead Standard.

9. Goyer RA, Transplacental transport of lead. *Environmental Health Perspectives*, 1990;89:101-5.

10. *NY Times*, Susan Gilbert, June 18, 1996, p. C7 reporting the results of a study at Macquarie University in Sidney, Australia. Thirteen women who had recently immigrated to Australia from the former Yugoslavia and then became pregnant were studied. The lead they were exposed to in the Balkans, and which was stored in their bones, has a different molecular weight from the lead in Australia. As their pregnancies progressed, their blood contained greater amounts of the Balkan lead, peaking during the second and third trimesters. By the end of the pregnancy, as much as 60 percent of the total amount of lead in the blood came from the women's own bones. This data was supported by similar results in studies of pregnant monkeys.

## OHIO – Renovator Rules

Frequently Asked Questions for the Ohio Administrative Code

Chapters 3701-32 and 3701-82

November 2014

FAQ 3701-32 and 3701-82 11/12/2014 Go to Table of Contents 3

Interpretative Guidance For Chapter 3701-32 and 3701-82 of the Ohio Administrative Code

Renovation, Repair and Painting Rule (RRP) Lead-Safe Renovation

### **1. What is the U.S. EPA rule RRP (Renovation, Repair and Painting Rule)?**

On April 22, 2008 the U.S. EPA issued a rule requiring the use of lead-safe practices. The **rule requires contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities, and schools built before 1978 must be certified** and must follow specific work practices to prevent lead contamination.

2. Where do I find more information about the RRP?

In **Ohio, the U.S. EPA is currently administering and enforcing most of the aspects of the RRP in Ohio.** For specific information, please refer to the U.S. EPA Renovation, Repair, and Painting program Web page or call 1-800-242-LEAD (5323).

3. Does Ohio have any lead-safe requirements that must be followed?

The **Ohio Department of Health established a lead-safe work program in 2003.** **Since then the U.S. EPA has established the RRP program.** The U.S. EPA RRP program contains many new requirements that are more stringent than the Ohio Department of Health rules.

4. Are **RRP training providers required to be Ohio approved** to give training in Ohio?

**Yes.** Any training provider wishing to offer the EPA approved RRP Renovator training in Ohio needs to not only be approved by the U.S. EPA, but also by

the Ohio Department of Health as an approved Lead Safe Renovation training provider. Any persons providing RRP training without U.S.EPA and Ohio Department of Health approval will be considered in violation of the Ohio Administrative Code and subject to civil action with penalties reaching **\$1,000 per day, per infraction.** Because the course is Ohio approved, certain Ohio-specific topics must be addressed during the course. For example, the **Ohio Administrative Code must be reviewed** and lead safe renovation in **Ohio requires the use of 6-mil poly sheeting for containment.**

5. Can an **RRP contractor conduct lead-safe renovation when there is a lead poisoned child living in the residence?**

**No.** The Ohio Administrative Code prohibits persons from performing lead-safe renovation in lieu of abatement or any person from performing lead abatement without a Lead Abatement Contractor's license when a lead poisoned child has been identified.

6. Who is **enforcing the RRP in Ohio?**

The **U.S. EPA is currently administering and enforcing most of the aspects of the RRP in Ohio.** For specific information please refer to the U.S. EPA Renovation, Repair, and Painting program Web page.

7. In Ohio, can a **certified Renovator take paint chip samples to determine the presence or absence of lead-based paint?**

**No.** A certified renovator cannot take paint chip samples to determine the presence of lead. Only licensed Risk Assessors or Inspectors can take paint chip samples. A **certified renovator can use a U.S. EPA recognized test kit that does not require the removal of paint to determine the presence of lead.** **Currently only the LeadCheck® swab fits that criterion.**

3701-32-11Lead-safe renovator training requirements and standards of conduct

3701-32-12Clearance examinations

Appendix A – Residential Units

Appendix B – Child Care Facilities and Schools

Appendix C – Minimum Number of Randomly Samples Units

(UU) "Lead-safe renovation" means the supervision or performance of services for the general improvement of all or part of an existing structure, including a residential unit, child care facility, or school, when the services are supervised or performed by a lead-safe renovator.

(VV) "Lead-safe renovator" means a person who has successfully completed a training program in lead-safe renovation approved pursuant to rule 3701-32-16 of the Administrative Code.

(G) Lead-safe renovators shall comply with rules 3701-32-03 and 3701-32-11 of the Administrative Code.

3701-32-11 Lead-safe renovator training requirements and standards of conduct.

(A) **Any person who supervises or performs services** for the general improvement of all or part of a structure, including a residential unit, child care facility or school may represent to the public that the services **are being supervised or performed by a lead-safe renovator if that person has:**

(1) **Completed a course of instruction on lead-safe renovation conducted by a training program approved** pursuant to section 3742.47 of the Revised Code and rule 3701-32-16 of the Administrative Code; or

(2) Successfully completed a **lead abatement contractor** or **lead abatement worker course** approved by the director pursuant to rule 3701-82-01 of the Administrative Code. – (Apply to Ohio Renovator not EPA Certification)

(B) Persons trained in lead-safe renovation between December 31, 2001, and April 7, 2004 by a training provider approved pursuant to section 3742.08 of the Revised Code and rule 3701-82-01 of the Administrative Code, **may hold themselves out as a lead-safe renovator.**

(C) Any person, regardless of whether the training program in lead-safe renovation has been completed, **is not subject to licensure solely for supervising or performing services for the general improvement of all or part of an existing structure.**

(D) **Lead-safe renovation performed by an untrained individual must be supervised by a lead-safe renovator who is present at the worksite.**

(E) **No person shall have lead-safe renovation performed in lieu of having lead abatement performed** on a residential unit, child care facility or school **at which a lead-poisoned child under six years of age has been identified.**

(F) When performing lead-safe renovation the lead-safe renovator shall comply with the following work practice measures:

(1) **Post signs** clearly defining the work area and warning occupants and other persons not involved in lead-safe renovation activities to remain outside the work area;

(2) **Before beginning the renovation, isolate the work area so that no dust or debris leaves the work area while the work is being performed.** In addition, maintain the integrity of the containment by ensuring that any plastic or other impermeable materials are not torn or displaced, and taking any steps necessary to ensure that no dust or debris leaves the work area while the work is being performed. The containment shall be established in such a manner that it does not interfere with occupant and worker egress in an emergency;

(3) **Collect, wrap or bag, and seal all waste generated from the lead-safe renovation in a manner that prevents release of dust and debris**

before the waste is removed from the work area for storage or disposal. If a chute is used to remove waste from the work areas, **it must be covered**. In addition, the renovator shall comply with the following:

(a) At the conclusion of each work day and at the conclusion of the renovation, **store waste under containment or behind a barrier that prevents access to the waste and any dust, debris,** or both; and

(b) **During transport, waste shall be wrapped or bagged and sealed to prevent the release of dust and debris.**

(4) In the case of interior lead-safe renovations:

(a) **Remove all objects** from the work area, including furniture, rugs, and window coverings, or **cover them with plastic sheeting or other impermeable material** with **all seams and edges taped** or otherwise sealed;

(b) **Close and cover all duct openings** in the work area with plastic sheeting or other impermeable material.

(c) Close windows and doors in the work area. **Doors must be covered with plastic sheeting or other impermeable material.** Doors used as an entrance to the work area must be covered with plastic sheeting or other impermeable material in a manner that allows workers to pass through while confining dust and debris to the work area;

(d) **Cover the floor surface, including installed carpet with taped-down six-mil plastic sheeting or other impermeable material** in the work area **six feet beyond the perimeter of surfaces** undergoing renovation or a sufficient distance to contain the dust, whichever is greater; and



(e) Ensure that all personnel, tools and other items, including the exteriors of containers of waste, are free of dust and debris before leaving the work area.

