UN & WHO Lead Paint Alliance Annotated Bibliography of Recent News

The LEAD Group Inc charity in Australia, asked Claude AI to write an Annotated Bibliography of the articles – many of them from the Center for Global Development (CGD) website - listed in the "In the News" section of "Eliminating lead paint matters!" 17 April 2026, by the Lead Paint Alliance or more fully, the Global Alliance to Eliminate Lead Paint. This article is the result.

LID is the Library Identifier from The LEAD Group's Library Database.

Introduction *[to United Nations and World Health Organisation Lead Paint Alliance 17 April 2026 newsletter, which was published in full as UN & WHO Lead Paint Alliance Plethora of Global Events in The LEAD Group's* LEAD Action News vol 23 no 3*, April 2026 at both www.lead.org.au and www.leadsafeworld.com]*

The Alliance is pleased to present its April 2026 newsletter in which we share updates about the ongoing work to phase out lead paint worldwide, including new lead-related resources, updates on progress towards laws, and lead paint in the news.

In the News: Lead Paint and Other Sources of Lead Exposure

These articles do not necessarily reflect the views or work of the Global Alliance to Eliminate Lead Paint.

Information and Action to Address Health Effects of Lead Exposure

The Long-Lasting Effects of Early Childhood Lead Exposure: Evidence from Piston-Engine Aircraft Emissions

Duong and Zhong. November 2024,
https://papers.thaotduong.com/Thao_Duong_Lead_Exposure.pdf [LID 29307]

United States, drawing on Texas longitudinal student data. National in scale, with global relevance for any jurisdiction where piston-engine aircraft (PEA) still use leaded fuel. Duong and Zhong exploit the sharp post-9/11 decline in PEA traffic as a natural experiment, employing difference-in-differences and instrumental variable strategies to estimate the causal effects of early childhood lead exposure on long-term outcomes. They find that a one-unit increase in PEA-emitted lead exposure from kindergarten through third grade significantly reduces educational attainment (lower test scores, lower high school graduation rates, reduced college enrolment) and adult labour market earnings, with marginal effects on school absenteeism and disciplinary incidents. The paper takes the CDC's 2021 reference value of 3.5 µg/dL as the relevant policy threshold and argues that even at the low

blood lead levels typical of post-leaded-gasoline America (down more than 90% since the 1970s), early-life lead exposure imposes substantial lifetime costs. The named source is PEA emissions, currently the largest remaining contributor to airborne lead in the US, as PEA is the only aircraft type still using leaded fuel.

2024 Volcano Art Prize
Elizabeth O'Brien: *Petition for our children:* Lead-Safety Message: Please sign my Petition EN6714 - Circular Economy for Lead to not only stop new lead mines digging more lead out of the ground but also start collecting and recycling ALL the lead already in circulation in Australia.
Description of Work: iPhone 13 photos collaged in Powerpoint. https://volcanoartprize.com/portfolio-item/petition-for-our-children/ [LID 28163]

Beyond mining: A pioneer attempt to assessing lead exposure risks in Nigeria

Fabolude et al. Environmental Impact Assessment Review. July 2025, https://www.sciencedirect.com/science/article/abs/pii/S0195925525001209?via%3Dihub [LID 29308]

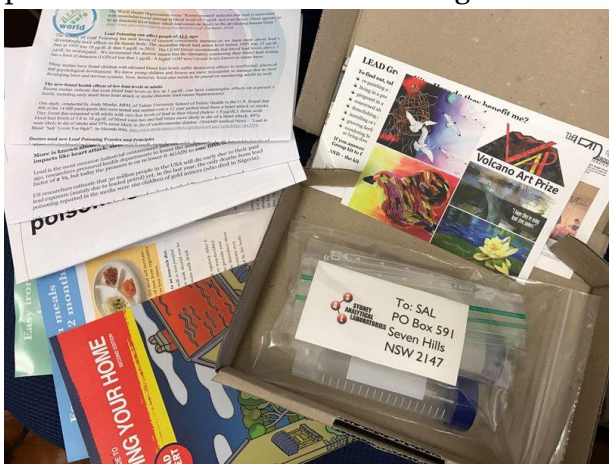
Nigeria, nationwide across all states. National in scale, with explicit methodological transfer to other LMICs facing similar data constraints. Fabolude and colleagues construct a Lead Exposure Index for Nigeria's states using Principal Component Analysis applied to road density, aerosol optical depth, poverty, and Google Trends data. The index identifies urban centres (Lagos and the Federal Capital Territory) and northern states as high-risk areas, extending the well-known artisanal-mining narrative into a broader account of exposure driven by urbanisation, road traffic, and environmental factors. Temporal Google-Trends analysis shows a spike in public interest following the 2010 Zamfara crisis, then a rapid decline, which the authors flag as a case for sustained awareness campaigns. The study does not measure blood lead levels: the authors explicitly note that the unavailability of direct BLL data is a constraint on validation, and they recommend nationwide BLL testing as a priority. Sources of exposure named: artisanal mining (historically dominant), road-traffic-related emissions, lead-based products, and environmental aerosols. The work is positioned as a screening methodology for countries where direct exposure data are sparse.

APEC calls for roadmap to eliminate lead from new water systems in Asia-Pacific Region

KTLA. July 2025, https://ktla.com/business/press-releases/ein-presswire/835952140/iapmo-supports-apec-workshop-in-south-korea-on-safe-drinking-water/ [LID 29312]

Asia-Pacific Economic Cooperation (APEC) region, with the workshop held in Incheon, South Korea (26-31 July 2025) and participation from the Philippines, Indonesia, the United States, Chile, China, Chinese Taipei, Malaysia, Thailand, Singapore, and Vietnam. Regional in scale, with implications for

global drinking-water-standards harmonisation. The article is a press release reporting on the APEC workshop "Strengthening Standards and Technical Regulations for Safer Drinking Water", supported by IAPMO, which aims to develop a collective roadmap for safer and more sustainable drinking water and sanitation systems across APEC economies. The workshop addresses material safety standards for plumbing products, prevention of contamination, supply chain integrity, and mutually recognised conformity assessment to reduce technical trade barriers. The framing statistic is that more than 2.2 billion people worldwide lack access to safely managed drinking water. No blood lead levels are reported. Lead is addressed implicitly via plumbing-material safety; explicit lead-source naming and concentration data are not included in the press release itself, though the LAN newsletter framing positions it as relevant to eliminating lead from new water systems.



2017 Volcano Art Prize
Andriam Bala: ***New Brass taps often add lead to water:*** **Lead-Safety Message:** Test your water before drinking from a brass tap or rainwater system using a LEAD Group Water Kit or Comprehensive Kit.
Description of Work: iPhone 4s video production with cinematography by Elizabeth O'Brien and editing by Malveek Kaur Dhaliwal.
https://volcanoartprize.com/portfolio-item/new-brass-taps-often-add-lead-to-water/ [LID 18507]

Evaluation of Lead Concentrations in Blood Samples from Donors in a Tertiary Hospital Located in the Niger Delta, Nigeria

Uku et al. International Journal of Research and Reports in Hematology. August 2025, https://journalijr2h.com/index.php/IJR2H/article/view/182/399 [LID 29309]

Nigeria, Port Harcourt in the Niger Delta. Regional in immediate scope, with implications for transfusion safety wherever donors live in heavily oil-polluted environments. Uku and colleagues ran a cross-sectional study of 246 male blood donors at the University of Port Harcourt Teaching Hospital blood bank, measuring blood lead by atomic absorption spectrophotometry. Mean blood lead level was 35.94 plus or minus 19.09 µg/dL (median 32 µg/dL), with 94.7% of donors above the WHO and ATSDR action threshold of 5 µg/dL and only 5.3% below it. The 18 to 25 age group, accounting for 65.4% of donors, carried the highest BLLs ($p = 0.013$). Strikingly, 96.3% of donors were non-smokers, did not work in lead-exposed occupations, and lived neither near paint factories nor refuse dumps, yet still showed grossly elevated BLLs, pointing to ambient environmental contamination as the dominant driver. All donors reported regular seafood consumption. The authors locate the cause in decades of oil-multinational and artisanal-refining pollution of Niger Delta air, soil, water, and seafood, and call for routine BLL screening of donor blood used for neonates, pregnant women, and young children. Sources of lead named: petroleum-industry environmental contamination (hydrocarbons and co-pollutants), illegal artisanal refining, polluted seafood, and ambient air.

Preventing lead (Pb) contamination in rural community water systems in LMICs

through analytical screening, policy and standards enforcement, and supply chain interventions

Roy et al. Groundwater for Sustainable Development. November 2025, https://www.sciencedirect.com/science/article/pii/S2352801X25001067 [LID 29298]

Ghana, with field work across seven rural districts (Bawku West, Builsa South, Fanteakwa, Garu, Sekyere East, West Gonja, Zabzugu) spanning three regions; global in implication for low- and middle-income country (LMIC) water supply chains. Roy and colleagues screened 101 rural water systems (84 India Mark II and Afridev borehole handpumps, 17 mechanised piped systems with taps) installed during 2019 to 2022, using a handheld X-ray fluorescence (XRF) analyser. Despite manufacturer assurances of lead-free components, 56.5% of handpump tanks (47/84) and 100% of mechanised-system taps (17/17) exceeded the NSF 372 / IPC lead-free standard of 0.25% Pb by weight; tap brasses ran up to 3.84% Pb and tanks up to 2.29%. Riser pipes, rods, cylinders, and foot valves generally complied. The team engaged original equipment manufacturers to source stainless steel substitutes; the switch lifted total system installation cost by 2% or less. No new blood lead levels are reported (the study is component-screening, not biomonitoring), but the authors frame the work against the WHO 5 µg/dL action level and prior data showing 9% of Ghanaian rural water samples above the 10 µg/L WHO Pb guideline. Sources of lead named: leaded brass and bronze fittings, galvanised steel tanks, and locally forged replacement valves within global LMIC plumbing supply chains, especially Indian-manufactured handpump components.

2024 Volcano Art Prize
Elizabeth O'Brien: *Lead Paint Recycling:* Lead-Safety Message: Strip old paint safely, recycle lead paint waste, make lead acid batteries from 100% recycled lead, toward achieving a circular economy for lead.
Description of Work: iPhone 13 photo.
https://volcanoartprize.com/portfolio-item/lead-paint-recycling/ [LID 28189]

A simple kit to detect extractable lead concentrations in soil

Moura et al. Geoderma. September 2025, https://www.sciencedirect.com/science/article/pii/S0016706125003441?via%3Dihub [LID 29310]

United States and Peru, with field validation in mining-impacted Peruvian towns. Global relevance for low-cost soil-lead screening in any community lacking access to laboratory ICP-MS or XRF. Moura, van der Molen, and van Geen describe a simplified field kit (single plastic test tube, soluble glycine hydrochloride capsule, pH paper, and a cotton swab impregnated with sodium rhodizonate) costing under USD 1 per test. Soil is extracted in simulated gastric fluid; the swab turns purple in the presence of bioaccessible lead. Tested on 201 paired samples from the US and Peru, the kit shows roughly 85% sensitivity and specificity at a threshold of approximately 200 mg/kg extractable Pb, with a method limit of detection near 600 mg/kg. The kit was deployed by nearly 2,000 high school students who collected and tested about 1,500 soil samples across three Peruvian mining towns. No blood lead

levels are measured: the focus is on the proximate exposure pathway. Source of lead addressed: contaminated soil, particularly from mining and historic paint, screened at household and community scale.

2025 Volcano Art Prize
Anna Mutton: *Still Waters Heavy Metals:* Lead-Safety Message: Lead contamination continues affecting drinking water supplies and environments; an aurora arcing gently over a quiet mountain range and undisturbed lake reflects how ecosystems react to pollutants we cannot perceive. **Description of Work:** Watercolour and acrylic paint on watercolour paper. https://volcanoartprize.com/portfolio-item/still-waters-heavy-metals/ [LID 28707]

NESREA seals 29 facilities in S'West for environmental pollution

PUNCH. September 2025, https://punchng.com/nesrea-seals-29-facilities-in-swest-for-environmental-pollution/ [LID 29311]

Nigeria, with enforcement actions in Ogun, Ekiti, and Osun states (south-west). National in scale, with implications for ULAB (used lead-acid battery) recycling enforcement across West Africa. PUNCH reports that the National Environmental Standards and Regulations Enforcement Agency (NESREA) sealed 29 facilities, nine of them battery and scrap-metal recyclers in the Ogijo community of Ogun State. NESREA Director General Innocent Barikor cites improper disposal of hazardous slag from battery recycling and notes that "tests have revealed the presence of lead in residents, resulting in illnesses and deaths"; no specific blood lead level values are reported in the article. Cited offences include failure to conduct staff blood-lead tests, lack of fume-treatment plants, indiscriminate black-oil discharge, manual battery breaking and washing, and non-compliance with Extended Producer Responsibility under the National Environmental (Battery Control) Regulations 2024. Sources of lead named: informal ULAB recycling, battery slag, and uncontrolled smelter emissions. The remaining 20 closures spanned construction, quarrying, plastics, food processing, and stone milling.

Buffalo forfeits more than $1 million in federal lead funds

Investigative Post. September 2025, https://investigativepost.org/2025/09/11/buffalo-forfeits-more-than-1-million-in-federal-lead-funds/ [LID 29313]

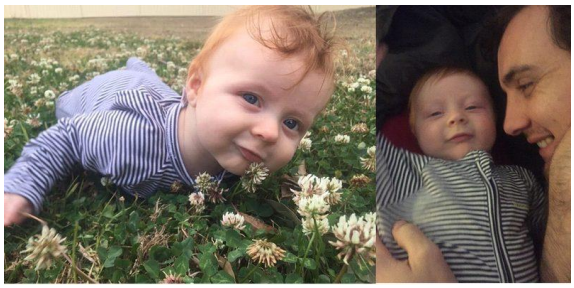
United States, Buffalo, New York. Local in scale, with broader implications for US municipal stewardship of federal lead-remediation grants. Investigative Post reports that the Buffalo Urban Renewal Agency (BURA) is forfeiting roughly USD 1.2 million of a USD 2 million 2021 HUD Lead Hazard Reduction Program grant, having spent or earmarked only USD 796,050. Of 110 homes originally targeted for lead-hazard remediation, work has been completed or contracted on just 34 units. HUD denied a second extension request. The article quotes advocates and elected officials describing the underspend as a "major failure" and "incompetence", and cites Buffalo's 14212 ZIP code as having the highest confirmed-child-lead-poisoning rate in New York State, with a quarter of children tested in 2020 showing elevated blood lead levels (specific BLL concentrations not stated;

"elevated" follows the NYS Department of Health reporting threshold). Source of lead: deteriorated lead-based paint in older rental housing stock. The story closes with state-level enforcement (a USD 515,000 settlement against a San Diego landlord over 14 children exposed in Buffalo properties).

Chicago has the most lead pipes in the nation. We mapped them all

Grist. September 2025, https://grist.org/accountability/chicago-lead-pipe-replacement-map-health/ [LID 29314]

United States, Chicago, Illinois. Local in scale, with national implications under the US EPA's Lead and Copper Rule Improvements (LCRI) and federal lead service line replacement deadlines. A Grist / Inside Climate News / WBEZ partnership analyses city Department of Water Management inventory data obtained by public records request and publishes an interactive address-level map of lead, suspected-lead, galvanized-requiring-replacement, and non-lead service lines. Chicago holds the nation's largest stock, with an estimated 412,000 of roughly 491,000 service lines containing or suspected of containing lead; the city's current replacement schedule will not finish until 2076, three decades past the federal deadline. The burden is racially patterned: 92 percent of service lines need replacement in majority-Latino census tracts, 89 percent in majority-Black tracts, 74 percent in majority-white tracts, and 65 percent in majority-Asian tracts. No blood lead level measurements are reported; the article frames cumulative exposure risk alongside industrial air pollution. Source of lead: lead and galvanised water service lines, gooseneck connectors, and internal plumbing in pre-1986 housing.



