



Task Force 6  
**Accelerating SDGs:** Exploring New  
Pathways to the 2030 Agenda



# ADDRESSING THE GLOBAL LEAD POISONING CRISIS TO ENSURE THRIVING CHILDHOODS AND LIFELONG HEALTH

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# **Abstract**



**L**ead poisoning is among the least recognised and most neglected global public health and development challenges. Estimates suggest that about one in two children in low- and middle-income countries have dangerously high blood-lead levels, hampering their ability to grow, learn, and thrive; lead exposure also causes an estimated 900,000 cardiovascular deaths per year (more than malaria). The key sources responsible for lead poisoning vary widely between and within countries, and include lead-acid battery recycling, mining and ore smelting, contaminated spices, lead paint, and cookware.


G20 cooperation is needed to increase awareness of this slow-moving global crisis; to develop a measurement and surveillance agenda that monitors population-level lead exposure and identifies sources of contamination; and to support policy and delivery interventions that reduce the burden of lead poisoning in affected communities. Under India's presidency, the G20 should take meaningful action to protect children's potential, people's lifelong health, and the shared environment from the widespread scourge of lead poisoning.



# **The Challenge**



# **1**



**T**he global phase-out of leaded petrol—completed in 2021<sup>1</sup>—ranks among the most ambitious and impactful public health achievements ever, saving an estimated 1.2 million lives and averting US\$2.4 billion in economic losses every year.<sup>2</sup> However, despite this extraordinary achievement—and popular perception—lead poisoning has not yet been relegated to the history books. Lead poisoning persists within marginalised communities in high-income countries (HICS) and remains ubiquitous, yet invisible, across most low- and middle-income countries (LMICs), representing one of the least recognised and most neglected challenges for global public health and development. Lead poisoning thus represents an insidious barrier to achieving many of the Sustainable Development Goals (SDGs), including health, education, poverty, growth, and environmental protection targets.

### **Lead is robbing children of their potential to learn and thrive**

Lead is a neurotoxin in humans and many animals; exposure in utero and in early childhood permanently alters neurological development, with lifelong

effects on learning, cognition, and behaviour. Lead exposure is causally linked to poorer learning outcomes, and increased risk of attention deficit hyperactivity disorder and other behavioural problems; there is also strong indicative evidence linking lead exposure to violence and delinquency.<sup>3</sup> Studies from the US<sup>4</sup> and Sweden<sup>5</sup> have shown associations between the cognitive effects of lead poisoning and decreases of 4 percent to 11 percent in lifetime earnings.

The cognitive effects of lead are seen even at very low blood-lead concentrations, with escalating impacts as blood-lead levels (BLLs) increase. The World Health Organization (WHO) has set a reference BLL at 5 µg/dL for clinical intervention; however, evidence suggests there is no safe level of lead, and substantial effects on cognition and behaviour have been documented below that threshold.<sup>6</sup> At higher blood-lead concentrations (greater than 40 µg/dL), children and adults can develop severe acute illness, including colic, decreased motor skills, seizures, neuropathy, encephalopathy, coma, and even death.<sup>7</sup>

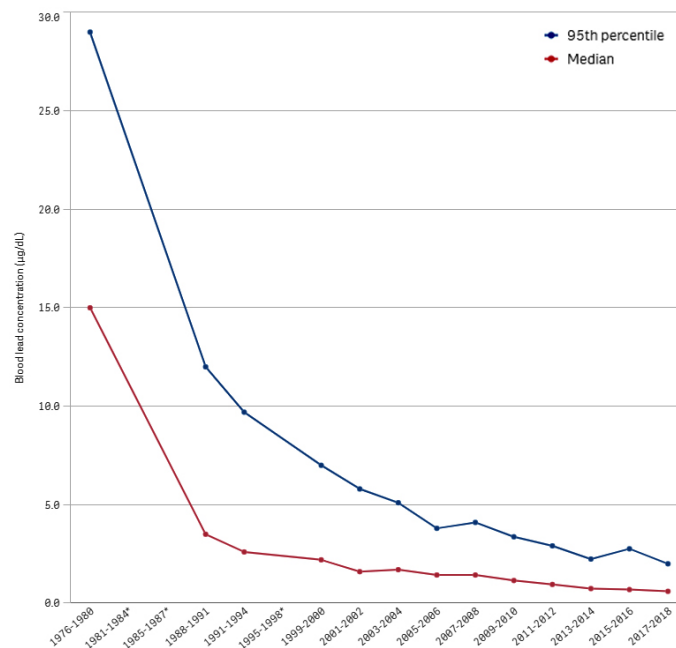
With these devastating effects in mind, figures on the scale of global lead poisoning shock the conscience, amounting to a slow-moving global crisis. Data is scarce—only a few HICs, such as the US, have reliable survey data on lead exposure over the last few decades, reflecting dramatic decreases following leaded gasoline’s phase-out (see Figure 1). But a recent estimate for 34 countries suggests that about one in two children in LMICs<sup>8</sup>—800 million children in total<sup>9</sup>—have dangerously high blood-lead levels. A 2013 study valued the total economic cost of lead-associated learning losses in LMICs

