WASHINGTON STATE UNIVERSITY
College of Pharmacy and Pharmaceutical Sciences

2026 USTUR Scientific Advisory Committee Meeting
Hampton Inn, Richland, Washington; April 16–17, 2026

2025 Recommendations and 2026 Overview

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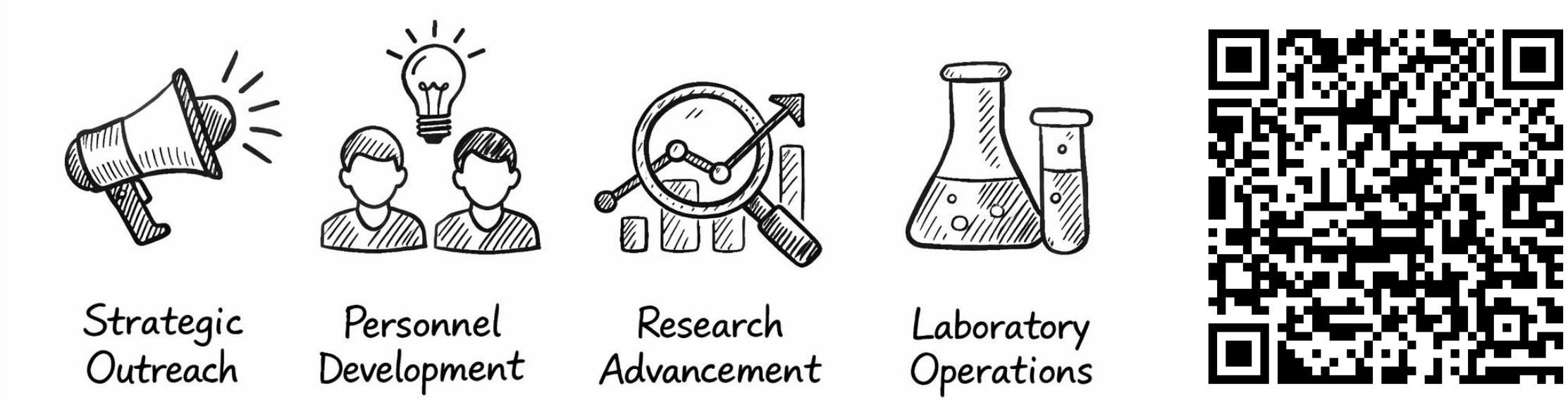
"Learning from Plutonium and Uranium Workers"

2025 SAC Feedback

- Following the 2025 Annual Meeting (April 9–10, 2025), the Scientific Advisory Committee (SAC) made **ten** recommendations on:



https://ustur.wsu.edu/sac/sac-meetings/sac-meeting-2025-recommendations/

Strategic Outreach

1. A review of the mission statement to potentially broaden it for inclusion of new clients/stakeholders. This could help justify the existence of the USTUR and to look for additional funding sources in addition to DOE from new research markets (private reactor, space, pharmaceutical industries)
2. A new brochure or document be developed for that describes:
   a) why the USTUR is unique and essential
   b) the current projects
   c) the potential future use of the data and radioanalytical services

Personnel Development

3. An additional FT employee be hired for performance of radiochemical analysis preparations and separations to ensure efficiency and continuity of services
4. The USTUR's staff take a course on Epidemiology. The NCI 2019 radiation epidemiology and dosimetry course is still available online

Research Advancement

5. Using the Python code retroactively on some historical sample cases to explore the impact to decisions
6. Considering measurement uncertainties relative to overall uncertainties when evaluating modeling uncertainties in future studies
7. Investigation of potential for obtaining addition radiation monitoring and vital status or death certificate information from the Million Person Study records

Laboratory Operations

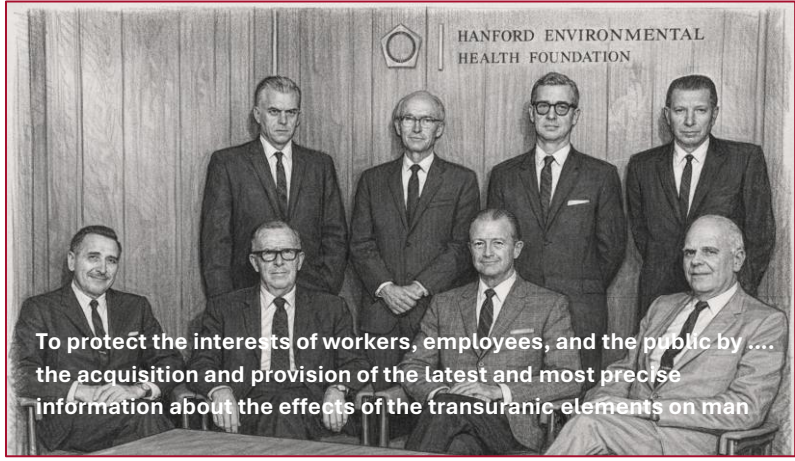
8. An investigation of the potential to offer a human tissue Performance Testing/Intercomparison Service for any interested users
9. Investigate further use of RESL for provider of PT samples
10. The procurement of an ICP-QQQ-MS for use in uranium, transuranium, and stable elements analyses and potential cellular studies

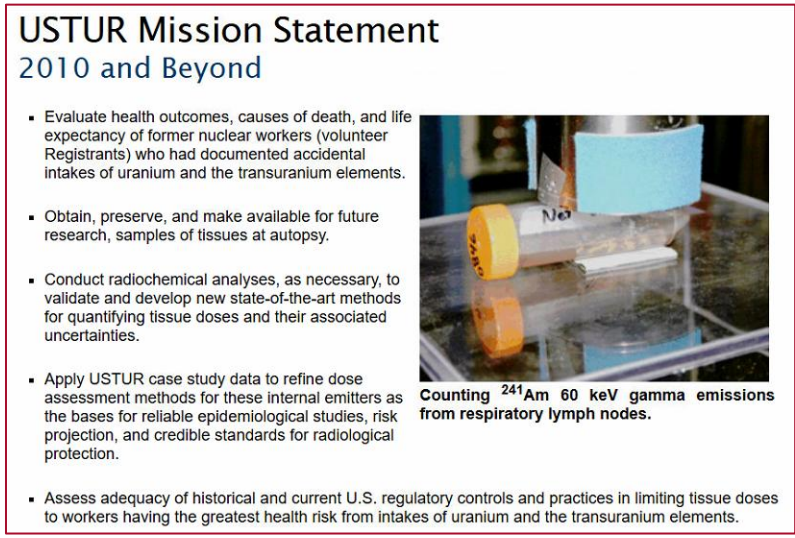
1. Mission: Chatting with AI

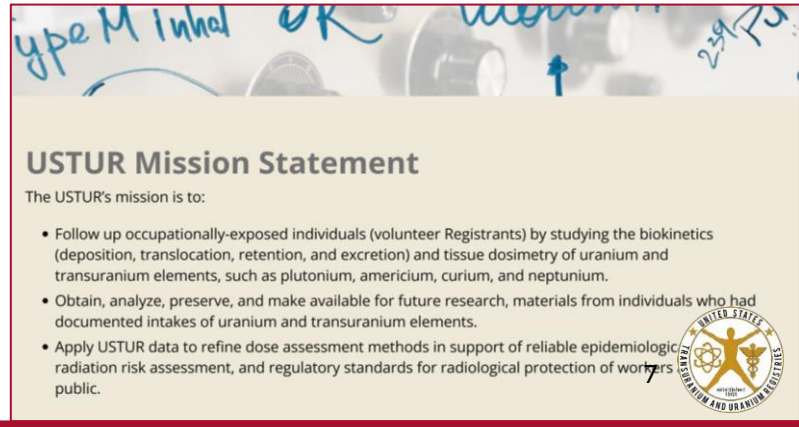
(My personal) vision of the Registries

- From "validation dataset" to **model-defining dataset**
- Implementation of **AI-assisted modeling**
- Biggest gap in radiation dose assessment remains **model uncertainty**
- **Health-outcome validation** and **bias correction** in risk estimation
- **Expansion beyond actinides** to other internal and occupational hazards (establish dataset for **beryllium** in human tissues)
- Integration with **omics-techniques**
- Remains **policy-relevant**, not just historically relevant

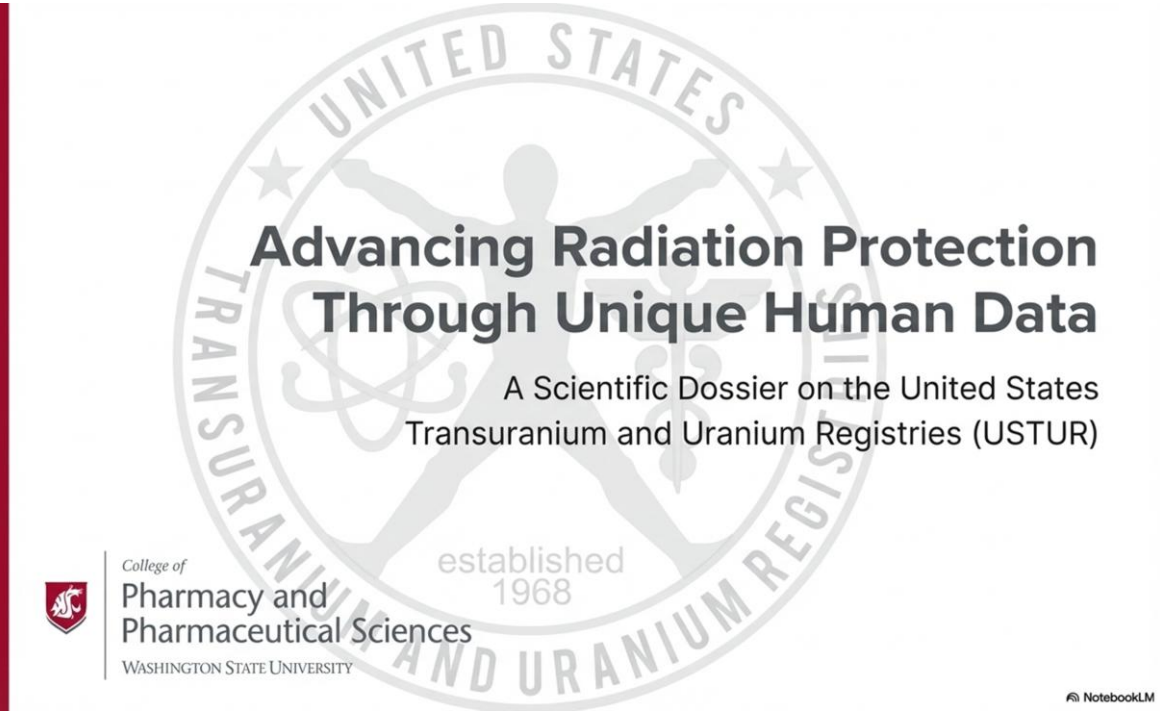
Serve as a center of excellence for human based research on actinide biokinetics and internal dosimetry, contributing to radiation protection of workers and the public, and providing support to epidemiological studies and regulatory needs

