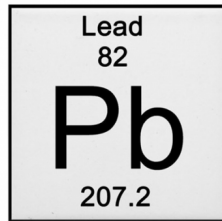




# Lead Poisoning in Children and Pregnant Women:

## A Presentation for NYS Healthcare Providers



**Developed by the Rochester Office of the  
WNY Lead Poisoning Resource Center:**  
Director - Stanley Schaffer, MD, MS  
Coordinator - Jennifer Becker, MPH  
**Funded by New York State Department of Health**



# Why Are We Still Talking About Lead Poisoning?



We have learned that:

- Many of the effects of lead exposure can occur at low levels of exposure
- Cumulative exposure over time predicts long-term outcomes
- There is no known threshold for adverse effects
- Effects of lead exposure early in life can be severe and permanent
- There is no effective treatment to overcome the adverse effects of lead poisoning. Chelation, performed for BLLs  $\geq$  45  $\mu\text{g}/\text{dL}$ , can reduce the body's lead burden, but it does not reverse the adverse effects of previous exposure.



# Uses of Lead

Lead is a naturally occurring element which has been used in hundreds of ways, including:

- |                      |                           |
|----------------------|---------------------------|
| Pipes/plumbing       | Cosmetics                 |
| Ammunition           | Traditional medicines     |
| Pewter and bronze    | Paints and glazes         |
| Leaded glass/crystal | Gasoline anti-knock agent |
| Building material    | Radiation shields         |
| Inks and dyes        | Car batteries             |
| Sweetener            | Plastics                  |



Elemental Lead (Pb)

Lead has no use in the human body. All forms of lead are TOXIC to people and animals.



Lead Oxide  
(PbO)



Lead Carbonate  
(PbCO<sub>3</sub>)



Tetraethyl Lead  
(C<sub>8</sub>H<sub>20</sub>Pb)



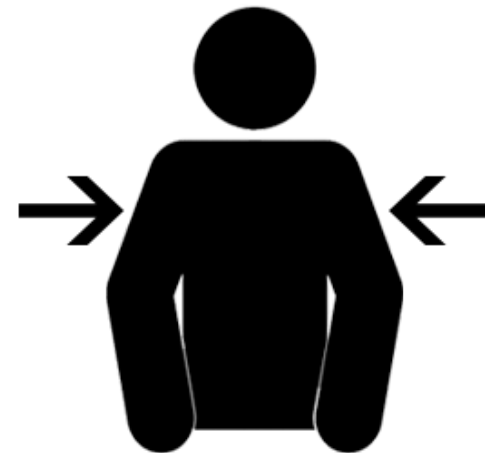
# Lead Exposure Pathways



INGESTION



INHALATION



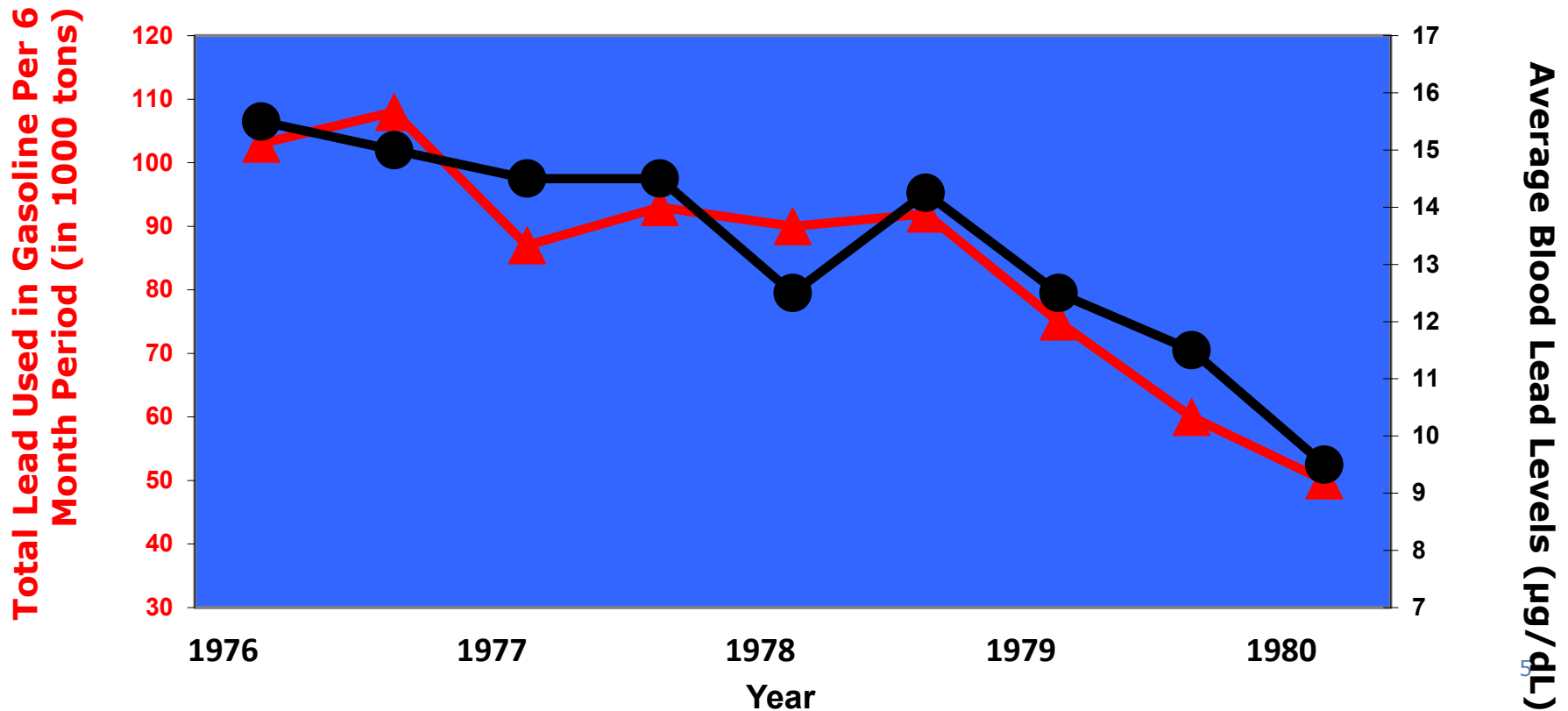
DERMAL

ATSDR Case Studies in Environmental Medicine: Lead Toxicity  
[https://www.atsdr.cdc.gov/csem/lead/docs/CSEM-Lead\\_toxicity\\_508.pdf](https://www.atsdr.cdc.gov/csem/lead/docs/CSEM-Lead_toxicity_508.pdf)



# Lead in Air in the USA

## Change in Blood Lead Levels in Relation to a Decline in Use of Leaded Gasoline in the U.S., 1976-1980



Annest JL, Pirkle JL, Makuc D, Neese JW, Bayse DD, Kovar MG. Chronological trend in blood lead levels between 1976 and 1980. N Engl J Med 1983;308:1373-7



# Lead is Still All Around Us

## Soil contamination from:

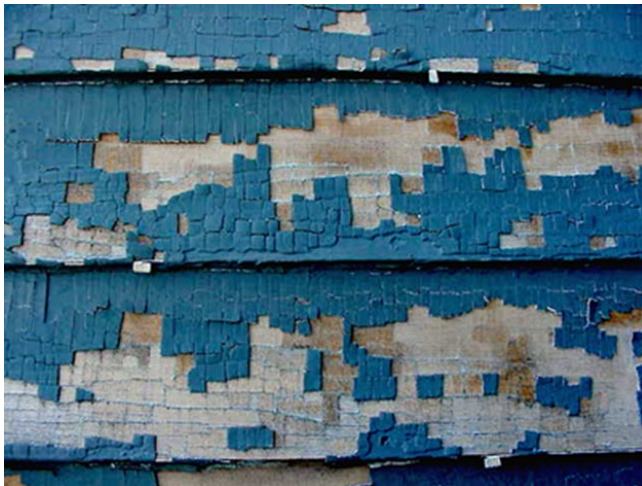
- Gasoline – historic auto emissions and current aviation fuel
- Industrial emissions
- Paint chips/dust from exterior renovation and scraping



# Lead is Still All Around Us

## Housing

- Homes that have cracked and peeling old lead paint on their walls.
- Lead from old lead paint may contaminate household dust and nearby soil.
- Home renovations that disturb old lead paint can spread invisible lead dust.



