



2015 Scientific Advisory Committee Meeting
Hampton Inn Hotel, Richland, WA
September 1 – 2, 2015

2014 SAC Recommendations and 2015 Overview

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*“Learning from Plutonium
and Uranium Workers”*





2014 SAC's Comments/Recommendations

- Following the 2014 Annual Meeting, the SAC made 7 comments and 12 specific recommendations





2014 SAC's Comments

- Great use of Tri-Cities nursing students during autopsies and dissections
- Appears to be increased interest in the USTUR by College of Pharmacy leadership, e.g. pharmacokinetics, genomics
- Established higher goals for analytical throughput, and implementation of these higher goals was already proceeding
- Found old Registrant data and reconstituted the Registrant list
- Meeting very well organized, especially with respect to previous recommendations
- Excellent presentations by [USTUR] staff
- Resolved the issue of handling donations from Registrants lost to follow-up





Recommendation #1

Need to decide on a mechanism and proceed with gathering [*Registrants*] work histories





2015 Data Collection

- Goal:
 - ✓ Pre-Nuclear Employment History
 - ✓ Former Worker Program: Yes/No
- Method: One-time questionnaire
- IRB Modification Request: Approved
- Sent: 49 USTUR living Registrants
- Received: 33 (67%)

United States Transuranium and Uranium Registries			
Washington State University · College of Pharmacy 1845 Terminal Drive, Suite 201 · Richland, WA 99354 Phone (509) 946-6870 or (800) 375-9317 · FAX (509) 946-7972			
Personal Information			
Name	Social Security	Date	
Street Address	City	State	Zip
Phone Number			
Pre-Nuclear Employment History			
Job Title/Type of Work	Employer	Address or Location	Dates (From-To)
Former Worker Program			
Are you enrolled in DOE's Former Worker Program? <input type="checkbox"/> Yes <input type="checkbox"/> No			





Recommendation #2

Complete the data quality objectives (DQO) document.
This will be needed for contract laboratories also





Quality Assurance Plan Revision

- QAP is a core part of DQO
- QAP: USTUR-800
 - ✓ *Developed in 1995*
 - ✓ *Updated in 2001*

7. Review of Procedures, Specifications, and Operating Logs
 - 7.1. Procedures and specifications shall be reviewed annually to insure that no modifications have occurred since the previous review. This review shall be conducted jointly with the technicians who actually perform the tasks associated with that procedure.
 - 7.2. Operating logs are reviewed on an as needed basis in order to assess potential problems and develop corrective action plans.
8. Observation of Operations and Evaluation of Quality Control Data
 - 8.1. A number of indicators are available to insure that the radiochemical process is in control. These include the blank which is run with each chemical batch, the QC spike, and the evaluation of the spectra for resolution and contamination.
 - 8.2. Radiochemical techniques are further evaluated by annually analyzing available NIST SRMs for actinides in human tissues (NIST liver and lung SRMs).
 - 8.3. The alpha spectrometry equipment kept in control by running weekly backgrounds, weekly energy calibrations, and monthly efficiency calibrations.
 - 8.4. Each analysis is checked to insure that it meets the data quality objectives

USTUR 800- 2

UNITED STATES TRANSURANIUM AND URANIUM REGISTRIES ANALYTICAL PROCEDURE MANUAL			
USTUR 800: QUALITY ASSURANCE PLAN			
Purpose	Quality assurance plan	Method Number	USTUR 800
Original Date	10/10/95	Author	USUTR Radiochemistry Staff
Revision Number	2	Approved By	Jim Elliston
Effective Date	8/1/00	Approval Date	1/31/01

