

INDIA'S LEAD CRISIS

A CALL TO ACTION

CSIR-NITI AAYOG VALIDATES UNICEF AND PURE EARTH'S "THE TOXIC TRUTH" REPORT

UNICEF and Pure Earth jointly published the report, "[The Toxic Truth](#)" in July 2020 highlighting the global lead poisoning issue. In response to The Toxic Truth report, Niti Aayog engaged the Council of Scientific & Industrial Research (CSIR) to examine and review the report's data and findings for India. CSIR, has now published its own report, "[Assessment of Lead Impact on Human and India's Response](#)", which validates The Toxic Truth's data and presents recommendations for reducing and mitigating Lead exposures in India. CSIR-NITI Aayog research and the UNICEF/Pure Earth report highlight a major and massive public health crisis in India. CSIR-NITI Aayog review shows the scale and intensity of Lead (Pb) poisoning in India, particularly of children, is indeed serious and cannot be ignored any longer. This is an appropriate time for a national mission to effectively and comprehensively tackle Pb contamination in India from multiple sources.

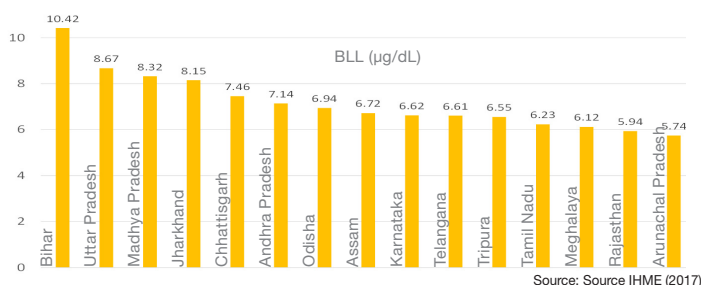
The Toxic Truth

- **Lead** is one of the most toxic and hazardous pollutants in the world, **poisoning 1/3 of all children**.¹
- Of the **800 million children** with elevated lead levels globally, **275 Million are in India—which is 30% of all children in India**.²
- The estimated annualized GDP loss from lower economic productivity and reduced lifetime earnings is **US\$236 bn or 5% of GDP**.⁴

CSIR NITI Aayog report

- **23 states** exceed 5ug/dL blood lead level (BLL) limit.
- States of **Bihar, Uttar Pradesh, Madhya Pradesh, Jharkhand, Chhattisgarh and Andhra Pradesh** account for 40% of India's population with an average blood Pb lead levels of more than 7 µg/dL.³

Average BLL Prevalence Across Various States In India

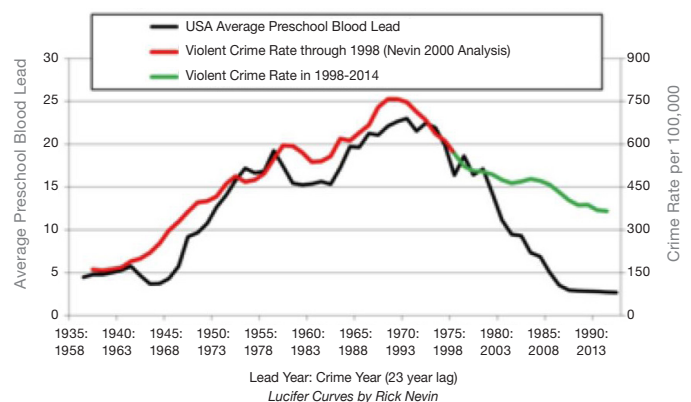


LEAD IS ONE OF THE MOST TOXIC AND HAZARDOUS POLLUTANTS

Lead is a potent neurological and cardiovascular toxicant. According to WHO there is no known "safe" blood-lead level. In addition to death, research shows that exposure to lead causes other serious health issues including:

