



ELEVATED LEAD IN CHILDREN - THE POTENTIAL FOR HARM AND OUR RESPONSE TO THE PROBLEM

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OBJECTIVES

- Define lead poisoning
- Discuss current recommendations for blood lead screening
- Discuss the factors that place children at higher risk for lead poisoning
- Describe the health effects of lead exposure
- Identify environmental sources of lead
- List measures that can be taken to prevent and manage lead exposure

WHAT IS LEAD POISONING?

- The chronic intoxication that is produced by the absorption of lead into the system, and characterized by fatigue, abdominal pain, nausea, diarrhea, loss of appetite, anemia, and muscular paralysis or weakness

WHAT IS LEAD POISONING?

- The Alabama Childhood Lead Poisoning Prevention Program (ACLPPP) observes the Centers for Disease Control and Prevention (CDC) blood lead level upper reference value of 5 µg/dL*

* µg/dL - micrograms per deciliter

TESTING FOR LEAD POISONING

- Lead poisoning can only be confirmed through direct blood testing
 - Venous blood lead level (BLL) testing is the most useful screening and diagnostic test for recent or ongoing exposure
 - Capillary BLL testing is easier to collect, but has a high potential for contamination
 - Confirmatory venous testing should be performed for any initial BLL \geq 5 µg/dL

RECOMMENDATIONS FOR SCREENING AND FOLLOW-UP

- Routine screening at 12 and 24 months of age
- Screening between 36 and 72 months if not previously screened
- Care coordination case management services for all children with an elevated blood lead level (EBLL) \geq 5 µg/dL
- Environmental home assessment for children with confirmed* EBLL \geq 15 µg/dL

*A confirmed blood lead level is one venous or two capillary screens within 12 weeks of each other

SCREENING THROUGH EPSDT

- As part of Early and Periodic Screening, Diagnostic, and Treatment (EPSDT), Medicaid-enrolled children are required to receive a blood lead screening at:
 - 12 months old
 - 24 months old
 - Up to 72 months (6 years) old if not previously screened

RECOMMENDATIONS FOR FOLLOW-UP TESTING

Recommended Schedule for Obtaining a Confirmatory Venous Sample	
Blood Lead Level (BLL)	Time to Confirmation
5-9 µg/dL	1 month - 3 months
10-44 µg/dL	1 week - 1 month*
45-59 µg/dL	48 hours
60-69 µg/dL	24 hours
≥ 70 µg/dL	Urgently as emergency test

*The higher the blood lead level, the more urgent the need for confirmatory testing.

RECOMMENDATIONS FOR FOLLOW-UP TESTING

Recommended Schedule for Follow-up Testing of Confirmed Elevated Blood Lead Levels		
Venous BLL	Early Follow-up (2-4 tests after identified)	Later Follow-up (after BLL declining)
5-9 µg/dL	3 months	6-9 months
10-19 µg/dL	1-3 months	3-6 months
20-24 µg/dL	1-3 months	1-3 months
25-44 µg/dL	2 weeks - 1 month	1 month
≥ 45 µg/dL	As soon as possible	As soon as possible

EXPOSURE RISK FOR LEAD

- Exposure to children, especially under 6 years old, is more harmful than to adults
 - Children demonstrate more frequent hand-to-mouth activities
 - Children have a higher rate of absorption
 - Children are not able to remove lead and other toxins from body as efficiently
 - Children's brains are in a stage of rapid development making them more susceptible to the neurological affects of lead

AT RISK POPULATIONS

- Children who are:
 - Birth to two years and spend a large percentage of their time in housing built before 1950
 - Living in poverty
 - Victims of abuse or neglect
 - Immigrants, including adoptees
- Children who have:
 - Developmental delays
 - Caregivers remodeling a home built before 1978
 - Caregivers with occupational lead exposure
 - A sibling or playmate diagnosed with lead poisoning

ROUTES OF EXPOSURE

- Ingestion
 - Hand-to-mouth activity
 - Attraction to sweet taste of lead paint chips
- Inhalation
 - Breathing lead contaminated air or dust
- Exposure via placenta
 - Intrauterine exposure due to mother's past or present exposure

LEAD EXPOSURE: SYMPTOMS

- ⦿ Low concentrations can affect:
 - Central nervous system
 - Kidneys
 - Reproductive system
- ⦿ Causing:
 - Learning disabilities
 - Behavioral problems
 - Decreased stature and growth
 - Impaired hearing acuity
- ⦿ Frequently no obvious symptoms until later, when neurological effects become evident

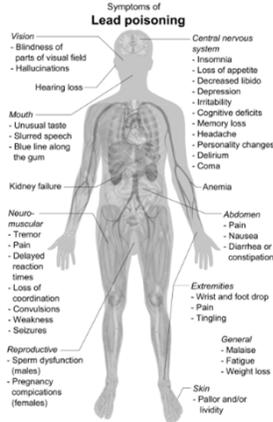


LEAD EXPOSURE: SYMPTOMS

- ⦿ Higher lead exposure can cause:
 - Anemia
 - Abdominal cramps/colic
 - Kidney damage
 - Coma
 - Seizures
 - Death
- ⦿ Damage from elevated blood lead levels is often permanent and continues to affect a child throughout his or her lifetime

LEAD EXPOSURE: SYMPTOMS

- ⦿ Has potential to affect every system in the body



PRIMARY SOURCE OF LEAD

- ⦿ Lead-based paint
 - 1978: Lead-based paint for houses banned
 - Approximately 24 million housing units have deteriorated lead-based paint and dust
 - ⦿ Over 4 million are home to one or more young children
- ⦿ Lead-based paint deteriorates over time due to:
 - Moisture
 - Normal wear and tear
 - Disturbance during renovation

