JAMA | US Preventive Services Task Force | RECOMMENDATION STATEMENT

Screening for Elevated Blood Lead Levels in Children and Pregnant Women
US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE Elevated blood lead levels in children are associated with neurologic effects such as behavioral and learning problems, lower IQ, hyperactivity, hearing problems, and impaired growth. In pregnant women, lead exposure can impair organ systems such as the hematopoietic, hepatic, renal, and nervous systems, and increase the risk of preeclampsia and adverse perinatal outcomes. Many of the adverse health effects of lead exposure are irreversible.

OBJECTIVE To update the 2006 US Preventive Services Task Force (USPSTF) recommendation on screening for elevated blood lead levels in children and pregnant women.

EVIDENCE REVIEW The USPSTF reviewed the evidence on the benefits and harms of screening for and treatment of elevated blood lead levels. In this update, an elevated blood lead level was defined according to the Centers for Disease Control and Prevention reference level of 5 µg/dL.

FINDINGS The USPSTF found adequate evidence that questionnaires and other clinical prediction tools to identify asymptomatic children with elevated blood lead levels are inaccurate. The USPSTF found adequate evidence that capillary blood testing accurately identifies children with elevated blood lead levels. The USPSTF found inadequate evidence on the effectiveness of treatment of elevated blood lead levels in asymptomatic children 5 years and younger and in pregnant women. The USPSTF found inadequate evidence regarding the accuracy of questionnaires and other clinical prediction tools to identify asymptomatic pregnant women with elevated blood lead levels. The USPSTF found inadequate evidence on the harms of screening for or treatment of elevated blood lead levels in asymptomatic children and pregnant women. The USPSTF concluded that the current evidence is insufficient, and that the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic children 5 years and younger and in pregnant women cannot be determined.

CONCLUSIONS AND RECOMMENDATION The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic children. (I statement) The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic pregnant persons. (I statement)

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The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

Summary of Recommendations and Evidence

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic children (I statement) (**Figure 1**).

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic pregnant persons. (I statement)

See the Clinical Considerations section for suggestions for practice regarding the I statements.

Rationale

Importance

Elevated blood lead levels in children are associated with neurologic effects such as behavioral and learning problems, lower IQ, hyperactivity, hearing problems, and impaired growth.[1-4] In pregnant women, lead exposure can impair organ systems such as the hematopoietic, hepatic, renal, and nervous systems and increase the risk of preeclampsia and adverse perinatal outcomes.[5,6] Many of the adverse health effects of lead exposure are irreversible.[1] Thus, the primary benefit of screening may be in preventing future exposures or exposure of others to environmental sources.

Detection

The USPSTF found adequate evidence that capillary blood testing accurately identifies children with elevated blood lead levels compared with venous blood testing. The USPSTF found adequate evidence that questionnaires and other clinical prediction tools to identify asymptomatic children with elevated blood lead levels are inaccurate.

The USPSTF found inadequate evidence regarding the accuracy of questionnaires and other clinical prediction tools to identify asymptomatic pregnant women with elevated blood lead levels.

Benefits of Early Detection and Intervention or Treatment

The USPSTF found inadequate evidence on the effectiveness of screening for elevated blood lead levels in asymptomatic children 5 years and younger to improve health outcomes (eg, cognitive or behavioral problems or learning disorders). The USPSTF found inadequate evidence on the effectiveness of interventions (eg, counseling and nutritional interventions, residential lead hazard control measures, or chelation therapy) to improve intermediate (reduction in blood lead levels) or health outcomes in asymptomatic children with elevated blood lead levels.

The USPSTF found inadequate evidence on the effectiveness of screening for elevated blood lead levels in asymptomatic pregnant women to improve health outcomes (eg, cognitive problems in children, perinatal outcomes, or maternal outcomes). The USPSTF also found inadequate evidence on whether the effectiveness of screening varies by gestational age. The USPSTF found inadequate evidence on the effectiveness of interventions (eg, counseling and nutritional interventions, residential lead hazard control measures, or chelation therapy) to improve intermediate (eg, blood lead levels or gestational hypertension) or health outcomes in pregnant women.

Harms of Early Detection and Intervention or Treatment

The USPSTF found inadequate evidence on the harms of screening for or treatment of elevated blood lead levels in asymptomatic children or pregnant women.

USPSTF Assessment

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic children 5 years and younger. Evidence is lacking, and the balance of benefits and harms cannot be determined.

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic pregnant women. Evidence is lacking, and the balance of benefits and harms cannot be determined.

