

Lead in Our Communities: A Chemical, Sociological and Public Health Analysis

Childhood lead poisoning is still of great concern within the United States, particularly in underprivileged communities that are often home to minority populations. Oneida County, New York has one of the highest instances of childhood lead poisoning per capita in the entire state. There are many pathways to lead exposure. This research looked to confirm the existence of a secondary lead smelter in Utica, New York through the analysis of soil samples and historical documents. It was hypothesized that the site of a former secondary lead smelter, and areas surrounding it, would exhibit high concentrations of lead. Soil samples were prepared for analysis using Environmental Protection Agency guidelines for the acid digestion of soil, after which atomic absorption spectroscopy was used to analyze the samples for concentration of lead content. Lead that is off put into the environment due to the operation of lead smelters shows secondary markers of increased cadmium concentration. The Cornell Nutrient Analysis Laboratory (CNAL) provided secondary analysis of all samples for lead and cadmium concentrations. The historical and chemical findings support the existence of a former lead smelter in downtown Utica, New York. This research has significant implications. One of the largest municipal housing complexes in the city of Utica, New York was located adjacent to the lot of the smelter, with the two coexisting for nine years. Examining various pathways to lead exposure is necessary to inform and shape the response to the public health issue of lead poisoning.

Key Words: lead, lead smelter, lead poisoning, acid digestion, atomic absorption spectroscopy, chemistry, sociology, public health