2019 Scientific Advisory Committee Meeting
Hampton Inn, Richland, WA, April 11 – 12, 2019

Research Plan and Operation in FY2020

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"Learning from Plutonium and Uranium Workers"

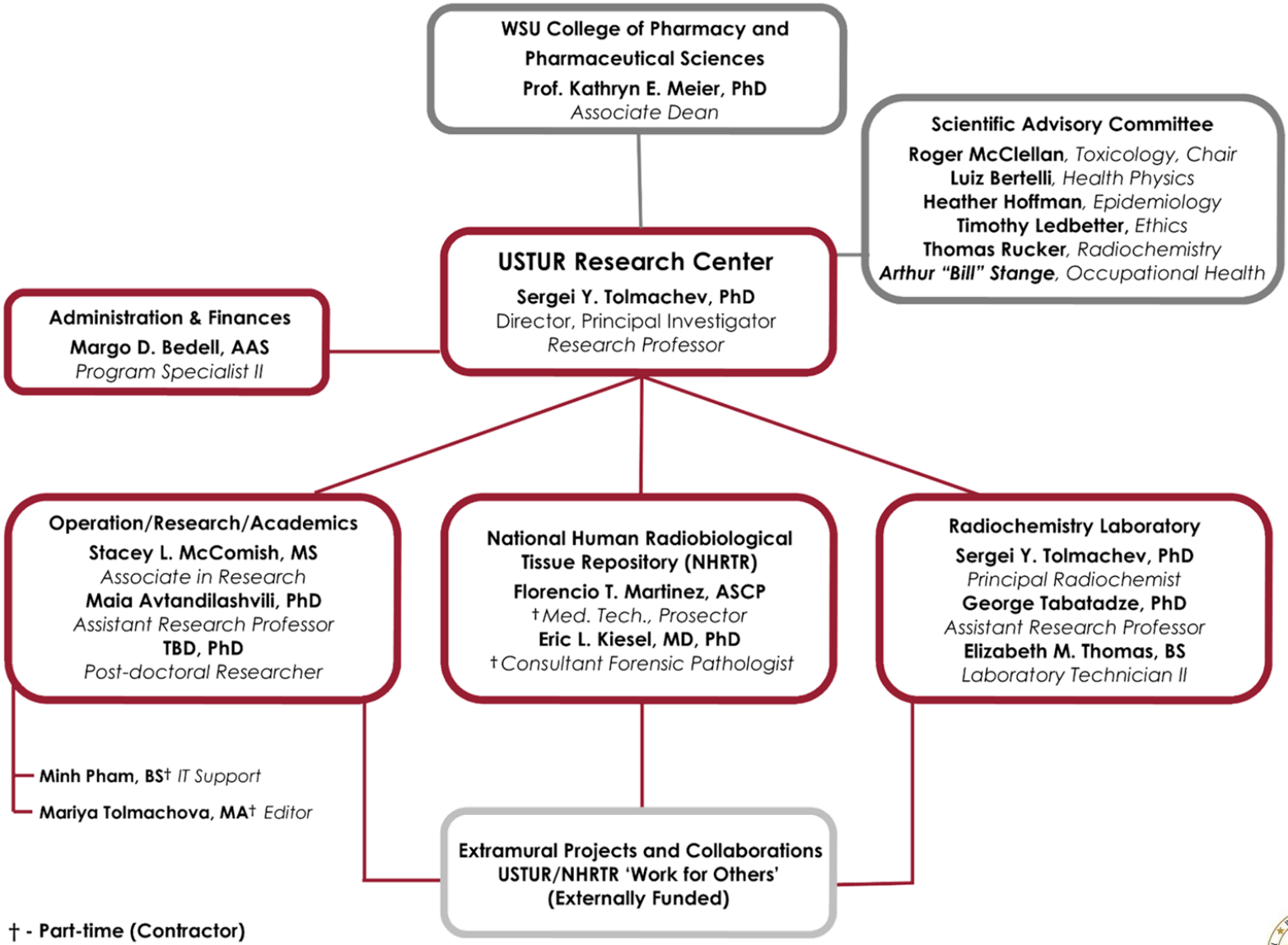
FY2020 Operation and Funding

- Fiscal year 2020 (FY2020): 4/1/2019 – 3/31/2020
- Agency: U.S. Department of Energy, Office of Domestic and International Health Studies (AU-13)
- Project: Management and Operation of the United States Transuranium and Uranium Registries (DE-HS000073)
- Operated by: Washington State University, College of Pharmacy and Pharmaceutical Sciences
- Operated under: Central DOE IRB #WASU-68-50181 (9/11/2019)
- Total budget: $1,200,000

