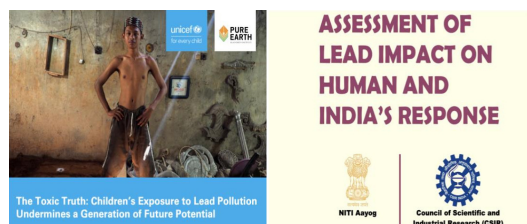


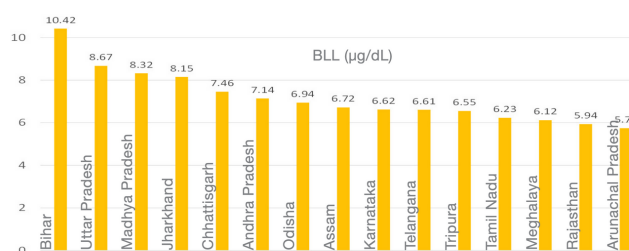
LEAD CRISIS - A SOLVABLE ENVIRONMENTAL HEALTH PROBLEM

Lead exposure is a much greater threat to health than previously understood. UNICEF and Pure Earth jointly published the report “The Toxic Truth” in July 2020, highlighting worldwide 1/3 i.e. 800 million children, have elevated lead levels (an estimated blood lead level ≥ 5 $\mu\text{g/dL}$, the WHO threshold for intervention) and 275 Million i.e. approx of those are in India. 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, in the year 2022, published its own report, “Assessment of Lead Impact on Human and India’s Response”, validating The Toxic Truth report stating that 23 states of India exceed the 5 $\mu\text{g/dL}$ 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 lead levels of more than 7 $\mu\text{g/dL}$.

Average BLL Prevalence Across Various States In India



Source: Rakesh Kumar et al., 2022 Assessment of Lead Impact on Human and India's Response

The Lancet Planetary Health published an article led by World Bank researchers, “Global health burden and cost of lead exposure in children and adults: a health impact and economic modelling analysis”, on September 12th 2023. A comparison between Global cost of lead exposure and the cost to India is given below

GLOBAL COST OF LEAD EXPOSURE—2019

CARDIOVASCULAR DISEASE (CVD) DEATHS



- **5.5 million** adults died from CVD in 2019 due to lead exposure.
- **90–95%** of this burden was in low- and middle-income countries.
- CVD deaths are **6 times** GBD (Global Burden of Disease) 2019 estimate.

IQ POINTS LOST

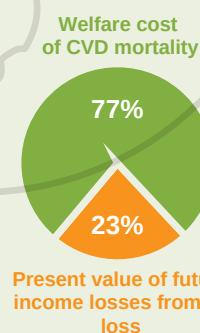


- Children under age five lost **765 million** IQ points.
- IQ loss in LMICs (low- and middle-income countries) is nearly **80% higher** than a previous estimate.

COMBINED COSTS



- The global financial cost of lead exposure in 2019 was US \$6 trillion, equivalent to **7%** of global GDP. In LMICs, it accounted for more than **10%** of GDP (Gross domestic product).



THE COST OF LEAD EXPOSURE TO INDIA—2019

CARDIOVASCULAR DISEASE (CVD) DEATHS



- **1.06 million** adults died from CVD in 2019 due to lead exposure.
- **19%** of total burden was in India.
- CVD deaths are **4.5 times** GBD 2019 India estimate.

IQ POINTS LOST

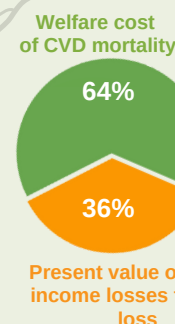


- Indian children under the age of five lost up to **154 million** estimated IQ (Intelligence Quotient) points because of lead exposure

COMBINED COSTS



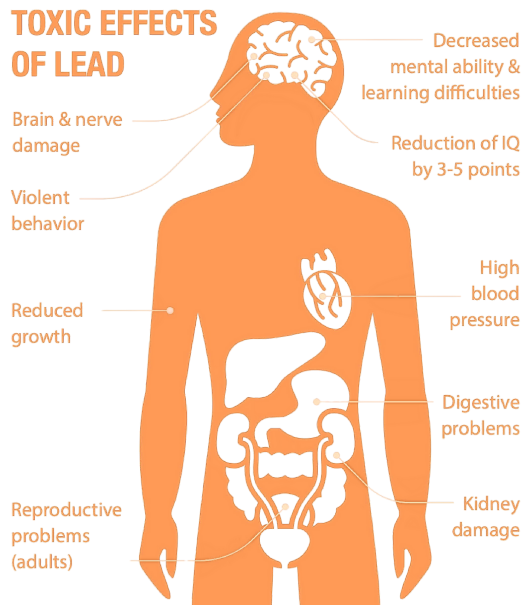
- The financial cost of lead exposure to India in 2019 was a staggering **US\$259 billion**, which is equivalent to **9%** of India's GDP in 2019



LEAD IS ONE OF THE MOST TOXIC AND HAZARDOUS POLLUTANTS

American Heart Association: "Exposure to nonessential metals such as lead...is a significant contributor to cardiovascular disease worldwide."

