Lead Poisoning

Prelims: Lead, Lead Poisoning, Plumbism, Saturism, Anaemia, Heavy Metal, **United Nations Environment Programme**, **Central Pollution Control Board (CPCB).**

Mains: Environmental Pollution & Degradation, Lead Poisoning and related concerns

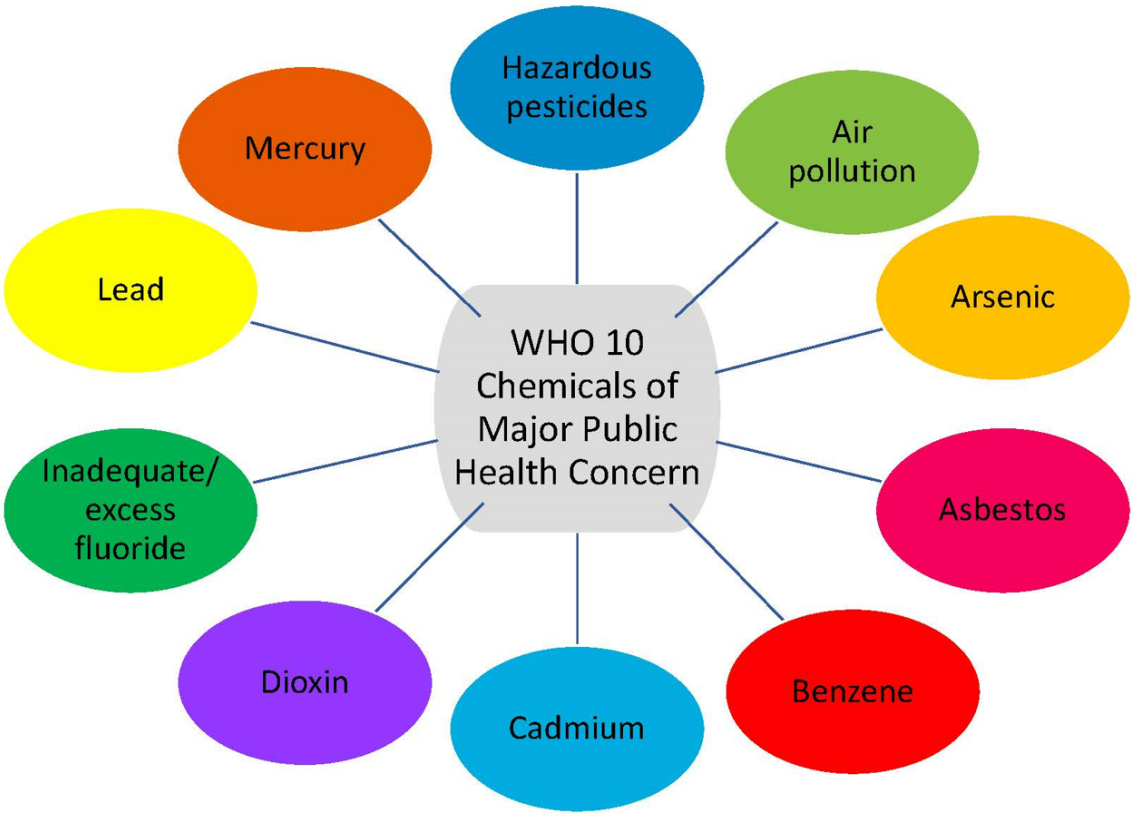
Source: BL

Why in News?

Lead poisoning remains a significant but overlooked public health crisis in India, particularly affecting children. While multiple laws regulate lead contamination across sectors, the **absence of a comprehensive legal framework** for its prevention and mitigation hinders effective enforcement and policy coherence.

Lead

- **Lead** is a **toxic, naturally occurring heavy metal** characterized by its **softness, malleability, and bluish-white luster**, with **no safe level of exposure** identified.
- **WHO** identifies lead as **one of 10 chemicals of major public health concern.**
    - **In 2021, WHO issued guidelines** recommending that **individuals with blood lead levels ≥5 µg/dL should be assessed for exposure sources**, and steps taken to eliminate them.
    - **Lead-based paint** continues to be **a major global source of lead exposure. WHO and UNEP's Global Alliance to Eliminate Lead Paint** urges countries to **implement legal restrictions**; however, as of January 2024, **only 48% have enacted such laws.**



What is Lead Poisoning?

