

Childhood Blood Lead Clinical Treatment Guidelines for Minnesota: Reference Manual

2019 REVISION

Childhood Blood Lead Treatment Guidelines for Minnesota

Guidelines Developed 2001
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Executive Summary

Although the toxicity of lead has been known for thousands of years, lead remains one of the most common environmental health threats to children. There are many sources of lead, such as soil contaminated from years of leaded gasoline use, lead dust accidentally brought home from parents' workplaces and hobby areas, lead in plumbing, and some imported products and traditional remedies. However, deteriorated lead paint in homes is the main source of lead exposure for U.S. children today. Children with elevated levels of blood lead during the first years of life may not show symptoms until they enter school and display learning difficulties, reduction in IQ, or behavior problems.

Childhood lead exposure has decreased dramatically since the 1970s due to policy changes and the efforts of parents and professionals across many disciplines. However, lead persists as an environmental contaminant. In Minnesota, 757 children under 6 years of age had confirmed elevated blood lead levels in 2017; 292 more children had elevated capillary results without follow-up venous results.

These guidelines represent a set of best practices and recommendations for health care providers working with children exposed to lead. They are based on national recommendations and input from a multi-disciplinary workgroup. These guidelines may be adapted for use within a specific clinic system, depending on resources available.

The 2019 revision of these guidelines includes several important updates. CDC now recognizes that there is no safe level of exposure to lead, and 5 µg/dL was set as a reference value. Minnesota Statutes also define elevated blood lead levels as 5 µg/dL and above; the guidelines are now consistent with these levels and other guidelines. The guidelines were also edited to improve clarity and provide health care providers with specific resources to which they can refer families.

Purpose of Treatment Guidelines

The Childhood Blood Lead Treatment Guidelines are for the treatment and follow-up of children with elevated blood lead levels. These guidelines represent a set of best practices and recommendations for health care providers working with children exposed to lead. Health care providers may include physicians, physician assistants, nurse practitioners, nurses, and other health professionals in a medical setting who serve and treat individuals who have received a blood lead test. Other guidelines regarding blood lead screening and case management for children and screening and treatment for pregnant and breastfeeding women may be found at the Minnesota Department of Health (MDH) [Blood Lead Level Guidelines](https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html) (<https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html>).

Public Health Process and Roles

Reporting Blood Lead Test Results

According to [Minnesota Statutes 144.9502, Subdivisions 3–4](https://www.revisor.mn.gov/statutes/cite/144.9502) (<https://www.revisor.mn.gov/statutes/cite/144.9502>), all blood lead test results must be reported to the Minnesota Department of Health by the hospital, medical clinic, medical laboratory, other facility, or individual performing blood lead analysis. For these guidelines, a facility performing blood lead analysis will be referred to as a performing facility. Subdivision 7 also states that facilities can report the information required under this section without liability. Elevated blood lead results must be reported to MDH within two business days, and non-elevated blood lead results must be reported to MDH no later than one month.

Health care providers do not need to call the Minnesota Department of Health to report elevated blood lead levels or individual blood lead test results. Ensure your lab is aware of the requirement to report all blood lead tests to the Minnesota Department of Health. If your clinic uses a point-of-care blood lead test, confirm you have protocol in place to ensure all blood lead test results are reported to the Minnesota Department of Health. If you are concerned that blood lead result(s) have not been appropriately reported to the Minnesota Department of Health by your performing facility, you may call 651-201-4919.

All blood lead test results must include:

- Whether the specimen was collected as a capillary or venous sample
- The date the sample was collected
- The results of the blood lead analysis
- The date the sample was analyzed
- The method of analysis used
- The full name, address, and phone number of the laboratory performing the analysis
- The full name, address, & phone number of the physician or facility requesting the analysis
- The full name, address, phone number, birthdate, gender, race and ethnicity of the person who received the blood lead test, and their guardian's name if available

Information about reporting blood lead tests to the Minnesota Department of Health, including reporting through electronic submission, can be found at [Blood Lead Information System \(https://www.health.state.mn.us/communities/environment/lead/prof/surv.html\)](https://www.health.state.mn.us/communities/environment/lead/prof/surv.html).

Sharing Information with Public Health

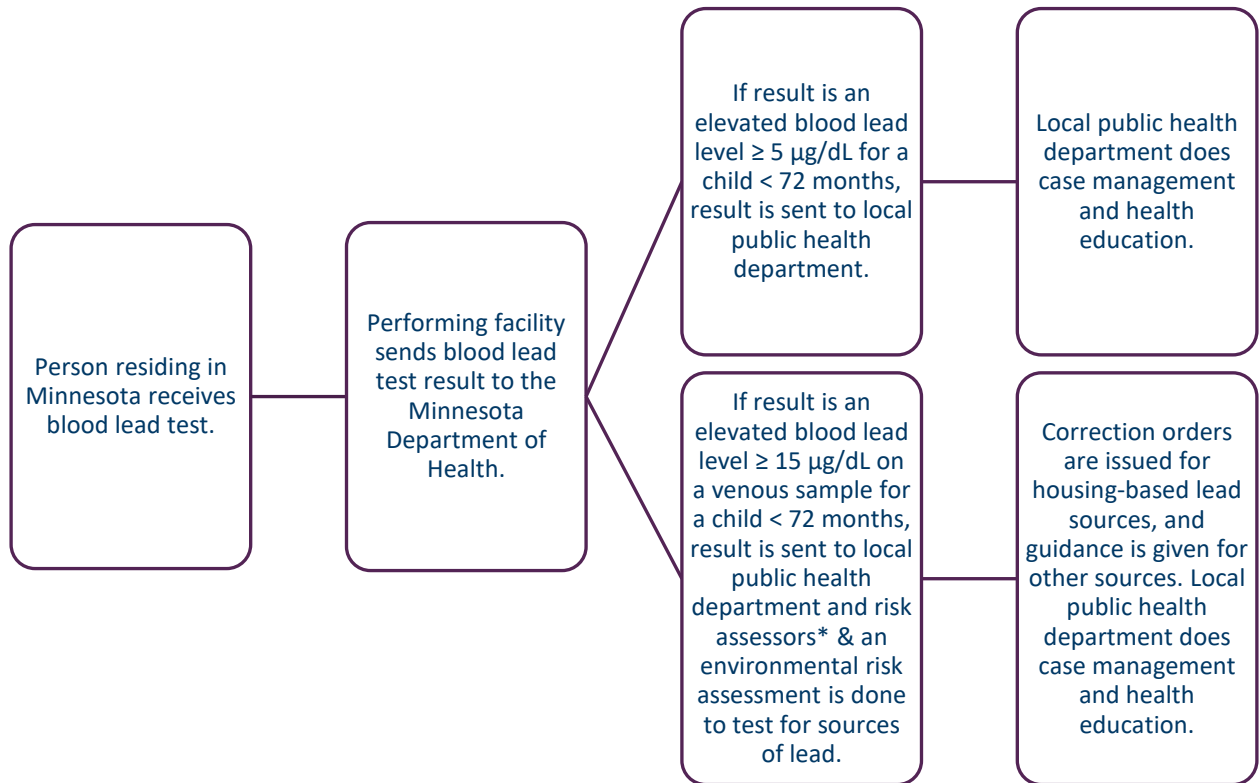
[Minnesota Statutes 144.9502, Subdivision 9, \(https://www.revisor.mn.gov/statutes/cite/144.9502\)](https://www.revisor.mn.gov/statutes/cite/144.9502), along with [Minnesota Statutes 145A.04 Subdivision. 1 \(https://www.revisor.mn.gov/statutes/cite/145A.04\)](https://www.revisor.mn.gov/statutes/cite/145A.04), grants local boards of health the authority to enforce the laws identified in these statutes and utilize blood lead data to monitor blood lead levels, ensure screening services are provided to high-risk populations, ensure the provision of medical and environmental follow-up, and conduct primary prevention. Based on these statutes, health care providers may share information about patients that have received a blood lead test with the relevant local public health department or Community Health Board as well as the Minnesota Department of Health.

