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Study shows lead poisoning leads to behavioral problems in school age, urban children

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Decades after lead was banned from paint and gasoline, a new five-year study of children from four U.S. cities shows that lead poisoning results not only in lower IQ scores but also learning and behavioral problems in school age urban children.



Cai

The study appears in the March issue of *Pediatrics*. Dr. Bo Cai, an assistant professor in the Department of Epidemiology and Biostatistics at USC's Arnold School of Public Health and one of the lead authors on the report, said parents should remain concerned about lead long after toddlerhood.

The analysis was based on data from 780 children exposed to high levels of lead in four U.S. cities (Baltimore, MD.; Newark, NJ; Philadelphia, PA and Cincinnati, OH). The researchers examined associations between blood lead concentrations at different ages, IQ, and behavioral test scores.

Although the blood lead concentration in 5-year-olds had no direct effect on behavior, Dr. Cai said, seven-year-olds with higher levels of the toxic metal in their blood were more likely to suffer IQ deficits, and independently, they were also more likely to exhibit behavior problems such as aggression, inattention and impulsivity -- an area that has not received as much study.

For years parents have been urged to be vigilant about lead exposure in very young children, but the study suggests that there is probably no safe age for parents to be unconcerned about the danger of lead poisoning.

That position is notwithstanding the recommendations of the American Academy of Pediatrics and the federal Centers for Disease Control and Prevention which stopped recommending screening every U.S. child for high lead levels a decade ago.

Children are at risk in an estimated 25 percent of U.S. homes that still contain deteriorating lead paint, which was banned in 1978. Children also are exposed when they play in yards contaminated by lead paint dust or emissions from leaded gasoline which was phased out in the early 1990s.

Besides *Pediatrics*, the study also was reported in *The Philadelphia Inquirer* and *USA Today*. More details of the study:

The new study was part of a larger effort to test a chelating agent, a type of medicine designed to filter lead from children's bodies. The medicine did indeed reduce concentrations of lead in the blood, but it did not have any measurable impact on intelligence or behavior.

The children's blood was tested starting at age 2; all measured between 20 and 44 micrograms per deciliter of blood, though the levels declined somewhat as they got older. The federal guideline is 10 micrograms; many health experts say even 10 is too high.

The children were given IQ and behavior evaluations at ages 5 and 7. Behavior scores were based on lengthy questionnaires filled out by teachers and parents.

For every increase of 10 micrograms per deciliter of blood, children scored about five points worse on a 100-point scale that measures "externalizing" behavior problems, such as aggression and acting out.

Also, for every 10-microgram increase, the children were nearly 11/2 times more likely to exhibit these types of problems.

The effect was present even after taking into account the fact that some behavior problems could be the result of a lower IQ, said primary author Aimin Chen, who is now at Creighton University. An effect on behavior was evident even after authors controlled for poverty, ethnicity, parental education, and whether the child had a single parent.

Cai joined the faculty at the Arnold School last August. Prior to this, he worked as a research fellow in National Institute of Environmental Health Sciences (NIEHS) of NIH. His work mainly focuses on statistical methodology with applications in public health.

Cai is a member of the Research Consortium on Children and Families (RCCF) and was recruited to USC as part a Faculty Excellence Initiative coordinated by RCCF.

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