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Biomonitoring Study of Heavy Metals in Blood from a Cement Factory Based Community

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Abstract. Little is known about the effects of cement factory pollution, emissions, and kiln dust on contaminant exposure in human populations, including school environments, in close proximity to these point sources. In Ravena, New York, USA and vicinity, environmental pollution from a local cement plant is considered significant and substantial according to the United States Environmental Protection Agency's Toxic Release Inventory, published in 2006, 2007, and 2010. We hypothesized that cement factory based communities, such as the one in Ravena, NY, may be differentially exposed to heavy metals, including mercury, via dust, soil, and air in addition to any contributions from fish consumption, dental amalgams, smoking habits, and occupational exposures, etc. Here we report measurements of several heavy metals in blood (Pb, Cd, As, Hg, Se and Al) and, for comparative purposes, total mercury in hair from a local (six-mile radius) population of Caucasian adults and children. We also report and synthesize local atmospheric emissions inventory information and new indoor air data (NYSERDA, 2011) from the local school which is situated directly across the street (within 750 feet) from the cement factory and quarry. In addition, to our human and environmental heavy metal results we also discuss scientific outreach coordination, and public health action opportunities that will likely have wide applicability for other community and environmental health studies confronting similar pollution issues.

Keywords: Heavy metals, cement, biomonitoring, human exposure