The ability of local public health departments to obtain and utilize blood lead analysis data and the associated epidemiologic data is crucial for fulfilling the responsibilities of an assessing agency under Minnesota Statutes 144.9504 and protecting and promoting the health of Minnesota residents.

Public Health Services

Health care providers do not need to contact the Minnesota Department of Health or local public health departments to request services for children less than 72 months of age with elevated blood lead levels. Health care providers are welcome to contact the Minnesota Department of Health to check on the status of a case, request to be connected with a local public health agency, or consult on likely sources of lead exposure (see Technical Assistance and Communication section on page 8).

For children under 72 months of age, an elevated blood lead level greater than or equal to 5 µg/dL will automatically trigger involvement from a local public health department, and an elevated blood lead level on a venous result greater than or equal to 15 µg/dL will ensure an environmental investigation (risk assessment). In some jurisdictions, environmental risk assessments may automatically be done for venous blood lead levels less than 15 µg/dL but greater than or equal to 5 µg/dL as well. *Figure 1: Process and Role of Public Health* on page 8 outlines the process for public health services.

Figure 1: Process and Role of Public Health

*A few jurisdictions perform environmental risk assessments and home visits for venous results at lower blood lead levels.

Case Management

When the Minnesota Department of Health receives an elevated blood lead level for a child under 72 months of age, it is sent out to the relevant local public health department. See *Figure 1* for the public health process. Depending on the location, this may be the city or county public health department or the Community Health Board serving that county. A staff member from that local public health department, usually a public health nurse, will provide health education and case management for the family. Depending on the local public health department's resources and the child's blood lead level, case management may include sending a letter with educational materials, calling the family, doing a home visit, or a combination of these services. If an environmental risk assessment is performed, the public health nurse will conduct a home visit in conjunction with the risk assessment.

Environmental Investigations (Risk Assessments)

According to [Minnesota Statutes 144.9504](https://www.revisor.mn.gov/statutes/cite/144.9504)
(<https://www.revisor.mn.gov/statutes/cite/144.9504>):

- An environmental risk assessment can be performed for any child under 72 months of age with a venous blood lead level of 5–14.9 µg/dL, as resources allow.
- An environmental risk assessment must be performed for any child under 72 months of age with a venous blood lead level of at least 15 µg/dL.
 - Environmental risk assessments can be performed at the primary residence and other facilities where the child spends more than a few hours a week.
 - Under some circumstances, risk assessments can also be performed at residences where the child no longer lives.
 - Environmental risk assessments are completed within 10 working days of the first qualifying venous blood lead level \geq 15 µg/dL being received by the Minnesota Department of Health.
- Following a risk assessment by a licensed lead risk assessor, lead correction orders can be issued to the property owner to address lead hazards. Property owners have 60 days to address lead hazards identified in the correction orders.
 - If an environmental risk assessment is performed, it is the responsibility of the licensed risk assessor to follow the property until it passes clearance inspection. In order to pass clearance inspection, the affected property must have no deteriorated lead paint and no bare soil or lead dust exceeding soil or dust standards.
- Minnesota Statutes do not allow for enforceable lead orders for children greater than 72 months of age. However, older children may still benefit from case management services.

Swab Team Services

According to [Minnesota Statutes 144.9504, Subdivision 6](https://www.revisor.mn.gov/statutes/cite/144.9504)
(<https://www.revisor.mn.gov/statutes/cite/144.9504>), services of a swab team may be offered free of charge to the property owner after a lead risk assessment is performed. Swab team services are activities that provide protection from lead hazards primarily through interim controls, including:

- Removing lead dust by washing, vacuuming with high efficiency particle accumulator (HEPA) or wet vacuum cleaners, and cleaning the interior of residential property
- Removing loose paint and paint chips, and repainting or installing guards to protect intact paint
- Covering or replacing bare soil that has a lead concentration of \geq 100 parts per million
- Health education

