

# Blood Lead Level and Hypertension Risk in the United States National Health Nutrition and Examination Survey (NHANES) 1999–2016

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**Citation:** *European Cardiology Review* 2020;15:e36. **DOI:** <https://doi.org/10.15420/ecr.2020.15.1.P013>

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**Aim:** Hypertension is a known manifestation of lead toxicity. However, whether low level exposure is related to hypertension is uncertain.

**Methods:** United States National Health Nutrition and Examination Survey (NHANES) participants >20 years old with blood pressure and lead measurements were included in this analysis. If not already diagnosed, a mean blood pressure  $\geq 130/80$  mmHg was regarded as hypertension. R statistics version 3.5.1 with package 'survey' and sample weight adjustment were used.

**Results:** 39,477 participants (20,803 of whom had stage 1 or 2 hypertension) were included in this analysis. Each doubling in blood lead level increased the odds of hypertension (OR 1.45, 95% CI [1.40–

1.50]). The association remained significant after adjusting for age, gender, ethnicity, waist circumference and smoking.

Using quartile 1 as reference (blood lead level  $<0.89$   $\mu\text{g/dl}$ ), quartiles 2, 3 and 4 (0.89–1.29; 1.30–2.09;  $\geq 2.10$   $\mu\text{g/dl}$ ) were associated with increased adjusted odds of hypertension (1.14 [1.05–1.25]; 1.15 [1.04–1.28]; 1.22 [1.09–1.36]) respectively.

**Conclusion:** Blood lead level is associated with hypertension in the US general population, most of whom do have elevated blood lead level. Our findings suggest that reducing present levels of environmental lead exposure may potentially reduce blood pressure and the consequent cardiovascular risk in adults. ■