PRIMARY SOURCE OF LEAD



LEAD-BASED PAINT

- ⦿ Flakes or chips from lead-based paint deteriorate into dust that cannot be seen with normal vision
- ⦿ Lead-based paint does not pose a problem if:
 - It is intact, encapsulated, enclosed, or completely covered with non lead-based paint
 - It is well maintained and the surfaces are kept clean

SECONDARY SOURCES OF LEAD



- Pottery and ceramics
- Older or imported mini-blinds
- Older outdoor playground equipment



SECONDARY SOURCES OF LEAD



- Candy from Mexico
- Exposure from caregiver job or hobby

SECONDARY SOURCES OF LEAD

- Toys
- Cosmetics
- Airborne lead from nearby industries



SECONDARY SOURCES OF LEAD

- Jewelry
- Unregulated spices
- Traditional folk medicine



SECONDARY SOURCES OF LEAD

- Keys
- Art and craft supplies
- Contaminated drinking water



DETECTION OF LEAD HAZARDS

- Do-it-yourself chemical spot test kits can be used, but can only measure surface lead
- Accurate detection requires the expertise of a qualified lead professional (QLP)
 - ADPH Lead Certification Program (334) 206-5373 or (800) 819-7644



LEAD HAZARDS AND ACTIONS

- ◉ Dwelling built before 1978
 - Paint over, or encapsulate, known lead paint
 - Ensure paint remains in good repair
 - Block access to damaged lead paint with contact paper, duct tape, or furniture
 - Limit use of windows
 - Only use a certified lead contractor for renovations
- ◉ Dwelling near heavy traffic or lead industry
 - Have ground cover, such as grass or mulch, placed over exposed soil
 - Maintain play areas on ground cover away from structures
 - Remove shoes upon entering home

LEAD HAZARDS AND ACTIONS

- ◉ Water
 - Run cold water for at least 30 seconds before use
 - Purchase an NSF certified water filter system, or drink bottled water
- ◉ Imported herbal remedies and spices
 - Avoid unregulated "medicines" and spices
- ◉ Food storage
 - Do not store foods in ceramic or pottery that may contain lead
 - Read labels before using storage containers to ensure they are food-safe

LEAD HAZARDS AND ACTIONS

- ◉ Art materials
 - Do not allow young children to use lead containing art supplies
 - Wash hands regularly when handling
- ◉ Toys
 - Stay current on recalls affecting toys
- ◉ Playground equipment/ play areas
 - Avoid playground equipment with peeling/ chipping paint
 - Encourage play away from areas of bare soil

LEAD HAZARDS AND ACTIONS

- ◉ Caregiver job

<ul style="list-style-type: none"> ▪ Construction ▪ Plumbing ▪ Radio/ TV repair ▪ Bridge or highway painting ▪ Auto repair ▪ Battery recycling ▪ Radiator repair ▪ Metalwork ▪ Lead smelter 	<ul style="list-style-type: none"> ▪ Furniture refinishing ▪ Signs and advertising ▪ Copper foundries ▪ Solderer/ welder ▪ Plastics maker ▪ Explosives ▪ Insecticides ▪ Junkyard ▪ Refrigeration/ heating
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LEAD HAZARDS AND ACTIONS

- ◉ Caregiver hobbies
 - Painting
 - Aluminum die-cast
 - Stained glass
 - Ceramics
 - Art restoration
 - Fishing
 - Indoor target practice
 - Bullet making

LEAD PREVENTION ACTIONS

- ◉ Cleanliness
 - Mop and use damp cloth around windows and doors at least twice a week
 - Clean toys and pacifier regularly to remove lead dust
- ◉ Personal hygiene
 - Wash hands frequently, especially before eating or napping, and after playing
- ◉ Diet
 - Encourage a low fat diet high in calcium, iron, and vitamin C

TREATMENT OF CHILDREN WITH HIGH BLOOD LEAD LEVELS

- ⦿ Chelation therapy used in children with blood lead levels above 45 µg/dL
 - May be used at levels below 45 µg/dL under the direction of a pediatric environmental health specialty unit or a pediatric toxicologist for persistent moderate levels
- ⦿ Cannot reverse health effects of lead poisoning but can decrease further damage

*Primary prevention through identification and elimination of lead exposure sources is the only way to prevent the health effects of lead, because

There is *no known safe level* of blood lead!

IN SUMMARY

- ⦿ The primary source of lead for children is lead-based paint found in buildings built before 1978
- ⦿ The primary route of lead exposure for children is ingestion through hand-to-mouth activity

IN SUMMARY

- ⦿ Common secondary sources of lead include:
 - Caregiver job or hobby
 - Contaminated water
 - Art and craft supplies
 - Older or imported mini blinds
 - Imported pottery and ceramic glaze
 - Costume jewelry
 - Airborne lead from local industry

IN SUMMARY

- ⦿ Lead exposure in children has the highest impact on the central nervous system, especially brain development
- ⦿ Children under 6 years old are considered most at risk for lead poisoning
 - Hand-to-mouth behaviors
 - Higher rate of absorption
 - Less efficient removal of toxins
 - More rapid brain development

IN SUMMARY

- ⦿ The only way to confirm lead poisoning is through blood lead testing, preferably a venous test
- ⦿ Blood lead levels can be reduced by decreased exposure through:
 - Frequent hand washing
 - Healthy diet low in fat, high in calcium, iron, and vitamin C
 - Maintaining paint in pre-1978 home
 - Mopping and dusting with a damp cloth at least twice a week

MOST IMPORTANTLY

- ⦿ *There is no known safe blood lead level!*