

USTUR Whole-body Case 0680: 53-year Follow-up of a Manhattan Project Worker

Martin Šefl¹, Maia Avtandilashvili¹, Sergei Y. Tolmachev¹

¹*U.S. Transuranium and Uranium Registries, College of Pharmacy and Pharmaceutical Sciences,
Washington State University, Richland, WA*

This whole-body tissue donor to the United States Transuranium and Uranium Registries (USTUR) was occupationally exposed to a mixture of plutonium compounds via chronic inhalation. This individual was one of 26 Manhattan project workers, informally known as 'UPPU (You Pee Pu) Club'. He died 53 years post-exposure. At the time of death, 1,765 Bq of ²³⁹Pu was retained in the body, of which 39.7% was in the skeleton, 37.5% in the liver, 16.0% in the respiratory tract, and 6.8% in the remaining soft tissues. Nineteen urine, one fecal, and one blood analysis results as well as four in vivo chest measurements were available. The organ activities at the time of death and bioassay data were used to estimate the intake and radiation doses using the Taurus internal dosimetry software. ICRP recommended biokinetic models adequately described the individual's long-term plutonium retention and excretion. The total cumulative ²³⁹Pu intake of 31,716 Bq was estimated; of which, 24,853 Bq (78.4%) were contributed by inhalation of plutonium nitrate and 6,863 Bq (21.6%) of plutonium dioxide. The committed equivalent doses to the red bone marrow, bone surface, liver, lungs, and brain were 0.71 Sv, 6.5 Sv, 8.3 Sv, 3.8 Sv, and 0.068 Sv, respectively. The committed effective dose was 1.22 Sv.

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