TOXIC EFFECTS OF LEAD



US EPA: "There is sufficient evidence to conclude that there is likely to be a causal relationship between lead exposure and conduct disorders, aggression, and criminal behavior"

SOURCES OF LEAD EXPOSURE

While the phasing out of leaded petrol resulted in a consistent decline in lead contamination in the developed world, India has seen **an increase** in deaths caused by lead exposure since 1990. Contaminated soil from industry, most often poorly operated lead-acid battery recycling facilities, is a well-documented and known source of lead hotspots. Pure Earth is conducting home-based assessments (HBAs) and Rapid Market Surveys (RMS) across 25 countries to identify other potential sources of this pervasive lead health threat. The products most commonly contaminated with lead include:



IT'S A SOLVABLE PROBLEM: PURE EARTH'S 5-STEP SOLUTION STRATEGY

Pure Earth has been addressing public health issues stemming from chemical and heavy metal pollutants, especially lead.

With a country office in India's capital city of New Delhi and state offices in the state of Bihar, Maharashtra and Tamil Nadu, Pure Earth India has a multi-faceted program addressing childhood lead poisoning, which entails the following components:

1. BLOOD LEAD LEVEL 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 ANALYSIS

Conduct a series of source analyses, including detailed house-based assessments (HBAs) 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. Rapid Market Survey (RMS) identify widespread sources, including spices, toys, and cookware. Toxic site assessments will identify industrial sources of exposure. These analyses determine which industry source(s) of lead is contributing to high BLL in that city/region/state.

3. SOURCE-SPECIFIC INTERVENTIONS

Based on the findings of blood testing and source analyses, Pure Earth, in collaboration with governments and industries, design and implement interventions to reduce the use and/ or release of lead in products and industrial processes. PE engages with key agencies, including the Ministry of Health and Family Welfare, the Ministry of Environment, Forest and Climate Change, Pollution Control Boards, food safety, industry 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 behaviour.

4. SYSTEMS STRENGTHENING

Enhancing education guidelines and capabilities, strengthening health and lead sources surveillance technologies, and educating teachers and parents on the dangers of lead.

5. STAKEHOLDER'S EDUCATION & AWARENESS

Implement education and awareness campaigns to raise stakeholders' understanding of solutions and risks of lead exposure.

INTERVENTIONS COST EFFECTIVENESS

Preliminary cost analyses conducted by Pure Earth and the World Bank highlight that all types of lead mitigation interventions are highly beneficial and have a very good payback.



Eliminating Lead in Spices (2 projects): Up to \$20,500 per \$1 invested



Regulating Lead-Based Paint: \$1200 benefit per \$1 invested



Moving to Lead-Free Pottery: \$326 benefit per \$1 invested

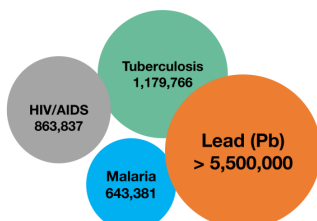


Contaminated Site Cleanup: \$2-\$144 benefit per \$1 invested

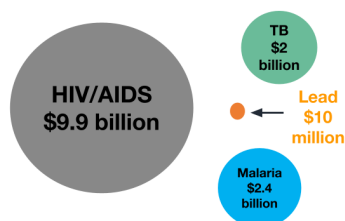
IMPACT vs INVESTMENT

This expanded understanding of lead exposure, its impacts and known solutions of lead pollution is a clarion call to action. The donor community and governments across the world need to examine and begin investing in solutions to lead exposure reduction that are more aligned with the scale of its impact. Also, governments and development agencies investing in education, maternal and child health, heart disease and stroke, need to consider how damage from lead exposure may be undermining these investments.

GLOBAL ANNUAL DEATHS



INTERNATIONAL FUNDING



PURE EARTH INDIA STRATEGY

Pure Earth India, with the aim of reducing lead exposure in India, is implementing projects to understand the severity of the issue across the country, identify the potential sources of exposure, which should help bolster the development and implementation of national and state-level interventions and action plans. These activities should also help institutionalize blood lead monitoring which will allow for the identification and treatment of children with high blood lead levels.