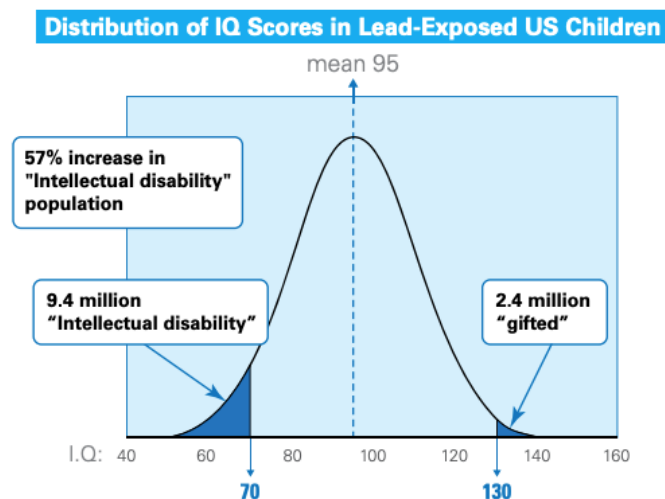
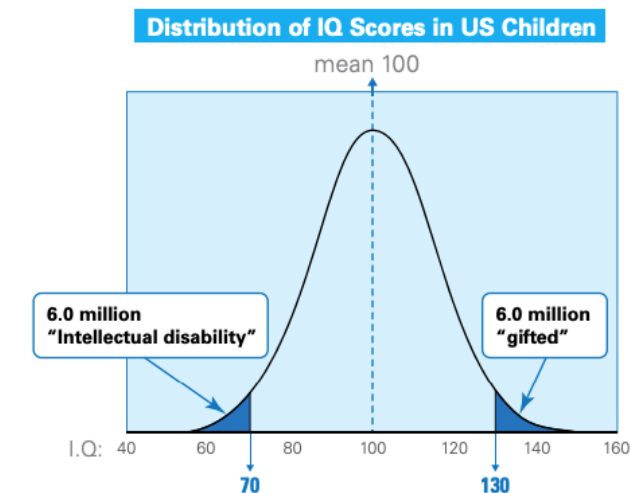
- Heart and kidney damage in adults.⁵
- Permanent damage affecting a child's brain development and central nervous system. This causes reduced intelligence, attention deficit disorders and lower educational attainment.
- Reduced lifetime earnings.⁶
- Anger management issues, and aggressive and violent behaviors in persons exposed early in life.⁷

Crime drops dramatically 18 years after lead levels drop



- Children with blood lead levels as low as 5 µg/dL have been found to score 3-5 or more points lower on intelligence tests than do their peers without elevated blood lead levels.⁸

Losses Associated with a 5-point Drop in IQ per 100 Million People



Source: The WHO and the Lead Paint Alliance, originally Weiss B. Neurobehavioral toxicity as a basis for risk assessment. Trends Pharmacol Sci. 1988;9(2):59-62.doi:10.1016/0165-6147(88)90118-6.

Lead is responsible for 900,000 deaths per year, with over 230,000 of those deaths occurring in India. Rough expert estimates suggest that mercury may cause fewer than 10,000 premature deaths in India.⁹ Deaths from pesticides—most of which are the result of self-poisoning—are likely similar.^{10,11} Exposure to arsenic, which is naturally occurring, kills several tens of thousands of people in India each year.^{12,13} Other toxins of concern include PCBs, BFRs, PFAS, EDCs, asbestos, and chromium. None are currently known to have as large an impact on premature death and disability as lead.

INDIA: A COUNTRY WITH SIGNIFICANT LEAD EXPOSURE

The US Centers for Disease Control and Prevention considers blood lead levels (BLLs) of 5 micrograms per deciliter (µg/dl) and up warranting action; however, no level of exposure is considered safe.¹⁴ What is most worrying is that out of the **800 million children** around the world with BLLs of 5 µg/dl or more, **275 million** live in India. **That's 30% of Indian children. Of them, as many as 64 million have BLLs of over 10 µg/dl.**¹⁵

Further, of the **900,000 annual deaths**¹⁶ from exposure to lead, **over 230,000 (or 26%) are in India alone.**¹⁷ Taken together, the number of children impaired by lead, and the extent of premature mortality from exposures to lead, India bears the world's greatest health and economic burden from this dangerous pollutant.

SOURCES OF LEAD EXPOSURE IN INDIA

While the phasing out of leaded petrol resulted in a consistent decline in lead contamination in the developed world, **India has seen a 21% increase in deaths caused by lead exposure since 1990.**¹⁸ There are multiple sources of lead in India ranging from adulterated spices, especially turmeric, informal or substandard recycling of used lead acid batteries (ULABs), some cosmetics, including sindoor, kajal, surma,¹⁹ bindi,²⁰ and amulets; even artisanal metallic cookware, and toys are found with lead content.



More than 50% of all batteries in India are estimated to be recycled in the informal sector.²¹ Interestingly, inspections reveal that many small and medium-sized licensed lead recyclers employ substandard, polluting practices, and are also cause for concern.

