



Lead Poisoning

Health Toll + Solutions

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PURE EARTH

What: US-based non-profit since 1999

Mission: Reduce exposure to lead & mercury in LMICs

Staff: ~100 staff across HQ and 9 country offices

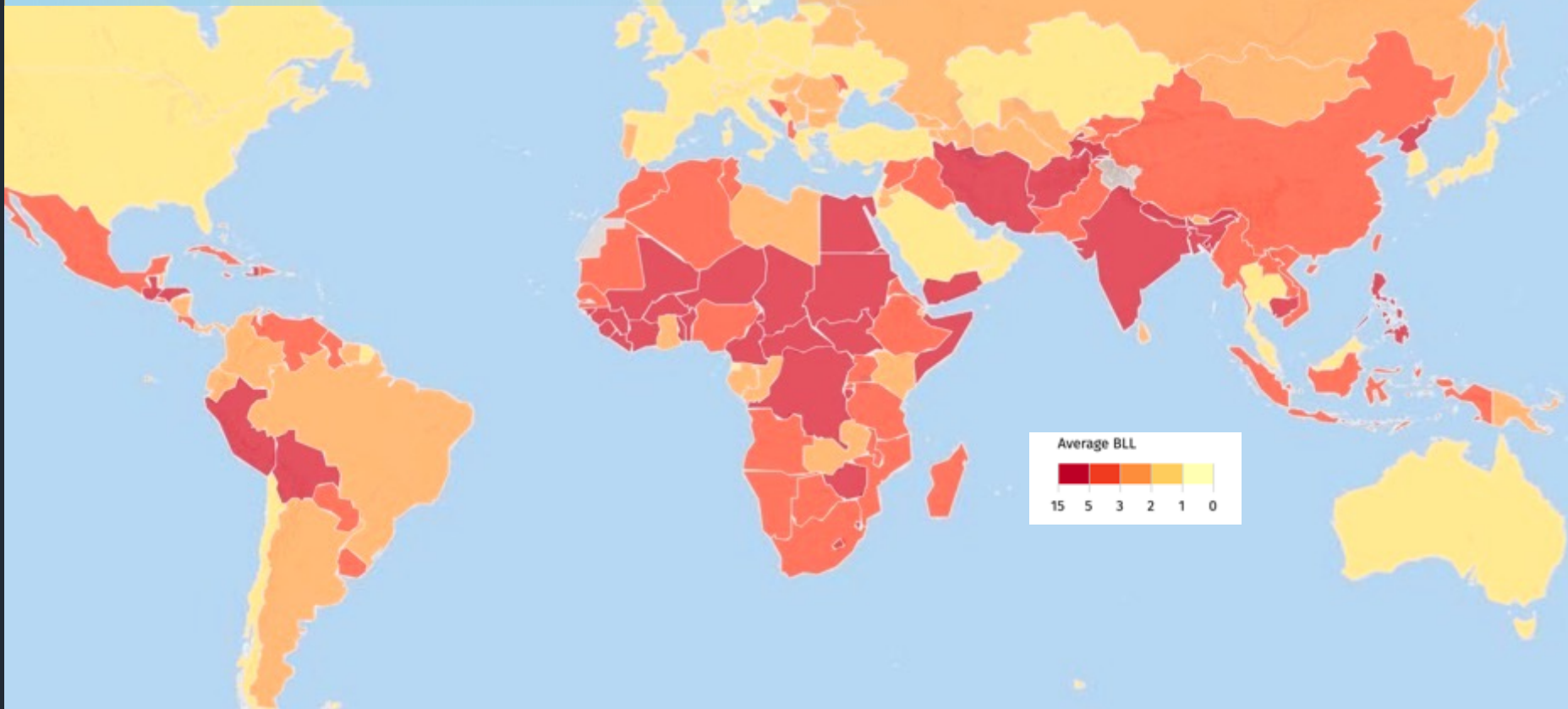
Budget: ~\$8M/yr (\$7M for lead work)

HQ + 8 Country Offices



CHILDHOOD LEAD EXPOSURE BY COUNTRY

www.LeadPollution.org





unicef 
for every child

 **PURE
EARTH**
BLACKSMITH INSTITUTE

2020 Toxic Truth report

Top findings:

- 1 in 3 kids has elevated BLL (815M)
- >90% in LMICs
- Information on exposure sources & solutions

