DETERMINING TRANSFER RATE PROBABILITY FUNCTIONS FOR THE SYSTEMIC COMPARTMENTS.

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Transfer rate constants for systemic compartments have been determined deterministically for use in International Commission on Radiological Protection (ICRP) dosimetric models. As a result, these models usually consider single values for these parameters. In this study, probability density functions are assigned to these rate constants for nuclear weapons grade plutonium based on an extensive literature review. Probabilistic distributions are found to fully describe these parameters. The four distributions used in this study are normal, lognormal, triangular, and uniform. Even though there exist many more different distributions, most of the data collected in this research project are well described by these four basic distributions. A similar study was undertaken to determine probabilistic functions for the gastrointestinal transfer rate constants. The parameter distributions found in these two studies were subsequently incorporated into computer models to probabilistically verify and validate ICRP dosimetric models using data obtained from the United States Transuranium and Uranium Registries (USTUR) for specific radiation exposure scenarios.

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