(5) In the case of exterior lead-safe renovations:

(a) **Close all doors and windows within twenty feet of the renovation. On multi-story buildings, close all doors and windows within twenty feet of the renovation on the same floor as the renovation.** On floors below the renovation, close all doors and windows directly beneath the renovation;

(b) Ensure that doorways within the work area that will be used while the job is being performed are covered with plastic sheeting or other impermeable material in a manner that allows workers to pass through while containing dust and debris to the work area; and

(c) **Cover the ground with plastic sheeting or other impermeable material extending ten feet beyond the perimeter of surfaces undergoing renovation** or a sufficient distance to collect falling paint debris, whichever is greater, unless the property line prevents ten feet of such ground covering.

(6) For interior and exterior renovations, **clean the work area until no dust, debris or residue remains and employ the following cleaning procedures:**

(a) Collect all paint chips and debris and, without dispersing any of the material, **seal the material in a heavy-duty bag;**

(b) Remove the protective sheeting. The **sheeting shall be folded before and taped to seal or sealed within a heavy-duty bag.** The sheeting shall be **misted before folding.** Sheeting used to isolate contaminated rooms from non-contaminated rooms must remain in place until after the cleaning and the removal of other sheeting. The **sheeting may be disposed of as waste.**

(c) **Wipe all remaining surfaces and objects in the work area, except for carpeted or upholstered surfaces, with a damp cloth. Mop uncarpeted floors thoroughly, using a mopping method that keeps the wash water separate from the rinse water, such as the two-bucket mop method, or using a wet mopping system.**

Replaces: 3701-32-11

Effective: 07/05/2009

R.C. 119.032 review dates: 04/01/2014

CERTIFIED ELECTRONICALLY

Certification

(2) The lead-safe renovator training program **shall not exceed six clock hours or 7.2 training hours. One and a half hours** of the 7.2 training hours shall be designated as hands-on training;

(3) The instructor-to-student ratio for each program **shall not exceed 1:25;**

(4) For each program it offers, the training program shall conduct a program examination at the completion of the program;

(a) The program examination shall be developed in accordance with the program examination requirements of paragraph (A)(4)(b) of this rule. The program examination for the essential maintenance practices training program and the lead-safe renovation program **shall each have a minimum of twenty-five multiple choice questions.** The passing score for the essential maintenance practices training program examination and the lead-safe renovation training program examination **shall be seventy-two per cent;**

(b) The proportion of examination questions devoted to each major program topic shall be as follows:

(i) For the essential maintenance practices program: twenty per cent on roles and responsibilities, health effects, federal, state and local regulations; eight per cent on visual examination; forty-eight per cent on worksite preparation and safe work practices; and twenty-four per cent on job site cleaning, waste disposal and clearance examinations; and

(ii) For the lead-safe renovation program : twenty per cent on role and responsibilities, health effects, federal, state and local regulations; eight per cent on visual examination; eight per cent on project management; forty per cent on worksite preparation and safe work practices; and twenty-four per cent on job site cleaning, waste disposal and clearance examinations.

(c) **If a trainee does not pass the examination, that individual must repeat the program prior to retaking the examination;** and

(d) The training program shall provide written proof of the successful completion of the essential maintenance practices program or lead-safe renovation program to each candidate within one week of grading the program examination.

(8) Collect, wrap or bag, and seal all waste generated from the essential maintenance practices to prevent release of dust and debris before the waste is removed from the work area for storage or disposal. If a chute is used to remove waste from the work areas, it must be covered. In addition, the renovator shall comply with the following:

(a) At the conclusion of each work day and at the conclusion of the essential maintenance practices, store waste under containment or behind a barrier that prevents access to the waste and any dust, debris or both; and

(b) During transport, waste shall be contained to prevent the release of dust and debris.

(9) For interior and exterior essential maintenance practices, clean the work area until no dust, debris or residue remains and employ the following cleaning procedures:

(a) Collect all paint chips and debris and, without dispersing any of it, seal this material in a heavy-duty plastic bag; and

(b) Remove the protective sheeting. Mist the sheeting before folding it, fold the dirty side inward, and either tape shut to seal or seal in heavy-duty plastic bags. Sheeting used to isolate contaminated rooms from non-contaminated rooms must remain in place until after the cleaning and removal of other sheeting. Dispose of the sheeting as waste.

(10) In the case of interior work practices, individuals shall implement the following steps:

(a) Clean walls starting at the ceiling and working down to the floor by either vacuuming with a HEPA vacuum or wiping with a damp cloth;

(b) Thoroughly vacuum all remaining surfaces and objects in the work area, including furniture and fixtures, with a HEPA vacuum. The HEPA vacuum must be equipped with a beater bar when vacuuming carpets and rugs; and

(c) Wipe all remaining surfaces and objects in the work area, except for carpeted or upholstered surfaces, with a damp cloth. Mop uncarpeted floors thoroughly, using a mopping method that keeps the wash water separate from the rinse water, such as the two-bucket mopping method, or using a wet mopping system.

(11) Perform visual examinations for deteriorated paint, underlying damage, and other conditions that may cause exposure to lead;

(12) Promptly and safely repair deteriorated paint or other building components that may cause exposure to lead and eliminate the cause of the deterioration;

(13) Ask tenants in a residential unit, and parents, guardians, and custodians of children in a child care facility or school, to report concerns about potential lead hazards by providing written notices to the tenants or parents, guardians, and custodians or by posting notices in conspicuous locations;

(14) Cover any bare soil on the property, except soil proven not to be lead-contaminated; and

(15) Not perform the following prohibited methods:

- (a) Open-flame burning, torching or charring of paint;
  - (b) Machine sanding or grinding or abrasive blasting or sandblasting paint unless the machine used is equipped with a HEPA exhaust control;
  - (c) Dry scraping or dry sanding paint unless the scraping is done in conjunction with heat guns or within one foot of electrical outlets or when treating defective paint spots totaling no more than two square feet in any one room, hallway, or stairwell, or totaling no more than twenty square feet on exterior surfaces;
  - (d) Use of a heat gun on paint above one thousand one hundred degrees Fahrenheit;
  - (e) Uncontained hydro-blasting or high pressure washing of lead-based paint; or
  - (f) Paint stripping in a poorly ventilated space using a volatile stripper that is considered a hazardous substance pursuant to 16 C.F.R 1500.3 or a hazardous chemical pursuant to 29 C.F.R. 1910.1200 or 29 C.F.R. 1926.59.
- (E) The owner or manager of a residential unit, child care facility or school shall:
- (1) Ensure that specialized cleaning associated with essential maintenance practices is performed on affected areas of the residential unit, child care facility or school in accordance with current and accepted methodologies, including, but not limited to, the procedures in Chapter 14 of the HUD guidelines and ensure that bare soil of the residential unit, child care facility or school is covered in accordance with current and accepted

methodologies, including, but not limited to, Chapter 11, or Chapter 12, or both, of the HUD guidelines.

(2) Ensure that a clearance technician, lead risk assessor or lead inspector performs a clearance examination annually in accordance with the procedures specified in rule 3701-32-12 of the Administrative Code. If the clearance examination indicates that the residential unit, child care facility or school does not meet the clearance examination standards set forth in rule 3701-32-19 of the Administrative Code, the owner or manager shall take any necessary steps to achieve the clearance standards. A clearance technician, lead risk assessor or lead inspector shall perform any necessary clearance examinations to ensure the residential unit, child care facility or school meets the clearance standards.

(3) Maintain a record of all essential maintenance practices including the clearance examination report or reports for at least three years.

Effective: 07/05/2009

R.C. 119.032 review dates: 04/02/2009 and 04/01/2014

CERTIFIED ELECTRONICALLY

Certification

06/25/2009

Date

Promulgated Under: 119.03

Statutory Authority: 3742.50

Rule Amplifies: 3742.06, 3742.41, 3742.42, 3742.43, 3742.44, 3742.45, 3742.46, 3742.47, 3742.48

Prior Effective Dates: 4/1/2004



# A Discussion of OSHA Requirements for Disturbing Paint with Lead in Light of the New EPA RRP Lead Regulations

by  
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*Wonder Makers Environmental*

Substantial effort has been put forth recently to educate contractors who are working on older facilities that may contain lead-based paint about the new Environmental Protection Agency (EPA) requirements for such work. The EPA's Renovation Repair and Painting (RRP) regulations became effective April 22, 2010. The new rules caught many contractors unaware of the extensive protective measures that they must utilize when working in homes or child occupied facilities that contain paint with a lead concentration greater than one-half of one percent (0.5%).

