

The 1st International Conference on Environmental Safety and Ecological Criteria (ICESEC 2013)

Nanjing, China

June 24-25, 2013

ASSESSMENT OF CHILDREN LEAD EXPOSURE IN A SMELTER SITE AREA IN CHINA: APPROACHES FOR THE IDENTIFICATION AND RANKING OF THE MOST RELEVANT EXPOSURE ROUTES

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More than 30 major lead pollution incidents had been reported in China from 2006 to 2012, and most of the victims were children living in mining and smelter areas. Children are more vulnerable than adults to the cognitive and developmental effects of lead poisoning; therefore the assessment of risks posed by children lead exposure in China represents a priority issue for research. Several investigations were focused on the characterization of pollution sources and contamination of environmental media, however, the scarce availability of biomonitoring data and limited detailed exposure assessments in small industrial sites hamper the identification of the most relevant sources and exposure pathways to receptors, which are the potential key factors to be considered for preventing lead poisoning events.

The application and comparison of two human exposure models has been performed in order to identify the relevance of different lead exposure routes for children in rural and smelter areas and to support the definition of effective risk management measures.

A new toolbox for the integrated assessment of human exposure has been recently developed by EU researchers within 2FUN/4FUN projects, which coupled an environmental multimedia exposure model and an internal exposure model (physiologically based pharmacokinetic, PBPK) in the same platform.

Through the application on a case study concerning children exposure in a historical Pb-Zn smelter site in southwest of China, the results of this new model were compared with the ones from the most common used Integrated Exposure Uptake Biokinetic model. Finally, the application provided the identification of the most relevant exposure routes and the ranking of their individual contributions to the total children exposure. The results of the application and of the comparison of the two exposure models will be presented and discussed.