

Lead Poisoning Prevention Guidelines for Prenatal Care Providers in Texas



Texas Department of State Health Services
Adult Blood Lead Epidemiology and Surveillance Program



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Prevention and Identification of Lead Poisoning in Women of Childbearing Age, Pregnant Women and Postpartum Women

Healthcare providers should offer all women of childbearing age anticipatory guidance in the form of the following:

1. Sources of Lead Exposure (*Appendix A*)
2. Nutritional Information (*Appendix B*)
3. Methods to Reduce Lead Exposure (*Appendix C*)
4. Blood Lead Test – For women working with lead

Follow established guidelines and manage blood lead levels accordingly.

Visit www.osha.gov/SLTC/lead/ to view OSHA Lead Standards.



Bloodborne lead crosses the placenta, and a pregnant woman with an elevated blood lead level may expose her fetus to the toxic effects of lead. Fetal lead exposure is harmful at very high blood lead levels and may be harmful at lower levels.

Healthcare providers should offer all pregnant women anticipatory guidance in the form of the following items:

1. Sources of Lead Exposure (*Appendix A*)
2. Nutritional Information (*Appendix B*)
3. Methods to Reduce Lead Exposure (*Appendix C*)
4. Risk Assessment Questionnaire (*Appendix D*)

If the woman is at risk or answers “yes” to any question on the Risk Assessment Questionnaire, then:

- a. Perform a venous blood lead test
- b. Evaluate possible anemia and calcium deficiency
- c. Follow Part II (Follow-Up Management of Elevated Blood Lead Levels in Pregnant Women, Postpartum Women, and Neonates) if blood lead test is $5 \mu\text{g/dL}$ or greater



At the postpartum visit, providers should advise all women about the major causes of lead poisoning in infants and the means of preventing exposure (*Appendix E*).



Follow-Up Management of Elevated Blood Lead Levels in Pregnant Women, Postpartum Women, and Neonates

Frequency of Maternal Blood Lead Follow-Up Testing During Pregnancy and Lactation

Venous Blood Lead Level (BLL)	Initial Follow-up Test During Pregnancy/Lactation	Subsequent Follow-up Testing During Pregnancy/Lactation	Follow-up Testing at Delivery
< 5 µg/dL	No follow-up testing is indicated.	No follow-up testing is indicated.	No follow-up testing is indicated.
5 - 14 µg/dL	Retest within 1 month.		Obtain maternal BLL* or cord BLL at delivery.
15 - 24 µg/dL	Retest within 1 month.	Retest every 2-3 months. More frequent testing may be indicated based on risk factor(s).	Obtain maternal BLL* or cord BLL at delivery.
25 - 44 µg/dL	Retest within 1 - 4 weeks.	Retest every month.	Obtain maternal BLL* or cord BLL at delivery.
≥ 45 µg/dL	Retest within 24 hours.	Retest at frequent intervals depending on clinical interventions and trend in BLLs. Consultation with a clinician experienced in the management of pregnant women with BLLs in this range is strongly advised.	Obtain maternal BLL* or cord BLL at delivery.

* If possible, obtain a maternal blood lead level prior to delivery since blood lead levels tend to rise over the course of pregnancy.

Actions for Maternal Management During Pregnancy and Lactation

Venous Blood Lead Level (BLL)	Actions
≥ 5 µg/dL	<ul style="list-style-type: none"> Attempt to determine source of lead exposure, using Appendix A of this document Counsel patients on avoiding further exposure Assess nutritional adequacy and counsel on eating a balanced diet with adequate intakes of calcium and iron Perform follow-up testing according to recommended schedule For occupationally exposed women, review the proper use of personal protective equipment and consider contacting employer to encourage reduction or removal of exposure Notify the Texas Department of State Health Services for coordination of case management services
10 – 44 µg/dL	<p>All of the above, plus:</p> <ul style="list-style-type: none"> Refer occupationally exposed women to occupational medicine specialist and remove from workplace exposure
≥ 45 µg/dL	<p>All of the above, plus:</p> <ul style="list-style-type: none"> Treat as a high-risk pregnancy and consult with an expert in lead poisoning on chelation and other treatment decisions

