

Project Unleaded

Global solutions for a future free of lead poisoning

Lead exposure: a deadly and costly health risk

Lead is one of the most toxic heavy metals and has profound consequences for human health. Exposure harms every system of the body, reducing victims' brain volume and increasing their likelihood of high blood pressure, heart disease, renal failure, and premature death. Children exposed to lead suffer irreversible consequences: lower IQs and decreased lifetime earnings. Globally, lead is responsible for approximately $6 trillion (USD) in economic losses and 5.5 million deaths.

Stanford's Project Unleaded

Stanford has conducted research on lead exposure for over a decade. After a successful collaboration that identified and eliminated lead chromate adulteration of turmeric in Bangladesh, Project Unleaded will expand existing work, with the goal of creating a future free of lead poisoning. To do so, we'll tackle the lead contamination problem from source to solution — identifying exposure pathways, investigating health impacts, and advancing solutions that reduce lead exposure.

Project Unleaded's approach to a lead-free future

1. Identifying and prioritizing the most important sources of lead poisoning.
2. Advancing field-appropriate rapid measurement techniques to detect lead in humans and the environment.
3. Developing, testing, and scaling up interdisciplinary interventions to eliminate major sources of lead contamination.



$6T USD

GLOBALLY, LEAD IS RESPONSIBLE FOR ~ $6 TRILLION (USD) IN ECONOMIC LOSSES



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Project Unleaded's Three Main Research Themes

1. Partner locally to identify critical lead exposure sources

WHY? Current global projections on lead poisoning make it difficult to pinpoint key sources of contamination, hindering strategic and targeted prevention efforts. A key question is "where is the lead that is getting into people's bodies coming from?" Local data, from years of research in Bangladesh, has proven far more effective in driving interventions than relying on global estimates.

HOW? We use interdisciplinary tools like epidemiological surveys, qualitative interviews, and chemical forensics to identify the dominant sources, patterns, and health impacts in affected populations.

WHERE? We are conducting this research in South Asia, a region with high levels of lead poisoning. In partnership with UNICEF in Bangladesh we are working to codify the source-attribution toolset and make it globally available.

2. Advance a global strategy to sustainably eliminate spices as a source of lead exposure

WHY? Spices – and specifically turmeric – have been identified as a key contributor to lead levels in several countries. The problem arises when some processors, unaware of the health risks, add lead chromate as a color-enhancing pigment, to make their product a more vibrant yellow. Spices can be separately targeted for intervention, as has been accomplished in Bangladesh.

HOW? Project Unleaded is collaborating with local and global partners to assess the problem of lead-tainted spices and advance successful interventions to eliminate lead chromate adulteration. We will also make tools publicly available for anyone to conduct assessments and implement interventions globally.

WHERE? The issue has been resolved in Bangladesh and the Republic of Georgia, and we are actively working toward this in India and Pakistan.

3. Investigate and address pollution from the lead-acid battery industry

WHY? Most global lead use is in lead-acid batteries, but the industry's impact on population-level lead exposure, pollution levels, and health impacts are not well understood, nor are the next steps for mitigating it.

HOW? Building off Project Unleaded's work in Bangladesh, we will characterize exposure to lead pollution from battery manufacturing and recycling, investigate industry incentives that drive lead exposure, and develop interventions that shift incentives towards a lead-free future.

WHERE? Our team of researchers from Stanford and ICDDR,B in Bangladesh have identified the battery industry as the major source of elevated blood lead levels (likely from inhalation of lead particulates) in young children in Dhaka.

Who are we?

Project Unleaded is a highly collaborative effort that involves various Stanford partners as well as global partners. The research is led by Dr. Jenna Forsyth and Dr. Steve Luby at Stanford, and global partners include UNICEF, LEEP, Pure Earth, Frameworks, icddr,b, UC Berkeley, Aga Khan University, Lahore University of Management Sciences, and the American Spice Trade Association. The King Center on Global Development has been a key funder.

Check out our website for more information and publications.

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