2019 Volcano Art Prize
Justine Cooney: *Good grass cover protects a baby from leaded soil:* Lead-Safety Message: Good grass cover or mulch or paving stops access to leaded soil but when a baby starts to crawl, parents have to stay very close to stop contaminated soil going in the mouth. **Description of Work:** Smartphone photos collaged using Word and Paint. https://volcanoartprize.com/portfolio-item/good-grass-cover-protects-a-baby-from-leaded-soil/ [LID 20246]

Toward a Lead-Free Future: Mobilizing to End Childhood Lead Exposure

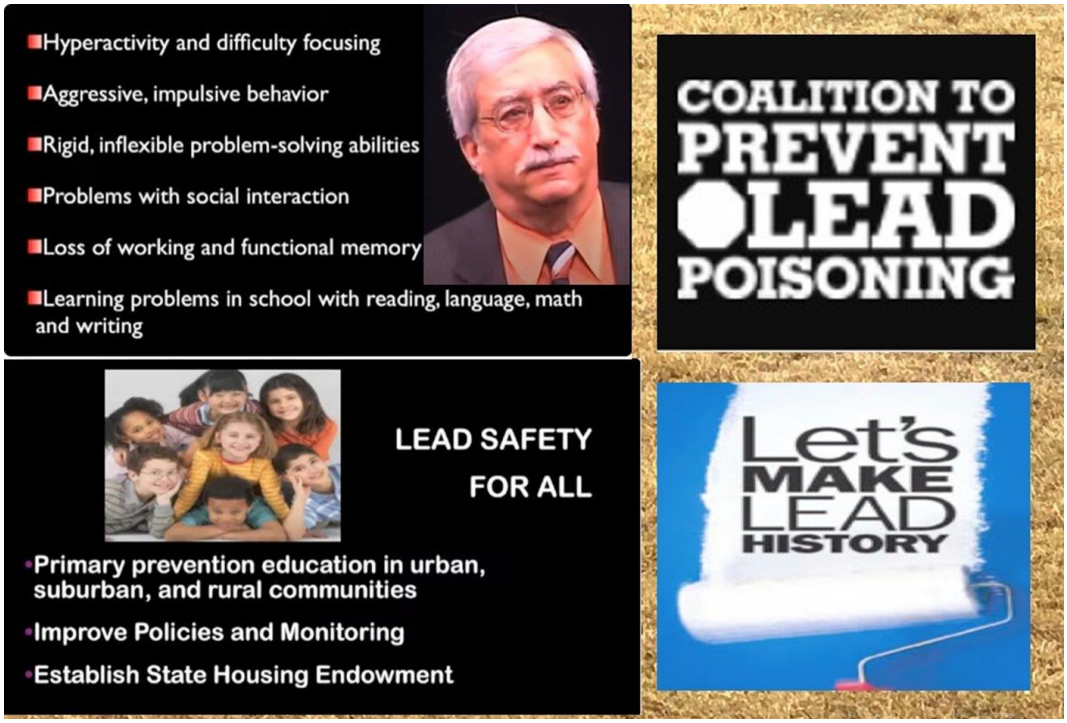
Partnership for a Lead-Free Future (PLF). September 2025, https://www.leadfreefuture.org/events-and-resources/events/toward-lead-free-future-mobilizing-end-childhood-lead-exposure [LID 29315]

Global, with country leadership drawn from Bhutan, Bangladesh, Guinea, Ethiopia, and Vietnam. Global in scale, with operational implications for LMIC ministries of health and the UN system. The Partnership for a Lead-Free Future (PLF) convened a high-level breakfast during the 2025 UN General Assembly to accelerate action and investment toward ending childhood lead exposure. The page anchors the now-standard PLF framing statistic: lead poisoning affects 1 in 3 children worldwide, undermining health, education, and economic potential, with the heaviest burden in low- and middle-income countries. The central question posed is what it will take, technically, politically, and financially, to deliver a lead-free future. No blood lead level figures are reported in the event description itself; the "1 in 3" figure corresponds to the IHME / UNICEF threshold of 5 µg/dL. Sources of lead are not enumerated on the event page. Speakers included PM Tshering Tobgay (Bhutan), UN DSG Amina Mohammed (video), UNICEF Executive Director Catherine Russell, UNEP Executive Director Inger Andersen, and health ministers from Bangladesh, Guinea, Ethiopia, and Vietnam, plus Open Philanthropy's Lead Exposure Action Fund and Bloomberg Philanthropies.

Mobilizing to End Childhood Lead Poisoning: Year 1 Progress Update

Partnership for a Lead-Free Future. September 2025, https://www.leadfreefuture.org/events-and-resources/knowledge-library/mobilizing-end-childhood-lead-poisoning-year-1-progress [LID 29316]

Global, with the PLF Secretariat housed at UNICEF in New York. Global in scale, with direct implications for the UN system, LMIC ministries of health, and philanthropic donors funding lead-poisoning programmes. The Partnership for a Lead-Free Future (PLF) reports on its first twelve months of coordinated action to end childhood lead poisoning. Stated achievements include increased government focus, expansion of the evidence base through national blood lead surveys and environmental assessments, and growth of the membership to include additional governments, multilateral organisations, civil society groups, and philanthropic actors (notably Open Philanthropy and Bloomberg Philanthropies). The headline figure shared at UNGA80 estimates that USD 1.6 billion invested over 15 years could eliminate lead poisoning as a significant health issue in LMICs. No new blood lead level data are reported in the progress update itself, which frames its case against the standing PLF / UNICEF "1 in 3 children" estimate (BLL above 5 µg/dL). Sources of lead are not enumerated in this top-line summary; the progress update functions as an annual report rather than primary research.



2025 Volcano Art Prize

Ralph Spezio, School Principal: *Put Children First:* Lead-Safety Message: When we have slain the lead monster, we will truly know we have put children first. **Description of Work:** TEDxRochester video presentation from 1 November 2010, created using PowerPoint and Paint; combines screenshots illustrating learning and behavioural problems caused by lead exposure alongside three actionable solutions. https://volcanoartprize.com/portfolio-item/put-children-first/ [LID 28914]

Toward a Lead-Free Future: The Fase for Action Now

Devex. September 2025,

https://www.youtube.com/watch?app=desktop&v=cPRVaIQnkYc&utm_source=lead [LID 29317]

Global, side event co-hosted in New York during the 80th United Nations General Assembly. Global in scale, with framing aimed at development financiers and policy ministries in low- and middle-income countries. The Devex YouTube recording (full video not transcribable through web fetch) accompanies a sponsored Devex article ("Toward a lead-free future: the case for action now", October 2025) drawn from a side event organised by Devex and Open Philanthropy alongside the Partnership for a Lead-Free Future. The framing argument is that childhood lead poisoning affects roughly 800 million children annually yet receives disproportionately little global attention and funding, and that tackling it is technically and fiscally tractable. The discussion calls for layered national models in which governments set rules, formal industries lift standards, and community organisations ground delivery, and flags low-cost sensors and smartphone-based screening as scalable testing platforms. No new blood lead level values are reported; the "800 million" framing follows the standard UNICEF / IHME estimate at the 5 µg/dL threshold. Sources of lead are not enumerated in this strategic-framing piece.

Improving the Lead Impact Model Biokinetic modeling for lead exposure attribution

Rethink Priorities. September 2025, https://rethinkpriorities.org/wp-content/uploads/2025/09/Improving-the-Lead-Impact-Model.pdf [LID 29318]

Global, with empirical anchoring in Pure Earth's Rapid Market Screening (RMS) sampling across 25 LMICs. Global in scale, with implications for how the burden of lead poisoning is apportioned across exposure sources in donor priority-setting. Rethink Priorities, working with Open Philanthropy and Pure Earth, presents an exploratory revision of Pure Earth's Lead Impact Model (LIM). The revised module estimates population-level blood lead burdens from individual sources using a modified version of the US EPA Adult Lead Methodology (ALM), with three modifications: a leaching-rate parameter for indirect sources (paint to dust, cookware to food), separate child (0 to 6 years) and adult (7+) compartments aligned with the IEUBK model, and age-specific gut absorption fractions. The output metric is cumulative population BLL (mean BLL multiplied by exposed population). No new measured BLL values are reported; the inputs are 5,000 RMS consumer-product samples and home-based assessments. The authors are emphatic that outputs are not yet fit for resource-allocation decisions. Sources of lead modelled: lead-adulterated food and spices (best suited), cookware leaching, paint-to-dust shedding, toys, soil, dust, water, and air. Indirect and environmental pathways remain the largest uncertainty.

Using Lead Isotopes as Tracers of Ocean Pollution

Olivelli. Nature Reviews Earth & Environment. September 2025, https://www.nature.com/articles/s43017-025-00728-0 [LID 29319]

Global oceans, with named observations spanning the Atlantic, Pacific, and Canadian Arctic. Global in scale, with implications for post-leaded-gasoline pollution surveillance and the GEOTRACES marine geochemistry programme. In a Nature Reviews Earth & Environment "Tools of the Trade" piece, Olivelli (Imperial College London, now Flanders Marine Institute) explains how lead isotope ratios (rather than bulk concentrations) are used to attribute oceanic lead pollution to specific sources, since industrial lead from coal combustion, smelting, incineration, and leaded gasoline carries distinct isotopic fingerprints relative to natural background. The 2021 global ban on leaded petrol is documented as having reduced concentrations in the Atlantic and Pacific, yet anthropogenic lead has still reached the deep ocean, including remote Arctic waters, and sometimes appears in isotope ratios without an accompanying concentration rise. No blood lead level values are reported; the medium is seawater, not human tissue. Sources of lead named: coal combustion, metal smelting, waste

incineration, and the legacy plume from leaded gasoline. The article is positioned as a methodological brief for monitoring emerging and unrecognised pollution pathways.

Environmental Lead Risk in the 21st Century

Chen et al. Communications Earth & Environment. September 2025, https://www.nature.com/articles/s43247-025-02735-x?utm_source=lead-update.cgdev.org [LID 29320]

Global, with explicit disaggregation by high-income versus low- and middle-income countries. Global in scale, with implications for the next decade of lead policy as the electrification-driven lead-acid battery industry expands. Chen and colleagues, in this open-access Communications Earth & Environment review, argue that the apparent victory over environmental lead is partial: in many LMICs the initial post-leaded-petrol decline in mean blood lead levels has flattened or reversed, with mean BLLs remaining above the WHO intervention level. They estimate annual global economic loss from contemporary childhood lead exposure exceeding USD 3.4 trillion (2021 USD, PPP-adjusted), with the burden falling overwhelmingly on LMICs. Current annual lead production is around 16 million tonnes, dwarfing the total nine million tonnes emitted from leaded petrol historically. Sources of lead emphasised: legacy contamination, ongoing coal combustion, lead-acid battery manufacture and informal recycling, and lead-containing consumer goods. Specific population-level BLL values are not pulled into the abstract; the paper benchmarks against the WHO BLL reference value of 5 µg/dL. The authors identify four areas requiring urgent policy intervention to prevent a resurgence.

2021 Volcano Art Prize
Consolata Frigil Kimario and Nancy Mwangi Njeri (performers); Dr Faridah Hussein Were (poet): *Working together to eliminate lead paints from the universe:* Lead-Safety Message: Effects of lead on children, such as low IQ, men and women as well as the environment. Encouraging stakeholders to work together to eliminate lead paints from the universe. **Description of Work:** A poem by Dr Faridah Were performed by two of her students on the 9th International Lead Poisoning Prevention Week of Action, 24-30 October 2021. https://volcanoartprize.com/portfolio-item/working-together-to-eliminate-lead-

paints-from-the-universe/ [LID 25806]

FG Inaugurates National Working Group to Eliminate Lead Poisoning in Nigeria

Arise News. September 2025, https://www.arise.tv/fg-inaugurates-national-working-group-to-eliminate-lead-poisoning-in-nigeria/ [LID 29321]

Nigeria, with the workshop convened in Abuja and recent outbreaks cited in Zamfara, Niger, and Sokoto states. National in scale, with regional implications for West African lead-poisoning governance. Arise News reports the Federal Ministry of Health and Social Welfare's inauguration of the National Interagency Working Group on Lead Poisoning Elimination and a two-day workshop to finalise and validate the Five-Year National Strategic Plan on Lead Poisoning Elimination. Coordinating Minister Muhammad Ali Pate (represented by Permanent Secretary Daju Kachollom) framed lead poisoning as a public health crisis affecting children's neurodevelopment and adults' cardiovascular, renal, and reproductive systems. The article cites the 2010 Zamfara outbreak (over 400 child deaths from artisanal-mining-related exposure), the 2015 Niger State outbreak, and fresh 2024 cases in Zamfara and Sokoto. No quantitative blood lead level values are provided. Sources of lead named: artisanal gold mining and associated ore processing, with implied secondary contamination of soil, crops, homes, workplaces, and water. The group's mandate spans exposure assessment, policy review, workforce capacity, and sustainable financing, coordinating across the Ministries of Environment, Solid Minerals, Steel, Agriculture, and Water Resources, NESREA, NAFDAC, SON, UNICEF, WHO, Resolve to Save Lives, and MSF (chelation therapy delivery partner).

Assessment of lead levels in decorative paints and potential health risks in Malawi

Mologo et al. Discover Environment. September 2025, https://link.springer.com/article/10.1007/s44274-025-00365-w?utm_source=lead-update.cgdev.org [LID 29322]

Malawi, with sampling in Blantyre, Lilongwe, and Mzuzu (covering the Southern, Central, and Northern regions). National in scale, with implications for African Lead Paint Elimination Project (GAELP) implementation and Malawi's regulatory limit of 90 mg/kg (90 ppm). Mologo and colleagues analysed 66 paint samples (high-gloss enamel, emulsion, undercoat, and primer) from 8 local manufacturers and 3 importers, plus paint flake samples from old primary school buildings, by flame atomic absorption spectrometry (ISO 6503:1984). Locally manufactured gloss enamel yellow paints recorded lead concentrations far exceeding the 90 mg/kg Malawi Standard, with values reported up to 20,740 mg/L; imported paints were substantially lower. A child human-health-risk assessment (EPA Exposure Factors Handbook ingestion model, body weight 31.9 kg, 100 mg/day ingestion, 180 days/year, 6-year exposure) was used to derive hazard quotients and incremental lifetime cancer risk for paint-flake ingestion in school environments. The study does not measure blood lead levels in Malawian children but cites earlier reports of high BLLs and the WHO reference value of 5 µg/dL. Sources of lead identified: solvent-based decorative paints (especially yellow, red, green colorants) and deteriorating school-building paint dust.

2020 Volcano Art Prize
Michael Musenga: ***Working to eliminate lead paint in Zambia:*** **Lead-Safety Message:** Lead Safe Zambia by 2020. **Description of Work:** Documents a 2016-2017 lead paint study in Zambia by the Children's Environmental Health Foundation (CEHF) that prompted government regulations banning paints exceeding 90 ppm lead content. https://volcanoartprize.com/portfolio-item/working-to-eliminate-lead-paint-in-zambia/ [LID 19830]

Lead batteries are poisoning millions of children. Here are 3 proven ways to stop it

Pawar. Vox. September 2025, https://www.vox.com/future-perfect/462703/lead-batteries-poisoning-solutions-brazil-epr-policy [LID 29323]

Global, with detailed case studies of Brazil, China, South Africa, the Philippines, India, Nigeria, Mexico, and the United States (Flint, Michigan reference point). Global in scale, with explicit policy-transfer claims for low- and middle-income countries. Pawar, writing in Vox Future Perfect, names informal used lead-acid battery (ULAB) recycling as one of the leading and most neglected global sources of childhood lead exposure: a typical car battery contains 15 to 20 pounds of lead worth about USD 15 at world prices, and roughly 10,000 to 30,000 informal smelters operate worldwide. The article cites the standard "1 in 3 children, 800 million globally" figure with blood lead levels at or above the Flint, Michigan crisis benchmark (no specific µg/dL value is given in the excerpt, though this maps to the WHO 5 µg/dL reference). The piece outlines three proven interventions: Brazil's removal of value-added tax on used-battery sales to licensed recyclers (which lifted formal recycling above 75% by 2022), China's enforced shutdown of illegal smelters paired with formal-sector incentives, and South Africa's extended-producer-responsibility take-back mandate. The World Bank 2023 estimate of USD 6 trillion annual GDP loss (about 7%) is cited. Sources of lead: informal ULAB recycling (acid drained on ground, lead plates melted in makeshift furnaces, slag dumped in fields and streams), plus poorly run formal plants in Nigeria and Mexico.

Elevated blood lead levels and associated risk factors among school children in a non-industrialized city in Indonesia

Nurjannah et al. PLOS One. October 2025, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0332301 [LID 29324]

Indonesia, Banda Aceh (Aceh Province, northern Sumatra), a non-industrialised city. National in scale, with implications for under-studied Indonesian populations outside known ULAB and smelter hotspots. Nurjannah and colleagues enrolled 130 randomly selected schoolchildren between October and December 2022 and measured venous blood lead alongside structured questionnaires on family demographics and household environment. Mean BLL was 3.01 plus or minus 1.14 µg/dL; 32 of 130 children (24.6%) had elevated BLLs at the CDC reference value of 3.5 µg/dL or higher. Multivariate analysis identified three independent risk factors for elevated BLL: male sex (OR 4.47, 95% CI 1.44 to 13.85, p = 0.009), mother's lower educational attainment (OR 3.85, 95% CI 1.35 to 10.95, p = 0.011), and corrugated iron roof on the home (OR 8.77, 95% CI 1.03 to 74.81, p = 0.047). Age, welfare status, water source, paternal smoking, and urban versus rural residence were not significant. The corrugated iron roof finding implicates rainwater-runoff and dust pathways. Sources of lead discussed in framing: ULAB recycling, leaded paint, cigarettes, foodstuffs, cookware, water pipes, furniture, house roofs, and traditional cosmetics. The authors call for larger samples and a national monitoring system, noting Indonesia has none.

