

THE STUDY OF IMPACT OF BATHING IN RESERVOIRS ON THE PROBABILITY OF ADVERSE HEALTH EFFECTS IN CHILDREN

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Background and Aims: The objective was to assess children's health risks related to the chemical contamination of local reservoirs and accidental swallowing of water when bathing in them.

Methods: The studies have been conducted in 2006-2011 in the city of Yekaterinburg, a large industrial center of the Sverdlovsk Region, Russian Federation. Chemical contamination of 5 natural reservoirs has been studied for the past 5 years. We assessed the total mutagenic activity of waters using the Ames mutagenicity test, the ecotoxicity using the Ecolum test-system and a *Daphnia magna* survival test. In order to specify the exposure parameters (the duration and frequency of exposure, and the body weight) to assess the oral exposure, we questioned 198 children aged 8-9. The health risks were assessed based on the highest and average exposure values.

Results: Concentrations of some chemicals in the study reservoirs exceeded Russian permissible levels. The maximum concentrations found (in mg/dm³) were 0.05 for lead, 0.002 for cadmium, 0.01 for arsenic, and 3.2 for aluminum. Concentrations of copper, nickel, and lead exceeded their permissible values in silt and sediments. The Ames test registered the excess (compared to background) number of reverse mutants without metabolic activation on stains of microorganisms TA-98 (1.8-2.26) and TA-100 (2.08-2.69); the death rate of *Daphnia magna* exceeded 50 % (52-75%). The cumulative personal cancer risks from cadmium, arsenic, and lead varied from 1.53×10^{-7} to 6.30×10^{-6} based on maximum exposure values and from 1.37×10^{-8} to 5.38×10^{-7} based on average exposure values. Hazard indices of contaminants were <1.

Conclusions: Taking into account a short duration of summer exposure and oral exposure only, chemical contamination of water reservoirs posed children's health risks close to acceptable ones. The findings are used to identify sources of contamination and to develop health risk management actions.