

# Blood Lead Screening Guidelines for Pregnant Women in Minnesota



Environmental Health Division  
Environmental Surveillance and Assessment Section  
Environmental Impact Analysis Unit – Lead Program  
P.O. Box 64975  
St. Paul, Minnesota 55164-0975  
[www.health.state.mn.us/divs/eh/lead](http://www.health.state.mn.us/divs/eh/lead)

**These guidelines have been reviewed and approved by the  
Minnesota Chapter of the American College of Obstetricians and Gynecologists (ACOG)**  
(The guidelines were based on the New York State Department of Health,  
*“Lead Poisoning Prevention Guidelines for Prenatal Care Providers.”*)



These guidelines are intended for use by providers serving pregnant and postpartum women. Part I provides reference information for the *prevention and identification* of lead poisoning in pregnant and postpartum women. Part II provides reference information for *management* of lead poisoning in pregnant and postpartum women.

### ***Summary***

- Fetal lead exposure is harmful at very high blood lead levels and may be harmful at lower levels, consistent with what is now known about blood lead levels of concern in infants and children.
- All pregnant women must be given anticipatory guidance regarding sources of lead exposure for themselves and for their children as part of prenatal and postpartum care.
- Prenatal care providers must assess pregnant women for current high-dose lead exposure using a risk assessment questionnaire. Women found to be at risk for high-dose exposure must be screened with a blood lead test.
- Studies of lead in pregnancy have suggested that most women with levels over 10 micrograms of lead per deciliter of whole blood ( $\mu\text{g}/\text{dL}$ ) have occupational lead exposure. However, other exposures are possible, such as: previous residence in a large metropolitan area or another country, traditional remedies or foods, home remodeling activities, drinking water, and non-commercial pottery and lead crystal.

### ***Lead Poisoning Prevention During Pregnancy***

Pregnant women with elevated blood lead levels transfer lead to the fetus. Fetal lead exposure is definitely harmful at very high blood lead levels and may be harmful at lower levels that are now known to be harmful to infants and children.

All pregnant women must be given anticipatory guidance regarding sources of lead exposure for themselves and for their children as part of prenatal and postpartum care. The Minnesota Department of Health (MDH) has developed educational materials that explain the hazards of lead exposure, common sources in the environment, and simple measures all families can take to reduce exposure of their children to lead. These are available to prenatal care providers.

Medical interventions to reduce body lead burden are contraindicated in pregnancy due to the potential toxicity of chelating agents to the fetus. The only intervention available is to reduce current exposure to lead hazards during the pregnancy. For this reason, MDH has chosen to limit lead screening of pregnant women to those who are at risk due to current high-dose exposure.

Prenatal care providers must assess pregnant women for current high-dose lead exposure using a risk assessment questionnaire. MDH has developed a risk questionnaire to identify pregnant women at risk for current high-dose exposure (see page 3, Part 1). Women found to be at risk for high-dose lead exposure must be screened with a blood lead test.

Studies of lead in pregnancy have suggested that most women with levels equal to or greater than 10 µg/dL have occupational lead exposure. If a pregnant woman has a venous blood lead level equal to or greater than 10 µg/dL and is at risk for current occupational lead exposure, she should be referred to an occupational health clinic for follow-up. An occupational health consulting physician is available. Contact the MDH lead program at 651-201-4610 for more information.

## **Part I**

### **Guidelines for the Prevention and Identification of Lead Poisoning in Pregnant and Postpartum Women**

Since blood borne lead crosses the placenta, a pregnant woman with an elevated blood lead level may expose her fetus to the toxic effects of lead.

All pregnant women should receive anticipatory guidance on preventing lead poisoning during pregnancy. They should be informed about the major sources of lead in the environment and the means of preventing exposure.

At the initial prenatal visit, health care providers should assess a woman's risk for current high-dose lead exposure. The questions below are the recommended risk assessment. Those women found to be at risk for current high-dose exposure should be tested for blood lead levels and counseled on how to reduce or eliminate current exposure.

Women found to have a blood lead level of 10 µg/dL or greater, should receive additional risk reduction counseling based on their responses to the risk assessment. There is currently no medical treatment universally recommended for women with elevated lead levels during pregnancy, however, an occupational health physician is available for consultation on individual cases. Contact the MDH lead program at 651-201-4610 for more information.