1. Organizational Structure
 - 1.1. The organization structure for the USTUR program as a whole is defined in the USTUR Operating Procedures Manual.
 - 1.2. The organizational structure of the USTUR Radiochemistry Section is shown in Figure 1 of this procedure.
 - 1.3. The duties of the radiochemistry personnel are roughly divided as follows.
 - 1.4. James T. Elliston (1.0 FTE): Assist in overall direction of project. Primary responsibility for oversight of the analytical process from electrodeposition through sample counting, data tabulation and analysis, database maintenance, data reporting, QA/QC and document retention; budget review; supervision of graduate students when assigned to routine tasks. Responsible to Ron Filipy.
 - 1.5. Dot Stuit (1.0 FTE): Assist in overall direction of the project. Primarily responsible for scheduling and chemical analysis of samples from the initial preparation through chemical separation prior to electrodeposition. Responsible to Jim Elliston.
 - 1.6. Gail Deckert (1.0 FTE): Assist in overall direction of the project. Primary responsibility is sample preparation, decomposition, and separation chemistry. Responsible to Jim Elliston.
 - 1.7. Cathy Grimm (0.25 FTE): Primary responsibilities include sample custodianship, sample analysis data entry, maintenance of standard certificates; maintain sample freezer. Reports to Jim Elliston.

Time card employees: Assist in cleaning glassware, maintaining clean laboratory environment, and other duties as needed.
2. Instructions and Procedures and Procedure Validation
 - 2.1. Procedures for the radiochemical assessment of USTUR samples are presented in the United States Transuranium and Uranium Registries Radiochemical Analysis Procedures Manual.
 - 2.2. Procedures which are to be used for analysis will be validated using intercomparison data and the analysis of available Standard Reference Materials

USTUR 800- 1





MAPEP Study

- DOE Mixed Analyte Performance Evaluation Program by Radiological and Environmental Sciences Laboratory (RESL)
- 2014 Radiobioassay and Radiation Measurement Conference
 - ✓ RESL/MAPEP result: PuO₂ ('high-fired') oxide analysis
 - ✓ Soil samples: ~50% of the participants failed on ²³⁹PuO₂
- USTUR-800: *Radiochemical techniques are further evaluated by annually analyzing available NIST SRMs for actinides in human tissues (NIST liver and lung SRMs)*
- SRM 4351 (Human Lung), SRM 4352 (Human Liver) and SRM 4356 (Ashed Bone): **Unknown actinide material type composition**
- RESL to USTUR: MAPEP-11-MaS24 **high-fired ²³⁹PuO₂ certified**





Recommendation #3

Develop marketing/public information materials for the USTUR, i.e. recruiting brochures





USTUR Brochures

Facts about the United States Transuranium and Uranium Registries




 College of
Pharmacy
 WASHINGTON STATE UNIVERSITY
www.ustur.wsu.edu

The NHRTR



The National Human Radiobiology Tissue Repository (NHRTR) is a tissue collection maintained by the Registries. It includes frozen and dried tissues, histological slides and blocks, and tissue solutions and other preparations obtained from volunteer donors with a known history

of intake of radioactive elements such as radium, uranium, plutonium and americium. It is available to researchers who may be able to use materials from this unique collection of tissues and associated medical and radiation exposure histories in studies of cancer and other diseases, or other research.

Who is Eligible to Participate?

Individuals with a known history of intake of radioactive materials are suitable candidates for participation in the research of the Registries. Persons with documented internal depositions of at least 2 nCi (74 Bq) of actinides such as plutonium, americium, uranium, or thorium qualify as Registrants. Donations are also accepted from workers with at least 10 rem (0.1 Sv) external dose in combination with exposure to a non-radiological agent such as asbestos or beryllium.

United States Transuranium and Uranium Registries & National Human Radiobiology Tissue Repository




 College of
Pharmacy
 WASHINGTON STATE UNIVERSITY
www.ustur.wsu.edu

How can researchers request the tissues and data?

The unique materials from the USTUR/NHRTR are available to reputable investigators for scientific research purposes. Scientific investigators may request, in writing, tissues or tissue samples from the NHRTR for legitimate research purposes.

