



SCHOOL NURSE, SPECIAL SERVICES, AND EDUCATOR'S GUIDELINES REGARDING CHILD LEAD POISONING INFORMATION

Health Effects of Lead: (CDC)

Protecting children from exposure to lead is important to *lifelong* good health. No “safe” blood lead levels (BLLs) in children have been identified. Even low levels of lead in blood have been shown to affect hearing and speech, IQ, ability to pay attention, and academic achievement. Effects of lead exposure cannot be corrected, though early interventions may assist in developing compensating interventions.

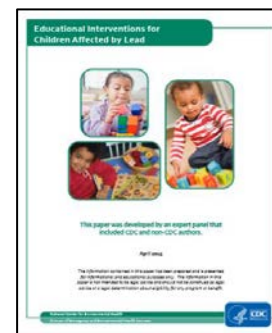
Even though the immediate health effect of concern in children who have lead poisoning is typically neurological, it is important to know that childhood lead poisoning can also lead to other health effects in childhood as well as later in life including, hearing and speech problems, renal effects, hypertension, reproductive problems, and developmental problems with their offspring.

Permanent neurologic damage and behavioral disorders have been found to be associated with lead exposure at **any** level, even below 5 $\mu\text{g}/\text{dL}$. Actions to identify the lead exposure sources and remove or prevent them are needed even at a level of 5 $\mu\text{g}/\text{dL}$. Very high BLLs ($\geq 70 \mu\text{g}/\text{dL}$) may cause severe neurologic problems, including seizures, comas, and even death.

Children’s IQs are particularly sensitive to lead-associated effects when the children are from 1 to 3 years of age. This occurs even at levels less than 5 $\mu\text{g}/\text{dL}$ due to their rapid metabolism, proximity to the floor, and high uptake of lead. Lead is recognized by the body as if it were calcium or iron and is very readily absorbed and stored in the child’s rapidly developing body by breathing in fine lead dust or by taking even small amounts of lead particles into their mouth.

Childhood lead exposure has been associated with:

- Hearing and speech issues
- higher absenteeism in high school
- lower class rank
- poorer vocabulary and grammatical reasoning scores
- longer reaction time
- poorer hand-eye coordination
- increased incidence of incarceration
- male and female reproductive issues



*Health care providers and local public health lead case management nurses are encouraged by the Missouri Department of Health and Senior Services, Child Lead Poisoning Prevention Program, to refer any Missouri child who has had blood lead levels of 10 $\mu\text{g}/\text{dL}$ or higher to the DESE First Steps program whenever the levels initially occur and the child is still under the age of 36 months. The child does not have to be experiencing developmental delays to qualify for an initial evaluation. This referral should be **routinely** carried out by the primary care clinician, and/or lead case management nurses though parents can self refer to this program while the child is under the age of 3. At older ages, children currently experiencing developmental delays or issues can still be referred to Parents As Teachers programs or possibly other school district services and this practice is encouraged as well.*

RECOMMENDATIONS FOR ONGOING DEVELOPMENTAL ASSESSMENTS AND INTERVENTIONS

Developmental Surveillance of Children with Elevated Blood Lead Levels:

This should be a joint effort made by parents, physician and schools.

It is recommended that school health forms should be reviewed and updated, if necessary, to ensure that children's blood lead screening and testing dates and results are included on school health forms. A child's history of lead elevations should be included on the child's medical problem list.

- **Be especially vigilant for emerging difficulties at critical transition points in childhood.**

There are three periods when different types of learning difficulties are typically expressed when children under the age of 6 have had a history of elevated BLLs:

1. **First grade:** Children begin acquiring basic academic skills such as reading words and performing arithmetic operations.
2. **Fourth grade:** The emphasis begins to shift from acquiring basic skills to using those skills to learn new material ("reading to learn" as opposed to "learning to read"); and
3. **Sixth or seventh grade:** Students are expected to use higher-order planning and organizational skills in order to complete long-term projects.

A child with a history of EBLLs who experienced difficulties making earlier transitions should be viewed as being at increased risk of experiencing difficulties with later transitions. Even children who made early transitions smoothly should be under increased surveillance at later transition points, as they may have problems when new educational demands are placed on them.