Follow-Up of Initial Blood Lead Testing of Neonate (< 1 month of age)

Initial* Venous Blood Lead Level ($\mu\text{g}/\text{dL}$)	Perform Follow-up Test
< 5	According to state lead screening guidelines for children.
5 - 24	Within 1 month (at first newborn visit).
25 - 44	Within 2 weeks. Consultation with a clinician experienced in the management of children with blood lead levels in this range is strongly advised.
≥ 45	Within 24 hours and then at frequent intervals depending on clinical interventions and trend in blood lead levels. Prompt consultation with a clinician experienced in the management of children with blood lead levels in this range is strongly advised.

* The initial blood lead level may be either from an umbilical cord sample at the time of delivery or an infant venous blood lead level.

Initiation of Breastfeeding

1. If a pregnant woman's blood lead level is $5 \mu\text{g}/\text{dL}$ or greater during pregnancy, follow-up testing should be performed according to Table 1.
2. Based on current (2010) recommendations from the Centers for Disease Control and Prevention, a temporary delay in the initiation of breastfeeding should be considered when maternal lead levels are at or above $40 \mu\text{g}/\text{dL}$. During this time, she should be advised to maintain her milk supply by pumping and discarding the milk until her blood lead level drops below $40 \mu\text{g}/\text{dL}$.
3. If the umbilical cord sample at the time of delivery or an infant venous blood lead level is at or above $5 \mu\text{g}/\text{dL}$, follow-up testing for the infant should be performed according to Table 3.



Continuation of Breastfeeding

1. If the follow-up test for the infant according to Table 3 is below $5 \mu\text{g/dL}$, breastfeeding should continue.
2. For breastfed infants whose blood lead levels are rising or failing to decline by $5 \mu\text{g/dL}$ or more, environmental and other sources of exposure should be evaluated. If no external source is identified, maternal blood lead levels are at or above $20 \mu\text{g/dL}$, and the infant's blood lead level is at or above $5 \mu\text{g/dL}$, then breast milk should be suspected as the source of exposure. Temporary interruption of breastfeeding until maternal blood lead level decline should be considered. During this time, she should maintain her milk supply by pumping and discarding the milk.



Summary of Public Health Actions Based on Maternal and Infant Blood Lead Levels

$\mu\text{g}/\text{dL}$	0	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	≥ 45
All Women of Childbearing Age										
Offer guidance on the sources of lead exposure, nutrition, and reduction strategies. Provide a blood lead test for women who work with lead.										
All Pregnant Women										
Offer guidance on the sources of lead exposure, nutrition and reduction strategies for all pregnant women. Administer the risk assessment questionnaire to each pregnant woman. If the woman is at risk, perform a venous blood lead test.										
Pregnant Women with Blood Lead Levels $\geq 5 \mu\text{g}/\text{dL}$										
Perform follow-up testing according to schedule in Table 1										
Attempt to determine source of exposure										
Counsel on avoiding further exposure										
Assess nutrition										
If occupational, review personal protective equipment and consider notifying employer										
Notify the Texas Department of State Health Services										
Refer occupationally exposed women to occupational medicine specialist										
Remove from workplace exposure										
High risk pregnancy – consult with an expert in lead poisoning										
Neonates (< 1 month of age)										
Follow-up test within 1 month										
Follow-up test within 2 weeks										
Follow-up test within 24 hours*										
Lactating Women										
Breastfeeding should be encouraged										
Breastfeeding may be initiated; monitor infant's blood lead level										
Perform follow-up testing according to schedule in Table 1										
Consider temporary delay in breastfeeding, but maintain milk supply										
$\mu\text{g}/\text{dL}$	0	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	≥ 45

* Consultation with a clinician experienced in the management of children with blood lead levels in this range is strongly advised.

