EXPOSURE ASSESSMENT OF WASTE MANAGEMENT: RESULTS FROM A MULTI YEAR FOLLOW-UP OF SOLID WASTE LANDFILLS

Enrico Davoli, *Istituto Mario Negri, Italy*
Elena Fattore, *Istituto Mario Negri, Italy*
Marinella Palmiotto, *Istituto Mario Negri, Italy*
Viviana Paiano, *Istituto Mario Negri, Italy*
Giorgio Celeste, *Istituto Mario Negri, Italy*
Maurizio Bonati. *Istituto Mario Negri, Italy*

Background and Aims: Potential risk to health from waste disposal in landfills is a public concern issue and this concern is based on equivocal evidence. The main conclusion of the overall assessment of the literature about waste management and health is that adverse effects evidence for population living near landfill is usually insufficient and inconclusive. A major problem is the weakness of quantitative exposure information and exposure assessment methods. We propose here exposure assessment based on a multi-disciplinary approach where emissions and ambient samples are characterized to assess exposure to potential hazards.

Methods: A multi year follow-up has been undertaken for two landfills that accepts non-hazardous solid waste. Exposure assessment was based on measured emissions from the landfill, both from landfill gas energy recovery systems and from uncontrolled surface emissions. Emissions and atmospheric concentrations have been assessed with analytical campaigns, sampling the main known carcinogenic compounds emitted from landfills coming both from landfill gas torch combustion (dioxins, furanes and PAHs) and from diffusive emissions (VCM and benzene). Exposure assessments were based on receptor's concentrations, using atmospheric dispersion models to estimate maximum concentrations and depositions in correspondence to sensitive receptors.

Results: Emissions from two different plants have been measured both for non-methanic volatile organic compounds PAHs and dioxin-like compounds. Results from diffusion modelling indicated limited exposure for identified receptors, with differences from year to year. Risk assessment has been performed both for carcinogenic and non carcinogenic assessment, showing acceptable risk.

Conclusion: Direct exposure measurements play a key role in order to improve the epidemiological studies for populations living in areas where waste management facilities are located or planned. A standardized approach, that might be discussed starting from this example, could become, within few years, a new instrument for environmental epidemiology in this complex problem, at least until reliable biomarkers will be available.