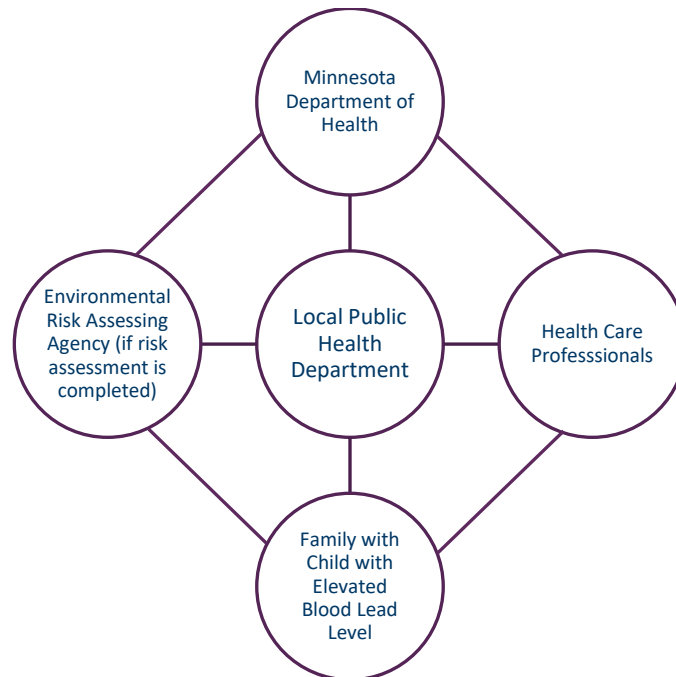
Swab team services address immediate lead hazards through interim controls; they are not designed to address long-term lead hazards within the property.

Technical Assistance and Communication

The Minnesota Department of Health offers guidance and answers questions from health care providers and local public health departments regarding blood lead testing and elevated blood lead case management. If health care providers have any questions about case management or environmental risk assessments, or have any information to share that may be relevant to addressing the lead exposure, they are encouraged to contact the Minnesota Department of Health or the relevant local public health department. Staff at the Minnesota Department of Health as well as staff at local public health departments typically work standard business hours, and will respond to messages as soon as they are able.

Figure 2 shows the common communication pathways among health care professionals, public health, environmental risk assessors, and families. Local public health departments often have the most direct contact with families and have the most information about sources of lead and other factors that may be contributing to a child's blood lead level. The Minnesota Department of Health may have information regarding sources of lead identified in environmental risk assessments and notes from local public health departments, and can share relevant information or questions from health care professionals with local public health or environmental risk assessors.

Figure 2: Communication Pathways



Children 72 Months and Older

Children aged 72 months and older typically do not receive local public health case management or environmental risk assessments. The Minnesota Department of Health periodically sends a list to local public health departments of children 72 months or older with an elevated blood lead level. Local public health departments may follow up with children 72 months and older as resources allow. Clinical treatment guidelines for children \geq 72 months with elevated blood lead levels are the same as for children $<$ 72 months (see pages 12–13). As children \geq 72 months do not usually receive case management from local public health departments, health professionals should educate families on possible sources of lead including housing and non-housing sources such as hobbies, cosmetics/religious powders, or imported spices. If health care professionals have questions about a blood lead level in a child \geq 72 months, they are encouraged to contact the Minnesota Department of Health.

Refugees

All refugees less than 17 years of age should receive a blood lead test upon arrival in Minnesota according to the [CDC Lead Poisoning Prevention in Newly Arrived Refugee Children: Tool Kit](https://www.cdc.gov/nceh/lead/publications/refugeetoolkit/refugee_tool_kit.htm) (https://www.cdc.gov/nceh/lead/publications/refugeetoolkit/refugee_tool_kit.htm) and the [Minnesota Refugee Health Provider Guide: Childhood Lead Screening](https://www.health.state.mn.us/communities/rih/guide/9lead.html) (<https://www.health.state.mn.us/communities/rih/guide/9lead.html>). In addition, all refugee children less than 72 months of age should receive a blood lead test from their health care provider three to six months after placement in permanent residence, regardless of their initial blood lead level.

Refugees less than 72 months of age with an elevated blood lead level receive standard case management and environmental risk assessment services. The Minnesota Department of Health periodically sends a list to local public health departments of refugees 72 months or older with an elevated blood lead level. The Minnesota Department of Health may also periodically send a list to local public health departments of refugees less than 72 months that are due for a blood lead test three to six months after placement in permanent residences. Depending on resources, local public health departments may contact refugees to remind them of the need for a follow-up blood lead test.

Childhood Blood Lead Treatment Guidelines for Minnesota

Treatment Guidelines: Blood Lead Tests on Capillary Samples

BLLs (µg/dL)	ACTIONS BASED ON RESULTS OF BLOOD LEAD TESTS ON CAPILLARY SAMPLES
ALL BLLs	ALL BLOOD LEAD TESTS ARE REQUIRED TO BE REPORTED TO MDH BY THE LAB OR CLINIC ANALYZING THE SAMPLE. HEALTH CARE PROVIDERS DO NOT NEED TO CALL MDH TO REPORT (UNLESS THEY SUSPECT A FAILURE TO REPORT PROPERLY).
Capillary < 5.0	<ul style="list-style-type: none"> Prevention Education: discuss blood lead testing and high-risk categories, primary sources of lead, and measures to keep children safe from lead. Education should be provided in the family's preferred language. Retest at 12 and 24 months or if risk factors change. For newly arrived refugees less than 72 months of age, retest 3 to 6 months after placement in permanent residence.
Capillary ≥ 5.0	<p>In addition to the steps described above for lower blood lead levels, perform the following:</p> <ul style="list-style-type: none"> Confirm with a venous draw no later than: <ul style="list-style-type: none"> 1 month for Blood Lead Levels (BLLs) 5.0–14.9 µg/dL 1 week for BLLs 15.0–44.9 µg/dL 48 hours for BLLs 45.0–59.0 µg/dL Immediately for BLLs ≥ 60 µg/dL. If a clinic is unable to do a venous draw, refer the child to a laboratory or facility able to perform a venous draw. MDH refers children < 72 months to local public health departments (LPH).

Treatment Guidelines: Blood Lead Tests on Venous Samples

BLLs (µg/dL)	ACTIONS BASED ON RESULTS OF BLOOD LEAD TESTS ON VENOUS SAMPLES
ALL BLLs	ALL BLOOD LEAD TESTS ARE REQUIRED TO BE REPORTED TO MDH BY THE LAB OR CLINIC ANALYZING THE SAMPLE. HEALTH CARE PROVIDERS DO NOT NEED TO CALL MDH TO REPORT (UNLESS THEY SUSPECT A FAILURE TO REPORT PROPERLY).
Venous < 5.0	<ul style="list-style-type: none"> Prevention Education. Discuss blood lead testing and high-risk categories, primary sources of lead, and measures to keep children safe from lead. Education should be provided in the family's preferred language. Retest at 12 and 24 months or if risk factors change. For newly arrived refugees < 72 months of age, retest 3 to 6 months after placement in permanent residence.