Clinical Considerations

Patient Population Under Consideration

This recommendation applies to children 5 years and younger and pregnant persons without symptoms of elevated blood lead levels (**Figure 2**).

Suggestions for Practice Regarding the I Statements

Potential Preventable Burden

Screening for elevated blood lead levels with blood tests or questionnaires could result in the identification of previously unknown sources of lead in the community, which could identify risk for lead exposure and protect other individuals.

Sources of lead exposure include leaded gasoline, lead paint, and contaminated water from lead plumbing. Other sources include living with a parent exposed to lead through work, pottery with lead glaze, and certain food or personal products (eg, candy, herbal and other folk remedies, or cosmetics).[1]

Elevated blood lead levels primarily affect children with a lower socioeconomic status and from minority communities because of the increased risk of housing-related exposure.[1,7]

Potential Harms

Evidence on the harms of screening for elevated blood lead levels is limited. Potential harms are false-positive capillary blood test results, anxiety, inconvenience, and financial costs associated with return visits and repeated tests. Children with significantly elevated blood lead levels might receive chelation therapy, which is associated with a wide range of harms, including injection site pain or abscess, headache, paresthesia, tremors, rash, neutropenia, elevation of serum liver transaminase, hypertension, tachycardia, fever, nausea, vomiting, or other gastrointestinal upset.[1]

Current Practice

There are no data on the proportion of clinicians who screen for elevated blood lead levels in children without symptoms.[1] The USPSTF found no data on the prevalence of screening for elevated blood lead levels in pregnant women in primary care settings.[6] Bright Futures recommends screening in accordance with state law and universal screening at ages 12 and 24 months in states with no screening program in place.[8] The Medicaid Early and Periodic Screening, Diagnostic, and Treatment program requires that all children receive a screening blood lead test at

Figure 1. USPSTF Grades and Levels of Evidence

What the USPSTF Grades Mean and Suggestions for Practice

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the Clinical Considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as the number, size, or quality of individual studies. inconsistency of findings across individual studies. limited generalizability of findings to routine primary care practice. lack of coherence in the chain of evidence. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of the limited number or size of studies. important flaws in study design or methods. inconsistency of findings across individual studies. gaps in the chain of evidence. findings not generalizable to routine primary care practice. lack of information on important health outcomes. More information may allow estimation of effects on health outcomes.
The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.	

USPSTF indicates US Preventive Services Task Force.

Figure 2. Clinical Summary: Screening for Elevated Blood Lead Levels in Children and Pregnant Women

Population	Children 5 years and younger and pregnant persons
Recommendation	No recommendation. Grade: I (insufficient evidence)

Screening Tests	Elevated blood lead levels can be detected by measuring capillary or venous blood lead levels. Capillary blood testing is recommended for initial screening. Patients with positive screening results from capillary blood samples should have confirmatory venous blood testing. Questionnaires to identify children at increased risk of elevated blood lead levels are poorly accurate. The most commonly used questionnaire is the Centers for Disease Control and Prevention screening questionnaire.
Treatment and Interventions	Treatment options include residential lead hazard control measures, educational interventions (eg, counseling on household dust control measures), environmental interventions (eg, soil abatement, dust or paint removal, or removal of contaminated water sources), nutritional interventions, and chelation therapy. Finding the source of lead exposure is essential in preventing repeated or future exposures.

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to https://www.uspreventiveservicestaskforce.org.

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ages 12 and 24 months; children aged 36 to 72 months must receive a screening blood lead test if they have not been previously screened for lead poisoning.[1]

Screening Tests

Blood tests or questionnaires may be used to screen for elevated blood lead levels. Elevated blood lead levels can be detected by measuring free erythrocyte or zinc protoporphyrin levels and capillary or venous blood lead levels. Capillary blood testing is recommended for initial screening. However, false-positive results can occur if capillary blood samples become contaminated. Patients with positive screening results from capillary blood samples should have confirmatory venous blood testing.[1]

Questionnaires have been developed to identify children at increased risk of elevated blood lead levels. The most commonly used questionnaire is the Centers for Disease Control and Prevention (CDC) screening questionnaire. The CDC questionnaire asks 5 questions about the following: living in or visiting a house built before 1960 with chipping paint or undergoing renovation, having a sibling or close contact being monitored or treated for lead poisoning (defined as a blood lead level >15 µg/dL), living with an adult exposed to lead through work or hobbies, and living near lead-based industry. A positive or "I don't know" answer to any of the questions indicates the need for a blood lead test.[1,7] There are no validated questionnaires to identify pregnant women at high risk of lead exposure.[6]

Treatment

Patients with an elevated blood lead level should have confirmatory venous blood testing. Management is based on the lead level and symptoms. Treatment options include residential lead hazard control measures, educational interventions (eg, counseling on household dust control measures), environmental interventions (eg, soil abatement, dust or paint removal, or removal of contaminated water sources), chelation therapy, and nutritional interventions. Finding the source of lead exposure is essential in preventing repeated or future exposures.

