

## **The Mayak Worker Dosimetry System (MWDS-2013): A Comparison of Intakes Based on Urine Versus Autopsy Data From Mayak Workers Using the Leggett Systemic Model for Plutonium**

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The Mayak Worker Dosimetry System-2013 (MWDS-2013) uses a model developed by Leggett and colleagues to represent the biokinetic behaviour of plutonium after uptake to blood. Of particular importance, with regard to estimating intakes (and doses), is the distribution of activity between urine and body organs (particularly liver and skeleton). In this study, measurement data (urine and autopsy) from around 500 Mayak workers have been used to validate use of this model. A robust method has been developed and used to estimate intakes from both urine and autopsy data separately, and the ratio of these estimates has been calculated for each worker. The geometric mean ratio has been shown to lie within a range of 0.92–1.14, depending on assumptions made. Since this range includes 1, the hypothesis that the model is unbiased with regard to estimating intakes either with urine or autopsy data cannot be rejected on the basis of these data. This lends weight to the argument for increasing the MWDS-2013 cohort to include an additional 500 workers for whom only autopsy data are available, and who have previously been excluded from the cohort. Future directions in which this work could be extended are also suggested.

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