



**40%** of high risk kids don't receive recommended lead tests.

# LEAD PREVENTION

## Resource Guide

Ohio Chapter  
INCORPORATED IN OHIO  
American Academy of Pediatrics  
DEDICATED TO THE HEALTH OF ALL CHILDREN®

**Ohio** | Department of Health

[www.ohioaap.org/lead](http://www.ohioaap.org/lead)



# LEAD FACTS

## for Ohio Families

### THE IMPORTANCE OF PREVENTION

- There is no safe blood lead level.
- There is no evidence that the effect of lead exposure can be reversed.
- Lead exposure is a risk factor for impaired development and school performance and behavioral problems through a person's entire life.
- An elevated blood lead level (EBLL) is not something that can be diagnosed and reversed – primary prevention is key.

**All kids living in high ZIP codes and all kids insured through Medicaid should have a venous or capillary test completed at 12 and 24 months, per Ohio Department of Health recommendations and Ohio law.**

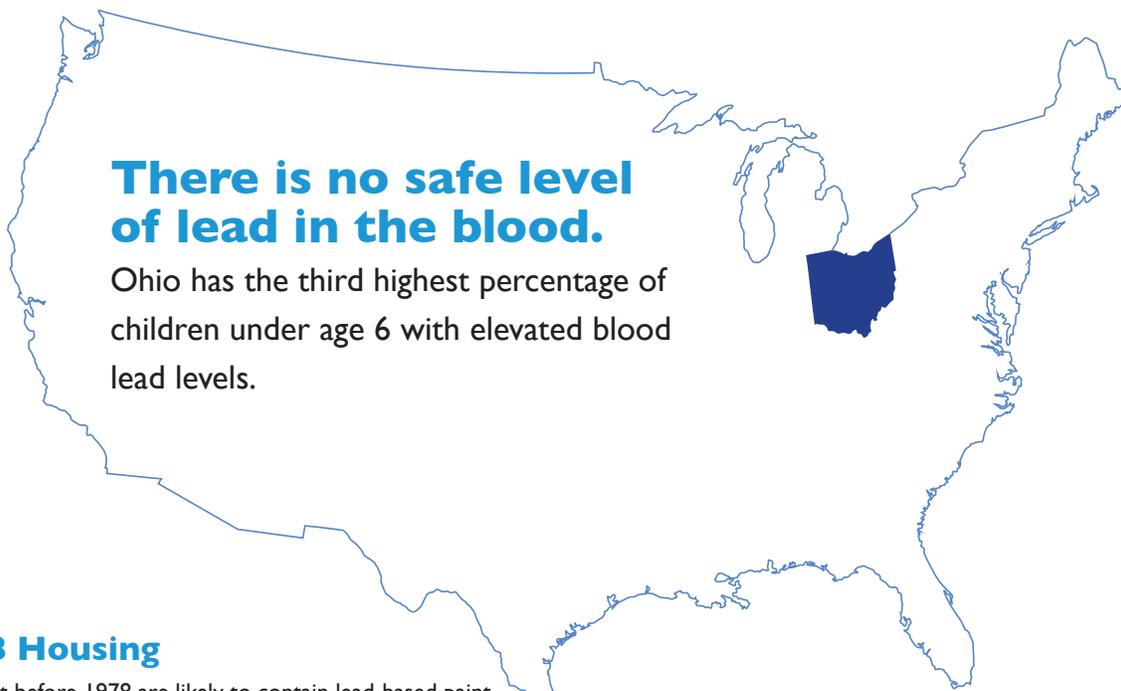
- While capillary testing is acceptable for screening purposes, medical and environmental testing should be planned based on venous confirmatory test following positive capillary test.
- Venous confirmatory testing should be performed on all children with a capillary blood lead level of 5 µg/dL or higher and all future lead level testings for those children should be venous testing.
- High-risk kids who did not have a blood level test at age 1 or 2 should have a capillary or venous test done. Recheck lead level in three to 12 months, depending on the child's age.

### PATIENT FOLLOW UP

- Steps if lead is detected (BLL < 5 µg/dL):
  - Geometric mean BLL for children <6 is approximately 1 µg/dL.
  - Reinforce primary prevention strategies.
  - Recheck lead level.
- EBLL (BLL ≥ 5 µg/dL) diagnosed through capillary testing should be confirmed with venous test
- Schedule a follow-up test.
- For additional medical management needs, possible referral to regional children's hospital.
- Early Intervention referral for children with BLL 5µg/dL or higher.

