

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

Is screening for lead poisoning justified?

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■ EVIDENCE-BASED ANSWER

Evidence is insufficient to recommend for or against universal screening of young children for lead poisoning in high-prevalence communities (strength of recommendation [SOR]: **C**). In low-prevalence communities, evidence is insufficient to recommend for or against a targeted screening approach, employing locale-specific demographic risk factors and personal risk questionnaires to inform screening decisions (SOR: **C**).

Although evidence does not suggest that treatment of individuals with elevated blood lead levels improves individual outcomes, public health strategies aimed at decreasing lead in the environment appear to have resulted in a significant decline in the number of children with elevated blood lead levels in recent decades. One could thus argue that screening may identify communities with high rates of lead poisoning, where environmental strategies could be targeted.

Because the epidemiology of lead poisoning continues to change, local and state health authorities must continuously update information on which to base decisions about screening.

■ EVIDENCE SUMMARY

The prevalence of elevated blood lead levels varies widely among different demographic groups and geographic regions, and it has decreased dramatically in the last several decades. Racial and ethnic minorities and children of families with low incomes, who live in the Northeast or Midwest, or who live in older houses continue to be at increased risk.¹ Children with blood lead levels 10 µg/dL have been shown to have poorer cognitive and behavioral functioning.²

No studies have demonstrated that screening for lead poisoning improves outcomes. To justify screening, one must therefore extrapolate from indirect evidence, demonstrating that screening tests are accurate and that treatment of children detected by screening is effective. Capillary blood samples are comparable with venous

samples for detecting elevated blood lead levels. The sensitivity of capillary samples ranges from 86% to 96% compared with venous samples.³

In low-prevalence areas, questionnaires may inform screening decisions. A questionnaire inquiring about age of housing, presence of peeling paint, ongoing renovations, siblings or playmates with elevated blood lead levels, adults in the home with occupational exposures to lead, and proximity to industrial sources of lead has a sensitivity for detecting blood lead levels 10 µg/dL ranging from 32% to 87%. Sensitivity varies depending on the population and geographic location in which the questionnaire is tested. Accuracy is improved by tailoring the questionnaire based on locally important risk factors.⁴

Proposed treatments for elevated blood lead levels include chelation therapy, education about hygiene and nutrition, household dust control measures, and soil lead abatement. No good-quality trials have demonstrated that lowering slightly to moderately elevated blood lead levels (10–55 µg/dL) improves patient-oriented outcomes such as cognitive and behavioral functioning. Although 1 observational study of chelation therapy linked lowering blood lead levels with improved cognitive function,³ a randomized controlled trial showed that chelation had no effect on cognitive or behavioral outcomes.⁵

All other trials evaluating treatment for lead poisoning looked at the intermediate outcome of blood lead levels. A systematic review of randomized controlled trials showed that home dust control interventions reduced the proportion of children with elevated blood lead levels (15 µg/dL) from 14% to 6%.⁶ A randomized controlled trial of high-efficiency particulate air (HEPA) filtration vacuuming showed no effect.⁷ More intensive interventions such as soil lead abatement and paint remediation have not proven effective in good-quality randomized controlled trials.

Increasing dietary calcium and iron and decreasing dietary fat are also commonly recommended for children with elevated blood lead levels, based on animal models and cross-sectional studies. The only randomized controlled trial that investigated calcium supplementation showed no effect on blood lead levels.⁸ Our search revealed no good-quality studies on the effect of iron or fat intake on lead poisoning.

In summary, because the prevalence of lead poisoning varies between communities and continues to change, standard recommendations are not possible. Clinicians must rely on local epidemiologic data to make screening decisions. Although questionnaires are accurate in predicting elevated blood lead levels in some settings, no specific set of questions can be recommended for all populations.

No treatment options for those with mild to moderate elevations in blood lead levels have been shown to improve clinically important outcomes, although some interventions may decrease blood lead levels.

■ RECOMMENDATIONS FROM OTHERS

The Centers for Disease Control and Prevention (CDC) recommends

- that individual states develop screening plans based on local data
- universal screening at 12 and 24 months of age:

- in communities where the prevalence of blood lead levels ≥ 10 $\mu\text{g}/\text{dL}$ exceeds 12% of children
- in communities where $\geq 27\%$ of housing was built before 1950
- for all children enrolled in Medicaid.

Otherwise screening should be targeted based on a questionnaire on age of housing, recent or ongoing remodeling, and having a sibling or playmate diagnosed with lead poisoning, in addition to questions on locally important risk factors.⁹

The American Academy of Pediatrics endorses the CDC recommendations.² The US Preventive Services Task Force, the American Academy of Family Physicians, and the American College of Preventive Medicine all recommend screening for lead poisoning at 12 months of age in children with demographic or geographic risk factors.^{3,10,11}

CLINICAL COMMENTARY

Lead screening: Think locally

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The local health department can provide information about lead screening in your community, whether based on blood levels or the housing conditions. If your patients need screening, you may want to add a reminder on a flow sheet in the chart to do a questionnaire or a blood draw. Finding and treating severely elevated lead levels can change outcomes, but for less elevated levels, the evidence shows no benefit. You should work with the health department when considering therapy for children with elevated blood lead levels.

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