Of the nearly 500 toxic sites assessed by Pure Earth India, more than 80% were contaminated with heavy metals, and the majority were locations of unsafe, licensed lead-acid battery recycling operations.²² The move to electric vehicles will not resolve this problem as these vehicles still need lead-acid batteries to backup lithium-ion batteries.



Used lead-acid batteries at informal recycling plant.

ECONOMIC IMPACT IS HIGH: 5% OF INDIA'S GDP

The impacts of lead on physical and mental well-being have economic implications which have been estimated at around 1.20% of world GDP in 2011 (1.88% for the Asian region).²³ It is estimated that diminished IQ in lead-poisoned children results in a loss of **\$236 billion in 2012 (5% of India's GDP)** in economic productivity every year.²⁴

In addition, there is the incalculable cost of social instability in India related to childhood lead exposures.

TACKLING LEAD EXPOSURES: A TOP NATIONAL PRIORITY

Given the significant impact on health, wellbeing and wealth, reducing India's lead pollution should be an urgent and nationwide priority. As in other low- and middle-income countries (LMICs), effectively reducing lead exposures in India will yield manifold benefits: **it will improve human health, protect children's potential, enhance economic growth and development, and contribute to social harmony.**

Corporate India should take this up as a top priority under their CSR/ESG framework.

Given that there are several potential sources of exposure to lead in India, tackling them will involve tailored approaches. The menu of interventions in each state or city will depend on the principal exposure sources identified. The remedial measures required include:

- Regulation including abolition of GST on recycled battery to remove the arbitrage benefitting informal recyclers,
- Enforcement—removal of unauthorized battery processors and implementing new guidelines for formal sector,
- Regulation and enforcement of producers of products, such as spices or cookware, which are poisoning consumers with lead,
- Public education and awareness-raising, and
- Clean-up of contaminated sites (paid for, to the extent possible, by the polluters).



Women working in a substandard battery recycling operations bring home toxic lead dust via their hair and clothing.

5-STEP APPROACH

- 1. Blood testing:** Conduct baseline Blood Lead Level (BLL) testing and analysis to understand geographic and demographic variations in exposure. Such testing not only improves our understanding of the severity of exposures and establishes a baseline, but also identifies highly exposed households in which source analyses can be conducted.
- 2. Source analyses:** Conduct a series of source analyses including detailed household assessments of all possible sources of lead in those households, revealed by the blood testing. This includes testing food, cookware, paint, soil, water, dust, and toys as well as surveying parents in multiple households. Marketplace assessments identify widespread sources including spices, toys, and cookware. Toxic site assessments will identify industrial sources of exposure. These analyses determine which sources of lead are most significant in that city/region/state.
- 3. Source-specific Interventions:** Based on the findings of blood testing and source analyses, Pure Earth design and implement interventions to reduce the use and/or release of lead in products and industrial processes. PE engages with key agencies including Ministry of Environment, Forest and Climate Change, Pollution Control Boards, food safety, or other agencies relevant to specific sources. Interventions may require regulations and enforcement, changes in industry practices, training of government officials to assess lead contamination, and changes in public education and consumer behavior.
- 4. Ongoing monitoring of BLLs:** Develop systems for ongoing monitoring of children's exposure levels and treatment infrastructure for severely poisoned children.
- 5. Public education:** Implement education campaigns to raise public awareness of solutions and risks from certain products and activities.

PURE EARTH HAS BEEN WORKING IN INDIA FOR OVER 15 YEARS

Pure Earth has been addressing public health issues stemming from chemical and heavy metal pollutants, especially lead. Based in New Delhi, Pure Earth has a multi-faceted program addressing childhood lead poisoning, which entails the following components:

- 1. Two state-wide programs: Bihar and Tamil Nadu.** Bihar is India's poorest state and has a significant presence of unsafe battery recycling and adulterated spices, making it an important state to invest in solutions. Tamil Nadu ranks in the top three states with lead poisoned children. Pure Earth is working with these states to establish a framework of policies and state-wide programs endorsed by the national and state pollution control boards to reduce lead poisoning from a variety of sources and build demand for further action. To that end, Pure Earth will work with state and local officials to:
 - Assess the extent and sources of lead exposures;
 - Upgrade battery recycling practices and phase out informal/illegal ULAB recycling;
 - Assess supply chains of spices and other food products and cookware;
 - Build capacity to remediate high-risk sites that are contaminated with lead; and
 - Implement policies and monitoring systems to ensure lead-free practices.
- 2. Development of policy recommendations** with the national and state governments including the support in implementation, capacity building and action on recently issued Battery Waste Management Rules, 2022.
- 3. Creation of a public education campaign** to help families protect young children and to spur additional action on pollution.