# Lead is Still All Around Us

## Plumbing

- pipes
- solder
- fixtures





# Lead is Still All Around Us

## Occupational Exposures can occur during

- Repair, renovation, abatement or painting of residential and commercial buildings
- Manufacturing of products containing or coated with lead (e.g., metal equipment parts, batteries, bullets, circuits)
- Use of firearms or working at a firing range (e.g., law enforcement, military, private industry, and training)
- Automobile and small aircraft maintenance and repair
- Road construction and bridge painting
- Recycling (e.g., stripping electronics)
- Plumbing work



# Lead is Still All Around Us

## Hobbies

- Conducting home renovation, repair, remodeling, or painting (in structures built prior to 1978)
- Furniture refinishing
- Artists – stained glass, painters, ceramics
- Gun enthusiasts, hunters, shooting firearms in target practice
- Casting or soldering (e.g., bullets, fishing weights)



# Lead is Still All Around Us

## Imported products:

- canned goods
- spices
- candy
- medicines
- cosmetics
- jewelry
- toys
- ceramic dishes
- crystal





# Lead is Still All Around Us

## Pregnant women

- Home renovation projects in preparation for a growing family
- Lead stored in bones from previous exposures being released because of pregnancy changes
- Pica – urge to eat non-food items which may contain lead – primarily soil, ceramics, or brick, but sometimes paint, plaster, or other material

<https://pubmed.ncbi.nlm.nih.gov/22302239/>





# Lead is Still All Around Us

## Children are uniquely vulnerable

- brains and bodily systems are rapidly developing
- spend a lot of time on the floor where the dust falls
- naturally put everything in their mouths
- lead paint has a sweet taste which is attractive to children



# Lead is Still All Around Us

## Low income renters in older housing

New York State has the largest percentage of older housing in the U.S

75% built before 1978  
45% rental units

US Census 2018 American Community Survey 5 year estimates  
(<https://data.census.gov/>)



# Lead is Still All Around Us

## Immigrant/Migrant/Refugee Families

- May use imported spices and medicines contaminated with lead
- Refugees often resettled in older housing that may have lead hazards



<https://www.cdc.gov/nceh/lead/prevention/refugees.htm>



# Lead is Still All Around Us

**In New York State and across the US, average blood lead levels tend to be higher in the summer months compared to winter. Reasons include...**



- Lead in pipes leaches into water more easily in warmer weather
- Dry summer winds stir up lead from the soil into the air and it can also get in the home
- Home renovations are more likely to occur in warm weather
- Lead on old painted windows is scraped off or becomes a powder due to friction as the windows are opened and shut
- Children are playing outside more on porches or in soil that contains lead



*Seasonality and trend in blood lead levels of New York State children*  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC449716/>







# Unusual Cases of Lead Exposure



# Unusual Cases of Lead Exposure



# Unusual Cases of Lead Exposure



# Unusual Cases of Lead Exposure

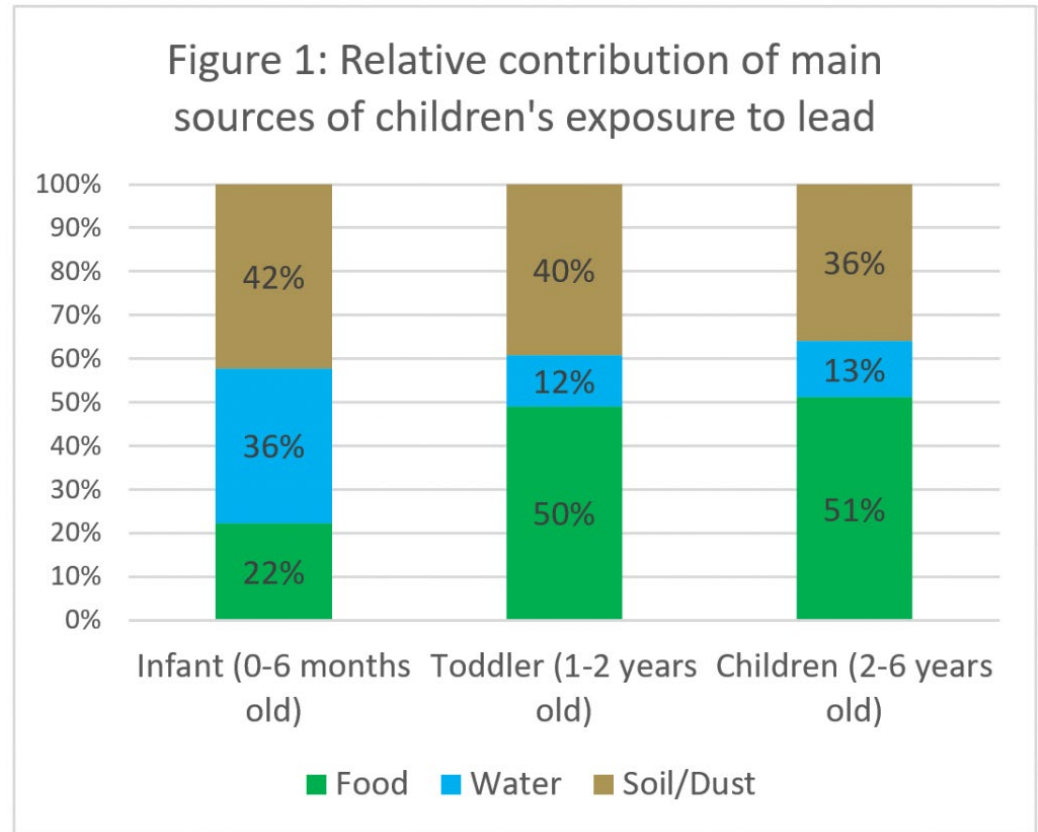


# Unusual Cases of Lead Exposure



# Exposure Sources for Children

- For 1 to 6 year olds with blood lead levels in the top 10%, more than 70% of the lead in their blood comes from soil and dust.
- However for the "average" child, with lower blood lead levels, water and food can also be primary sources.

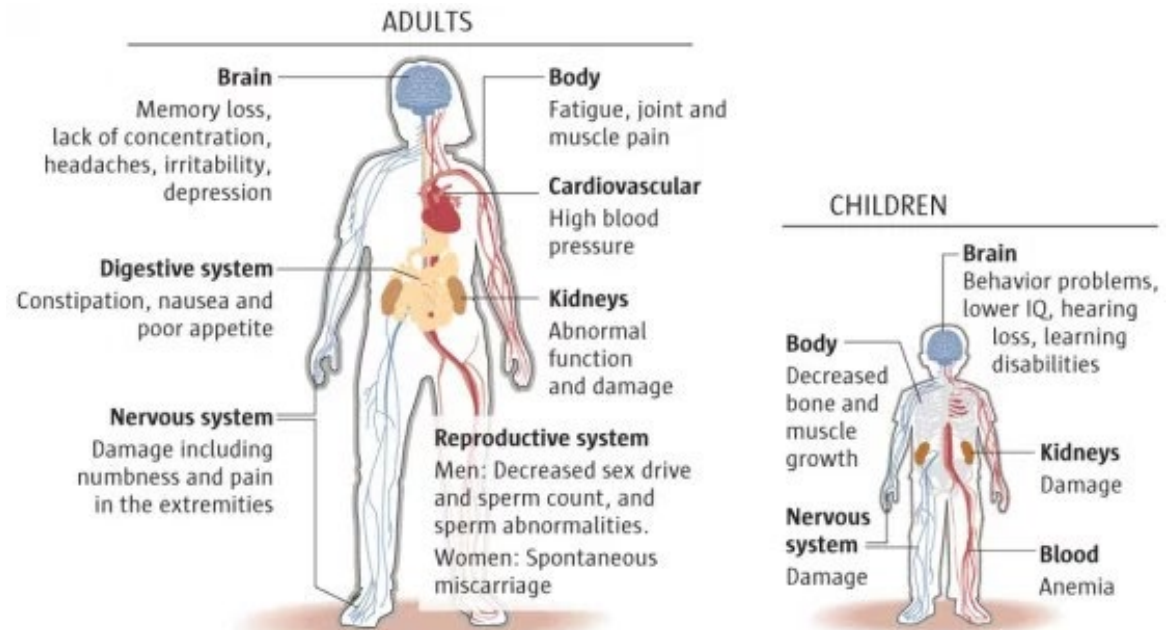


# Health Effects of Lead

At very high levels, lead can cause encephalopathy, seizures, coma or death.