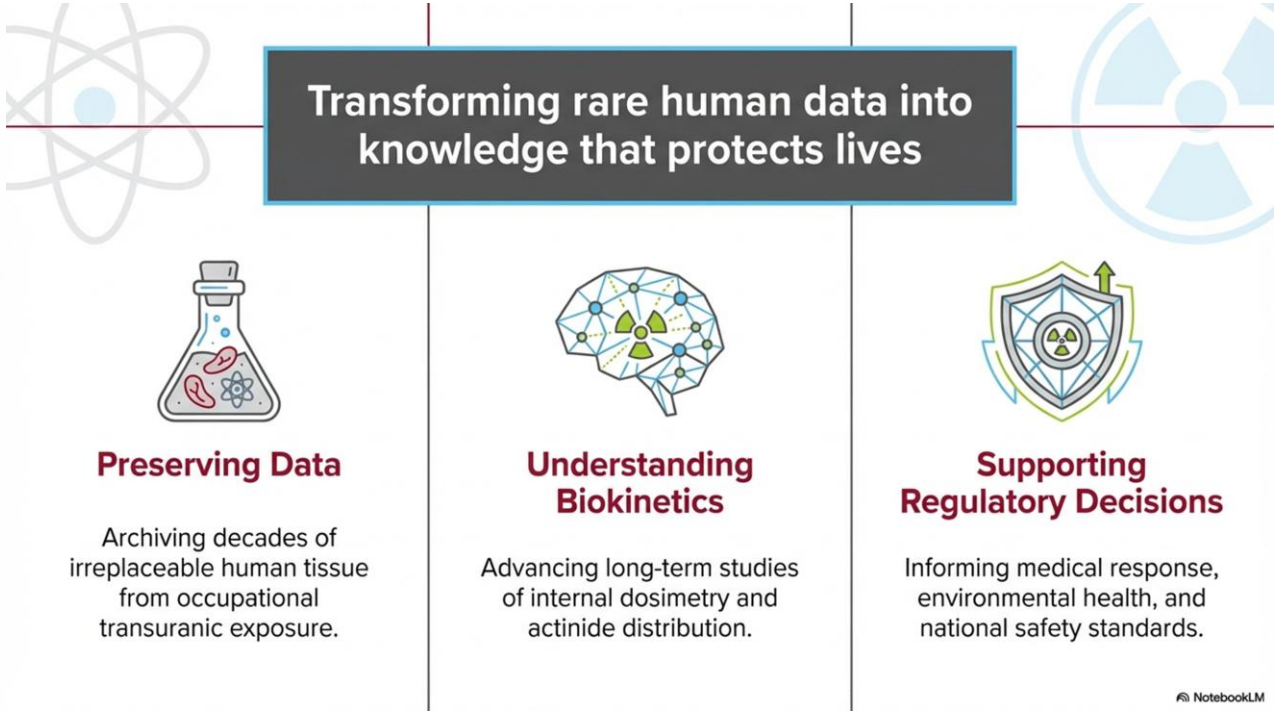






2. New Brochure: Work in Progress (I)





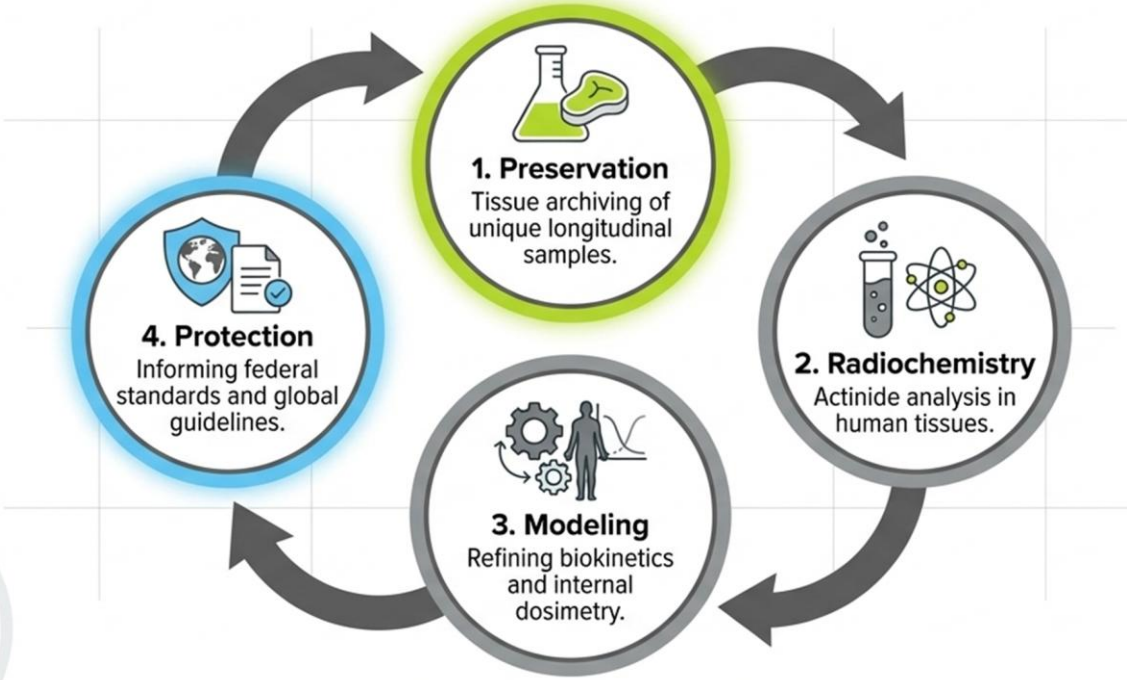
2. New Brochure: Work in Progress (II)

USTUR provides the most accurate internal radiation dose estimates available. This longitudinal scientific data spans decades of actual occupational exposure.

This data cannot be recreated through experimental studies.

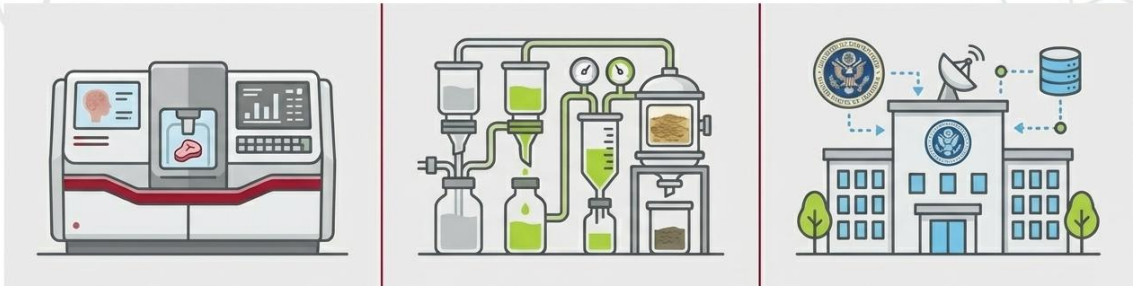
NotebookLM

The USTUR scientific lifecycle transforms physical samples into global policy

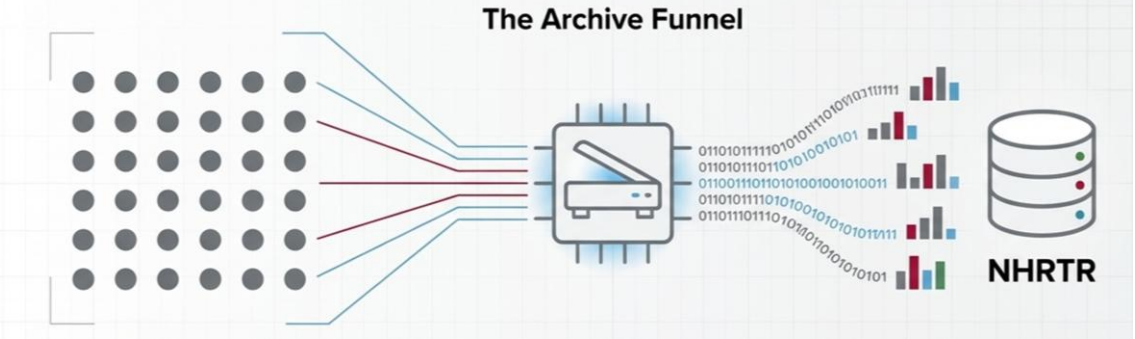


2. New Brochure: Work in Progress (III)

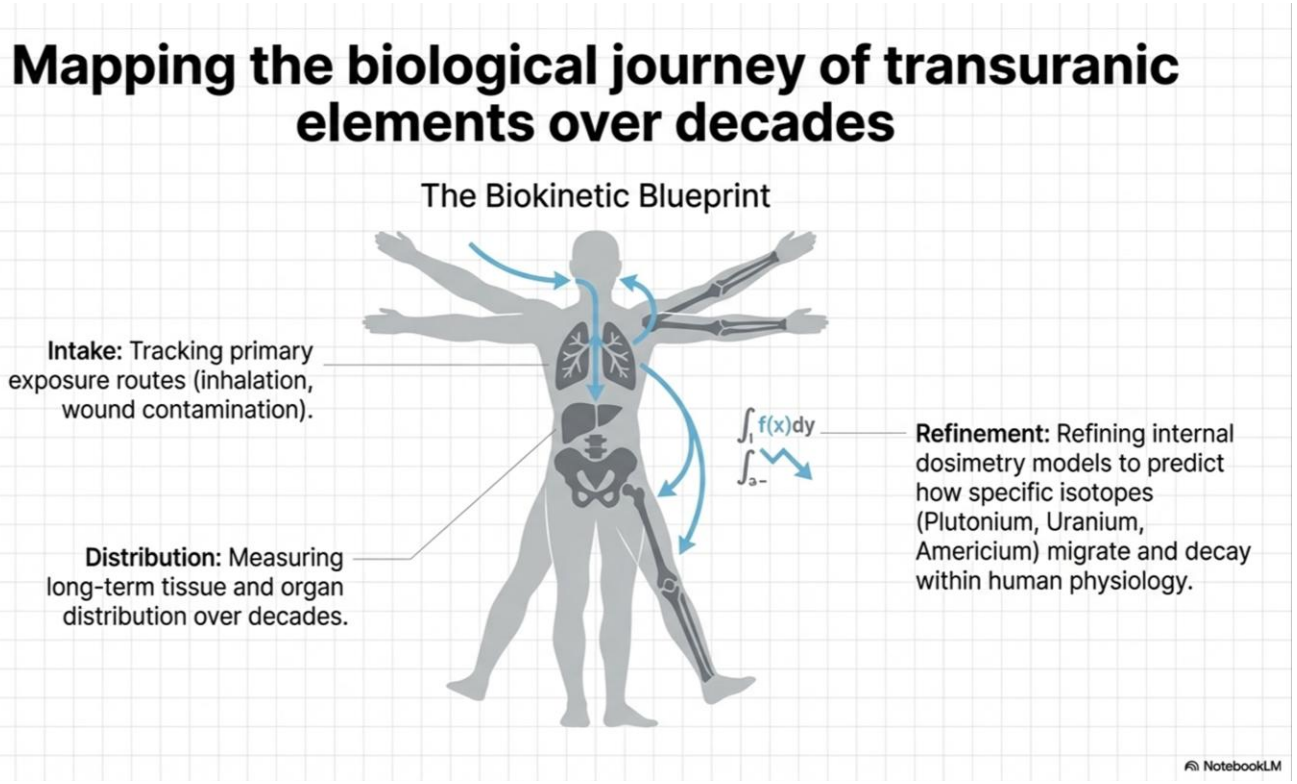
High-precision actinide analysis drives our radiochemical services



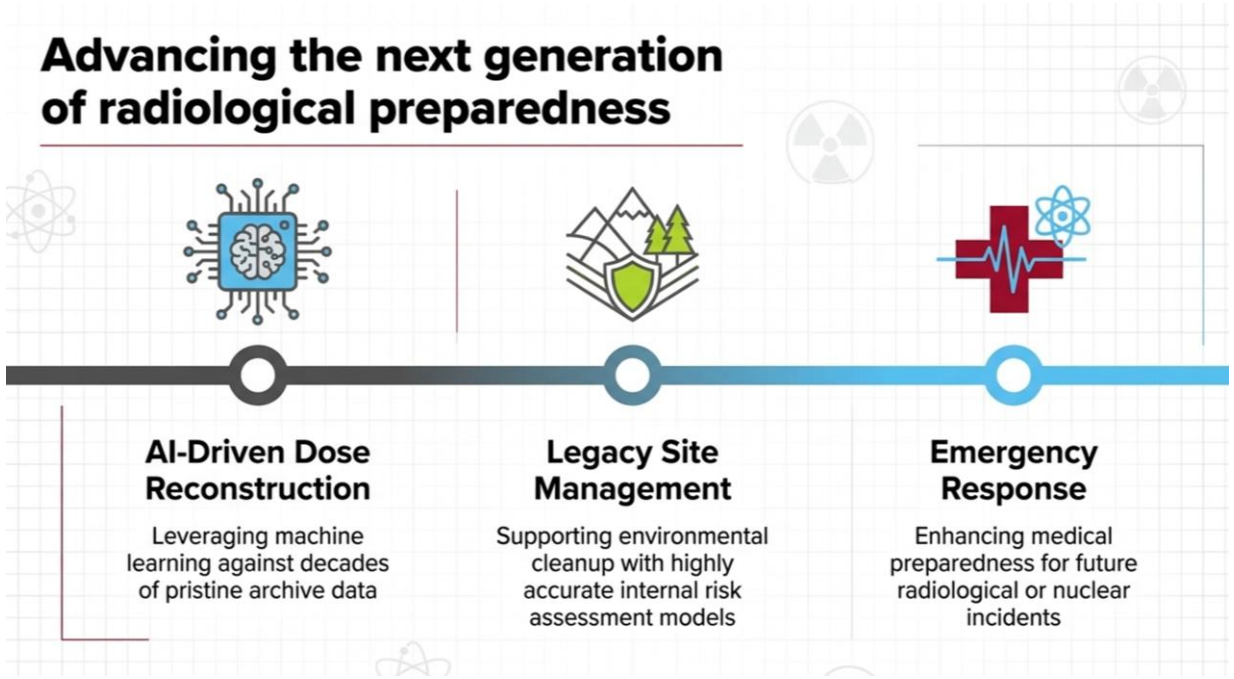
Digitizing decades of physical history for open-access epidemiological research