TREATMENT GUIDELINES CONTINUED ON NEXT PAGE

BLLs (µg/dL)	ACTIONS BASED ON RESULTS OF BLOOD LEAD TESTS ON VENOUS SAMPLES
Venous 5.0–14.9	<p>In addition to the steps described above for lower blood lead levels on venous samples, perform the following:</p> <ul style="list-style-type: none"> ▪ After initial confirmed venous result, repeat test on a venous sample every 3 months until < 5.0 µg/dL. ▪ MDH refers children < 72 months to local public health departments (LPH); LPH does case management and health education. ▪ Communicate with LPH regarding potential sources of lead. Test all household members who are likely exposed to lead source(s) or refer them to their primary care provider for blood lead testing within one month. <ul style="list-style-type: none"> ▪ For housing-based sources, exposed individuals are typically < 72 months. ▪ For non-housing-based sources, household members of all ages may be exposed. ▪ Assess nutritional status (especially iron & calcium) through a conversation with family about the child's normal diet. ▪ Complete diagnostic evaluation including a physical exam and history. ▪ Complete studies to evaluate iron status and treat iron deficiency if present according to Pediatric Environmental Health Specialty Unit (PEHSU) medical management for childhood lead exposure guidelines.* ▪ Check and follow neurologic & developmental status. Refer to programs like Follow Along or Help Me Grow as applicable. ▪ Education on decreasing elevated BLLs: educate the family and discuss potential sources of lead, reducing or removing exposure, lead abatement, nutrition, the chronic nature of problem, and need for ongoing monitoring of BLLs. ▪ Provide written, culturally appropriate lead poisoning prevention educational materials.
Venous 15.0– 44.9	<p>In addition to the steps described above for lower blood lead levels on venous samples, perform the following:</p> <ul style="list-style-type: none"> ▪ Household members who are likely exposed to lead sources should be tested or referred to their primary care provider for a blood lead test within one week. ▪ After initial confirmed venous result, repeat test on a venous sample every 3 months or do more frequent monitoring, as needed. MN Poison Control (1-800-222-1222) or Region 5 PEHSU (1-866-967-7337) may be consulted for questions about monitoring frequency. ▪ MDH or the local public health department will conduct an environmental inspection (risk assessment) and public health nursing home visit for children < 72 months of age. A few jurisdictions perform environmental inspections and home visits for venous results at lower blood lead levels on a routine basis or upon parent request. <ul style="list-style-type: none"> ▪ Through the environmental inspection, the suspected lead sources will be identified. Lead correction orders will be issued for housing-based lead sources, and recommendations will be given for other lead sources.
Venous 45.0–59.9	<p>In addition to the steps described above for lower blood lead levels on venous samples, perform the following:</p> <ul style="list-style-type: none"> ▪ Household members who are likely exposed to lead sources should be tested or referred to their primary care provider for a blood lead test within two business days. ▪ Reconfirm blood lead test result as soon as possible, even for venous results. ▪ Consult MN Poison Control (1-800-222-1222) or Region 5 PEHSU (1-866-967-7337) for guidance regarding possible chelation treatment, diagnostic tests, and other recommended actions. ▪ Check abdominal radiograph. If swallowed lead object found, lead object should be passed or removed prior to chelation. Consult with MN Poison Control or PEHSU. ▪ Notify MDH immediately if child is hospitalized or chelation is begun. Coordinate care with all medical team members and public health, and put an action plan in place. Discuss with MDH and family ways to reduce immediate lead exposure. ▪ After initial confirmed venous result, more frequent monitoring through repeated tests on venous samples will likely be needed. Develop a monitoring plan based on BLL trends that includes repeat venous tests three to six weeks after chelation therapy is complete. If BLL ≥ 45 µg/dL following chelation, consult with MN Poison Control or PEHSU.
Venous ≥ 60.0	<p>In addition to the steps described above for lower blood lead levels on venous samples, perform the following:</p> <ul style="list-style-type: none"> ▪ TREAT AS AN EMERGENCY— potential encephalopathy. ▪ Household members who are likely exposed to lead sources should be tested or referred to their primary care provider for a blood lead test immediately.

* PEHSU: [Recommendations on Medical Management of Childhood Lead Exposure and Poisoning \(https://www.pehsu.net/Library/facts/medical-mgmt-childhood-lead-exposure-June-2013.pdf\)](https://www.pehsu.net/Library/facts/medical-mgmt-childhood-lead-exposure-June-2013.pdf)

Sources of Lead

Health care professionals should be aware of common sources of lead when interacting with families. For children, the primary route of exposure is ingestion of products or dust containing lead. The following list is provided to give background information on common sources of lead. MDH can provide additional information or technical assistance when unusual or newly emerging lead sources are suspected. Educational materials on specific lead sources can be found at [Lead Fact Sheets and Brochures](https://www.health.state.mn.us/communities/environment/lead/fs/index.html) (<https://www.health.state.mn.us/communities/environment/lead/fs/index.html>).

Paint and Dust

- Chipping or peeling paint is the most common source of lead exposure. Homes built before 1978 may contain lead-based paint.
 - One third of homes in Minnesota may have lead paint. Older homes are more likely to have sources of lead.
 - 75–85% of Minnesota children with a high blood lead level have hazardous lead paint in their home.
 - Lead paint exposures can occur at home, daycare, or a relative's home.
- Window components and porches are common areas to find lead-based paint.
 - Other areas include walls, floors, doors, door frames, bannisters, baseboards, and antique bathtubs.
- Even tiny amounts of dust from lead paint can cause a child's blood levels to rise. Friction surfaces such as windows or doors can wear off lead paint into lead dust even when the paint is not obviously chipped.
 - A teaspoon of lead dust in an entire home is enough to cause a child to have elevated blood lead levels.
- [Cleaning Up Sources of Lead in the Home](https://www.health.state.mn.us/communities/environment/lead/fs/cleaningup.html) (<https://www.health.state.mn.us/communities/environment/lead/fs/cleaningup.html>) provides information about cleaning up dust and paint chips.

