

# Lead Poisoning and Learning

**Lead has no positive value to the body and is not safe in any amount. Even a small amount can cause changes in the brain that make it difficult for a child to learn, to pay attention, and to control moods and behavior. Lead affects the brain's ability to organize and plan ahead and to make good decisions (called the executive function). Because lead poisoning can lower I.Q. many children never reach their full academic potential. When they struggle to learn and fail, they can become discouraged and give up on school and drop out.**

Findings	Source(s)
As the amount of lead in children's blood was on a downward trend between 1953-2003, Scholastic Achievement Test (SAT) scores rose, leading experts to conclude that lead could have been linked to lower scores on the achievement test. Lower lead in the blood also was linked to fewer cases of mental retardation overall.	Nevin R. <i>Trends in preschool lead exposure, mental retardation, and scholastic achievement: Association or causation?</i> In Environmental Research Vol. 109, No. 3, April 2009.
Childhood lead poisoning is found to affect the ability of the brain and nervous system to work together to connect thinking and behavior.	Brubaker C. et al. <i>Altered Myelination and Axonal Integrity in Adults with Childhood Lead Exposure: A Diffusion Tensor Imaging Study</i> in Neurotoxicology 2009. Doi: 10.1016/j.nuero.2009.07.007
Childhood lead poisoning can result in smaller brain size in adults in the parts of the brain that control moods and are responsible for planning and decision-making.	Cecil, K. et al. <i>Decreased Brain Volume in Adults with Childhood Lead Exposure</i> in PLoS Medicine Vol. 5 No. 5, e: 112 2008. Doi: 10.1371/journal.pmed.0050112
Lead in the blood, even in small amounts, is connected with symptoms of Attention Deficit Hyperactivity Disorder (ADHD). A study of a group of 150 children ages 8-17 included children with ADHD and children who did not have ADHD. The amount of lead in each child's blood was measured. Higher amounts of lead were linked to symptoms of hyperactivity and also linked to lower intelligence as measured by IQ tests.	Nigg J. et al. <i>Low Blood Lead Level Associated with Clinically Diagnosed Attention Deficit/Hyperactivity Disorder and Mediated by Weak Cognitive Control</i> in Society of Biological Psychiatry 2008.
This international study followed 1,333 children from birth or infancy until 5-10 years of age and found that in general, the more lead in the blood, the lower the child's IQ. Even a small amount of lead brought IQ down.	Lanphear B., et al. <i>Low-Level Environmental Lead Exposure and Children's Intellectual Function: An International Pooled Analysis</i> in Environmental Health Perspectives, July 2005.
Lead in a child's bloodstream is connected with lower IQ, even at amounts that are below the level currently defined as lead poisoning.	Canfield R., et al. <i>Intellectual Impairment in Children with Blood Lead Concentrations below 10 micrograms per deciliter</i> in the New England Journal of Medicine, Vol. 348 No. 16 April 17, 2003.
Lead that has entered the body is eventually stored in the bones. This lead is pulled from the bones back into the blood stream during pregnancy and at times when bones are growing a lot, like early childhood.	Oliveria S. et al. <i>Season modifies the relationship between bone and blood lead levels: the Normative Aging Study</i> in 57 Archives of Environmental Health No. 5, Sept-Oct 2002.

\*Modeled after a chart developed by the Minnesota Department of Public Health

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<p>Children exposed to lead as fetuses (because, for example, from lead in the mother) showed slower mental development than other children until they reached 24 months old. After that age, children who had not had any further contact with lead since birth, and whose lead level did not rise, showed greater mental improvements than the children who continued to be exposed to lead after birth.</p>	<p>Bellinger D. <i>Low-Level Lead Exposure and Children's Cognitive Function in the Preschool Years</i> in <i>Pediatrics</i> Vol. 87 No.2 February 1991.</p>
<p>Academic problems are connected with childhood lead poisoning. As the amount of lead in a child's blood increased, children showed some decrease in math scores, reading scores, non-verbal reasoning, and short-term memory.</p>	<p>Lanphear B.P., Dietrich K., et al. <i>Cognitive deficits associated with blood lead concentrations &lt; 10 mg/dL in US children and adolescents</i> in <i>Public Health Reports</i> 2000.</p>

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