Personnel

FY2020 total FTE:	6.7
• Director, PI	1.0
• Research faculty	2.8
• Postdoctoral researcher	0.9
• Technical personnel	1.0
• Administrative personnel	1.0
Temporary appointment:	
• Adjunct faculty	0.2
• Hourly workers	1.0

Organization Structure



Specific Aims

- Manage and operate the Registries
- Conduct scientific research
- Demonstrate and promote broader use and application of USTUR research, data, and materials

Management and Operation

- Communicate with Registrants and next-of-kin
- Accept Registrant donations
- Operate the National Human Radiobiological Tissue Repository (NHRTR)
- Complete radiochemical analysis of tissues
- Develop and populate USTUR information systems

National Human Radiobiological Tissue Repository (NHRTR)

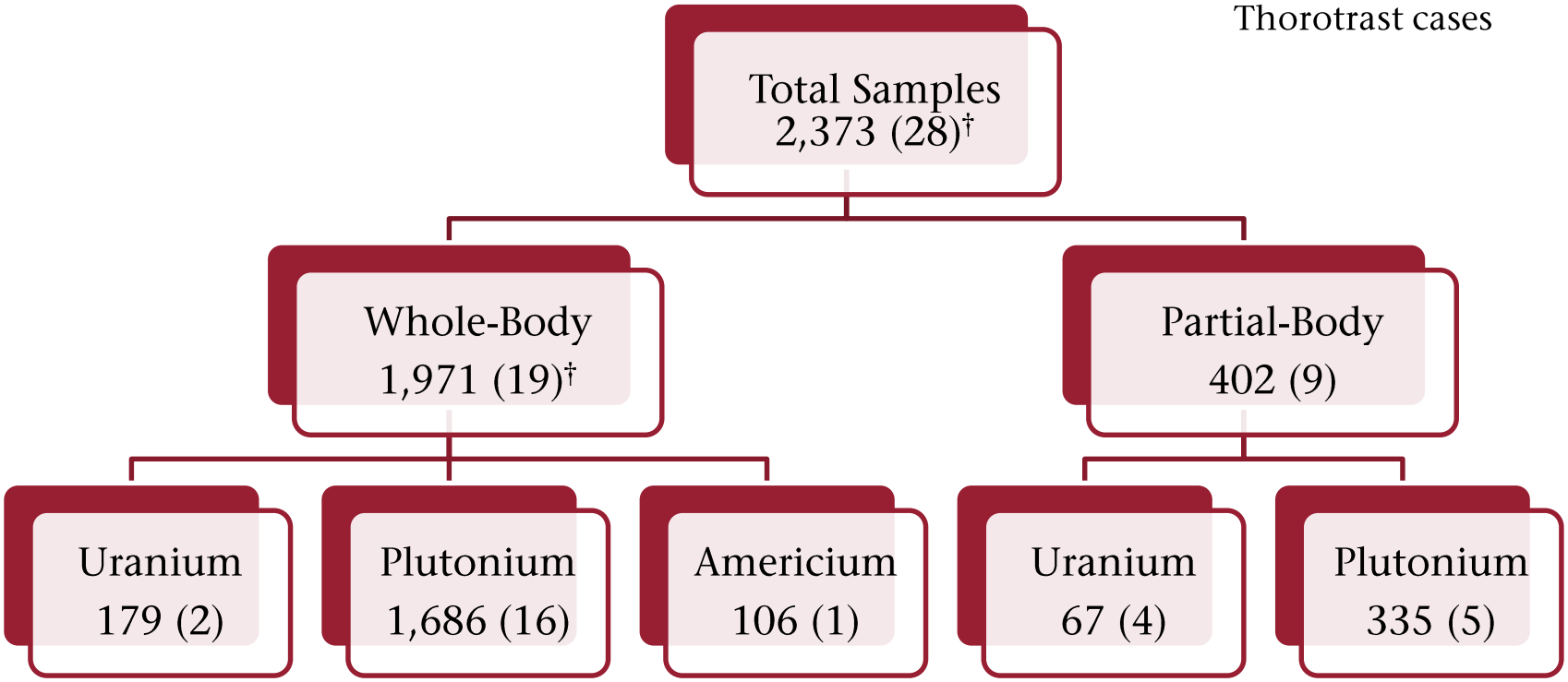
- Expeditiously dissect and inventory tissues from new donations
- Inventory remaining USTUR materials
- Inventory tissue samples from non-USTUR collections
- Inventory of acid-digested tissue samples from non-USTUR collections