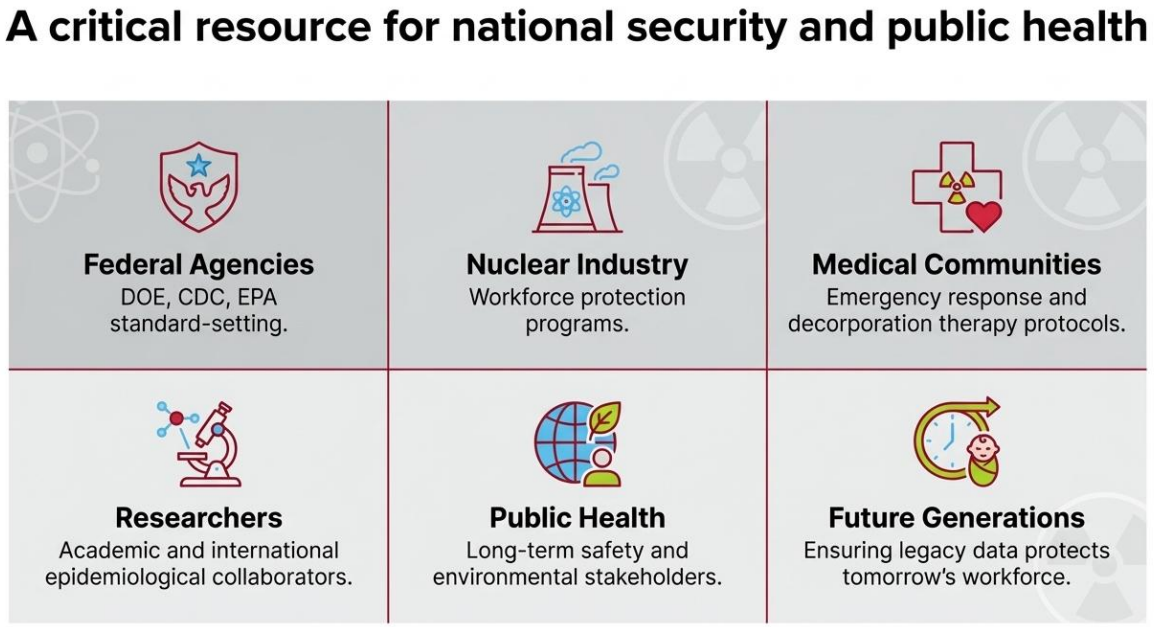


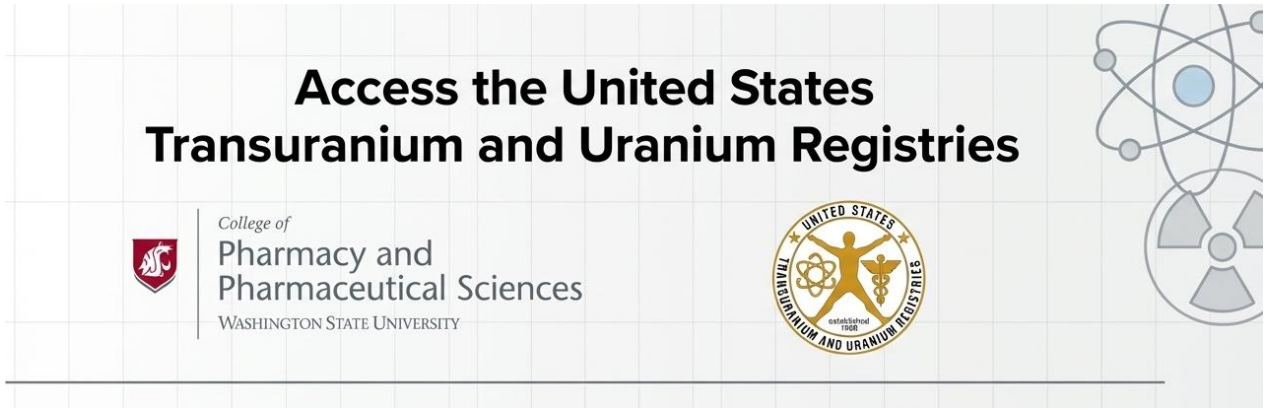
Mapping the biological journey of transuranic elements over decades

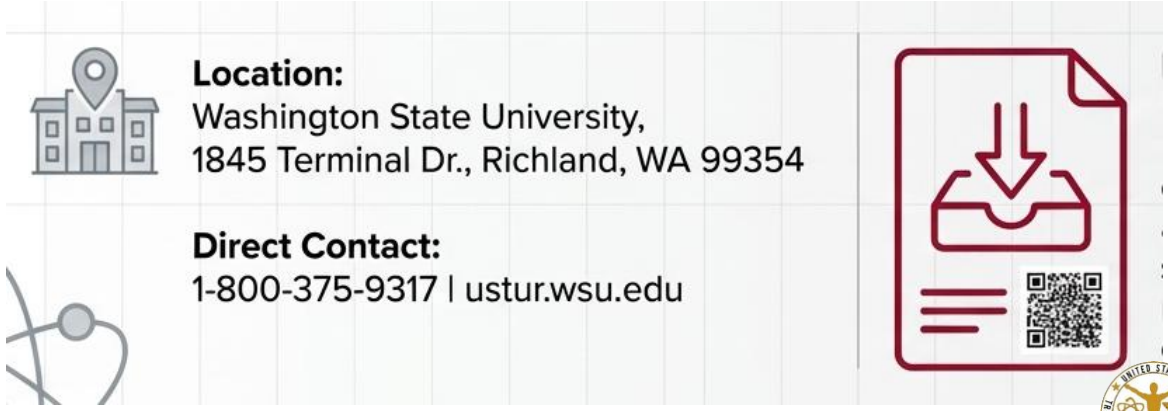


2. New Brochure: Work in Progress (IV)





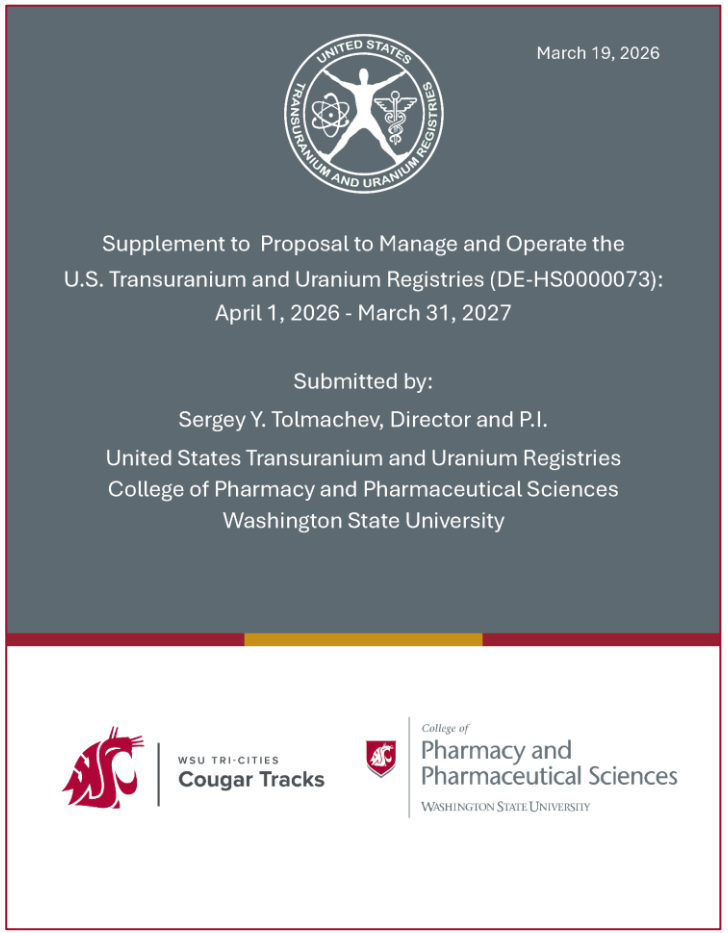




3. Cougar Tracks Proposal

To establish the Radiological and Nuclear Security Leadership Academy (RNSLA) at Washington State University Tri-Cities

- Agency: U.S. DOE, EHSS-12 office
- Period: April 1, 2026 – March 31, 2028
- Requested budget: **$499,583**
  1. Year 1 – $252,829 (approved)
  2. Year 2 – $246,754
- USTUR 'share': **$247,122**
  1. Year 1 – $122,051
  2. Year 2 – $125,071
- **Radiochemical Intern: 1.0 FTE**



4. Dosimetry and Epidemiology Training

OCCUPATIONAL INTERNAL DOSIMETRY TRAINING & MEETING

HOSTED BY THE RADIOLOGICAL ENGINEERING, DETECTION, AND DOSIMETRY (RED²) LABORATORY
GEORGIA INSTITUTE OF TECHNOLOGY | ATLANTA, GA
JULY 28 – AUGUST 1, 2025

A 5-day **free ($3000-value)** in-person training for radiation protection professionals focused on internal dosimetry principles, tools, and regulatory applications. Includes lectures, practical exercises, and campus tours. Final day features interactive meetings across internal dose, in vivo, and external dosimetry programs.

This training builds on a widely-attended 2023 session and focuses on applied tools and methods in occupational internal dosimetry. The course covers the use of **International Commission on Radiological Protection (ICRP)-based biokinetic models** (Publications 30, 68, and 130) to derive dose limits such as ALIs and DACs, the design of internal dosimetry programs in DOE- and NRC-regulated environments, and practical approaches for evaluating intakes of radioactive materials. Participants will work through example problems using tools including **Integrated Modules for Bioassay Analysis** (IMBA), in addition to methods using Excel, LibreOffice, and R for independent calculations without reliance on commercial software.

Who Should Attend:
- Health physicists and internal dosimetrists
- Staff from DOE national laboratories and nuclear facilities
- Federal employees involved in radiation protection
- Personnel from nuclear reactor vendors and utilities
- Bioassay analysts and radiation safety officers
- Graduate students in health physics or nuclear science
- Medical professionals involved in internal dose assessment, such as nuclear medicine specialists and health physicists in clinical settings

Schedule Snapshot:
Mon–Wed: Internal dosimetry lectures, modeling, and exercises
Thurs: Facility tours, hands-on workshops, software sessions
Fri: Site case presentations across internal, in vivo, and external monitoring

Trainers Include:
Dr. Thomas LaBone (Aiken, SC): Over 40 years of experience in internal dosimetry across the DOE complex and radiopharmaceutical industry; expert in intake evaluation and biokinetic modeling.

Dr. Charles "Gus" Potter (Sandia National Laboratories): Senior scientist with over 30 years designing internal dose programs; contributor to ANSI/HPS and ISO internal dosimetry standards and longtime academic instructor.