Renovation of Older Homes

- Renovation creates large amounts of dust, which can lead to both lead inhalation and ingestion exposures and high blood lead levels in homes built before 1978.
 - Certain renovation practices, such dry-sanding paint or using heat guns to remove paint are particularly dangerous.
 - Lead-safe work practices should be used when renovating a home built before 1978. Information on lead-safe work practices is available at [Remodeling the Older Home](https://www.health.state.mn.us/communities/environment/lead/home/remodel.html) (<https://www.health.state.mn.us/communities/environment/lead/home/remodel.html>).
 - [MDH Hiring a Contractor](https://www.health.state.mn.us/communities/environment/lead/home/howhire.html) (<https://www.health.state.mn.us/communities/environment/lead/home/howhire.html>) has information on hiring a contractor and certifications for different types of renovation or lead removal work.

- Federal law requires that all contractors performing renovation work in pre-1978 residences to be certified. Use the [EPA Locate Certified Renovation and Lead Dust Sampling Technician Firms](https://cfpub.epa.gov/flpp/pub/index.cfm?do=main.firmSearch) (<https://cfpub.epa.gov/flpp/pub/index.cfm?do=main.firmSearch>) database to find firms with a Renovation, Repair, and Painting (RRP) certification.
- For lead abatement or lead removal work, a certification from the Minnesota Department of Health is required. Contractors and consultants that are certified for lead abatement may be found at [MDH: Lead Poisoning Prevention: Find a Contractor or Consultant](https://lead.web.health.state.mn.us/searchFirm.jsf) (<https://lead.web.health.state.mn.us/searchFirm.jsf>).

Soil and Water

Soil

- Bare soil can be a source of lead, especially in areas near busy streets or old homes.
 - 30–40% of Minnesota children with a high blood lead level have hazardous levels of lead in soil at their home.
 - Bare soil should be covered with a durable ground cover such as grass or mulch and shoes should be removed at the door to reduce the chance of lead exposure.

Water

- Lead in water is not commonly a cause of elevated blood lead levels in Minnesota, but may contribute to low levels of lead.
- Municipal water supplies and private wells in Minnesota are not generally a substantial source of lead. Lead can enter drinking water as it passes through household plumbing.
 - Homes built before 1986 may have lead parts in their plumbing systems. Plumbing in buildings built after 1986 may still have some parts containing low levels of lead.
- Water can be tested if there is a concern about lead contamination. Local jurisdictions (cities or counties) may have free or discounted water testing available; this varies from jurisdiction to jurisdiction. [Well Testing, Results, and Options](https://www.health.state.mn.us/communities/environment/water/wells/waterquality/tips.html) (<https://www.health.state.mn.us/communities/environment/water/wells/waterquality/tips.html>) has more information about testing well water.
- Only water from the cold tap should be used for cooking or drinking. Let the water run before using it for drinking or cooking.
 - If you have a lead service line, let the water run for 3-5 minutes. If you do not have a lead service line, let the water run for 30-60 seconds.
- More information is available at [Lead in Drinking Water](https://www.health.state.mn.us/communities/environment/water/contaminants/lead.html) (<https://www.health.state.mn.us/communities/environment/water/contaminants/lead.html>).

Lead-Related Occupations and Industries

Lead is used in a variety of industries. Children may be exposed to lead dust if it is carried home from the workplace on the clothing, shoes, or body of a household member who works with lead. Precautions should be taken to reduce children’s exposure to take-home lead, including:

- Washing hands frequently
- Not smoking or eating in areas where lead may be present
- Taking shoes off before entering the home
- Changing out of work clothes and shoes and showering before getting in one's vehicle or going home
- Washing work clothes separately from other clothing or having work clothes laundered at work.

Hobbies can also be a source of lead exposure. Often, hobbies are performed in or around the home, leading to increased opportunities for family members to be exposed. Hobbies that involve lead should be performed in well-ventilated areas and away from areas to which children have access.

Common occupations, industries, and hobbies where lead exposure may occur include:

- Art including ceramics/pottery, jewelry, painting, stained glass, prints, and lead figurines
- Automobile and ship manufacturing, body work, and repair
- Manufacturing of glass, paint, pigment, plastic, ammunition, fishing sinkers, batteries, ceramics, cable, wire, countertops, industrial machinery, rubber products, and electrical components
- Construction, demolition, and bridge reconstruction
- Renovation, refinishing, remodeling, lead abatement, painting, paint removal
- Plumbing, pipe fitting, radiator repairs
- Restoring or refinishing antique products and furniture, or upcycling and reuse of old barn wood or painted wood
- Using or working at firing ranges, making ammunitions or explosives, reloading shotgun shells, working as a gunsmith or police officer, and being a member of the armed forces
- Metal processing and industrial work including mining or refining lead, cable and wire splicing or production, welding, burning, or cutting metals, or foundry work
- Recycling or salvaging metal, glass, electronics, and batteries, working as a solid waste incinerator operators or junkyard employee
- Bleigiessen (tradition of dropping molten lead into water to make future predictions).

This should not be considered an exhaustive list of all potential occupational lead sources.

Food and Cookware

Imported or Recalled Spices and Candies

- Imported or recalled spices may contain lead.
 - Spices most at risk are those that are unlabeled and have been purchased outside of the U.S. If spices are suspected, families should switch to spices purchased in the U.S.
 - Examples of spices that have been found to contain lead include:
 - Turmeric, which is the most common spice found to be adulterated with lead in Minnesota communities
 - Other spices such as chilies, curry powder, or various spice mixes
- Imported candy from multiple countries have also been found to contain lead.

Other Food Products

- Game meat harvested with lead ammunition
 - Lead bullets can fragment extensively, and trimming away meat around the wound channel is not sufficient to prevent lead exposure.
 - Alternatives include use of non-lead ammunition, bow hunting, or consumption of other protein sources.
- Food grown in lead-contaminated soils
 - When gardening in potentially contaminated sites, test soil for contaminants or build raised beds and use clean soil as discussed in [MDH Gardening in Urban Soil \(https://www.health.state.mn.us/communities/environment/hazardous/topics/gardurbsoil.html\)](https://www.health.state.mn.us/communities/environment/hazardous/topics/gardurbsoil.html).