Compliance with the EPA regulations requires contractors to have at least one individual who has completed an approved eight-hour RRP training course. The training is valuable; however, it focuses strictly on the mandates for dealing with lead-based paint as laid out by the EPA. This focus on the requirements of a single regulatory agency is a disservice to contractors as it puts them at risk of complying with one set of rules that will result in noncompliance with other rules that also cover such work. Specifically, there are many areas of the EPA's RRP rules that are at odds with the Occupational Safety and Health Administration's (OSHA) regulations for working with lead.

Of primary importance is the section of the EPA training that tells contractors that only paints that contain more than 0.5% lead are covered by the RRP rules. While this is true, it implies that working with paints that have a lower lead concentration is safe and/or legal without utilizing any protective equipment or work practices. However, the OSHA lead standard for the construction industry makes no distinction between working painted surfaces with greater than 0.5% lead and those that have less. In fact, the terminology used by each agency highlights this discrepancy. Whereas the EPA uses the term "lead-based paint"<sup>1</sup> OSHA repeatedly references the term "lead containing coatings or paint"<sup>2</sup>.

Since the OSHA standard covers activities that disturb paint with any measurable concentration of lead, a real potential exists for a contractor following the EPA RRP rules to legally sand or otherwise disturb painted surfaces with low concentrations of lead without the benefit of personal protective equipment or engineering controls, and thereby be in violation of the occupational safety rules. An even greater concern is that such a scenario would endanger the individuals performing the work. Worse yet, the EPA has acknowledged for years that disturbing paint with lead at levels below the RRP regulatory cut off can be dangerous:

Lead can still be present in paint which is not classified as “lead-based.” This would occur when the paint has a lower amount of lead than the federal government regulates. If lead is present in the paint, lead dust can be released when the paint deteriorates, or is disturbed during remodeling, renovation, sanding, or some maintenance work that breaks the surface of the paint. <sup>3</sup>

This **health risk is so great that OSHA requires construction contractors to identify all materials that contain lead and forces them to conduct air monitoring if their work activities are going to disturb that material.** This initial air monitoring is conducted on workers disturbing lead-containing paint to establish exposure levels to lead for those workers. The recorded levels are then compared to two different airborne concentrations listed in the OSHA standard: the **action limit (AL) and the permissible exposure limit (PEL).** Currently, the action limit is set at **30 micrograms of lead per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) and the permissible exposure limit is  $50 \mu\text{g}/\text{m}^3$ .** **These limits are easily exceeded, even when the paint being disturbed has a lead concentration less than the EPA limit of 0.5%.** Illustration 1 is a graph of typical airborne lead levels for common work activities when the paint film that is being damaged contains approximately 0.3% lead—a concentration low enough that the material is exempted from RRP requirements.

**Airborne concentrations greater than OSHA limits trigger a variety of contractor requirements that are not even mentioned in the standard EPA RRP training classes. Not only is ignorance of the OSHA requirements no excuse for contractors to avoid citations, inability to conduct air monitoring is not accepted as an excuse either. If personal monitoring of activities disturbing paint with lead is not conducted by the contractor then OSHA mandates that “the employer shall treat the employee as if the employee were exposed above the PEL.”**<sup>4</sup>

The **OSHA standard then gets even more specific.** Where surfaces with paint containing lead are going to be disturbed and **no personal air monitoring data related to specific tasks is provided by the contractor** or an industry association, the regulations specify the expected airborne concentrations of lead for a wide range of work activities. For example, manual demolition of painted surfaces (such as drywall removal), hand scraping, hand sanding, and use of a power tool with a dust collection system must be treated as if the exposure levels were between 50 and  $500 \mu\text{g}/\text{m}^3$ . **This means that most contractors that disturb paint with any level of lead are required to move substantially beyond the minimum requirements of the EPA's Renovation, Repair and Painting (RRP) Rule.** In essence, all such work should look like an asbestos or mold remediation project with negative pressure enclosures and a minimum one-stage decontamination chamber.

The **air monitoring results are also the information that forms the foundation for a number of other important requirements under the OSHA rules.** Based on the **exposure levels** measured during the initial monitoring, determinations **must be made as to the training requirements, work practices, and engineering controls that will be used by those workers.** To provide an example of how much critical information is left out of the EPA

RRP training, the following is a list of OSHA requirements for jobs impacting lead paints, based on exposure monitoring levels:

- For work where **exposure to lead is found to be below 30  $\mu\text{g}/\text{m}^3$  of airborne** (exterior demolition work usually falls into this category):
  - General housekeeping
  - Hand and face washing
  - “Right to Know” training for lead
- For work where exposure to lead is **found to exceed 30  $\mu\text{g}/\text{m}^3$  but is below 50  $\mu\text{g}/\text{m}^3$  of airborne lead:**
  - All of the above requirements
  - Lead awareness training (2 hours)
  - Initial blood testing on the first day lead levels are found to be above 30  $\mu\text{g}/\text{m}^3$   
Medical surveillance if exposed above 30  $\mu\text{g}/\text{m}^3$  for more than 30 days per year
- For **work where exposure to lead is found to exceed 50  $\mu\text{g}/\text{m}^3$  of airborne**
  - All of the above requirements
  - Respirators
  - Engineering controls including HEPA vacuums, negative air machines, and wet methods  
Personal protective equipment  
Regulated areas, signs, and labels  
Decontamination facility

The truly disheartening part of all of this confusion, overlap, and narrow presentation of important safety and health information is that at least one of the agencies involved in regulating lead recognized years ago that better coordination was needed to help contractors deal with this dangerous substance. In 2007 OSHA did a review of its lead standard and the evaluation resulted in two important recommendations. Unfortunately, there was not enough coordination between various entities to act on the following suggestion:

***OSHA will consult with EPA and HUD to determine the value of a unified training curriculum and whether a course can be developed to meet the requirements of all three agencies. OSHA also will attempt to develop interpretations for its initial assessment requirements [29 CFR 1926.62(d)], in order to integrate them better with HUD and EPA requirements, reduce duplication, and make better use of historical data; these interpretations should help reduce costs and simplify the standard's requirements for small businesses. 5***

As a result, the **narrow training presented in the majority of EPA RRP classes puts contractors at great risk** of **both civil and regulatory liability rather than protecting**

<sup>1</sup> According to page 9 of the publication Testing Your Home for Lead (EPA 747-K-00-001, July 2000), in order for it to be considered lead-based paint, the paint must have greater than or equal to 0.5% lead.

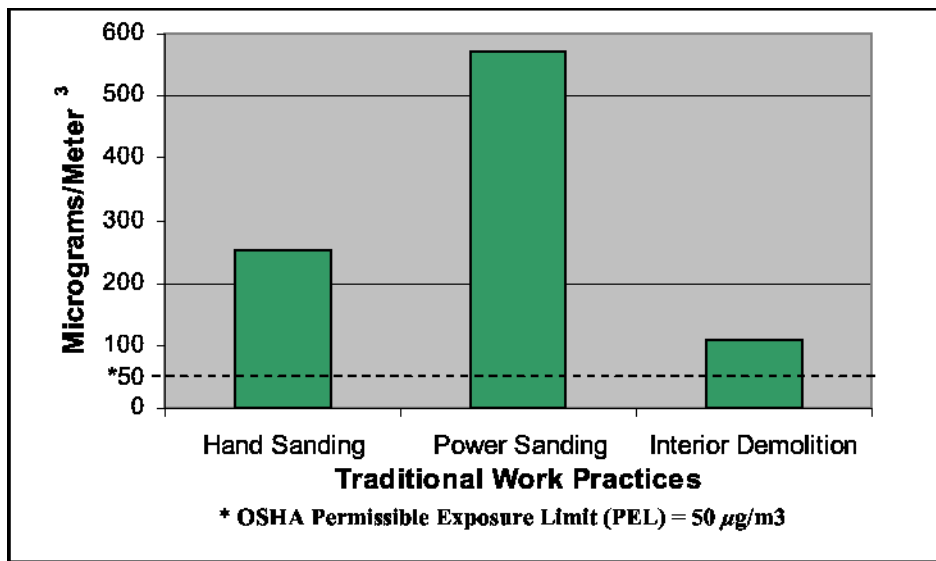
<sup>2</sup> For example, see the sections of the federal standard for lead in the construction industry identified as 29 CFR 1926.62(d)(2)(i) and 29 CFR 1926.62(d)(2)(iii)(B).