Resource: Pediatric Environmental Health Specialty Units <https://www.pehsu.net>

# CHILDHOOD LEAD POISONING



## There is no safe level of lead in the blood.

Ohio has the third highest percentage of children under age 6 with elevated blood lead levels.

### Pre-1978 Housing

- Houses built before 1978 are likely to contain lead-based paint.
- Ohio's large burden of elevated blood lead levels can be attributed to the age of Ohio's housing stock as well as the lack of maintenance and deterioration of some homes. The systemic disinvestment in certain neighborhoods, disproportionately affecting minority communities, has resulted in high lead exposure risk in those communities.

### Sources of Lead Exposure

Ways children can be exposed to lead:



Lead-based paint dust/chips



Occupational take-home lead



Water



Food/herbs



Soil



Toys



Cosmetics\*



Spices\*



Folk remedies\*

\* Kids born abroad, especially recent refugees, are a potential high-risk population, as cosmetics, spices, and folk remedies from abroad are a less common, but not rare, source of exposure.



**80%** of Ohio's lead poisoning cases result from dust created by deteriorated lead-based paint in **houses built before 1978.**

# LEAD POISONING PREVENTION



Ensuring lead-safe environments and preventing any exposure to lead in children should be our most important goal. Physicians can play a significant role in this by educating parents and communities about the dangers of lead. When exposure is identified, there are important steps that must be taken to reduce exposure, absorption, and hazards.



## Reduce Hazards

- **Beware of lead dust:** Remodeling and renovating can create lead dust.
- **Create safe barrier around lead hazards:** Use furniture as a barrier to windows that contain lead paint.
- **Keep child safe:** Remove child from area and contain dust during remodeling.



## Reduce Exposure

### Cleaning

- Common places with lead dust include wood floors, carpet, upholstery, window sills and window wells.
- Wet mop instead of dry sweeping.
- Borrow a HEPA vacuum from your local health department.
- Thoroughly clean toys and other items that are used by children.

### Hygiene

- Wash hands often, especially before meals and before bedtime.
- Do not let children play in bare soil outside.

### Occupational

If you work around products or materials containing lead (i.e. manufacturing, automotive, or construction) avoid exposing your child to lead by:

- Changing clothes and shoes at work.
- Showering as soon as you get home.
- Washing work clothes separately.
- Protection during renovation projects is important.



## Reduce Absorption

- A well-rounded healthy diet that contains vitamin D supports healthy development.
- Vitamin C aids in iron absorption.

### Foods rich in Iron and Calcium:

- Non-heme iron: Dried beans, peas, lentils, spinach and broccoli.
- Heme iron: Lean red meats, chicken and fish.
- Calcium: Low-fat milk, cheese, and yogurt.

### Foods rich in Vitamin C:

- Citrus, leafy greens, broccoli, bell peppers and sweet potatoes.

# SIGNS & SYMPTOMS OF LEAD POISONING



Most commonly, exposure is acutely asymptomatic, but long-term effects are observed at low and acutely asymptomatic levels. This is why we need to test high-risk kids.

## Signs and symptoms:



Irritability



Behavioral problems



Abdominal pain



Lethargy



Loss of appetite



Headaches



Memory loss



Seizures  
(high lead exposure)

## Lifelong consequences:

- Speech and language problems.
- Decreased bone and muscle growth.
- Hearing loss.
- Damage to the nervous system and/or kidneys.

## Effects of lead poisoning:

- Developmental delay.
- Cognitive problems.
- Decreased IQ.
- Attention Deficit Disorder.

## Healthcare Provider Responsibilities

Blood lead testing is required for each Ohio child younger than 6 (with an emphasis on 1 and 2 year olds) who:

1. **Is Medicaid eligible.**
2. **Lives in a high risk ZIP code.** (See map on Ohio AAP website.)
3. Lives in or regularly visits a home or building built before 1950.
4. Lives in or regularly visits a home or building built before 1978 that has deteriorated paint
5. Lives in or regularly visits a home or building built before 1978 that has current or planned renovation/ remodeling.
6. Has a sibling or playmate who has or did have an elevated blood lead level.
7. Frequently encounters an adult who has a lead-related hobby or occupation.
8. Lives near an active lead smelter, battery recycling plant, or other industry known to generate airborne lead dust.