Logistics:
Location: Marcus Nanotechnology Building, Georgia Tech
Nearby hotels:
- Renaissance Midtown Atlanta (**government rate available**)
- *Participants must arrange own travel/lodging*
- Coffee/light snacks during breaks; meals on own
- Social and Networking Event!

Accreditation: This training is approved for **40 Continuing Education Credits (CECs)** by the American Academy of Health Physics (AAHP).

Registration: FREE ($3000 value)
Priority Deadline is **June 28, 2025** **(Register Soon!)**

https://sites.gatech.edu/dewji/occupational-internal-dosimetry-meeting-and-training/

Contact us:
red2@me.gatech.edu

RED²

NIH NATIONAL CANCER INSTITUTE Division of Cancer Epidemiology & Genetics

SAVE THE DATE

Radiation Epidemiology & Dosimetry Course

December 14-17, 2026
NCI Shady Grove, 9609 Medical Center Drive, Rockville, MD

Registration details coming soon!

Course participants will learn about the health effects of radiation exposure. Lectures will begin with fundamentals and progress to topical sessions on medical, occupational, and environmental radiation exposures, including exposure assessment and risk of cancer and non-cancer diseases. The course will run from 9am to 5pm daily.

Featured topics:

Overview of Radiation Health Effects & Exposure Assessment
- Principles of Ionizing Radiation Epidemiology & Disease Risk
- Principles of Radiation Exposure Assessment
- Principles of Radiobiology
- Principles of Non-Ionizing Radiation Epidemiology & Disease Risk

Medical Radiation Exposures: Diagnostic & Screening Procedures
- CT Scans
- Interventional Fluoroscopy

Medical Radiation Exposures: Radiotherapy
- Photon Radiotherapy
- Emerging Radiotherapy Techniques
- Nuclear Medicine

Occupational Radiation Exposures
- Medical Workers
- Non-Medical Workers

Environmental Radiation Exposures
- Atomic Detonations
- Natural Background Radiation & Radon
- Nuclear Accidents

Genomics & Radiation-Related Disease Risks
- Germline Genetic Susceptibility to Radiation-Related Diseases
- Somatic Genomics of Radiation-Related Cancer
- Transgenerational Effects of Radiation Exposures

Topical Issues
- Space Radiation
- Radiation Risk Communication

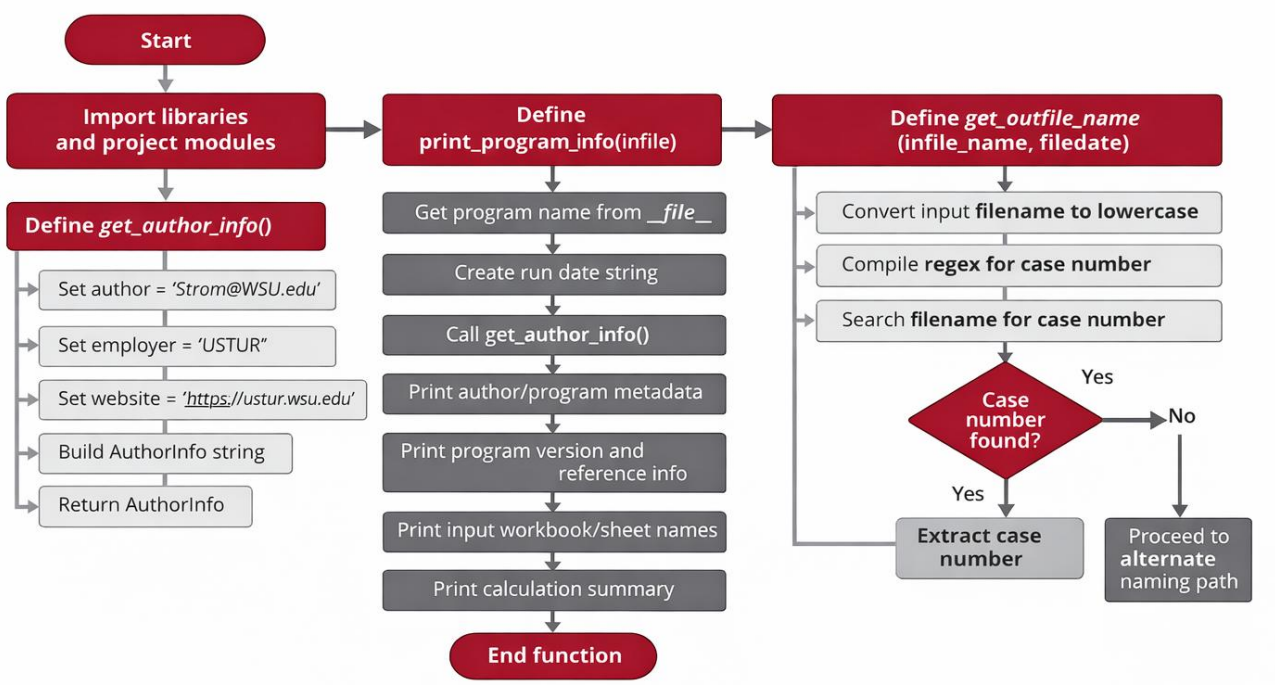
Practical Applications
- NCI Dosimetry Tools (NCICT, NCINM, NCIRF, Phantoms)
- Epicure Modeling
- NCI Radiation Risk Assessment Tool (RadRAT)

5. URpy for Retrospective Data Analysis

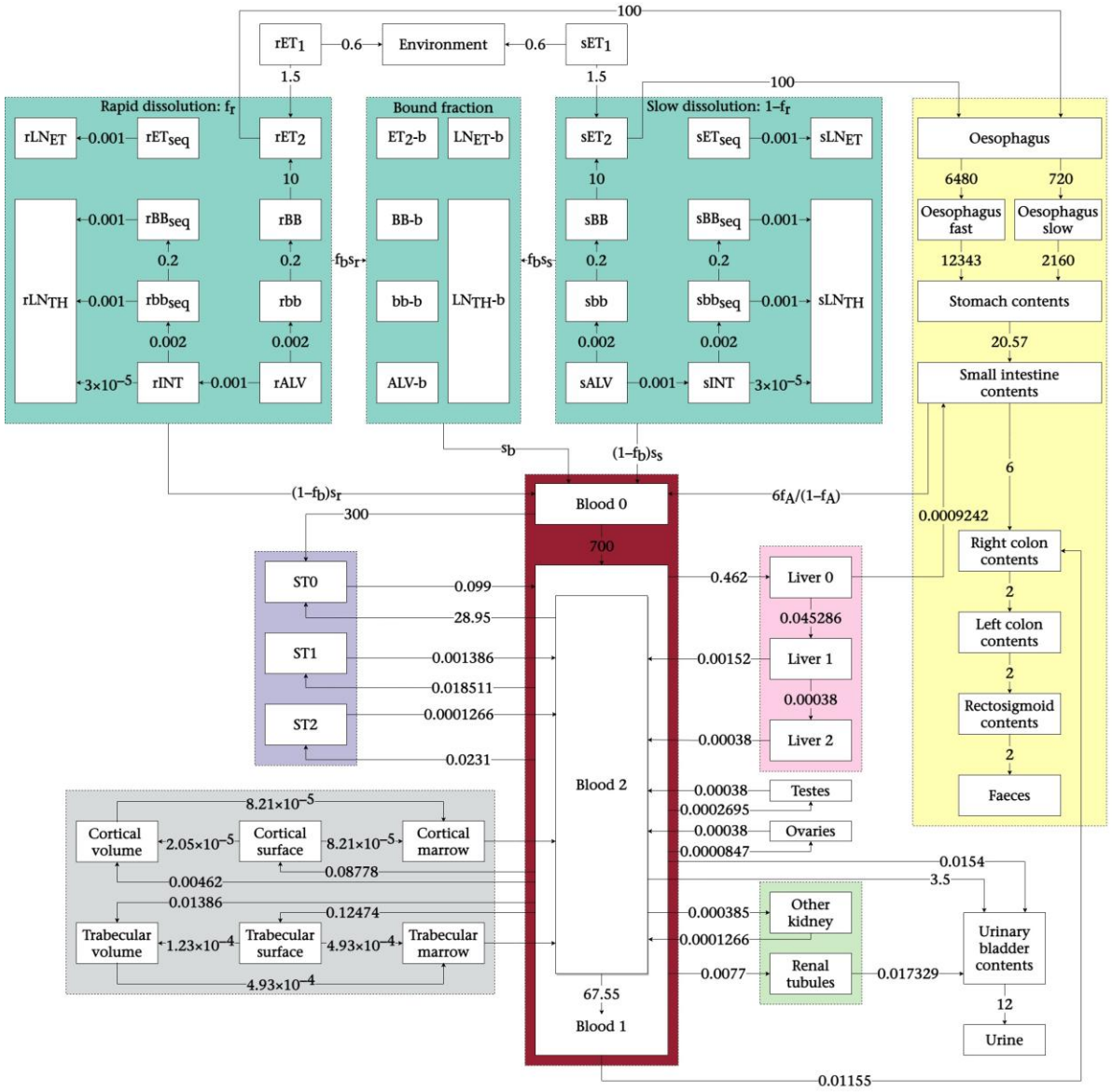


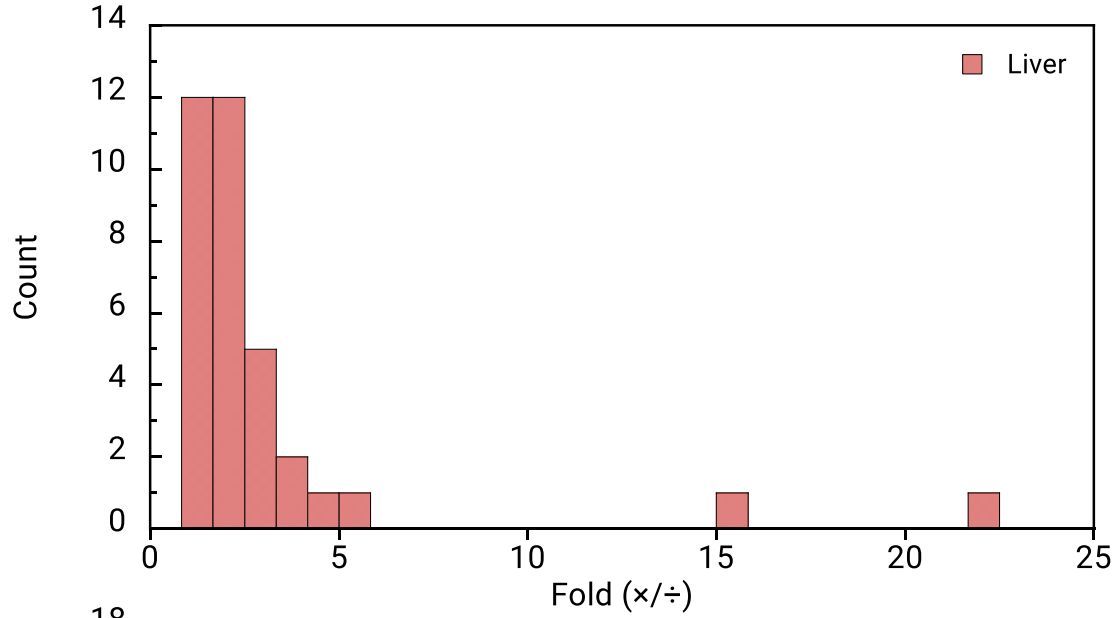

Ten cases were re-evaluated demonstrating:

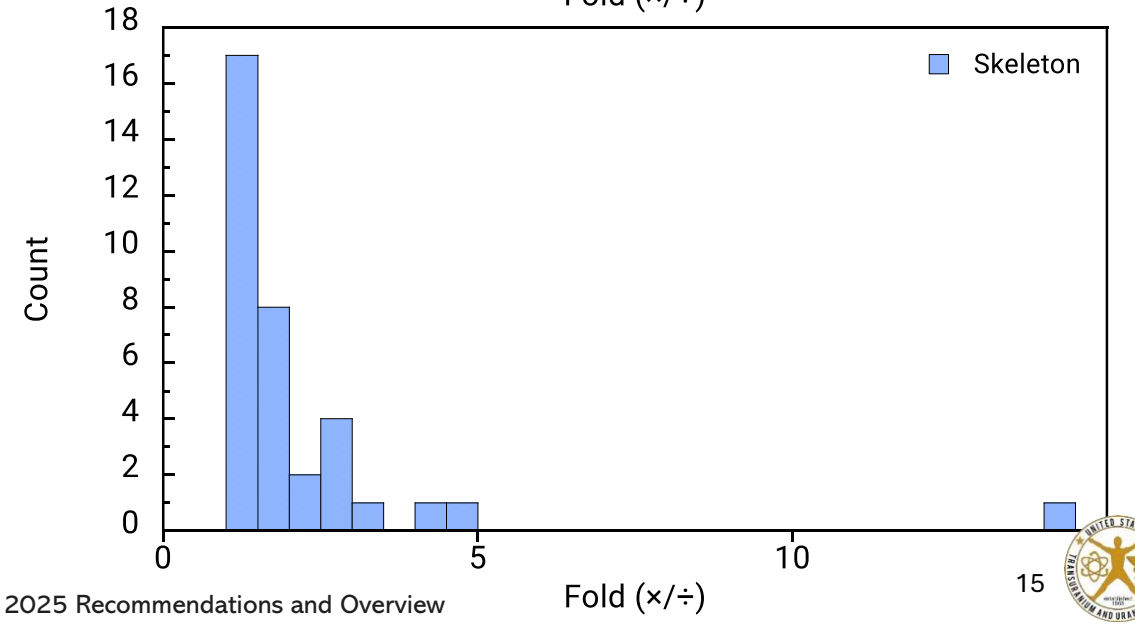
- Consistency in central value and uncertainty calculations
- Full compliance with Data Quality Objectives (DQO) document
- Impact on decision-making: **None**



6. Measurement vs Model: Accuracy



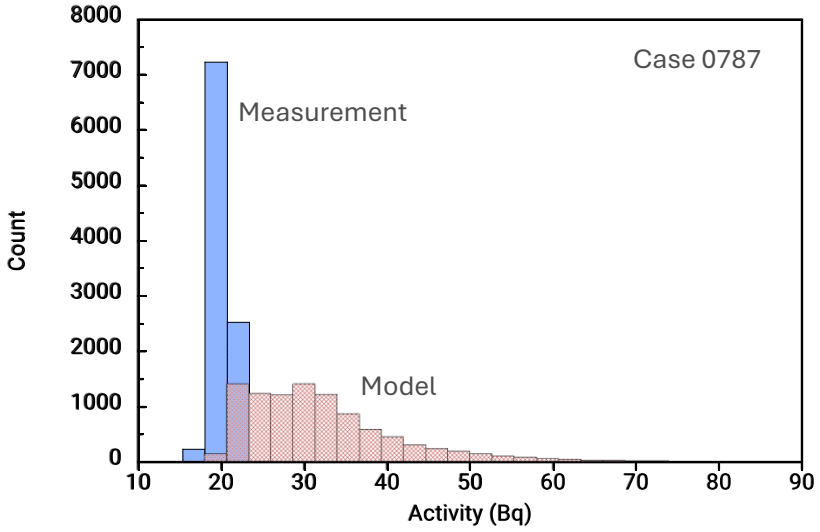


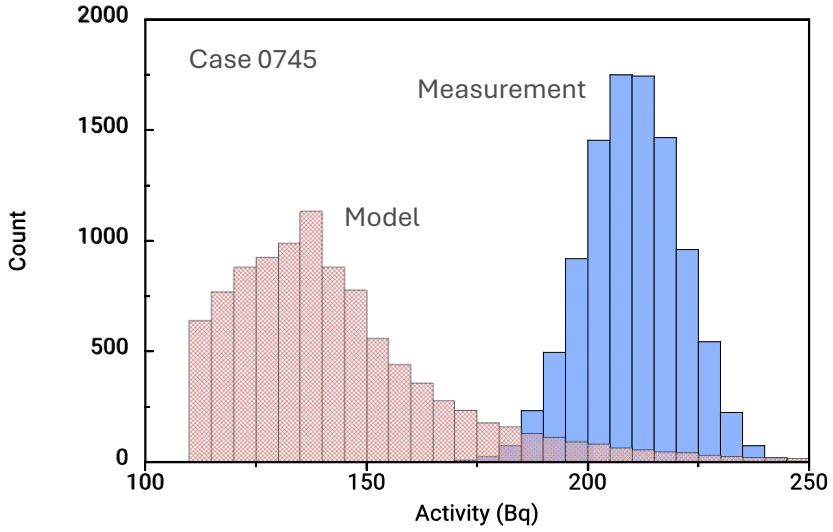


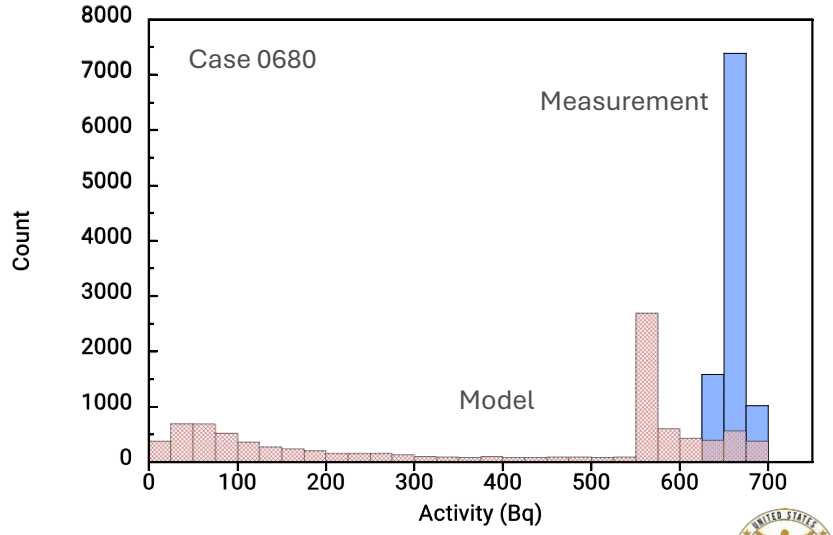
6. Measurement vs Model: Distribution

- Two parameters of **human respiratory tract model** varied

Parameter	Prior distribution
f_r – fraction dissolved rapidly	Uniform (min=0, max=0.2)
s_s – slow dissolution rate, d^{-1}	Lognormal (median=1×10^{-4}, GSD=6) – truncated at 0.002

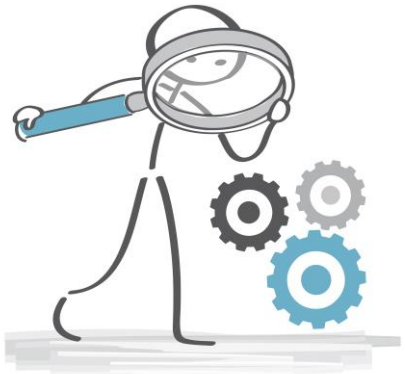


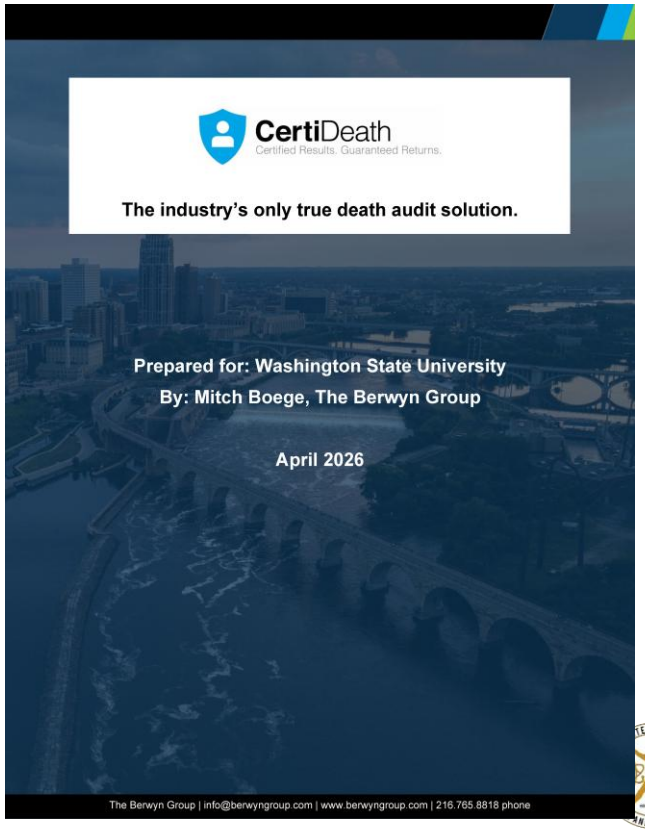




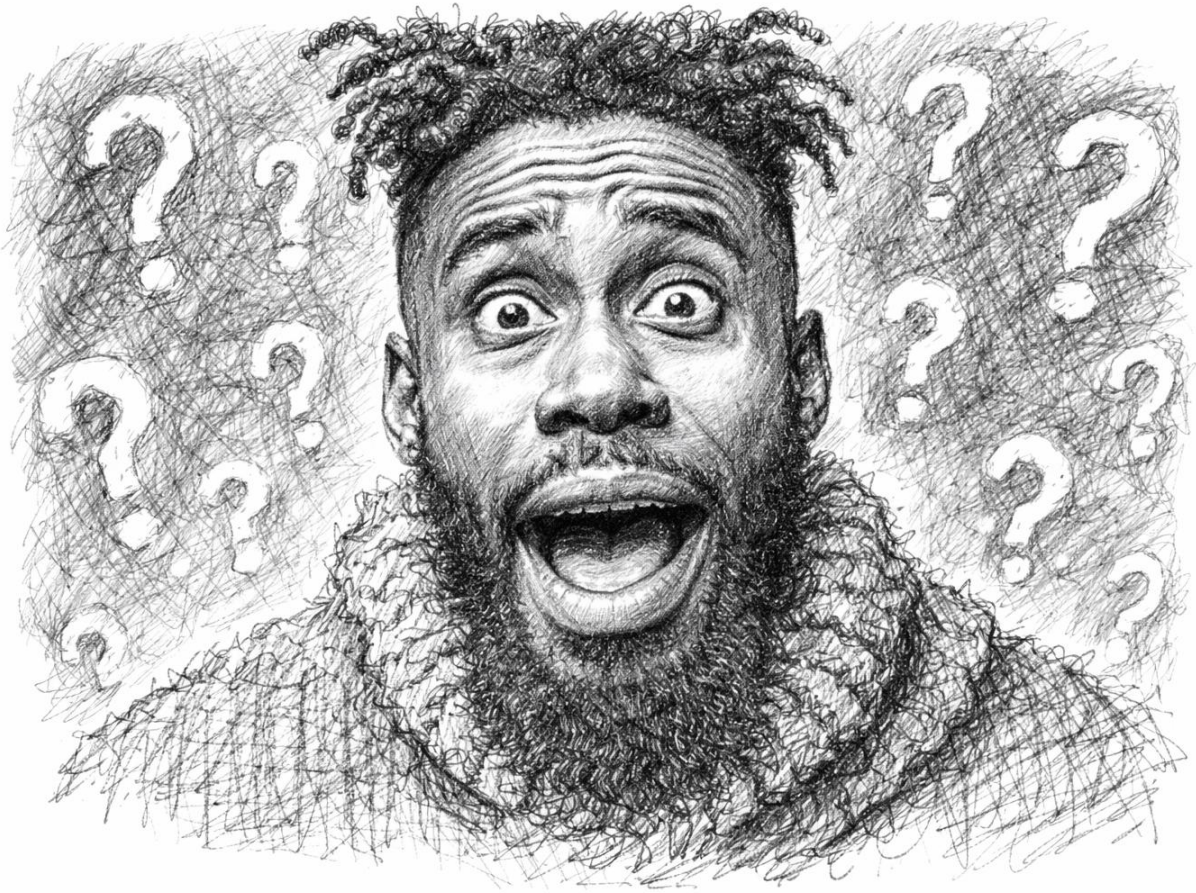
7. Obtaining Vital Status

- Obtained death certificates and causes of death from MPS for deceased Registrants
- Initiated an IRB amendment to permit the use of Ancestry.com and/or Pension Benefits Information Research Services (PBI) for determining vital status of inactive Registrants who may still be alive
- Received proposal from PBI Research Services





