

LOW-LEVEL ENVIRONMENTAL LEAD EXPOSURE IN CHILDHOOD AND ADULT INTELLECTUAL FUNCTION: A FOLLOW-UP STUDY

Maitreyi Mazumdar, *Children's Hospital Boston, Harvard Medical School, Harvard School of Public Health, United States*

David Bellinger, *Children's Hospital Boston, Harvard Medical School, Harvard School of Public Health, United States*

Matthew Gregas, *Children's Hospital Boston, United States*

Kathleen Abanilla, *Children's Hospital Boston, United States*

Janine Bacic, *Children's Hospital Boston, United States*

Herbert Needleman, *University of Pittsburgh School of Medicine, United States*

Background: Early life lead exposure might be a risk factor for neurocognitive impairment in adulthood.

Objectives: We sought to assess the relationship between early life environmental lead exposure and intellectual function in adulthood. We also attempted to identify which time period blood-lead concentrations are most predictive of adult outcome.

Methods: We recruited adults in the Boston area who had participated as newborns and young children in a prospective cohort study that examined the relationship between lead exposure and childhood intellectual function. IQ was measured using the Wechsler Abbreviated Scale of Intelligence (WASI). The association between lead concentrations and IQ scores was examined using linear regression.

Results: Forty-three adults participated in neuropsychological testing. Childhood blood-lead concentration (mean of the blood-lead concentrations at ages 4 and 10 years) had the strongest relationship with Full-Scale IQ ($\beta = -1.89 \pm 0.70$, $p = 0.01$). Full-scale IQ was also significantly related to blood-lead concentration at age 6 months ($\beta = -1.66 \pm 0.75$, $p = 0.03$), 4 years ($\beta = -0.90 \pm 0.41$, $p = 0.03$) and 10 years ($\beta = -1.95 \pm 0.80$, $p = 0.02$). Adjusting for maternal IQ altered the significance of the regression coefficient.

Conclusions: Our study suggests that lead exposure in childhood predicts intellectual functioning in young adulthood. Our results also suggest that school-age lead exposure may represent a period of increased susceptibility. Given the small sample size, however, the potentially confounding effects of maternal IQ cannot be excluded and should be evaluated in a larger study.