



WASHINGTON STATE UNIVERSITY
College of Pharmacy and
Pharmaceutical Sciences



Occupational Internal Dosimetry Training Meeting
Atlanta, Georgia, July 28 - August 1, 2025

Inside US Transuranium and Uranium Registries: A Chronicle of Actinide Research

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Where It All Started



“to protect the **interests of workers, employees, and the public** by ... the acquisition and provision of the latest and most precise information about the **effects of the transuranic elements on man**”

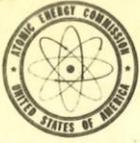
*United States Atomic Energy Commission (AEC) Meeting on Plutonium Contamination in Man
July 25-26, 1966*



Official Establishment



United States Atomic Energy Commission (AEC) Official Announcement
August 1, 1968

 UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

AUG 1 6 1968 *Only one sent to Norwood*

This is to announce that the Division of Biology and Medicine has authorized the establishment of a "Plutonium Registry" with the Hanford Environmental Health Foundation of Richland, Washington.

sending to Op. office and H & S people

This is to announce that the Division of Biology and Medicine has authorized the establishment of a "Plutonium Registry" with the Hanford Environmental Health Foundation of Richland, Washington. This Registry is the outcome of discussions held over the past two years between contractors handling plutonium, and representatives of the Divisions of Biology and Medicine and Operational Safety. For the present the Registry is national in scope, including both contractors and licensees of the Commission. Hopefully, other nations may in time care to pool their information.

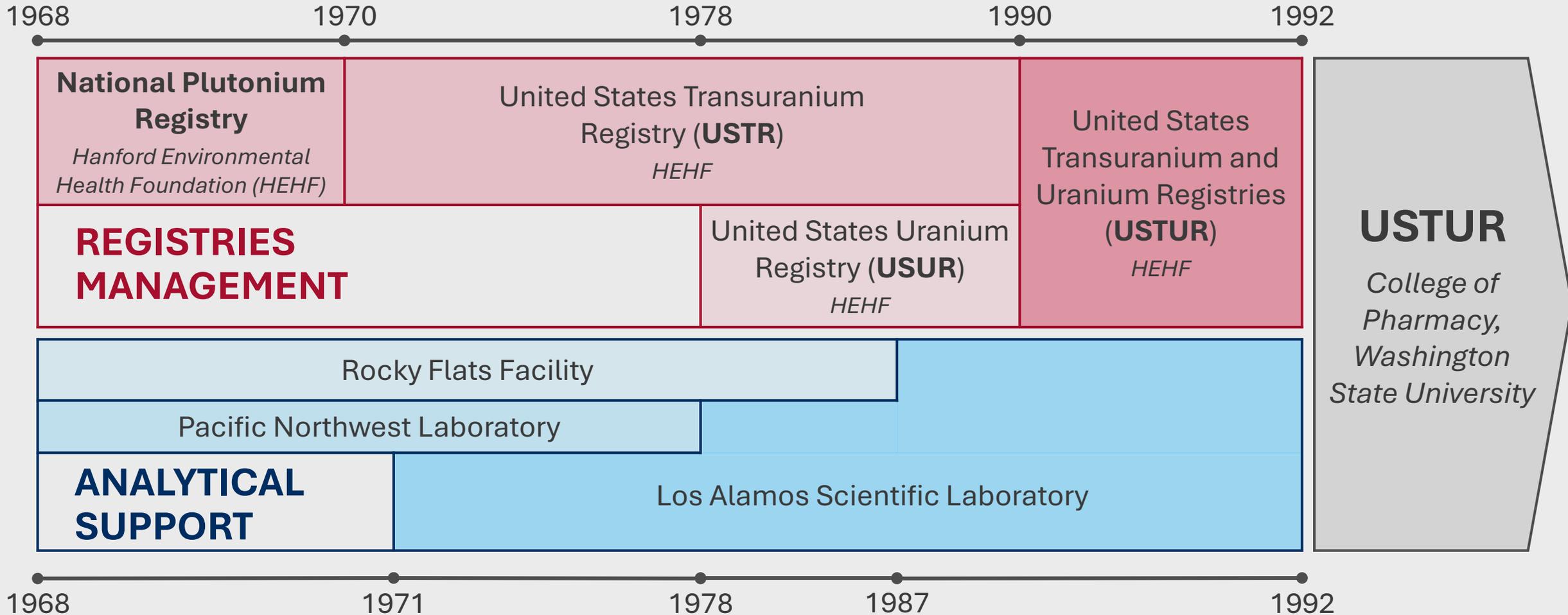
This Registry, if it is to be the unique development in the field of occupational medicine that it can be, must depend on the cooperation of the management, and medical and health physics personnel of the various installations in which plutonium contaminations occur. Therefore, when W. D. Norwood, M.D., Principal Investigator of the Plutonium Registry, contacts you or your group, you will understand that he will really be acting as your agent and an extension of your installation. The philosophy underlying the Registry was presented at the Hanford Symposium in May 1967 and will soon appear in a special volume of Excerpta Medica; a reprint will be sent you as soon as possible.