to be nearly US\$1 trillion annually.<sup>10</sup> Lead poisoning thus represents a mass injustice to the world’s children, and a long-term, insidious tax on its collective productivity and welfare.

### Lead is helping drive the global burden of cardiovascular disease

An increasingly robust body of evidence also points to lead exposure as a strong, causal risk factor for health problems in adulthood—most notably, for mortality and morbidity from cardiovascular disease. In the US, a large-scale 2018 cohort study found that lead exposure,

**Figure 1: Lead exposure in children aged 1 to 5 years in the US (1976-2018)**



Note: Median (red) and 95th percentile (blue) concentrations in blood

Source: US Environmental Protection Agency<sup>11</sup>

even at relatively low levels, doubled the risk of heart disease and may be responsible for more than one-quarter of all heart attacks.<sup>12</sup> At the global level, 2019 Institute for Health Metrics and Evaluation estimates suggest that lead is responsible for 900,000 deaths per year (more than malaria),<sup>13</sup> although many experts now consider this to be an *underestimate* given recent evidence.


### Lead remains common in our environment, homes, and workplaces

Lead remains ubiquitous in food, water, air, paint, consumer goods, cosmetics, cookware, and other products—particularly in LMICs, where there are still large gaps in regulation and enforcement. The relative contribution of different sources of lead exposure has not been sufficiently studied or documented, but suggestive evidence points to several sources that are likely to be important:<sup>14</sup>

- **Lead Acid Battery Recycling:** Lead is an essential component of lead-acid batteries, which power cars, generators, and renewable energy storage, and which account for the vast majority (over 80 percent) of current lead usage.<sup>15</sup> The lead from used batteries can be almost fully

recovered and recycled, but the risks of severe occupational exposure and environmental contamination are extremely high if such activities are done informally or in industrial operations with insufficiently stringent environmental and safety standards. Researchers estimate that informal recycling operations are responsible for severe lead poisoning of 6-17 million people, with average BLLs of 31.2 µg/dl in children and 21.2 µg/dl in adults.<sup>16</sup>

- **Mining and Smelting:** Mining operations for lead ore—or sometimes other metals, including gold, nickel, and platinum—can lead to severe occupational exposure and long-term environmental degradation. For example, Zambia's infamous Kabwe mine has been closed for decades, yet the surrounding community—including 90,000 children—continues to experience almost universal lead poisoning, often with extremely high BLLs exceeding 75 µg/dl.<sup>17</sup>
- **Paints:** Lead is added to paints to enhance colour, durability, or drying capacity; in turn, lead paint can cause human exposure during its manufacture and application (via



lead fumes), as well as decades later (via inhalation or ingestion of old paint chips or lead dust). As of end-2021, 111 countries (57 percent) did not have confirmed, legally binding controls that limit production, import, and sale of lead paint.<sup>18</sup> Paint samples sold across South America, Africa, and Asia have been found to contain very high levels of lead, often exceeding 10,000 ppm.<sup>19</sup> As a reference, the UN Environment Programme (UNEP) uses 90 ppm as the default legal limit within its Model Lead Paint Law.<sup>20</sup>