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

The following questions are suggested to determine if a pregnant woman is at risk for current high-dose exposure to lead. They are adapted from a risk assessment questionnaire for children developed by the Centers for Disease Control and Prevention (CDC).

- Do you or others in your household have an occupation that involves lead exposure? (See Section A.)
- Sometimes pregnant women have the urge to eat things that are not food, such as clay, soil, plaster or paint chips. Do you ever eat paint chips?
- Do you live in an old house with ongoing renovations that generate a lot of dust (e.g., sanding and scraping)?
- To your knowledge, has your home been tested for lead in the water, and if so, were you told that the level was high? (Note: a level over 15 parts per billion (ppb) or micrograms per liter (µg/L) is considered high.)
- Do you use any traditional folk remedies or cosmetics that are not sold in a regular drug store or are homemade, which may contain lead? (See Section B.)

- Do you or others in your household have any hobbies or activities likely to cause lead exposure? (See Section C.)
- Do you use non-commercially prepared pottery or leaded crystal?

Testing is not recommended for women who are not at risk. If the woman answers "yes" to any of the questions above, or if she has moved to Minnesota from a major metropolitan area or another country within the last twelve months, she is at risk for current high-dose lead exposure and should have a blood lead test. There is a relatively low incidence of elevated lead levels in pregnancy. Therefore, it is suggested that unless a woman responds "yes" to a risk assessment question, she not be tested unless there is other reason to suspect potential ongoing exposure to lead. A blood lead test during pregnancy is not indicated for a previous history of childhood lead exposure.

## **Section A. Lead Related Occupations and Industries**

- Ammunition/Explosives Maker
- Auto Repair/Auto Body Work
- Battery Manufacturing and Repair
- Bridge, Tunnel and Elevated Highway Construction
- Building or Repairing Ships
- Cable/Wire Stripping, Splicing or Production
- Ceramics Worker (Pottery, Tiles)
- Construction
- Firing Range Work
- Glass Recycling, Stained Glass and Glass
- Jewelry Maker or Repair
- Lead Abatement
- Lead Miner
- Leaded Glass Factory Worker
- Manufacturing and Installation of 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
- Paint/Pigment Manufacturing
- Pottery Making
- 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

If a pregnant woman is exposed to lead at work, she has a right to a safe working environment under federal and state laws. To obtain information on employee workplace rights under the Minnesota Occupational Safety and Health Administration (MNOSHA), call the MNOSHA Workplace Safety Consultation line at 1-800-DIAL-DLI (1-800-342-5354).

## **Section B. Traditional/Folk Remedies or Cosmetics That Have Been Found to Contain Lead:**

People in other parts of the world may have a higher risk of being exposed to lead because of lead in gasoline, certain industrial practices, or the use of traditional/folk remedies or cosmetics. It is especially important to test all pregnant women for lead if at any time they have used one or more of the following materials that have been found to contain lead. In addition, because of the potential for environmental exposures, testing should be done if they have moved to Minnesota from another country within the last 12 months.

IN ASIAN, AFRICAN, & MIDDLE EASTERN COMMUNITIES:

*(as a cosmetic or a treatment for skin infections or umbilical stump)*

alkohl, kajal, kohl, or surma (black powder)

IN ASIAN COMMUNITIES:

*(for intestinal disorders)*

bali goli (round flat black bean)

ghasard/ghazard (brown powder)

kandu (red powder)

IN HMONG COMMUNITIES:

*(for fever or rash)*

pay-loo-ah (orange/red powder)

IN LATINO COMMUNITIES:

*(for abdominal pain/empacho)*

azarcon (yellow/orange powder), also known as:

alarcon, cora, coral, liga, maria luisa, and rueda

greta (yellow/orange powder)

IN SOUTH ASIAN (EAST INDIAN) COMMUNITIES:

*(bindi dot)*

sindoor (red powder)

*(dietary supplement)*

Ayurvedic herbal medicine products (HMPs)

## **Section C. Hobbies and Activities That May Cause Lead Exposure:**

The most common household activities associated with lead hazards are home renovations and repairs. These include scraping, sanding or burning of lead-based paint on woodwork, walls or other household structures. Also, sanding, stripping or burning of lead-based painted furniture generates a lead hazard. Pregnant women and children are especially sensitive to these hazards and should not be present when this work is done.