Imported or Handmade Pottery or Ceramics, Other Cookware

- Imported or handmade pottery, ceramics, or other cookware with a lead glaze may contain lead that could leech into food or drink.
 - Lead is most likely to leach into food or drink when ceramics or cookware are used for storing liquids or acidic materials, for heating foods in the oven, stovetop, or microwave, or when lead-glazed pottery is fired under lower temperatures.
- The Food and Drug Administration (FDA) has regulations for labeling lead-glazed pottery as not for use with food. However, some imported or handmade products may not comply, and the use of heirloom cookware is common.
 - Many shops in Minnesota do small-scale imports of pottery, especially from Latin American countries, which have not undergone FDA lead testing or inspection.
- If pottery, ceramics, or cookware are suspected, it is recommended that the family replace the product with a lead-free version, or use the product for decoration purposes only.
- Examples of pottery, ceramics, or other cookware found to contain lead include:
 - Bean pots
 - Tajines
 - Clay or ceramic pots, pitchers, mugs, jars, and dishes, especially ones that are painted or antiques
 - Handmade or imported pottery with lead glaze
 - Imported or antique pressure cookers or crockpots
 - Pewter dishes and leaded crystal.

Cosmetics and Traditional or Alternative Remedies

Cosmetics and Religious Powders or Products

- Imported cosmetics and religious powders or products may contain lead.
- Traditional cosmetics or religious powders may be culturally important to individuals, so it is important to work with families to help them understand possible risks and benefits.
- The following are some examples of traditional medications/alternative remedies grouped by the community known to use the product:
 - South Asian and Indian Communities:

- Sindoor or kumkum is a red or orange powder used for bindi dots, along the hairline to signify marriage status, for religious purposes, or on prayer stations.
- Asian, African, and Middle Eastern Communities:
 - Kohl, alkohl, kajal, tiro, or surma is a black powder or liquid used as eyeliner for cosmetic purposes, to promote eye health, to ward off evil, or to treat skin infections or promote healing around umbilical stumps.
 - Kohl is banned for sale in the United States.

Traditional Medications, Alternative Remedies and Products

- Products from many forms of traditional, herbal, or alternative medicines and remedies have been found to contain lead.
 - Products may be imported or purchased in the United States in stores or online, and country of origin cannot be used as an indicator of product safety.
 - Traditional remedies may be culturally important to individuals, so it is important to work with families to help them understand possible risks and benefits.
 - The use of traditional or alternative remedies is not confined to immigrant communities.
- The following are some examples of traditional medications/alternative remedies that have been found to contain lead:
 - Ayurvedic medicines are Hindu traditional medicines and have many names and a variety of forms and uses.
 - Rasa Shastra is a subset of Ayurvedic medicines and is more likely to contain lead because they may have heavy metals or minerals added intentionally for purported therapeutic effects.
 - Chinese traditional medicines and traditional medicines from other communities
 - These are generally powders used to treat a variety of illnesses, including digestion issues, fevers, skin infections, fevers, colic, and respiratory issues.
 - Various forms of clay, chalk, or earth is sometimes taken internally for various uses such as treating morning sickness or promoting digestion.
 - Calabash chalk or clay, bentonite clay, and diatomaceous earth are some of the most common forms
 - Herbal supplements including dietary supplements
 - Imported gripe water
 - Other sources: this is not an all-inclusive list

Other Sources of Lead

Exposures that occurred in another country

- Individuals who have recently moved from or spent substantial time in another country may have greater risk for lead exposure, depending on the environmental regulations and sources of exposure in that country.
 - Lead paint and leaded gasoline are still allowed in some countries.
 - Some countries have stricter regulations about lead in foods and products than others.

Pica Behavior

- Pica is the deliberate ingestion of nonfood items, and can cause elevated levels of lead in people. Pica in children can include chewing, gnawing on, or eating materials including:
 - Paint chips
 - Soil or clay
 - Windowsills, bannisters, floorboards, doorframes, painted surfaces, plaster, or sheetrock
- If pica behavior is identified, it should be managed to prevent exposure to substances containing lead.

Jewelry, Amulets, Toys, Keys, Fishing Sinkers, Chalk, and Furniture

- Children may put objects that may contain lead in their mouths. These may include:
 - Jewelry, amulets, beads, hair clips, clothing charms or good luck charms
 - Amulets may have different names, such as tabeez or tabiz, and may be worn for religious purposes or to ward off evil and may not be considered jewelry by families.
 - Keys, including car and door keys
 - Fishing sinkers
 - Chalk, especially colored sidewalk chalk
 - Imported, antique, painted, or recalled children's toys, blocks, musical instruments, and metal toys such as cars
 - Antique furniture, and decorative pieces made from recycled/upcycled wood, doors, shutters, or other products containing lead paint from old buildings or barns

Resources for Identifying Products Containing Lead, Including Recalls

- Some resources for identifying potential items containing lead are listed below.
- To check for recalled products that were sold in the United States and contain lead:
 - Recalled foods, supplements, cosmetics, and some other products are listed on the [U.S. Food & Drug Administration \(FDA\) Recalls, Market Withdrawals, & Safety Alerts \(https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts\)](https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts) website.
 - Recalled items such as toys are listed on the [United States Consumer Product Safety Commission \(https://www.cpsc.gov/Recalls\)](https://www.cpsc.gov/Recalls) website.
- To gain a general idea of potential products containing lead:
 - New York City maintains a database open to the public of the [Metal Content of Consumer Products Tested by the NYC Health Department \(https://data.cityofnewyork.us/Health/Metal-Content-of-Consumer-Products-Tested-by-the-NY/da9u-wz3r/data\)](https://data.cityofnewyork.us/Health/Metal-Content-of-Consumer-Products-Tested-by-the-NY/da9u-wz3r/data).
 - This database includes over 2,000 products tested for lead in New York City, including food, spices, cosmetics, medications, children's products, pottery, jewelry, and other sources. While individual products may or may not be found in Minnesota, the database provides ideas of potential sources.