<sup>3</sup> Testing Your Home for Lead, page 9, EPA 747-K-00-001, July 2000.

<sup>4</sup> 29 CFR 1926.62(d)(2)(i).

<sup>5</sup> Excerpted from Regulatory Review of 29 CFR 1926.62; Lead in Construction Pursuant to Section 610 of the Regulatory Flexibility Act and Section 5 of Executive Order 12866 Occupational Safety and Health Administration, Directorate of Evaluation and Analysis, Office of Evaluations and Audit Analysis; September 2007.

**Illustration 1: Typical Airborne Lead Levels for Common Work Activities**



**OSHA New Warning Signs Requirements**  
**after June 01, 2016**

**1926.62(m)(1)(i)**

The employer shall post the following warning signs in each work area where an employee's exposure to lead is above the PEL.

DANGER  
LEAD WORK AREA  
MAY DAMAGE FERTILITY OR THE UNBORN CHILD  
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM  
DO NOT EAT, DRINK OR SMOKE IN THIS AREA

**1926.62(m)(1)(ii)**

The employer shall ensure that no statement appears on or near any sign required by this paragraph (m) that contradicts or detracts from the meaning of the required sign.

**1926.62(m)(1)(iii)**

The employer shall ensure that signs required by this paragraph (m) **are illuminated and cleaned as necessary so that the legend is readily visible.**

**1926.62(m)(1)(iv)**

The employer **may use signs required by other statutes, regulations or ordinances in addition to, or in combination with, signs required by this paragraph** (m).

**1926.62(m)(1)(v)**

**Prior to June 1, 2016**, employers may use the following legend in lieu of that specified in paragraph (m)(1)(i) of this section:

WARNING  
LEAD WORK AREA  
POISON  
NO SMOKING OR EATING

## Top Stories

### OSHA penalties to be adjusted for inflation after August 1

Maximum penalties for OSHA violations are [set to increase](#) for the first time since 1990 as part of overall federal penalty adjustments mandated by Congress last year. The increases were announced Thursday by the Department of Labor, which issued [two interim rules](#) covering penalty adjustments for several DOL agencies, including OSHA, the Mine Safety and Health Administration and Wage and Hour Division.

**OSHA's new penalty levels will take effect after Aug. 1**, when the The

The maximum penalty for:

**Serious violations** will rise

**from \$7,000 to \$12,471.**

The maximum penalty for:

**Willful or repeated violations** will increase from

**\$70,000 to \$124,709.**

**Any citations issued by OSHA after Aug. 1 will be subject to the new penalties if the related violations occurred after November 2, 2015.** OSHA will provide guidance to field staff on the implementation of the new penalties by Aug. 1.

# Lowe's Home Centers, L L C Settlement

(WASHINGTON - April 17, 2014) – Lowe's Home Centers, one of the nation's largest home improvement retailers, has agreed to implement a comprehensive, corporate-wide compliance program at its over 1,700 stores nationwide to ensure that the contractors it hires to perform work minimize lead dust from home renovation activities, as required by the federal Lead Renovation, Repair, and Painting (RRP) Rule, the Department of Justice and the U.S. Environmental Protection Agency (EPA) announced today. The company will also pay a \$500,000 civil penalty, which is the largest ever for violations of the RRP Rule.

## Violations

The government complaint alleges that Lowe's failed to provide documentation showing that the contractors it hires to perform renovation projects for Lowe's customers had been certified by EPA, had been properly trained, had used lead-safe work practices, or had correctly used EPA-approved lead test kits at renovation sites. EPA's investigation showed that at three homes located in Alton, IL, Trotwood, OH, and Kent OH, Lowe's contractors failed to ensure that work areas had been properly contained during renovations and cleaned up after renovations. EPA discovered the violations through a review of records initially prompted by tips and complaints submitted by the public.

## Actions Required by Settlement

Lowe's has agreed to implement the following specific compliance requirements at all of its over 1,700 stores nationwide to ensure the company and the contractors it hires to perform renovation work for Lowe's customers are following the RRP Rule, including:

- Lowe's will maintain RRP Firm Certification
- Lowe's will continue delivering the lead hazard pamphlet to potential customers and will ensure its contractors retain a record that the contractor delivered the pamphlet to the occupants of the renovated properties
- Lowe's will add a link on its website to EPA's website for lead-safe work practices
- Lowe's will revise its customer intake system to advise each potential customer about its contractor's use of a checklist that the customer can request upon completion of project
- Lowe's will use only RRP Certified Firms and Certified Renovators for renovations of housing built before 1978 and renovations of any child-occupied facilities, including day-care centers and preschools.
- Lowe's will suspend any contractors with expired RRP certifications
- Lowe's will suspend contractors if Lowe's determines the contractor is not in compliance with RRP rule
- Each contractor is required to use, and certify that it has used, Lowe's enhanced Installer Renovation Recordkeeping Checklist
- Lowe's will verify receipt of the Checklist prior to paying the contractors



- Lowe's will commence an inquiry into all notices it receives regarding alleged noncompliance with lead safe work practices by its contractors and shall have a Certified Firm and/or Certified Renovator certify that the area has been cleaned as set forth in 40 C.F.R. § 745.85(b).
- Lowe's will submit periodic reports quarterly for the first year, then bi-annually after that.

## Human Health and Environmental Concerns

EPA enforces the RRP rule and other lead rules to protect children and others, such as pregnant women, who are more vulnerable to lead poisoning as a result of exposure to lead dust.

Lead exposure affects the nervous system and can cause a range of health effects, from behavioral problems and learning disabilities, to seizures and death. Children six years old and younger are most at risk. Even low levels of lead in children's blood can be harmful. If not detected early, children with high levels of lead in their bodies can suffer from:

- Damage to the brain and nervous system;
- Behavior and learning problems, such as hyperactivity;
- Slowed growth;
- Hearing problems;
- Headaches;
- Anemia; and/or
- In rare cases of acute lead poisoning from ingestion of lead, seizures, coma and even death.

Lead can accumulate in our bodies over time, where it is stored in bones along with calcium. During pregnancy, lead is released from bones as maternal calcium is used to help form the bones of the fetus. This is particularly true if a woman does not have enough dietary calcium. Lead can also be easily circulated from the mother's blood stream through the placenta to the fetus. Mothers with high levels of lead in their bodies can expose their developing fetuses, resulting in serious and developmental problems including:

- Miscarriages;
- Premature births or low birth weight;
- Brain damage, decreased mental abilities and learning difficulties; and/or
- Reduced growth in young children.

## Pollutant Reductions

This settlement is expected to increase awareness of the RRP Rule requirements among the public and regulated community, which may contribute to a significant reduction in lead exposure.

A study conducted for EPA measured lead exposures for various renovation and remodeling activities and confirmed the general ranges OSHA estimated for paint removal and demolition. The study also estimated the hours of activity that would result in an estimated geometric mean 8-hour TWA of 50 mg/m<sup>3</sup>. Table 2-2 presents the data. Surface preparation consists of a variety of activities including wet and dry scraping and sanding and feathering of edges.