# MEDICAL MANAGEMENT

- All capillary (finger/heel stick) test results  $\geq 5\mu\text{g/dL}$  must be confirmed by venous draw. (A capillary test is a finger prick. A venous draw is a blood draw.)
- Point-of-care instruments such as the Lead-Care®II cannot be used to confirm an elevated blood lead level.
- Any confirmed level of lead in the blood is a reliable indicator that the child has been exposed to lead.
- The Ohio Healthy Homes and Lead Poisoning Prevention Program will respond accordingly to all blood lead levels of  $5\mu\text{g/dL}$  or greater.
- According to the American Academy of Pediatrics *Bright Futures*, physicians should follow the *Medical Management Recommendations* provided by ODH.
- A minimum of two tests are recommended for all at-risk children prior to their third birthday, specifically at the child's one and two year well child visits.
- Healthcare providers must screen for asymptomatic lead poisoning and provide guidance on primary prevention.

## Aiding Families

- Perform an environmental and family occupational history to educate parents about common sources of childhood lead exposure.
- Encourage parents to identify potential lead hazards in their homes and recommend ways to reduce their child's lead exposure.
- Provide parents with free educational pamphlets and booklets developed by ODH.

### Medical Management Recommendations for Ohio Children receiving Blood Lead Test

- Ohio Healthy Homes and Lead Poisoning Prevention Program: 1-877-LEAD-SAFE
- Help Me Grow Hotline (Home Visiting and Early Intervention): 1-800-755-GROW (4769)
- Medicaid Provider Hotline: 1-800-686-1516
- Children with Medical Handicaps (CMH): 614-466-1700
- Poison Control: 1-800-222-1222
- Women, Infants and Children (WIC): 614-644-8006

Blood Lead Level (BLL)	Confirm Using Venous Blood:	Medical Management Recommendations for BLL	Venous Retest Intervals After Recommended Actions
$<5$ $\mu\text{g/dL}$	Not required	<ul style="list-style-type: none"> <li>• Explain that there is no safe level of lead in the blood, what the child's BLL means, and how the family can reduce exposure. For reference, the geometric mean blood lead level for children 1 to 5 year is 1.3 <math>\mu\text{g/dL}</math>.</li> <li>• Monitor the child's neurological, psychosocial, and language development.</li> </ul>	<ul style="list-style-type: none"> <li>• Test again at age 2 if first test is at age 1.</li> <li>• Lead testing should be considered if the child moves to a different home, daycare, school, etc. that was built before 1978.</li> </ul>
$5-9$ $\mu\text{g/dL}$	1 to 3 months	<p><b>In addition to medical management actions listed above:</b></p> <ul style="list-style-type: none"> <li>• Provide lead education: potential environmental sources, effect of diet on exposure, potential health effects, and hazards associated with renovating pre-1978 homes.</li> <li>• Monitor subsequent increases/decreases in blood lead levels until the BLL remains <math>&lt;5 \mu\text{g/dL}</math> for at least six months and lead exposures are controlled.</li> <li>• Complete child history and physical exam.</li> <li>• Assess iron status. Also consider status of hemoglobin or hematocrit. Children with low iron levels are more likely to have high blood lead levels. Follow AAP guidelines for prevention of iron deficiency.</li> <li>• Obtain an abdominal X-ray if particulate lead ingestion is suspected. Bowel decontamination should be performed if particulate lead ingestion is indicated.</li> <li>• Refer to the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) for other nutritional counseling.</li> <li>• Refer to Help Me Grow program within seven days if a potential delay in development has been identified.</li> <li>• Refer to the Children with Medical Handicaps program (CMH).</li> </ul>	<ul style="list-style-type: none"> <li>• Every three months for first two to four tests.</li> <li>• After fourth test, every six to nine months until BLL drops below <math>5 \mu\text{g/dL}</math>.</li> </ul>
$10-44$ $\mu\text{g/dL}$	Within 1 month	<p><b>In addition to medical management actions listed above:</b></p> <ul style="list-style-type: none"> <li>• Confirm results by venous blood sample immediately. A venous specimen will ensure therapy is based on current and reliable information.</li> <li>• Lab work for hemoglobin or hematocrit and free erythrocyte protoporphyrin are indicated.</li> <li>• Immediately remove child from exposure source. (Chelation could have negative effects if not moved to lead safe environment.)</li> <li>• Hospitalization and chelation therapy should be considered with consultation from a medical toxicologist or pediatric environmental health specialist.</li> </ul>	Within 1 month.
$\geq 45$ $\mu\text{g/dL}$	As soon as possible	<p><b>In addition to medical management actions listed above:</b></p> <ul style="list-style-type: none"> <li>• Confirm results by venous blood sample immediately. A venous specimen will ensure therapy is based on current and reliable information.</li> <li>• Lab work for hemoglobin or hematocrit and free erythrocyte protoporphyrin are indicated.</li> <li>• Immediately remove child from exposure source. (Chelation could have negative effects if not moved to lead safe environment.)</li> <li>• Hospitalization and chelation therapy should be considered with consultation from a medical toxicologist or pediatric environmental health specialist.</li> </ul>	<ul style="list-style-type: none"> <li>• As soon as possible.</li> <li>• Consult with expert.</li> </ul>

