
Children's Environmental Health Research Findings
March 2011

Topic: Lead poisoning

Title: Childhood lead poisoning from the smelter in Torreón, México

Conclusion: In spite of new controls on atmospheric releases from the smelter, children in Torreón, Mexico remain at risk of lead poisoning.

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Abstract: Lead concentrations and isotopic compositions in blood samples of 34 children (ages 2-17 years) living within a 113 km² area of a silver-zinc-lead smelter plant in Torreón, México were compared to those of associated environmental samples (soil, aerosols, and outdoor and indoor dust) to identify the principal source(s) of environmental and human lead contamination in the area. Lead concentrations of soil and outdoor dust ranged 130-12,050 and 150-14,365 µg/g, respectively. Concentrations were greatest near the smelter, with the highest levels corresponding with the prevailing wind direction, and orders of magnitude above background concentrations of 7.3-33.3 µg/g. Atmospheric lead depositions in the city varied between 130 and 1350 µg/m²/d, again with highest rates <1 km from the smelter. Average blood lead concentrations (11.0±5.3 µg/dL) in the children ranged 5.0-25.8 µg/dL, which is 3-14 times higher than the current average (1.9 µg/dL) of children (ages 1-5 years) in the US. Lead isotopic ratios ((206)Pb/(207)Pb, (208)Pb/(207)Pb) of the urban dust and soil (1.200±0.009, 2.467±0.003), aerosols (1.200±0.002, 2.466±0.002), and blood lead (1.199±0.001, 2.468±0.002) were indistinguishable from each other, as well as those of the lead ores processed at the smelter (1.199±0.007, 2.473±0.007). Consequently, elevated blood lead concentrations of the children in Torreón, as well as in their environment, are still dominated by industrial emissions from the smelter located within the city, in spite of new controls on atmospheric releases from the facility.

Policy Implications: Children living near smelters are at risk of lead poisoning.

Keywords: lead, smelter