2021 Volcano Art Prize
Shristi Lohani: *Beware of the lead paint in kids toys:* Lead-Safety Message: Let's be careful we are not handing lead painted toys to our kids. **Description of Work:** Digital photo. https://volcanoartprize.com/portfolio-item/beware-of-the-lead-paint-in-kids-toys/ [LID 27721]

The Impact of Lead Water Pollution on Birth Outcomes: A Natural Experiment in Scotland

Higney et al. Environmental and Resource Economics. October 2025, https://link.springer.com/article/10.1007/s10640-025-01041-6 [LID 29325]

Scotland, Edinburgh and Glasgow plus surrounding areas. National in scale for the UK; methodologically important globally for any jurisdiction undertaking lead pipe replacement. Higney and colleagues exploit two natural experiments in Scotland (water-pH treatments in the 1970s and a second round in the 1980s to 1990s) introduced to suppress the dissolution of lead from plumbing into Edinburgh's and Glasgow's soft, acidic upland-catchment water supplies. The historical exposure context is striking: in 1975, 33% of Scottish households had water lead above 50 µg/L, and 50% of surveyed Glasgow households exceeded 100 µg/L, levels comparable to the worst contemporary global readings (Ericson et al. 2021). Using a staggered difference-in-differences design on roughly 650,000 birth and mortality records linked to maternal address (1975 to 2000), the authors find no consistent effect of the water-treatment-induced lead reduction on birthweight or under-5 mortality, though the minimum detectable effect cannot rule out 1 to 3 deaths prevented per 1,000 births. Blood lead level

values for the cohort are not reported in this paper; the prior Glasgow and Edinburgh lead studies are cited. Source of lead: lead pipes and fittings releasing lead into soft, acidic drinking water (plumbosolvency). The result diverges from North American studies finding birthweight and mortality effects, prompting calls to investigate mediating pathways.

Candidate biomarkers of lead-exposed municipal water biofilms provide insights into lead monitoring potential

Mirza et al. Journal of Applied Microbiology. October 2025, https://academic.oup.com/jambio/article-abstract/136/10/lxaf247/8275757 [LID 29326]

United States, laboratory pipe-loop experiments by a multi-institution team (Memphis, Clemson). Global in scale, with implications for drinking-water lead monitoring in any distribution system using plastic service lines. Mirza, Hadiuzzaman, Ladner, Salehi, and Brown developed biofilms inside cross-linked polyethylene (PEX-A) and high-density polyethylene (HDPE) pipe loops, exposed them to lead at 0, 5, and 500 µg/L for 4 and 8 weeks, then ran a 4-week recovery phase in lead-free water. Using 16S rRNA bacterial metabarcoding and biomarker analyses, they show that lead exposure measurably shifts biofilm microbial community structure and identify a set of indicator taxa whose abundance signatures persist after lead is removed. The take-home: candidate biofilm biomarkers offer a complementary, possibly more sensitive, route to detecting historical and intermittent lead contamination than spot water sampling, which can miss episodic releases. No blood lead level data are reported (the study is microbiological). Source of lead in the experimental design: simulated plumbing release from premise-plumbing pipe materials into drinking water, the same pathway dominating contemporary US drinking-water lead exposure.

Impact of Occupational Lead Exposure on Lung Cancer Risk in Korean Male Workers: A Retrospective Cohort Study

Lee et al. Cancer Research and Treatment. October 2025, https://e-crt.org/journal/view.php?doi=10.4143/crt.2025.282 [LID 29327]

Republic of Korea, nationwide. National in scale, with implications for IARC reclassification of inorganic lead carcinogenicity (currently Group 2A in humans) and for occupational safety regulators in any industrialised economy with similar surveillance. Lee, Lee, Yoon, and Ye conducted a retrospective cohort study of 26,092 male workers identified from the Korean nationwide Special Health Examination Data with measured 2009 blood lead concentrations, linking to the national cancer registry across 1999 to 2020 with a five-year wash-out period and a mean follow-up of 9.98 years. Compared with workers having blood lead below 3.130 µg/dL, adjusted standardised incidence ratios for lung cancer were 2.95 (95% CI 1.47 to 5.27) for blood lead 3.130 to 4.899 µg/dL and 3.13 (95% CI 1.82 to 5.00) for blood lead at or above 4.900 µg/dL, after adjustment for age, smoking, exposure duration, and co-exposures to other lung carcinogens. The dose-response trend is statistically significant. The finding sits well below the conventional occupational action threshold (10 µg/dL in many jurisdictions; 5 µg/dL under recent NIOSH revision), arguing for tightened standards. Source of lead: occupational exposure across Korean industries; sectoral breakdown is not given in the abstract.

B-274 Leveraging Dried Blood Spots (DBS) for Universal Lead Screening in Children Free

Olaniyan et al. Clinical Chemistry. October 2025, https://academic.oup.com/clinchem/article/71/Supplement_1/hvaf086.661/8270208 [LID 29328]

United States, conference abstract from the AACC / ADLM annual meeting. National in scale, with global relevance for any country implementing universal childhood lead screening but lacking phlebotomy capacity. Olaniyan, Kocemba, and Dahal address the recurring screening-compliance bottleneck: in 2016, nearly 600,000 US children aged 1 to 5 years had whole blood lead at or above the CDC reference value of 3.5 µg/dL, and several states have moved to universal screening for this age group, yet attendance for venipuncture remains the rate-limiting step. The team developed and validated an Inductively Coupled Plasma Tandem Mass Spectrometry (ICP-MS/MS) method for quantifying lead in dried blood spot (DBS) samples, framed as an at-home collection workflow to lift compliance with universal screening. Specific limit of detection, linear range, and venous-versus-DBS correlation values from the validation are not retrievable from the abstract via web fetch (the meeting-supplement landing page is Cloudflare-protected). Sources of lead are not enumerated; the work is methodological. The implicit policy framing reinforces that no blood lead level in children is considered safe and that the relevant action threshold is 3.5 µg/dL under the 2021 CDC reference value.

Protein Powders and Shakes Contain High Levels of Lead

Consumer Reports. October 2025, https://www.consumerreports.org/lead/protein-powders-and-shakes-contain-high-levels-of-lead-a4206364640/ [LID 29329]

United States, with implications for any Western dietary-supplement market lacking heavy-metal limits. National in scale (US), with cross-border relevance because many tested products are exported. Consumer Reports tested 23 dairy-, beef-, and plant-based protein powders and ready-to-drink shakes, sampled across multiple lots from major US retailers, for total protein, arsenic, cadmium, and lead. More than two-thirds of products exceeded CR's daily safety level for lead in a single serving, with some exceeding it by more than tenfold. CR's daily level of concern is 0.5 µg of lead per day; two plant-based products delivered 1,200 to 1,600% of this level per serving (between 6 and 8 µg of lead per serving), and CR's chemist Tunde Akinleye flags that average lead per serving has risen since the 2010 round of testing. Plant-based products averaged nine times the lead of dairy-based products and twice that of beef-based. No blood lead level measurements are reported; the dose model is cumulative dietary exposure with no safe lead threshold acknowledged. Sources of lead named: bioaccumulation in plant protein sources (notably rice, pea, hemp, soy) grown on lead-contaminated soils; the article also names the absence of FDA limits for heavy metals in supplements as a structural driver.

2021 Volcano Art Prize
Monika Mangal: *Switch your Lead Contained Lipstick to Lead free:* Lead-Safety Message: Lead and other trace metals may be found in many lipsticks; these occur naturally and can accidentally contaminate other ingredients during production. **Description of Work:** Photograph captured using an iPhoneX device. https://volcanoartprize.com/portfolio-item/switch-your-lead-contained-lipstick-to-lead-free/ [LID 27748]

Knowledge on lead exposure among Paint workers in Kirtipur Municipality, Nepal

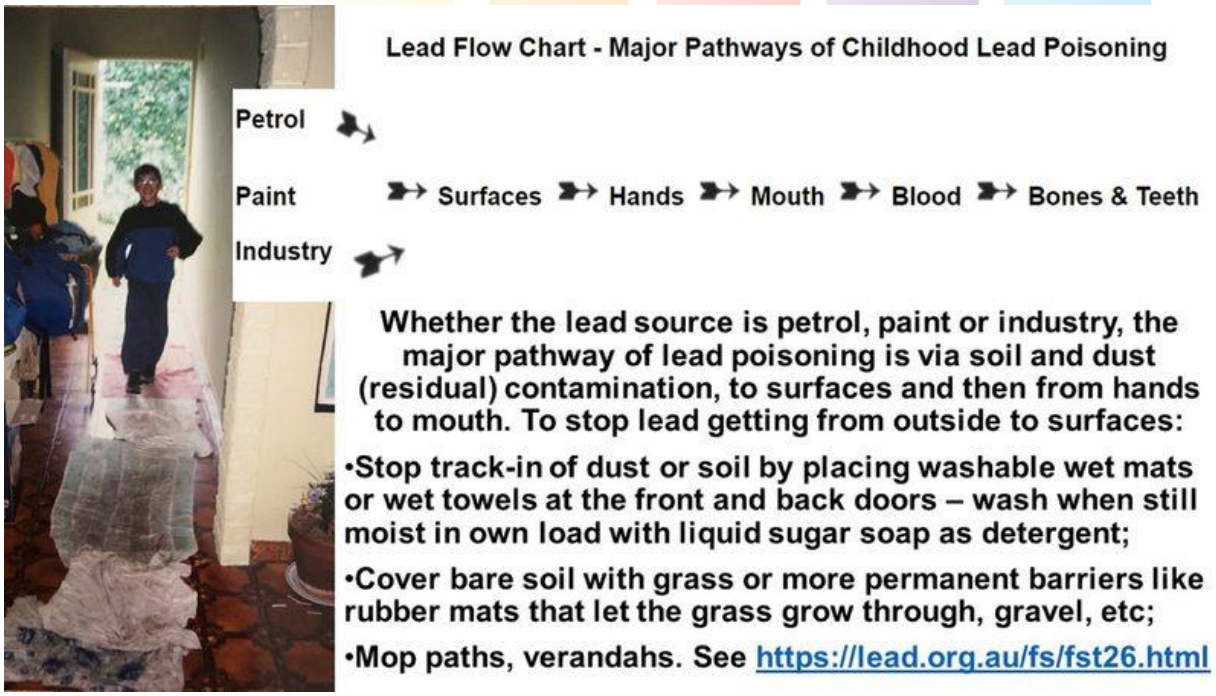
Paudel et al. International Journal of Occupational Safety and Health. October 2025, https://www.nepjol.info/index.php/IJOSH/article/view/70468 [LID 29330]

Nepal, Kirtipur Municipality (Kathmandu Valley). Local in scale, with implications for occupational health programmes across South Asian construction and decorative paint trades. Paudel and colleagues from the Nepalese Army Institute of Health Sciences and Patan Academy of Health Sciences conducted a cross-sectional study of 108 paint workers (each with at least two years of exposure) between June and August 2024, using semi-structured interviews and venous haemoglobin estimation. Mean participant age was 37.6 plus or minus 9.8 years, mean years of paint-work exposure 15.3 plus or minus 8.9 years, and mean shift length 9.4 plus or minus 2.1 hours per day. Only 10 of 108 workers (9.3%) had good knowledge of lead exposure; headache was the commonest reported symptom of lead toxicity. Formal training on hazards and safety was strongly associated with better knowledge (p less than or equal to 0.001), whereas age, work duration, experience, and education were not. On haemoglobin testing, 28 of 108 workers (25.9%) were anaemic. Blood lead levels were not measured: anaemia is used as a proxy. Sources of lead implied: occupational inhalation and dermal exposure during decorative-paint mixing, spraying, and sanding in residential and commercial settings, with no indication of consistent personal protective equipment use.

The strange role of lead poisoning in humanity's success

The Economist. October 2025, https://www.economist.com/science-and-technology/2025/10/15/the-strange-role-of-lead-poisoning-in-humanitys-success [LID 29331]

Global, with fossil specimens drawn from Africa, Asia, and Europe and contemporary laboratory work led from Southern Cross University, Mount Sinai, and UC San Diego. Global in scale, with deep-time implications for how humans evolved tolerance to a neurotoxic metal that is now re-emerging as a public health threat. The Economist summarises a Science Advances study (October 2025) that analysed dental enamel and dentine from 51 hominids, spanning modern humans, Neanderthals, Australopithecus africanus, and the extinct great ape Gigantopithecus blacki, using high-precision laser-ablation geochemistry. Distinct childhood-formed "lead bands" indicate repeated episodes of lead intake from natural sources (volcanic activity, lead-rich water and soil) and from mobilisation of skeletal lead during illness or stress, established as a recurring feature of hominid life for millions of years. Genetic and organoid follow-up suggests modern humans carry adaptations conferring greater resilience to lead's neurodevelopmental effects than archaic relatives. No blood lead levels are reported (enamel and dentine lead, not BLL, are the medium); the framing is paleoenvironmental rather than clinical. Sources of lead named: natural geochemical exposure, volcanic eruptions, and bone-stored lead released under physiological stress. The pointed framing: industrial lead lands on a species already biologically familiar with the metal.



2022 Volcano Art Prize
Elizabeth O'Brien: ***Wet towels collecting leaded soil off Harry's shoes:*** **Lead-Safety Message:** Stop leaded soil track-in with wet washable towels at the back door. **Description of Work:** Photography combined with online materials from the LEAD Group, assembled using PowerPoint.
https://volcanoartprize.com/portfolio-item/wet-towels-collecting-leaded-soil-off-harrys-shoes/ [LID 26565]

Prenatal and Early Postnatal Lead Exposure, Sensitive Periods, and Later Adult Mental Health

Lin et al. JAMA Psychiatry. October 2025,
https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2840553 [LID 29332]

United States, St. Louis, Missouri. National in scale (US), with global implications for life-course evidence on prenatal lead and psychiatric outcomes. Lin and colleagues used the Saint Louis Baby Tooth Later Life Health Study (SLBT), a cohort whose deciduous (baby) teeth were banked in childhood during the 1950s to 1970s and which has been reassembled in adulthood to assess long-term outcomes. Of 5,131 SLBT participants, 718 (13.3%) had baby teeth analysed for lead with 695 and 697 contributing to the depression and anxiety endpoints respectively. Lead was quantified across tooth layers corresponding to gestational and early postnatal periods (a sensitive-period design). An interquartile-range increase in combined tooth lead was associated with nearly twofold odds of major depressive disorder in later adulthood, with the late prenatal (approximately third trimester) window emerging as the most sensitive period. Late prenatal and postnatal lead were associated with greater adult anxiety symptoms but not with categorical generalised anxiety disorder. Tooth lead, not blood lead, is the medium; no µg/dL BLL values are reported. Source of lead: ambient mid-twentieth-century US exposure dominated by leaded gasoline and lead paint.

Togo steps up fight against lead in consumer products

Togo First. October 2025, https://www.togofirst.com/en/health/2910-17430-togo-steps-up-fight-against-lead-in-consumer-products [LID 29333]

Togo, with workshop convened in Lomé on 27 October 2025. National in scale, with explicit regional

alignment to the Economic Community of West African States (ECOWAS) and the Global Alliance to Eliminate Lead Paint. Togo First reports that the Ministry of Environment, supported by the international NGO Lead Exposure Elimination Project (LEAP), brought together paint manufacturers, importers, artisans, and industry stakeholders to coordinate the phase-out of lead from paints, varnishes, cosmetics, and other consumer products. Mery Yaou (Director of Environment) framed the workshop as awareness-raising and safer-practice promotion. LEAP representative Nafissatou Cissé positioned the meeting around enforcement of the ECOWAS regulation setting a 90 parts-per-million (90 mg/kg) lead concentration limit in paints, consistent with WHO recommendations, and noted that all ECOWAS member states must adopt and enforce this standard. No blood lead level measurements are reported. Sources of lead named: industrial and decorative paints, varnishes, cosmetics, and other everyday consumer products. Secretary-General Koffi Aoufoh Dimizou reaffirmed government commitment to strengthening the environmental regulatory framework.

Life in the World's Most Polluted Town

Action for Southern Africa. October 2025, https://actsa.org/wp-content/uploads/2025/10/REPORT_-LIFE-IN-THE-WORLDS-MOST-POLLUTED-TOWN-Online-version-1.pdf [LID 29334]

Zambia, Kabwe (former lead and zinc mining town in Central Province). National in scale, with global implications for historic-pollution corporate accountability and the wider Anglo American class action heard by South Africa's Supreme Court of Appeal in November 2025. Action for Southern Africa (ACTSA), Environment Africa Zambia, London Mining Network, and Rights and Accountability in Development (RAID) document Kabwe's status as among the most lead-polluted towns on earth, with soil lead in residential areas exceeding 3,000 mg/kg (compared with the US EPA 400 mg/kg residential screening level). The report cites that 95% of local children have blood lead levels above the threshold considered to cause brain damage; specific µg/dL distributions are summarised at the report-launch level (the figure corresponds to BLL above 5 µg/dL using the historical 10 µg/dL baseline from earlier Kabwe surveys, with many children far higher). Health outcomes detailed include miscarriage, stillbirth, prenatal harm, impaired neurodevelopment, lower IQ, and behavioural and cognitive disorders. Over 100,000 to 140,000 people are framed as affected. Sources of lead: legacy soil and dust contamination from nearly a century of Broken Hill (later ZCCM, formerly Anglo American interest) lead and zinc mining and smelting, including tailings and uncovered slag heaps still present in the town.