References

Centers for Disease Control and Prevention (2010). *Guidelines for the identification and management of lead exposure in pregnant and lactating women*. Retrieved from <http://www.cdc.gov/nceh/lead/publications/LeadandPregnancy2010.pdf>.

Minnesota Department of Health (2004). *Blood lead screening guidelines for pregnant women in Minnesota*. Retrieved from <http://www.health.state.mn.us/divs/eh/lead/reports/pregnancy/pregnancyguidelines.pdf>.

New York City Department of Health and Mental Hygiene and Mount Sinai Center for Children's Health and the Environment (2004). *Guidelines for the identification and management of pregnant women with elevated lead levels in New York City*. Retrieved from http://www.nyc.gov/html/doh/downloads/pdf/lead/lead_preg_women_032006.pdf.

New York State Department of Health & American College Obstetricians and Gynecologists District II (2009). *Lead poisoning prevention guidelines for prenatal care providers*. Retrieved from <http://www.health.ny.gov/publications/2535.pdf>.

Sources of Lead Exposure

Lead can be found in many places. Adults can be exposed to lead in many different ways. Below are lists of some occupations, hobbies, products and behaviors that may cause lead exposure.

Common lead related occupations and industries

- Ammunition/explosives maker
- Auto repair shops/Auto body work
- Battery manufacturing and repair
- Brass/copper foundry
- Bridge, tunnel and elevated highway construction
- Building/repairing ships
- Cable/wire stripping, splicing or production
- Ceramics worker (pottery, tiles)
- Construction
- Firing range work
- Glass recycling, stained glass and glass manufacturing
- Jewelry making or repair
- Lead abatement
- Lead miner
- Manufacturing and installing plumbing components
- Manufacturing of industrial machinery and equipment
- Melting metal (smelting)
- Metal scrap yards and other recycling operations
- Motor vehicle parts and accessories
- Occupations using firearms
- Use of lead-based paints
- Paint/pigment manufacturing
- Production and use of chemical preparations
- Radiator repair
- Remodeling/repainting/renovating houses or buildings
- Removing paint (sandblasting, scraping, sanding, heat gun or torch)
- Steel metalwork
- Tearing down buildings/metal structures
- Welding, burning, cutting or torching

Common hobbies that may cause lead exposure

- Doing home renovations and repairs – remodeling/repainting/renovating houses or buildings
- Making stained glass and painting on stained glass
- Print making and other fine arts (with lead white, flake white and chrome yellow pigments)
- Copper enameling
- Bronze casting
- Making pottery and ceramic ware with lead glazes and paints
- Jewelry making with lead solder
- Glassblowing with leaded glass
- Melting lead for bullets, fishing weights or lead figurines
- Collecting, painting, or playing games with lead figures
- Soldering electronics with lead solder
- Liquor distillation
- Hunting and target shooting
- Painting/stripping cars, boats, and bicycles
- Gardening in lead-contaminated soil
- Eating lead-contaminated game and fish



Some traditional/folk remedies or cosmetics that have been found to contain lead

Alkohol (also known as kohl, surma): A black powder used within Middle Eastern, African, and Asian cultures as an eye cosmetic and umbilical stump remedy.

Azarcon (also known as reuda, liga, coral, alarcon and maria luisa): A bright orange powder used within Hispanic cultures to treat gastrointestinal upset and diarrhea.

Bali goli: A round, flat black bean which is dissolved in “gripe water” and used within Asian Indian cultures for stomach ache.

Ghazard: A brown powder used within Asian Indian cultures to aid digestion.

Greta: A yellow-orange powder used within Hispanic cultures to treat digestive problems.

Pay-loo-ah: An orange red powder used within Southeast Asian cultures to treat rash or fever.

Behaviors that may cause lead exposure

Sometimes people have the desire to eat items that people normally do not eat. Some items people may eat are pottery pieces, dirt, paint chips, clay, soil, or plaster. This condition is called pica. People with pica may not know that the non-food items they eat have high amounts of lead. If you eat non-food items, talk to your doctor about how to change your eating habits safely.

