# LEAD EXPOUSRE FROM PLAYGROUND EQUIPMENTS

By Advanced Study Institute of Asia

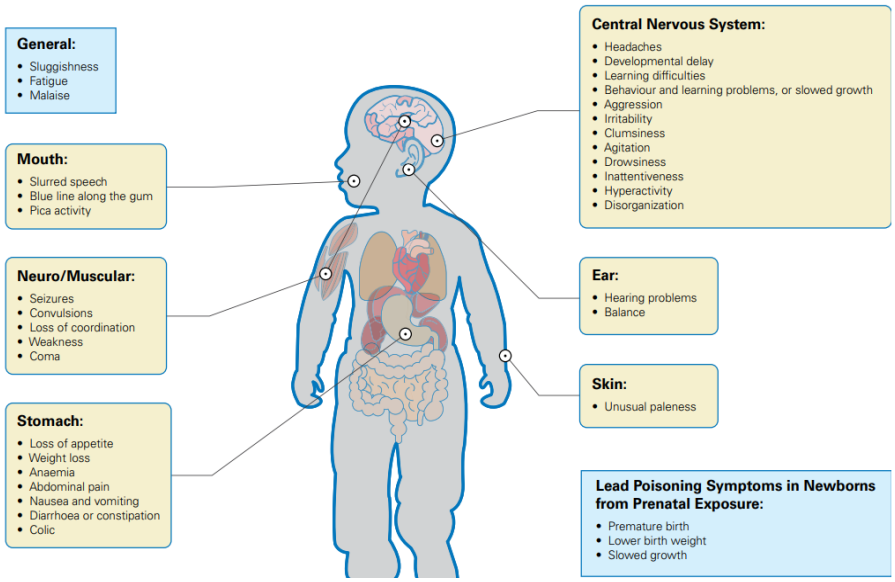
## INTRODUCTION

Lead poisoning is a serious health condition caused by exposure to high levels of lead, a toxic metal that can build up in the body over time, particularly affecting children. Alarmingly, **50% of children with elevated blood lead levels globally are found in India**. Even small amounts of lead exposure can cause significant health problems such as to impaired neurological and cognitive development in children, and these effects are often irreversible. The symptoms of lead poisoning can be hard to detect initially, as they often do not appear until dangerous amounts have accumulated in the body. According to the UNICEF report, **275 million** children in India record blood lead levels above the WHO intervention threshold of 5 **µg/dL**,[1] with **64.3 million** children exceeding **10 µg/dL**.

## THE WIDESPREAD EFFECTS OF LEAD

Lead exposure occurs through inhalation, ingestion, or skin contact. Absorption rates are high, especially in children, infants, pregnant women, and those with nutrient deficiencies. Common sources include contaminated food, water, and deteriorating lead-based paint. Lead disrupts normal bodily functions[2], creates reactive radicals, and damages cells. It impacts the nervous system, genes, and blood production. Prolonged exposure leads to accumulation in tissues, causing long-term health risks like hypertension, kidney damage, and nervous system impairment.[3]

Figure 1. Symptoms of Lead Poisoning in Children




[1] *UNICEF & Pure Earth. (2020). The toxic truth: Children's exposure to lead pollution undermines a generation of future potential.*

[2] *Ara, A., & Usmani, J. A. (2015). Lead toxicity: a review. Interdisciplinary toxicology, 8(2), 55-64.*

[3] *Rehman, K., Fatima, F., Waheed, I., & Akash, M. S. H. (2018). Prevalence of exposure of heavy metals and their impact on healthconsequences. Journal of cellular biochemistry, 119(1), 157-184.*

## THE IMPACT OF LEAD POISONING

Lead is a neurotoxin that adversely affects children's health and development. Even low-level exposure can result in neurological issues and learning problems.

Figure 1. The Impact of Lead Poisoning in Children


### *Lead Exposure and Children's IQ:*

*Lead exposure is a pressing public health issue, especially for **children under 12**. Research shows that even low levels of lead can significantly impair cognitive development, leading to lower IQ scores.*

#### *Key Findings*

***Significant IQ Loss**: Children with blood lead levels above **10 µg/dL** experience an average IQ reduction of **22.63 points**[4].*

***Duration Matters**: Prolonged exposure (over **4.5 years**) correlates with more severe cognitive deficits.*

### *Lead Exposure and Behavioural Impact*

*Lead adversely impacts various behavioral and neurodevelopmental outcomes in **children aged 3 to 7 years.***

#### *Key Findings*

***Behavioral Associations**: Children with an average blood lead level of **more than 10µg/dL** [5] exhibited **increased anxiety, social problems, and attention deficits**, particularly affecting their executive function and attention skills.*

## LEAD EXPOSURE FROM PLAYGROUND EQUIPMENT'S: VULNERABILITY OF CHILDREN

Playgrounds are critical environments where children play but also face significant risks from lead exposure. **Deteriorating paint on equipment's in playground** can release lead particles into the environment, leading to ingestion or inhalation during play. Despite the ban on lead-based paints for decorative purposes, many playgrounds still contain dangerously high levels of lead due to the deterioration of old paint and the continued availability of lead paint for commercial use.