Lead affects many body systems:

- Neurological
- Renal
- Cardiovascular
- Hematological
- Immunological
- Reproductive
- Developmental



Agency for Toxic Substances and Disease Registry (ATSDR).  
2020. Toxicological profile for Lead. Atlanta, GA:  
U.S. Dept of Health and Human Services, Public Health Service.  
[www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=96&tid=22](http://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=96&tid=22)





# Health Effects of Lead

Neurological effects at lower levels of exposure in childhood include:

- Irreversible loss of IQ
- Auditory processing difficulty
- Attention problems & distractibility (ADHD)
- Emotional dysregulation
- Increased likelihood of
  - Dropping out
  - Delinquency
  - Incarceration





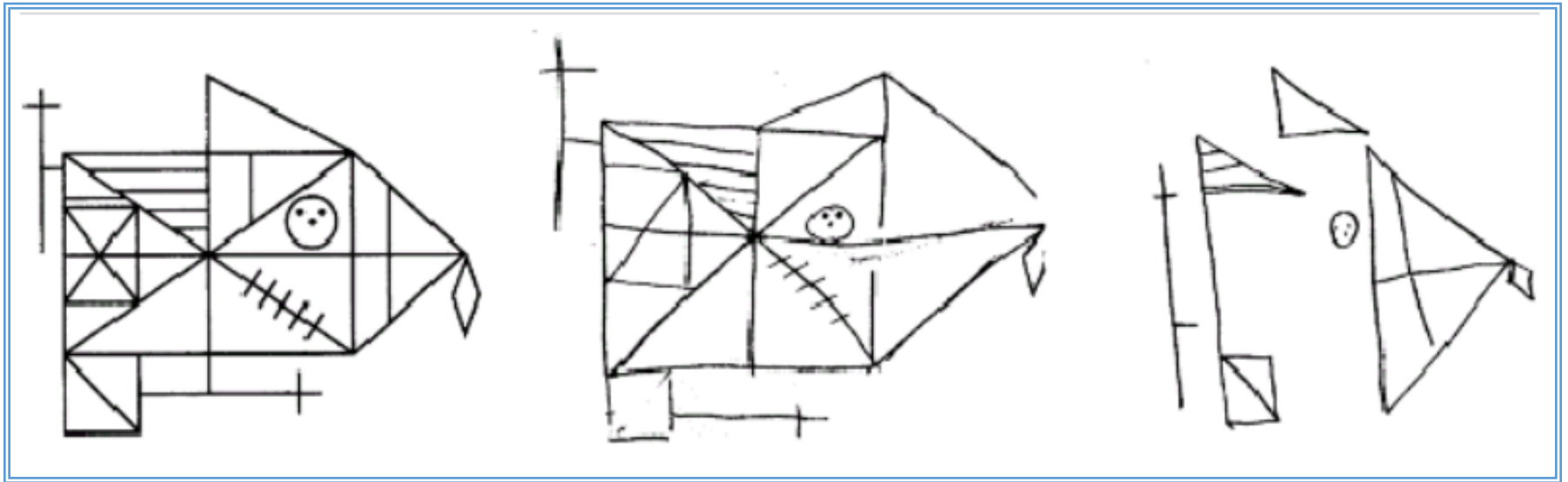
# Health Effects of Lead

- All Neuropsychological functions are at risk (e.g. attention, memory, and executive functioning)
- Affects social judgment
- No signature injury
- A “lag effect”
  - A child may not have “delay” initially – but effects may present later
  - Long term surveillance of behavior and neurodevelopment is needed
  - Changes may be identified during critical transition school points - 1st, 4th, 6th grades

From Theodore Lidsky, PhD and Pat McLaine, DrPH, MPH, RN  
Oct 2017 Conference in Rochester NY: **The Effects of Lead Exposure on Learning**



# Health Effects of Lead: Visual Memory



Complex Figure

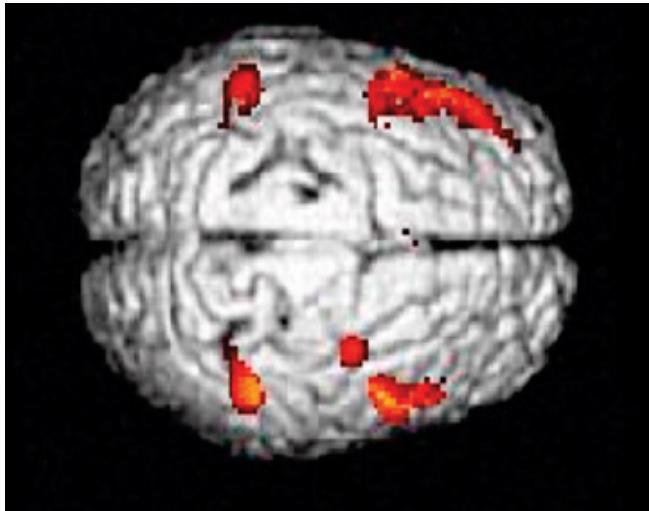
Non-Lead Exposed  
Child

Lead Poisoned Child

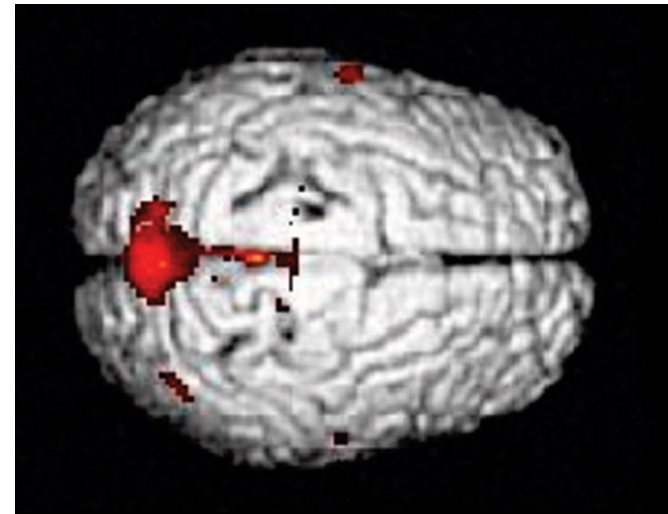


# Health Effects of Lead

Functional MRIs showing areas of brain function after tasks requiring impulse control were given to adults:



Brain of an adult who was not exposed to lead as a child



Brain of an adult who was exposed to lead as a child

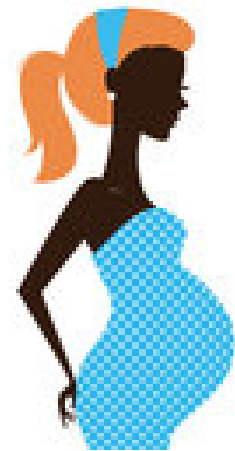
Cecil K, Dietrich K, Adler C, Eliassen J, Lanphear, B.  
Presented at the Annual Meeting of the Radiological Society of North America, 2009.



