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# Scale and Sources of Lead Exposure in India

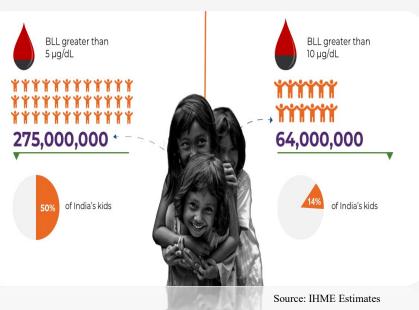
Dr Indu Bhushan 10<sup>th</sup> July 2025



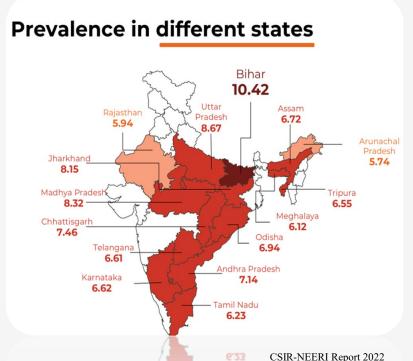
# **Lead Poisoning in India**

51% percent of Indian children have high blood lead levels (BLLs)  $> 5 \mu g/dL$ 

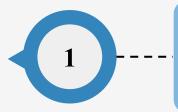
(The Toxic Truth, UNICEF-Pure Earth, 2020)



Average BLLs in 23 states in India are well above 5 µg/dL

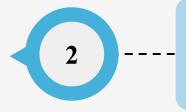


### **Blood Lead Levels in Indian Children**



#### Pooled Mean BLL (All-India)<sup>1</sup>

- 10.4 μg/dL (95% CI: 9.55–11.2) across 65 studies.
- High-risk: 14.3 μg/dL; Low-risk: 8.7 μg/dL



#### City-wide Assessment (10 Cities Study)<sup>2</sup>

- Median BLL: 8.8 μg/dL (range: 4.8–30.6).
- 82.5% of 2,247 children had BLL  $> 4 \mu g/dL$



### Local Hotspot: Patna, Bihar<sup>3</sup>

- 14.9  $\mu$ g/dL; 87%  $\geq$  5  $\mu$ g/dL; 68%  $\geq$  10  $\mu$ g/dL.
- Near battery recycling areas: up to 24.4 μg/dL

#### Source:

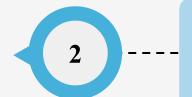
- Upadhyay, K., et al. Estimation of the Pooled Mean Blood Levels of Indian Children: A Systematic Review and Meta-Analysis. PubMed, 2024. <a href="https://pubmed.ncbi.nlm.nih.gov/40104047/">https://pubmed.ncbi.nlm.nih.gov/40104047/</a>.
- Kumar, Divas, et al. Assessment of Blood Lead Level of School Children in 10 Cities of India: A Cross-Sectional Study. ResearchGate, 2023. https://www.researchgate.net/publication/375278739.
- Brown, Mary Jean, et al. Prevalence of Elevated Blood Lead Levels among Children in Patna, Bihar: A Cross-Sectional Study. PLoS Global Public Health, 2022. https://journals.plos.org/globalpublichealth/article?id=10.1371/journal.pgph.0000743

## **Health Impact and National Burden**



#### **Cognitive Damage**<sup>1</sup>

BLLs of ~7 µg/dL associated with IQ loss of 4–7 points.



#### **India's Burden in 2019**<sup>2</sup>

 232,510 deaths and 6.98 million DALYs due to lead exposure.



#### South Asia leads in global burden<sup>3</sup>

India among top 5 countries in age-standardized DALYs.

#### Source

- 1. Ericson, Bret, et al. IQ Loss and Economic Burden Due to Lead Exposure in Low- and Middle-Income Countries. Environment International 120 (2018): 1–9. https://doi.org/10.1016/j.envint.2018.08.047.
- Ericson, Bret, et al. Global Burden of Disease Due to Lead Exposure in 2019. Toxics 9, no. 11 (2021): 301. https://doi.org/10.3390/toxics9110301.
- Prasad, Vandana, et al. Age-Standardized Mortality and DALY Rates Due to Lead Exposure in South Asia: Insights from the Global Burden of Disease Study. BMC Public Health 22, no. 1 (2022). https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15874-7.





## **Sources of Lead Poisoning**

#### **Household Sources**

- Lead-Based Paint and Household Dust
- Ceramics, Cookware, and Utensils
- Cosmetics (e.g., sindoor, kohl/kajal)
- Toys and Jewellery
- Spices and Herbal Remedies

#### **Environmental Sources**

- Soil
- Water
- Atmospheric Deposition -Industrial emissions and lead smelting contribute to air pollution and settle on soil, crops, and surfaces.

#### **Occupational Sources**

- Battery Recycling (Informal/Small-Scale)
- Mining and Smelting
- Construction, Demolition, and Renovation Work
- Metalworking, Radiator Repair, Shipbuilding

# **Policy Challenges**

Lack of Representative Data

Lack of Political Commitment

**Lack of Efforts** 

# Thank You!