Nutritional Information

General Nutrition

- Eat frequent and regular meals. Environmental lead is more easily absorbed on an empty stomach.
- Iron or calcium deficits promote lead absorption. A diet rich in iron and calcium reduces the absorption of lead. Calcium supplements made from bone should be avoided, as they may contain lead.

Examples of Sources of Iron and Calcium

Iron

- Fortified breads and cereals
- Cooked legumes (dried beans and dried peas)
- Spinach
- Lean red meat

Calcium

- Milk
- Yogurt
- Cheese
- Cooked greens
- Calcium fortified orange juice



Methods to Reduce Lead Exposure

Do's and Don'ts

- DO** discuss with your employer ways to reduce possible lead exposure on the job
- DO** damp mop and damp dust rather than dry sweep and dry dust
- DO** avoid drinking acidic liquids from imported ceramic cups, mugs or from leaded crystal
- DO** avoid the use of traditional folk remedies or cosmetics which might contain lead
- DO** avoid lead-related crafts
- DO** wash hands thoroughly before meals
- DO** run water from the faucet for at least a minute until it runs cold before collecting for drinking and cooking
- DON'T** be in the home when renovations that may involve lead-based paint are taking place
- DON'T** be in the home when clean up after renovations that may involve lead-based paint is taking place
- DON'T** store food in open imported cans

Risk Assessment Questionnaire

Reference Appendix A (Sources of Lead Exposure) when questioning your patient.

Testing is not recommended for pregnant women who are not at risk. One “yes” to any question should warrant a blood lead test.

1. Do you or others in your household have an occupation that involves lead exposure?
2. Sometimes pregnant women have the urge to eat things that are not food, such as clay, soil, plaster or paint chips. Do you eat non-food items?
3. Do you live in a house built before 1978 or in a house with recent renovations that generated dust (e.g. sanding and scraping)?
4. Has the water in your home been tested for lead, and if so, were you told that the level was high?
5. Do you use any herbal remedies, home remedies or cosmetics that are not sold in a regular store or are homemade?
6. Do you or others in your household have any hobbies or activities likely to cause lead exposure?

7. Do you use non-commercially prepared pottery/ceramics or leaded crystal?
8. Do you use imported spices or foods?
9. In the past 12 months, have you moved from another country or metropolitan area where lead contamination is high?
10. Some factors have been associated with blood lead levels higher than the general population of pregnant women. Do you consume alcohol, smoke cigarettes, have generally poor nutrition (including low calcium intake or iron deficiency anemia), or had a baby in the past and have not breastfed?
11. Do you live near a point source of lead, such as lead mines, smelters, or battery recycling plants (even if the establishment is closed)?
12. Do you have a history of previous lead exposure or evidence of an elevated body burden of lead?
13. Do you live with someone who has an elevated blood lead level?

Preventing Lead Poisoning in Infants

For Baby

- Wash your baby's pacifier and/or bottle with soap and water if they fall on the floor
- For formula-fed infants, use only bottled or filtered water, or water from the cold tap when preparing the baby's formula. Be sure to:
 - Wash your hands before preparing the bottle
 - Run water from the faucet for at least a minute
 - Mix in the formula and allow it to cool to lukewarm temperature before serving
- DO NOT use home remedies to treat baby's colic or upset stomach
- Line the floor with sheets so that the baby and any toys don't come in direct contact with the floor
- Use a sheet to cover the seat of the car before installing the baby's car seat
- Wash the liner/padding of the baby's car seat once per week



For the Home

- Use a door mat outside and inside every entrance of your home
- Take off your shoes when you enter the house
- Consider using only vacuums with HEPA filters
- Wet mop floors instead of dry sweeping

For Family Members who Work with Lead

- Change out of work clothes before driving or riding in the family vehicle
- Wash work clothes separately from baby's clothes and family's clothes and linens





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