# Effects of Lead During Pregnancy

Lead exposure (even at low levels) is:

- Inversely associated with fetal growth & neurodevelopment
- Associated with an increased risk of gestational hypertension/pre-eclampsia
- Associated with increased risk of premature delivery and/or low birth weight
- Associated with a heightened risk of spontaneous abortion
  - 2.3x greater risk if BLL of 5-9  $\mu\text{g}/\text{dL}$
  - 5.4x greater risk if BLL of 10-14  $\mu\text{g}/\text{dL}$
  - 10.2x greater risk if  $\text{BLL} \geq 15 \mu\text{g}/\text{dL}$



Borja-Aburto, VH, et al., Am. J. Epidemiol. 1999.



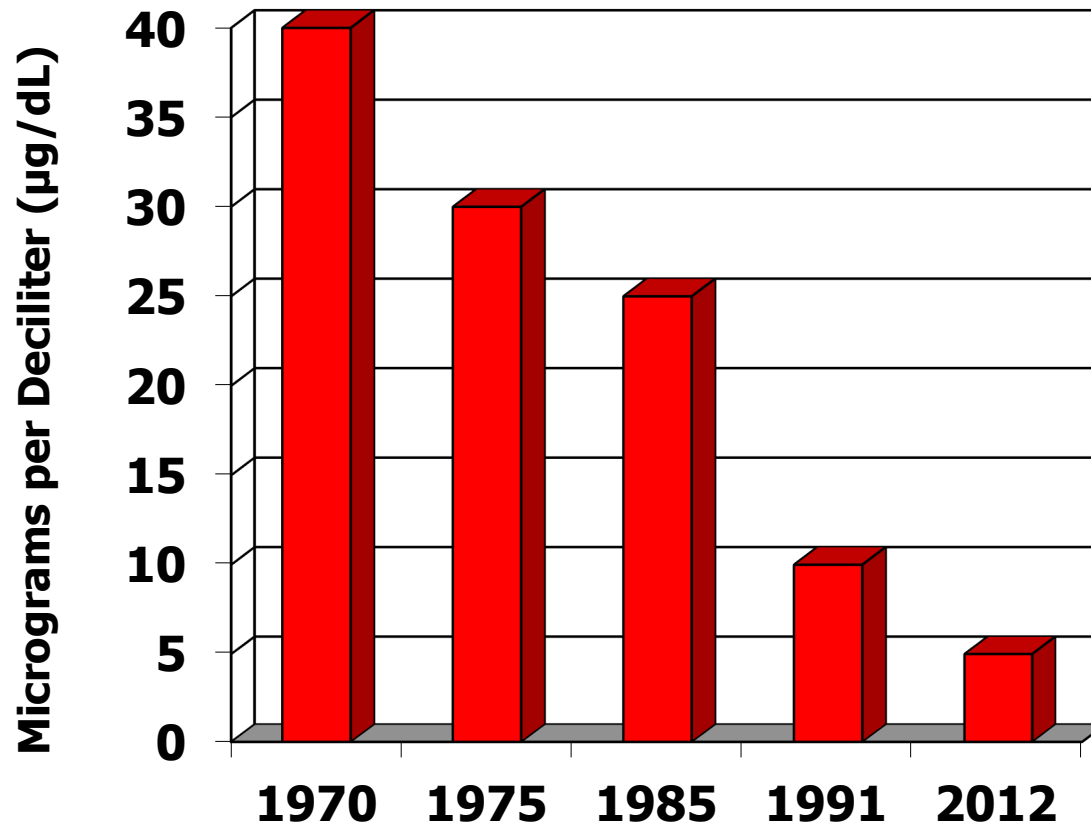
# Pregnant Women and Fetus/Newborn

- Lead passes through the placenta to the fetus primarily in the 2nd half of the pregnancy
- Lead can pass to the infant in breastmilk (but only 3% of maternal blood lead passes)
- Lead may be stored in adult bones and released during pregnancy or while breastfeeding via the pathways used to mobilize calcium to the infant. This is more likely if the woman's diet is low in calcium.



# What is Considered an Elevated Lead Level?

**Blood Lead Cut-offs  
As Determined by the CDC**



# Symptoms of Lead Exposure

## BLLs < 30 µg/dL

- usually no symptoms for BLLs < 30 µg/dL, even though toxicity has been seen for all organ systems at BLLs less than ≤10 µg/dL!
- general malaise
- gastrointestinal symptoms

## BLLs > 30 µg/dL

- gastrointestinal symptoms
  - abdominal colic/pain
  - nausea, vomiting
  - diarrhea
  - constipation
- neurological symptoms
  - headache
  - hyperirritability
  - decreased activity
  - paresthesia
  - muscle pain and weakness
- hematological symptoms
  - decreased hemoglobin synthesis
  - anemia

## BLLs > 100 µg/dL

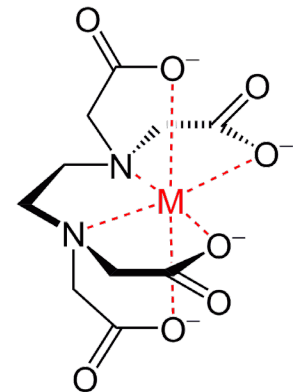
- decreased consciousness
- cerebral edema leading to seizures and coma, encephalopathy, and death.





# Chelation Therapy

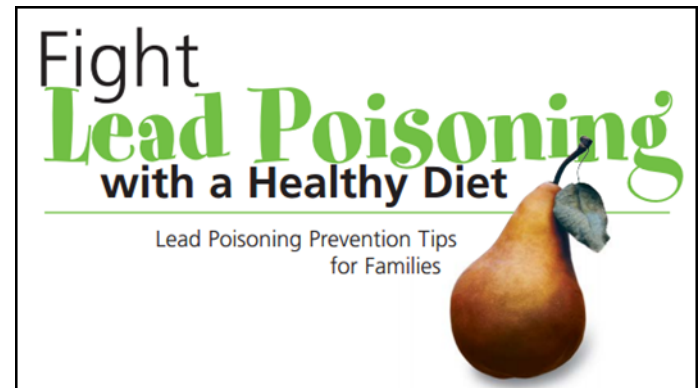
- For children with blood lead levels  $\geq 45 \mu\text{g/dL}$
- May be considered for pregnant women and should be managed in conjunction with experts in high-risk pregnancy and lead poisoning
- Decreases body burden of lead
- Relief of symptoms, but does NOT reverse neurodevelopmental effects



# Prevention is Important!

## What is the role of the health care provider?

- Be informed about lead poisoning and common sources of exposure
- Educate families about the risks of lead poisoning and how to prevent their children from being exposed
- Ensure that children have diets containing adequate amounts of iron, calcium and Vitamin C
- Routinely test children's blood lead levels when exposure risk is highest: at or around age 1 (from 9 to 17 months) and again around age 2 (from 18 to 35 months)
- Be proactive and avoid complacency



# Identifying Children with Lead Poisoning

- Why test children for lead?
- Is doing risk assessment sufficient?
- Since there is no effective treatment for lead poisoning, why bother re-testing children who have elevated lead levels?

At **one** and **two**,  
testing for lead  
is what to do.

Lead *poisons* people, especially **children**.

Contact your doctor and have **YOUR** children tested for **lead**  
at their first birthday and again at their second birthday.

