

## Estimation of Skeletal Plutonium and Americium Content from Bone Samples Taken at Autopsy

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The United States Transuranium and Uranium Registries (USTUR) are a resource of human tissue samples donated by workers accidentally exposed to actinides. Bone samples taken from partial body donations are used to estimate the entire skeletal content of Pu-239 + Pu-240, Pu-238 and Am-241. The purpose of this investigation was to create and validate methods of estimating total skeletal content of Pu-239 + Pu-240 and Am-241 based on limited bone samples. Radiochemical data from thirteen whole body donors of the USTUR were used to extrapolate total skeletal activity concentrations from measurements of various individual bones. Two methods were used for this; mean ratios of bone activity concentration to skeletal activity concentrations, as well as regression models relating total skeletal activity concentrations to bone activity concentrations.

These methods were found to produce reasonable estimates of total skeletal content from bone samples. Limiting factors for these methods are expected to include the types of bone historically collected, and the varying sizes and locations of the collected bone samples from partial body donations. These factors may have a great impact on the usefulness of these techniques.

The method of regression of a single bone sample or bone sample group content against the total skeletal content have the added benefit of statistically defensible prediction intervals.

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