2017 Volcano Art Prize
Isla MacGregor: *Peeling lead paint polluting patios and potato patches:*
Lead-Safety Message: Use a LEAD Group Kit to test for lead in peeling paint, dust, water and soil before you plant your potatoes or let your children play on the patio. **Description of Work:** Photograph. https://volcanoartprize.com/portfolio-item/peeling-lead-paint-polluting-patios-and-potato-patches/ [LID 18390]

Untold: Toxic Legacy

Laura Hughes. Financial Times. October 2025, https://www.ft.com/untold?utm_source=lead-update.cgdev.org&utm_medium=newsletter&utm_campaign=cgd-lead-poisoning-bi-weekly-update-october-31 [LID 29335]

United Kingdom, with named case material from Leeds and reporting across England. National in scale, with regulatory implications for the Department of Health and Social Care, Defra, and the UK Health Security Agency's Lead Exposure in Children Surveillance System (LEICSS). The Financial Times "Untold: Toxic Legacy" podcast and accompanying long-read series, reported by Laura Hughes (launched 22 October 2025), is the output of a two-year investigation arguing that the UK faces an unrecognised childhood lead-poisoning epidemic. The series opens with the death of a toddler in Leeds from lead poisoning and includes statements that "millions" may be unknowingly at risk, prompting the UK government in late 2025 to reconsider routine childhood blood-lead screening (a citizen-led study has since launched per GOV.UK). Specific national blood-lead level distributions are not provided in the publicly accessible podcast summaries; the relevant statutory action level remains 5 µg/dL under the UK Lead Exposure in Children Surveillance System. Sources of lead surfaced across the series: deteriorating lead paint in older housing, lead water-pipe and solder legacy, contaminated food and consumer products, and gaps across housing, environmental, and food standards systems. The author's pointed framing: "officials do not know how big the problem really is."

Heavy metal contamination in urban agriculture: evidence from Nairobi

Murphy et al. Environmental Science and Pollution Research. October 2025, https://link.springer.com/article/10.1007/s11356-025-37030-x [LID 29336]

Kenya, Nairobi County. National in scale (Kenya), with implications for food-safety surveillance in any LMIC reliant on informal urban agriculture. Murphy and colleagues used a random geographical sampling strategy to recruit dark-leafy-greens farmers across Nairobi, supplementing with kale samples from peri-urban wholesale markets. Samples were analysed at the Kenya Plant Health Inspectorate Service (KEPHIS) for lead, cadmium, and mercury. Mean lead contamination was 0.68 mg/kg (0.68 ppm); cadmium 0.09 mg/kg; mercury 0.11 mg/kg. Spatial analysis shows crops grown closer to roadways carry higher lead, and those near industrial sites carry higher mercury; native indigenous greens and out-of-county kale offered no clear contamination advantage. Combining contamination with dietary intake data, the authors estimate that 71% of adults and 69% of children consuming leafy greens in their sample exceed daily reference intakes for lead, with 12% exceeding cadmium and 52% exceeding mercury reference levels via greens alone. No blood lead level measurements are reported; exposure is modelled from food. Sources of lead named: residual contamination from leaded petrol along roads, urban industrial emissions, contaminated irrigation water from open drainage channels, and historical soil contamination. The pointed finding is that a public-health recommendation to increase leafy-green intake for micronutrients sits in tension with current contamination levels.

2023 Volcano Art Prize
Shitemi Owen: *Anti Lead in Paint Campaign Cake:* Lead-Safety Message: This cake symbolises the successful work of the University of Nairobi Chemistry Students Association and Basco Paints of raising lead poisoning awareness and introducing lead-free paints to Kenya. **Description of Work:** Marks the 10-year anniversary of the WHO International Lead Poisoning Prevention Week of Action 2022 campaign to ban lead paints. https://volcanoartprize.com/portfolio-item/anti-lead-in-paint-campaign-cake/ [LID 27630

Lead Exposure and Antisocial Behavior: A Systematic Review of Human and Animal Evidence

Shaffer et al. Environment International. November 2025, https://www.sciencedirect.com/science/article/pii/S0160412025005379?utm_source=lead-update.cgdev.org [LID 29337]

Global evidence base spanning human cohort and animal toxicology studies. Global in scale, with implications for public health, criminal justice, and policy framings that link environmental lead to behavioural outcomes. Shaffer and colleagues conducted a systematic review (registered protocol, 2022) of peer-reviewed epidemiological and toxicological literature in PubMed, BIOSIS, and Web of Science through June 2024. From more than 15,000 records screened, 43 epidemiological studies and 37 animal studies met inclusion. Outcomes assessed include aggression, conduct and antisocial personality disorders, and violation of social norms (delinquency and crime). The review concludes that there is a likely causal association between lead exposure and antisocial behaviour, with the strongest human evidence for violation of social norms (rated moderate certainty) and converging animal evidence for aggression. The synthesis does not pool a single dose-response curve but is consistent with effects extending into the low blood-lead range relevant to contemporary populations (no µg/dL threshold is asserted; the underlying primary studies span historical and contemporary BLLs). Sources of lead are not quantified in the review since it is a meta-analytic synthesis, but the included primary studies span leaded gasoline, paint, occupational, and dietary exposures.

Significant reduction of blood and tissue lead and cadmium concentrations in free-range and broiler chickens through soil remediation with biochar, phosphates, and calcined dolomite: Implications for public health and food safety

Tembo et al. Journal of Hazardous Materials Advances. November 2025, https://www.sciencedirect.com/science/article/pii/S2772416625003183?utm_source=lead-update.cgdev.org [LID 29338]

Zambia, with field setting in Kabwe, the same legacy lead and zinc mining town discussed in the ACTSA report (LID 29334). National in scale, with implications for any region where ULAB recycling or mining contaminates poultry-rearing soils. Tembo and colleagues evaluated four soil amendments, biochar, triple superphosphate, phosphoric acid, and calcined dolomite, for their capacity to immobilise lead and cadmium in contaminated soils and thus reduce concentrations in free-range and broiler chicken blood, liver, and kidney. The publicly visible abstract describes "significant" reductions in blood and tissue lead and cadmium across treated groups relative to untreated controls; specific percent reductions and µg/g tissue values were not retrievable through web search and the

ScienceDirect full text was bot-blocked in this pass. Sources of lead addressed: legacy mining and smelting contamination of household-yard and free-range chicken-rearing soils in Kabwe, with food-chain implications for residents who consume their own poultry and eggs. No human blood lead level values are reported; the human-health implication is dietary (food safety) rather than direct measurement. The authors position the work as a low-cost, locally sourceable amendment package for mine-affected households.

2020 Volcano Art Prize
Elizabeth O'Brien: *Is my breakfast lead poisoning me?:* Lead-Safety Message: Is there too much lead in my breakfast or is the lead leaching out of my bones now that I'm 64, or both? **Description of Work:** iPhone 8 photos collaged in Powerpoint. https://volcanoartprize.com/portfolio-item/is-my-breakfast-lead-poisoning-me/ [LID 19828]

UK reconsiders screening for lead poisoning in children

Laura Hughes. Financial Times. November 2025, https://www.ft.com/content/e27fffd8-a698-4137-b9be-71d9b00f37f1 [LID 29339]

United Kingdom, national. National in scale, with implications for screening policy across other high-income countries that do not currently mandate childhood blood-lead testing. The Financial Times news article by Laura Hughes (paywalled, accessed via syndicated coverage and the author's own public summaries) reports that the UK government is reconsidering whether to introduce routine blood-lead screening for children, following the FT's two-year "Untold: Toxic Legacy" investigation, which argues that millions of UK children may be unknowingly at risk from the toxic metal. The framing connects deteriorating lead paint in older housing stock, lead and copper plumbing fittings, and the contribution of over 6,000 abandoned lead mines reportedly leaking hundreds of tonnes of metals into UK rivers each year, to a likely under-detected childhood exposure burden. The article does not present new BLL distributions: the relevant UK reporting threshold is 5 µg/dL under the Lead Exposure in Children Surveillance System (LEICSS); routine population screening would be a substantive policy shift. Sources of lead summarised: paint in pre-1992 housing, lead pipes and solder, contaminated food, and abandoned-mine drainage into water supplies.

SON, NGO train 35 lab experts to battle lead poisoning

Ozolua Uhakheme. The Nation. November 2025, https://thenationonlineng.net/son-ngo-train-35-lab-experts-to-battle-lead-poisoning/?utm_source=lead-update.cgdev.org [LID 29340]

Nigeria, with training held at the Standards Organisation of Nigeria (SON) Lagos office and participants drawn from multiple states (Kano cited). National in scale, with implications for the National Interagency Working Group on Lead Poisoning Elimination (see LID 29321). The Nation reports a two-day capacity-building workshop organised by SON in partnership with Resolve to Save Lives Nigeria, training 35 laboratory experts from regulatory, academic, and state agencies in

operation and field use of X-ray fluorescence (XRF) analysers for lead detection in consumer products. SON Deputy Director Adetoyi Adeyinka and Resolve to Save Lives Executive Director Nanlop Ogbureke both frame the work as evidence-gathering ahead of enforcement of lead-elimination regulations, with explicit reference to lead-related child deaths in Zamfara and Niger states. South Africa-based facilitator Mirko Steinhage of Spectrometer Technologies led the practical XRF, radiation-safety, and software components. No new blood lead level data are reported. Sources of lead targeted by the screening programme: cosmetics (including lipstick and traditional "tiro" eye applications), toys, paints, water, and broader consumer products under SON and NAFDAC remit.

The sinister alchemy that puts lead into Zambian children's veins

The Continent. November 2025, https://continent.substack.com/p/the-sinister-alchemy-that-puts-lead?utm_source=lead-update.cgdev.org [LID 29341]

Zambia, with focus on Kabwe in Central Province, the same legacy lead and zinc mining town examined in LIDs 29334 (ACTSA) and 29338 (Tembo). Local in immediate scope, with national, regional, and pan-African implications via the ongoing class action against Anglo American in South African courts. The Continent (a pan-African weekly) profiles the slow-motion poisoning of roughly 200,000 Kabwe residents from the legacy Broken Hill mine (operated from 1906, closed 1994) and the persistent "Black Mountain" of mine waste. The article cites that 95% of children sampled in affected townships have elevated blood lead levels and approximately 50% meet the threshold the World Health Organization (WHO) describes as requiring urgent chelation; specific µg/dL cutoffs are not quoted in the article but correspond to the WHO 5 µg/dL action level and the >45 µg/dL chelation threshold widely used in Kabwe screening studies. Documented sequelae in children include anaemia, respiratory illness, school absenteeism, and behavioural change. Sources of lead named: residual mine tailings and waste rock, with secondary pathways through soil, vegetation, water, and dust. The piece previews the 140,000-claimant class action in South African courts, with decisions expected in 2026.

2025 Volcano Art Prize

Jenny Rowbotham: *Broken Hill Monitoring System:* Lead-Safety Message: Why does air monitoring equipment appear non-functional at Broken Hill given the discrepancy between reported low airborne lead emissions (95 kg in 2015/16) versus 1.6 million kg transferred to tailings storage in the same year? Regulatory scrutiny of mining operations data is needed. **Description of Work:** Data from the National Pollutant Inventory combined with smartphone photographs and digital collage in PowerPoint and Paint. https://volcanoartprize.com/portfolio-item/broken-hill-monitoring-system/ [LID 28966]

Protecting Americans' Health Starts with Fixing Our Country's Lead Problem

Fitzgerald and Greene. Earth Justice. November 2025, https://earthjustice.org/article/protecting-americans-health-starts-with-fixing-our-countrys-lead-problem [LID 29406]

United States, national in scale, with named hotspots in Alabama, Missouri, New York, and California, plus airport-emission concentrations across California, Florida, Arizona, Washington, and Colorado. National in scope, with implications for several EPA rulemakings due to finalise by December 2025. Fitzgerald and Greene argue that despite a half-century of progress since the phase-out of leaded petrol, the United States is not yet free of lead and the current EPA is weakening rather than strengthening protections. They identify three under-addressed pathways: emissions from large municipal waste combustors that burn lead-containing materials; leaded aviation gasoline still used by roughly 170,000 piston-engine aircraft at 20,000 airports, accounting for around 70% of remaining atmospheric lead releases and exposing over 5 million people (including 360,000 children under five) living near these airports; and secondary lead smelters and battery recyclers, with cited community impacts in Alabama, Missouri, New York, and California. No specific blood lead level values are reported in the article; the framing rests on the now-standard position that there is no safe level of lead exposure, especially for children. Policy levers urged: finalise stronger Large Municipal Waste Combustor emissions limits, phase out leaded avgas, tighten secondary-lead-smelter Clean Air Act standards, and update the Lead National Ambient Air Quality Standards, last revised in 2008. Sources of lead named: waste-combustor stack emissions, leaded aviation fuel, and secondary lead smelter and battery-recycling air emissions.

A Study to Assess the Awareness Regarding Lead Poisoning among Students of Selected Secondary Schools at Unguja, Zanzibar

Okafor et al. International Journal of Biochemistry Research & Review. November 2025, https://journalijbcrr.com/index.php/IJBCRR/article/view/1061/2280 [LID 29406]

Tanzania, with field work in selected secondary schools on Unguja Island, Zanzibar; the lead author is affiliated with the State University of Zanzibar, the same institutional anchor as the related occupational lead-exposure work in LID 29367. Local in immediate scope, with regional implications for school-based health-literacy programming across East Africa where childhood lead exposure remains under-recognised. Okafor and colleagues, publishing in the International Journal of Biochemistry Research & Review, set out to assess what adolescents already know about lead poisoning: its sources, its health effects, and the behaviours that reduce or amplify risk. The article is the first peer-reviewed Zanzibari adolescent lead-awareness assessment of which we are aware. The journal landing page on journalijbcrr.com is Cloudflare-protected and was not retrievable through automated fetches in this pass, so specific sample sizes, awareness percentages, and statistical associations between demographic variables and knowledge scores could not be quoted; full quantitative findings should be incorporated when the PDF is obtained through Liz's institutional access. No blood lead levels are measured in this study: the design is knowledge, attitudes, and practices (KAP) rather than biomonitoring. Sources of lead implicit in the topic framing (and consistent with the East African evidence base): leaded paint in older school and residential buildings, used lead-acid battery (ULAB) recycling, contaminated cosmetics, ceramic glazes, and contaminated soil and dust. The work is positioned as groundwork for school-curriculum integration and community awareness programming.

Millions of Children Need Life-Changing Lead Poisoning Medicine. Why Isn't It Affordable?

Theo Mitchell and Rachel Bonnifield. Center for Global Development (CGD). November 2025, https://www.cgdev.org/blog/millions-children-need-life-changing-lead-poisoning-medicine-why-isnt-it-affordable [LID 29224]

Global, with quantified national populations of severely lead-poisoned children: roughly 1 million in India, 200,000 in China, and 100,000 in Nigeria, plus the Nigerian artisanal-gold-mining case as the framing exemplar. Global in scale, with implications for the WHO Essential Medicines List, donor-funded prequalification, and chelation supply chains across low- and middle-income countries (LMICs). Mitchell and Bonnifield argue that the world has the clinical means to treat the most severely poisoned children but lacks affordable global supply of the necessary medicines. The chelating agents discussed are succimer (also known as DMSA, the preferred oral option in the 45 to 70 µg/dL blood lead range), D-penicillamine (an existing oral option, narrowly usable because of serious side effects), and unnamed non-oral chelation drugs delivered parenterally in inpatient settings for cases above 70 µg/dL (the BLL window in which calcium disodium EDTA and dimercaprol / BAL have historically been used internationally). The cost gap is structural: a course of succimer can run to USD 500 to 1,000 in low-income settings, an Indian generic is available at around USD 150 per 1,800 mg course, and unlicensed European supplement versions sit as low as USD 8. The authors call for adding succimer to national Essential Medicines Lists, expanding WHO prequalification (and the WHO-Listed Authority pathway) for chelation drugs, and donor signalling to fund the ~USD 600,000 upfront prequalification cost for a generic manufacturer. Sources of lead in the framing population: artisanal gold mining (Nigeria), ULAB recycling, and contaminated consumer products driving the broader LMIC BLL burden.

Does Lead Exposure Really Kill Five Million People Per Year? (Probably, Yes)

Lee Crawfurd. Center for Global Development. November 2025, https://www.cgdev.org/blog/does-lead-exposure-really-kill-five-million-people-year-probably-yes [LID 29408]

Global, with the headline estimate of approximately 5.5 million adult deaths in 2019 from lead-attributable cardiovascular disease drawn from Larsen and Sánchez-Triana (2023). Global in scale, with implications for how lead is ranked against HIV/AIDS and malaria in global-health priority setting. Crawfurd interrogates whether the now-widely-cited 5.5 million figure is plausible, and concludes that it likely is. The observational dose-response data sit at a relative risk ratio of about 1.5 for cardiovascular mortality at the mean low- and middle-income country (LMIC) adult BLL of around 5 µg/dL (50 µg/L). To pressure-test that, Crawfurd cross-validates against two quasi-experimental studies that exploit natural variation in lead exposure: Hollingsworth and Rudik's use of NASCAR race-track exposure, and Fletcher and Noghanibehambari's use of historical proximity to lead service pipes as an instrumental variable. Both yield a relative risk closer to 2.0, slightly above the observational data, supporting rather than undermining the headline estimate. The standout framing: "That's more people than died of HIV/AIDS and malaria combined." No new blood lead level distributions are reported; the population BLL inputs are the GBD 2019 and WHO 5 µg/dL action-level estimates. Sources of lead are not enumerated in this analytical blog: the focus is the dose-response statistics and inferential reliability. Crawfurd registers "reasonably high confidence" in the order of magnitude while explicitly calling for more causal LMIC studies.

