

Avoiding Biased Estimates of Dose when Nothing is Known About the Time of Intake

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A common problem in internal dosimetry occurs in routine monitoring, when it is required to estimate an intake from a measurement made at the end of a monitoring interval, and the time of intake is unknown. ICRP suggests that it should be assumed that the intake occurred in the middle of the monitoring period. However, it has been shown that this will, in the long-term, lead to biased estimates of a worker's intake and dose. In order to overcome this biasing, the United States Department of Energy (USDOE) recommends a different method based on calculating the intakes for all possible intake times in the interval and then taking an arithmetic average. In a recent paper, it has been shown that both the ICRP and USDOE methods were biased and that the only unbiased estimator of the true intake was obtained by assuming a constant chronic intake throughout the monitoring interval. In all of the analyses carried out to date on this 'Constant Chronic' method, it was assumed that the measurements were exact. In this paper, the effects of assuming either normally or log-normally distributed measurement errors are explored, and the effect on the bias of the intake estimate is investigated.

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