

ASSOCIATIONS BETWEEN BLOOD LEAD AND KIDNEY OUTCOMES IN ADOLESCENTS FROM A SMELTER COMMUNITY

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Background and Aims: Although environmental exposure to lead is common, few studies have examined its impact on kidney function in children. Analyses of associations between lead dose and glomerular filtration measures are especially scarce. Therefore, the extent of lead-related nephrotoxicity in children and adolescents remains uncertain.

Methods: Cross-sectional study of 512 adolescent (12-15 years of age) long term residents in Torreón, Mexico, who were chronically exposed to lead due to a large lead-zinc smelter located within city limits. Associations between blood lead and three kidney outcomes (serum creatinine and cystatin C, and urinary N-acetyl- β -D-glucosaminidase [NAG]) were examined using multiple linear regression.

Results: Median (5th – 95th percentiles) blood lead, serum creatinine and cystatin C, and urine NAG were 4.0 (1.7 – 9.8) μ g/dl; 0.58 (0.45- 0.82) mg/dL; 0.76 (0.61 - 1.0) mg/L; and 220.5 (101.2 - 647.3) μ mol/h/g creatinine, respectively. After adjustment for age, sex and body mass index, a doubling of blood lead was associated with increases of 0.02 mg/L (95% CI 0.01 to 0.03) in serum cystatin C, -0.01 mg/dL (95% CI -0.02 to 0.002) in serum creatinine, and 0.03 log(μ mol/h/g creatinine) (95% CI 0.0002 to 0.06) in NAG.

Conclusions: These results provide support for nephrotoxicity due to environmental lead in chronically exposed children, but the lack of association with serum creatinine, a traditional measure of kidney function, deserves further investigation.