Investigators must agree to maintain privacy of the Registrants and to follow all ethical human subjects considerations and legal requirements as well as the published policies of the Registries. If available, the Registries will provide the most suitable tissue requested (e.g. frozen, formalin-fixed, or dried) for study. The only stipulations are that the Registries be acknowledged as the source of the samples, radiochemical analysis, or other data used in scientific proposals or manuscripts submitted for publication, and that a USTUR faculty member be included as a coauthor if previously unpublished data generated by the USTUR are included in a manuscript. Scientific collaboration with the USTUR is encouraged as appropriate.

Where are the NHRTR materials kept?

The NHRTR is located in a modern laboratory research facility in Richland, WA. The facility includes an autopsy room and a radiochemistry laboratory for tissue preparation and analysis. Tissue samples are vacuum-packed and stored frozen at -30° or -70° C.



USTUR-337-15

USTUR-338-15





Recommendation #4

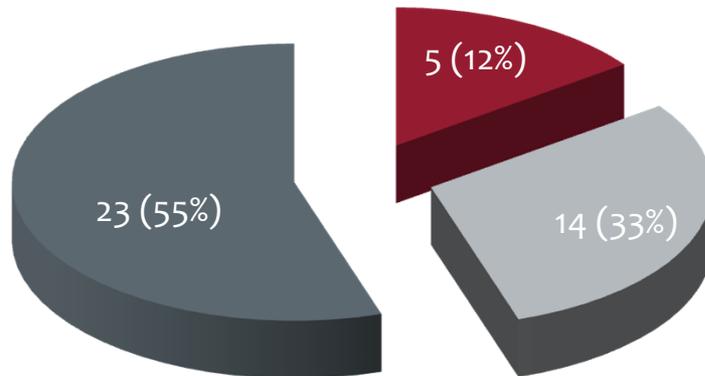
Request funding for contract laboratory analyses to help clear [*tissue*] backlog