THE FOLLOWING ARE OTHER POTENTIAL SOURCES OF EXPOSURE:

- Bronze Casting
- Collecting, Painting, or Playing Games with Lead Figurines
- Copper Enameling
- Electronics with Lead Solder
- Hunting and Target Shooting
- Jewelry Making with Lead Solder
- Liquor Distillation
- Making Pottery and Ceramic Ware with Lead Glazes and Paints
- Making Stained Glass and Painting on Stained Glass
- Melting Lead for Fishing Sinkers or Bullets or Lead Figurines
- Painting/Stripping Cars, Boats, and Bicycles
- Print Making and Other Fine Arts (When Lead White, Flake White and Chrome Yellow Pigments are Involved)
- Remodeling, Repairing, and Renovating Homes

## **Section D. Nutritional Information for Pregnant and Lactating Women:**

- 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.
- Breastfeeding is generally safe even if a woman has an elevated blood lead level. However, if a mother with an elevated blood lead level is breastfeeding, the infant's blood lead level should be carefully and frequently monitored. (See Prenatal Care Providers' Reference Information-Part II for details.)

Examples of Sources of Iron and Calcium:

<b>Iron</b>
fortified breads & cereals
cooked legumes (dried beans & dried peas)
spinach
lean red meat

<b>Calcium</b>
milk
yogurt
cheese
cooked greens
calcium fortified orange juice

Brochures to assist with risk reduction education are available from the MDH. Contact the MDH lead program at 651-201-4610 or [www.health.state.mn.us/divs/eh/lead](http://www.health.state.mn.us/divs/eh/lead) for more information.

**Section E. Methods to Reduce Lead Exposure in Pregnant Women  
- 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 sweep and dry dust.
- Do avoid drinking acidic liquids from imported ceramic cups and mugs, or from leaded crystal.
- Do avoid the use of traditional folk remedies or cosmetics, which might contain lead.
- Do avoid lead related crafts to avoid exposure to lead.
- Do wash hands thoroughly before meal preparation.
- 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 clean up after renovations involving lead-based paint.
- Don't strip paint from antique furniture such as cribs and rocking chairs.
- Don't store food in open imported cans.

## **Section F. Education For Postpartum Women To Prevent Lead Poisoning In Infants:**

- Breastmilk is usually best for babies, even if your blood lead level is elevated. (See detailed information in Part II.)
- If baby formula is used, take care when preparing it. Use cold tap water - not hot - to make infant formula. Let the cold water run for at least a minute, to flush any lead picked up from the pipes. Purchase bottled water if the home's drinking water exceeds the Environmental Protection Agency's action level of 15 ppb.
- Feed your baby foods that get ahead of lead. Iron fortified formula and cereals can lower your baby's lead risk. Serving foods that are high in iron and calcium can help lower the family's lead risk.
- Obtain a pacifier that can be attached to your baby's shirt so it won't fall on the floor. Wash the pacifier often. This will help remove any lead dust.
- Wash your baby's hands and toys often. Babies suck their fingers and put things in their mouths - things that might have lead dust on them. Washing helps lower the lead risk.
- Take your baby for regular health care visits and follow the health provider's lead test advice.

## Part II

### **Guidelines for Management of Lead Poisoning in Pregnant Women and Postpartum Women**

#### **All women should receive:**

- At the initial prenatal visit:
  - Risk assessment (for current high-dose lead exposure)
  - Anticipatory guidance (on avoiding lead exposure)
- At the postpartum visit:
  - Anticipatory guidance for prevention of lead poisoning in infants
  - If the pregnant woman is at risk for current high-dose lead exposure, a blood lead test should be performed.

#### **Blood Lead Level Actions (management during pregnancy)**

- 0-9 µg/dL** Provide information on sources of lead, how to avoid exposure, and nutrition information. (See Part I, Section A, B, C, D and E.)
- 10-19 µg/dL** Retest blood lead level to determine if the level is mildly increasing. If there is a significant rise in the blood elevated lead level (up to 20 µg/dL or higher), seek additional information on risk reduction and patient management. If there is no upward trend, retest during the third trimester close to term to assess the need for newborn evaluation.
- Provide counseling on possible sources of lead and information on how to reduce or eliminate exposure. (See Part I, Section A, B, C, and risk reduction practices, Section E.)
- Provide nutrition counseling to reduce absorption of ingested lead. (See Part I, Section D.)
- 20-44 µg/dL** Retest the blood lead level to determine if the level is moderately increasing. If the repeat blood lead level is between 10-19 µg/dL, retest during the third trimester close to term to assess the need for newborn evaluation. If the blood lead level remains above 20 µg/dL, seek additional information for further risk reduction and patient management.

