

Total human exposure assessment for environmental pollutants using multimedia and multiroute scenarios in Korea**JY Yang, YW Lim*, YS Kim, MK Ho, YS Kim, DC Shin****The Institute for Environmental Research, Yonsei University, Seoul, Korea.*****School of Environmental Health, Sounam University, Namwon, Korea**

In the case of POPs (persistence organic compounds) that have been release into environment, the goal of exposure assessment is to estimate the individual's total intake through various contact media and exposure pathways. The objective of this study was to estimate human exposure to environmental pollutants using a multimedia/multiroute scenario in an urban area of Korea.

The assessment of the human exposure for pollutants involved five scenarios: the multiroute-multiagent model for VOCs (volatile organic compounds), the multimedia-multiroute-multiagent model for inorganic compounds, the multimedia-multiroute-complex agent model for PAHs (polycyclic aromatic hydrocarbons), the multimedia-multiroute-congeners agent model for dioxin, and the multimedia-multiroute-radionuclide agent model for radon. The scenarios have been designed to provide the user with the options of: (1) making point estimates of average exposure during an exposure duration, (2) using a Monte Carlo add-in to make stochastic estimates of the distribution of exposure uncertainty/variability, and (3) to apply a sensitivity analysis to determine the variance contributions of model inputs to the overall variance in the estimated distribution of exposure and risk. The multimedia-multiroute human exposure models predicted LADD (lifetime average daily dose) of pollutants using human intake factors and concentrations in the exposure contact media.

For VOCs, the inhalation LADD accounted for more than 90% of the total LADD and the major route was not only direct inhalation by air pollution but also indirect exposure route by the water consumption. For metals, the ingestion LADD accounted for more than 50% of the total LADD and the major route was indirect ingestion by the transfer process from pollutants in the soil to the foods. For PAHs, exposure via inhalation (78%) in outdoor/indoor air was highest compared with exposure via other medium/pathways. For dioxins, the ingestion LADD accounted for more than 95% of the total LADD and the major route was indirect ingestion by the transfer process from pollutants in the air, soil, or water to the foods. The major route was indirect inhalation of radon gas by diffusion process from its source (eg., soil or ground water) to its accumulation indoor.