In brief, the Registry will function as a cooperative information pool with Dr. Norwood managing its operation. Dr. Norwood will require your help in arriving at many policy determinations and an even larger number of operational details. Since voluntary cooperation will be the key element in the Registry, your collaboration now and for a long time into the future is solicited.

Dr. Norwood's address is P. O. Box 100, Richland, Washington 99352; telephone number 509-942-1111, extension 64010.



History of the Registries



USTUR Today

Mission

- Follow up occupationally exposed workers by
 - studying biokinetics and tissue dosimetry of the actinides
- Refine dose assessment methods to support
 - reliable epidemiological studies
 - radiation risk assessment
 - occupational radiological protection regulatory standards

Funded

U.S. Department of Energy
Office of Domestic and International Health
Studies

Managed

Washington State University
College of Pharmacy and Pharmaceutical
Sciences



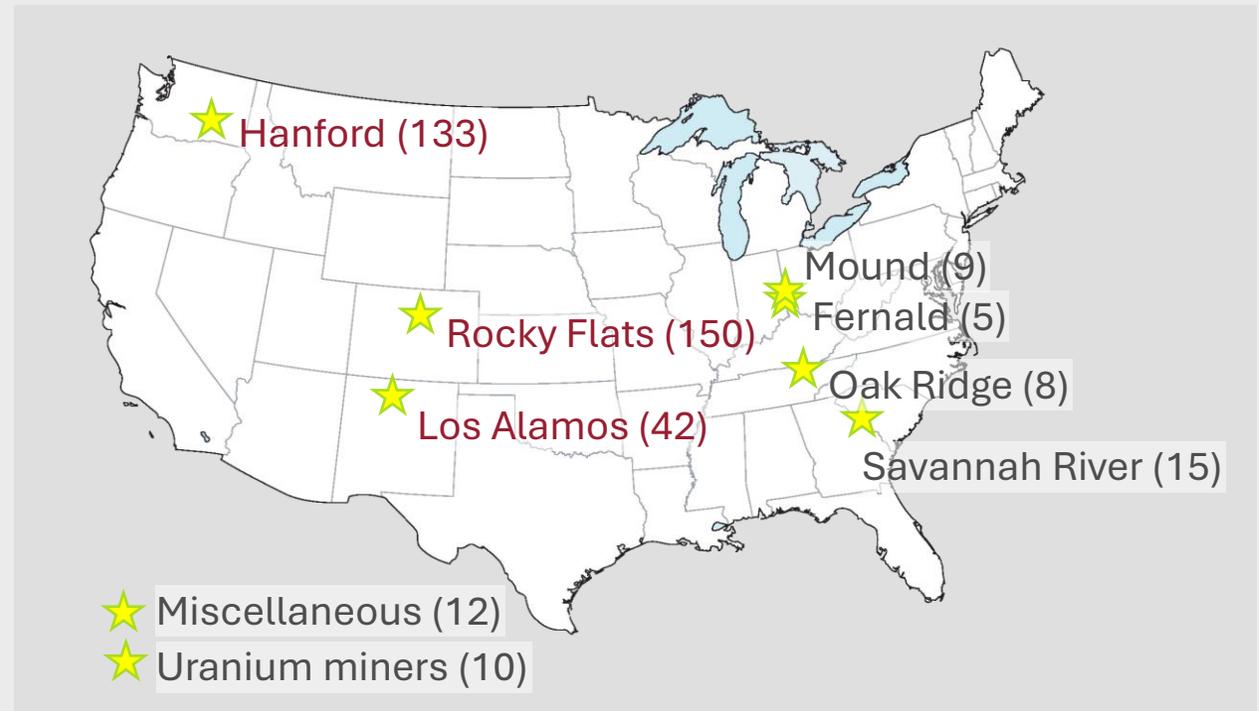
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USTUR Registrants