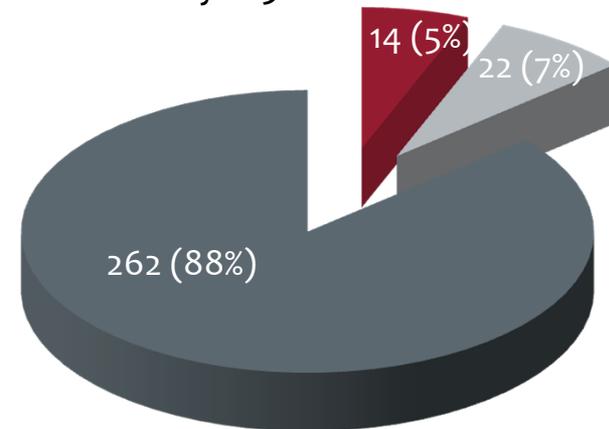
Donation Analysis Status 2014

Whole-Body: 42



■ Intact ■ Incomplete ■ Complete

Partial-Body: 298



■ Intact ■ Incomplete ■ Complete

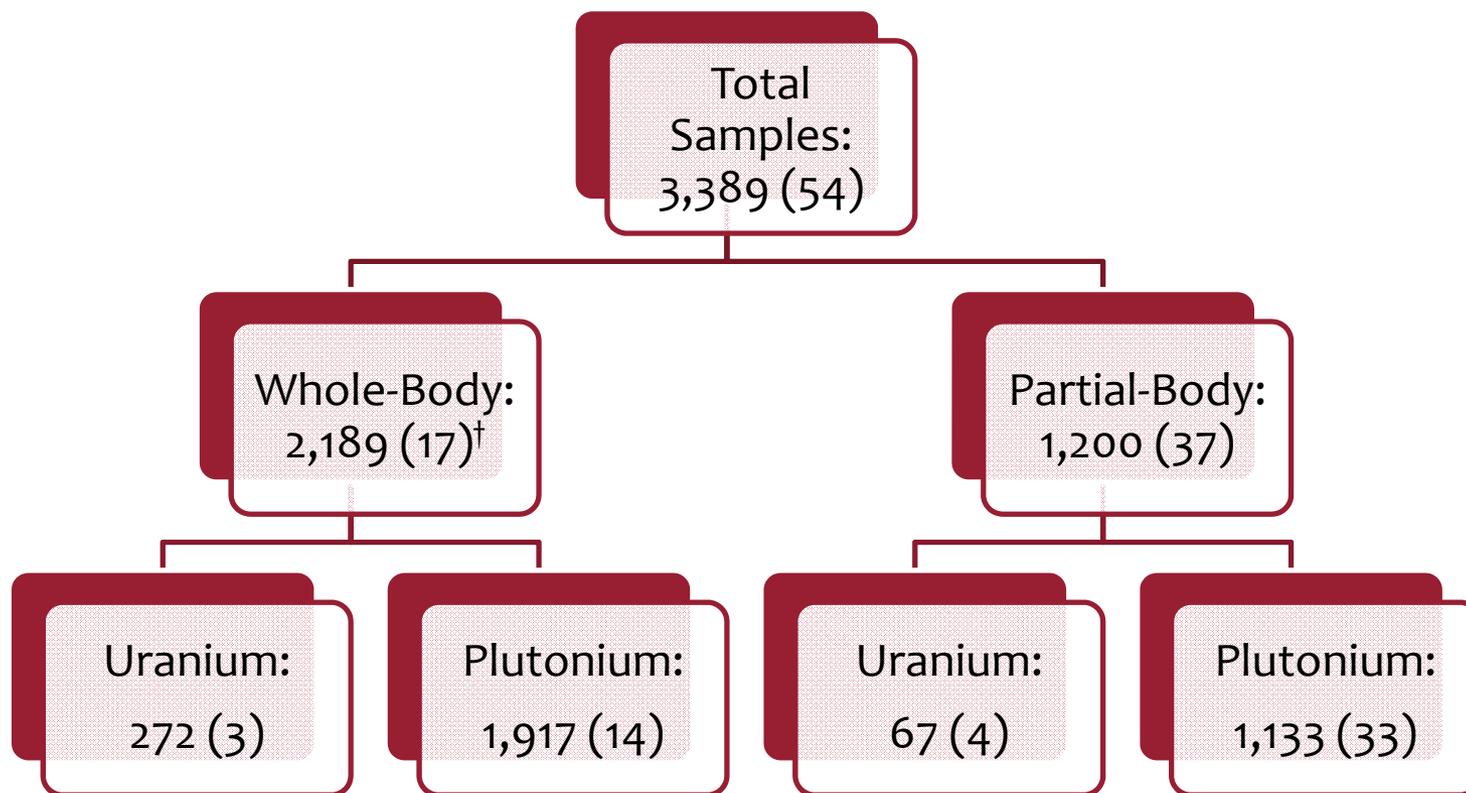
Intact – no tissue samples were analyzed

Incomplete – few samples were analyzed; ‘survey’ analysis completed

Complete – no samples need to be analyzed



Tissue Sample Backlog 2014



† - number of cases excluding Thorotrast (2)





Questions & Answers

- How much do we need?

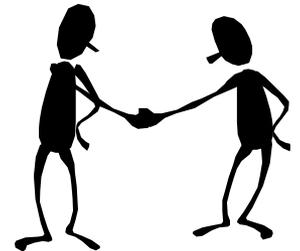
$$3,000 \times \$600 = \$1,800,000$$



- What we can do with limited \$\$\$?

One whole-body analysis: $150 \times \$600 = \$90,000$

\$90,000: analysis of 5 partial-body donations



- No funding requested in 2014 – 2015





Recommendation #5

Participate in Department of Energy (DOE) Office of Environment, Health, Safety and Security (EHSS) occupational medicine and Energy Facility Contractors Group (EFCOG) occupational medicine conferences; hand out marketing materials



2015 DOE Annual Occupational Medicine Workshop

- March 16 – 17, 2015, DOE Headquarters
- Organized by Dr. Ardaize, DOE Chief Medical Officer
- 40 min presentation “Update on the US Transuranium and Uranium Registries and Research” by Dr. Tolmachev

Facts about the United States Transuranium and Uranium Registries



College of Pharmacy
WASHINGTON STATE UNIVERSITY
www.ustur.wsu.edu

What is the USTUR?

