

# Childhood lead exposure is associated with increased risk of criminal arrest in adulthood

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Childhood exposure to lead is associated with adult criminal behaviour, including violent crime, finds a new study in this week's *PLoS Medicine*. Dr Kim Dietrich and colleagues (University of Cincinnati, USA) studied the association between exposure to lead in the uterus and during early childhood and criminal arrests in adulthood, in poor areas of Cincinnati.

Lead is known to be toxic to the nervous system. Childhood exposure has been identified as a potential risk factor for antisocial behaviour in adulthood. But this link has relied on indirect measurement of childhood lead exposure in adults or has measured childhood lead exposure directly but has not followed lead-exposed children into adulthood. The new study overcomes both of these limitations.

Between 1979 and 1984, the researchers recruited pregnant women living in poor areas of Cincinnati, which had a high concentration of older lead-contaminated housing. Out of the 376 newborns recruited into the study, 250 were included in the final analysis. Blood lead levels were measured during pregnancy and then regularly until the children were six and a half years old, as an indication of their lead exposure. This exposure was then correlated with local criminal justice records on how many times each of the 250 offspring had been arrested between becoming 18 years old and the end of October 2005.

The researchers found that increased blood lead levels before birth and during early childhood were associated with higher rates of arrest for any reason and for violent crimes. For example, for every 5ug/dl increase in

blood lead levels at six years of age, the risk of being arrested for a violent crime as a young adult increased by almost 50% (the “relative risk” was 1.48).

The authors discuss a number of limitations in their study including not being able to capture all criminal behavior (since most criminal behavior does not lead to arrest) and being unable to assess IQ (lead exposure impairs intelligence, which in turn makes it more likely that a criminal offender will be arrested).

Despite these limitations, the study’s findings, say Dr Dietrich and colleagues, “implicate early exposure to lead as a risk factor for behaviors leading to criminal arrest.” Although both environmental lead levels and crime rates have dropped over the last 30 years in the US, the overall reduction was not uniform—inner-city children remain particularly vulnerable to lead exposure. The findings therefore suggest that a further reduction in childhood lead exposure might be an important and achievable way to reduce violent crime.

In an expert commentary on this study, Dr David Bellinger (Harvard Medical School, Boston, USA)—who was uninvolved in the research—says “even if the contribution of lead to arrest risk is small, however, it has a special status in that, in contrast to most other known risk factors for criminality, we know full well how to prevent it.” Dr Bellinger notes that while lead’s detrimental effect on IQ is the outcome most often studied, impaired IQ “is clearly only the tip of the iceberg” when it comes to the harms of childhood lead exposure.

Source: Public Library of Science

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