Consideration of *in vitro* bioaccessility of indoor dust when assessing risksin smelter communities

E. Sigal1; G. Ferguson1; C. Bacigalupo1

In smelter communities, one of the most important pathways to consider in Human Health Risk Assessments (HHRA) is potential exposures to relevant chemicals (i.e., metals) in indoor dust. Wet and dry deposition causes atmospheric emissions from smelters to settle onto local soils and other surfaces. Both the settled material and the airborne chemicals may be transferred into residential homes via human and local meteorological activity. Outdoor yard soil can be transported indoors by wind, household pets, or on clothing or shoes of humans.
These outdoor sources, combined with numerous indoor, anthropogenic sources, form typical household dust. Studies have reported that between 20 and 30% of indoor contamination comes from outdoor soil sources. This is an important pathway of exposure in human health risk assessments, especially for sensitive individuals.

The bioaccessibility of a contaminant is the portion that is soluble in the gastrointestinal environment, and is available for uptake into the blood stream. This soluble fraction can be measured in an in vitro laboratory setting, and can be used as a surrogate for bioavailability. The use of bioaccessibility in risk assessment is considered to be valid and applicable, provided that some basic data requirements are fulfilled to permit regulatory groups (e.g., U.S. EPA, Health Canada) to ascertain the validity and defensibility of such measurements. While in vitro assays are commonly used to evaluate soil, evaluation of bioaccessibility of metals in dust is not routinely undertaken. In a recent community-based HHRA, consideration was give to the bioaccessibility of metals present in indoor dust collected from within homes in the community. Comparison of the dust bioaccessiblity to soil for the same community provides some insight to its utility and necessity of collecting this type of data at other locations. Not surprisingly given its ultrafine characteristics, bioassessibilty for dust was slightly higher than for soil. The soil and dust bioaccessibility data for six smelter-related metals will be discussed and compared.