- **Cookware:** Lead-glazed ceramics—common in Latin America, North Africa, and South Asia, with lead glazes used to enhance colour and shine—can leach lead into food and drink. Artisanal aluminium pots, made with scrap metal by small-scale producers and used across many LMICs, have been found to frequently contain lead, though the conditions under which it becomes bioavailable remain unclear.
- **Contaminated Spices:** Lead is sometimes added to spices to enhance the colour and increase the market price; turmeric is often

adulterated with lead chromate, a bright orange pigment. A 2019 (pre-intervention) study in Bangladesh found that 50 percent of turmeric samples contained lead adulteration at baseline;<sup>21</sup> high lead levels have also been found in spices originating in Georgia, India, Russia, Algeria, Ecuador, Pakistan, and Nepal.<sup>22</sup>

In addition, lead contamination may occur via the following sources:<sup>23</sup>

- **Cosmetics**, most notably Kohl (*surma*) eyeliner, but also non-Kohl lipsticks and henna.
- **Toys, jewellery, and consumer goods** via lead pigments and metal components.
- **Drinking water** via lead pipes or service lines, or contaminated groundwater.
- **Religious powders and traditional medicines**, primarily within East and South Asia.
- **Lead ammunition and fishing weights**, which remain legal and widely used even in countries like the US, Canada, and the UK.



- **E-waste recycling** via lead components in discarded electronics.
- **Light aviation fuel**, which remains leaded even in high-income countries.
- **Residual pollution from leaded gasoline**, particularly in dense cities and along major highways.
- **Folkloric traditions**, including a lead-based form of fortune-telling common in Eastern Europe.

There is no single “silver bullet” intervention for global lead poisoning, as the relative importance of these different sources varies across and within countries. Given the scope and scale of the problem, a mix of interventions, adapted to local epidemiology and context, is needed to reduce the overall burden dramatically. These include stronger regulation and enforcement to remove lead from paint and consumer goods; strong restrictions on using lead beyond essential industrial applications; worker protections to prevent occupational exposure to

lead; and safe, self-contained circular supply chains for recycling of lead-acid batteries.

### **Data deficits compound the challenge**

Further compounding the challenge is a shortage of data on the prevalence and causes of lead poisoning, particularly in LMICs. While most wealthy countries conduct regular, robust surveillance on population BLLs, no LMIC has such a system in place, and just two (Georgia and Mexico) have conducted representative BLL surveys.<sup>24</sup> Estimates from most other countries are extrapolated from small-scale data collection exercises or modelled based on data from other demographically similar countries. These estimates are, by their very nature, unreliable.<sup>25</sup>


Similarly, there is limited data on the relative contribution of different sources of lead exposure to the overall burden of lead poisoning—both in specific settings and at the global level. This obviously constrains policy action, as interventions must be targeted at locally important sources of lead exposure to effectively address the problem.



# **The G20's Role**

# **2**






**T**he G20 cannot afford to ignore the global crisis of lead poisoning, in part because all its member states are directly affected—albeit to differing levels of severity. The emerging economies within the G20 have the highest burdens. India is home to an estimated 276 million children with BLLs above 5 µg/dl<sup>26</sup>—by far the highest, in absolute numbers, worldwide. Average BLL exceeds 3 µg/dl in several other G20 countries: China, Indonesia, Mexico, South Africa, each with many millions of children above the 5 µg/dl reference level.<sup>27</sup>

Yet, given the deleterious health and cognitive effects documented even at very low levels of exposure—and given that lead poisoning is most likely to occur in marginalised communities, where it then perpetuates cycles of inequity and social division—even the wealthiest countries have a stake in addressing the issue. In the US, for example, lead poisoning remains a highly politically salient issue and a Biden administration priority<sup>28</sup> to address racial inequality and socioeconomic deprivation. The G7 recently reiterated its “strong commitment to reduce lead in the environment...and vulnerable

communities”,<sup>29</sup> acknowledging their continued investment in this issue. But the G7 countries cannot eliminate local or global lead poisoning alone.

While G20 member states can and should take unilateral, local action to protect their populations, broader dialogue and cooperation are needed to increase awareness of this ongoing crisis at the global level while addressing its international dimensions. As the premiere forum for global cooperation, the G20’s imperative for engagement is twofold.

First, attention by the G20 is needed to elevate lead poisoning on the international agenda, motivating national and international action. Lead poisoning is most dangerous where it is invisible; countries without robust surveillance systems are often entirely unaware of the problem and, therefore, unmotivated to address it. The G20 leadership can kickstart a virtuous cycle of policy intervention by shining a high-level light on the problem while facilitating learning, exchange, and shared accountability for progress at the national level. This would include high-level communication and dialogue about the scale and



scope of the problem; development of a measurement and surveillance agenda to monitor population-lead exposure; systems to identify sources of contamination in food, consumer products, and the environment; and support to policy and delivery interventions that reduce the burden of lead poisoning in affected communities.