Recycling Lead for U.S. Car Batteries Is Poisoning People

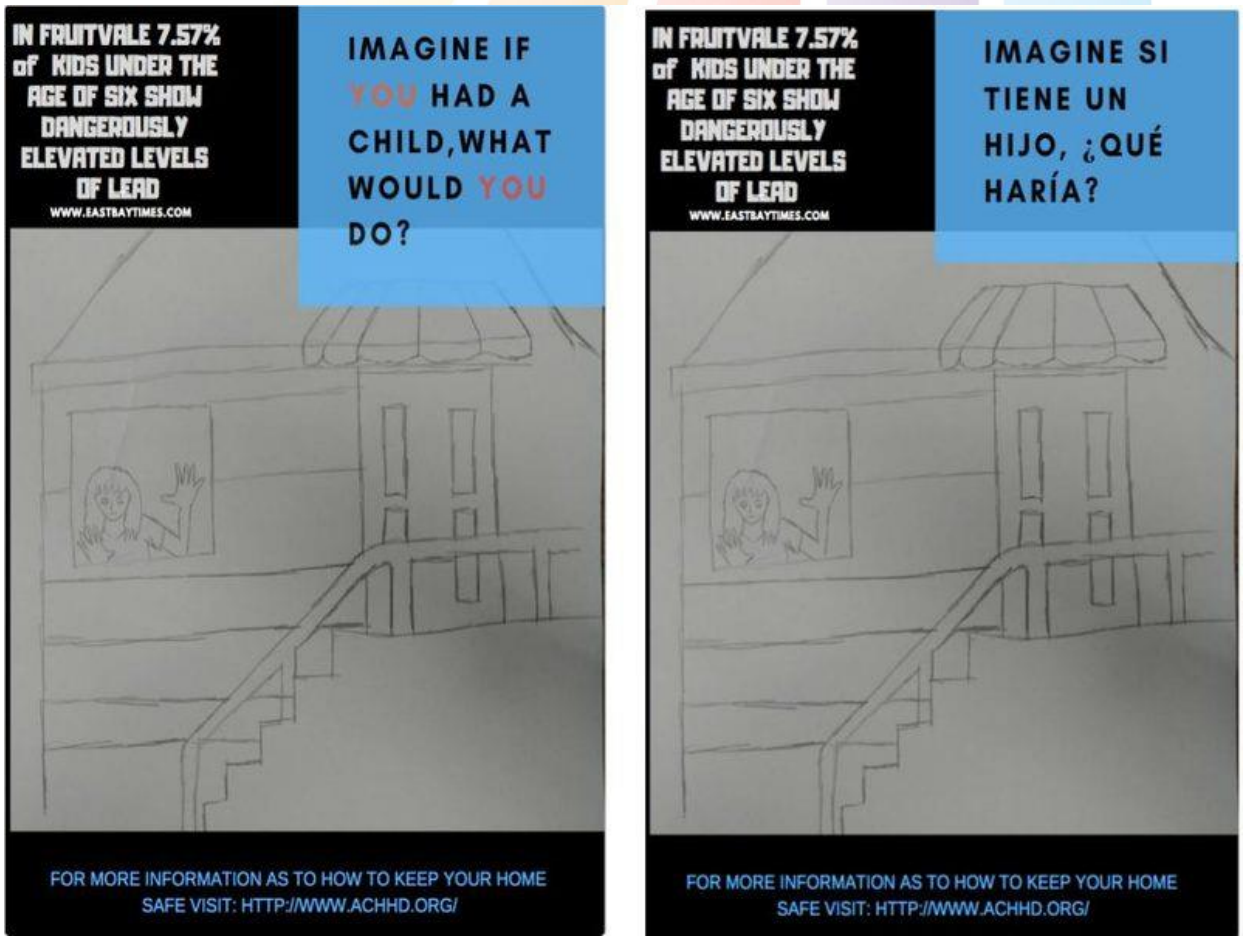
Peter S. Goodman et al. The New York Times. November 2025, https://www.nytimes.com/interactive/2025/11/18/world/africa/lead-poisoning-car-battery.html [LID 29342]

Nigeria, focused on Ogijo (Ogun State, near Lagos), with comparative material from Togo, Tanzania (Dar es Salaam), Ghana, and California (Vernon). National in scale for Nigeria, with global implications for the auto and battery industries' lead supply chains. Goodman and colleagues, reporting for The New York Times in partnership with The Examination, ran independent blood lead testing on 70 Ogijo residents and workers via Sustainable Research and Action for Environmental Development (SRADev Nigeria). Seven of ten residents had harmful blood lead levels (BLLs) and every recycling worker tested was poisoned; more than half of children tested had BLLs the authors describe as capable of causing lifelong brain damage. Profiled cases include 5-year-old Samuel Bakare at 15 µg/dL (three times the WHO action level of 5 µg/dL), his 8-year-old brother Israel at higher still, and their mother Oluwabukola Bakare at 31.1 µg/dL, a range associated with miscarriage and preterm birth. Dust and soil samples reached 186 times generally recognised hazard thresholds; one school yard measured >1,900 ppm soil lead against 95 ppm at the Vernon, California preschool that triggered a US environmental-disaster designation. Sources of lead: informal used lead-acid battery (ULAB) recycling smelters (True Metals named) supplying lead to battery makers serving Ford, GM, Tesla, Amazon, Lowe's, and Walmart. The reporting frames the auto industry's "recycling success story" as a globally externalised poisoning.

The Auto Industry Was Warned: Battery Recycling Was Poisoning People

Will Fitzgibbon. The New York Times. November 2025, https://www.nytimes.com/2025/11/25/world/africa/lead-battery-recycling-pollution-cars.html [LID 29343]

Global supply chain investigation by The New York Times in partnership with The Examination; site reporting from Nigeria (Lagos/Ogijo), Ghana, Tanzania, Mexico, and India. Global in scale, with implications for automotive sustainability disclosure regimes that have so far excluded lead. Fitzgibbon's companion piece to LID 29342 documents nearly three decades of internal industry awareness that informal lead recycling was poisoning workers and host communities, and serial industry blockages of voluntary certification: the 2005 "Green Lead" proposal pitched to Ford by Australian lawyer Phillip Toyne; the 2007 BEST Standard 1001 pilot in India that no major manufacturer joined; and the 2011 to 2012 ASTM International process in which Johnson Controls (now Clarios) sent 50 representatives to a voting meeting, dominating 80 of 98 seats and ending the standards drive. Retired Ford executive Bernd Gottselig acknowledged the abatement was "financially challenging". The article re-cites the investigation's blood lead testing of children near Lagos showing levels capable of lifelong brain damage; the specific µg/dL values are reported in the companion piece (15 µg/dL in 5-year-old Samuel; 31.1 µg/dL in his mother) rather than here. Sources of lead: informal and semi-formal used lead-acid battery (ULAB) recycling smelters whose output enters automotive supply chains via global trading houses. Named makers include Ford, GM, Tesla, Stellantis, Hyundai, Volkswagen, BMW, Nissan, Volvo, and Clarios, with most declining to address the findings or excluding lead from sustainability reporting.



2020 Volcano Art Prize
Yurayma, Chris, Brian: ***In Fruitvale 7.57% of Kids under 6 Show Elevated Blood Lead:*** **Lead-Safety Message:** The incidence of elevated levels of lead is very high in our neighborhood, and we made this poster to teach people about this issue. **Description of Work:** Poster created by three 15-year-old students from ASCEND TK-8 School in Oakland's Fruitvale District. https://volcanoartprize.com/portfolio-item/in-fruitvale-7-57-of-kids-under-6-show-elevated-blood-lead/ [LID 19870]

UK to launch first lead poisoning screening study of children after FT investigation

Laura Hughes. Financial Times. November 2025, https://www.ft.com/content/f2bba700-8399-4777-99ba-c68f16b427b9 [LID 29344]

United Kingdom, with the pilot launched in Leeds and run from Northumbria University. National in scale, with implications for the case for routine paediatric lead screening across the UK and comparable high-income jurisdictions that have so far treated childhood lead as a residual issue. Hughes's Financial Times piece reports that the UK government, following a two-year FT investigation, is launching its first citizen-led childhood lead screening study, directed by Professor Jane Entwistle (Northumbria University). The pilot is framed as groundwork for nationwide testing of one- and two-year-olds, a measure already urged by approximately 50 MPs, peers, and academics in submissions to Health Secretary Wes Streeting; the Social Market Foundation has called for universal screening. The article and accompanying coverage cite an estimate of roughly 200,000 UK children with undiagnosed lead exposure. No new blood lead level concentrations are published in the article; the FT series previously documented elevated paediatric BLLs near abandoned lead mines and in

households exposed to imported spices and traditional cosmetics. Sources of lead named or implied: legacy mine waste contaminating soil and food chains, deteriorated paint, drinking water, imported spices, sindoor, kohl, and traditional medicines. The framing is pointed: routine paediatric BLL surveillance, taken for granted in the US, remains absent in the UK.

Personalized lead exposure information and preventive behaviors in Ivory Coast: Insights from a pilot study

Gille et al. PLOS One. November 2025, https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0336949 [LID 29345]

Ivory Coast (Côte d'Ivoire), with field work in Abidjan. Local in immediate scope, with implications for behaviour-change interventions that pair point-of-use lead screening with risk communication, transferable across LMICs where lead paint remains in use. Gille and colleagues ran a pilot with 153 pregnant women between September 2023 and March 2024, visiting each three times and delivering personalised exposure information generated from in-home X-ray fluorescence (XRF) analysis alongside generic risk education. Participants whose homes tested lead-positive were 33 to 35 percentage points more likely to acknowledge their exposure risk than those receiving only generic information; among mothers of young children, the personalised arm was 23 percentage points more likely to prevent children from ingesting paint chips and 41 percentage points more likely to increase handwashing. No effects were seen on home cleaning or renovation behaviours. The study did not measure children's blood lead levels: the authors flag this as a key limitation and call for BLL-validated follow-up. Background screening showed 14 of 23 paint samples exceeded 500 ppm, confirming the magnitude of the exposure source. Source of lead: lead-based paint in domestic interiors. The work is positioned as a low-cost behavioural complement to regulatory bans on lead paint.

EPA to provide $3 billion to US states to reduce lead in drinking water

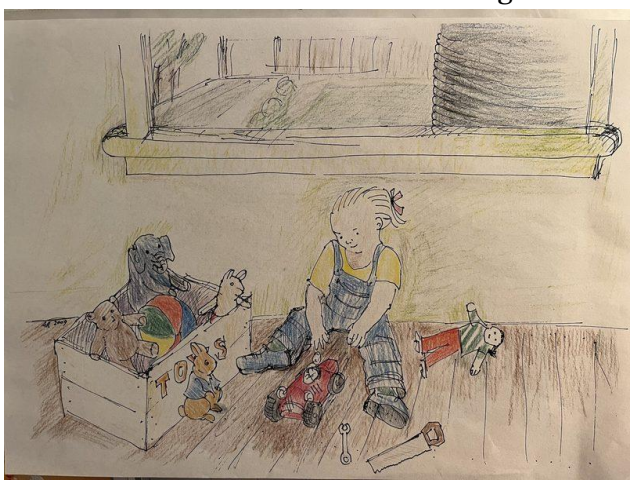
Reuters. November 2025, https://www.reuters.com/legal/litigation/epa-provide-3-billion-us-states-reduce-lead-drinking-water-2025-11-25 [LID 29346]

United States, federal allocation to the 50 states via State Revolving Fund (SRF) programs. National in scale, with relevance to lead service line replacement efforts referenced in LIDs 29313 (Buffalo) and 29314 (Chicago). Reuters reports that the US Environmental Protection Agency (EPA) announced USD 3 billion in new Drinking Water State Revolving Fund (DWSRF) money on 25 November 2025 to accelerate lead service line replacement, plus redistribution of USD 1.1 billion in previously awarded but unspent funds to states with active lead pipe replacement needs. The agency revised its national estimate downward from 9 million to roughly 4 million lead service lines, reflecting better inventory data submitted under the Lead and Copper Rule Revisions. States that have neither obligated nor spent prior awards since FY2023 must submit a remediation plan before becoming eligible for new funding, an accountability lever directly relevant to underspenders like the Buffalo Urban Renewal Agency (LID 29313). No blood lead level data are included in the announcement; the framing is infrastructure exposure reduction rather than population BLL outcomes. Source of lead: lead service lines, gooseneck connectors, and lead-containing premise plumbing in pre-1986 housing and commercial buildings.

A World Without Lead: Paving the Path to a Healthy, Productive Future

World Bank. November 2025, https://www.worldbank.org/en/topic/environment/publication/a-world-without-lead-paving-the-path-to-a-healthy-productive-future [LID 29347]

Global, with concentrated focus on low- and middle-income countries (LMICs) where exposure and economic burden cluster. Global in scale, framed as a development priority on a par with mainstream World Bank environmental and human-capital agendas. The World Bank's flagship lead report synthesises the 2019 burden-of-disease and human-capital data: 765 million IQ points lost globally to childhood lead exposure, USD 1.4 trillion in lost lifetime income, and 5.5 million adult deaths from cardiovascular disease attributed to lead, totalling roughly a trillion-dollar annual economic drag. The report restates the now-uncontroversial position that there is no safe level of lead in the body and that the affected populations are disproportionately pregnant women, infants, children, and the poor. No new blood lead level concentrations are published; the document draws on existing IHME and Bjorn Larsen and Roy Sanchez-Triana modelling. Sources of lead named: used lead-acid battery (ULAB) recycling (cited as 86% of all lead mined or recycled), industrial smelting and mining, lead paint, lead service lines, cosmetics, toys, contaminated spices, and adulterated teas. Recommended policy levers: site remediation, enforceable national standards, institutional capacity, and high-level political commitment to elimination. The publication functions as the Bank's formal entry into the Partnership for a Lead-Free Future coalition framing.



2025 Volcano Art Prize
Anne Roberts: *Toddler with Toys:* Lead-Safety Message: A LEAD Group Kit is a fantastic tool for detecting lead in a toddler's environment through lab analysis of surface dust wipes from the playfloor and window sill, bare soil, water from brass taps installed in the last 3 years, from rain tanks or bores, paint, toy paint and ceiling cavity dust or vacuum dust.
Description of Work: Created using colouring pencils and pen on paper, this artwork communicates lead-safety information sourced from the Lead Safe World Project's page on DIY sampling and lab analysis testing kits. https://volcanoartprize.com/portfolio-item/toddler-with-toys/ [LID 28898]

Industry and consumer products as lead exposure sources among children across 3 regions in Ghana

Nash et al. Environmental Research. December 2025, https://www.sciencedirect.com/science/article/pii/S0013935125022662?via%3Dihub [LID 29348]

Ghana, with field sampling across three regions: Greater Accra, Ashanti, and Northern. National in scale (these three regions house the bulk of the survey population), with implications for the broader Pure Earth and UNICEF Global Initiative to End Childhood Lead Poisoning to which Ghana acceded in 2024. Nash and colleagues report the Environmental Research peer-reviewed analysis of the joint Ghana Health Service, Pure Earth Ghana, and UNICEF national blood lead survey: 3,227 children aged 1 to 5 were sampled, of whom 1,725 (53.5%) had blood lead levels (BLLs) at or above 5 µg/dL, the WHO action threshold. Children living near the two formal used lead-acid battery (ULAB) recycling plants in Greater Accra recorded BLLs at or above 45 µg/dL, the WHO chelation threshold. Home-based assessments and product testing identified three dominant exposure pathways: contaminated soil (particularly near ULAB recycling and informal industrial sites), locally fabricated aluminium and

metallic cookware (high-lead solder and scrap inputs), and traditional eye cosmetics, principally chilo, kohl, and kaji kaji. Additional contaminated items included white baked clay (shire, ayilor, farinkasa) and turmeric. Sources of lead: ULAB recycling, informal metal cookware fabrication, traditional cosmetics, ceramic dishware, and adulterated spices. The paper formalises the underlying survey behind earlier Ghana press coverage.

Early life lead exposure as a risk factor for aggressive and violent behaviour in young adults: A systematic review

Obamuyide et al. Aggression and Violent Behavior. December 2025, https://www.sciencedirect.com/science/article/pii/S135917892500059X [LID 29349]

Global synthesis, with included studies disproportionately from the United States and other high-income settings; the authors note the under-representation of LMIC evidence. Global in scale, with implications for the long-running "lead-crime hypothesis" debate and for justice-system policy. Obamuyide and colleagues searched 17 electronic databases through October 2024 and identified 17 manuscripts meeting inclusion criteria, in which lead exposure was indexed by blood lead in 12 studies, bone lead in 3, and dentine lead in 2. Outcomes spanned self-reported aggression, recorded violent offending, and validated aggression inventories in young adults. The review concludes consistent positive association between early childhood lead exposure and aggressive or violent behaviour in young adulthood, supporting environmental lead control as a population-level violence-prevention lever. The publicly available abstract does not pool a quantitative effect estimate; individual BLL ranges across included studies span the low-to-moderate childhood exposures characteristic of the leaded-petrol-era US cohorts. The authors flag the dearth of high-quality LMIC evidence as the principal evidence gap. Sources of lead in the included studies: legacy leaded petrol, lead paint, contaminated soil, and occupational exposure pathways feeding into childhood blood lead burden.