8. An investigation of the potential to offer a human tissue Performance Testing/Inter-comparison Service for any interested users



9. Performance Evaluation Program: Request

Site Specific Performance Evaluation Program at Radiological and Environmental Sciences Laboratory (RESL)

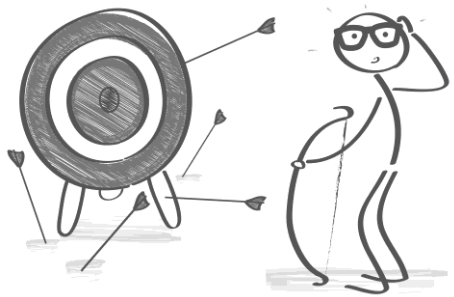
- Radionuclides of interest: ^{241}Am, ^{239}Pu, ^{238}Pu, ^{238}U, ^{234}U

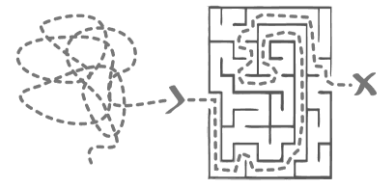
1. **Soft tissue** (liver preferred) dried sample: 400 g of fresh tissue equivalent
   - activity per sample: **0.06 – 6** dpm
   - **refractory** Pu and U: **Yes**
2. **Soft tissue** (liver preferred) dried sample: 400 g of fresh tissue equivalent
   - activity per sample: **6 – 30** dpm
   - **refractory** Pu and U: **Yes**
3. **Bone** dried sample: 20 g of fresh tissue equivalent
   - activity per sample: **0.06 – 6** dpm
   - **refractory** Pu and U: **No**
4. **Bone** dried sample: 20 g of fresh tissue equivalent
   - activity per sample: **6 – 30** dpm
   - **refractory** Pu and U: **No**

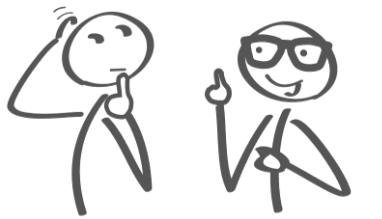
9. Performance Evaluation Program: Results

Tabatadze, SAC 2019

- ^{238,239}Pu: 100% pass
- ^{241}Am: 75% pass
- ^{234,238}U: failed







Department of Energy

Radiological & Environmental Sciences Laboratory

LabName: USTUR **Matrix: Liver**

LogNo	Sample ID	Nuclide	Known Activity	Expermental Activity	Ratio Exp/Known	Agreement
SP-472	Liver-0318-1	Am-241	7.05 +/- 0.15 E-1 pCi	6.7 +/- 0.5 E-1 pCi	0.95 +/- 0.07	YES
SP-472	Liver-0318-1	Pu-238	5.12 +/- 0.11 E-1 pCi	5.9 +/- 0.4 E-1 pCi	1.15 +/- 0.09	YES
SP-472	Liver-0318-1	Pu-239	9.6 +/- 0.2 E-1 pCi	1.00 +/- 0.06 E0 pCi	1.04 +/- 0.07	YES
SP-472	Liver-0318-1	U-234	1.42 +/- 0.03 E0 pCi	1.31 +/- 0.06 E0 pCi	0.92 +/- 0.05	YES
SP-472	Liver-0318-1	U-238	1.48 +/- 0.03 E0 pCi	5.73 +/- 0.19 E0 pCi	3.87 +/- 0.15	NO 18.6 sig, 287%

LabName: USTUR **Matrix: Bone Ash**

LogNo	Sample ID	Nuclide	Known Activity	Expermental Activity	Ratio Exp/Known	Agreement
SP-475	BoneAsh-0218-2	Am-241	2.44 +/- 0.05 E0 pCi	1.5 +/- 0.3 E0 pCi	0.63 +/- 0.11	NO 3.5 sig, -37%
SP-475	BoneAsh-0218-2	Pu-238	3.80 +/- 0.09 E0 pCi	3.31 +/- 0.12 E0 pCi	0.87 +/- 0.04	WARNING 3.4 sig
SP-475	BoneAsh-0218-2	Pu-239	2.85 +/- 0.07 E0 pCi	2.39 +/- 0.09 E0 pCi	0.84 +/- 0.04	WARNING 4.4 sig
SP-475	BoneAsh-0218-2	U-234	2.86 +/- 0.07 E0 pCi	1.68 +/- 0.06 E0 pCi	0.59 +/- 0.02	NO 16.6 sig, -41%
SP-475	BoneAsh-0218-2	U-238	9.1 +/- 0.2 E0 pCi	1.76 +/- 0.06 E0 pCi	0.194 +/- 0.008	NO 101.4 sig, -81%

9. Performance Evaluation Program: Provided

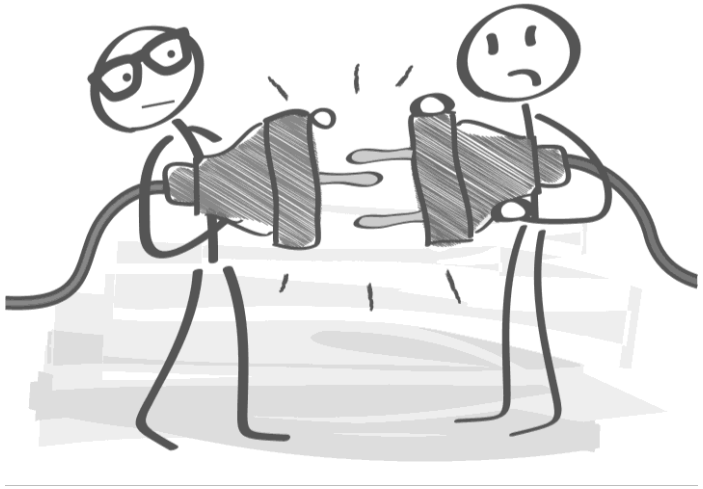
- K. Inn *et al.* (2025) Что??...Нет??...Не может быть?? USTUR Puzzles.

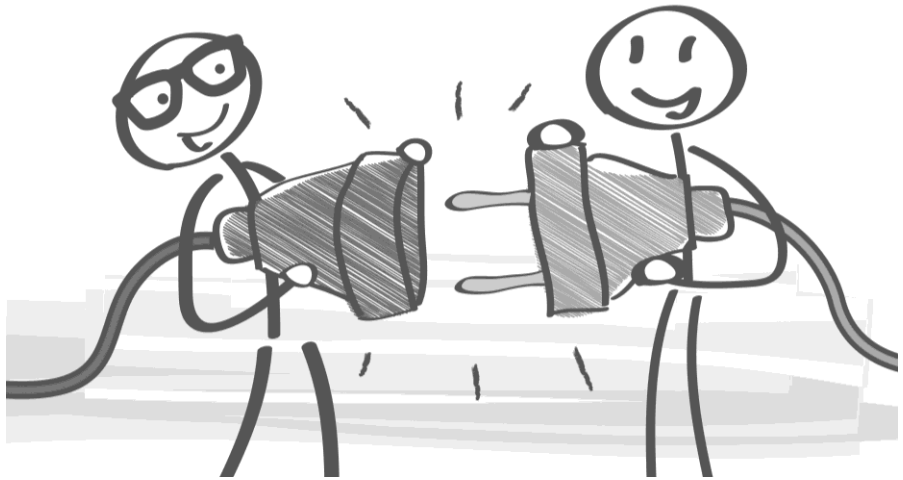
  68th Annual Radiobioassay and Radiochemical Measurements Conference

1. **Soft-tissue** sample: 20 g of freeze-dried **liver**
   - activity per sample: **0.512 – 1.48** pCi
   - added as: **0.408 g** high-fired spiked **clay/Zr/porcelain/soil** [Am+Pu+U]
2. **Soft-tissue** sample: 20 g of freeze-dried **liver**
   - activity per sample: **3.28 – 10.5** pCi
   - added as: **3.018 g** high-fired spiked **clay/Zr/porcelain/soil** [Am+Pu+U]
3. **Bone** sample: 2.03 g of ash
   - activity per sample: **0.668 – 2.49** pCi
   - 20 g of fresh tissue equivalent spiked with **0.421 g** of **soil** [DU+^{238,239}Pu+^{241}Am]
4. **Bone** sample: 2.06 g of ash
   - activity per sample: **2.44 – 9.1** pCi
   - 20 g of fresh tissue equivalent spiked with **1.534 g** of **soil** [DU+^{238,239}Pu+^{241}Am]

9. Performance Evaluation Program: Conclusion

- Instead of performance testing of **tissue sample** analysis, a **soil sample** analysis was challenged
- A **lack of guidance** during the sample request resulted in inadequate samples being provided. *The belief that others knew what we were doing and what we needed did not work*





