Coefficient Giving

Global initiatives to combat lead exposure from ULAB recycling

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Background

Who we are and what we do

The Lead Exposure Action Fund launched in 2024 to support partners working to reduce lead exposure in LMICs.

Our strategy has 3 pillars:

- **Measurement:** Determining where and how people are exposed.
- **Mitigation:** Supporting policy and technical solutions to reduce exposure.
- **Mainstreaming:** Elevating lead as a priority issue for governments, aid agencies, and philanthropies.

Who we are and what we do

- We support work to understand and address major exposure sources.
- Our current level of understanding varies by source.

Source	Measurement (where and how bad it is)	Mitigation (how to get the lead out)
Paint	Well understood	Effective intervention being scaled
Spices	Ongoing characterization; now fairly well understood	Ongoing development, with early wins
Metallic cookware	Ongoing characterization	Early stages of development

ULABs as a source of lead exposure

- **Measurement:** Estimates are highly uncertain, but global modelling-based studies[1,2] suggest it may cause a significant share of the worldwide burden of lead exposure. More work is planned.
- **Mitigation:** Among lead sources, ULABs are among those to which solutions are less well developed. There are promising initial directions; validating and pursuing them requires investment and government buy-in.

[1] Crawfurd, Lee, James Hu, and Theo Mitchell. 'Beyond Hotspots: Estimating Population Lead Exposure from Battery Recycling'. *Environmental Pollution* 401 (July 2026): 128326. https://doi.org/10.1016/j.envpol.2026.128326.
[2] Ericson, Bret, Phillip Landrigan, Mark Patrick Taylor, Joseph Frostad, and Jack Caravanos. 'The Global Burden of Lead Toxicity Attributable to Informal Used Lead-Acid Battery Sites'. *Annals of Global Health* 82, no. 5 (2017): 686. https://doi.org/10.1016/j.aogh.2016.10.015.

ULABs as a source of lead exposure

- Pollution controls are costly, both to install and to operate.[3]
- Regulating ULAB recycling can be challenging.
- ULAB recycling is often highly polluting by default.

Backyard smelting	Low standard industrial smelting	High standard industrial smelting
		
Low investment costs	Mid investment costs	High investment costs
Low operational costs	Low operational costs	Mid operational costs
Lead recovery rate: 50-60%	Lead recovery rate: up-to 90%	Lead recovery rate: > 98%
Very polluting	Very polluting	Environmentally sound

[3]Wilson, Brian, and Andreas Manhart. 'Standard Operating Procedures for Environmentally Sound Management of Lead-Acid Batteries'. Sustainable Recycling Industries, December 2021.

Our strategy

How we're approaching ULABs

What we want the field to look like:

1. Major knowledge gaps and information asymmetries are addressed.
2. Governments have the capacity to pursue effective policies and technical solutions.
3. We've tested many plausible solutions and can start scaling the most promising ones.

Our high-level strategy:

1. Creating and disseminating research and public goods.
2. Building expertise in CSOs who partner with governments.
3. Exploring promising, scalable approaches to tackling the issue.

1. Research and public goods

- **UNICEF and others:** systematic pollution site mapping in multiple high-priority geographies (more on next slide)
- **Öko-Institut:** research to quantify pollution from different stages of the recycling process and from different plant types
- **Partnership for Battery Action:** “Battery Index”, a standardized assessment methodology to rate recyclers on their safety practices and lead exposure impacts

Systematic mapping of pollution sites

What our grantees will do: locate and characterize active and inactive lead-polluting industrial sites, including ULAB recyclers

Why this matters:

- Advancing our understanding of the relationship between proximity to sites and lead poisoning
- Informing governments of scale, distribution, and characteristics of ULAB recyclers in jurisdiction
- Identifying recyclers that governments can target for licensing, monitoring, and enforcement

2. Civil society capacity

Grantees we've supported to work on ULABs, and where they've worked (**Asia**):

- Clinton Health Access Initiative (**India**, Nigeria, Ethiopia)
- Coalition for Clean Lead (USA)
- Lahore University of Management Sciences (**Pakistan**)
- Lead-Acid Battery Recycling Initiative (**Philippines**, **Cambodia**)
- Lead-Free India (**India**)
- Lead Research for Action (Malawi)
- Öko-Institut (Nigeria)*
- Partnership for Battery Action (Nigeria, Ghana)
- Project Unleaded, Stanford University (**Bangladesh**, **Pakistan**)
- Pure Earth (**Indonesia**, Nigeria)*
- SRADev Nigeria (Nigeria)

*Excludes work supported by other funders

How our grantees partner with governments

Policy and regulatory advisory: Supporting governments to define standards for licensed, safe recycling and to promulgate locally tailored policies that favour safer recycling. **Lead-Acid Battery Recycling Initiative, Pure Earth, Öko-Institut.**

Enforcement and monitoring support: Providing tools and technical assistance to help governments directly intervene on unsafe recycling. This can involve helping to develop licensing methodologies, real-time pollution monitoring, and remote site detection. **Lead-Free India, Partnership for Battery Action, Project Unleaded.**

Procurement and market shaping support: Where governments and publicly controlled bodies are significant battery buyers, supporting these buyers to shift toward longer-life or lead-free batteries and ensure ULABs go to safer recyclers. **Clinton Health Access Initiative.**

3. Mitigation approaches

We're actively looking into 2 sets of approaches:

1. **Investments to make ULAB recycling safer**
    a. Recyclers get safer
    b. More ULABs reach safer recyclers
2. **Investments to reduce ULAB generation**
    a. Each battery recycled less often
    b. Fewer lead-acid batteries in use

We currently think the majority (but not all) of the most impactful work is here.

Some of the questions we're asking

Make ULAB recycling safer

Recyclers get safer

- Can currently unsafe recyclers be upgraded cheaply?
- Can cheaper pollution controls close the cost gap?
- Can real-time monitoring ensure installed pollution controls are always used?
- Where can existing technologies be repurposed, and where should we invest in novel technologies?

More ULABs reach safer recyclers

- Can we straightforwardly identify safer recyclers?
- Which market-based policies most effectively steer ULABs to safer recyclers?
- How can countries w/o safe capacity export ULABs?
- Can HIC sourcing rules boost safer LMIC recyclers?

Reduce ULAB generation

Each battery recycled less often

- How much of the LAB market can public procurement shift toward long-life LABs?
- What would favour the import of long-life LABs where they aren't domestically made?

Fewer lead-acid batteries in use

- What could accelerate the shift to other chemistries?
- What could blunt the e-mobility and off-grid solar LAB boom where recycling isn't safe?

Closing thoughts

What governments can do

1. Understand the scale and shape of your country's ULAB problem
2. Work with partners to devise and enact smart policies that reduce harm, likely including those that favour safer recycling
3. Strengthen monitoring and enforcement capacity
4. Follow the latest research and adopt new tools and methods to increase the effectiveness of #1-3

How philanthropy and MDBs can help

Philanthropy: flexibility and speed

- Creating and disseminating research products, public goods
- Seeding and growing CSOs with deep expertise and local context
- Piloting novel mitigation approaches with potential to scale

MDBs: scale and incentive

- Lending and financing for sustainable, capital-intensive interventions
- Lending and financing in ways that support policy change
- Lending and financing for longer-term remediation