Towards a Lead-Free India: Understanding Risks and Shaping Responses

Pahlé India Foundation. December 2025, https://www.linkedin.com/posts/ilppw2025-leadfreefuture-publichealth-ugcPost-7388520146828554240-u3IQ/ [LID 29409]

India, with research and surveillance sites named in Odisha, Meghalaya, and Mizoram, and the institutional network spanning seven All India Institute of Medical Sciences (AIIMS), the ICMR-National Institute of Nutrition (NIN), the ICMR-National Institute of Occupational Health (NIOH), and state National Health Missions in Kerala and Meghalaya. National in scale, framed around International Lead Poisoning Prevention Week (ILPPW) 2025. The post summarises a national webinar co-hosted by Pahlé India Foundation (PIF) and UNICEF, "Towards a Lead-Free India: Understanding Risks and Shaping Responses", convened around 23 October 2025. Headline commitments from the discussion: BLL surveys are underway across seven AIIMS institutions, alongside PIF-led lead exposure studies in Odisha, Meghalaya, and Mizoram; UNICEF reaffirmed advocacy for India's inclusion in the Partnership for Lead-Free Future; the Government of Meghalaya announced plans to integrate lead testing into Integrated Child Development Services (ICDS) cookware procurement; and ICMR-NIOH committed to a nationwide biomarker analysis to underpin evidence-based action. The Center for Global Development (CGD) is named among participating organisations. No specific blood lead level concentrations are quoted; the AIIMS surveys, Odisha-Meghalaya-Mizoram studies, and ICMR-NIOH biomarker work are positioned as the source of forthcoming national BLL data. Sources of lead implicit in the policy levers named: contaminated cookware (the Meghalaya ICDS lever), ULAB recycling, adulterated spices and cosmetics, and

occupational exposure (the ICMR-NIOH biomarker remit). The framing closes on nutrition-linked interventions, community awareness, and policy integration as the joint route to a lead-free future.

Methylation-enriched Telomere Length Mediates the Association between Lead Exposure and Cognitive Function in an Aging Population

Li et al. Regenesis Repair Rehabilitation. December 2025, https://www.sciencedirect.com/science/article/pii/S2950575525000498 [LID 29350]

United States, drawing on the National Health and Nutrition Examination Survey (NHANES) sample of older adults. National in scale, with implications for the dementia-prevention literature and for occupational and environmental health surveillance of ageing cohorts. Li and colleagues analysed 1,661 NHANES participants aged 60 and older to test whether methylation-predicted telomere length (mTL), estimated using the Horvath DNA methylation clock, mediates the association between blood lead and cognitive function. Lead exposure showed a dose-dependent association with cognitive impairment: participants in the highest blood lead quartile (Q4) had significantly lower composite cognitive scores than those in the lowest quartile (Q1), and continuous blood lead was inversely associated with cognitive performance. Mediation analyses indicated that shortened mTL partially mediates the lead-cognition association, supporting accelerated biological ageing as a mechanism. The publicly visible abstract reports quartile cutoffs in the µg/dL range typical of NHANES adults but does not state exact threshold values; the ScienceDirect full text was bot-blocked in this pass. Sources of lead in the NHANES adult population: cumulative low-level lifetime exposure (legacy leaded petrol and paint, drinking water, occupational, and dietary), without identification of a single dominant source. The paper extends mechanistic support for the cumulative-exposure account of late-life cognitive decline.

Cross-sectional associations of self-reported firearm use with blood lead concentrations in a nationally representative cohort of US adults

Day et al. Environmental Epidemiology. December 2025, https://journals.lww.com/environepidem/fulltext/2025/12000/cross_sectional_associations_of_self_reported.7.aspx [LID 29351]

United States, nationally representative civilian adults via the National Health and Nutrition Examination Survey (NHANES). National in scale, with implications for firearm-range occupational health, hunting communities, and the broader debate over lead ammunition phase-out. Day, Braun, and Hoover pooled five NHANES cycles, combining blood lead with self-reported firearm noise exposure (1999 to 2004, n = 9,606) and firearm use (2011 to 2012 and 2015 to 2016, n = 5,972). Median blood lead was 15 µg/L (IQR 10 to 22; ~1.5 µg/dL) in the earlier cohort and 8.8 µg/L (IQR 5.7 to 14; ~0.9 µg/dL) in the later cohort. Self-reported firearm noise exposure was associated with a 15% higher blood lead concentration (95% CI 7% to 23%). Firearm use overall was not significantly associated, but a dose-response trend emerged: 1% lower (1 to 1,000 rounds), 9% higher (1,000 to 10,000), and 21% higher (10,000+ rounds), trend p = 0.07. The authors conclude that high-volume firearm users carry detectably higher BLL. Sources of lead named: lead bullet fragments and lead-containing primer aerosolised on discharge, "take-home" contamination on clothing, game-meat ingestion, and lead accumulation in firing-range soils.

2022 Volcano Art Prize
Lucinda Curran: ***Clean Up After Your Reno - prevent lead poisoning; protect our kids, pets, wildlife and our future:*** **Lead-Safety Message:** Not all hazards are visible or obvious when renovating; collect and dispose of paint chips properly using drop sheets to prevent exposure among children, pets, and wildlife. **Description of Work:** Digital art incorporating photographs of a recently renovated house. https://volcanoartprize.com/portfolio-item/clean-up-after-your-reno-prevent-lead-poisoning-protect-our-kids-pets-wildlife-and-our-future/ [LID 26405]

Cautious Signs of Progress on Lead Exposure in Bangladesh

Lee Crawfurd and Caroline Mallory. Center for Global Development. December 2025, https://www.cgdev.org/blog/cautious-signs-progress-lead-exposure-bangladesh-0?utm_source=lead-update.cgdev.org [LID 29352]

Bangladesh, with country-wide framing and specific reference to Dhaka. National in scale, with implications for the UNICEF and Pure Earth Global Initiative as a putative success case. Crawfurd and Mallory's CGD blog summarises new survey data showing Bangladesh's average childhood blood lead level (BLL) has declined from 70 µg/L (≈7.0 µg/dL) estimated in 2023 to 52 µg/L (≈5.2 µg/dL) in 2025; 38% of children remain above the WHO 50 µg/L action threshold, equating to roughly 20 million children with measurable IQ and educational losses. Dhaka prevalence among children aged 2 to 4 dropped from 75% to 65% between 2022 and 2025. Approximately 7.5% of pregnant women showed exposure with maternal-foetal transfer implications. The authors credit a multi-pronged response since 2020: youth-led activism against illegal smelters, regulatory enforcement, public education, and the dramatic collapse of turmeric adulteration with lead chromate (from 47% of samples in 2019 to 0% by 2021). Sources of lead named: adulterated turmeric (now largely eliminated), informal used lead-acid battery (ULAB) recycling (now estimated to account for roughly one-third of exposure), pesticides and herbicides, lead solder in food cans, indigenous medicines, and e-waste recycling. The framing is genuinely cautious: substantive progress, not victory.

ULABs Wrapped 2025

Hugo Smith. December 2025, https://leadbatteries.substack.com/p/ulabs-wrapped-2025?utm_source=lead-update.cgdev.org [LID 29353]

Global year-in-review by Hugo Smith on Substack, with country threads on Nigeria, Bangladesh, the Philippines, China, and Brazil. Global in scale, written for the donor and advocacy audience converging on used lead-acid battery (ULAB) recycling as the lead-elimination movement's single highest-leverage source. Smith's "ULABs Wrapped 2025" frames the year as a structural shift: the launches of the Lead Acid Battery Recycling Initiative (LABRI), Lead Research for Action (LeRA), and Partnership for Battery Action; new Bloomberg Philanthropies grantmaking; and continued CGD research funding aimed at LMIC ULAB recycling. The piece cites Bangladesh's national survey, with

roughly 20 million children (38%) above 5 µg/dL blood lead, and the Berkhout and colleagues result that children near contaminated sites scored 0.48 standard deviations lower in numeracy and 0.36 standard deviations lower in general cognitive ability than peers further afield. Bangladesh analysis attributes roughly 85% of ULAB-related lead pollution to informal recyclers (estimated 10% loss rates against 2% for formal-sector smelters). Updated estimates put annual productivity losses from lead poisoning in LMICs at USD 300 to 500 billion. The Nigeria NYT investigations (LIDs 29342 and 29343) are flagged as the year's defining advocacy moment. Source of lead: predominantly informal ULAB recycling, with secondary mentions of legacy contamination and consumer products.

2025 Volcano Art Prize
Elizabeth O'Brien: *Ban Lead Ammunition:* Lead-Safety Message: Ammunition-derived lead poses health risks to everyone; household firearm ownership is associated with elevated blood lead levels in children, and EU regulations aim to safeguard children and wildlife from lead ammunition's toxic impacts. **Description of Work:** Photography depicting spent lead bullet casings discovered in a residential setting. https://volcanoartprize.com/portfolio-item/ban-lead-ammunition/ [LID 28901]

Epidemiologic Trends in Pediatric Lead Poisoning at Freestanding Children's Hospitals, 2016–2023

Hahn et al. Hospital Pediatrics. January 2026, https://publications.aap.org/hospitalpediatrics/article-abstract/16/1/85/205894/Epidemiologic-Trends-in-Pediatric-Lead-Poisoning?utm_source=lead-update.cgdev.org [LID 29355]

United States, across 47 freestanding children's hospitals reporting to the Pediatric Hospital Information System (PHIS). National in scale, with implications for inpatient burden estimation, chelation guideline implementation, and lead-screening referral pathways. Hahn and colleagues describe 2016 to 2023 trends in paediatric lead poisoning encounters captured by PHIS: 845 inpatient hospitalisations and 1,137 emergency department visits with a primary diagnosis of lead poisoning, accruing more than USD 4.5 million in mean cumulative annual billed charges. The publicly visible abstract focuses on encounter counts, demographic distribution, length of stay, and hospital-level variation rather than population blood lead level (BLL) distributions; the AAP full text was bot-blocked in this pass and specific µg/dL severity strata, chelation rates, and percent-change trend statistics could not be quoted. The work positions tertiary paediatric hospitals as a sentinel surveillance system for the residual severe end of US childhood lead exposure (cases requiring inpatient management, generally BLLs well above the CDC 3.5 µg/dL reference value and frequently above the 45 µg/dL chelation threshold). Sources of lead in this clinical population, as in earlier PHIS analyses: deteriorated lead paint in older housing, contaminated dust and soil, imported spices and traditional remedies, and lead-containing consumer products.

Lead is all around us. It could be poisoning our children

Rosa Silverman. The Telegraph. January 2026, https://www.telegraph.co.uk/news/2026/01/04/lead-could-be-poisoning-our-children [LID 29354]

United Kingdom, with case material drawn from English households. National in scale, with implications for residential property disclosure, DIY retail labelling, and primary-care training, all of which the article positions as currently inadequate. Silverman's Telegraph feature continues the FT-led press cycle (LIDs 29335, 29339, 29344) treating UK childhood lead exposure as an underestimated public-health problem. The article opens with parent Jess Draper, who feared her son had been poisoned after she sanded lead paint from a household door; Draper's framing ("we need to make lead the new asbestos") supplies the rhetorical centre of gravity. Three policy levers are foregrounded: mandatory lead risk assessment in property surveys at sale, point-of-sale hazard information in DIY and trade outlets where paint stripping supplies are bought, and GP-level training to recognise lead poisoning. No specific blood lead level concentrations are reported; the piece takes the absence of routine UK paediatric BLL screening (raised in LID 29344) as its background condition. Sources of lead named: lead-based paint in older British housing stock (banned for residential use but still present), lead plumbing in pre-1970 properties, and the dust and chip exposures generated by uninformed DIY removal. The framing is explicitly advocacy-aligned with the Lead Exposure and Poisoning Prevention Alliance (LEAPP).

Beyond Hot Spots: Estimating Population Lead Exposure from Battery Recycling

Crawfurd et al. Center for Global Development, https://www.cgdev.org/publication/estimating-population-lead-exposure-battery-recycling?utm_source=lead-update.cgdev.org [LID 29356]

Global, with explicit focus on low- and lower-middle-income countries (LMICs). Global in scale, with implications for how donors and regulators weight informal used lead-acid battery (ULAB) recycling against other lead-elimination interventions. Crawfurd and colleagues at the Center for Global Development reconcile two strands of evidence on ULAB-attributable exposure: classic "hot spot" sampling studies that document very high BLLs within hundreds of metres of smelters and yards, and newer quasi-experimental work showing detectable lead effects across far larger areas around the same sites. A simulation model integrating both strands estimates that ULAB recycling accounts for roughly 33% of population lead exposure in LMICs, against a hot-spot-only estimate near 0.5%, a roughly 60-fold revision driven by the dispersion of contamination beyond proximal zones. The report restates that approximately one in three children worldwide carries blood lead at or above harmful thresholds (the UNICEF and IHME 5 µg/dL figure); no new BLL distributions are produced here. Source of lead: informal and semi-formal ULAB recycling, the single largest by-weight use of lead globally. The implication for advocacy: most of the harm sits in the diffuse low-to-moderate range across millions of households, not solely in the headline-grabbing acute cases.

Association of Lead in Drinking Water With Head and Neck Cancer in the United States

Scussiatto et al. Otolaryngology–Head and Neck Surgery, https://pubmed.ncbi.nlm.nih.gov/41553005/ [LID 29357]

United States, ecological analysis across 608 counties in the SEER (Surveillance, Epidemiology, and End Results) cancer registry catchment. National in scale, with implications for the toxicology of low-level drinking-water lead and for the case against the EPA's lead and copper rule action level. Scussiatto and colleagues link county-level head and neck cancer incidence to EPA drinking-water lead measurements (inverse-distance-weighted from monitoring data), with adjustment for tobacco, alcohol, and demographics, and Holm correction for multiple comparisons. Higher county-level water lead concentrations were significantly associated with elevated incidence of oral and pharyngeal cancers (IRR 1.05; 95% CI 1.00 to 1.08; $p < 0.01$), gum and mouth cancers (IRR 1.03; 95% CI 1.00 to 1.08; $p = 0.02$), and oesophageal neoplasms (IRR 1.01; 95% CI 1.00 to 1.03; $p = 0.02$). The authors

emphasise that associations held below the existing EPA action limit, framing the result as evidence that no safe lead-in-water threshold exists for cancer outcomes either. The study is ecological and does not measure individual blood lead levels or individual water consumption; specific µg/L water lead exposure cutpoints are not extractable from the abstract. Source of lead: drinking water, sourced through lead service lines, premise plumbing, and lead-soldered municipal infrastructure.

Electronic Waste-Associated Lead Exposure and Child Neurodevelopment in Sub-Saharan Africa: A Systematic Review and Meta-Analysis

Yaala et al. Working Paper. January 2026, https://www.preprints.org/manuscript/202601.1358?utm_source=lead-update.cgdev.org [LID 29358]

Sub-Saharan Africa (SSA), with sub-Saharan studies anchored in Ghana (Agbogbloshie, Accra) and comparator low- and middle-income country (LMIC) studies from India, China, and Vietnam. Regional in scale, with global implications for e-waste governance under the Basel Convention. Yaala, Osei Adu, and Armah (University of Cape Coast, Ghana) ran a PRISMA-compliant systematic review and random-effects meta-analysis: 612 records screened, 12 studies in qualitative synthesis, and 5 (n = 1,492 children aged 3 to 15) in the pooled analysis. Higher e-waste-related lead exposure was associated with significantly poorer neurodevelopmental outcomes overall (pooled standardised mean difference -0.42; 95% CI -0.61 to -0.23; I-squared = 56%), with a markedly larger effect in SSA (SMD -0.58; 95% CI -0.89 to -0.27) than in non-SSA LMICs (SMD -0.35; 95% CI -0.54 to -0.16). Leave-one-out sensitivity analyses kept the pooled estimate stable (-0.38 to -0.46); funnel-plot inspection showed no strong publication bias. All included studies measured venous blood lead and used validated IQ or cognitive instruments; the authors note Ghanaian e-waste-community BLLs run several-fold above international reference values. Sources of lead: open burning of cables, manual dismantling of circuit boards, leaded solder, cathode-ray tube glass, and embedded lead-acid batteries in informal e-waste recycling streams.

Is Lead Poisoning a Missing Link in the Fight Against Malnutrition?

