

LEAD POLLUTION IN BANGLADESH



New research published in the Lancet Planetary Health is expanding our understanding of the impact of lead pollution. Global deaths attributable to lead exposure, previously estimated at 900,000, are now 5.5 million. Bangladesh has its own shared of children lead poisoned as one of the LMIC countries.

ANNUAL IMPACT OF LEAD EXPOSURE IN BANGLADESH ¹

138,054

Cardiovascular Disease (CVD) deaths from lead

20,596,306

loss of IQ points in children under 5

\$10,897M

cost of IQ loss from lead

\$17,736M

cost of CVD mortality from lead

SOURCES OF EXPOSURE IN BANGLADESH ²

The Rapid Market Screening (RMS) program is a project of Pure Earth with support from GiveWell to gain insights into the consumer products and foods that contribute to lead poisoning in low- and middle-income countries. Between 2021 and 2023, researchers analyzed lead concentrations in thousands of products and foods from markets across 25 countries, including Bangladesh.



RAPID MARKET SCREENING FINDINGS

03

districts were the part of the screening: Khulna, Barishal, and Rajshahi

197

samples of market products collected and analyzed

11

product types sampled: Aluminum cookware, aluminum, ceramic, steel, melamine, and plastic foodware, toys, cosmetics, paint - unclassified, craft/art, spices, and rice/starch

24%

of samples contained lead levels above the threshold level

Metallic foodware, Ceramic foodware, and Paint

contained the highest levels of lead



A total of 197 samples were collected and analyzed; lead is detected in 55 samples.

The samples with maximum readings with lead in each district are mentioned below:



METALLIC FOODWARE

- **Khulna: 1496 PPM**
- **Rajshahi: 853 PPM**
- **Barisal: 1310 PPM**



CERAMIC FOOD WARES

- **Khulna: 822 PPM**
- **Rajshahi: 4636 PPM**
- **Barisal: 1310 PPM**

The percentages of some of the major samples that exceeded the relevant reference level:

- Metallic foodware (59%)
- Ceramic foodware (44%)
- Paint - Unclassified (54%)
- Paint - arts/craft (50%)*
- Rice/Starch (17%), and
- Toys (13%)

*Results from 5 or fewer samples



PAINT - UNCLASSIFIED, CRAFT/ART

- **Khulna: 31360 PPM**
- **Rajshahi: 7707,8186 PPM**
- **Barisal: 12230 PPM**



TOYS

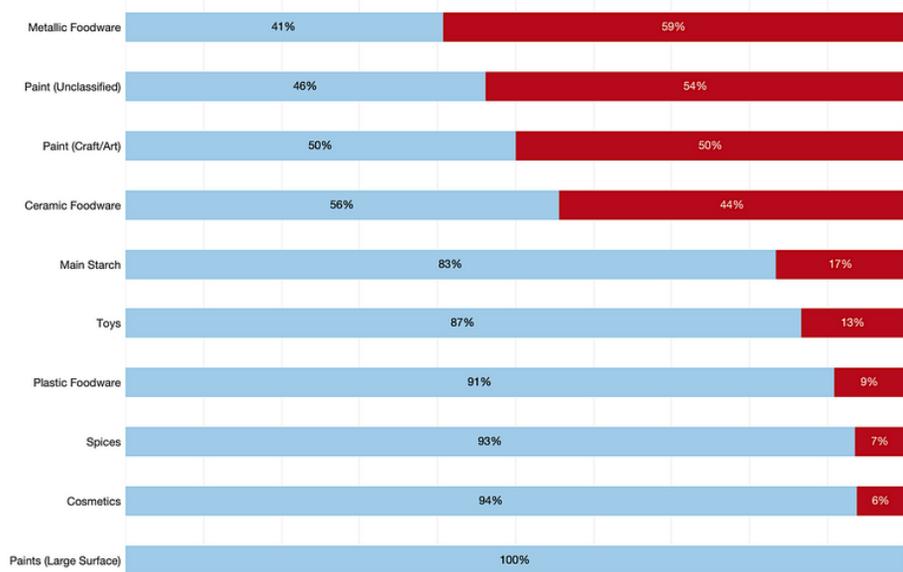
- **Khulna: 606 PPM**
- **Rajshahi: 1814 PPM**
- **Barisal: 755 PPM**

The samples were tested with a ThermoFisher NITON hand-held portable X-ray Fluorescence Heavy Metal Analyzer (Olympus Vanta Model). Samples were purchased and tested off-site.