[www.health.ny.gov/leadtestkids](http://www.health.ny.gov/leadtestkids)

 Department  
of Health



# NYS Requirements for Medical Providers



**NYS Public Health Law (§ 1370) was amended, and as of October 1, 2019, the definition of an elevated blood lead level in a child was lowered to 5 µg/dL**

**Details:** [regs.health.ny.gov/volume-1a-title-10/content/part-67-lead-poisoning-prevention-and-control](https://regs.health.ny.gov/volume-1a-title-10/content/part-67-lead-poisoning-prevention-and-control)

**Letter:** [www.health.ny.gov/environmental/lead/docs/commissioner\\_letter\\_guidance\\_aug2019.pdf](http://www.health.ny.gov/environmental/lead/docs/commissioner_letter_guidance_aug2019.pdf)

**Two of these regulations have specific requirements for prenatal and pediatric healthcare providers:**

**67-1.2 Lead screening and follow-up of children by health care providers.**

[regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers](https://regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers)

**67-1.5 Lead screening and follow-up of pregnant women by prenatal care providers.**

[regs.health.ny.gov/content/section-67-15-lead-screening-and-follow-pregnant-women-prenatal-providers](https://regs.health.ny.gov/content/section-67-15-lead-screening-and-follow-pregnant-women-prenatal-providers)



# NYS Requirements for Medical Providers



- **Provide anticipatory guidance to all parents of children < 6 years old**
- **Risk assessment at every well child visit (from 6 months to 6 years old)**
  - NYS questions can be tailored to patient population
  - Obtain a blood test if “yes” to any of the questions
- **Blood lead testing at age one and again at two**
- **Testing children of any age if lead exposure is suspected**
- **Test all foreign-born children up to 16 yrs old on arrival in the US and again 3-6 months after they obtain permanent residences**
- **Follow up of elevated levels**



# NYS Requirements for Medical Providers: Anticipatory Guidance for Parents

- NYSDOH *Lead Poisoning is a Danger for Every Baby and Child*  
[www.health.ny.gov/publications/2594](http://www.health.ny.gov/publications/2594)
- NYSDOH *Beware of Lead*  
[www.health.ny.gov/publications/6517](http://www.health.ny.gov/publications/6517)
- NYSDOH *How to Protect Your Child From Lead Poisoning (reverse side of What Your Child's Blood Lead Test Means)*  
[www.health.ny.gov/publications/2526](http://www.health.ny.gov/publications/2526)



Here's what you should know.





# NYS Requirements for Medical Providers: Anticipatory Guidance for Parents

## How to Protect Your Child From Lead Poisoning

- Fix peeling lead paint and make home repairs safely
- Wash dust off hands, toys, bottles, windows and floors.
- Be careful not to bring lead home on clothes, toys, or jewelry
- Keep lead out of your food and tap water.
- Serve children foods that have calcium, iron, and vitamin C.

Details at [www.health.ny.gov/publications/2526.pdf](http://www.health.ny.gov/publications/2526.pdf)





# NYS Requirements for Medical Providers: Risk Assessment

Health Care Providers must assess all children ages 6 months to 6 years at every well child visit for risk of lead exposure, and they must obtain a blood lead test if there is a positive response to any of the questions.

**NYS DOH resource:**

**Does your child need a lead test?**

English: [www.health.ny.gov/publications/6670.pdf](http://www.health.ny.gov/publications/6670.pdf)

Many other languages are available:

[www.health.ny.gov/environmental/lead/education\\_materials](http://www.health.ny.gov/environmental/lead/education_materials)







# NYS Requirements for Medical Providers: Risk Assessment

1. Does your child live in or regularly visit a building built before 1978 with potential lead exposures, such as peeling or chipping paint, recent or ongoing renovation or remodeling, or high levels of lead in the drinking water?
2. Has your child spent any time outside the United States in the past year?
3. Does your child live or play with a child who has an elevated blood lead level?
4. Does your child have developmental disabilities, put nonfood items in their mouth, or peel or disturb painted surfaces?
5. Does your child have frequent contact with an adult who may bring home traces of lead from a job or hobby such as: house painting, plumbing, renovation, construction, auto repair, welding, electronics repair, battery recycling, lead smelting, jewelry, stained glass or pottery making, fishing (weights, “sinkers”), firearms, or collecting lead or pewter figurines?
6. Does your family use traditional medicines, health remedies, cosmetics, powders, spices, or food from other countries?
7. Does your family cook, store, or serve food in crystal, pewter, or pottery from other countries?
8. Did your child miss a lead test? New York State requires all children be tested for lead at age 1 and again at age 2.



# NYS Requirements for Medical Providers



## Prenatal Providers are expected to:

- Give anticipatory guidance during pregnancy (*use NYSDOH Are You Pregnant?* [www.health.ny.gov/publications/2593](http://www.health.ny.gov/publications/2593))
- Do a risk assessment at first prenatal visit; blood lead test if at risk (*see risk questions in* [www.health.ny.gov/publications/2593](http://www.health.ny.gov/publications/2593))
- Provide risk reduction counseling if  $\geq 5$   $\mu\text{g}/\text{dL}$  BLL
- At the postpartum visit, advise all women about the major causes of lead poisoning in infants and the means of preventing exposure, and
- If the mother had a confirmed venous BLL  $5$   $\mu\text{g}/\text{dL}$  or greater during pregnancy, communicate with the pediatric provider to arrange for blood lead testing of the newborn before hospital discharge.



# Recommendations for Blood Lead Testing of Refugee Children and Refugee Pregnant Women

1. Perform blood lead testing for all refugee children birth to 16 years old and all refugee pregnant women upon entering the United States.
2. Repeat blood lead testing of all refugee children less than 16 years of age and all refugee pregnant women three to six months after they obtain permanent residence, regardless of initial blood lead test results.
3. Perform nutritional evaluations for all refugee children and pregnant women; offer appropriate nutrition education; and provide vitamin supplements as indicated.



For more information see

[www.health.ny.gov/environmental/lead/health\\_care\\_providers/2011-12-10\\_guidelines\\_lead\\_testing\\_refugee\\_children.htm](http://www.health.ny.gov/environmental/lead/health_care_providers/2011-12-10_guidelines_lead_testing_refugee_children.htm)



# Childhood Blood Lead Testing Rates in New York State

| Children born in 2013 | 9-17 Months Old Tested, % | 18-35 Months Olds Tested, % | Tested $\geq 2x$ by 36 Months, % |
|-----------------------|---------------------------|-----------------------------|----------------------------------|
| NYC                   | 78.2                      | 79.7                        | 70.3                             |
| NYS Excluding NYC     | 71.7                      | 71.4                        | 55.9                             |
| <b>Total NYS</b>      | <b>74.8</b>               | <b>75.4</b>                 | <b>62.8</b>                      |

Source: NYS Community Health Indicator Reports  
[www.health.ny.gov/statistics/chac/indicators](http://www.health.ny.gov/statistics/chac/indicators)



# Barriers to Testing

**What do you see as the top three barriers to improving blood lead testing among young children?**

**County Health Departments' answers:**

## **Parents:**

- **Don't understand effects of lead on their children and importance of getting it checked**
- Are busy, so may not follow through when lead test is ordered, even if a lab in the same building.
- May lack transportation or access to lab
- Have other priorities or lack of time
- Don't want to subject child to blood draw

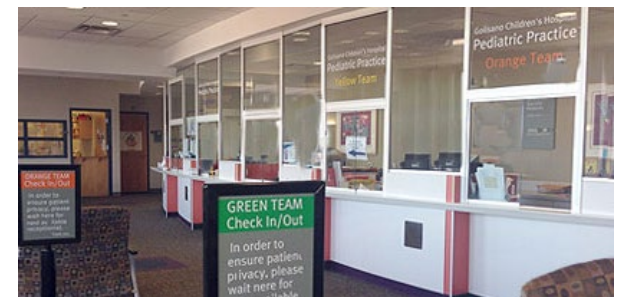
## **Health care providers:**

- **Don't emphasize importance of blood lead testing to parents**
- Forget to check medical record to see if child is due for test
- Do risk assessment with questionnaire but do not do blood test
- Too busy to follow up if parents don't get children tested as ordered



