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## Studies link lead to adult crime, brain damage

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Tue May 27, 2008 8:00pm EDT

By Maggie Fox, Health and Science Editor

WASHINGTON, May 27 (Reuters) - Exposure to lead in early childhood or in the womb can cause permanent brain damage that may even cause criminal behavior, researchers reported on Tuesday.

Two studies showed that people with high levels of lead in childhood grew up with blocks of missing brain cells -- and they also were far more likely to be arrested for crimes, especially violent crimes.

The effect is so strong that it may account for a large percentage of crimes in inner-city areas, where old houses are far more likely to have lead paint, said Kim Dietrich of the University of Cincinnati in Ohio, who led one of the studies in the Public Library of Science journal PLoS Medicine.

"There are some data that suggest that in fact lead does run in parallel with crime trends over the past several decades," Dietrich said in a telephone interview.

Dietrich and colleagues signed up pregnant women living in Cincinnati neighborhoods ridden with lead-contaminated housing between 1979 and 1984. They tested the women and then their children from birth and have been watching the children as they grew up.

They correlated blood-lead level data from 250 of the children to criminal arrest records.

Those with high lead levels before birth and during early childhood had higher rates of arrest than those with lower lead levels. About 55 percent of the now-grown children had at least one arrest, 28 percent involving drugs and 27 percent serious motor vehicle violations.

"Lower income, inner-city children remain particularly vulnerable to lead exposure," Dietrich said.

"Although we've made great strides in reducing lead exposure, our findings send a clear message that further reduction of childhood lead exposure may be an important and achievable way to reduce violent crime.

### MISSING BRAIN CELLS

His colleague Dr. Kim Cecil of Cincinnati Children's Hospital Medical Center did magnetic resonance imaging, or MRI scans, of the brains of their volunteers.

They found more than 1 percent of total gray matter in the brain was missing.

"The most affected regions included frontal gray matter, specifically the anterior cingulate cortex," Cecil's team wrote in a second study. This region is responsible for mood regulation and decision-making.

Men were far more affected than women.

"Our findings also suggest that this structural change is permanent," they wrote.

The implications are profound, Dietrich said. "Usually the effects of lead poisoning are irreversible," he said.

Environmental enrichment programs such as those used to help children who are abused may help, he added. "I don't think they are lost but it certainly is a warning," he said.

Lead paint is by far the biggest source of poisoning, he said -- despite recent U.S. scares involving lead in water, in imported toys and in folk medicine.

The mothers of the children likely had lead in their bodies from their own childhoods, and exposed their babies in the womb, he said.

"Many also grew up in these neighborhoods," Dietrich said.

In a third, unrelated study, a team of University of Pittsburgh researchers showed adults can be inoculated with a second wave of lead as they get older.

Writing in the Archives of Environmental and Occupational Health, Lisa Morrow and colleagues showed that lead can leach into the blood from bones as people age and lose bone mass. (Editing by Eric Walsh)

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