Radiochemistry Group Tasks

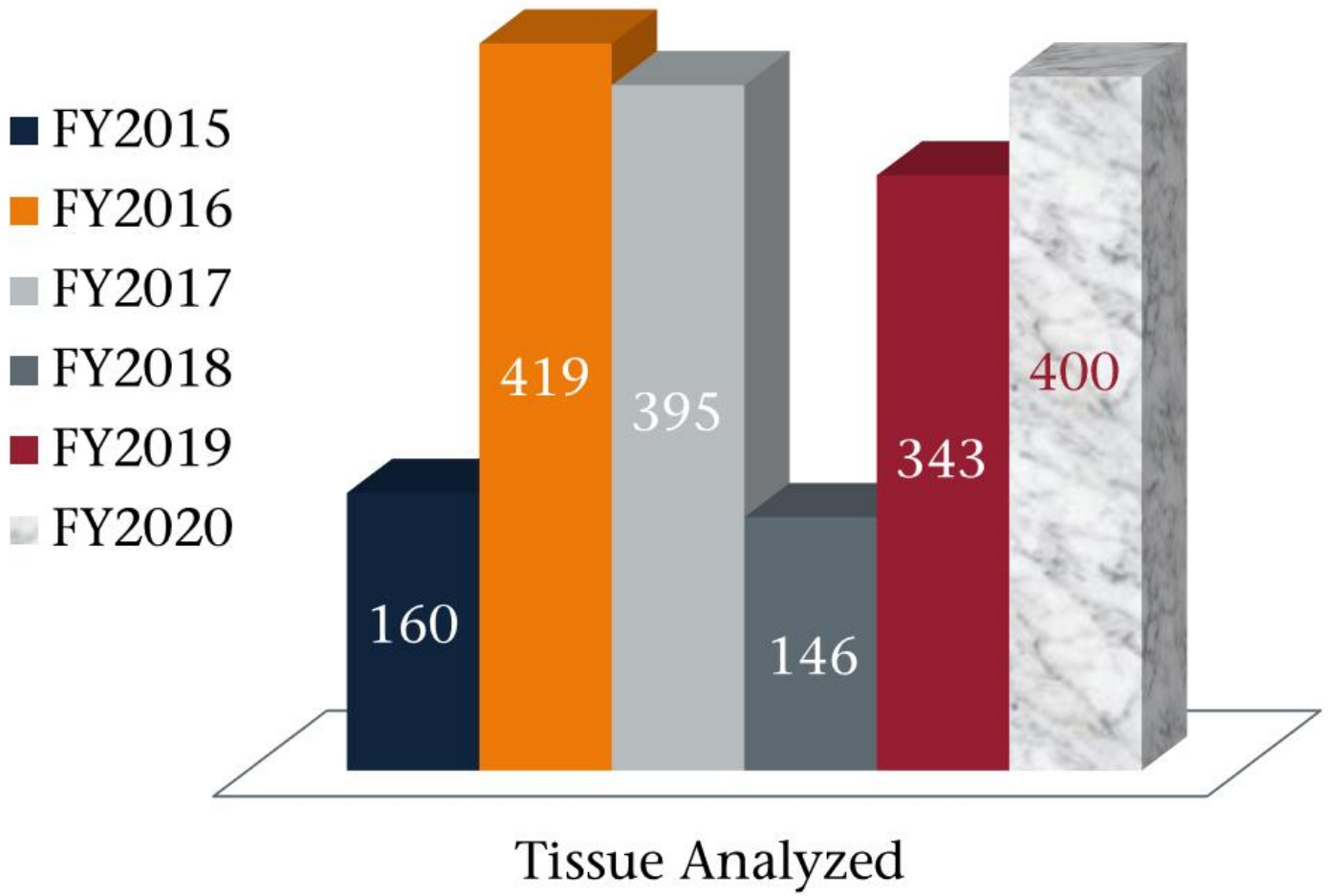
- Publish DQO
- Reduce tissue sample backlog
- Populate Radiochemistry database
- Integrate Radiochemistry and Health Physics databases