**Table 2-2: Mean Exposures and Time Required to Reach 8-hour TWA for Renovation and Remodeling Activities**

	Number of Employees Monitored	Estimated Geometric Mean Exposure (mg/m <sup>3</sup> )	Hours of Activity to Reach a Mean 8-Hour TWA of 50 mg/m <sup>3</sup>
Sanding - power	3	571	42 minutes
Sawing into wood	6	546	44 minutes
Sanding - hand	6	254	1 hr 34 min
Sawing into plaster	2	110	3 hr 38 min
Demolition	20	108	3 hr 42 min
Surface prep - interior	31	58.2	6 hr 52 min
HVAC work	4	49.6	8 hr
Drilling into wood	7	15.10	> 8 hr
Carpet removal	14	7.54	> 8 hr
Window replacement	8	7.48	> 8 hr
Drilling into plaster	6	6.76	> 8 hr
Surface prep - exterior	38	4.33	> 8 hr

Source: Lead Exposures Associated with Renovation and Remodeling Activities, January 2000, prepared by Battelle for U.S. EPA.

# 16 Sobering Numbers That Remind Us To Honor The Sacrifice Of 9/11 Responders

Posted: 09/11/2014 7:33 am EDT Updated: 09/15/2014 12:59 pm EDT

1,400

The number of first responders who have died from health complications stemming from their work at Ground Zero, since Sept. 11, 2001, according to estimates.



JUSTIN LANE via Getty Images

Thirteen years after the Sept. 11, 2001, terrorist attacks, some first responders and rescue workers are still waiting to receive proper care and compensation. From increased rates of cancer and other diseases to a continued failure by lawmakers to pass clear legislation to manage benefits, their burden has mounted with time, as new studies detail the toxic environments they rushed into.

As Americans move forward and look back this Sept. 11, let's remember the sacrifice of those who put their lives on the line that day.

414

The number of first responders killed on Sept. 11, 2001. Personnel responding to the attack on the Pentagon and to the downed plane in Shanksville, Pennsylvania, all survived.

**60,000-70,000**

The **number of responders exposed to the highly toxic dust** from the wreckage of the World Trade Center towers. It contained **asbestos, glass shards, cement and other toxins.**

**2,000**

The **number of first responders injured.**



*Firefighters make their way over the ruins and through clouds of smoke at the World Trade Center in New York. Many of the first responders and those who labored at the site in the months following the attacks suffer from respiratory ailments.*

**100-250**

The **number of materials in each particle of dust** from the destroyed towers.

**91,000**

The number of liters of jet fuel combusted in the attack, contributing to the dust cloud.

10-11

The pH level of destroyed concrete, which accounted for two-thirds of the total mass of World Trade Center dust. In comparison, ammonia's pH level is 11. In 2006, Environmental Protection Agency scientist Cate Jenkins said dust created by the attack was "as caustic and alkaline as Drano."



A firefighter holds a shovel as he walks through the rubble in the aftermath of the Sept. 11 attacks.

2,518

The number of rescue workers, including firefighters and EMT personnel, who have cancer.

15%

How much more likely first responders are to be diagnosed with cancer than the general public, according to a federally sponsored study of almost 21,000 World Trade Center rescue and recovery workers.

**239%**

How much **more likely first responders are to be diagnosed with thyroid cancer** than the general public.

**21%**

How much **more likely first responders are to be diagnosed with prostate cancer** than the general public. Prostate cancer was not covered under the Zadroga Act, which provides testing and treatment for first responders, **until last year**.

**1,400**

The **number of first responders who have died from health complications stemming from their work at Ground Zero**, since Sept. 11, 2001, according to estimates.





*In 2006, FDNY firefighter John McNamara stands outside Memorial Sloan Kettering Cancer Center, where he was undergoing chemotherapy for cancer he contracted Sept. 11. (Photo by Robert Sabo/NY Daily News Archive via Getty Images)*

12



The **number of years it took for the first sick responders to begin receiving payments for health compensation.**

**55,188**

The **total number of complete registrations submitted to the 9/11 Victims Compensation Fund** as of Sept. 8, 2014, [according to a program report](#). At least 91 people from the Pentagon and Shanksville sites also applied to the fund, [according to federal officials in 2013](#). Would-be claimants are required to register for the fund in order to apply for benefits, and applications are reviewed rigorously.

**1,843**

The **number of applications for compensation that had been paid**, as of Sept. 8, 2014. The mean amount of these payments is \$267,915.72.

**2**

The **number of years until the Zadroga Act expires**, unless lawmakers extend the law, which provides [health care and compensation](#) to both responders and survivors.

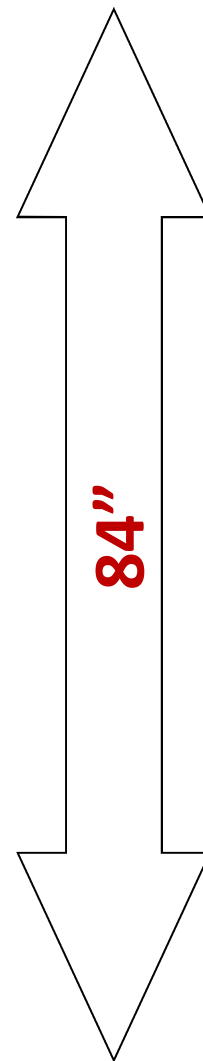
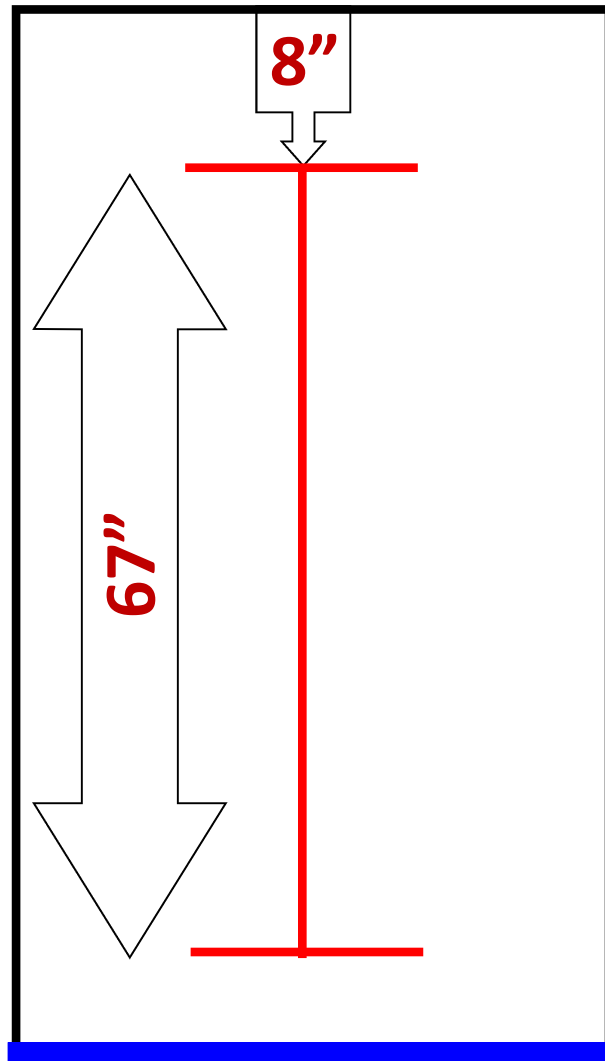
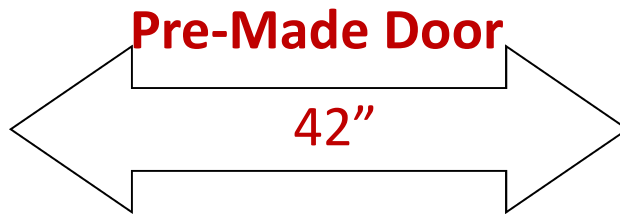


*Christine Gonda places a picture of firefighter George Cain at the engraving of his name at the South Pool, during anniversary ceremonies at the site of the World Trade Center on Sept. 11, 2012, in New York.*

The approximate **number of service dogs** that assisted in the search and rescue operation. They would later help in uncovering victims' belongings, such as jewelry, to be returned to victims' families. Studies have indicated that dogs, unlike their human handlers, have not shown signs of any **significant health issues** from their work.