The Toxic Truth: Children's Exposure to Lead Pollution Undermines a Generation of Future Potential

Global Impact

- Annual Deaths: 1.6 - 5.5M (heart disease)
- 765 million IQ points lost annually (World Bank)
- The average child in LMICs permanently loses 6 IQ point from lead exposure (World Bank)
- \$1- 6 trillion global GDP loss





Brain Damage and IQ Loss

- The body can't distinguish between calcium, which it needs, and lead, which damages all body systems
- Causes **permanent brain damage**
- Damages the prefrontal cortex, used for **decision making and mood control**
- Harms the hippocampus, used for **learning and memory**

Child and Maternal Health

- During pregnancy, lead is flushed from mother's bones into baby
- BLL ratio of mother to child is ~1:1
- Premature birth
- Low birth weight
- Impaired brain development
- Behavioral problems
- Impaired growth, motor skills

Source: The Toxic Truth, 2020, Pure Earth and UNICEF



Photo Credit: Pure Earth



Educational Toll

- Center for Global Development research:

Lead exposure may explain **20%**
of the learning gap between
rich and poor countries

- Children can be **exposed at school** through contaminated cookware, paint, and soil

Source: Center for Global Development, *How Much Would Reducing Lead Exposure Improve Children's Learning in the Developing World?*, 2023

Violence & Crime

2023 Systematic Review of Lead & Crime:

“... an excess risk for criminal behavior in adulthood exists when an individual is exposed to lead in utero or within childhood.”

US EPA, 2023:

“There is sufficient evidence to conclude that there is likely to be a causal relationship between lead exposure and conduct disorders, aggression, and criminal behavior”

Sources: [The association between lead exposure and crime: A systematic review](#);
EPA draft [Integrated Science Assessment](#) on lead



Exposure sources:

Exposure sources vary by country, state, city.

- Contaminated soil (ULAB, e-waste, smelting)
- Metal cookware
- Ceramic cookware
- Paint
- Cosmetics & religious powders
- Spices
- Foods
- Occupational (take home also)
- Toys
- Jewelry and amulets
- Water
- Traditional medicines
- Other consumer products



How Do We Identify Exposure Sources?

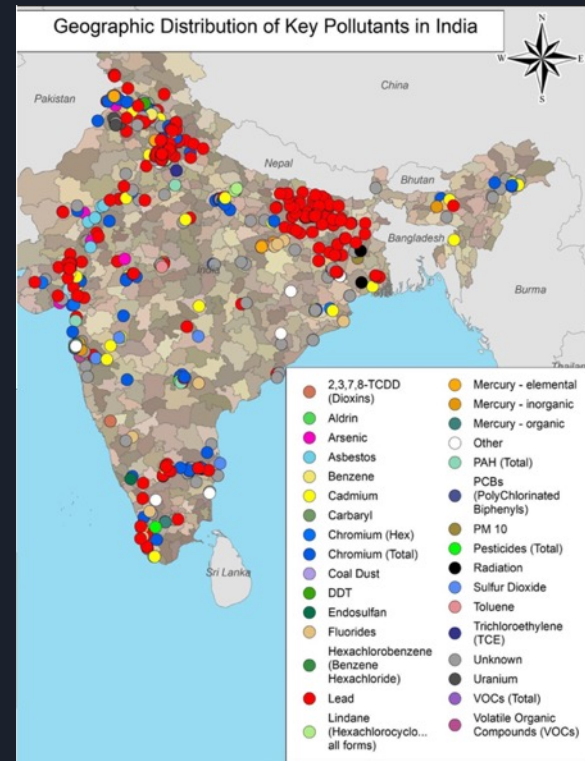
1. Home-Based Assessment



2. Market Goods Screening



3. Toxic Site Assessments





Rapid Market Screening



Rapid Market Screening

Tested lead levels in:

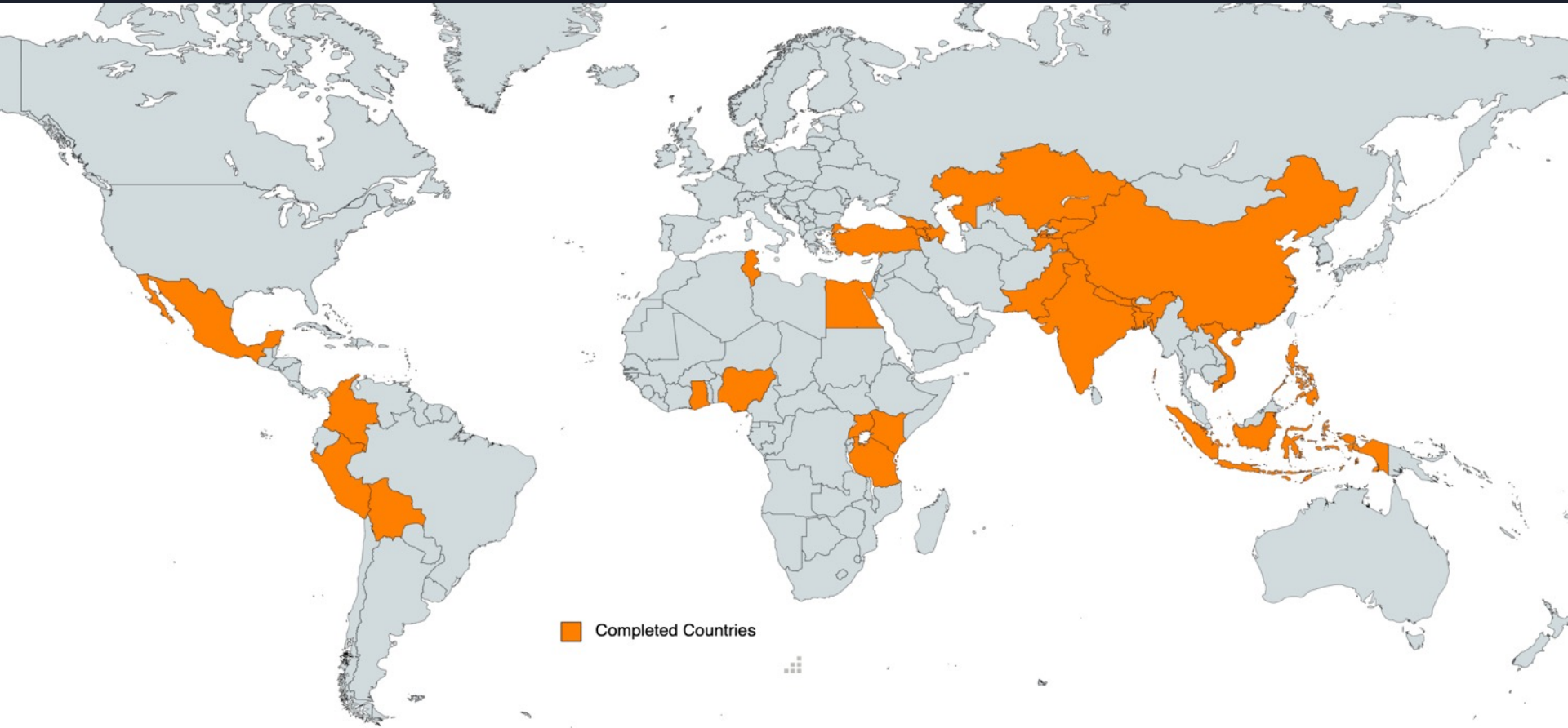
- 5,000+ items
- 25 countries
- 11 categories: Metal foodware, ceramic foodware, Plastic foodware, toys, paint, spices, dry foods, sweets, cosmetics, medicines
- Indicative, not conclusive
- See the [report](#) →



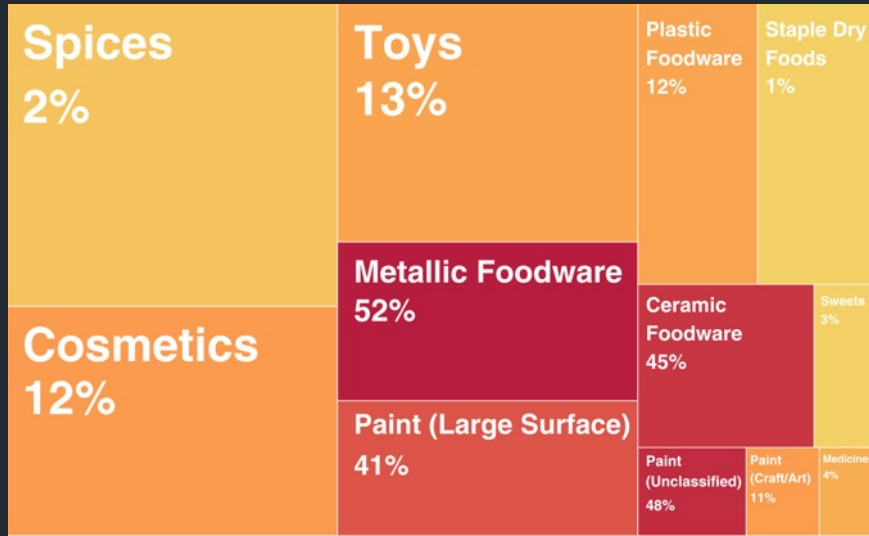
LEAD IN CONSUMER GOODS:

A 25-COUNTRY ANALYSIS OF LEAD (PB)
LEVELS IN 5,000+ PRODUCTS AND FOODS

Rapid Market Screening Countries



Findings by product type



% of Samples Above Reference Level



1%

52%

Box size is proportional to the number of samples in each product category

Across 5,010 samples: 18% contaminated

- **Metallic foodware:** 52% of 518 samples
- **Ceramic foodware:** 45% of 310 samples
- **Paints (large surfaces):** 41% of 437
- **Toys:** 13% of 781 samples
- **Plastic foodware:** 12% of 364 samples
- **Cosmetics:** 12% of 815 samples
- **Paints (art & special uses):** 11% of 70
- **Traditional and herbal medicines:** 4% of 54
- **Spices:** 2% of 1085 samples
- **Sweets:** 3% of 111 samples
- **Staple dry foods:** 1% of 362 samples



USG's Int'l Response

- USAID & EPA signed an MOU to collaborate on int'l lead issues
- USAID has aggressively raised awareness among major int'l stakeholders
- USAID & State Dept. have announced modest programs as first programmatic steps

Global Annual Deaths



HIV/AIDS
863,837

Tuberculosis
1,179,766

Malaria
643,381

Lead (Pb)
1,600,000
(at the low end)



International Funding

HIV/AIDS
\$9.9 billion

TB
\$2
billion

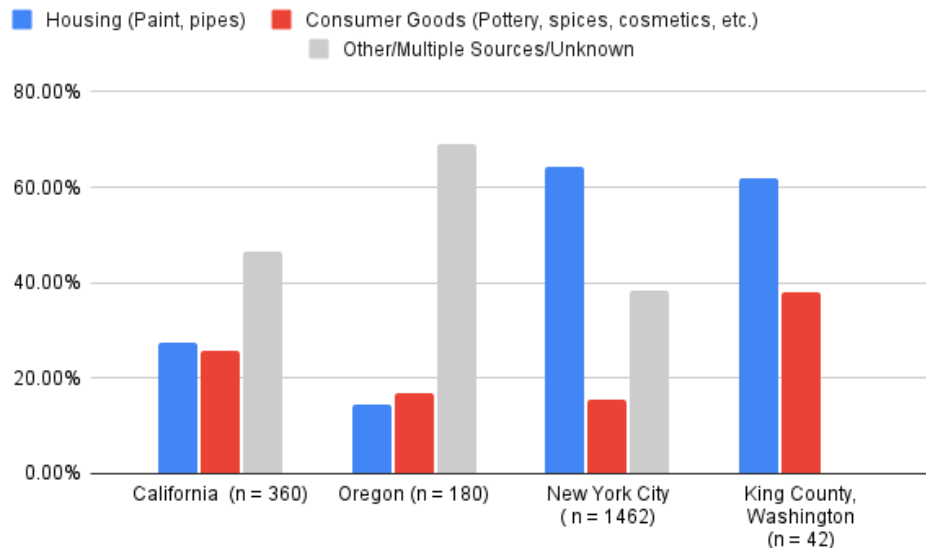
Lead
\$15
million

Malaria
\$2.4
billion



CONTAMINATED
PRODUCTS COME TO
THE U.S. TOO

Sources of Lead Exposure in U.S. Homes



Note: This figure presents housing and consumer-related sources of lead exposure. For information on other/multiple/unknown sources, please reference the paper (Porterfield et al, 2024).



Source: *Consumer Products as a Potential Source of Lead Exposure: A Snapshot Across Four U.S. Jurisdictions*, Porterfield et al, 2024 (pending publication)



Thank You

