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## Lead poisoning in Nigeria affects thousands

Worst incident on record may be “tip of the iceberg”



The world's worst-ever recorded outbreak of lead poisoning has been occurring in Zamfara state, Nigeria, since at least March 2010, the World Health Organization (WHO) reported this month in a global alert<sup>1</sup>. At least six villages are affected by the outbreak, caused by the informal processing of lead-rich gold ore in residential areas. More than 160 children have died from lead poisoning in the region over the past few months.

“Lead concentrations in soil of >100,000 ppm [parts per million] were found in and around habitations in the villages,” writes the WHO. “In order to prevent further deaths and long-term neurological impairment in affected children it is essential that the lead contamination is removed from villages and particularly the domestic compounds.” The soil lead limit for residential areas in the USA is 400 ppm.

Soil inside residential compounds was found to contain up to 10% lead.

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Following the discovery of the poisonings, the Zamfara Ministry of Health requested assistance from the US Centers for Disease Control and Prevention (CDC), which reports on the situation today in *Morbidity and Mortality Weekly Report*<sup>2</sup>.

The CDC team investigated 119 households in the area and found that a quarter of the children living there had died in the previous 12 months. More than 80% of these had convulsions before death, which is a sure sign of severe lead poisoning, they say. The investigators collected blood samples from 205 living children and found that all but six of them had blood levels over 45 µg/dL, the level at which chelation therapy is recommended. Chelation therapy involves the injection of chemicals that bind lead in the blood, allowing it to be excreted in urine.

Currently the charity Médecins Sans Frontières is giving around 100 children chelation therapy. But 2000 more are in need and cannot be treated until the lead contamination is removed from the area, says Meredith Block, program director at the Blacksmith Institute, New York, USA which is directing the cleanup operation in the area. “The environmental component is a critical part of treatment,” Block explains. “Chelation therapy doesn’t work if you return the kids to the contaminated area.”

So far, one village has been fully decontaminated, and another is due to be finished at the end of next week. However, the Institute is yet to receive the funding needed to finish this work in these two villages — and Block estimates there may be up to 11 more villages requiring decontamination.

Decontamination is relatively simple, and involves removing the top two centimetres of soil and scrubbing down the inside of houses to remove any lead dust that may have accumulated. But the resources to finish the job are not yet available, and the rainy season is approaching, which could spread the contamination further and make the roads to the villages impassable. The Blacksmith Institute has appealed to the WHO and UNICEF for the \$1.2m required to complete decontamination, but bureaucracy has stalled delivery of any funds, Block says. The amount is small relative to the organisations’ overall budgets, she points out.

“The Nigeria incident is likely the tip of the iceberg,” says Leo Trasande, from the Mount Sinai School of Medicine, New York, USA. “It is likely there are many more [contaminated] sites across Africa.”

Although leaded petrol, once a major source of lead poisoning, has been phased out across Africa there are many remaining sources of contamination. Block highlights an informal lead-acid battery recycling taking place in Dakar, Senegal as “the next unprecedented lead poisoning incident”. Trasande points to paint, water, and landfill sites as remaining sources of lead exposure across Africa. “Many more people are likely to suffer consequences from lower-level, but nonetheless problematic, exposures,” he explains.

Trasande has studied one such site in Kampala, the capital city of Uganda, where one in five children aged between four and eight were found to have blood lead levels higher than the CDC’s 10µg/dL “safe limit”, which can impair neurological development. The researchers found that elevated blood lead levels were associated with proximity to a landfill site in the

city. The results of the study were published in *Environmental Health Perspectives* last month<sup>3</sup>.

Most studies of lead exposures in African countries took place before leaded petrol was phased out. Before the ban, it is likely that nearly all children in Kampala had blood lead levels higher than 10µg/dL, the authors say, so it is clear that the ban has been beneficial. Nonetheless, lead poisoning remains highly prevalent in the city's children.

#### Reference and links

1. World Health Organization. Nigeria: mass lead poisoning from mining activities, Zamfara State. 7 July 2010. [Article](#)
2. Biya O, Gidado S, Haladu S, Geoffrey T, Nguku P, Durant J, *et al.* Outbreak of Acute Lead Poisoning Among Children Aged <5 Years — Zamfara, Nigeria, 2010. *MMWR* 2010; **59**:27 [Article](#)
3. Graber LK, Asher D, Anandaraja N, Bopp RF, Merrill K, Cullen MR, *et al.* Childhood Lead Exposure After the Phaseout of Leaded Gasoline: An Ecological Study of School-Age Children in Kampala, Uganda. *Environ Health Perspec* 2010; **118**:884–889. doi: [10.1289/ehp.0901768](https://doi.org/10.1289/ehp.0901768)

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