*Moxie and her handler, Mark Aliberti, arrived at the World Trade Center on the evening of Tuesday, Sept. 11, 2001, and searched the site for eight days.*



## Pre-Made Door

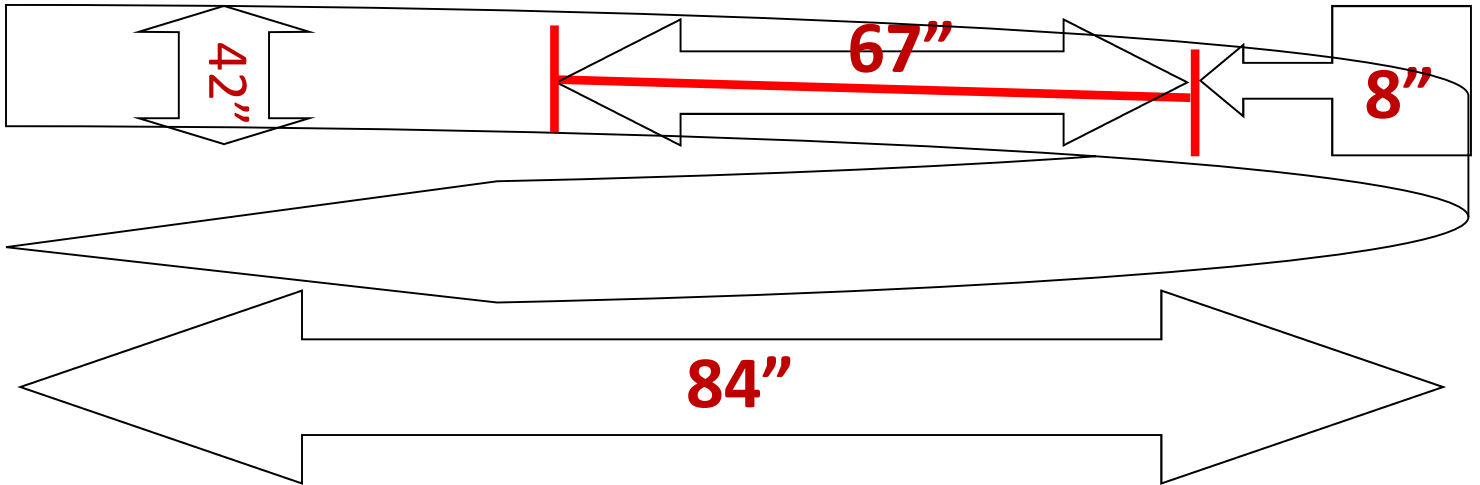
1. Cut from a poly roll 20' x 100 a piece 42" (42"x20')
2. Put two end together folding the piece in half
3. On the top half measure down 8", put top tape 12" long
4. From the top tape measure down 67" and put bottom tape 12 long.

#1 Cut 42" x 20' long

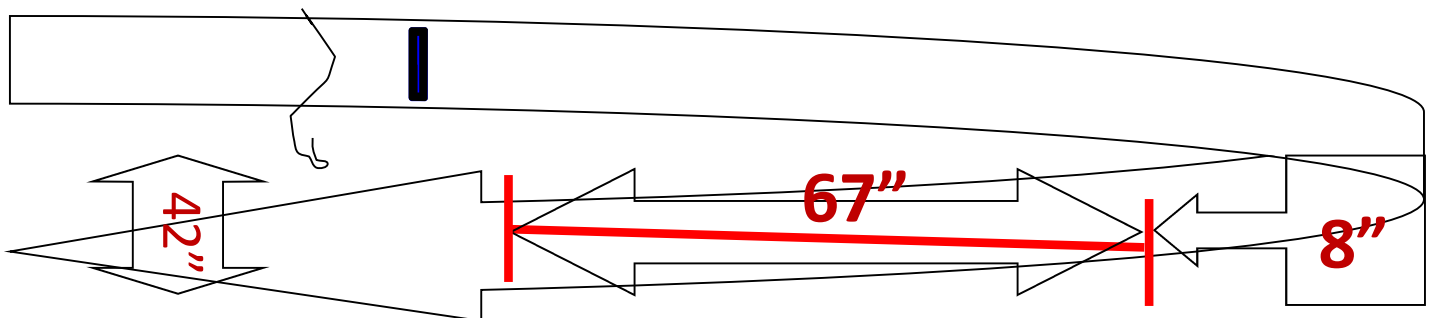
42" x 20' fold in half with two ends together

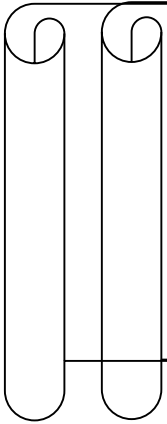
#2 Put two ends together

#3 Top piece with tape



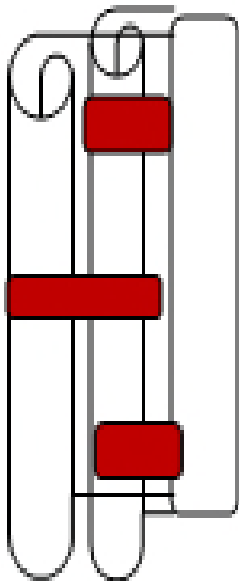
#4 Put bottom piece on top, cut 1' below bottom tape, insert wood roll 3"





#5. Roll both end to 8" from top,  
the weight piece first then the  
tape opening piece