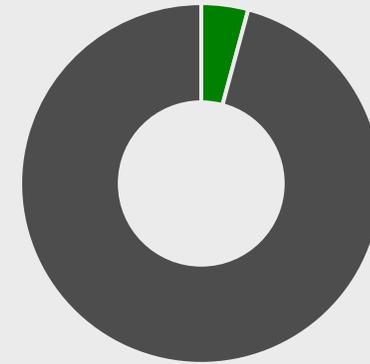
- Individuals with documented history of exposure to the actinides
- Volunteered to donate their organs, tissues, or entire bodies for research
- Selection criteria: 2 nCi (internal deposition) or 10 rem (external)
- Mainly former nuclear workers from DOE sites

Primary nuclide	
^{239}Pu	306
^{238}Pu	12
^{241}Am	5
Uranium (NU, HEU, DU)	49



Registrant Statistics

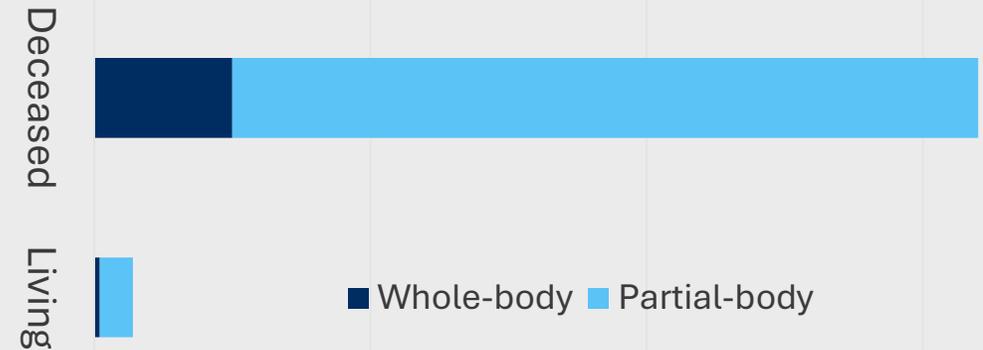
Overall Status	Number of Individual
Living	14
Deceased	370



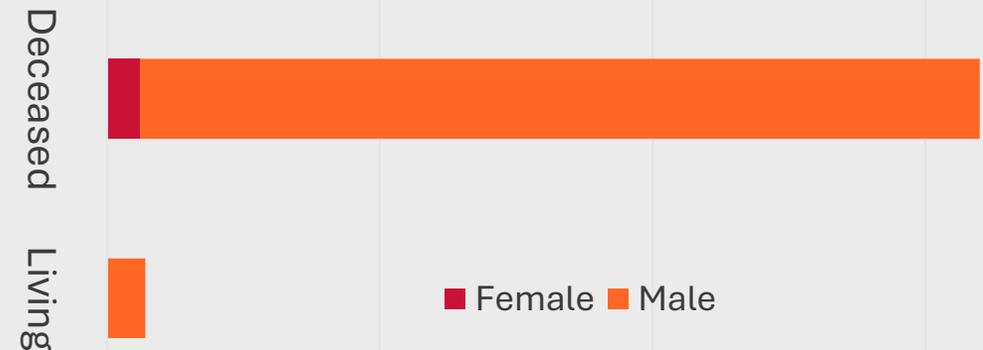
Total number:
384

- Living
- Deceased

Donor Type	Living	Deceased
Whole-body	2	50
Partial-body	12	320



Gender	Living	Deceased
Female	0	12
Male	14	358



Facilities and Data Assets



Work history



Medical records



Smoking history[†]



