Pu contaminated wound
- The USTUR whole-body donor accidentally punctured his finger while working in the hood gloves.
- The wound was contaminated with plutonium nitrate.
- Initial survey meter reading: 20,000 dpm
- Decontaminated to ~5,000 dpm
- Worksite personnel estimated initial wound activity as ~4.1 kBq of 239Pu

Treatment
- Contaminated tissue was excised twice: ~2.3 kBq was removed
- 59 Bq was measured in wound a month later
- Chelation treatment was administered
- 16 g Ca-DTPA in 16 l.v. injections
- Over two months post-intake

U.S. Transuranium and Uranium Registries (USTUR)
- Established by U.S. Atomic Energy Commission in 1968
- Since 1992, operated by College of Pharmacy at Washington State University as a research grant funded by U.S. Department of Energy
- Follows up occupationally exposed workers, from exposure through full lifespan, by studying the bioinetics (uptake, translocation and retention), and tissue dosimetry of the actinides (Pu, Am, and U).
- Retains data from 34 living and 355 deceased Registrants.
- 19 USTUR registrants had recorded 239Pu wound(s) as major intake route: 8 whole-body, 11 partial-body
- Chelation treatment administered to 5 of 19

Follow-up bioassay available: urine, wound counts
- Post-mortem tissue analyses: liver, skeleton, wound

Bioassay
- 83 valid urine measurements
  - Autoradiography
  - MDA: ~0.8 mBq
- 57 measurements affected by DTPA
  - Max rate: 11.2 Bq d⁻¹ on day 1
  - Total Pu excreted: 77.8 Bq
- 26 “post-treatment” measurements
  - Average rate: 3.0 ± 2.5 mBq d⁻¹
  - < MDA after 1,000 d post-intake

Tissue Radiochemical Analysis

Data Analysis Method
- IMBA Professional Plus+ (Birchall et al. 2007)
- Special academic edition
- Allows to build and solve systemic models

Models
- NCRP 156 Wound Model (2007) Soluble strong material
- Pu systemic model (Leggett et al. 2005)

Results
- Max likelihood fit: χ² alpha > 0.05

Pu retention at time of death, Bq

Future Work
- Apply the system of models for Pu decorporation (Dumit et al. 2018) to:
  - simultaneously fit DTPA-affecting and not-affecting urine data
  - Improve, validate and optimize the proposed system of models

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