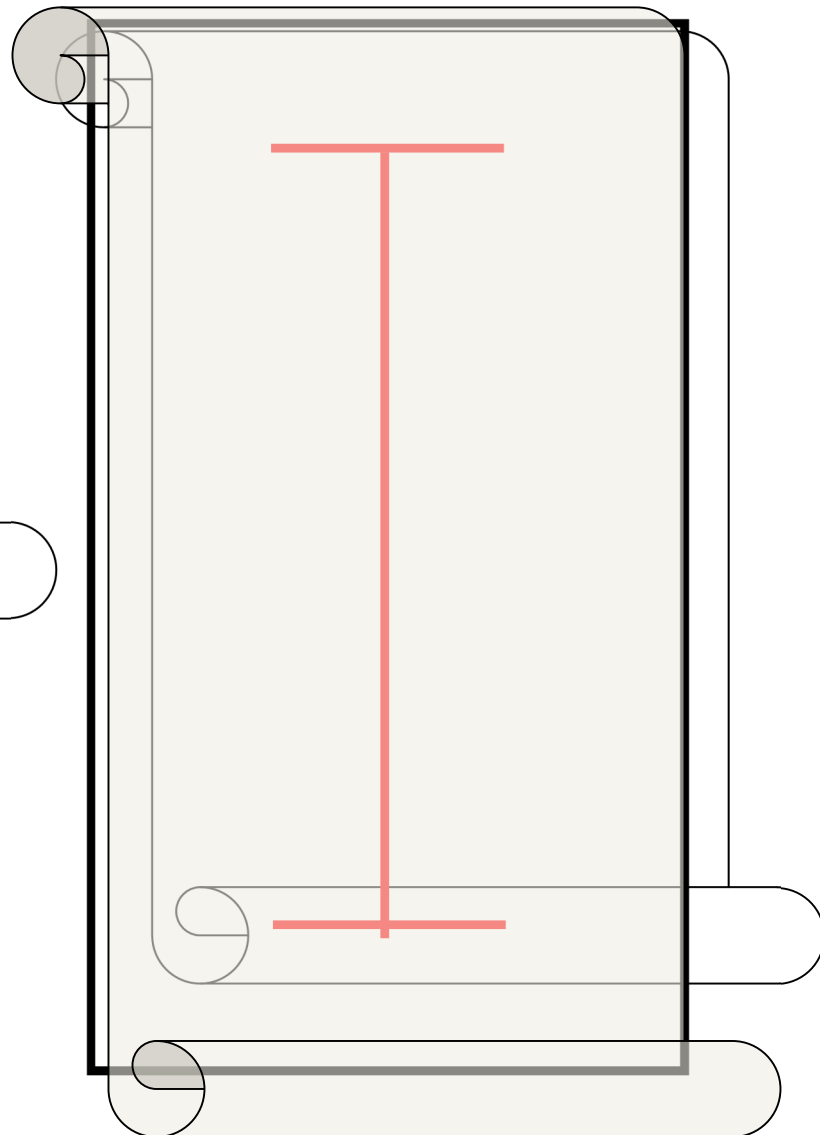
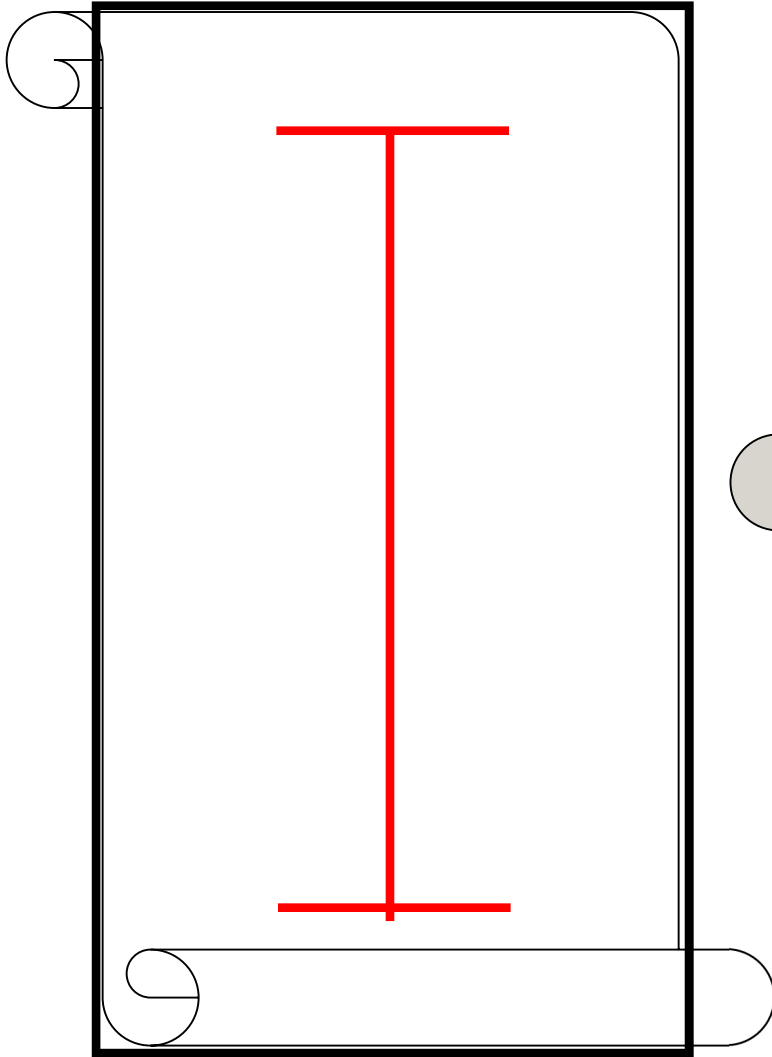
#6. Roll both end to  
8" from top



Break center tapes lower  
the bottom roll down,  
tape to jamb



Break Two outer tapes  
lower the top weighted  
roll down.





# Keeping Lead at Work

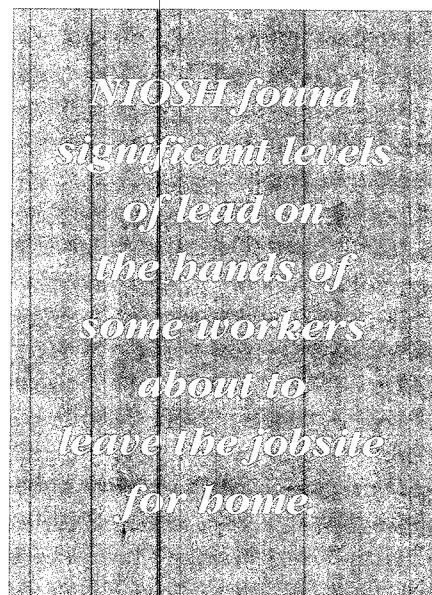
by Greg M. Piacitelli, MS, CIH, and Elizabeth A. Whelan, PhD,  
National Institute for Occupational Safety and Health

**E**xposure to lead from construction work may not be limited to the job site. Workers can inadvertently carry lead home from work on clothes, skin, hair, and tools, and in their vehicles. These "para-occupational" or "take-home" exposures among workers' families may cause lead poisoning in family members. This type of exposure is not a new problem. Holt cited 2 early studies of families of lead workers that were published in 1860 and 1896.<sup>1</sup> Oliver reported in 1914 on lead poisoning in wives of house painters who washed their husbands' overalls—observations that resulted in a series of laws in Great Britain to protect workers' families from lead poisoning.<sup>2</sup>

Families of lead-exposed workers, especially young children, are of particular concern. Children are at higher risk for lead exposure because they have more hand-to-mouth activity than adults and because the efficiency of gastrointestinal absorption of lead in children exceeds that of adults.<sup>3</sup> Lead poisoning has been shown to cause a variety of problems in children, ranging from behavioral disorders to brain damage. Elevated blood lead levels can have adverse reproductive effects in women and men and can also affect the fetus in pregnant women, causing irreversible neurological damage.

A recent report by the National Institute for Occupational Safety and Health (NIOSH) cites about 65 incidents of lead poisoning among workers' families; about a third of

these were reported in the last 10 years.<sup>5</sup> Exposure of lead workers' families has been identified in nearly 30 different industries, most commonly in lead smelting, battery man-



ufacturing and recycling, radiator repair, pottery/ceramics, and stained glass crafts. However, family members' exposure to lead has rarely been reported in the construction industry, including work on steel structures. This may be partly due to the fact that, before 1993, the construction industry was exempt from the Occupational Safety and Health Administration (OSHA) lead standard and was therefore relatively under-regulated and understudied.<sup>5</sup>

Several factors suggest that take-home lead may be more of a problem for families of construction workers than for families of workers in other lead industries. Because construction work is often short-

term and transient and typically conducted in isolated locations, it may be more difficult to implement and practice preventive measures specifically intended to minimize the potential for lead to be taken from work sites. These measures include the use of on-site hygiene facilities for changing from contaminated work clothing and showering before leaving work each day.

To evaluate take-home lead exposures in the construction industry, NIOSH recently conducted 2 studies of bridge workers and their families. This article describes NIOSH's findings in these studies.

## Study of Abrasive Blasters

In a study of abrasive blasters removing lead-based paint from a bridge in Connecticut, NIOSH investigators measured lead contamination on workers' skin and in their cars.<sup>6</sup> Lead found on these surfaces is thought to be an indication of potential contamination of workers' homes. Lead was found at the end of the work shift on the hands and faces of most workers immediately upon leaving the work area. A decontamination trailer with a changing room and showers was available at this site (although its use by the workers was observed to be irregular). Additional samples collected immediately before workers left for their cars to return home indicated that significant levels of lead were found on some workers' hands. This suggests that workers were not adequately removing lead by washing

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or that they were re-contaminating their hands through contact with contaminated clothing or surfaces before leaving the work site.