Tissue analysis results

Registrants' data



Bioassay measurements



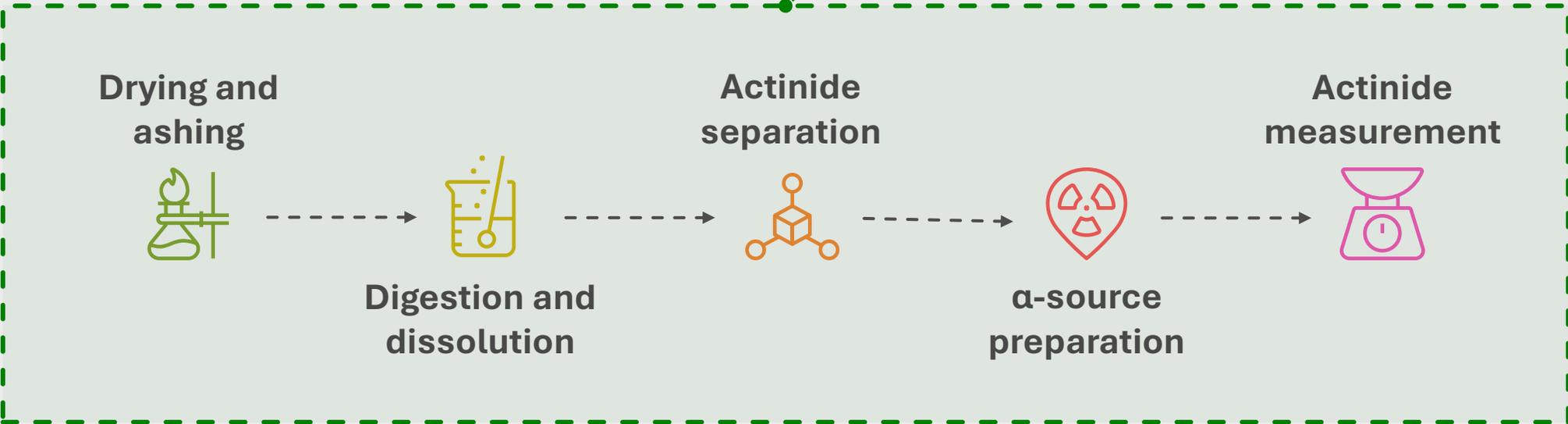
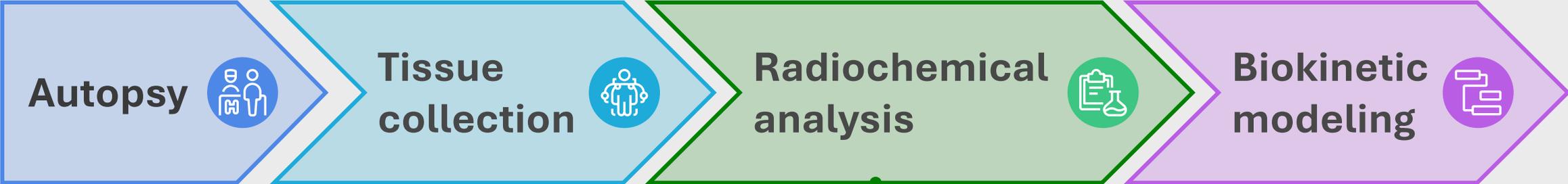
Radiation exposure records