# Strategies to Overcome Barriers

- **Parent Education/Awareness** – make use of NYS and other educational materials
- **Flagging Overdue Patients** (e.g. if patient misses 12 or 24 month visit)
- **Use of Electronic Medical Record (EMR) Reminders**
- **Use of point-of-care analyzer or blood sample drawn during patient visit and sent to lab** (so parents don't have to make an extra trip to a lab)
- **Consider testing routinely at 18 months** in addition to 12 & 24 months
- **Run reports in NYSIIS or EMR to identify patients who need testing**
- **Primary Care Medical Home Quality Measure /QARR Measure** - practice can earn PCMH status and get additional funding; insurers incentivized to assist practices improve testing (e.g. Kids Quality Agenda Performance Improvement Project)



# Point of Care BLL Testing Machines

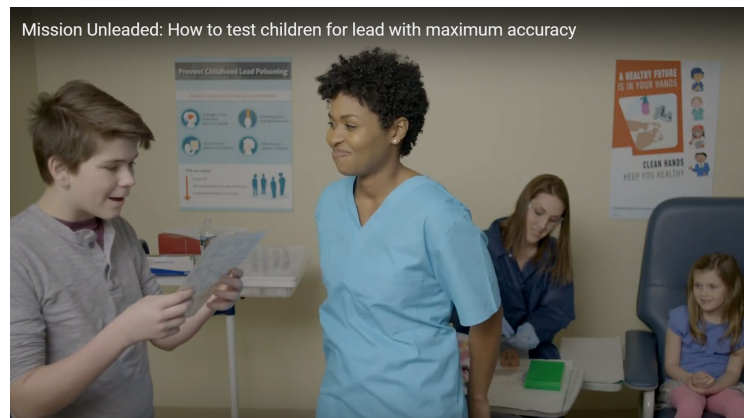
- A point of care blood lead testing machine allows for capillary testing in the office before the patient leaves.
- If  $\geq 5 \mu\text{g}/\text{dL}$  then a confirmatory venous draw is needed.
- Medical offices must:
  - 1) Get a CLIA waiver from the NY State Department of Health's Wadsworth Center before starting use.
  - 2) Have staff watch a NYSDOH webinar training session on the proper use of the machine and the reporting of results.
  - 3) Reporting results to NYSDOH - Physician office labs that conduct lead testing must report all results to the New York State Department of Health in a timely manner. Contact the NYSDOH Lead Poisoning Prevention Program at [LPPP@health.ny.gov](mailto:LPPP@health.ny.gov) to be approved and enrolled to report blood lead test results to NYSDOH.



# Training video on how to get uncontaminated blood samples

The Centers for Disease Control and Prevention produced an 18 minute video on how to test children for lead with maximum accuracy. “Mission Unleaded” is available at either of these links:

- CDC website - [www.cdc.gov/labstandards/videos/blood\\_lead\\_5\\_low\\_res.mp4](http://www.cdc.gov/labstandards/videos/blood_lead_5_low_res.mp4)
- YouTube - <https://youtu.be/g2p2qREch9g>





# Share BLL Results with Parents

## What Your Child's Blood Lead Test Means

The blood lead test tells you how much lead is in your child's blood. Lead can harm a child's growth, behavior, and ability to learn. The lower the test result, the better.

Most lead poisoning occurs when children lick, swallow, or breathe in dust from old lead paint. Most homes built before 1978 have old lead paint, often under newer paint. If paint peels, cracks, or is worn down, the chips and dust from the old lead paint can spread onto floors, windowsills, and all around your home. Lead paint dust can then get onto children's hands and toys, and into their mouths.

Most children have had some contact with lead in old paint, soil, plumbing, or another source. This is why New York State requires doctors to test all children with a blood lead test at age 1 year and again at age 2 years. For children up to age six years, your doctor or nurse should ask you at every well child visit about ways your child may have had contact with lead. Children who have had contact with lead should be tested.

A test result of 5  $\mu\text{g}/\text{dL}$  or greater, using blood from a fingertip, should be checked again with a second test using blood taken from a vein (often in the arm). If the second result is still 5  $\mu\text{g}/\text{dL}$  or greater, you should follow the steps below.

| Test Result<br>in micrograms per<br>deciliter ( $\mu\text{g}/\text{dL}$ ) | Next Steps  |
|---|---|
| <b>0-4</b>  | <ul style="list-style-type: none"><li>• <b>There is very little lead in your child's blood.</b></li><li>• The average lead test result for young children is about 1.4 micrograms per deciliter (<math>\mu\text{g}/\text{dL}</math>).</li></ul>   |
| <b>5-14</b>   | <ul style="list-style-type: none"><li>• <b>Your child's lead level is high. A result of 5 <math>\mu\text{g}/\text{dL}</math> or higher requires action.</b></li><li>• Your doctor or nurse will talk with you about your child's diet, growth and development, and possible sources of lead.</li><li>• Your local health department will talk with you about how to protect your child and will visit your home to help you find sources of lead.</li><li>• Your child should be tested again in 1 to 3 months.</li></ul> |
| <b>15-44</b>  | <ul style="list-style-type: none"><li>• <b>Your child's lead level is quite high. You and your doctor should act quickly.</b></li><li>• Your doctor or nurse will talk with you about your child's diet, growth and development.</li></ul>  |

[regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers](https://regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers)

[www.health.ny.gov/publications/2526.pdf](https://www.health.ny.gov/publications/2526.pdf)





# Preschools and Child Care facilities/homes also need the blood lead test result

## **Section 67-1.4 - Lead screening status of children who enroll in preschool or child care.**

- For children who are between one and 6 years old, child care and preschool providers must obtain documentation of blood lead screening from a health care provider within three months of initial enrollment
- If no documentation of lead screening exists, the child shall not be excluded from attending; however, the parent/guardian must be given information on lead poisoning prevention and be referred to the child's primary health care provider to obtain a blood lead test.

<https://regs.health.ny.gov/content/section-67-14-lead-screening-status-children-who-enroll-preschool-or-child>



# Using the New York State Immunization Information System (NYSIIS)

The **New York State Immunization Information System (NYSIIS)** contains blood lead test results reported since 2004 for all NY children residing outside of NYC. Practices outside of NYC can use NYSIIS to look at individual patients or create practice-level reports:

- Blood Lead Reports
- Test Due List Report
- Follow Up Action Needed List Report
- Maximum Age Exceeded List Report
- Aggregate Clinical Performance Report

For more information on NYSIIS see -

[www.health.ny.gov/prevention/immunization/information\\_system/providers/](http://www.health.ny.gov/prevention/immunization/information_system/providers/)



Similarly, the **NY Citywide Immunization Registry (CIR)** contains results for all children residing in NYC.

[www1.nyc.gov/site/doh/providers/reporting-and-services/citywide-immunization-registry-cir.page](http://www1.nyc.gov/site/doh/providers/reporting-and-services/citywide-immunization-registry-cir.page)