Crawfurd and Kandpal. CGD. January 2026, https://www.cgdev.org/blog/lead-poisoning-missing-link-fight-against-malnutrition?utm_source=lead-update.cgdev.org [LID 29359]

Global, with empirical work drawing on nationally representative surveys from India, Georgia, and Mexico. Global in scale, with implications for the integration of lead remediation into nutrition programming and stunting reduction across LMICs. Crawfurd and Kandpal's CGD blog argues that lead exposure and undernutrition are biologically and policy-wise more tightly coupled than typically treated. Lead competes with calcium during intestinal absorption and skeletal incorporation, suppresses growth hormone signalling, blunts appetite and nutrient uptake, and iron-deficient children absorb substantially more lead through the shared divalent-metal transport pathway. Empirically, the authors analyse three surveys with paired BLL and anthropometry: the 1999 India DHS (Delhi and Mumbai), the 2018 Georgia MICS, and the 2023 Mexico ENSANUT. Average child blood lead in LMICs sits near 5 µg/dL, with the India sample running roughly twice the Georgia and Mexico means. Group differences of 4 to 8 µg/dL between exposed and reference children corresponded to height-for-age z-score differences of approximately -0.13 to -0.20 standard deviations, plausibly explaining 5% to 10% of stunting risk in the high-exposure setting. Associations were context-dependent (strong in India, weak elsewhere), consistent with a non-linear dose-response. Sources of lead implied by these surveys: ULAB recycling, adulterated spices, lead paint, cosmetics, drinking water, and contaminated soil. The framing is that nutrition programmes

overlooking lead, and lead programmes overlooking nutrition, both leave gains on the table.

2024 Volcano Art Prize
Elizabeth O'Brien: *Daily Lead Detox Foods:* Lead-Safety Message: I eat 30 different plants plus mushrooms daily and take LivOn Vit C, Vit D, calcium and magnesium. I experiment with fresh ginger in every meal and fresh garlic for brekky and lunch to see if I can get my blood lead level to fall. **Description of Work:** iPhone 13 photos collaged in Powerpoint. https://volcanoartprize.com/portfolio-item/daily-lead-detox-foods/ [LID 28165]

A case report of an unconventional chronic lead poisoning resulting from daily eyelid application of kohl

Aïn et al. Practical Laboratory Medicine. January 2026, https://www.sciencedirect.com/science/article/pii/S2352551725000708?via%3Dihub [LID 29360]

Single-patient case report from France (laboratory and clinical setting), with the patient born in Rabat, Morocco, where the kohl was sourced. Individual in immediate scope, but with implications for diaspora populations in Europe and North America and for cosmetic regulation across the Maghreb and broader MENA region. Aïn and colleagues describe a 63-year-old woman who applied traditional kohl to the eyelids daily from age 20, with neurological symptoms accruing over more than 40 years: memory disturbance, spatial disorientation, persistent headache, and tingling paraesthesia of the fingers and face. Blood lead measurements reached 170 µg/L in August 2021 and 198 µg/L in January 2022 (≈19.8 µg/dL), levels the authors describe as sub-toxic but persistently elevated. Following discontinuation of kohl, blood lead fell to 98 µg/L within two months and below the 50 µg/L target after roughly one year, consistent with the published kinetic compartments (blood half-life ~50 days, soft tissue ~9.4 months, bone ~9.7 years). All four sampled kohl preparations contained 67.7% to 79.3% lead by weight, with a shiny macroscopic appearance characteristic of galena. The article frames the case as the first published 40-year-plus chronic kohl exposure in an adult and a demonstration of substantial transcutaneous and peri-ocular lead uptake. Source of lead: galena-rich traditional kohl, applied to the eyelid margin.

Blood Lead Concentrations and Depressive and Anxiety Symptoms in Childhood

Hoover et al. JAMA Network Open. January 2026, https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2844422?utm_source=lead-update.cgdev.org [LID 29366]

United States, drawing on the HOME (Health Outcomes and Measures of Environment) Study cohort based in Cincinnati, Ohio. Local cohort with national implications for low-level childhood lead exposure and adolescent mental health, an outcome domain receiving renewed attention alongside the older cognitive and behavioural literature. Hoover and colleagues followed 218 children (121 female) prospectively from 2003 to 2019, with serial blood lead measurements from age 1 through 12 and depression and anxiety assessments at age 12 using child and caregiver-reported instruments. Median within-child mean blood lead was 9.6 µg/L (≈0.96 µg/dL; IQR 7.8 to 12.6, range 4.8 to 32.4 µg/L), well below the CDC 35 µg/L (3.5 µg/dL) reference value. Each doubling of mean childhood blood lead was associated with elevated child-reported depressive symptoms (RR 1.90; 95% CI 1.00 to 3.66) and combined child-plus-caregiver depression risk (RR 1.76; 95% CI 1.12 to 2.78). The strongest association was seen for exposures around age 8 years. No overall association emerged with anxiety on the SCARED, although the school avoidance subscale was elevated (RR 1.64). The authors conclude that even low-level childhood lead exposure predicts adolescent depressive symptoms, particularly when exposure occurs in late childhood and early adolescence. Sources of lead in HOME participants: deteriorated paint, dust, and water in older Cincinnati housing stock, consistent with the cohort's longitudinal exposure profile.

2019 Volcano Art Prize
Jennifer Birch: *Lead Poisoning Diagnosis:* Lead-Safety Message: Don't let your doctor say what's best - insist on a heavy-metal poison test. **Description of Work:** Photographic work featuring the artist's dog with an explanatory caption. https://volcanoartprize.com/portfolio-item/lead-poisoning-diagnosis/ [LID 19442]

Duration-dependent Depletion of Micronutrients in Nigerian Male Workers Exposed to Lead

Okafor et al. International Journal of Biochemistry Research & Review. January 2026, https://hal.science/hal-05478647v1 [LID 29367]

Nigeria, with recruitment in Lagos and the lead author affiliated with the State University of Zanzibar (Tanzania). Local in immediate scope but with implications for occupational health surveillance across West African informal motor and battery trades. Okafor and colleagues ran a six-month cross-

sectional study of 100 male workers aged 18 to 60 (50 battery chargers, 50 auto painters), stratified within each occupation by exposure duration: less than 5 years versus 5 years or more. Blood lead level (BLL), haemoglobin, and a micronutrient panel (zinc, selenium, iron, vitamin C, uric acid) were measured. In auto painters, all five micronutrients were significantly depleted in the >5-year group; in battery chargers, depletion was steeper and more uniform, with highly significant reductions in zinc, iron, selenium, and vitamin C alongside a smaller but significant uric acid drop. The authors interpret this as a dose-duration response in which cumulative lead body burden progressively erodes the antioxidant and trace-element reserve. The publicly visible abstract did not disclose specific µg/dL BLL means or standard deviations across exposure strata; the ResearchGate and journal landing pages were Cloudflare-blocked in this pass. Sources of lead: spray-painting of motor vehicles using lead-pigmented or lead-driered paint, and informal lead-acid battery charging and refurbishment workshops. The work supplements the global literature on micronutrient interactions with cumulative occupational lead exposure (see LID 29359 for the parallel paediatric malnutrition link).

Millions exposed to lead in toothpaste, sindoor and eyeliners

Arjun Poudel. Kathmandu Post. February 2026, https://kathmandupost.com/health/2026/02/02/millions-exposed-to-lead-in-toothpaste-sindoor-and-eyeliners?utm_source=lead-update.cgdev.org [LID 29368]

Nepal, with product sampling concentrated in Kathmandu Valley and brand-level findings spanning major South Asian and multinational manufacturers. National in scale, with implications for cosmetic and oral-care regulation across South Asia, where sindoor, gajal, and herbal toothpaste circulate freely across borders. Poudel's Kathmandu Post piece reports a Centre for Public Health and Environmental Development (CEPHED) survey: 31% of tested products contained detectable lead, 24% exceeded the US and Canadian 1 ppm cosmetic limit, 27% breached the EU 0.5 ppm standard, and 16% exceeded Nepal's own 10 ppm guideline. Sindoor (vermilion powder applied at the hair parting) was the most contaminated category at 40% of samples nationally and 60% in Kathmandu Valley, with peak concentrations of 124.73 ppm. Toothpaste contamination ran at 45% with peaks of 51.28 ppm, with elevated lead reported in Himalaya Kids Orange, Colgate, Pepsodent, and Dabur Red samples. Gajal (kohl-type eyeliner) is flagged as a particular paediatric hazard given mucosal application. No new blood lead level concentrations are reported in the article: CEPHED's framing is exposure-source quantification rather than population BLL measurement. The piece calls for a sub-1-ppm statutory limit and dedicated cosmetic regulatory oversight before October 2026. Sources of lead named: sindoor (lead chromate or lead tetroxide pigments), gajal and kohl (galena-based), and adulterated or contaminated toothpaste.

A century of hair clippings show lead exposure rates have plummeted

Meghan Bartels. Scientific American. February 2026, https://www.scientificamerican.com/article/a-century-of-hair-clippings-show-lead-exposure-rates-have-plummeted/?utm_source=lead-update.cgdev.org [LID 29369]

United States, Greater Salt Lake City, Utah, with archived hair samples sourced from family scrapbooks spanning 1916 to 2024. Regional in immediate scope, with global methodological implications for historical biomonitoring where contemporaneous blood lead measurements do not exist. Bartels's Scientific American piece reports work led by Diego Fernandez at the University of Utah analysing 47 archived hair samples by geochemical analysis. Lead concentrations in hair followed the now-familiar industrial trajectory: rising through the early twentieth century, peaking in the 1960s, then declining by more than 100-fold to 2020 to 2024 levels (the 1960s peak ran roughly

120 times current values). The decline aligned with the founding of the US Environmental Protection Agency (1970), the Clean Air Act, the Clean Water Act, the closure of two regional smelters, and the phase-out of leaded petrol. The article does not report blood lead levels (BLLs were not part of the assay; hair is a non-invasive proxy), and does not quote exact ppm or ng/g hair lead values: the visual chart in the article provides the trajectory rather than numerical concentrations. The method does not separate exogenous deposition on the cuticle from endogenous incorporation into the shaft, a recognised limitation. Sources of lead implied or named: leaded petrol exhaust, smelter emissions from the Utah Pb-Zn industry, and ambient air and water contamination prior to the 1970s regulatory regime.

2026 Volcano Art Prize
Kevina Malhotra: *Lead Bioindicators:* Lead-Safety Message: Both hummingbird feathers and seahorses are good lead bioindicators because both live in limited moving ranges and bioaccumulate local lead pollution. **Description of Work:** Coloured pencils on paper combined digitally through Paint and PowerPoint. https://volcanoartprize.com/portfolio-item/lead-bioindicators/ [LID 29410]

Assessing Lead Exposure Risks from Commonly Used Consumer Products in Malawi

Lead Research for Action. February 2026, https://www.leadresearch.org/post/assessing-lead-exposure-risks-from-commonly-used-consumer-products-in-malawi?utm_source=lead-update.cgdev.org [LID 29370]

Malawi, with sampling across 24 markets in three districts. National in scale, with implications for the broader sub-Saharan African consumer-product lead literature and the IHME-Lead Research for Action (LeRA) collaboration's market-screening protocol. Lead Research for Action's Malawi report screened 747 consumer products across 12 categories (metallic cookware, plastic foodware, geophagic substances, dried leafy greens, and others) by X-ray fluorescence (XRF) and confirmatory laboratory analysis. More than half of metallic cookware samples exceeded 100 ppm lead; some plastic foodware items exceeded 1,000 ppm, with substantial variation by colour and brand; geophagic materials (clay-based substances eaten especially during pregnancy) "greatly exceed maximum acceptable levels" for directly ingested products. Biokinetic modelling translated geophagic clay consumption during pregnancy into "potentially large associated increases" in maternal and foetal blood lead levels; no direct BLL measurements were taken in this study (specific µg/dL projections were not extracted from the publicly visible summary). The report concludes that multiple everyday product categories are likely significant lead exposure sources in Malawi and recommends targeted regulatory action and follow-up biomonitoring. Sources of lead named: lead-soldered or scrap-input metallic cookware (informal and formal production), lead pigments in coloured plastic foodware, contaminated geophagic clays, and contaminated dried leafy greens, with brand-level findings deferred to the follow-up brief (LID 29378).

Netflix's 'answer to Chernobyl' tells harrowing story of lead poisoning

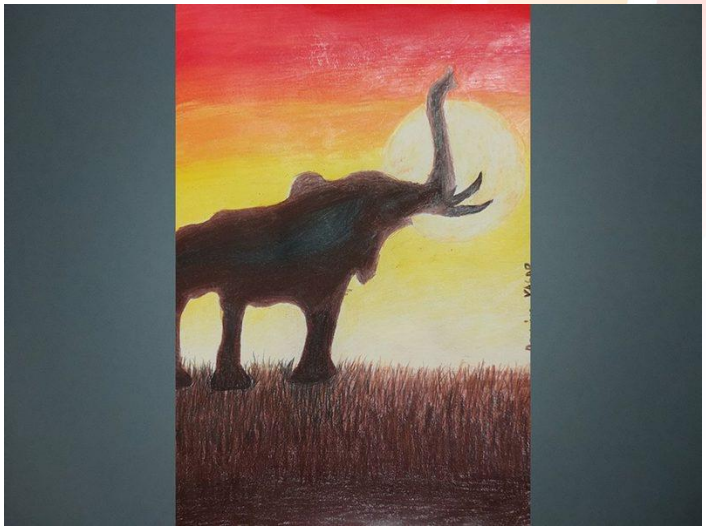
Metro. February 2026, https://metro.co.uk/2026/02/12/netflixs-answer-chernobyl-tells-harrowing-story-children-suffering-lead-poisoning-26851188/?utm_source=lead-update.cgdev.org [LID 29371]

Poland, 1970s setting (Silesia, near a state-owned lead smelter), dramatised in the Netflix six-part series Lead Children. National in immediate scope, but with global cultural reach via streaming and explicit comparisons to HBO's Chernobyl and Netflix's Toxic Town (the Corby UK lead-and-cadmium-in-reclamation case). Metro's review piece (Milo Pope) covers the show's reception, plot, and historical underpinnings. The series dramatises the real-life campaign of Dr Jolanta Wadowska-Król, who in the 1970s identified and pursued the link between a nearby state smelter and mass lead poisoning of children, against active suppression by the communist Polish government and Soviet-aligned institutional pressure. Her advocacy eventually forced the demolition of housing closest to the plant and the chelation and clinical management of large numbers of affected children. The article does not quote specific blood lead level concentrations or paediatric case counts; the show, drawn from Wadowska-Król's testimony and Michal Jedryka's book Lead Children, depicts BLLs and clinical signs without numerical anchors in this review. Source of lead: smelter emissions from a state-owned non-ferrous works (the Szopienice lead smelter in the Katowice district is the real-world referent, though not named in this review). The framing positions the production as a cultural lead-poisoning awareness moment akin to the Chernobyl miniseries.

How to stop the flow of lead in new and existing drinking water systems

JH Redmon. PLOS Water. February 2026, https://journals.plos.org/water/article?id=10.1371%2Fjournal.pwat.0000497&utm_source=lead-update.cgdev.org [LID 29372]

Global, with case material drawn from the United States (North Carolina childcare facilities), Central America (largest-city distribution sample), and sub-Saharan Africa (rural handpump studies). Global in scale, framed for the PLOS Water audience as a unified prevention-plus-remediation agenda spanning high- and low-income contexts. Redmon's PLOS Water opinion piece argues that lead contamination of drinking water is neither solved in wealthy countries nor confined to a residual fringe in LMICs, but is a global continuing problem with shared infrastructural drivers. Cited prevalence figures include approximately 25% of global samples exceeding the WHO provisional guideline of 10 µg/L, 12% of North Carolina childcare facility samples exceeding that threshold, and 8.9% of first-draw samples in a Central American capital city above guideline. African handpump component testing found 51% of foot valves and 45% of tap spouts containing lead above the US Reduction of Lead in Drinking Water Act 0.25% threshold. The piece restates that WHO attributed nearly half of the two million chemical-exposure deaths in 2019 to lead, with more than 30% of childhood developmental disability linked to lead. No new blood lead level distributions are reported. Sources of lead named: lead service lines, leaded brass and bronze plumbing fittings, lead-containing solder, and lead-bearing pump components (foot valves, tap spouts) in rural community supplies. The recommended dual strategy: keep new lead components out of new systems and find-and-fix existing in-place lead.



2026 Volcano Art Prize
Devrim Yasar (age 11, Creative Einstein): *Elephants, Droughts and Lead:* Lead-Safety Message: During droughts, shrinking water holes can concentrate heavy metals like lead. As water levels fall, elephants are forced to consume sediment, mud, and water with high concentrations of contaminants. **Description of Work:** Coloured pencil drawing with digital side panels created in Paint and PowerPoint. https://volcanoartprize.com/portfolio-item/elephants-droughts-and-lead/ [LID 29363]

Housing age and sociodemographic characteristics as predictors of residential lead exposure and modeled child blood lead levels

Alde et al. Science of the Total Environment. February 2026, https://www.sciencedirect.com/science/article/pii/S0048969726001750?utm_source=lead-update.cgdev.org [LID 29373]

United States, comparing two states with contrasting housing stocks and water-supply regimes: Indiana and North Carolina. Multi-state in immediate scope, with national implications for equity-focused lead-risk modelling and for the CDC and EPA's transition from blanket screening to risk-targeted screening. Alde and colleagues sampled residential lead in soil, dust, and drinking water across Indiana and North Carolina households and modelled child blood lead levels (BLLs) using IEUBK or similar biokinetic frameworks. Housing age was the consistent dominant predictor across both states, with newer homes associated with significantly lower lead in all three environmental media and lower modelled child BLL; the strength of the housing-age association was greater in North Carolina than in Indiana. Sociodemographic predictors diverged: in Indiana, percentage of Black residents was associated with higher water lead, while in North Carolina poverty level and water-source type were the stronger water-lead predictors. Private well use was associated with 4.4 times higher water lead than municipal supply. The publicly visible summary does not report numerical µg/dL modelled BLL distributions; the ScienceDirect full text was bot-blocked in this pass. Sources of lead named: deteriorated lead paint and dust in older housing, lead-bearing private well systems and household plumbing, and soil contamination from legacy paint and historical industrial deposition. The authors call for locally calibrated, equity-aware lead-risk targeting.