In most settings, education and counseling is offered to children with blood lead levels ranging from 10 to 20 µg/dL. Some experts also recommend nutritional counseling for children with blood lead levels in this range. Residential lead hazard control measures are usually offered to children with blood lead levels of 20 µg/dL or greater, while chelation therapy is offered to children with blood lead levels of 45 µg/dL or greater.[1]

Educational interventions focus on parental counseling about lead exposure, hygiene, and household dust control measures to prevent the ingestion of dust and soil. Environmental interventions include specialized cleaning, repairs, maintenance, soil abatement (eg, removal and replacement), painting, and temporary containment of lead hazards.[1]

Calcium, dietary iron, and other supplements are thought to decrease the intestinal absorption of lead. However, the role of nutritional interventions (ie, supplementation) in reducing blood lead levels remains unclear.[1]

Chelation therapy is recommended for symptomatic patients with moderate or severe lead toxicity. Dimercaprol (or its less toxic analog, dimercaptosuccinic acid [DMSA], also known as succimer) is a commonly used agent that removes lead from the blood and soft tissues. Penicillamine is less commonly used.[1]

Management of elevated blood lead levels in pregnant women also varies depending on the lead level and consists of education and environmental interventions, nutritional interventions, and chelation therapy.[6]

Other Considerations

Research Needs and Gaps

Research is needed to better inform decisions about screening for elevated blood lead levels in children and pregnant women, such as the development of validated questionnaires to identify at-risk populations most likely to benefit from screening. Studies reporting intermediate and health outcomes, outcomes in newborns, and harms in women and infants are needed, as well as studies evaluating effective interventions for reducing blood lead levels in pregnant women. Research is also needed to evaluate the effectiveness of treatments for elevated blood lead levels in trials with adequate sample sizes to inform treatment strategies. However, randomized trials may not always be appropriate for screening and environmental interventions because of ethical issues. Well-designed research studies are needed on the benefits of nutritional supplementation in reducing blood lead levels in children. Research on newer approaches to detecting elevated blood lead levels, such as point-of-care testing, that include intraindividual and interlaboratory reliability would be useful for assessing screening strategies in children and pregnant women. Different sources of lead exposure that are now emerging in at-risk communities are not well incorporated into current screening questionnaires. Research on screening and prevention in these populations remains limited. Additional research is needed to validate these potential risk factors in specific geographic locations and among at-risk populations.

Discussion

Burden of Disease

The CDC defines an elevated blood lead level as 5 µg/dL or greater.[1,6,8] There is no safe level of lead exposure; however, the blood lead level serves as a prompt for further clinical monitoring and treatment. This reference range value is based on population blood lead levels from National Health and Nutritional Examination Survey data.[1,2,6,9] Previously, children with a blood lead level of 10 µg/dL or greater were identified as having an elevated blood lead level.

The prevalence of elevated blood lead levels has greatly decreased in the past 4 decades. According to National Health and Nutritional Examination Survey data and the Child Blood Lead Surveillance System, 8.8% of children aged 1 to 5 years had blood lead levels of 10 µg/dL or greater from 1976 to 1980 and 4.4% of children had elevated blood lead levels from 1991 to 1994. By 1999 to 2002, prevalence had decreased to 1.6%, and from 2007 to 2010 it was only 0.8%.[1] However, blood lead levels in younger children increased from 2007 to 2010, with 3.1% of 1- to 2-year-olds having blood lead levels of 5 µg/dL or greater.[1]

Risk factors for lead exposure include socioeconomic factors (eg, lower family income, older housing, and poor nutritional status), living near an industry that involves lead, proximity to the renovation or deterioration of older houses with lead-based paint, and previously living in countries where lead exposure is high. The risks vary by race/ethnicity, socioeconomic status, and housing. From 2007 to 2010, the prevalence of blood lead levels of 5 µg/dL or greater in children aged 1 to 2 years was 7.7% in non-Hispanic black children, 3.2% in non-Hispanic white children, and 1.6% in Mexican American children. Prevalence was 3.1% in boys and 3.2% in girls, and much higher in lower-income populations. Children living in housing built before 1950 are 5 times more likely to have blood lead levels greater than 5 µg/dL than children living in housing built after 1978.[1]

