SECONDHAND TOBACCO SMOKE: A SOURCE OF LEAD EXPOSURE IN US CHILDREN AND ADOLESCENTS

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Background and Aims: Secondhand tobacco smoke (SHS) remains a major source of indoor pollution worldwide. Lead is a tobacco constituent measured in mainstream and sidestream smoke. Our goal was to evaluate the relationship between SHS exposure (number of smokers at home and serum cotinine) and blood lead levels in US children and adolescents who participated in the National Health and Nutrition Examination Survey, 1999-2004. We also evaluated lead dust concentrations as a potential mediator between SHS and blood lead levels.
Methods: We analyzed data from 6,830 participants 3 to 19 years of age who were not active smokers and had SHS exposure information and blood lead measurements. We performed linear regression models on log-transformed blood lead levels by serum cotinine quartiles or number of smokers at home adjusted for socio-demographic and household characteristics. Stratified analysis by participant characteristics was used to evaluate the consistency of the findings across categories.
Results: Median (interquartile range) blood lead levels were 1.1 (0.8-1.7) µg/dL. After multivariable adjustment, participants in the highest quartile of serum cotinine (≥0.44µg/L) had 28% (95% CI 21, 36%) higher blood lead levels compared to those in the lowest quartile (<0.03 µg/L). Similarly, blood lead levels in children who lived with 1 and ≥2 smokers were 14% and 24% higher, respectively, compared to those living with no smokers. In participants with lead dust information available (3 to 5 years of age), the association between SHS and blood lead levels remained similar before and after adjustment for lead dust concentrations.
Conclusions: SHS may contribute to increased blood lead levels in US children. Lead dust does not appear to mediate this association, suggesting inhalation as a major pathway of exposure. Eliminating SHS exposure could reduce lead exposure in children. These findings have important public health implications for lead and SHS prevention programs.

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