Association between potential lead exposure assessed using a screening questionnaire and aggressive behaviour among adolescents in Jakarta, Indonesia: a cross-sectional study

Suraya et al. BMJ Public Health. February 2026, https://bmjpublichealth.bmj.com/content/4/1/e003239?utm_source=lead-update.cgdev.org [LID 29374]

Indonesia, with field work in Jakarta. National in immediate scope, with implications for LMIC

adolescent lead exposure surveillance where direct blood lead measurement at population scale is logistically infeasible. Suraya and colleagues sampled middle and high school students aged 13 to 18 in Jakarta, indexing exposure with the Indonesian Ministry of Health's lead exposure risk questionnaire and aggression with a validated behavioural inventory. The article fills a recognised LMIC evidence gap noted in LID 29349 (Obamuyide systematic review): non-blood-based exposure proxies coupled with adolescent aggression outcomes. The publicly visible material confirms the cross-sectional design, the Jakarta school-based sample, and the use of the Ministry questionnaire (which surveys living environment, water source, paint condition, household trades, cosmetics, traditional remedies, and exposure to motor vehicle and battery work), but specific sample size, odds ratios, and confidence intervals were not extractable; the BMJ Public Health full text was bot-blocked in this pass. No blood lead levels are measured in the study by design. Sources of lead implied by the questionnaire instrument: deteriorated lead-based paint, lead-contaminated water and soil, parental occupational exposure (battery recycling, auto painting, soldering), lead-containing cosmetics and traditional remedies. The work is positioned as a low-cost screening tool for jurisdictions lacking biomonitoring capacity.

Lead-Safe Off-Grid Electrification: Understanding the Issues in Sub-Saharan Africa

Rachel Bonnifield and Caroline Mallory. Center for Global Development. February 2026, https://www.cgdev.org/publication/lead-safe-off-grid-electrification-understanding-issues-sub-saharan-africa?utm_source=lead-update.cgdev.org [LID 29375]

Sub-Saharan Africa, with focus on rural, remote, and conflict-affected areas where grid electrification remains absent. Regional in scale, with global development-policy implications because off-grid solar electrification is a flagship Sustainable Development Goal 7 strategy and a major Bank-, donor-, and impact-investor-financed sector. Bonnifield and Mallory at CGD interrogate the lead-poisoning externality of off-grid solar: 677 million people lacked electricity in 2023, roughly 87% of them in sub-Saharan Africa, and the off-grid solar sector that has been the principal expansion mechanism relies almost entirely on lead-acid battery storage. The authors estimate that off-grid solar generates 250,000 to 1.5 million tonnes of used lead-acid battery (ULAB) waste annually, equating to 13% to 47% of the region's total ULAB waste stream. Where this material enters informal smelting and breaking yards, the recycling pathway produces severe environmental contamination and direct community exposure. The publication does not report new blood lead level concentrations: it sits in the policy and burden-quantification space rather than biomonitoring. The piece argues for integrating lead-safe end-of-life battery collection and certified recycling into off-grid electrification financing, procurement, and policy from project inception. Source of lead: lead-acid batteries deployed in solar home systems and mini-grids, downstream into largely informal ULAB collection and smelting in West, East, and Southern African urban peripheries.

2025 in Review: Advancing Lead Elimination at Scale

Lead Exposure Elimination Project. February 2026, https://leadelimination.org/2025-in-review/?utm_source=lead-update.cgdev.org [LID 29476]

Global, with field programmes across 40 countries representing roughly 76% of births in low- and middle-income countries (LMICs); explicit case material from Pakistan, Ghana, Liberia, Burundi, Niger, Peru, and Sierra Leone. Global in scale, framed for the donor and Partnership for a Lead-Free Future audience as the year-in-review for the Lead Exposure Elimination Project (LEEP). LEEP's report restates the headline figure that approximately one in three children globally has elevated blood lead and estimates that 97.8 million children could be protected from lead paint exposure across 35

years through programmes initiated in 2025. Operational metrics: 13 paint studies completed in 2025; new lead paint regulations adopted in five countries (Burundi, Liberia, Niger, Peru, Sierra Leone); manufacturers representing more than 80% of the lead paint market across 22 countries engaged; warnings issued to more than 50% of the lead paint market in Ghana and Liberia. The most striking trend data are from Pakistan: oil-based lead paint market share fell from 88% in 2021 to 41% in 2024, with an estimated 7.5 million children protected from paint-mediated exposure. The 2026 targets are 50 countries, regulation in 14 total countries, and 50% reduction in lead adulteration of turmeric in two provinces or states. No new blood lead level data are reported. Sources of lead targeted: lead paint, turmeric and other adulterated spices, traditional eyeliners (kohl and surma documented up to 80% lead by weight), and lead-pigmented plastic foodware.

Schoolchildren's exposure to potentially toxic metals/metalloids and cognitive impairments in communities of the Brazilian Amazon new agricultural frontiers

Menezes-Filho et al. Neurotoxicology. March 2026, https://www.sciencedirect.com/science/article/abs/pii/S0161813X26000252?utm_source=lead-update.cgdev.org [LID 29377]

Brazil, Santarém plateau, State of Pará, in the Amazon's new agricultural frontiers. Local in scale, with regional implications for soybean-expansion zones across Amazonia and global relevance for children living near intensive agriculture on naturally metal-rich soils. Menezes-Filho and colleagues recruited 69 children aged 6 to 12 years across six communities during the 2024 rainy-season soybean planting period, measuring blood and urinary metals/metalloids by inductively coupled plasma mass spectrometry and administering the Raven Coloured Progressive Matrices, NEPSY-II, and Five Digit Test (FDT). Median blood lead level was 1.9 µg/dL (range 0.6 to 40.1 µg/dL), with 14.3% of children above the CDC 3.5 µg/dL blood lead reference value. Blood lead was inversely associated with Raven raw scores and with the verbal domain of NEPSY-II; mercury was also negatively associated with cognitive performance. The authors attribute lead exposure principally to consumption of foods cultivated in naturally Pb-rich Amazonian soils, and mercury exposure to a fish-rich diet, framing both as cognitive risks for children in agricultural-frontier communities.

Lead Exposure Risks from Consumer Products in Malawi: Key Recommendations and Next Steps

Tammy Tan and Isabel Arjmand. Lead for Research Action. March 2026, https://www.leadresearch.org/post/lead-exposure-risks-from-consumer-products-in-malawi-key-recommendations-and-next-steps?utm_source=lead-update.cgdev.org [LID 29378]

Malawi, with field photographs from Salima District markets. National in scale, designed as a tractable policy companion to LeRA's 2025 Malawi lead content study (LID 29370), with regional relevance to sub-Saharan Africa. Tan and Arjmand set out source-by-source recommendations for the four product categories identified as highest priority: geophagic pregnancy soils (GPS), plastic foodware, metallic cookware, and staple/other foods. Key concentrations: GPS mean 48 ppm Pb (median 47, range 9 to 66); plastic foodware mean 442 ppm (median 14, range below LOD to 7,100 ppm), with green and orange plastics highest (means 955 and 736 ppm); one hair dye at 14,000 ppm; one nonstick cookware item above 300,000 ppm. Modelled BLL impacts: GPS consumption of 16 g/day at 48 ppm projects a maternal BLL increase of about 5.21 µg/dL over pregnancy, with foetal BLL 3.65 to 4.69 µg/dL; staple-food contamination projects BLL rises of roughly 0.5 to 5 µg/dL. Recommendations: adopt the EU 100 ppm interim limit for plastic foodware, the UN FAO 100 ppm interim limit for cookware, ban lead acetate in hair dyes, ban imports of contaminated nonstick

cookware, set ceramic leachability limits, and run a Q2/Q3 2026 BLL study on geophagic pregnant women. Sources of lead named: GPS, lead-pigmented plastic foodware (additives), formal and informal metallic cookware (scrap inputs, solder, coatings), contaminated leafy greens and staple foods, leaded hair dye, and ceramic glazes.

An Analytical Study of Lead Levels in Jewellery, Cosmetics & Toys for Children in Bangladesh

Hossain et al. Preventive Medicine Research & Reviews. March 2026, https://journals.lww.com/pmrr/fulltext/9900/an_analytical_study_of_lead_levels_in_jewellery,.156.aspx [LID 29379]

Bangladesh, with sampling concentrated in major markets of Dhaka city. National in scale, with regional implications for South Asian consumer-product surveillance and global relevance for the Lead Paint Alliance's Model Law agenda on lead in toys, jewellery, and cosmetics. Hossain and colleagues (Environment and Social Development Organisation, ESDO; Bangladesh Medical University, Department of Public Health and Informatics) purposively sampled 250 children's products and screened them by portable X-ray fluorescence (XRF). Lead was detected in 62.8% of samples, with 58.6% exceeding the 90 ppm safety threshold used as the international reference for paints and surface coatings. By category, toys accounted for 82.8% of the lead-contaminated items, cosmetics 12.1%, and jewellery 5.1%; plastic materials carried 80.9% of the contamination. Related ESDO XRF work (Hossain as senior technical adviser) has previously reported maximum readings around 2,350 ppm Pb in hard plastic toys from Chawkbazar, well above the 90 ppm limit, alongside coincident chromium, mercury, and cadmium exceedances. No blood lead levels were measured; the design is a market-survey screen rather than a biomonitoring study. The authors call for stricter import controls, enforcement of the existing 90 ppm threshold, and consumer-awareness measures. Sources of lead named: lead-pigmented plastic toys (the dominant pathway), lead-bearing pigments in skin-lightening creams and other cosmetics, and lead in cheap children's jewellery.

The Longer Reach of Lead: Early Childhood Lead Exposure and Cognitive Ability Later-in-Life

Chin et al. Preprint. March 2026, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=6300273&utm_source=lead-update.cgdev.org [LID 29380]

United States, drawing on the nationally representative Health and Retirement Study (HRS) administered through the University of Michigan's Institute for Social Research. National in scale, with global relevance for any country still working through the long tail of leaded-gasoline cohorts and for the economic accounting of childhood lead exposure. Zahran, Chin, Keyes, and Mushinski (the SSRN abstract_id 6300273 March 2026 revision of working paper 5220896) link geo-referenced HRS respondents (n in the hundreds of thousands) to state-year estimates of tetraethyl-lead emissions from leaded gasoline during their early childhood, exploiting the post-1970s phase-down as a natural experiment. They find consistent later-in-life impairment on standardised cognitive and memory measures attributable to early childhood lead exposure, with effects that worsen with age and amplify with household poverty (an interaction the authors flag as central to lifetime-cost estimates). Companion findings from the team's parallel work estimate that policy-driven cuts in childhood lead exposure improved standardised test scores by 0.13 to 0.17 standard deviations, with a dose-response shape uniform across the performance distribution; press coverage of the broader programme cites roughly 170 million Americans exposed in early childhood to lead levels at least five times current

safety thresholds. No new blood lead level values are reported in this paper: exposure is reconstructed from gasoline-emissions records rather than measured BLLs. Source of lead named: tetraethyl-lead emissions from leaded gasoline, concentrated in dense-traffic and industrial zones during the 1960s and 1970s.

2021 Volcano Art Prize
Gary Keller: *Where toddlers go to cut their teeth on lead:* Lead-Safety Message: Where toddlers go to cut their teeth on lead: a warning about lead-painted surfaces accessible to crawling and teething children. **Description of Work:** Photos made into a poster. https://volcanoartprize.com/portfolio-item/where-toddlers-go-to-cut-their-teeth-on-lead/ [LID 27732]

Blood lead levels in children and soil lead contamination in a former mining area in Germany

John et al. Environmental Epidemiology. April 2026, https://journals.lww.com/environepidem/fulltext/2026/04000/blood_lead_levels_in_children_and_soil_lead.5.aspx?utm_source=lead-update.cgdev.org [LID 29381]

Germany, in the former mining district of Goslar (Lower Saxony), with sampling in the Oker and Harlingerode neighbourhoods where commercial mining ceased in 1988. Local and national in scale, with global relevance for any legacy mining or smelter community managing persistent soil-lead burdens. John and colleagues conducted a cross-sectional study in 2023/24 measuring blood lead levels (BLLs) in 310 children aged 5 to 7, paired with detailed soil-lead mapping and guardian-reported exposure pathways (hand-to-mouth contact, handwashing, homegrown and foraged food, outdoor play, secondhand smoke). The geometric mean BLL was 22.7 µg/L (i.e. 2.27 µg/dL); 51% of children exceeded the German Human Biomonitoring reference values of 19/22 µg/L (i.e. 1.9 µg/dL for girls and 2.2 µg/dL for boys – *Ed. Note: these are the lowest child blood lead reference values or "blood lead action levels" in the world*), 24% exceeded the US reference of 35 µg/L (3.5 µg/dL), and 13% exceeded the WHO 50 µg/L (5 µg/dL) benchmark. Residential soil lead concentrations reached medians of around 1,500 mg/kg, classified into low (below 200), moderate (200 to 400), high (400 to 1,000), and very high (above 1,000) mg/kg strata. Children in the most contaminated strata had BLLs 29% higher than those in the least contaminated. Soil contamination emerged as the dominant exposure pathway. The authors call for continued and strengthened preventive measures (hand hygiene, soil cover, dietary advice on homegrown produce) in former mining regions. Sources of lead named: legacy mining and smelter contamination of residential soils, with secondary contributions from homegrown produce, hand-to-mouth soil ingestion, and (minor) secondhand cigarette smoke.

Effectiveness of soil remediation intervention of abandoned used lead-acid battery recycling sites to reduce lead exposure among children: A three-arm pretest-posttest non-equivalent comparison group trial

Rahman et al. International Journal of Hygiene and Environmental Health. April 2026, https://www.sciencedirect.com/science/article/pii/S1438463926000167?utm_source=lead-update.cgdev.org [LID 29382]

Bangladesh, Mirzapur (Tangail District), centred on two abandoned used lead-acid battery (ULAB) recycling sites that ceased operating in early 2019. Local in scale, with national and global implications for ULAB-contaminated communities across South Asia and sub-Saharan Africa, and operationally relevant to Pure Earth and World Bank PRTR (Pollutant Release and Transfer Register) remediation programmes. Rahman and colleagues ran a three-arm pretest-posttest non-equivalent comparison-group trial: a soil-remediation intervention site, a ULAB control site (no remediation), and a non-ULAB control community, following 167 children aged 6 months to 12 years with blood lead measurements at baseline and 12 months. Mean BLLs at baseline and follow-up were 9.01 then 7.04 µg/dL in the intervention arm, 8.85 then 8.11 µg/dL in the ULAB control arm, and 4.28 then 3.78 µg/dL in the non-ULAB control arm. Difference-in-differences analysis showed a 15% greater BLL decline in the intervention arm versus the ULAB control and 11% greater versus the non-ULAB control. Older children (above 5 years), those within 200 m of the site, and those with above-median baseline BLLs gained the most. Crucially, post-intervention BLLs in the active arm remained above the CDC reference value of 35 µg/L (3.5 µg/dL), indicating that site remediation alone is necessary but not sufficient. Pathways: soil and household dust contaminated by informal ULAB smelting and acid drainage at the abandoned recycling sites, with exposure increasing with proximity to site.

Circulating miR-126 and miR-155 are associated with environmental lead exposure: A translational approach via human biomonitoring and bioinformatic networks

González-Bravo et al. Toxicology Reports. June 2026, https://www.sciencedirect.com/science/article/pii/S2214750026000120?via%3Dihub [LID 29383]

Mexico, in the Ejido "Las Palmas" community of Tamuín municipality, San Luis Potosí, a region with a long history of mining and metallurgical activity. Local in scale, with national implications for Mexican biomonitoring (NOM-199-SSA1-2000) and global relevance to the mechanistic literature linking low-to-moderate lead exposure to cardiovascular and inflammatory disease. González-Bravo and colleagues take a translational, cross-sectional approach: they measure blood lead levels (BLLs) and quantify two circulating microRNAs, miR-126 and miR-155. Mean BLL was 7.6 ± 5.8 µg/dL, with more than 50% of participants exceeding Mexico's reference threshold of 5 µg/dL. Both miRNAs showed significantly altered expression ($p < 0.05$) in association with elevated BLLs. Pathway enrichment pointed to inflammation, angiogenesis, lipid metabolism, and atherosclerosis-related processes, with myelocytomatosis (MYC) implicated as a regulatory node affecting cardiovascular function. The authors are explicit that the observational design precludes causal inference and call for larger epidemiological cohorts. Source of lead: environmental exposure characterised at the community level (the abstract does not pin down specific industrial sources, though San Luis Potosí is a long-established mining and smelting region of Mexico, with that contextual attribution implied).