No. and type of samples analyzed from Khulna, Rajshahi, and Barishal divisions are:

- Metallic foodware: 27
- Ceramic foodware: 09
- Plastic foodware: 11
- Paints: 30
- Rice/Starch: 12
- Toys: 30
- Spices: 46
- Cosmetics: 32

% of Samples Below or Above Reference Level in Bangladesh



Above ref?
■ Above Reference Level
■ Below Reference Level

Reference Levels and measured lead levels are expressed in parts per million of lead (ppm), which is equivalent to milligrams per kilogram (mg/kg). The following reference levels are used:

- Ceramic foodware: 100 ppm
- Metal foodware: 100 ppm
- Plastic foodware: 100ppmm
- Cosmetics: 2 ppm (EU/Germany)
- Toys: 100 ppm (US)
- Paint: 90 ppm (UNEP)
- Spices: 2 ppm (EU)
- Sweets: 0.1 ppm (US)
- Staple Dry Foods: 0.2 ppm (FAO)
- Herbal/traditional medicines: 10 ppm (WHO)

Rapid Market Screening Recommendations

- 1. Blood Lead Level Testing:** Conduct regular blood lead level testing in low- and middle-income countries to gain better insight into lead poisoning prevalence, aiding resource allocation and progress tracking. Establish a blood lead monitoring process nationally, and integrate blood lead data into the MOHFW's existing routine health information system
- 2. Home-Based Source Assessments:** Combine blood lead level surveys with in-home source analyses to identify connections between contaminated products and lead poisoning incidents in children, pinpointing local sources of contamination.
- 3. Source Analysis at national level:** Government should take initiative to conduct nation-wide lead source analysis to understand the magnitude of the problem and plan interventions
- 4. Research on Foodware Leachability:** Investigate the safety of metal and ceramic foodware by assessing leachability, especially in settings like schools and hospitals where children are exposed. Replace contaminated cookware where necessary.
- 5. Establish Limits for Total Lead in Foodware:** Set maximum allowable concentrations for total lead in foodware at the lowest achievable level, ensuring product safety, and preventing lead leaching into food. Also Many consumer and food products do not have reference values/standards for using lead in the products. Need to standardize the use of lead
- 6. Reduce Leachability in Metallic Foodware:** Research methods to reduce lead leachability in metal pots, potentially through additives or coatings.
- 7. Enforce Lead Paint Laws:** Implement and enforce regulations limiting lead in paint, following national regulation. Bangladesh already has limited lead in paint to 90 PPM, yet enforcement of such laws is not enforced by regulatory authorities.

Rapid Market Screening Recommendations

8. Replicate Spice Adulteration Programs: Expand successful efforts to combat lead-based pigment adulteration in spices from Bangladesh and Georgia to other regions

9. Enforce laws and regulations to prevent lead-based chemical use in consumer products including spices, aluminum cookware, and ceramic foodware.

10. Further research: Conduct more research to confirm sources - Agricultural fields, chemical fertilizers, culture fish, and fish feed. Explore the exposure route of lead contamination through qualitative investigation

11. Building Capacity of Government: The research evidence suggests to urgent need to build the Health System's capacity to fight against lead poisoning

12. A national multi sectoral strategy and action plan is needed to address lead poisoning in Bangladesh.

13. Collaborate with the private sector to prevent the usage of leaded paint in toys, and leaded glaze in aluminum and ceramic cookware and foodware

14. Raise awareness: Public awareness and education is crucial to prevent the sources of lead exposure, collaborating with vendors and producers' associations is imperative to bring social and behavioural change and transforming the knowledge into practice level

Sources

1 Global Cost of Lead Exposure in Children and Adults. *The Lancet Planetary Health*. Larsen, Bjorn and Sánchez-Triana, Ernesto September 2023.

2 Rapid Market Screening Final Report. Pure Earth September 2023.