# Clinical Lead Exposure Assessment for Children with Elevated Blood Lead Levels

|   |  |
|---|--|
| <b>History</b>  | <i>Current Status:</i> Symptoms of lead exposure; previous blood lead test results; family history of lead poisoning; dietary history; development; country of birth; extended travel outside the U.S.; recent immigrant, refugee or adoptee.  |
|   | <i>Child Behaviors:</i> Pica; degree of hand-to-mouth activity; mouthing/chewing on window sills, furniture, keys, and toys; frequent playing in soil; inadequate hand washing before eating.  |
|   | <i>Potential Paint Sources:</i> Age and condition of home and other places child spends time (day care, relatives); evidence of chewed or peeling paint on woodwork, furniture, or toys; recent renovations; condition of windows; methods used to control dust and dirt (wet mopping vs. sweeping, use of door mats). |
|   | <i>Potential Non-Paint Sources:</i> Use of imported cosmetics, health remedies, spices, or children's jewelry; food served, stored, or prepared in pottery from other countries particularly from Latin America or Asia, painted china, pewter, or leaded crystal; bare soil in outdoor play areas.                    |
|   | <i>Caregiver Exposures and Behaviors:</i> Occupations and hobbies of household members; painted or unusual materials burned in fireplaces or near home.  |
| <b>Physical Exam:</b> Include complete neurologic exam.   |  |
| <b>Nutritional Assessment:</b> Evaluate growth and adequacy of diet, including iron, vitamin C, and calcium intake with follow-up anticipatory nutritional counseling.  |  |
| <b>Developmental Assessment:</b> Evaluate achievement of, or regression from, milestones, particularly in psychosocial and language domains. This should include use of a standardized developmental screening tool <sup>8</sup> and follow-up anticipatory developmental counseling.   |  |
| <b>Laboratory Tests:</b> Evaluate iron status and hemoglobin or hematocrit. Arrange follow-up blood lead testing per the <i>Management of Children According to Blood Lead Level</i> p.2.   |  |
| <b>Referrals:</b> For suspected developmental delays, refer to Early Intervention Program for children less than three years old or the child's school district for children three years or older, and, if appropriate, a pediatric developmental specialist. For nutritional assistance, refer to/for WIC and SNAP Benefits. |  |



# Follow up of Elevated Blood Lead Levels

## Who should be retested?

- Any child with a lead level of 5µg/dL or higher

## Considerations for when to retest

- How high is the lead level?
- Is it falling, stable, or rising?
- If it's rising, how quickly is it doing so?



## Other considerations

- Is the child iron deficient or anemic?
- Has the home been inspected and have lead hazards been eliminated?

## **NYSDOH Guidelines for Health Care Providers for the Prevention, Identification, and Management of Lead Exposure in Children**

Full Guidelines - [www.health.ny.gov/publications/6671.pdf](http://www.health.ny.gov/publications/6671.pdf)

Quick Reference - [www.health.ny.gov/publications/2501.pdf](http://www.health.ny.gov/publications/2501.pdf)





# Recommendations for Follow-Up on Children

| BLL ( $\mu\text{g}/\text{dL}$ ) | Confirmatory Test * | Follow-up Test     |
|---------------------------------|---------------------|--------------------|
| 5 to <15                        | Within 3 months     | Every 1 – 3 months |
| 15 to <25                       | Within 1 week       | Every month        |
| 25 to <45                       | Within 48 hours     | Consult with RLRC  |
| 45 to <70                       | Within 24 hours     | Consult with RLRC  |
| $\geq 70$                       | Immediately         | Consult with RLRC  |

\*if elevated capillary specimen

RLRC = Regional Lead Resource Center

([www.health.ny.gov/environmental/lead/exposure/childhood/regional\\_lead\\_resource\\_centers.htm](http://www.health.ny.gov/environmental/lead/exposure/childhood/regional_lead_resource_centers.htm))



# Recommendations for Follow-up Blood Lead Level (BLL) Testing in Pregnant and Lactating Women

| BLL ( $\mu\text{g}/\text{dl}$ ) | Recommendation for Follow-up after Receiving Test Results   |
|---------------------------------|---|
| <5                              | No follow-up testing is indicated.  |
| 5-14                            | Within 1 month: Obtain a maternal BLL or cord BLL at delivery and perform newborn follow-up testing.  |
| 15-24                           | Within 1 month and then every 2-3 months: More frequent testing may be indicated based on risk factor history. Obtain a maternal BLL or cord BLL at delivery and perform newborn follow-up testing.   |
| 25-44                           | Within 1-4 weeks and then every month: Obtain a maternal BLL or cord BLL at delivery and perform newborn follow-up testing. (The higher the BLL, the stronger the recommendation is for a consultation. Consult with your Regional Lead Resource Center.) |
| >45                             | Within 24 hours and then at frequent intervals depending on clinical interventions and trend in BLLs: Obtain a maternal BLL or cord BLL at delivery and perform newborn follow-up testing.  |

More at <https://www.health.ny.gov/publications/6624.pdf>

See also:

- CDC [www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf](http://www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf)
- ACOG [www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation](http://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation)







# Risk Reduction

## How to Protect Your Child From Lead Poisoning

- Fix peeling lead paint and make home repairs safely
- Wash dust off hands, toys, bottles, windows and floors.
- Be careful not to bring lead home on clothes, toys, or jewelry
- Keep lead out of your food and tap water.
- Serve foods that have calcium, iron, and vitamin C.

Details at [www.health.ny.gov/publications/2526.pdf](http://www.health.ny.gov/publications/2526.pdf)



# Nutritional Counseling

**Eat a Variety of Nutritious Foods to Help Reduce the Effects of Lead**

**Iron**  
Protects against harmful effects of lead

**Calcium**  
Makes it hard for lead to enter the body

**Vitamin C**  
Helps the body absorb calcium and iron better

**Some foods are good sources of calcium and iron**

Learn more about how you can protect your family from lead at [www.health.ny.gov/lead](http://www.health.ny.gov/lead) or contact your local health department.

2524 9/19

Eat a Variety of Nutritious Foods to Help Reduce the Effects of Lead (Poster)  
<https://www.health.ny.gov/publications/2524.pdf>

**Good Nutrition Helps Reduce the Effects of Lead!**

Lead can harm children's growth, behavior and ability to learn, and can affect them for life. Lead can also be a problem for adults, especially pregnant women and their babies. However, when there is nutritious food in the body, it is difficult for lead to be absorbed.

**Eat a variety of these nutritious foods**

|   |  |   |
|---|--|---|
| <p><b>Calcium</b><br/>Makes it hard for lead to enter the body</p> <p>Dairy products</p>  | <p><b>Iron</b><br/>Protects against harmful effects of lead</p> <p>Eggs<br/>Lean meats, fish, and seafood<br/>Whole grain breads and cereals<br/>Peanut butter</p> | <p><b>Vitamin C</b><br/>Helps the body absorb calcium and iron better</p> <p>Peppers<br/>Fruits<br/>Tomatoes<br/>Potatoes</p> |
| <p><b>Some foods are good sources of both calcium and iron</b></p> <p>Dark green vegetables<br/>Soy products<br/>Beans, peas, and lentils<br/>Almonds</p> |  |   |

**Did You Know?**  
The most common source of lead poisoning is dust and chips from old paint. Lead can also be found in some products imported from the Middle East, Latin America, South Asia, and China.

**Remember!**  
Children may not look or act sick, but a blood test could show that they have high lead levels. New York State requires health care providers to test all children for lead with a blood lead test at age 1 year and again at age 2 years.

Learn more about how you can protect your family from lead at [www.health.ny.gov/lead](http://www.health.ny.gov/lead) or contact your local health department.

6672 9/19

Good Nutrition Helps Reduce the Effects of Lead! (Flyer)  
<https://www.health.ny.gov/publications/6672.pdf>





# Developmental Monitoring and Educational Interventions

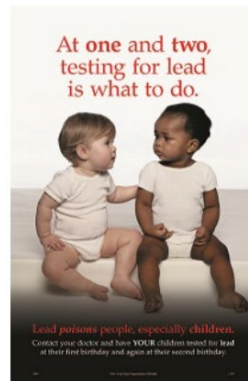
As noted on NYS DOH guidelines for Management of Children According to Blood Lead Level (BLL), children with BLLs  $\geq 5 \mu\text{g}/\text{dL}$  are at risk for developmental delays and behavior problems so their development needs to be monitored.

- [www.health.ny.gov/publications/2501.pdf](http://www.health.ny.gov/publications/2501.pdf)
- [www.cdc.gov/nceh/lead/publications/Educational\\_Interventions\\_Children\\_Affected\\_by\\_Lead.pdf](http://www.cdc.gov/nceh/lead/publications/Educational_Interventions_Children_Affected_by_Lead.pdf)



# Free Educational Material for Your Staff and Patients

New York State Department of Health  
FREE Lead Poisoning Prevention Educational Materials



The NYS DOH Lead Poisoning Prevention website has various educational materials in the form of posters, pamphlets, coloring books, stickers, etc., which you can order for free. Some are in multiple languages, and some are downloadable.