- **About: Lead poisoning** (also known as **Plumbism** and **Saturism**) occurs when **lead accumulates in the body over time**, typically over months or years, leading to toxic effects.
- **Status of Lead Poisoning: Lead is poisoning 1/3 of all children globally.**
  - A **2020 UNICEF-Pure Earth report** found that **half of India's children** have **high blood lead levels (BLL)**. About **275 million** children exceed the **WHO's safe limit (5 µg/dL)**, and **64.3 million** have even higher levels (**above 10 µg/dL**).
  - **CSIR-NITI Aayog Report:** 23 states exceed the recommended 5 µg/dL BLL limit.
  - **Approximately 5% of India's GDP loss due to lead poisoning.**
- **Sources:**

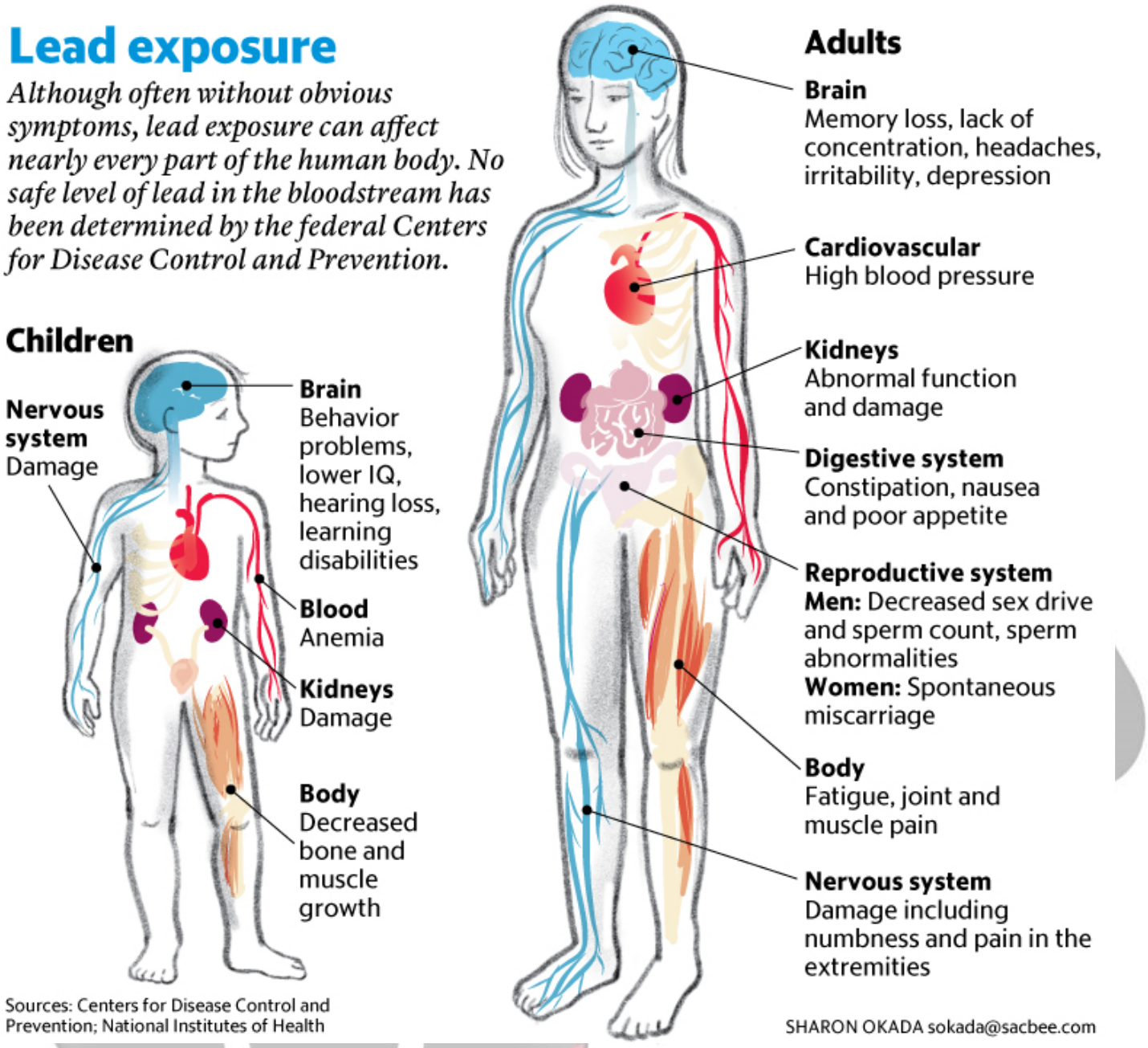
Everyday risks

There is potential for lead exposure in several common occupations and products that are used in nearly every household

OCCUPATIONAL SOURCES	Non-Occupational Sources
Battery work	Traditional medicine
Mining	Vehicular exhaust
Glass manufacturing	Contaminated cosmetics and sindoor
Automobile repair	Household storage batteries
Ceramic work	Household paints
Painting	Contaminated spices
Pottery	Effluent from lead-based industries
Smelting	Contaminated soil, dust and water near lead-based industries
Printing work	Food grown in lead contaminated areas
Plumbing	Retained bullets
Soldering	Food stored or cooked in lead-coated vessels
Making lead pipes and plastic	Painted toys

Source: "Assessment of Lead Impact of Human and India's Response", Niti Aayog and Council of Scientific Research

- **Symptoms & Effects:** Symptoms include **fatigue, abdominal pain, nausea, diarrhoea, loss of appetite, anemia, muscle weakness,** and a characteristic dark line along the gums.



What is Mercury Poisoning?

Click Here to Read: Mercury Poisoning

What are the Policy Measures to Combat Lead Poisoning in India?