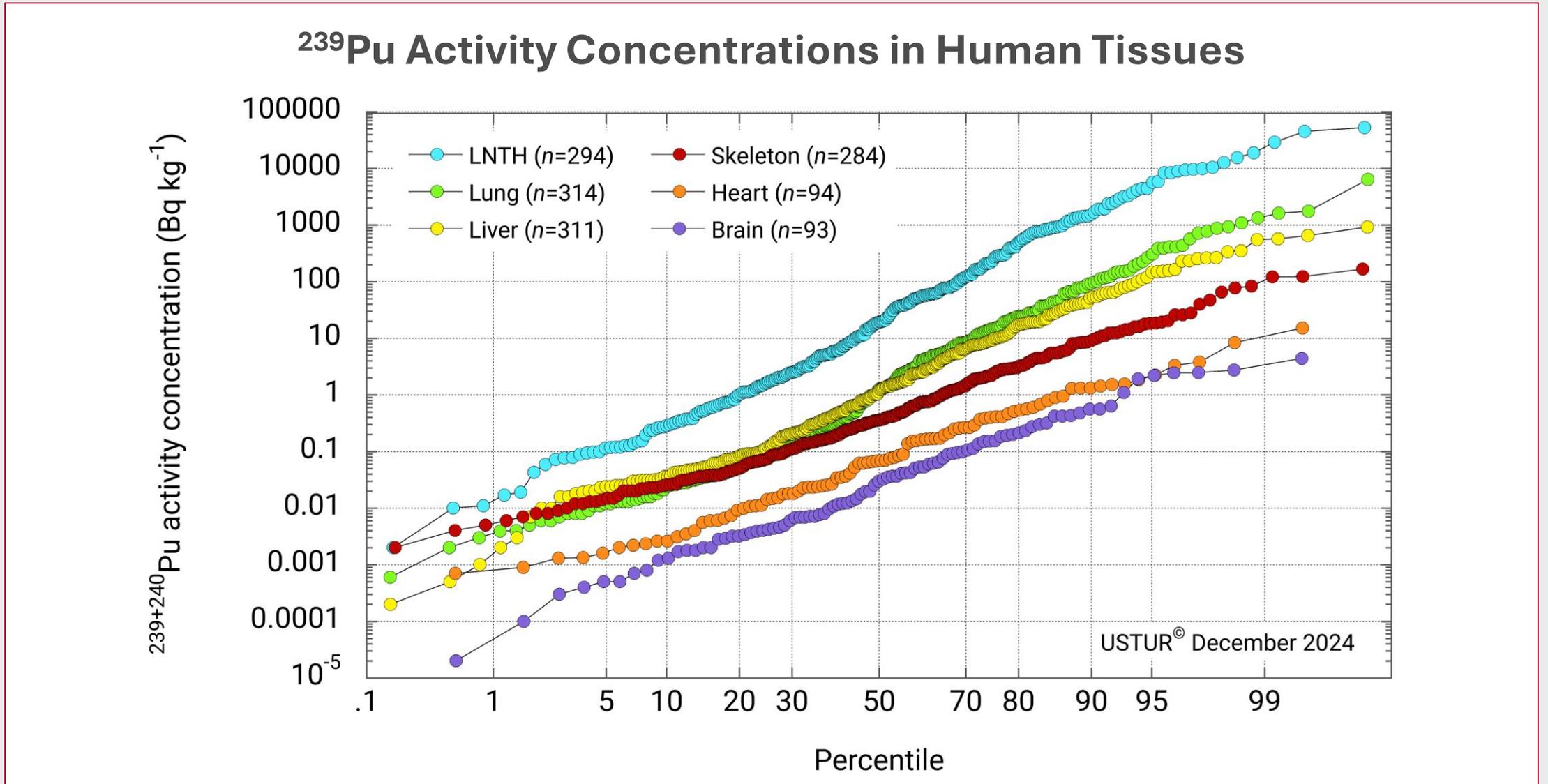
Industrial hygiene records[†]