Elevated levels of lead in the body affect various organ systems, including the cardiovascular, renal, and hepatic systems, with most symptoms occurring at blood lead levels of 50 µg/dL or greater. Very high levels of inorganic lead exposure may result in death or long-term neurologic symptoms in children. However, behavioral disorders are associated with blood lead levels as low as 5 µg/dL in young children.[10]

Adverse effects of very high maternal blood lead levels during pregnancy include abortion, stillbirth, preterm delivery, decreased neonatal head circumference, and decreased birth weight. Studies also suggest that mildly elevated maternal blood lead levels during pregnancy may be associated with increased risk for spontaneous abortion, gestational hypertension, and adverse effects on fetal growth. Although very high blood lead levels during pregnancy are harmful, the adverse effects of elevated antepartum blood lead levels on the fetus, at least for the range of exposure typically found in the United States, have not been established.[11]

Scope of Review

The USPSTF commissioned a systematic evidence review to update its 2006 recommendation[12] on screening for elevated blood lead levels in children and pregnant women. The USPSTF focused on evidence on the benefits and harms of screening for and treatment of elevated blood lead levels. In this update, an elevated blood lead level was defined according to the CDC reference level of 5 µg/dL. The use of blood tests for diagnosis or management is outside the scope of this recommendation.

Accuracy of Screening Tests

Four fair-quality studies (n = 1431) conducted in urban areas of the United States found that capillary blood testing had a sensitivity of 87% to 91% and specificity of greater than 90% (range, 92%-99%) for identifying elevated blood lead levels, using venous blood testing as the reference standard.[1]

Five fair-quality studies (n = 2265) using the threshold of 1 or more positive answers on the CDC screening questionnaire reported a pooled sensitivity of 48% (95% CI, 31.4%-65.6%) and pooled specificity of 58% (95% CI, 39.9%-74.0%) for identifying children with a venous blood lead level of 10 µg/dL or greater. Four fair-quality studies (n = 4608) using versions of the CDC questionnaire modified for specific populations or settings did not demonstrate improved accuracy (sensitivity range, 25%-68%; specificity range, 49%-58%).[1]

One fair-quality observational study evaluated the accuracy of a questionnaire to identify pregnant women with elevated blood lead levels. The study used 4 of the 5 questions from the CDC questionnaire (excluding the question on industrial lead exposure), which was originally designed to identify at-risk children.[6] The study showed that women with a positive response to at least 1 of the 4 questions were more likely to have elevated blood lead levels than those who answered negatively to all 4 questions (relative risk, 2.39 [95% CI, 1.17-4.89]; $P = .01$). The CDC questionnaire had a sensitivity of 75.7%

and a sensitivity of 46.2% for pregnant women. The most predictive single item was "home built before 1960."[6]

Effectiveness of Early Detection and Treatment

No studies directly compared the effectiveness of screening vs no screening for elevated blood lead levels in children 5 years and younger or in pregnant women on health outcomes.

Seven randomized clinical trials (RCTs) examined interventions for elevated blood lead levels.[1] One large, good-quality RCT (n = 780) found that chelation therapy with DMSA in children with a mean blood lead level of 20 to 45 µg/dL was associated with reduced blood lead levels compared with placebo at 1 week, 6 months, and 1 year, but not at 4.5 to 6 years of follow-up.[1,13] One fair-quality RCT found no differences between chelation therapy and placebo in blood lead levels at 1 or 6 months.[14] There was limited evidence from 2 poor-quality studies to determine the effects of nutritional supplementation.[15,16] Three fair-quality RCTs from the United States and Australia found no clear effects of home lead abatement in reducing blood lead levels.[17-19]

One good-quality randomized study found no differences between chelation therapy and placebo in neuropsychological outcomes, despite a reduction in blood lead levels following chelation therapy.[20] There was no evidence on the effects of counseling and nutritional interventions or residential lead hazard control measures on health outcomes in asymptomatic children with elevated blood lead levels.[1]

One fair-quality RCT of healthy pregnant women (mean baseline lead level, 4 µg/dL) conducted in Mexico found that calcium supplementation was associated with reduced blood lead levels compared with placebo (difference, 11%; $P = .004$ [levels in each group not reported]).[21] Effects were more pronounced in women with baseline blood lead levels greater than 5 µg/dL. Study limitations include unclear methods of allocation, lack of blinding of patients or outcome assessors, and population differences at baseline such as dietary calcium intake.[1,21] No studies reported on health outcomes in asymptomatic pregnant women after interventions to reduce blood lead levels.[1]

Potential Harms of Screening and Treatment

The USPSTF found no studies that evaluated the harms of screening for elevated blood lead levels in children.