- **Existing Policy Measures/ Legal Provisions:**
  - **Ban on Leaded Petrol (2000): India phased out leaded petrol**, reducing **airborne lead pollution, health risks, and environmental damage**. This transition also helped **reduce engine knocking**, improving **vehicle efficiency and engine longevity**, aligning with global efforts for cleaner fuel and better air quality.

Regulations	Provisions
Environment Protection Act, 1986	It empowers the **central government (CPCB)** to regulate lead contamination by setting permissible limits for **effluents and pollutants**.
Factories Act, 1948	It ensures worker health and safety, indirectly

	addressing lead poisoning in industries using lead. **Chapter III** focuses on worker safety, welfare, and hygiene. ▪ **The 3rd schedule** deals with a list of notifiable diseases including **lead poisoning**, and **lead tetra-ethyle poisoning**.
The Code of Practice for Water Supply in Buildings, 1957	It prohibits **lead pipes for domestic water supply**, setting a **10 µg/L lead limit in water**. However, it **permits lead piping** for **flushing and overflow systems**. ▪ The **Lead Stabilizers in PVC Pipes Rules, 2021** bans lead-based stabilizers in PVC pipes, mandates BIS compliance, and requires water quality testing.
Insecticides Act, 1968	It regulates the import, manufacture, sale, and use of insecticides for safety and efficacy. ▪ **Schedule 2** lists **Lead Arsenate** as an insecticide.
Food Safety and Standards Act, 2006	It empowers **FSSAI** to regulate food safety and **set lead limits in food** (e.g.,**turmeric (10), leafy vegetables (0.3), pulses (0.2), sugar (5.0), infant Food (0.2), etc.**) and drinking water (**0.01 mg/L** as per BIS). ▪ **FSSAI** also bans **Lead Chromate** in spices due to health risks.
Hazardous Waste Management Rules, 2016	It classifies **lead-containing waste** and regulates its storage, treatment, and disposal, requiring industries to obtain **SPCB/PCC** authorization. ▪ **Batteries Waste Management Rules, 2022**: It regulates **lead-acid battery** recycling under **Extended Producer Responsibility (EPR)**.
Drugs and Cosmetics Act, 1940	These set a **lead limit of 20 ppm** in cosmetics, mandating compliance for manufacturers and importers with proper ingredient labeling.
The Child Labour Act, 1986	It helps mitigate **lead poisoning** by prohibiting child labor in **hazardous environments**.
Bureau of Indian Standards Act, 2016	It designates **BIS** as India's **National Standards Body**, ensuring **standardization, marking, and quality certification** of goods. ▪ It regulates **lead limits in kitchenware** (e.g., **cooking ware: 0.5 mg/dm², cups & mugs: 0.5 mg/L**).

What are the Challenges to Implementation in Lead Regulations?

- **Lead in Insecticides:** The **Insecticides Act, 1968**, still lists **Lead Arsenate** as an insecticide, despite its ban under the **2019 list of prohibited pesticides** by the **Ministry of Agriculture** due to health and environmental risks.
- **Lead in Food Products: FSSAI** has banned **Lead Chromate** in **turmeric** but allows **lead content up to 10 ppm**, creating a **regulatory loophole** that permits trace lead contamination

despite the ban.
- **Lead in Paints:** The **2016 rules** limit lead in new paints but do not address existing lead-based paint in homes.
- **Water Contamination:** Weak enforcement of the **Code of Practice for Water Supply in Buildings (1957)** and **Lead Stabilizers in PVC Pipes Rules (2021)**.

Way Forward

- **Stronger Legal Framework:** Introduce a **dedicated set of rules under the Environment Protection Act (EPA), 1986**, regulating **lead production, recycling, and disposal** to ensure comprehensive legal coverage.
- **Establish a Safe Blood Lead Level (BLL):** Define and implement a **national threshold for BLL** in line with WHO recommendations to guide policy interventions.
- **Occupational Safety Standards:** Adopt **global best practices** such as **US' Occupational Safety and Health Administration (OSHA) regulations** and the **UK's Control of Lead at Work Regulations (2002)** to protect workers in lead-related industries.
- **Stricter Enforcement:** Establish **clear penalties** for non-compliance, particularly in industries, water supply, and toy manufacturing, aligning with **EU Toy Safety Directive standards**.
- **Public Awareness & Market Incentives:** Promote **lead-free products** through **tax incentives** and large-scale **public awareness campaigns** to encourage safer alternatives.

Conclusion

To combat lead poisoning effectively, a **comprehensive regulatory framework**, stricter enforcement, and **public awareness initiatives** are essential. Given its severe health risks, lead poisoning must be treated as a **top public health priority** in India.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Lead, ingested or inhaled, is a health hazard. After the addition of lead to petrol has been banned, what still are the sources of lead poisoning? (2012)

1. Smelting units
2. Pens and pencils
3. Paints
4. Hair oils and cosmetics

Select the correct answer using the codes given below:

(a) 1, 2 and 3 only
(b) 1 and 3 only
(c) 2 and 4 only
(d) 1, 2, 3 and 4

Ans: (b)