Iron Deficiency

Elevated blood lead levels may be associated with nutritional deficiencies, especially iron deficiency. Health care providers should assess children's nutritional status through a conversation with the family about the child's normal diet. Health care providers should also complete studies to evaluate iron status, and treat iron deficiency if present. Resources regarding iron deficiency in children and recommended iron studies include:

- The American Academy of Pediatrics and the Pediatric Environmental Health Specialty Units: [Recommendations on Medical Management of Childhood Lead Exposure and Poisoning \(https://www.pehsu.net/Library/facts/medical-mgmt-childhood-lead-exposure-June-2013.pdf\)](https://www.pehsu.net/Library/facts/medical-mgmt-childhood-lead-exposure-June-2013.pdf)
- Baker, R. D., & Greer, F. R, the American Academy of Pediatrics Committee on Nutrition. (2010). [Diagnosis and prevention of iron deficiency and iron-deficiency anemia in infants and young children \(0–3 years of age\). *Pediatrics*, 126\(5\), 1040-1050. \(https://pediatrics.aappublications.org/content/126/5/1040\).](https://pediatrics.aappublications.org/content/126/5/1040)
- Oatley, H., Borkhoff, C. M., Chen, S., Macarthur, C., Persaud, N., Birken, C. S., Maguire, J. L., & Parkin, P. C. (2018). [Screening for iron deficiency in early childhood using serum ferritin in the primary care setting. *Pediatrics*, 142\(6\). \(https://pediatrics.aappublications.org/content/142/6/e20182095.long\)](https://pediatrics.aappublications.org/content/142/6/e20182095.long)

Chelation

Chelation may be considered for blood lead levels on a venous sample greater than or equal to 45 µg/dL. Research does not show health benefits for chelation for blood lead levels less than 45 µg/dL. When chelation is considered, the Minnesota Poison Control (1-800-222-1222) or the Region 5 Pediatric Environmental Health Specialty Unit (PEHSU) (1-866-967-7337) should be consulted. Either the Minnesota Poison Control or the Region 5 PEHSU will be able to provide guidance on:

- Whether chelation treatment is recommended
- Type of chelation (succimer or EDTA) and dosage
- Diagnostic tests
- Iron therapy
- Evaluation for and removal of foreign object(s)
- Additional questions

For blood lead levels of 45 µg/dL or greater, blood lead levels should be reconfirmed as soon as possible, even for blood lead test results on venous samples. An abdominal radiograph should be completed to check for any possible foreign objects containing lead. If a swallowed foreign body is seen on the abdominal radiograph, it should be passed or removed prior to chelation. Information regarding blood lead levels, any medical treatments including iron therapy the child is receiving, and foreign objects is important to share with the Minnesota Poison Control or Region 5 Pediatric Environmental Health Specialty Unit for making decisions regarding chelation.

The Minnesota Department of Health should be notified as soon as possible if a child is hospitalized or chelation is begun. This is essential for coordinating care and putting an action plan into place with the Minnesota Department of Health, the local public health department, and the relevant agency performing the environmental risk assessment. Health care providers should discuss possible sources of lead and ways to reduce lead exposure with the family until the source of lead can be addressed. Close communication between health care providers and public health staff is critical for identifying sources of lead and creating an action plan for a lead-safe environment for the child.

Resources

Minnesota Department of Health Resources

Contact Information

The Minnesota Department of Health contact information for the most common questions and concerns from health care providers are listed below. Other contact information is available at the [MDH Lead Poisoning Prevention Contacts](https://www.health.state.mn.us/communities/environment/lead/contactus.html) (<https://www.health.state.mn.us/communities/environment/lead/contactus.html>).

Questions Regarding:	Contact Information:
<ul style="list-style-type: none"> ▪ Elevated blood lead case management ▪ Guidance on blood lead testing 	<p>Phone Number: 651-201-4892</p>
<ul style="list-style-type: none"> ▪ Reporting blood lead results to MDH ▪ Incoming or outgoing blood lead results 	<p>Phone Number: 651-201-4919 Email: health.bloodleadresults@state.mn.us Fax Number: 651-201-4909 Mailing Address: Minnesota Department of Health, Health Risk Intervention Unit, P.O. Box 64975, St. Paul, MN 55164-0975</p>

Educational Materials

[Lead Fact Sheets and Brochures](https://www.health.state.mn.us/communities/environment/lead/fs/index.html)

(<https://www.health.state.mn.us/communities/environment/lead/fs/index.html>) contains educational materials about lead exposure and prevention in 11 different languages. Printed materials may be ordered through an order form on this page or viewed online.

Guidelines

In addition to this document, the Minnesota Department of Health has developed and periodically updated [Blood Lead Level Guidelines](https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html) (<https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html>) for lead. These are available on the webpage and include:

- Childhood Blood Lead Screening Guidelines for Minnesota,
- Blood Lead Screening Guidelines for Pregnant and Breastfeeding Women in Minnesota, &
- Childhood Blood Lead Case Management Guidelines for Minnesota

Accessing Data

The [Minnesota Public Health Data Access: Childhood Lead Exposure](https://data.web.health.state.mn.us/web/mndata/lead) (<https://data.web.health.state.mn.us/web/mndata/lead>) contains maps, charts and data for childhood lead exposure, lead testing, and risk factors. Data are available at the state level and by county and census tract.

Minnesota Department of Health Lead Webpage

Additional information on topics not covered in these guidelines may be found at [Minnesota Department of Health: Lead](https://www.health.state.mn.us/communities/environment/lead/index.html) (<https://www.health.state.mn.us/communities/environment/lead/index.html>).

Additional Resources

Many local public health departments help families with the additional resources below, but partnership with primary health care providers can improve outcomes for families.

Medical Resources

- Medical assistance programs
 - Navigators for medical assistance enrollment can be found at [MNsure: Find Free Help Near You](https://www.mnsure.org/help/find-assister/) (<https://www.mnsure.org/help/find-assister/>).
- Transportation assistance to medical appointments
- Family home visiting
 - Some families may qualify for family home visiting services through local public health departments to help improve their health and well-being, depending on local resources.

Learning and Developmental Resources

It is important to remember that children may not show signs of learning difficulties or developmental delays until long after their exposure to lead. Family members and professionals working with families should remain alert to signs of delays so early intervention services can be provided.