In this study, lead was present in all workers' cars that were sampled. High lead loadings were found on drivers' floors (geometric mean [GM] = 1,900  $\mu\text{g}/\text{m}^2$ ), armrests (GM = 1,100  $\mu\text{g}/\text{m}^2$ ), and steering wheels (GM = 240  $\mu\text{g}/\text{m}^2$ ). For comparison, OSHA recommends a level of 2,000  $\mu\text{g}/\text{m}^2$  in evaluating cleanliness of change areas, storage facilities, and lunchrooms/eating areas at construction sites.<sup>7</sup> No guidelines are provided by OSHA for assessing contamination in workers' cars. Abrasive blasters, who typically have very high exposure to air-borne lead, had relatively low lead loadings in their cars (370  $\mu\text{g}/\text{m}^2$ ). This may be explained by the observation that workers considered to be highly exposed to lead, such as blasters, regularly changed out of work clothing and showered before entering their cars. Other workers who were thought to be only minimally exposed to air-borne lead did not regularly follow hygiene practices intended to prevent take-home exposures. In this study, worker exposures to air-borne lead were not predictive of lead contamination levels inside their cars. This observation demonstrates the need for all lead-exposed workers to shower and to leave their work clothing at the job site—or risk contamination of their personal automobiles and potential exposure to family members.

### Study of Workers' Families

NIOSH investigators later conducted a study to assess lead exposures among 37 families of construction workers; 22 neighborhood families with no known lead exposures were included for comparison.<sup>8,9</sup> The construction workers reported that OSHA hygiene requirements (e.g., changing and shower facilities)

specifically intended to prevent take-home lead exposures were infrequently followed by their employers. Blood lead testing indicated that children of construction workers were 6 times more likely than neighborhood children to have a blood lead level at or above the Centers for Disease Control and Prevention (CDC) action level of 10  $\mu\text{g}/\text{dL}$ .<sup>10</sup> Environmental measurements indicated that the hands of lead-exposed workers were 7 times more contaminated with lead compared with control workers; no difference was found between exposed and control family members' hands. Surface lead contamination was significantly higher in automobiles driven by the construction workers; some locations, such as armrests, were 10 times more contaminated for the exposed group. Elevated lead loadings in lead workers' automobiles were found on the driver's floor (GM =

1,100  $\mu\text{g}/\text{m}^2$ ), driver's armrest (GM = 2,000  $\mu\text{g}/\text{m}^2$ ), and passenger's armrest (GM = 1,200  $\mu\text{g}/\text{m}^2$ ). Lead loadings for these same locations in control cars were 250, 190, and 120  $\mu\text{g}/\text{m}^2$ , respectively. Geometric mean surface lead concentrations were significantly higher on floors where work clothing was changed in exposed homes (370 ppm) compared to control homes (120 ppm). These results suggest that occupational exposures and poor hygiene practices are the primary causes of lead contamination in workers' cars and homes.

### Preventing Take-Home Lead

These studies have therefore demonstrated that lead from construction sites can be carried on workers' skin and clothing, thereby contaminating their cars and homes and resulting in lead exposures to

*continued*

their families. What can be done to prevent this problem?

### **Current Protective Measures Required by OSHA**

The OSHA lead standard for the construction industry includes several provisions specifically intended to prevent lead from leaving the work site on workers or their clothing.<sup>5</sup> These provisions, listed below, are required only for those workers exposed for 1 day to air-borne lead greater than the permissible exposure limit (PEL) of 50  $\mu\text{g}/\text{m}^3$  over an eight-hour, time-weighted average.

- Employers are required to provide and assure proper use of full-body protective clothing that is laundered at least weekly (or daily for workers exposed above 200  $\mu\text{g}/\text{m}^3$ ). The employer is required to assure that contaminated protective clothing is removed only in designated change areas and left on-site for laundering or disposal. Workers are not permitted to wear or take home any lead-contaminated clothes, shoes, or equipment.
- Employers are required to provide clean change areas with separate storage areas for protective work clothing and for street clothes, which prevent cross-contamination.
- Employers are required to provide shower facilities, where feasible, and assure that employees shower before going home.

In addition to these provisions for workers exposed above the PEL, employers must provide hand washing facilities for all workers exposed to lead. At sites where showers are not provided, the employer must assure that employees wash their hands and face at the end of the work shift.

### **Additional Measures for the Prudent Employer**

NIOSH has found at construction sites that clothing and skin contamination may occur in any worker ex-

posed to lead—regardless of the airborne level. If preventive measures are not practiced, this contamination at the workplace may result in secondary contamination of personal automobiles and homes. Therefore, prudent employers should provide protective clothing and hygiene facilities for all employees who may enter work areas where lead is present. All employees should be informed specifically about the hazards associated with lead on skin and clothing, and should be strongly encouraged to follow guidelines for changing work clothes, showering or washing, and leaving contaminated items at work.

Employers should consider collecting samples of lead dust on workers' hands and in cars to evaluate the effectiveness of their lead prevention program. There are simple and inexpensive methods for assessing lead contamination on sur-

faces such as workers' hands and car interiors.<sup>11</sup> Sample results may identify problems in current hygiene procedures and demonstrate the importance of stringent personal hygiene practices. Cars requiring decontamination may also be identified. Qualified personnel, such as industrial hygienists, should conduct a lead monitoring and decontamination program.

Lead in workers' cars may also come from non-occupational sources. Contributing sources include residential lead-based paints, particulate fallout from local sources of industrial air pollution, soil contaminated from past motor vehicle emissions, and disintegration of exterior lead-based paints.<sup>6,8,9</sup> Nevertheless, it is reasonable to assume that the workers' occupational exposure to lead is a primary factor. Prudent construction contractors should therefore be con-

**continued**

cerned about the presence of lead in their workers' cars.

Employers can also help in efforts to reduce lead contamination in workers' automobiles if significant lead levels are found or suspected. Employers frequently have high-efficiency particulate (HEPA) vacuum cleaners at work sites for cleaning clothing, respirators, and work

equipment. HEPA vacuums are specially designed to prevent the release of collected lead dust back into the environment. Employers can help workers safely maintain clean vehicles by allowing their employees access to a HEPA vacuum. Also, employee usage of lead-specific detergents for wiping their car interiors is also recommended. Employers

can often provide these products to their employees or assist workers in obtaining them at minimal cost.

Currently, there are no health-based federal regulations for lead dust in automobiles. The Department of Housing and Urban Development (HUD) and the Environmental Protection Agency (EPA) have recommended "clearance levels" for surface lead levels in housing following lead hazard control work.<sup>12,13</sup> The highest recommended lead level on bare or carpeted floors is 1,000  $\mu\text{g}/\text{m}^2$  (100  $\mu\text{g}/\text{ft}^2$ ). OSHA has adopted an earlier HUD recommendation of 200  $\mu\text{g}/\text{ft}^2$  for lead on floors in evaluating cleanliness in non-work areas at construction sites.<sup>7</sup> OSHA does not expect that surfaces in change areas, lunch rooms, or storage areas be any cleaner than this level. These recommendations are not entirely health-related but are based on empirical evidence that these levels are achievable by prudent cleanup procedures. Based on previous NIOSH studies<sup>8</sup>, it appears feasible to maintain lead levels inside cars to at least this same level. Lead loadings measured in control cars indicate that ambient lead levels are well below the 1,000  $\mu\text{g}/\text{m}^2$  guideline and are therefore achievable. It is important to recognize that lead in cars, especially on seats, armrests, or the steering wheel, represents a potential exposure for ingestion, especially by young children.

### Conclusion

A critical aspect in preventing take-home lead hazards is ensuring employee compliance with measures intended to minimize lead contamination. Owners, managers, and supervisors should be proactive in training, enforcement, and encouragement for proper hygiene practices. Education efforts should focus on the health effects of lead exposure, including effects on family members such as

young children and pregnant women. Also, giving workers results of any dust sampling performed on hands or inside cars provides a visual indication of the effectiveness of the workers' efforts and any improvements needed. A concerted and mutual effort by employers and their workers is needed to be successful at keeping lead at work—and out of workers' cars and homes. **JPCL**

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# DANGER LEAD WORK AREA



**MAY DAMAGE FERTILITY  
OR THE UNBORN CHILD  
CAUSES DAMAGE TO THE  
CENTRAL NERVOUS SYSTEM**



**DO NOT  
EAT  
DRINK  
SMOKE  
IN THIS AREA**

