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Dental enamel as biomarker for environmental contaminants in relevant industrialized estuary areas in São Paulo, Brazil

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Heavy metal contamination is a long-standing and very well-known public health problem, and its exposure can cause damage to several organs of human body, especially on the central nervous system of young children and teenagers. The aim of this article is to evaluate lead, cadmium, and manganese contamination in 125 children from 6 to 13 years old living in contaminated areas during the period from 2006 to 2009 (São Vicente, Cubatão Downtown, Bertioga and Cubatão Pilões/Água Fria). This estuary area is the most important example of environmental degradation by chemicals from industrial sources. This is across-sectional study through clinical examinations and dental enamel tests. All mothers from these children lived in the area since before the pregnancy. Lead, cadmium, and manganese levels (μg/g) were measured on dental enamel samples through graphite furnace atomic absorption spectrometry, searching for the occurrence of heavy metals. The mean lead concentrations were 139.48 μg/g in Cubatão Pilões/Água Fria, 170.45 μg/g in Cubatão Downtown, 213.52 μg/g in São Vicente, and 151.89 μg/g in Bertioga. The mean cadmium concentrations were 10.83 μg/g in Cubatão Pilões/Água Fria, 12.58 μg/g in Cubatão Downtown, 10.92 μg/g in São Vicente, and 14.57 μg/g in Bertioga. The mean manganese concentrations were 23.49 μg/g in Cubatão Pilões/Água Fria, 30.90 μg/g in Cubatão Downtown, 41.46 μg/g in São Vicente, and 42.00 μg/g in Bertioga. Dental surface enamel may be used as an efficient biomarker of past environmental exposure to lead, manganese, and cadmium which are associated to wellknown sources of heavy metal contamination. The results suggest that the evaluated children were exposed to sources of lead, cadmium, and manganese since before their conceptions.Although Bertioga initially was chosen as a control area of this study, it was also verified to have heavy metal contamination on examined children.

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