**Download:** [www.health.ny.gov/environmental/lead/education\\_materials](http://www.health.ny.gov/environmental/lead/education_materials)

**Order Form:** [www.health.ny.gov/forms/order\\_forms/lead.pdf](http://www.health.ny.gov/forms/order_forms/lead.pdf)





# Role of the Local Health Department

As of October 1, 2019 Local Health Departments are required to provide care coordination and environmental management to children with venous lead levels of 5  $\mu\text{g}/\text{dL}$  and above.

Environmental inspections include the child's home and other locations where they spend significant time. Health care providers can reach out to their county health department with questions concerning lead poisoning prevention:

[www.nyscho.org/directory](http://www.nyscho.org/directory)



# NYS Regional Lead Resource Centers

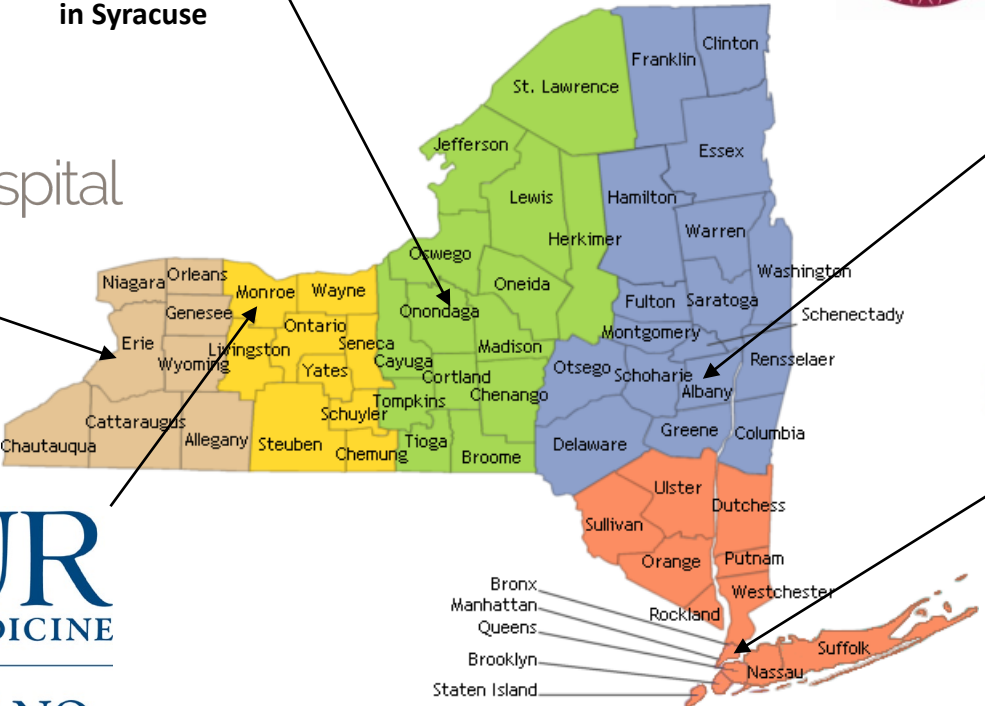


in Syracuse



JOHN R. OISHEI  
Children's Hospital

in Buffalo



in Bronx



in Rochester



# When to Contact your Regional Lead Resource Center

- Anytime you have questions about lead poisoning prevention, assessment, blood lead testing, clinical care and public health follow-up of children and pregnant women exposed to lead
- Immediately when a child's BLL is  $\geq 70$   $\mu\text{g}/\text{dL}$
- Within 24 hours when a child's confirmed venous BLL is 45-69  $\mu\text{g}/\text{dL}$
- For a consultation when
  - a child's BLL is 15-44  $\mu\text{g}/\text{dL}$  or
  - a pregnant woman's BLL is  $\geq 10$   $\mu\text{g}/\text{dL}$

[www.health.ny.gov/environmental/lead/exposure/childhood/regional\\_lead\\_resource\\_centers.htm](http://www.health.ny.gov/environmental/lead/exposure/childhood/regional_lead_resource_centers.htm)



# Collaborating to Prevent Lead Poisoning

To prevent lead poisoning, Health Care Providers can collaborate with community agencies to:

1. Raise awareness
2. Bring about policies that prevent lead exposure
3. Support efforts to obtain funding for removing lead hazards from homes and communities



See **Preventing Lead Exposure in U.S. Children: A Blueprint for Action**

[https://nchh.org/resource-library/report\\_preventing-lead-exposure-in-u.s.-children\\_a-blueprint-for-action.pdf](https://nchh.org/resource-library/report_preventing-lead-exposure-in-u.s.-children_a-blueprint-for-action.pdf)





# Lead Poisoning Prevention Coalitions

| City/Region  | Coalition                                     | Phone        |
|--|---|--------------|
| New York City  | WE ACT for Environmental Justice              | 212-961-1000 |
| Syracuse   | Green and Healthy Homes Initiative            | 315-474-1939 |
| Utica  | Lead Free Mohawk Valley                       | 315-731-3722 |
| Albany   | Green and Healthy Homes Initiative            | 518-446-9638 |
| Rochester  | Coalition to Prevent Lead Poisoning           | 585-224-3125 |
| Finger Lakes   | Finger Lakes Coalition to Stop Lead Poisoning | 585-396-4854 |
| Elmira   | Chemung County Lead Coalition                 | 607-737-2028 |
| Buffalo  | Lead Safe Task Force Coalition                | 716-852-2857 |
| Cattaraugus County,<br>Seneca Nation,<br>Allegany County | Lead coalition in formation                   | 716-701-3412 |



# Educational Videos for Families

## Lead Poisoning... The Perfect Predator

[youtu.be/m32jfnhGCNM](https://youtu.be/m32jfnhGCNM)

A 24 minute documentary that brings together perspectives from parents, teachers, home inspectors, landlords, health care professionals, legal advisors, local officials, and the victims themselves. Produced through a public health partnership including Cornell Cooperative Extension Oneida, the Health Departments of Oneida, Steuben, and Tompkins Counties, New York State, and Excellus BlueCross BlueShield.  
[www.stoplead.org](http://www.stoplead.org)



## Lead Awareness for Parents

[youtu.be/C0HnWFrQlo4](https://youtu.be/C0HnWFrQlo4)

A 10 minute film that provides an overview on lead hazards and highlights the importance of getting children tested for exposure to lead. Produced by the Coalition to Prevent Lead Poisoning ([www.theleadcoalition.org](http://www.theleadcoalition.org)) and WXXI in Rochester, NY. Also in Spanish and American Sign Language:  
[www.youtube.com/channel/UC1X\\_uOtMvJdtnTfhdF0L3mg](https://www.youtube.com/channel/UC1X_uOtMvJdtnTfhdF0L3mg)



# Federal Resources and Information



- Centers for Disease Control and Prevention  
[www.cdc.gov/nceh/lead](http://www.cdc.gov/nceh/lead)
- Consumer Product Safety Commission  
[www.cpsc.gov/Recalls](http://www.cpsc.gov/Recalls)
- Environmental Protection Agency  
[www.epa.gov/lead](http://www.epa.gov/lead)
- U.S. Dept. of Housing and Urban Development  
[www.hud.gov/program\\_offices/healthy\\_homes](http://www.hud.gov/program_offices/healthy_homes)



# Want to Learn More? Need Additional CE credit?



Case Studies in Environmental Medicine: Lead Toxicity

<https://www.atsdr.cdc.gov/csem/csem.asp?csem=34&po=0>

3 hours CME/CNE credit available



# Thank You!

Visit the NYS Department of Health Lead Poisoning Prevention Program website:

[www.health.ny.gov/environmental/lead](http://www.health.ny.gov/environmental/lead)