Provide counseling on possible sources of lead and information on how to reduce exposure. (See Part I, Section A, B and C, and risk reduction practices Section E.)

Provide nutrition counseling to reduce absorption of ingested lead. (See Part I, Section D.)

Refer woman to an Occupational Health Clinic if occupational exposure is suspected. Contact the MDH lead program at 651-201-4610 for more information.

Refer woman to the local public health agency for an environmental investigation if occupational exposure, hobbies and folk remedies have been ruled out as a source of lead exposure.

For advice about patient counseling concerning teratogenic effects, consult the Minnesota Children with Special Health Care Needs program at MDH. Phone: 651-215-8956 or 1-800-728-5420. [www.health.state.mn.us/divs/fh/mcshn](http://www.health.state.mn.us/divs/fh/mcshn)

**45 µg/dL +** Early symptoms of lead poisoning may include: fatigue, irritability and depression; difficulty sleeping and concentrating; stomach cramps; constipation; weakness in the arms and legs; and problems with coordination. Very high levels may cause convulsions, coma and even death. Consider hospitalization. Immediate removal from the contaminated environment may be indicated.

Provide counseling on possible sources of lead and provide information on how to eliminate or reduce exposure. (See Part I, Section A, B, C, and risk reduction practices from Section E.)

Provide nutrition counseling to reduce absorption of ingested lead. (See Section D.)

Refer woman to an Occupational Health Clinic if occupational exposure is suspected. Contact the MDH lead program at 651-201-4610 for more information.

Refer woman to the local health agency for environmental investigation if occupational exposure, hobbies and folk remedies have been ruled out as a source of lead exposure.

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## **Management at time of delivery:**

If a baby is born to a mother with an elevated blood lead level (10 µg/dL or greater), umbilical cord blood should be tested to determine the newborn's blood lead level. The infant's pediatrician should be informed so that appropriate follow-up can take place, including early follow-up testing of the baby.

## **Breastfeeding recommendations for women with an elevated blood lead level:**

Breastfeeding is generally safe for women with elevated blood lead levels. However, if a mother with an elevated blood lead level is breastfeeding, the infant's blood lead level should be carefully and frequently monitored. This should be performed within two weeks of baseline measurement and then at least monthly. If an infant is born to a mother with an elevated blood lead level and the infant has a blood lead level of 10 µg/dL or greater and rising, environmental sources should be investigated. If no remediable environmental source of lead can be detected, breastfeeding should be discouraged. If an infant is born to a mother with an elevated blood lead level and the infant's blood lead level stays below 10 µg/dL, breastfeeding should continue.

*For more information about lead screening, contact:*

Minnesota Department of Health

Environmental Surveillance and Assessment Section

Environmental Impact Analysis Unit

(651) 201-4610; or 1-800-657-3908; or TTY (651) 201-5797

*If you require this document in another format, such as large print,*

*Braille, or cassette tape, call (651) 201-5000.*

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Prenatal lead exposure is of concern because it may have an effect on cognitive development and may increase delinquent and antisocial behaviors when the child gets older. Prenatal lead exposure may also reduce neonatal weight gain. In addition to fetal risk, lead may be a risk to the mother by causing an increase in blood pressure.

Lead is transferred from the mother to the fetus because the placenta is a weak barrier to the passage of lead. Therefore, it may be assumed that fetal blood contains the same concentration of lead as maternal blood. The Centers for Disease Control and Prevention (CDC) and the Minnesota Department of Health (MDH) consider 10 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) and above to be an elevated blood lead level for children.

In many cases, high levels of lead in pregnant women arise from maternal occupational exposure. However, other lead exposures may occur, such as: remodeling a home containing lead paint that allows lead dust to become airborne and inhaled; a family member's occupation or hobby resulting in "take-home" lead; using non-commercial home remedies or cosmetics that contain lead; using non-commercial glazed pottery for cooking; and pica behavior of the mother, such as eating soil or pieces of clay pots. There may also be exposure of the fetus to lead coming out of the mother's bones. This may arise from long-term previous exposures of the mother even though lead exposure is not happening during the pregnancy. Lead may come out of maternal bones faster during pregnancy and lactation because of the mother's and fetus's need for calcium. A diet rich in iron and calcium may help reduce absorption of lead during pregnancy.