[†] Self reported

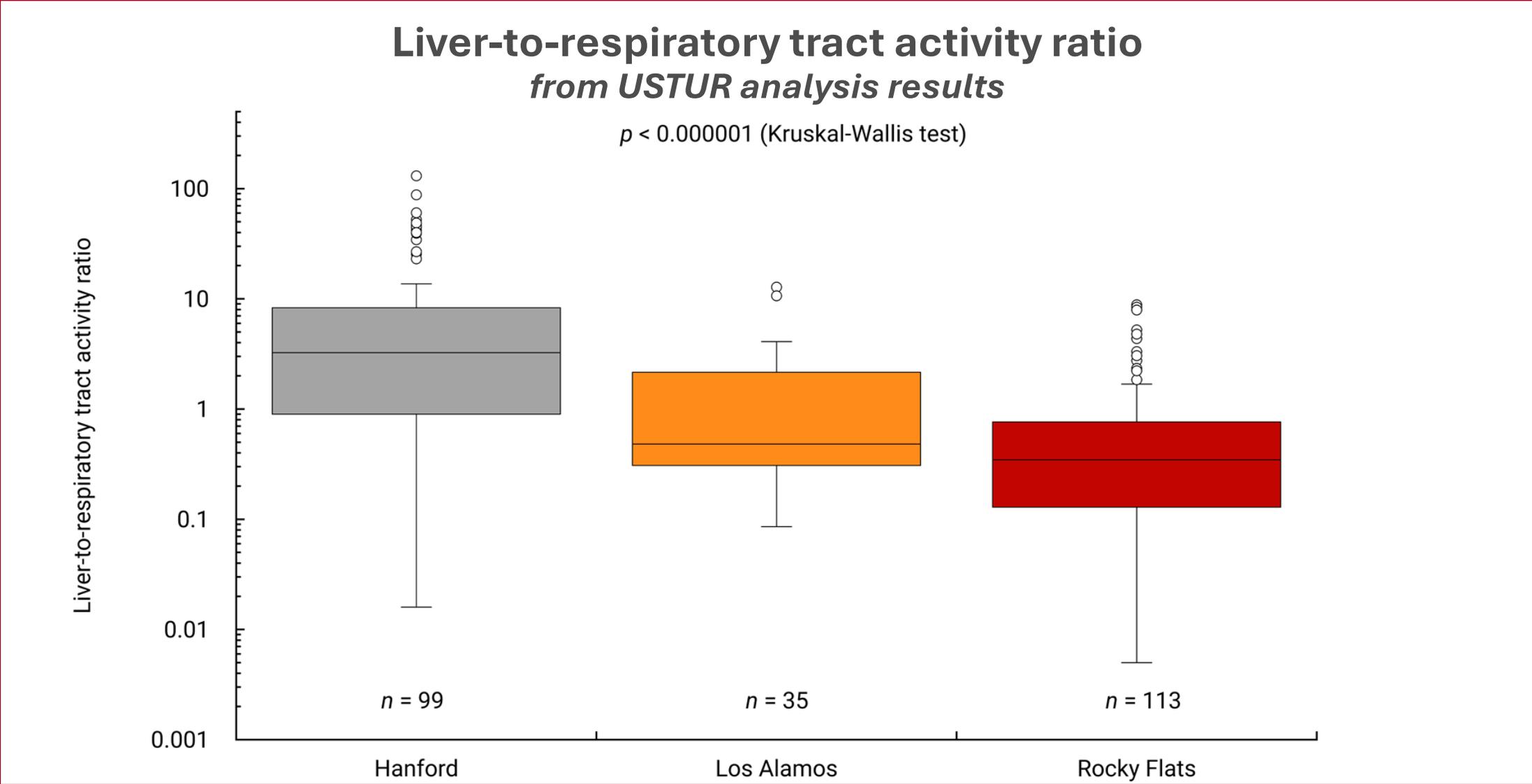
Registries Operations Schematic



Developing Biokinetic Models (I)