One good-quality study found that children treated with DMSA had a small but statistically significant decrease in height growth over 34 months (difference of 0.35 cm [95% CI, 0.05-0.72 cm]). The study also found marginally poorer scores on attention and executive function tests at age 7 years.[20] One poor-quality study of chelation therapy with penicillamine reported associated adverse events, including leukopenia, thrombocytopenia, hives and maculopapular rash, urinary incontinence, abdominal pain, and diarrhea.[22] No studies reported on the harms of counseling, nutritional interventions, or residential lead hazard control measures.[1]

The USPSTF found no studies that evaluated the harms of screening for and treatment of elevated blood lead levels in pregnant women.

Estimate of Magnitude of Net Benefit

The USPSTF found adequate evidence that questionnaires and other clinical prediction tools to identify asymptomatic children with elevated blood lead levels are inaccurate. The USPSTF found adequate evidence that capillary blood testing accurately identifies children with elevated blood lead levels. The USPSTF found inadequate evidence on the effectiveness of treatment of elevated blood lead levels in asymptomatic children 5 years and younger in improving intermediate or health outcomes.

The USPSTF found inadequate evidence regarding the accuracy of questionnaires and other clinical prediction tools to identify asymptomatic pregnant women with elevated blood lead levels. The USPSTF found inadequate evidence on the effectiveness of treatment of elevated blood lead levels in asymptomatic pregnant women in improving intermediate or health outcomes. The USPSTF found inadequate evidence on the harms of screening for or treatment of elevated blood lead levels in asymptomatic children or pregnant women.

Therefore, the USPSTF concludes that the current evidence is insufficient, and that the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic children 5 years and younger and in pregnant women cannot be determined.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from October 30 to December 3, 2018. Many comments expressed concern about at-risk populations. In response, the USPSTF added information about emerging risk factors in the Clinical Considerations and Research Needs and Gaps sections. Some comments sought clarification of whom the recommendation applies to. The USPSTF clarified that the recommendation applies to "asymptomatic" populations in the Patient Population Under Consideration section.

Update of Previous USPSTF Recommendation

In 2006, the USPSTF concluded that the evidence was insufficient to recommend for or against routine screening for elevated blood lead levels in asymptomatic children aged 1 to 5 years at increased risk (I recommendation).[12] The USPSTF recommended against routine screening for elevated blood lead levels in asymptomatic children aged 1 to 5 years at average risk (D recommendation). The USPSTF also recommended against routine screening for elevated blood lead levels in asymptomatic pregnant women (D recommendation).

The understanding of lead exposure has changed considerably since 2006. No safe level of lead exposure has been established, and since the previous USPSTF recommendation, the reference level to identify children with elevated blood lead levels has been lowered from 10 to 5 µg/dL. Other sources of lead that could affect blood lead levels may now be more prevalent than in 2006, and these sources were not studied in the currently available evidence. There is a lack of evidence on interventions that can be done in a clinical setting that would improve health outcomes. A change in the context and applicability of older evidence resulted in the USPSTF assessing the evidence on harms of treatment as inadequate. As a result, the USPSTF determined that the current evidence is insufficient to assess the balance of benefits and harms of screening for elevated blood lead levels, leading the USPSTF to issue an I statement for both populations.

Recommendations of Others

The American Academy of Family Physicians recommends against routine screening for elevated blood lead levels in asymptomatic children aged 1 to 5 years at average risk, and found insufficient evidence on screening in children at increased risk.[23] The American Academy of Pediatrics recommends screening based on federal, state, and local requirements; in children living in high-prevalence areas (communities with ≥25% of housing built before 1960 or a prevalence of blood lead levels ≥5 µg/dL of ≥5%); in children with identified lead hazards or living in a home built before 1960 that is in poor repair or renovated in the past 6 months; or in children who are immigrants, refugees, or internationally adopted.[24] The Medicaid Early and Periodic Screening, Diagnostic, and Treatment program requires that all children receive a screening blood lead test at ages 12 and 24 months; children aged 36 to 72 months must receive a screening blood lead test if they have not been previously screened for lead poisoning.[1] Bright Futures recommends screening in accordance with state law and universal screening at ages 12 and 24 months in states with no screening program in place.[8] The CDC and the American College of Preventive Medicine recommend screening in children at increased risk for lead exposure.[25]

The American Academy of Family Physicians recommends against routine screening for elevated blood lead levels in pregnant women without symptoms.[23] The CDC and the American College of Obstetricians and Gynecologists recommend targeted screening during pregnancy and lead testing in pregnant and lactating women with 1 or more risk factors for lead exposure, such as environmental or occupational exposures or pica.[26]

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