**Children under six years old** [6]are particularly susceptible to lead exposure due to their behaviors and developmental stages:

- **Hand-to-Mouth Activity**: Young children frequently **put their hands and objects in their mouths**, increasing the likelihood of ingesting lead dust or paint chips.
- **Higher Absorption Rates**: Children absorb lead more efficiently than adults; they can **absorb up to 50% of ingested lead** compared to about 10% in adults.

[4] *Source: Heidari, S., Mostafaei, S., Razazian, N., Rajati, M., Saeedi, A., & Rajati, F. (2022). The effect of lead exposure on IQ test scores in children under 12 years: a systematic review and meta-analysis of case-control studies. Systematic reviews, 11(1), 106.*

[5] *Source: Roy, A., Bellinger, D., Hu, H., Schwartz, J., Ettinger, A. S., Wright, R. O., ... & Balakrishnan, K. (2009). Lead exposure and behavior among young children in Chennai, India. Environmental health perspectives, 117(10), 1607-1611.*

[6] *Ara, A., & Usmani, J. A. (2015). Lead toxicity: a review. Interdisciplinary toxicology, 8(2), 55-64.*

## ALARMING LEAD LEVELS IN PLAYGROUND EQUIPMENT: A GLOBAL CONCERN

### Findings from Malaysia, Mexico, the Philippines, and Thailand

Alarming data revealed by the International Pollutants Elimination Network (IPEN) in 2019, playground equipment[7] across countries like Malaysia, Mexico, the Philippines, and Thailand frequently contains lead levels that far exceed the **United Nations Environment Program's (UNEP) recommended limit of 90 parts per million (ppm)**.[8] Disturbingly, some items such as **Red Monkey Bars** have been found with lead concentrations soaring above **100,000 ppm**, including a staggering **620,000 ppm** in a yellow multi-layered handle in Malaysia and **663,000 ppm** on a **yellow-painted surface** in the Philippines. These findings underscore an urgent need for stringent regulations on lead paint to safeguard children's health.

### Recent Findings from Bhutan

A recent study conducted in Thimphu, Bhutan, from May 2021 to April 2022 examined potential lead exposure sources in children's environments across **28 sites**, including schools and playgrounds. Researchers tested **777 samples** using portable X-ray fluorescence (XRF) spectroscopy and discovered excessive lead in **16 samples**, predominantly from painted or plastic items on playground equipment[9]. The colours most associated with high lead levels were **yellow, green,** and **orange** that the rrecommended limit of **90 parts per million (ppm) set by the United Nations Environment Program (UNEP).** This study highlights the serious health risks posed by lead exposure, which can lead to neurological issues and learning problems even at low levels.

## THE CALL FOR ACTION

**While direct studies on lead in playground equipment in India are unavailable.** The research emphasizes the urgent need for screening BLL in children and testing of playgrounds and find safer alternatives to lead-based paints in playgrounds. Implementing regulations to eliminate lead-containing materials is essential for safeguarding children's health. ***The safety of children should be a top priority.*** There is an urgent need for robust regulations for paint to ensure that playgrounds remain safe for play and overall growth and development.

## RECOMMENDATION

- ✓ ***Recommendation 1:*** Establishing strict bans/limits on the allowable lead content in paint used for playground equipment's.
- ✓ ***Recommendation 2:*** Implementing mandatory screening of blood lead levels in children integrating with RBSK scheme for children.
- ✓ ***Recommendation 3:*** Conducting regular testing and maintenance of existing playground equipment's to identify and remediate lead contamination.
- ✓ ***Recommendation 4:*** Educating communities about the risks associated with lead exposure.

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[7] *Playground equipment include Slides, Swings, Climbing Frames, See-Saws and other Combination Units*

[8] *UNEP LIMIT: The 90-ppm total lead limit recommended by UNEP represents a health-protective, achievable, and globally harmonized standard to prevent lead exposure from paint. Adopting this limit is a critical step towards the worldwide elimination of lead paint.*

[9] *Pem, D., Wangdi, U., Gyeltshen, N., Wangdi, K., Wangdi, C., & Erbele, P. (2022). Potential sources of lead in children'senvironments, Thimphu, Bhutan. Bhutan Health Journal, 8(2), 13-17.*

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