- **A new sample request with explicit guidance to RESL is in preparation**

10. Procurement of ICP-MS

SPECTRO
AMETEK

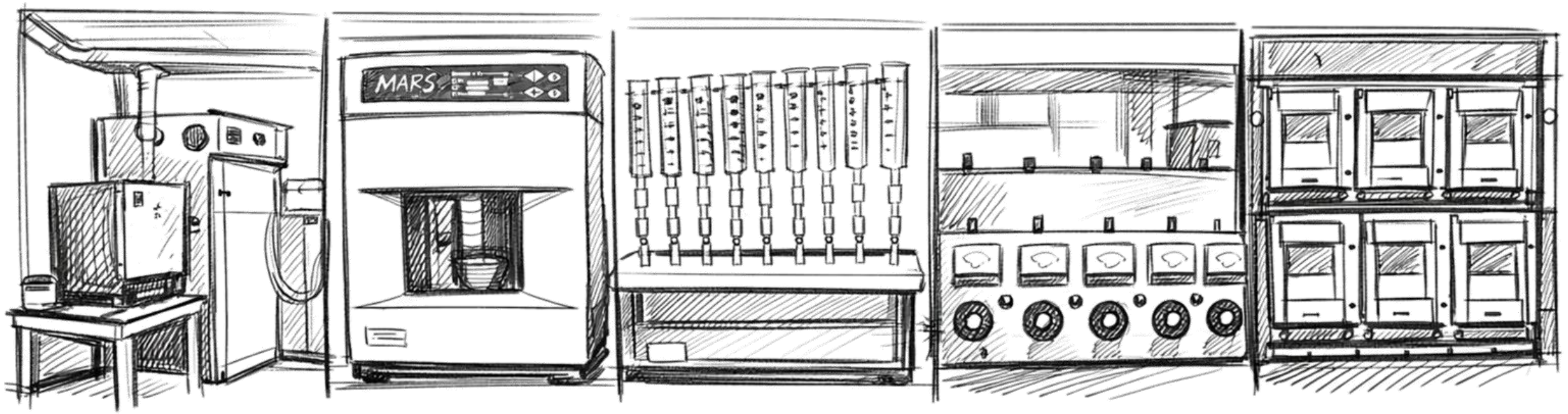
ICP-Optical Emission Spectrometry

ICP-Mass Spectrometry

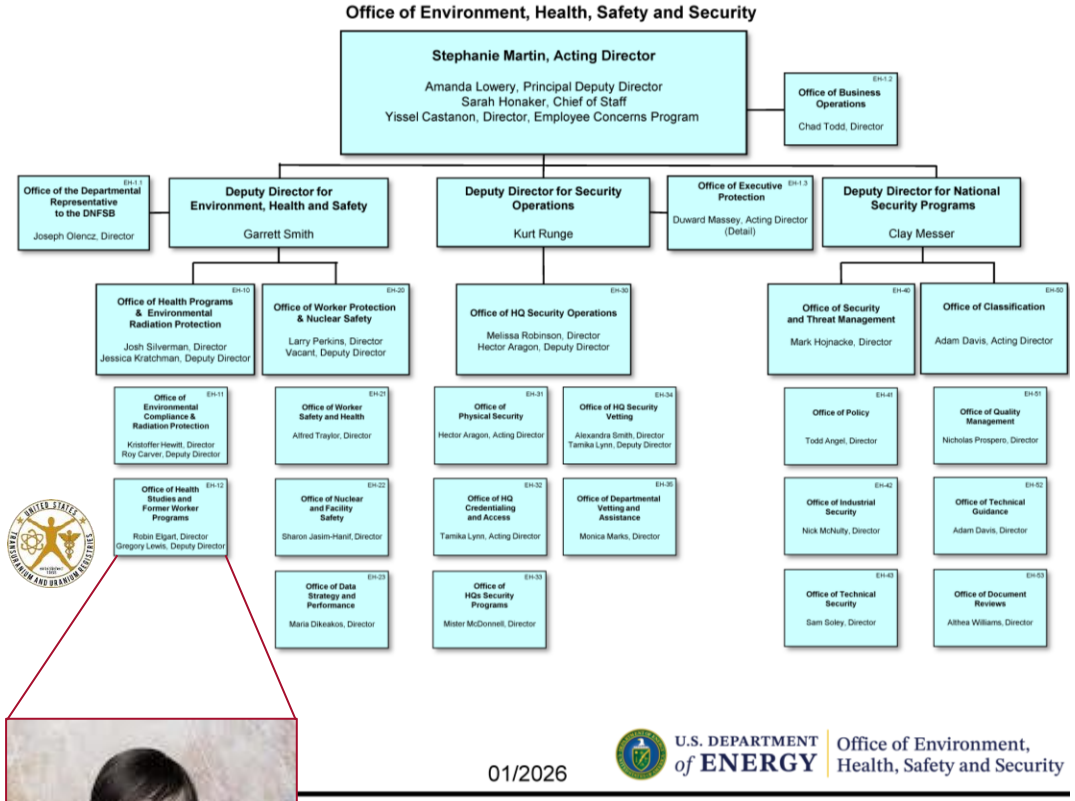
analytikjena
An Endress+Hauser Company

Graphite Furnace Atomic Absorption Spectrometry

FY2026 Operations and Research



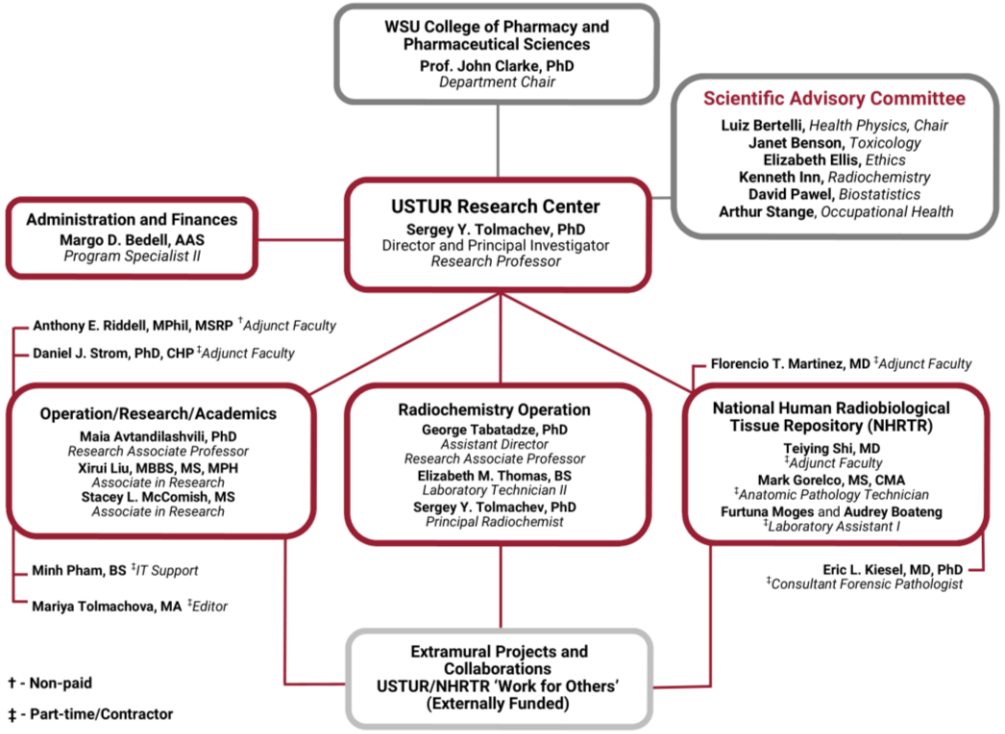
Key Organizational Changes



Robin Elgard, Director
Office of Health Studies and Former Worker Programs (EH-12)

Julie Akers, Interim Dean
College of Pharmacy and Pharmaceutical Sciences

John Clarke, Chair
Department of Pharmaceutical Sciences



Research Output

6 	**4** 	**4** 	**5** 
Scientific publications	Invited talks	Podium presentations	Poster presentations

On-going Research Projects

- Uncertainties in radiation doses and epidemiological outcomes
- Radionuclides distribution and dosimetry using iQID
- Beryllium (^{9}Be) measurements, distribution, and biokinetics
- Distribution and biokinetics of minor actinides: ^{244}Cm and ^{237}Np (MPS/ORNL)
- Plutonium (^{239}Pu) and radium (^{226}Ra) in the human heart (MURR)
- Development of a new human respiratory tract model (LANL)
- Medical countermeasures research (LANL, KIT)

Urine Sample Analysis: Living Registrants

2022
- Initial sample collection
- **Fourteen** urine samples

2022
- Agreement for annual follow up
- **Ten** Registrants

2025
- Radiochemical analyses
- **Completed:** thirteen samples

2026
- 2026 follow up collection
- **Six** Registrants

Radioanalytical Laboratory
U.S. Air Force School of Aerospace Medicine (USAFSAM)

U.S. AIR FORCE

Case	Autopsy type	Site	Sample volume (mL)	Measured concentration (fCi L^{-1})							
				^{239}Pu		^{238}Pu		^{241}Am		^{230}Th	
				Result	MDA	Result	MDA	Result	MDA	Result	M
0266	WB	ROC	1280	136±28	7.9			15.3±8.1	6.1		
0327	PB	HAN	1275	0.39±3.82	10.1			6.71±5.34	5.8		
0409	WB	ROC	980	5.81±6.37	8.7			-9.92±9.56	23.9		
0466	PB	ROC	1340	9.59±8.00	10.3			2.56±4.55	8.2		
0638	PB	MSC	2320	1.26±2.14	3.8			7.00±6.59	10.3		
0758	PB	ROC	2360	2.19±2.87	4.4			-4.16±3.93	9.8		
0763	WB	MND	1360	2.66±4.38	7.7	8.81±6.99	7.9	-5.80±7.58	17.5	7.12±6.59	7
0815	PB	ROC	2510	17.67±6.51	3.5			3.39±2.94	3.4		
0820	PB	ROC	2280	480±44	3.8			40.97±9.95	3.8		
0852	PB	HAN	1440	1.37±3.43	7.1	3.65±4.71	7.3	-2.44±7.48	15.7		
0855	SP	MSC	2480					35.0±10.6	10.0		
0860	PB	ROC	2330	14.7±6.2	3.8			5.0±3.3	3.1		
0950	PB	PBA	2510	0.82±2.07	4.3			2.5±3.1	4.9		

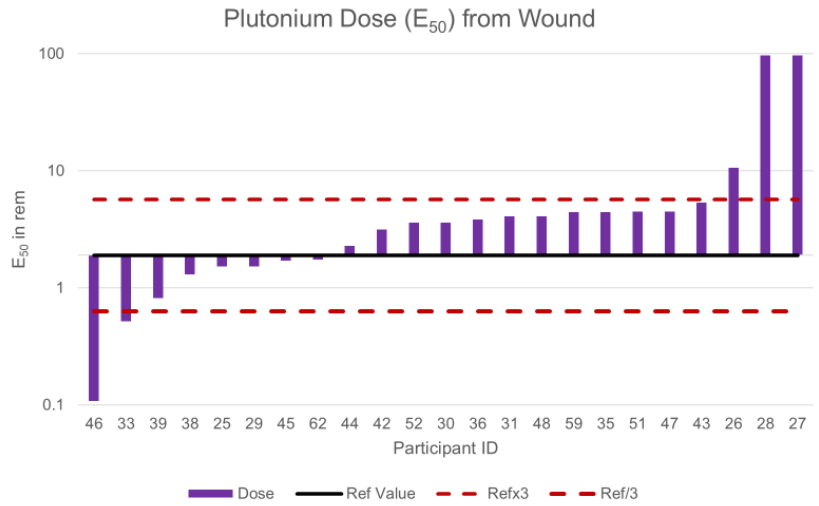
Broader Use of USTUR Data

2025 Dosimetry Intercomparison Exercise (DICE)

August 1, 2025
HMIS-2304353 rev 1

Cheryl Antonio, CHP
Hanford Internal Dosimetry Program
HMIS Radiological Site Services

Case 25A – Group Statistics Dose



USTUR WHOLE BODY CASE 0262: 33-Y FOLLOW-UP OF PUO_2 IN A SKIN WOUND AND ASSOCIATED AXILLARY NODE

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Received October 2, 2006, amended ????, accepted ????

Abstract — This whole body donation case (USTUR Registrant) involved two suspected PuO_2 inhalation intakes, each indicated by a measurable Pu α-activity in a single urine sample, followed about 1½ y later by a puncture wound to the thumb while working in a Pu glovebox. The study is concerned with modeling simultaneously the biokinetics of deposition and retention in the respiratory tract and at the wound site; and the biokinetics of Pu subsequently transferred to other body organs, until the donor's death. Urine samples taken after the wound incident had readily measurable Pu α-activity over the next 14 y, before dropping below the minimum detectable excretion rate (< 0.4 mBq d^{-1}). The Registrant died about 33 y after the wound intake, at age 71 y, from hepatocellular carcinoma with extensive metastases. At autopsy, all major soft tissue organs were harvested for analysis of their ^{238}Pu, $^{239+240}Pu$ and ^{241}Am content. The amount of $^{239+240}Pu$ retained at the wound site was 68 ± 7 Bq (1 S.D.), measured by low-energy planar Ge (LEGe) spectrometry. A further 56.0 ± 1.2 Bq was retained in an associated axillary lymph node, measured by radiochemistry. Simultaneous mathematical analysis (modeling) of all *in vivo* urinary excretion data, together with the measured lung, thoracic lymph node, wound, axillary lymph node, and systemic tissue contents at death, yielded estimated intake amounts of 757 and 1,504 Bq, respectively, for the first and second inhalation incidents, and 204 Bq for the total wound intake. The inhaled Pu material was highly insoluble, with an estimated long-term absorption rate from the lungs of 2×10^{-5} d^{-1}. The Pu material deposited at the wound site was mixed: about 14% was rapidly absorbed, about 49% was absorbed at the rate of about 6×10^{-5} d^{-1}, and the remainder (about 37%) was absorbed extremely slowly (at the rate of about 5×10^{-6} d^{-1}). Thus, it was estimated that only about 40% of the Pu initially deposited in the wound had been absorbed systemically over the 33-y period until the donor's death. The biokinetic modeling also indicated that, in this individual case, some of the parameter values (rate constants) incorporated in the ICRP Publication 67 Pu model were up to a factor two different from ICRP's recommended values (for Reference Man).

