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DETERMINING PROBABILISTIC DISTRIBUTIONS FOR GASTROINTESTINAL TRACT TRANSFER RATES

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The International Commission on Radiological Protection (ICRP) dosimetric models have usually considered the reference man to determine deterministic values for the parameters in these models. However, to test the ICRP dosimetric models probabilistically, it is necessary to determine probabilistic distributions for all the input parameters. In this study a systematic review of transfer rate constants for the gastrointestinal tract for nuclear weapons grade plutonium was conducted, in which probability density functions were assigned to these parameters. In general, the probabilistic distributions can be fully described by four basic distributions: normal, lognormal, triangular, and uniform. A similar study was performed to determine transfer rate probability functions for the systemic compartments. The results of these two studies were subsequently used to verify and validate the ICRP dosimetric models using probabilistic computer codes based on these ICRP models. The testing was performed using autopsy data from the United States Transuranium and Uranium Registries (USTUR).

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