- **Developmental Assessments**
 - It is strongly recommended that the child receive a developmental screening test. Assessments may be performed by the health care provider or the child may be referred to a local community program that administers developmental screening tests
 - For advice on specific tests, go to [Developmental and social-emotional screening of young children \(0-5 years of age\) in Developmental and Social-Emotional Screening of Young Children \(0-5 years of age\) in Minnesota](https://www.health.state.mn.us/people/childrencyouth/ctc/devscreen/index.html) (<https://www.health.state.mn.us/people/childrencyouth/ctc/devscreen/index.html>).
- **Follow Along**
 - The Follow Along Program is a free service that helps track developmental milestones. Parents or local public health can make referrals. Children can be referred at any blood lead level. More information and local contacts can be found at [Follow Along Program](https://www.health.state.mn.us/people/childrencyouth/fap/index.html) (<https://www.health.state.mn.us/people/childrencyouth/fap/index.html>).
- **Help Me Grow**
 - Help Me Grow is part of Minnesota’s statewide intervention system under the Individuals with Disabilities Education Act.
 - Children with a venous blood lead level ≥ 45 $\mu\text{g}/\text{dL}$ are automatically eligible for Help Me Grow. Children with a venous blood lead level ≥ 15 $\mu\text{g}/\text{dL}$ should be referred for an evaluation to determine eligibility for Help Me Grow.
 - Children with any blood lead level who are showing signs of developmental delays may also be eligible for Help Me Grow.
 - Anyone can make referrals to Help Me Grow, including health professionals. Referral information can be found at [Help Me Grow: How to Refer](http://helpmegrowmn.org/HMG/GetHelpChild/HowRefer/index.html) (helpmegrowmn.org/HMG/GetHelpChild/HowRefer/index.html).
- **Head Start and Early Head Start**
 - Head Start programs promote school readiness of children ages birth to 5 from low-income families by supporting their development in a comprehensive way. More information on local programs can be found through the [Minnesota Department of Education: Head Start](http://education.state.mn.us/MDE/fam/elsprog/start/) (education.state.mn.us/MDE/fam/elsprog/start/).

Other Resources

- Many medical clinics have their own social services systems and resources.
- For additional housing, legal, or nutrition resources, please refer to the [Childhood Blood Lead Case Management Guidelines for Minnesota: Reference Manual](https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html#case) (<https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html#case>).

Commonly Used Terms

Blood lead level (BLL): A diagnostic blood lead test with units of micrograms of lead per deciliter of whole blood in any person.

Child: An individual under 18 years of age. For lead cases, only children under 72 months of age receive case management and environmental risk assessment services.

Clearance inspection: Identification of deteriorated paint and bare soil and resampling and analysis of interior dust lead concentrations in a residence to ensure that an environmental case can be closed.

Capillary blood sample: A quantity of blood drawn from a capillary. The sample generally is collected by finger stick. Elevated results must be confirmed with a venous blood sample.

Case manager: A local public health professional who works with the families of children with elevated blood lead levels to assess needs and facilitate access to needed resources.

Environmental risk assessment, or lead risk assessment: An investigation to determine the existence, nature, severity, and location of lead hazards.

Elevated blood lead level (EBLL): A diagnostic blood lead test with a result that is equal to or greater than five micrograms of lead per deciliter of whole blood in any person.

Health care provider: A physician, nurse practitioner, physician assistant, nurse, or other health professional in a medical setting.

Interim controls: A set of measures intended to temporarily reduce human exposure or likely exposure to known or presumed lead hazards, including specialized cleaning, repairs, maintenance, painting, temporary encapsulation, or enclosure.

Lead hazard: A condition that causes exposure to lead from dust, bare soil, drinking water, or deteriorated paint that exceeds MDH standards.

Lead hazard reduction: Abatement or interim controls undertaken to make a residence or other facility lead-safe.

Lead order or lead correction order: A legal instrument to compel a property owner to address lead hazards according to the specifications given by the assessing agency.

Lead risk assessor: An individual who performs lead risk assessments or lead inspections and who has been licensed by the Minnesota Department of Health.

Lead risk assessing agency: An agency that performs lead risk assessments or lead inspections with lead risk assessors who has been licensed by the Minnesota Department of Health.

Lead-safe practices: Methods for construction, renovation, remodeling, or maintenance activities that are not regulated lead work and that are performed so that they do not result in exposure to lead.

Local public health (LPH) department: The public health department or agency of a city, county, or Community Health Board that is working with an individual with an elevated blood lead level.

Minnesota Department of Health (MDH): The state health department that receives all blood lead tests results for Minnesota residents and provides case coordination, technical assistance, and environmental risk assessments.

Minnesota Poison Control: The system that provides free recommendations for poison exposure management and public and professional education services for the people living in Minnesota, North Dakota, and South Dakota.

Pediatric Environmental Health Specialty Unit (PEHSU): Academically based units that are typically at university medical centers that serve as a source of medical information and advice on environmental conditions that influence reproductive and children's health.

Refugee: A foreign-born resident who is not a United States citizen and who cannot return to his or her country of origin or last residence because of persecution or the well-founded fear of persecution because of race, religion, nationality, membership in a particular social group, or political opinion, as determined by the State Department or United States Citizenship and Immigration Services (USCIS).

Region 5 Pediatric Environmental Health Specialty Unit (PEHSU): The Pediatric Environmental Health Specialty Unit (PEHSU) that serves the geographic region that includes Minnesota.

Performing Facility: The hospital, medical clinic, medical laboratory, other facility, or individual performing blood lead analysis.

Primary prevention: Preventing lead exposure before blood levels become elevated.

Secondary prevention: Intervention to mitigate health effects on people with elevated blood lead levels.

Swab team services: Activities that provide protection from lead hazards primarily through the use of interim controls, such as:

- Removing lead dust by washing, vacuuming with high efficiency particle accumulator (HEPA) or wet vacuum cleaners, and cleaning the interior of residential property, and
- Removing loose paint and paint chips and repainting or installing guards to protect intact paint.

Venous blood sample: A quantity of blood drawn from a vein. This is considered a confirmatory test and is required for a child to be eligible for some services.

µg/dL: Micrograms of lead per deciliter of whole blood. Also expressed as mcg/dL.