

# ALLOSTATIC LOAD MODIFIES THE EFFECT OF BLOOD LEAD LEVELS ON HYPERTENSION AMONG MIDDLE-AGED ADULTS IN THE U.S.

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**Background and Aims:** Lead and chronic stress exposures can independently affect hypertension risks but synergistic effects may also be possible.

**Methods:** We examined whether chronic stress, operationalized as allostatic load (AL), modifies the effect of lead exposure on hypertension outcomes in a nationally representative sample of 6,511 middle-aged U.S. adults (aged 40-65 years) participating in the National Health and Nutritional Examination Survey (NHANES) 1999-2006. AL was defined as the aggregate score of 7 components, reflecting physiologic dysregulation of the cardiovascular, inflammatory, and endocrine systems.

**Results:** The median (interquartile range) blood lead concentration was 1.70 µg/dL (1.19 - 2.50). Multivariate logistic regression models demonstrated that higher blood lead levels were associated with significantly higher risk of diastolic hypertension, but not systolic or general hypertension. In models stratified by AL, positive associations between lead and hypertension were observed in high AL but not low AL participants. Among the high AL group, adults in the highest quintile of lead exposure had elevated odds of systolic (Odds ratio (OR) = 1.62, 95% confidence interval (CI): 1.11, 2.38) and diastolic (OR = 2.59; 95% CI: 1.57, 4.25) hypertension compared to adults in the lowest lead quintile.

**Conclusions:** Our results suggest that the effect of lead on hypertension is stronger among those who are chronically stressed. Future research should assess the implications of cumulative exposures to environmental and social stressors for regulatory decision-making in order to better protect the health of vulnerable populations who often face disproportionate and elevated exposures to multiple chemical and non-chemical hazards.