Forty-eight-year follow-up of a female worker exposed to highly enriched uranium via chronic and acute inhalation

Maia Avtandilashvili[1] · Sergey Y. Tolmachev[2]

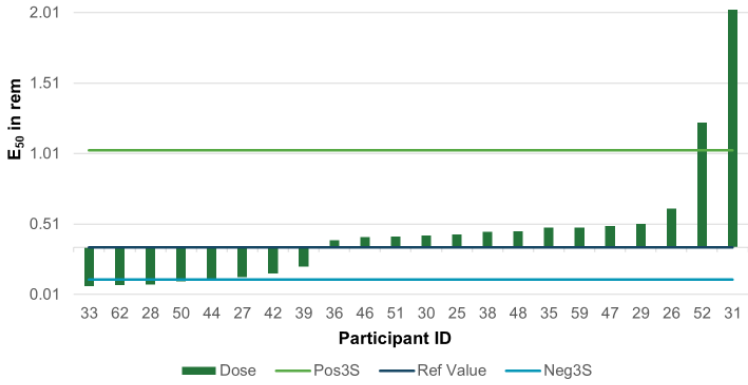
Received: 5 June 2023 / Accepted: 8 December 2023

Abstract
The United States Transuranium and Uranium Registries (USTUR) is a unique resource of data and materials for studying biokinetics of uranium in the human body. In this study, bioassay data and post-mortem organ activities from a female whole-body USTUR donor who was exposed to highly enriched uranium were analyzed using the IMBA Professional Plus® software to derive the best estimate of the total intake. The resulting radiation doses delivered to this individual's whole body and major target organs were calculated from estimated intake based on case-specific dose coefficients derived using the AIDE® software. Both intake and dose calculations were carried out using the biokinetic and dosimetric models recommended by the International Commission on Radiological Protection (ICRP) in its Occupational Intakes of Radionuclides publication series. Different exposure scenarios including chronic and acute inhalation intakes were tested. A combination of a chronic inhalation intake and two acute inhalation intakes appears to best describe the bioassay data. To fit this female individual's autopsy data, the transfer rate from the liver to the blood was increased by a factor of 8 and the transfer rate from the kidneys to the blood was decreased by a factor of 2.2. This resulted in the best fit to all data ($p = 0.519$). The total intake was estimated to be 44.1 kBq, and the committed effective dose was 211 mSv with 96.8% contributed by ^{234}U. 96.6% of the committed effective dose was contributed by the lungs. The remaining 3.4% of the committed effective dose was contributed by all systemic tissues and organs with the highest contribution (0.40%) from the red bone marrow. It is concluded that the current ICRP models, with the adjustment for smoking status, adequately describe uranium biokinetics for this individual except retention in the liver and kidneys. However, this study was based on a single case and may not be sufficient to identify any apparent sex-specific differences in uranium biokinetics.

Keywords Highly enriched uranium · Inhalation · Autopsy tissue analysis · Biokinetic modeling · Female

Case 25B - Dose Distributions

Uranium mixture Dose (E_{50}),
Reference Dose was 0.344 rem



OneNuclear and Cougar Tracks Proposals

WASHINGTON STATE UNIVERSITY

OneNuclear Initiative

A ROADMAP TO UNIFY NUCLEAR RESEARCH, DEVELOPMENT & EDUCATION ACROSS THE WSU SYSTEM

Corey Hines, Nuclear Science Center and Noel Schulz, Institute for Northwest Energy Futures (INEF)

March 19, 2026

Supplement to Proposal to Manage and Operate the
U.S. Transuranium and Uranium Registries (DE-HS0000073):
April 1, 2026 - March 31, 2027

Submitted by:

Sergey Y. Tolmachev, Director and P.I.
United States Transuranium and Uranium Registries
College of Pharmacy and Pharmaceutical Sciences
Washington State University

WSU TRI-CITIES Cougar Tracks

College of Pharmacy and Pharmaceutical Sciences
Washington State University

Radiation Effects Research Foundation Proposal

RADIATION RESEARCH **205**, 295–306 (2026)
0033-7587/26 $15.00

DOI: 10.1667/RADE-25-00167.1

Radiation Effects on the Incidence of Myocardial Infarction in Atomic Bomb Survivors, 1958–2015

Satoshi Kurisu,[a,1] Munechika Misumi,[b] Shuji Arakawa,[c] Michiko Yamada,[a] Tomoki Nakamizo,[d] Yoshimi Tatsukawa,[a] Noriaki Yoshida,[a] Kayoko Ishihara,[a] Misa Imaizumi,[d] Yuko Kadowaki,[e] Ritsu Sakata,[e] Ayumi Hida,[d] Yukiko Nakano,[f] Koji Maemura,[c] Waka Ohishi[a]

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Article in Press
https://doi.org/10.1038/s41598-026-41788-6

Inference under outcome misclassification in health risk models using a simulation study with a validation dataset

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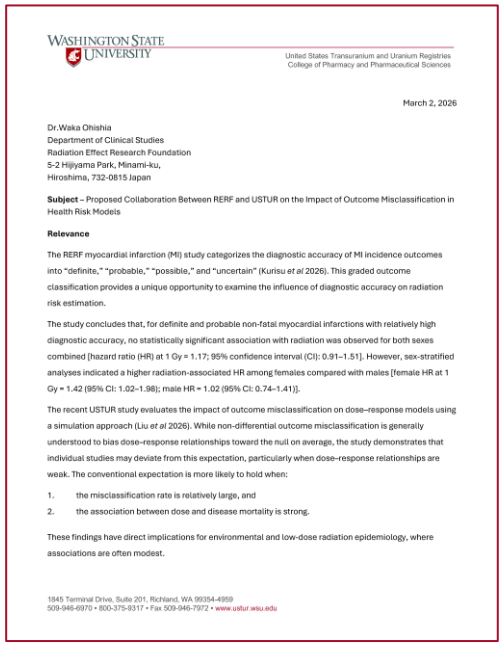
Xirui Liu, Stacey L. McComish, Sara C. Howard, Joey Y. Zhou & Sergey Y. Tolmachev



WASHINGTON STATE UNIVERSITY
United States Transuranium and Uranium Registries
College of Pharmacy and Pharmaceutical Sciences

March 2, 2026

Dr.Waka Ohishia
Department of Clinical Studies
Radiation Effect Research Foundation
5-2 Hijiyama Park, Minami-ku,
Hiroshima, 732-0815 Japan

Subject – Proposed Collaboration Between RERF and USTUR on the Impact of Outcome Misclassification in Health Risk Models

Relevance

The RERF myocardial infarction (MI) study categorizes the diagnostic accuracy of MI incidence outcomes into "definite," "probable," "possible," and "uncertain" (Kurisu *et al* 2026). This graded outcome classification provides a unique opportunity to examine the influence of diagnostic accuracy on radiation risk estimation.

The study concludes that, for definite and probable non-fatal myocardial infarctions with relatively high diagnostic accuracy, no statistically significant association with radiation was observed for both sexes combined [hazard ratio (HR) at 1 Gy = 1.17; 95% confidence interval (CI): 0.91–1.51]. However, sex-stratified analyses indicated a higher radiation-associated HR among females compared with males [female HR at 1 Gy = 1.42 (95% CI: 1.02–1.98); male HR = 1.02 (95% CI: 0.74–1.41)].

The recent USTUR study evaluates the impact of outcome misclassification on dose–response models using a simulation approach (Liu *et al* 2026). While non-differential outcome misclassification is generally understood to bias dose–response relationships toward the null on average, the study demonstrates that individual studies may deviate from this expectation, particularly when dose–response relationships are weak. The conventional expectation is more likely to hold when:

1. the misclassification rate is relatively large, and
2. the association between dose and disease mortality is strong.

These findings have direct implications for environmental and low-dose radiation epidemiology, where associations are often modest.

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509-946-6970 • 800-375-8317 • Fax 509-946-7972 • www.ustur.wsu.edu

Proposed Collaboration

USTUR's ongoing research focuses on simulation-based approaches to evaluate outcome misclassification in dose–response models. The next phase is to confirm and validate simulation findings using a real-world epidemiological cohort, ideally involving low-dose radiation exposure and a weak or borderline statistically significant association.

The RERF MI cohort is unique and well suited for this purpose, as it provides explicitly graded diagnostic accuracy of outcomes, unlike other large radiation cohorts (e.g., the Million Person Study), which rely primarily on death certificate–based outcomes (with known misclassifications). The availability of outcomes with varying diagnostic accuracy offers greater flexibility as a real-world dataset for validating USTUR's simulation-based findings.

References

Kurisu *et al* (**2026**) *Radiation Effects on the Incidence of Myocardial Infarction in Atomic Bomb Survivors, 1958–2015*. Radiation Research: **205**, DOI: 10.1667/RADE-25-00167.1.

Liu *et al* (**2026**) *Inference Under Outcome Misclassification in Health Risk Models Using a Simulation Study with a Validation Dataset*. Scientific Reports: **Accepted**, DOI: 10.1038/s41598-026-41788-6

Sergey Y. Tolmachev
Professor & Director

26-001

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RE: Potential collaboration between the RERF and USTUR

From nwaka@rerf.or.jp <nwaka@rerf.or.jp>
Date Mon 3/2/2026 5:42 PM
To Tolmachev, Sergey Y <stolmachev@wsu.edu>
Cc rajaraman_p@rerf.or.jp <rajaraman_p@rerf.or.jp>

Thank you for your message and for sharing your proposal.
I will circulate your proposal among our statistical collaborators and relevant colleagues at RERF for internal discussion and consideration.

If we were to move forward with a collaborative project involving RERF cohort data, a formal research protocol and institutional review would be necessary.
We will take this into account as we discuss the proposal internally and will get back to you in due course.

With best regards,

Waka Ohishi

New Services

- Health Physics Society
  - Board of Directors (2025 – 2028)
  - International Collaboration Committee (2025–2028)
  - Fellow Award Nomination Class 2026
  - Columbia Chapter Secretary (2025 – 2027)
- National Council on Radiation Protection and Measurements
  - Council Member (2026 – 2032)
- Beryllium Health and Safety Committee
  - Research Subcommittee Chair
- Washington State Academy of Sciences
  - Education Committee

Professional and Academic Services

HEALTH PHYSICS SOCIETY
SINCE 1960 COLUMBIA CHAPTER

HEALTH PHYSICS SOCIETY
FOUNDED 1956

HPS Specialists in Radiation Protection

WASHINGTON STATE UNIVERSITY PULLMAN

SCIENTIFIC AUTHORITY SINCE 1929 · NCRP · CONGRESSIONALLY CHARTERED

National Council on Radiation Protection and Measurements

WASHINGTON STATE UNIVERSITY SPOKANE

WASHINGTON STATE UNIVERSITY TRI-CITIES

WASHINGTON STATE ACADEMY OF SCIENCES
SCIENCE IN THE SERVICE OF WASHINGTON STATE

健 物 Jhps
JAPANESE JOURNAL OF HEALTH PHYSICS
日本保健物理学会
JAPAN HEALTH PHYSICS SOCIETY

Physical Science & Biophysics Journal
ISSN: 2641-9165

Beryllium Health & Safety Committee

AUSTIN BIOMETRICS AND BIOSTATISTICS

Collaborative Research Network

The Million Person Study

Oak Ridge Institute for Science and Education

Oak Ridge National Laboratory

National Council on Radiation Protection and Measurements

MURR

Missouri

Los Alamos National Laboratory EST. 1943

Kansas State University

NASA

EURADOS

UK Health Security Agency

Uniformed Services University of the Health Sciences 1972

Physics & Engineering Francis Marion University

World Health Organization

Clemson University

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TRI-CITIES

Can We Really "Calculate" a Risk?

Models, Uncertainty, and Decisions in Internal Dosimetry

How do scientific models translate into realworld decisions?
Using internal dosimetry as a case study, this lecture explores how radiation risk is quantified—and where calculation meets judgment.

Wednesday, April 15

6:00 PM (doors open at 5:30 PM)

WSU Tri-Cities East Auditorium

Free admission & open to the community.

https://bit.ly/3MVcaf4

François Paquet, PhD

Globally recognized expert in radiological protection and internal dosimetry; Deputy Director for Research and Expertise in the Environment at the French Nuclear Safety and Radiation Protection Authority (ASNR, France). Dr. Paquet serves as ViceChair of ICRP Committee 2 and Chair of the ICRP Task Group on Internal Dosimetry, and has authored more than 180 peer reviewed publications.

Sponsored by the Herbert M. Parker Foundation in partnership with Washington State University Tri-Cities, the Parker Lectures honor distinguished scientists, memorialize Mr. Parker's contributions to radiation protection, and enhance public understanding of radiological issues.

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Thank you