

MODEL OF MULTIPLE EXPOSURE TO CONTAMINANTS IN MONITORING THE ENVIRONMENTAL IMPACT ON POPULATION HEALTH

V. Kliment

National Institute of Public Health, Prague, Czech Republic

SUMMARY

The model study is focused on possibilities of comprehensive evaluation of the multiple exposure of humans to selected inorganic contaminants (arsenic, cadmium, lead, zinc) monitored within the subsystems of the monitoring the environmental impact on population health (inhalation and ingestion exposure from air, drinking water and foodstuffs and biological monitoring). The mean daily intake of contaminants of average adults is assessed using the monitoring and literature data. The exposure balance showed that the total intake of individual contaminants studied did not exceed the limit values given by the exposure standards (acceptable daily intake). The highest value of exposure reaching 28 % of the limit was reported for cadmium. The prevailing pathway of exposure is ingestion of foodstuffs; more than 95 % in all contaminants under study.

Information on the intake of contaminants is used as input data in a linear multicompartamental model describing their kinetics and retention in the human organism. The results of the model computation are compared with the laboratory data obtained in the biological monitoring of adult urine. The model and monitoring sets of results were found to conform well for cadmium and zinc. For arsenic and lead the model values are roughly one order of magnitude lower than the monitored ones which should be considered as acceptable for the model studies of this type.

The model study of contaminant monitoring data processing and evaluation suggests further applications of health risk assessment representing one of the basic outputs of monitoring the environmental impact on population health.

Key words: modelling, exposure to metals, retention

Address for correspondence: V. Kliment, National Institute of Public Health, Šrobárova 48, 100 42 Prague, 10, Czech Republic