

## Lead Poisoning

### Why in news?

India lacks a targeted, comprehensive legal framework to combat lead poisoning with India experiencing alarming levels of exposure.

### What is lead poisoning?

- **Lead poisoning** - It occurs when toxic lead particles accumulate in the body, primarily through environmental and industrial exposure and it's also known as Plumbism and Saturnism.
- Lead can be ingested through mouth, inhaled through the respiratory system or absorbed by the skin, as per the World Health Organization (WHO).
- **Safe limit of lead exposure** - There is ***no known safe level of exposure to lead***.
- **Lead poisoning in India** - India bears the world's highest health and economic burden due to lead poisoning.
- According to the 2020 UNICEF report, 275 million children in India record blood lead levels of beyond the tolerable limit of ***5 µg/dL***.

Some 23\* states exceed  
the permissible blood lead  
level of 5 µg/dL

■ Blood lead  
levels



- **Common sources of lead poisoning**

Occupational	Environmental	Others
<ul style="list-style-type: none"> <li>• Lead smelters</li> <li>• Painter/decorators</li> <li>• Battery manufacturers</li> <li>• Stain-glass workers</li> <li>• Jewellery makers</li> <li>• Bronze workers etc</li> </ul>	<ul style="list-style-type: none"> <li>• Paint (walls, furniture)</li> <li>• Toys</li> <li>• Water</li> <li>• Food</li> <li>• Air (petrol, industry)</li> <li>• Dust/soil</li> </ul>	<ul style="list-style-type: none"> <li>• Traditional Medicine</li> <li>• Cosmetics lead shot</li> <li>• Lead glazed ceramics</li> <li>• Vehicular exhaust</li> <li>• Contaminated spices</li> </ul>

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### What are the impacts of lead poisoning?

- **Health effects** - Lead poisoning's health effects are severe and broad-reaching, affecting nearly every organ.
  - Impair cognitive development and behavioral issues.
  - Irreversible neurological damages.
  - Hypertension, kidney damage, and reduced fertility.
  - For pregnant women, exposure can lead to miscarriages, preterm birth, and birth defects.
- **Financial burden** - Increased dependency of affected population on social services, leads to economic burden.
- **Amplifies poverty cycles** - Those living in below poverty line often face higher risks of exposure due to proximity to industrial zones or reliance on lead-tainted products.
- **Affects labour markets** - It can reduce the productivity of labour and further impacts economic growth.
  - Productivity lost due to lead exposure in 2019 was \$906 billion, equivalent to 0.68% of world GDP.
- **Consumer safety** - Increased risk to children as they are far more likely to ingest lead indirectly by chewing on toys or other objects with lead.

## WHAT LEAD DOES

Lead has no biological function in the body; rather, it can impair physical and developmental growth



### 1. FETUS

**INTAKE ROUTE**  
Placenta

**EFFECTS\***

Delay in neurological development  
Premature birth  
Low birth weight

**TREATMENT PROTOCOL**

Chelation and nutritional intervention for the mother

### 2. INFANTS, YOUNG CHILDREN

**INTAKE ROUTE**  
Mother's milk, inhaled air, skin contact

**EFFECTS\***

Decreased activity of enzymes that produce heme  
Impaired physical and developmental growth  
Low intelligence quotient

**TREATMENT PROTOCOL**

Chelation and nutritional intervention

### 3. CHILDREN

**INTAKE ROUTE**  
Inhaled air, skin contact, ingestion

**EFFECTS\***

Decreased nerve conduction velocity  
Hampered cognitive development and intelligence  
Hearing loss  
Jaundice  
Anaemia  
Encephalopathy  
Impact on vitamin D metabolism if lead is deposited on bones

**TREATMENT PROTOCOL**

Chelation (Medication that binds with lead and facilitates excretion through the urine); nutritional intervention to ensure that essential elements are not lost from the body

### 4. ADULTS

**INTAKE ROUTE**  
Inhaled air, ingestion, skin contact

**EFFECTS\***

Decreased activity of enzymes that produce heme, an iron-containing compound crucial for all organs  
Changes in blood pressure  
Damage to renal function  
Fluctuation in sperm count

**TREATMENT PROTOCOL**

Chelation; nutritional intervention for pregnant women

Note: \*Effects mentioned vary depending on blood lead level Source: Expert comments, World Health Organization

## What are the challenges in combating lead poisoning?

- **Multiple exposure sources** - Sources of lead poisoning change from location to location, and there are usually multiple exposure sources in any given place.
- **Inefficient structural arrangement** - India's existing laws concerning lead are fragmented across multiple agencies which leads to inefficiency and inaction.

*India's legal landscape includes nine pieces of primary legislation and nine pieces of subordinate legislation that touch upon various aspects of lead regulation.*

- **Lack of coordination** - Existing Battery Waste Management Rules, 2022, remains ineffective due to lack of coordination.
- **Illiteracy** - Inadequate education among people in key pollution areas, affects the effectiveness of awareness creation.
- **Poverty** - It pushes the people to work in often harsh environment and exposed to lead.
- **Informal recycling** - More than 50% of all batteries in India are estimated to be recycled in the informal sector.

## What are the international measures to combat lead poisoning?

- **Partnership for Lead-Free Future** - Headed by USAID and UNICEF, this partnership was

launched in 2024 to promote a lead-free environment by addressing pollution sources and fostering international cooperation.

- **Global Alliance to Eliminate Lead Paint(GAELP)** - It is a voluntary partnership formed by the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) to prevent exposure to lead through promoting the phase-out of paints containing lead.
- **Basel convention** - This international treaty regulates the transboundary movement of hazardous wastes, including lead-containing materials, aiming to ensure safe disposal practices.
- **International lead poisoning prevention week** - It is organised by World Health Organization on October 20-26 to create awareness among the people about lead poisoning.

### What measures are needed to combat lead poisoning?

- **Targeted measures** - Implementing a dedicated lead prevention law or enhancing current environmental and health regulations to comprehensively address lead sources—from production to disposal—is essential for cohesive action.
- **International obligations** - As India is a signatory to United Nations Environment Programme's (UNEP) efforts to eliminate lead in paint its laws need to be in line with their framework.
- **National surveillance** - Developing a national lead registry to monitor blood lead levels in vulnerable populations.
- **Regulatory impact assessments** - Conducting assessment of lead pollution both before and after implementation to ensure that the law is evidence-based and aligned with its objectives.
- **Identify and control lead sources** - Mapping areas prone to high lead exposure, such as industrial zones and urban slums.
  - Extending producer responsibility to manufacturers can ensure safer product lifecycle management.
- **Circular economy** - Recycling of lead-based products like car batteries and lead base products to reduce lead contamination.
- **Improve healthcare response** - Training health professionals to recognize lead poisoning symptoms, and routine screenings in high-risk populations.
  - Facilities such as Ayushman Bharat Arogya Kendras could incorporate lead testing.
- **Raise public awareness** - Collaborations with NGOs, schools, and media can inform communities about risks and prevention strategies.
- **Self-regulation through market forces** - Motivating industries to adopt safer practices through incentives such as subsidies and access to credit.

### Reference

[The New Indian Express | Legal Framework to Combat Lead Poisonin](#)