Tissue Sample Backlog 2019

† - excluding two Thorotrast cases

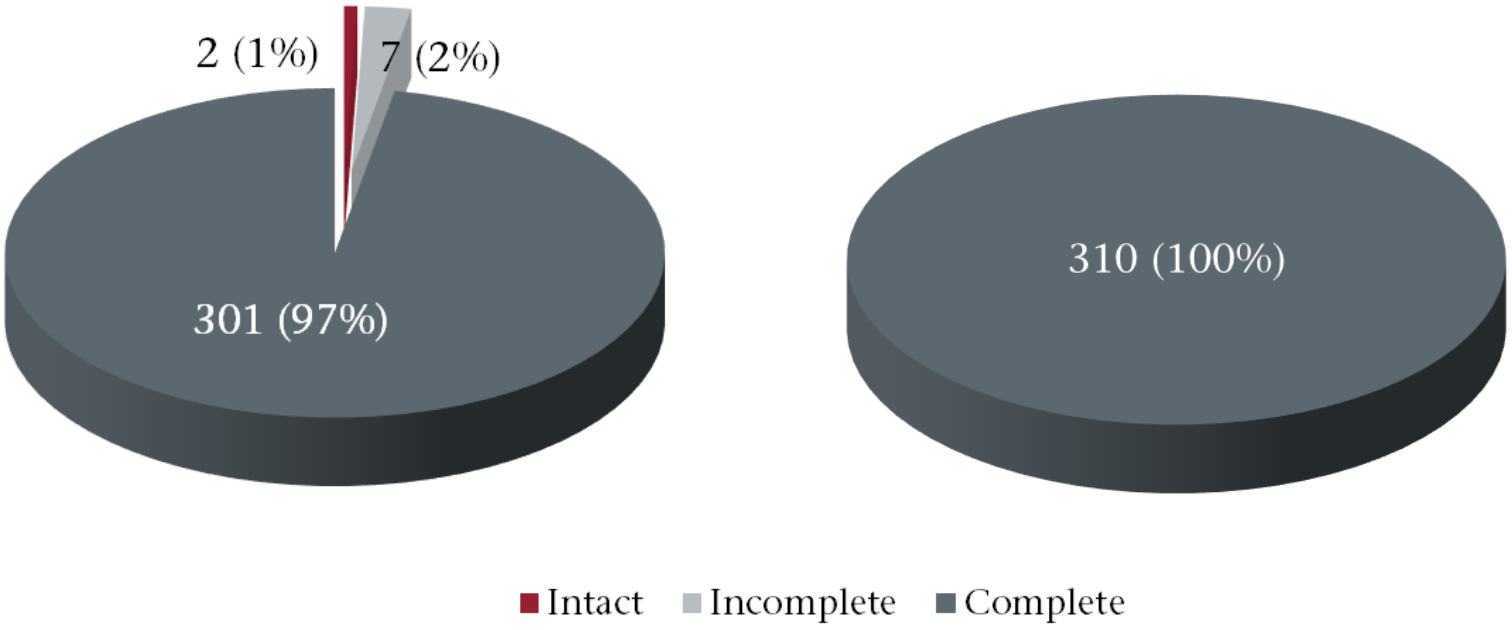


Tissue Analysis Throughput



Radiochemistry Goal 2020

- Analyze all partial-body cases



Health Physics in 2020: Study Groups

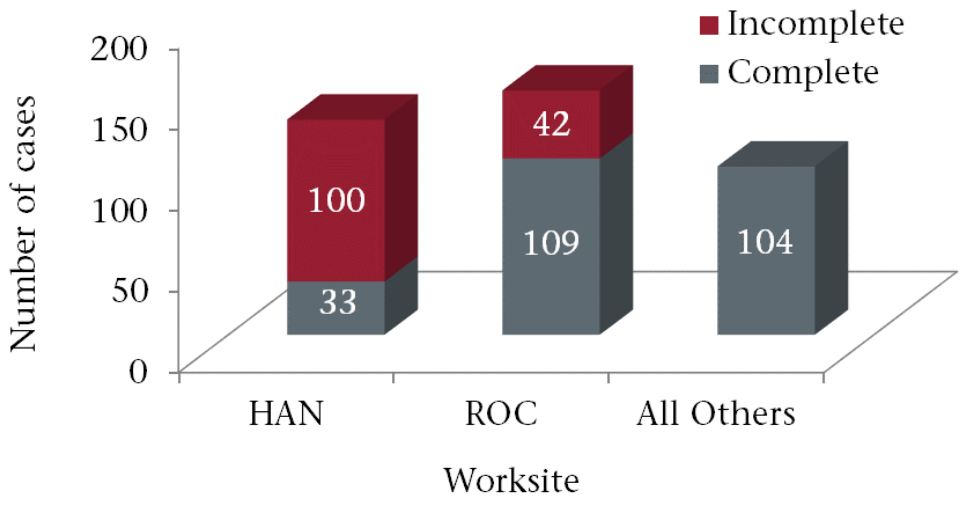
Group	Total	Complete		
		HP	RAD	HP+RAD
$^{239}PuO_2$	21	18	21	18
UPPU	12	12	11	11
Wound	12	10	12	10
^{238}Pu	9	9	9	9
DTPA	18	15	17	14
Single intake	61	60	60	59

Health Physics Database Goals

Cases to be completed in 2020

- $^{239}PuO_2$: 3 cases (ROC)
- Wound: 2 cases (HAN)
- DTPA: 3 cases (HAN)

All worksites except Hanford (2021)



USTUR Research Projects

- Biokinetic modeling of individual cases: ***Analysis of uncertainties in organ dose estimates***
- Improvement of plutonium decorporation model
- Long-term retention and distribution of ^{241}Am in the skeleton
- Beryllium in human tissues

Post-doctoral Research

- Project: *Evaluation of uncertainties in radiation dose assessment for internally deposited radionuclides in support of radiation epidemiology*
- Applicants

  Domestic: 3
  International: 4 (China, Czech Republic, India, Iraq)
- Skype interview: May 1, 2019
- Anticipated start date: June 1, 2019

‘Golden Standard’ in Internal Dosimetry

- Modeling 20+ plutonium inhalation cases with different material types (soluble *vs* insoluble)
- Estimating radiation dose using bioassay monitoring data and post-mortem radiochemistry tissue analysis results
- Comparing USTUR dose estimates with those derived in other studies using ICRP default or site-specific model parameters