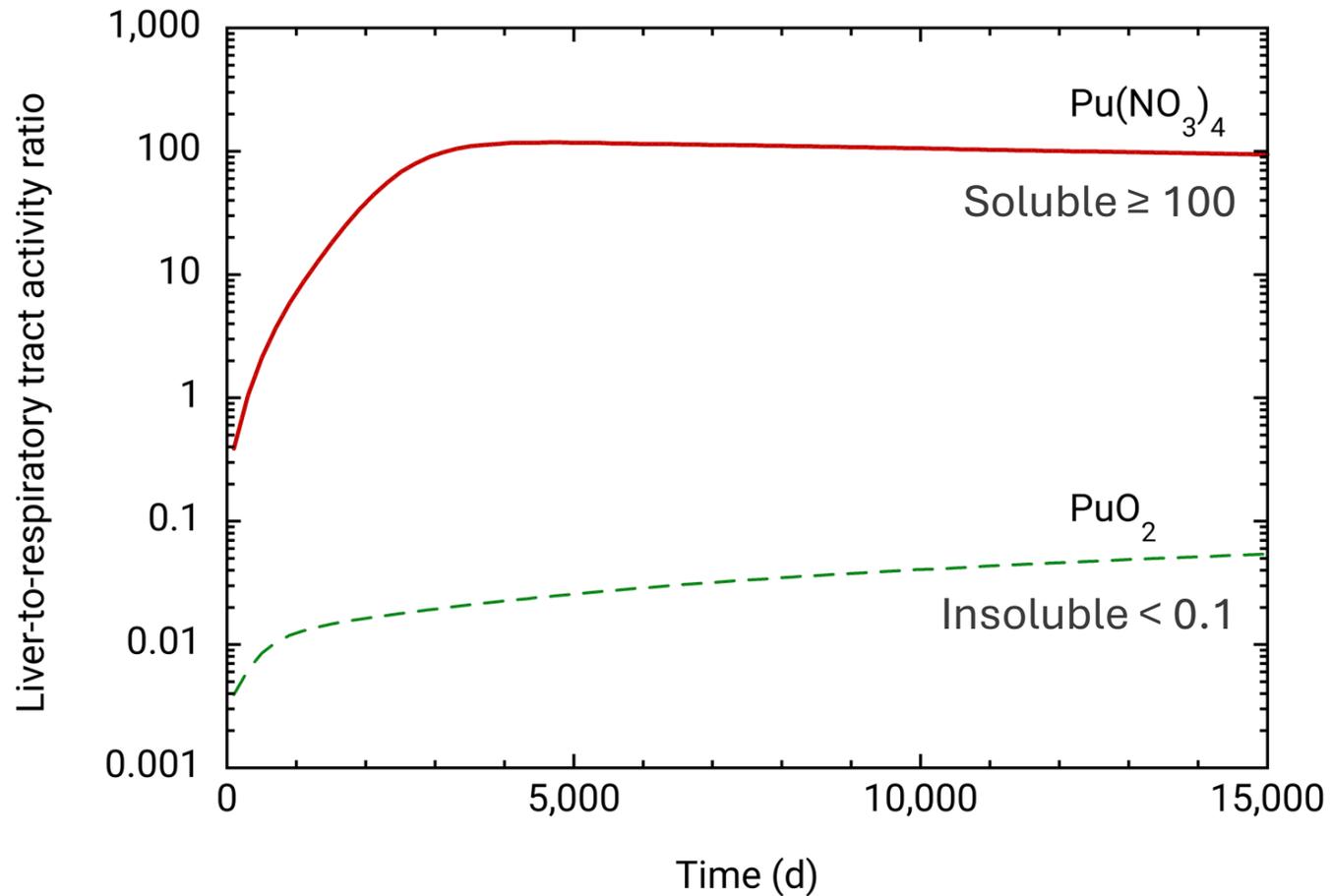


Developing Biokinetic Models (II)