# ELEVATED BLOOD LEAD TEST



## ODH Lead Poisoning Prevention Surveillance System

- State law requires clinical laboratories to be approved by ODH.
- All clinical laboratories are required to report blood lead levels to ODH.
- Cases and investigations are open for health department staff.

## Case Management

- Case management services are provided by local health departments to coordinate the care of children with elevated blood lead levels.
- Case managers work collaboratively with primary care providers and public health lead investigators to ensure that proper medical management and follow-up occurs.
- Case managers provide education to families about the effects of lead and how to reduce their child's lead level.

## Public Health Lead Investigation

- A public health lead investigation occurs when a child's blood lead level is confirmed at 5 – 9  $\mu\text{g}/\text{dL}$ .
- A public health lead investigation with an environmental risk assessment occurs when a child's blood lead level is confirmed at 10  $\mu\text{g}/\text{dL}$  or higher.
- An investigator will attempt to identify lead hazards in a child's environment and provide guidance on avoiding those hazards.

## Additional Practices

- All children with BLL  $\geq 5$   $\mu\text{g}/\text{dL}$  should be referred to Help Me Grow Early Intervention, as this automatically establishes eligibility for early intervention (EI) services.
- Encourage families to talk with their EI service coordinators about ways to facilitate communication between the early intervention program, school, and the medical home.

# RESOURCES

## Contact:

### Ohio Healthy Homes and Lead Poisoning Prevention Program

#### Ohio Department of Health

246 North High Street

Columbus, Ohio 43215

Phone: 1-877-LEAD-SAFE (1-877-532-3723)

## Additional Resources for Information on Childhood Lead Poisoning:

### Government Agencies

- Ohio Department of Medicaid: <http://www.medicaid.ohio.gov/FOROHIOANS/Programs/Lead.aspx>
- U.S. Department of Housing and Urban Development (HUD): [https://portal.hud.gov/hudportal/HUD?src=/program\\_offices/healthy\\_homes](https://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes)
- U.S. Environmental Protection Agency (EPA): <https://www.epa.gov/lead>
- Centers for Disease Control and Prevention (CDC): <https://www.cdc.gov/nceh/lead/>

### Lead Advocacy and Support Groups:

- National Center for Healthy Housing: <http://centerforhealthyhousing.org/>
- Children's Environmental Health Network <http://cehn.org>
- Ohio Healthy Homes Network: <http://www.ohhn.org/>
- Pediatric Environmental Health Specialty Units: [www.pehsu.net](http://www.pehsu.net)
- American Academy of Pediatrics: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/default.aspx>
- Ohio Chapter, American Academy of Pediatrics: [www.ohioaap.org](http://www.ohioaap.org)

# CLINICAL SCENARIO

## Timmy is a 12-month-old male in for a well child visit

- He lives in an apartment with his mom and two siblings.
- Mom does not know the age of the apartment building.
- He visits with his dad, who works in construction and lives in an “older” building with his mother.
- Mom is going to school.
- He attends childcare at a licensed daycare center.
- He is insured by Medicaid.

## Does Timmy need a blood lead level?

### YES – According to Ohio law, Timmy needs a lead level

- He is insured by Medicaid.
- His father’s occupation and housing are also possible sources of lead.

## Timmy’s lead level comes back at 7.5 µg/dL

The local health department contacts Timmy’s mom and provides her with information on preventing lead exposure:

- Wet cleaning of surfaces.
- Encouraging iron-rich foods.
- Discouraging oral behaviors.
- Getting a follow-up lead level in about three months.

## At 15 months, Timmy comes back

- Mom has been cleaning the home two times per week.
- Dad has been changing his clothes before playing with Timmy.
- Lead level, CBC, Ferritin, CRP [From Aparna: or reticulocyte Hgb] (per AAP guidelines).
  - Lead 12 µg/dL.
  - CBC Hgb 10.8, otherwise normal.
  - Ferritin 5.0.
  - CRP normal.

