THE IMPACT OF RESIDENTIAL SOURCES OF LEAD ON BLOOD LEAD LEVELS OF YOUNG CHILDREN IN MONTRÉAL, QUÉBEC (CANADA)

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Background and Aims: Lead sources in the general environment have reduced dramatically but the importance of domestic sources in Canada remains unknown. This study evaluated the contribution of residential sources of lead to blood lead levels (BLLs) of young children.

Methods: We conducted a cross-sectional survey from September 2009 to March 2010. A total of 306 children aged 1-5 yrs, selected at random in old sectors of Montréal, participated in the study. Only participants who drank tapwater and had lived at least one year at the same residence were included. During home visits, the following environmental samples were collected: 5 kitchen tap water samples (1 liter after 5 minutes flushing and 4 liters after 30 minutes stagnation), 3 house dust floor and one windowsill samples. Paint content for lead was also evaluated by XRF. Parents answered questionnaires regarding dietary and general habits. A venous blood sample was drawn from the child. All laboratory analyses were done using established or slightly modified USEPA methods and included internal and external quality control. Multiple linear regression analyses of the log transformed BLL were used for statistical analysis.

Results: The geometric mean (GM) of BLLs was 0.065 µmol/dl (95% Confidence Intervals: 0.061-0.069). There was a positive relationship between BLLs and the arithmetic mean (AM) of lead concentrations in tapwater treated in tertiles or as a continous variable (p <0.05). There was also a positive relationship with window dust with significant interaction with season and daycare at home (p< 0.05). The predictive model explained 22.2% (R^2) of the variation of BLLs. Both regression models were adjusted for co-variates and other residential exposures.

Conclusions: Despite low BLLs in young children living in old sectors of Montréal, tapwater and house dust are still responsible of some increase of BLL during fall and winter.