Not every woman is at risk for lead exposure, so a risk screening questionnaire should be used to decide when to test a pregnant, or potentially pregnant, woman for lead.

## Blood Lead Screening Risk Questionnaire for Pregnant Women in Minnesota

Health-care providers should **use a blood lead test** to screen pregnant women if they answer, "yes" or "don't know" to any of the following questions, or if they have moved to Minnesota from a major metropolitan area or another country within the last twelve months:

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 ever eat any of these things—even accidentally?
3. Do you live in a house built before 1978 with ongoing renovations that generate a lot of dust (for example, sanding and scraping)?
4. To your knowledge, has your home been tested for lead in the water, and if so, were you told that the level was high?
5. Do you use any traditional folk remedies or cosmetics that are not sold in a regular drug store or are homemade? (See list on back.)
6. Do you or others in your household have any hobbies or activities likely to cause lead exposure? (See list on back.)
7. Do you use non-commercially prepared pottery or leaded crystal?



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The guidelines were based on the New York State Department of Health,  
*Lead Poisoning Prevention Guidelines for Prenatal Care Providers.*

## Sources of Lead

The most common sources of lead are paint, dust, soil, and water. Other sources include:

### Traditional Remedies/Cosmetics

IN ASIAN, AFRICAN, & MIDDLE EASTERN COMMUNITIES:

*As a cosmetic or a treatment for skin infections or umbilical stump.*

- alkohl, kajal, kohl, or surma (black powder)

IN ASIAN COMMUNITIES:

*For intestinal disorders.*

- bali goli (round flat black bean)
- ghasard/ghazard (brown powder)
- kandu (red powder)

IN HMONG COMMUNITIES:

*For fever or rash.*

- pay-loo-ah (orange/red powder)

IN LATINO COMMUNITIES:

- Some salt-based candies made in Mexico

*For abdominal pain/empacho.*

- azarcon (yellow/orange powder), also known as: alarcon, cora, coral, liga, maria luisa, and rueda
- greta (yellow/orange powder)

IN SOUTH ASIAN (EAST INDIAN) COMMUNITIES:

*For bindi dots.*

- sindoor (red powder)

*As a dietary supplement.*

- Ayurvedic herbal medicine products

### Hobbies

*May also include some of the occupations listed in the right column.*

- Bronze Casting
- Collecting, Painting or Playing Games with Lead Figurines
- Copper Enameling
- Electronics with Lead Solder
- Hunting and Target Shooting
- Jewelry Making with Lead Solder
- Liquor Distillation
- Making Pottery and Ceramic Ware with Lead Glazes and Paints
- Making Stained Glass and Painting on Stained Glass
- Melting Lead for Fishing Sinkers or Bullets or Lead Figurines
- Painting/Stripping Cars, Boats, and Bicycles

- Print Making and Other Fine Arts (When Lead White, Flake White and Chrome Yellow Pigments are Involved)
- Remodeling, Repairing, and Renovating Homes

### Occupations/Industries

- Ammunition/Explosives Maker
- Auto Repair/Auto Body Work
- Battery Manufacturing and Repair
- Bridge, Tunnel and Elevated Highway Construction
- Building or Repairing Ships
- Cable/Wire Stripping, Splicing or Production
- Ceramics Worker (Pottery, Tiles)
- Construction
- Firing Range Work
- Glass Recycling, Stained Glass and Glass Work
- Jewelry Maker or Repair
- Lead Abatement
- Lead Miner
- Leaded Glass Factory Worker
- Manufacturing and Installation of 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
- Paint/Pigment Manufacturing
- Pottery Making
- 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

### Miscellaneous

- Antique/Imported Toys
- Chalk (Particularly for Snooker/Billiards)
- Imported Candy
- Imported Pottery
- Non-Commercially Prepared Pottery
- Non-Commercially Prepared Leaded Crystal
- Some Children's Jewelry

[www.health.state.mn.us/divs/eh/lead](http://www.health.state.mn.us/divs/eh/lead)

For more information about lead, contact the **Lead Program at (651) 201-4610**

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