- **Be alert for behaviors that might interfere with learning.**

An elevated BLL in early childhood is associated with an increased risk for behaviors such as inattention, distractibility, and impulsivity that can interfere with learning long after the blood lead levels have decreased. These behaviors are characteristic of the recently recognized inattentive subtype of ADHD. Even if the behaviors a child presents are not sufficient to warrant the diagnosis of ADHD, the child may be helped by the types of classroom and work accommodations routinely made for children with an attention disorder. Children who experienced severe, chronic lead intoxication are known to have neurobehavioral problems such as impulsivity, aggression, and short attention span.

- **Refer children having neurodevelopmental problems for a thorough diagnostic evaluation at early onset.**

If you suspect that a child might be experiencing neurodevelopmental problems, consider arranging a thorough diagnostic (as opposed to screening) evaluation, sooner rather than later. Children with neurodevelopmental problems associated with an elevated BLL are likely to benefit from interventions. If a child **currently has or has ever had** an elevated BLL, the primary care provider should take a more aggressive approach in assessing that child's neurodevelopment and referring that child for specialty services for follow-up such as is done for children who are known to be low birth weight infants. Developmental and behavioral screening that health care professionals conduct at well-child visits, may be sufficient to identify children who are failing to make age-appropriate progress and transitions and who thus require additional diagnostic evaluation; but referrals to school districts or other specialists are still in order if there is any question. Kindergarten-readiness evaluations are not usually utilized or designed to identify potential lead-associated learning difficulties.

- **It is important to include a history of a child’s elevated blood lead level (EBLL) in the problem list maintained in the child’s medical record.**

Ask for health care providers and parents to provide the child’s lead screening results and follow up blood lead level results on school health forms. Most school health forms will need to be updated to include this information. Please see if there is a field to report this information on your school health forms and add it if it is not already there.

If a child changes his or her PCP, enters early intervention DESE programs, enters kindergarten or a new school, ensure that this information, along with other pertinent aspects of the child’s medical history, is transmitted to the next provider or school district.

The PCP should work with lead case managers, school districts, HeadStarts and with school district IEP services staff to ensure appropriate follow-through.

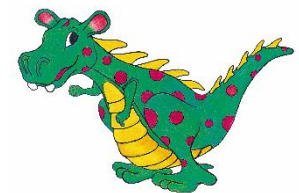
- **Watchful developmental surveillance is needed throughout elementary and secondary school ages when a child has a history of elevated blood levels, even if the blood lead levels were relatively low and no ill effects have been noted for years. A child’s case of lead poisoning should not be considered “completed” when the child’s BLLs are reduced or when he or she reaches school age.**

The period of increased risk for the expression of lead-associated neurodevelopmental problems continues long after lead exposure has been remediated and BLLs reduced. Reduction of a child’s blood lead level does not mean that the need for neurodevelopmental monitoring has ended. The child’s primary care physician, along with school districts, should provide ongoing, long term developmental surveillance of the child.

- **Be advocates for the child.**

Assessments should be conducted by multidisciplinary teams, which might include developmental-behavioral pediatricians, educators, neuropsychologists, neurologists, speech/language pathologists, and child psychiatrists.

This might involve assisting the family in arranging for periodic diagnostic evaluations and interpreting the results. The early and continued monitoring and evaluation could reduce special education or specialized therapy costs in future years. Most importantly, it can assist in providing the child a better potential for successful life outcome in terms of health, behavior, cognition, career options, and life earning potential.



Lead Publications Pertinent to School Nurses

- **CDC:** www.cdc.gov/nceh/lead/publications/educational_interventions_children_affected_by_lead.pdf
(This is an April 2015, 79 page document and you will find many more helpful publications in this site as well.)
- **Missouri Department of Health and Senior Services Child Lead Poisoning Prevention Program**
<http://health.mo.gov/living/environment/lead/index.php>

Nurses, do you have health fairs? Please see literature available on the above web sites. Literature is typically downloadable or can be ordered for events such as health fairs at no cost on a huge variety of health related topics.

Questions? Phone: (573) 751-6102