Rapid Marketplace Screening (RMS) in Bangladesh

**BACKGROUND**

Pure Earth has conducted Rapid Marketplace Screening (RMS) with support from GiveWell in 12 countries including Bangladesh.

Pure Earth developed and followed a sampling protocol based on a Desk Review Report (DRR) which summarized published literature on known lead exposure sources to inform initial sampling and analysis of products, commodities, and substances that may contain lead.

The trained investigators of Pure Earth conducted the formative research (FR) with the information presented in the DRR, visited the markets, and determined what lead-containing products to sample.

**OBJECTIVE**

To identify sources of lead exposure and prioritize countries for future interventions. This formative research is to guide a larger and more formal and comprehensive sampling and testing of selected ‘lead-positive’ products.

**METHODOLOGY**

Steps of RMS:

- Train the investigators on project goals, procedures, data entry process in SurveyCTO, and operating XRF instrument.
- Identify Markets
- During the market visit: Collect samples, fill out market-level questions, vendor-level questions, and product questions
- Level the samples with a Unique ID
- Level the sample photo and photo ID
- Analyze the samples via XRF
- Send selected samples for laboratory testing
- Upload the data using SurveyCTO

**XRF TESTING ON SAMPLES**

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 and at International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) lab.

**List of Markets Visited in Khulna Division**

1. Boro Bazar
2. Prantik Market
3. New Market

The Rapid Marketplace Screening (RMS) was conducted in Dhaka city in the first phase in December 2021, and in three divisions: Khulna, Rajshahi, and Barishal in the second phase in July 2022.
STUDY SAMPLES FROM KHULNA

In the Khulna division, a total of 75 samples of 11 types of items were screened: lead is found in 15 samples.

XRF ANALYSIS SAMPLES WITH LEAD (Low to High)

<table>
<thead>
<tr>
<th>Samples</th>
<th>Amount of lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Peeper</td>
<td>3 ppm</td>
</tr>
<tr>
<td>2. Turmeric</td>
<td>4 ppm</td>
</tr>
<tr>
<td>3. Nail polish</td>
<td>186 ppm</td>
</tr>
<tr>
<td>4. Aluminum Pan</td>
<td>186 ppm</td>
</tr>
<tr>
<td>5. Aluminum Mug</td>
<td>240 ppm</td>
</tr>
<tr>
<td>6. Aluminum Mug</td>
<td>252 ppm</td>
</tr>
<tr>
<td>7. Aluminum bowl</td>
<td>260 ppm</td>
</tr>
<tr>
<td>8. Steel cup</td>
<td>319 ppm</td>
</tr>
<tr>
<td>9. Aluminum Mug</td>
<td>444 ppm</td>
</tr>
<tr>
<td>10. Local paint red</td>
<td>572 ppm</td>
</tr>
<tr>
<td>11. Toy</td>
<td>606 ppm</td>
</tr>
<tr>
<td>12. Ceramic cup</td>
<td>822 ppm</td>
</tr>
<tr>
<td>13. Aluminum Pan</td>
<td>1496 ppm</td>
</tr>
<tr>
<td>14. Local paint yellow</td>
<td>1496 ppm</td>
</tr>
<tr>
<td>15. Local paint yellow</td>
<td>31300 ppm</td>
</tr>
<tr>
<td></td>
<td>31360 ppm</td>
</tr>
</tbody>
</table>

RECOMMENDATIONS

- Need to explore the exposure route of the lead contamination through qualitative investigation.
- Need to prioritize the lead exposure issue to conduct a national-level analysis of potential lead sources.
- Many consumer and food products do not have reference values/standards for using lead in the products. Need to standardize the use of lead.
- Strict monitoring and enforcement of the law and regulations are required to prevent using lead arbitrarily.
- Public awareness raising and capacity building of the relevant authority on lead issue is crucial to prevent the sources of lead exposure.

REFERENCE LEVELS

- Rice & cereals - less than 0.1 mg/kg as defined by WHO/FAO.
- Raw & processed turmeric - 2.5 ppm (mg/kg). (BSTI)
- Spices other than turmeric - 2mg/kg (QCVN 8-2:2011/BYT).
- Decorative Paint - 90ppm (UNEP, Bangladesh).
- Toys - 100ppm (US Consumer Product Safety Commission)
- Cosmetic & Vermilion (Sindoor) - 10-20 ppm (US FDA)

SAMPLES WITH HIGH LEVEL OF LEAD (Pb)

- Local Paint (Yellow) - 31360 ppm
- Aluminum (Pan) - 1496 ppm
- Ceramic (Cup) - 822 ppm
- Toy - 606 ppm
- Cosmetics (Nail polish) - 186 ppm