- Quantifying uncertainties in support of radiation epidemiology

Collaboration, Collaboration and Collaboration

- Biokinetic modeling and uncertainty analysis in radiation dose assessment
- Plutonium binding in respiratory tract
- Characterization of plutonium particles in respiratory tract
- Distribution of beryllium in human body
- Keratinous tissues in biokinetics and nuclear forensics
- Plutonium biokinetics and brain dosimetry

Research and Collaboration Network

Upcoming Presentations

3rd International Conference on Dosimetry and its Applications, Lisbon, Portugal, May 27 – 31, 2019

1. Tolmachev et al. *Plutonium in human brain: Is more biokinetic detail needed for dosimetry?*

74th Northwest Regional Meeting of the American Chemical Society, Portland, OR, June 16 – 19, 2019

2. Tolmachev et al. *Uranium content, distribution, and biokinetics in human body*

64th Annual Meeting of the Health Physics Society, Orlando, FL, July 7 – 11, 2019

3. Avtandilashvili and Tolmachev. *Macrodistribution of plutonium among dosimetric compartments of the human respiratory tract*
4. McComish et al. *Limitations of cause of death data among autopsied population in the United States Transuranium and Uranium Registries*
5. Strom et al. *Cylindrical representations of recycling biokinetic models*
6. Tolmachev et al. *Case studies in brain dosimetry for internally deposited radionuclides*

50th Anniversary Events

- HPS special session on USTUR's research (2016)
- USTUR booth at the HPS (2016)
- 4th special issue of Health Physics journal (2019)
- eBook of USTUR publications 1994 – 2018 (2019)