

Study: 1 in 3 ADHD cases linked to lead, smoke

Environmental factors could play a large role in kids' attention deficit

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CHICAGO — About one-third of attention deficit cases among U.S. children may be linked with tobacco smoke before birth or to lead exposure afterward, according to provocative new research.

Even levels of lead the government considers acceptable appeared to increase a child's risk of having attention deficit hyperactivity disorder, the study found.

It builds on previous research linking attention problems, including ADHD, with childhood lead exposure and [smoking](#) during pregnancy, and offers one of the first estimates for how much those environmental factors might contribute.

"It's a landmark paper that quantifies the number of cases of ADHD that can be attributed to very important environmental exposures," said Dr. Leo Trasande, assistant director of the Center for Children's Health and the Environment at Mount Sinai School of Medicine in New York.

More importantly, the study bolsters suspicions that low-level lead exposure previously linked to behavior problems "is in fact associated with ADHD," said Trasande, who was not involved in the research.

The study's estimate is in line with a National Academy of Sciences report in 2000 that said about 3 percent of all developmental and neurological disorders in U.S. children are caused by toxic chemicals and other environmental factors and 25 percent are due to a combination of environmental factors and genetics.

"The findings of this study underscore the profound behavioral [health](#) impact of these prevalent exposures, and highlight the need to strengthen public health efforts to reduce prenatal tobacco smoke exposure and childhood lead exposure," said the authors, led by researcher Joe Braun of the University of Wisconsin-Milwaukee.

The study was to be published online Tuesday in the journal Environmental Health Perspectives.

Genetic and environmental factors

ADHD is a brain disorder affecting between 4 percent and 12 percent of school-age children — or as many as 3.8 million youngsters. Affected children often have trouble sitting still and paying attention and act impulsively at home and at

school. Researchers aren't certain about its causes but believe genetics and environmental factors including prenatal exposure to alcohol, tobacco or illicit drugs may play a role.

Dr. Helen Binns, a researcher at Children's Memorial Hospital in Chicago, said the study is a thoughtful analysis but doesn't prove lead exposure is among the causes. It's possible, for example, that young children with ADHD are more likely than others to eat old leaded paint chips or inhale leaded paint dust because of their hyperactivity.

The researchers analyzed data on nearly 4,000 U.S. children ages 4 to 15 who were part of a 1999-2002 government health survey. Included were 135 children treated for ADHD.

They asked whether mothers had smoked during pregnancy but used blood tests to determine lead exposure, said co-author Dr. Bruce Lanphear, a researcher at Cincinnati Children's Hospital Medical Center.

Smoking during pregnancy increases risk

Children whose mothers smoked during pregnancy were 2½ times more likely to have ADHD than children who weren't prenatally exposed to tobacco.

Children with blood lead levels of more than 2 micrograms per deciliter were four times more likely to have ADHD than children with levels below 0.8 microgram per deciliter. The government's "acceptable" blood lead level is 10 micrograms per deciliter, and an estimated 310,000 U.S. children ages 1 to 5 have levels exceeding that.

Based on study estimates, more than 5 million 4-to-15-year-olds nationwide have levels higher than 2 micrograms per deciliter, Lanphear said.

Trasande said the study adds further proof that the government should lower its threshold for safe lead exposure.

Exposure to tobacco smoke after birth was not associated with increased ADHD risks, even though childhood exposure to lead was.

"Saying there are different periods of vulnerability to different toxins is perfectly plausible," said Dr. Robert Geller, a pediatric toxicologist at Emory University.

"There may be very specific periods of vulnerability," depending on when the developing brain is exposed, Geller said.

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