Second, G20 dialogue and action are needed to address the international dimensions of lead poisoning, which are increasingly relevant within an interconnected world:

- Contaminated foods and consumer goods flow across borders—sometimes via official import/export channels, and other times via individual travellers or migrants. In New York City, cases of lead poisoning are now routinely linked to imported spices,<sup>30</sup> religious powders, cookware, cosmetics, and consumer goods; these are often sourced abroad during travel, within countries of origin for immigrant communities. Spices from South Asia are exported worldwide; India's largest export markets for turmeric (a frequently contaminated spice, though the prevalence of

contamination in India is unknown) include the US, Bangladesh, United Arab Emirates, Malaysia, Germany, Morocco, and Japan.<sup>31</sup> Import surveillance and enforcement actions can help spot some contaminated goods at the port. Nevertheless, such actions are, by their nature, non-comprehensive, and all countries will continue to be vulnerable unless contamination is addressed at the source.

- Global demand for lead-acid batteries continues to grow, driving a large international trade in new batteries; newly mined and recycled lead; and used lead-acid batteries, which can be almost fully recycled for reuse. Though some international agreements help regulate these flows, they remain large and sometimes unsafe. Waste lead-acid batteries are sometimes exported and subsequently recycled in receiving countries under less stringent standards than in exporting countries, with adverse effects on human health.<sup>32</sup> In turn, the recycled lead fuels new battery production, with total import/exports of lead-acid batteries valued at about US\$10 billion annually.<sup>33</sup>

- Lead poisoning is a critical One Health issue, as environmental lead contamination can decimate wildlife populations and threaten humans via the contaminated food supply. The effects of lead poisoning on environmental


degradation and wildlife can also cross borders, including via effects on migratory birds<sup>34</sup> and potentially via contaminated river waters<sup>35</sup> or strong winds.<sup>36</sup>



# **Recommendations to the G20**


# **3**





**U**nder India's presidency, the G20 can and should take meaningful action to protect children's potential, everyone's lifelong health, and our shared environment from the widespread scourge of lead poisoning. The following actions are recommended for the G20's consideration:

- Issue a clear declaration that affirms and elevates the importance of addressing global lead poisoning to achieve the SDGs; promote thriving childhoods and lifelong health; protect our shared environment; and drive sustainable, global prosperity. The declaration should reflect and mobilise governmental commitment to tackle this challenge with resources and attention commensurate with its importance as a development, education, health, and environment issue.
- In line with WHO and UNEP standards, the G20 should endorse strong regulations on lead in paint, food, water, and consumer goods. Member states, in turn, should commit to promptly introducing and enforcing such regulations to the extent possible given the national context. Though not perfect, US standards are among the most stringent in the world and may be useful as a template.
- In cooperation with technical agencies, particularly the WHO, the G20 should commit to an expanded lead surveillance programme with international reporting and shared accountability. As part of this initiative, each G20 member should commit to producing nationally representative data on BLLs by 2026, through routine surveillance systems or a representative BLL survey. G20 members should also commit to conducting at least one diagnostic exercise to determine sources of lead poisoning in the same period. As appropriate, the countries may consider using overseas development aid to sponsor similar data collection exercises in cooperation with other LMIC governments.
- As an immediate, high-impact policy intervention, the G20 should cooperate to eliminate intentional lead adulteration in spices. Recent experience in Georgia and Bangladesh suggests that targeted education and enforcement actions can quickly and dramatically



reduce the lead content of spices on local markets.<sup>37</sup> A coordinated, international campaign to detect adulteration at source and in port; to remove contaminated spices from market; and to proportionately penalise offending producers would offer a ‘quick win’ on at massive scale, protecting hundreds of millions of children and adults.

- The G20 should expand dialogue and cooperation to strengthen the international circular economy for lead acid batteries in a way that protects workers, livelihoods, environments, communities, and economic growth.


Attribution: Rachel Silverman Bonnifield, “Addressing the Global Lead Poisoning Crisis to Ensure Thriving Childhoods and Lifelong Health,” *T20 Policy Brief*, May 2023.




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