

BLOOD LEAD LEVEL AND CYSTATIN C-BASED eGFR IN ADOLESCENTS IN THE THIRD NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES III).

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Recent data indicate an association of low-level lead exposure (blood lead levels [BLL] <10 µg/dL) with CKD and its progression in adults. The association between BLL and kidney function in children is not well described.

We examined the association between BLL, modeled as quartiles and comparing <5 and ≥5 µg/dL, and glomerular filtration rate as estimated by the cystatin C-based Filler equation (eGFR), in a representative sample of non-institutionalized US adolescents aged 12-20 years who participated in NHANES III (1988-1994).

Cystatin C values were available for 801 adolescents; 49.5% female, 68.9% White, 15.4% Black and 8.6% Mexican-American. The median (interquartile range) for eGFR and BLL was 112.9 (99.4, 126.6) mL/min/1.73m² and 1.6 (0.7, 2.9) µg/dL, respectively. The mean eGFR for those with BLL <5 versus ≥5 µg/dL was 115.3 versus 102.8 mL/min/1.73m², $p=0.002$.

After adjustment for age, sex, race/ethnicity, urban/rural dwelling, and tobacco smoke (log serum cotinine level), the odds ratios (OR) for eGFR below the 25th percentile comparing BLL quartiles is shown below.

	Adjusted OR (95% CI)
BLL Quartile 1 (≤ 0.7 µg/dL)	1.00 (Reference)
BLL Quartile 2 (0.8-1.6 µg/dL)	0.93 (0.27, 3.24)
BLL Quartile 3 (1.7-2.9 µg/dL)	1.16 (0.41, 3.27)
BLL Quartile 4 (≥3.0 µg/dL)	1.81 (0.50, 6.57)

Following similar adjustment, the OR (95% CI) for eGFR below the 25th percentile in participants with BLL ≥5 versus <5 µg/dL was 3.02 (1.01, 9.01).

In summary, increasing BLL, at levels below the CDC's current public health action value of 10 µg/dL, is associated with increased odds of having lower cystatin C-based eGFR in this cohort of healthy adolescents.