## The Ohio Dept of Health performs a lead risk assessment at the home

- Timmy’s mom’s home was built in 1919.
- There are lead hazards on the windows and trim as well as high lead dust levels on the floor.
- There is water damage from a previous roof leak that is causing the plaster to bubble and crack.
- There is bare soil in the back yard at the home where he plays.
- Timmy drinks about 48 ounces of cow’s milk each day.
- Dad’s home was built in 1967 and completely renovated in the 1990s, and dad only works in new construction.

## What other actions to take?

### Iron supplementation

- Ferritin of 5 -> likely to increase lead absorption; low iron also is associated with developmental delays. (See Baker et al., Pediatrics, 2010.)

### Reinforce temporary measures to address lead hazards

- Covering over areas of deteriorating paint with tape, etc.
- Avoiding contaminated soil in the backyard.
- Repeat lead level needed in about one month.

# EBLL: LETTER FROM PRACTICE



Dear \_\_\_\_\_

Your child's lead level is \_\_\_\_ µg/dL. Please come back in \_\_\_\_\_ to have his/her level rechecked.

\_\_\_\_\_ We prescribed a multivitamin with iron today.

\_\_\_\_\_ We did not prescribe a multivitamin with iron today because \_\_\_\_\_

Lead can affect your child's development, behavior and learning. You can do several things to help keep your child healthy and protect your child from future lead poisoning. A list of resources is attached to this letter.

## Your child should ...

- Take a multivitamin with iron.
- Eat two to three servings of food with calcium, including dairy, leafy greens, or cereal with extra calcium, each day.
- Attend a high quality day care or preschool.

## Parents and caregivers should ...

- Reduce lead exposure from peeling paint and soil. (shoes off indoors, wet mop, vacuum with HEPA filter.)
- Run the tap water on cold for one to two minutes before drinking, cooking or mixing formula
- Enroll in Help Me Grow to evaluate your child's development and receive help with your concerns. Children under 3 years old with lead levels of 5µg/dL or higher are automatically eligible for Help Me Grow services.
- Watch for signs of delay in elementary school and if you see them, request an evaluation for special education services in writing to the school district
- Read, talk, and sing with your child

## Tenants should ...

- Know your right to safe living conditions
- Always pay rent no matter what conditions are in the unit
- Give your landlord a written letter about lead hazards, such as peeling paint
- Contact your local department of health about investigating the source of lead
- Consult with an attorney about any possible personal injury claims against your landlord

## Homeowners should ...

- Contact your local department of health about investigating the source of lead
- Learn about lead safe renovation practices before doing work in the home

Please let your doctor know if you have questions or concerns. We know that it can be challenging to secure safe and affordable housing. We hope that these resources will help support the work you are doing to keep your child and family healthy. We are here to help and partner with you.

Programs and Providers	Contact Information
Help Me Grow (Early Intervention evaluation and services)	1-800-755-4769
xxxxxxx (to find daycare and preschools)	
Ohio Department of Health	1- 877-532-3723
xxxxxx (referrals to local private attorneys)	
Legal Aid	Ohiolegalhelp.org
Financial Assistance	
For Rent or Moving Money:	
County Job and Family Services; Prevention, Retention and Contingency (PRC)	
For cleaning up or fixing lead hazards:	
Ohio Department of Health	1-877-532-3723
Information on Lead and Poisoning	
Epa.gov/lead	
Cdc.gov/lead	

# PHYSICIAN TALKING POINTS



## Pre-testing

- Lead poisoning is a common but preventable cause of learning disabilities and behavioral problems in children.
- No blood lead concentration in children is considered “safe.”
- Ohio law requires blood lead testing at 12 and 24 months of age for children insured by Medicaid or who live in a high-risk ZIP code.
- Only 50% of high-risk children are being tested.
- There are state and local resources to help families deal with a lead-poisoned child.
- Children with iron deficiency absorb lead more easily than children with normal iron.

## Post-testing

- Across the United States, the mean blood lead concentration of children <6 years old is approximately 1 µg/dL.
- Children with elevated blood lead levels will need appropriate follow-up through their local health department and their pediatrician’s office.
- The neurodevelopmental effects of lead poisoning cannot be reversed, but the CDC recommends supporting neurodevelopment with early intervention programs, a stimulating home environment, and a good diet.
- Minimizing how long lead levels are high is beneficial.

## Office flow-chart