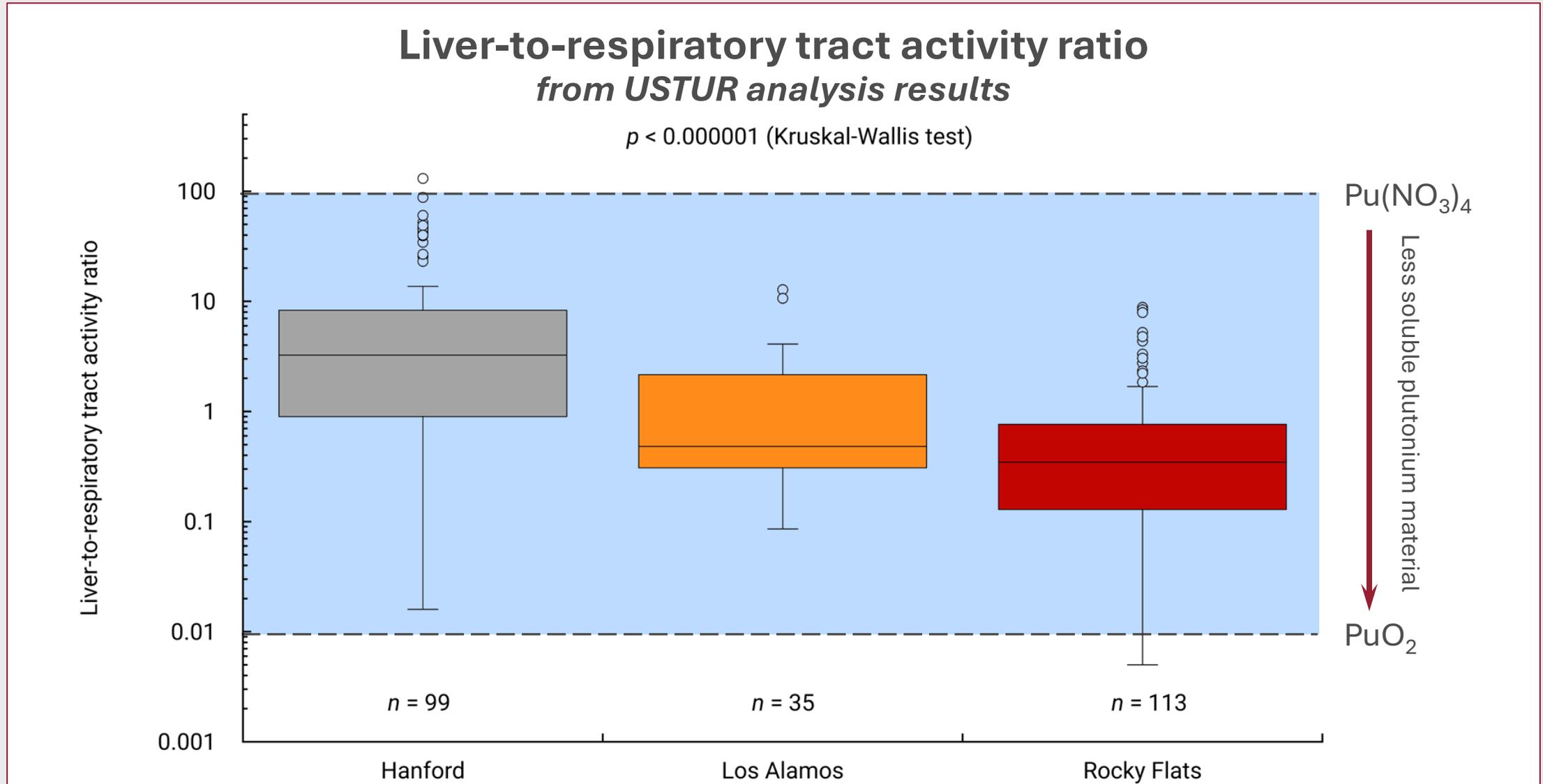


Developing Biokinetic Models (III)

Liver-to-respiratory tract activity ratio
from ICRP reference models



Developing Biokinetic Models (IV)



Cause of Death Misclassification Study (I)



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RESEARCH ARTICLE

Misclassification of causes of death among a small all-autopsied group of former nuclear workers: Death certificates vs. autopsy reports

Stacey L. McComish  , Xirui Liu , Florencio T. Martinez , Joey Y. Zhou , Sergey Y. Tolmachev 

Published: May 3, 2024 • <https://doi.org/10.1371/journal.pone.0302069>

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Cause of Death Misclassification Study (II)

Underlying Cause of Death based on ICD-10 Code Chapter																	
Death Certificate		Autopsy Report															
		1	2	3	4	5	6	9	10	11	13	14	17	18	19	20	Total
1	Infectious and parasitic	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
2	Neoplasms	-	72	1	-	-	-	5	2	-	-	-	-	-	-	-	80
3	Blood and immune	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	2
4	Endocrine, nutritional, metabolic	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	2
5	Mental and behavioral	-	1	-	-	1	1	3	1	-	-	-	-	-	-	-	7
6	Nervous system	-	-	-	-	-	10	4	1	-	-	-	-	-	-	-	15
9	Circulatory	1	3	-	1	-	2	90	5	1	-	1	1	1	1	1	108
10	Respiratory	-	4	-	-	-	-	12	10	-	-	-	-	-	-	-	26
11	Digestive	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	2
13	Connective tissue	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	2
14	Genitourinary	-	1	-	-	-	-	2	-	-	-	1	-	-	-	-	4
17	Malformations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
18	Symptoms and findings	-	1	-	-	-	-	1	-	1	-	-	-	-	-	-	3
19	Injury or poisoning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
20	External causes	-	1	-	-	-	-	-	-	-	-	-	-	-	2	12	15
	Total	1	83	2	2	1	13	121	19	5	0	3	1	1	3	13	268



Cause of Death Misclassification Study (III)

ICD-10 Cause of Death (Chapter)	Number of Cases	
	Total	Match
Neoplasms (2)	80	72 (90.0%)
Nervous system (6)	15	10 (66.7%)
Circulatory (9)	108	90 (83.3%)
Respiratory (10)	26	10 (38.5%)
External causes (20)	15	12 (80.0%)
Other	24	6 (25.0%)
Total	268	200 (74.6%)



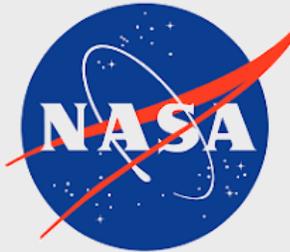
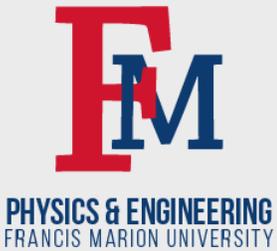
Collaborative Research Network



National Council on Radiation Protection and Measurements



UK Health Security Agency



World Health Organization



Thank you! :)

**We're Looking for
URANIUM**



**Likely Sites:
LUNG-BONE-KIDNEY**