1. UNICEF and Pure Earth (2020). The Toxic Truth: Children's Exposure to Lead Pollution Undermines a Generation of Future Potential. Available at: <https://www.pureearth.org/unicef-and-pure-earth-call-for-urgent-action-to-protect-800-million-children-affected-by-lead/>
2. Ibid.
3. Rakesh Kumar et al., 2022 Assessment of Lead Impact on Human and India's Response. Available at: <https://www.pureearth.org/wp-content/uploads/2022/06/Lead-Report-India-CSIR-NITI-Ayog-June-2022.pdf>
4. Attina, T.M., Trasande, L., "Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries", (Environmental health perspectives 121, No. 9, 2013).
5. Lanphear, B. P., Rauch, S., Auinger, P., Allen, R. W., & Hornung, R. W. (2018). Low-level lead exposure and mortality in US adults: a population-based cohort study. The Lancet Public Health, 3(4), e177–e184.
6. The data presented here on the extent and scale of lead exposures in India were gathered by Indian researchers working for IHME's Global Burden of Disease program.
7. Institute for Health Metrics and Evaluation (IHME), Global Burden of Disease dataset 2019.
8. Lanphear BP, Dietrich K, Auinger P, Cox C. "Cognitive Deficits Associated with Blood Lead Concentrations <10 microg/dL in US Children and Adolescents. (Public Health Rep. 2000);115(6):521-529. doi:10.1093/phr/115.6.521 Lanphear B, Hornung R, Khoury J, Yolton K, Baghurst P, Bellinger D, Canfield R, Dietrich K, Bornschein R, Greene T, Rothenberg S, Needleman H, Schnaas L, Wasserman G, Graziano J, Roberts R. "Low Level Environmental Lead Exposure and Children's Intellectual Function: An International Pooled Analysis." (Environmental Health Perspectives, 2005). 113:7 CID: <https://doi.org/10.1289/ehp.7688>
9. <https://www.sciencedirect.com/science/article/pii/S2214999616308207>
10. <https://www.sciencedirect.com/science/article/pii/S016050321730280X>
11. <https://www.sciencedirect.com/science/article/abs/pii/S0140673602112049>
12. <https://cebp.aacrjournals.org/content/23/7/1187.short>

13. <https://iwaponline.com/jwh/article/3/2/101/3648/An-estimation-of-the-global-burden-of-disease-due>
14. Centers for Disease Control and Prevention, Blood Lead Levels in Children, May 28, 2020.
15. UNICEF and Pure Earth (2020). The Toxic Truth: Children's Exposure to Lead Pollution Undermines a Generation of Future Potential. Available at: <https://www.pureearth.org/unicef-and-pure-earth-call-for-urgent-action-to-protect-800-million-children-affected-by-lead/>
16. Institute for Health Metrics and Evaluation (IHME). (2019). Global Burden of Disease. Available at: <http://ghdx.healthdata.org/gbd-results-tool>. The IHME is the most comprehensive and trustworthy data source for the global burden of disease. In 2018, the World Health Organization and the Institute for Health Metrics and Evaluation signed a memorandum of understanding to cooperate in the development of annual global burden of disease estimates, effectively making IHME the official source of these statistics.
17. The data presented here on the extent and scale of lead exposures in India were gathered by Indian researchers working for IHME's Global Burden of Disease program.
18. Institute for Health Metrics and Evaluation (IHME). (2018). GBD Compare - Data Visualizations. <http://vizhub.healthdata.org/gbd-compare>.
19. Eye cosmetic powder, also used to make kajal, a paste.
20. A colored dot worn on the center of the forehead.
21. Pugazhenthry L. (2017). Lead Battery & Recycling in India Future Indicators. Bangalore, India.
22. <https://www.contaminatedsites.org/>
23. Attina, T.M., Trasande, L., "Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries", (Environmental health perspectives 121, No. 9, 2013).
24. Ibid. Environ Health Perspect 121:1097–1102; <http://dx.doi.org/10.1289/ehp.1206424>. Access link: <https://ehp.niehs.nih.gov/doi/10.1289/ehp.1206424>