CONVINCING KEY STAKEHOLDERS

We are continuously working to bring in new, credible and impactful voices from government, issue experts, journalists, the private sector and philanthropies to initiate and strengthen action on lead exposure solutions, particularly for lead-laden aluminum cookware, local paint, toys, adulterated spices and unsound used lead acid battery recycling.

We brought together manufacturers, recyclers, distributors, regulators, scientists, and philanthropists of lead-acid batteries in India to recommend improvements in BWMR 2022 and facilitate the faster adoption of good practices. Additionally, we established and are active members of the **India Working Group (IWG)**, which includes experts from health, policy, governance and execution, science and research, media and communications, industry and social impact. The IWG meets quarterly to deliberate and further advocate on the most pressing and feasible actions to reduce lead exposure in India.

BLOOD LEAD SURVEILLANCE

We are conducting **statewide blood lead level (BLL) surveys in Bihar, Tamil Nadu, and Maharashtra.**



VENOUS BLOOD LEAD TEST

CAPILLARY BLOOD LEAD TEST

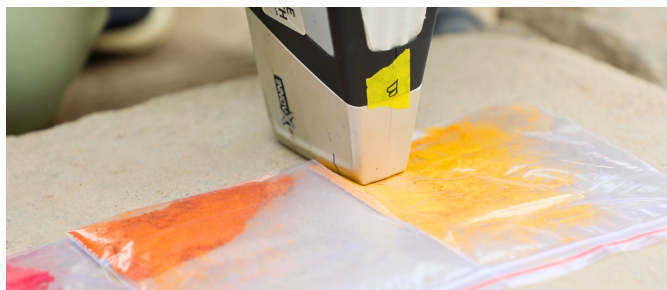


In July 2023, concluded Blood Lead Level (BLL) survey among 697 children and 55 pregnant women in 8 Bihar districts (Patna, Nawada, Vaishali, Bhagalpur, Muzaffarpur, Purnea, West Champaran & Gaya). The results indicated that more than 90% of children in urban Bihar and more than 80% of children in rural Bihar have BLL above 5 µg/dL.

With the Ministry of Health and Family Welfare and State Health Departments, we are advocating for the launch of population-level Blood Lead Surveillance. This will help in identifying the prevalence of lead poisoning, and its hotspots across the nation.

LEAD CONTAMINATION AND SOURCE IDENTIFICATION

We have identified and assessed more than **500 sites in India** for toxic contamination under the **Toxic Site Identification Program (TSIP)**. The majority of these sites are contaminated due to unsafe battery recycling.



The First **lead source-apportionment study** conducted by Pure Earth in Patna in 2020 identified spices, mainly **lead-laden turmeric and red chili powder**, as one the key sources in homes posing serious health risks to about 85% of kids tested for BLLs. These spices are the main ingredients of all Indian meals consumed daily and are subject to adulteration, with evidence of its occurrence in the South Asia region. Hence, the interest in monitoring Lead-contamination is crucial.

Pure Earth is collaborating with Stanford University and others to gather authentic information on the supply chains and understand the scope of adulteration in **4 states (Bihar, eastern parts of Uttar Pradesh, West Bengal and Jharkhand)**.

According to three states, **Maharashtra, Uttar Pradesh and Tamil Nadu; Rapid Market Screening Program (RMS)** the products most commonly contaminated with lead in India are:



SOURCE-SPECIFIC RISK REDUCTION INTERVENTIONS

Toxic site remediation

We executed the first lead risk reduction project in Patna in the year 2018 and the second in Vellore, Tamil Nadu, in the year 2020, both around informal battery makers located in close proximity to an elementary school. We, along with local partners and community participation, closed the sub-standard operations of the ULAB, successfully remediated the soil contamination, and cleaned the homes and school's interior of lead dust.



We have approached the **Food Safety and Standards Authority of India** to

- Strengthen further the implementation of the Food Safety and Standards Act, 2006, especially the standards for lead in spices and its tracking.

Ministry of Environment Forest and Climate Change, Center/State Pollution Control Board are requested for

- The adoption of standard operating procedures (SOPs) that PE with other organisations drafted for used lead acid battery (ULAB) recycling.
- Stricter Enforcement of Lead Contents in Household and Decorative Paints Rules, 2016.

INFORMATION, EDUCATION AND COMMUNICATION

Widespread lack of awareness about the issue and the solutions, or, where there may be some awareness, a lack of understanding about the breadth, seriousness and long-term impacts of lead perpetuates inertia. We have been posting short videos and messages on social media; organising public events and reaching out to larger audiences through the Internet, blogs, print media and TV. We believe this lead pollution crisis can be solved, **Together we can solve pollution, save lives, and protect the planet.**