The United States Transuranium and Uranium Registries (USTUR) is a federal-grant program funded by the U.S. Department of Energy (DOE) Office of Domestic and International Health Studies.

Founded in 1968 operated by Washington State University's College of Pharmacy since 1992

The USTUR was designed as a program to improve radiation protection of nuclear workers. The Registries studies the distribution, dose, and possible health effects of exposure to plutonium, americium, uranium, and thorium (actinides) in radiation workers and other individuals with known exposures.

United States Transuranium and Uranium Registries & National Human Radiobiology Tissue Repository



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What kinds of human tissues have been collected?

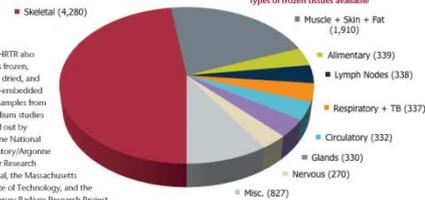
The USTUR receives, preserves, and catalogs a portion of each organ and bone from whole-body donors as well as selected tissue and organ samples from partial-body donors. Additionally, the Registry receives tissue samples from surgical specimens from the Registrants and tissue-related materials, including histopathology slides from other radiation worker studies.

Currently, the NHRTR holds approximately 9,000 frozen and formalin-fixed tissue samples from 41 whole- and 103 partial-body USTUR donors (see figure below), and approximately 10,000 acid-digested tissue samples. A wide range of tissues is available including samples from the bone, lung, lymph node, liver, kidney, and brain.

The NHRTR also houses frozen, alkyl, alkyl, and plastic-embedded bone samples from the radium studies carried out by Argonne National Laboratory/Argonne Cancer Research Hospital, the Massachusetts Institute of Technology, and the New Jersey Radium Research Project.

The NHRTR
The National Human Radiobiology Tissue Repository (NHRTR) is a tissue collection associated with the Registries. The NHRTR is comprised primarily of tissues obtained at autopsy from USTUR Registrants. It includes frozen and acid-digested tissues, as well as histological slides and tissue blocks. The NHRTR also houses an existing collection of tissue materials obtained from the terminated Radium Worker study at Argonne National Laboratory and historical plutonium injection studies. These unique collections of tissues, records, and related materials are available to other researchers studying radiation effects, cancer, and other biological phenomena.

Types of frozen tissues available



Tissue Type	Count
Skeletal	4,280
Muscle + Skin + Fat	1,910
Alimentary	339
Lymph Nodes	338
Respiratory + TB	337
Circulatory	332
Glands	330
Nervous	270
Misc.	827





Recommendation #6

Make use of WSU's public affairs office to publicize USTUR accomplishments and human interest stories, e.g. the science fair awardee



The Dean's Newsletter: *Building the Leaders of Tomorrow*



WASHINGTON STATE UNIVERSITY

The Dean's Newsletter

From College of Pharmacy Dean
Gary M. Pollack, Ph.D.



August 2015
In This Issue...

- Cell discovery
- Dr. Danial Baker
- Teaching and learning
- Student scholar
- Other news

Dear Friends and Colleagues:

An important element of the mission of our college is the development of outstanding health care professionals and pharmaceutical scientists. Implicit in this mission statement is the preparation of our students to seek out, accept, and succeed in positions of leadership throughout their careers.

One strategy we use to assist in the preparation of future leaders is to offer a menu of academic options that allow students to tailor their experiences to their individual career goals and interests. During the past few years we have introduced an honors program that allows selected students to pursue a research project and develop skills associated with basic, translational, or clinical research; a combined Pharm.D./Ph.D. program that provides an efficient pathway to success for students who wish to pursue a career in academia, the pharmaceutical industry, or federal regulatory agencies; and a combined Pharm.D./MBA program to support the goals of students who wish to start or own their own business or aspire to leadership positions in healthcare systems or the corporate sector.





Recommendation #7

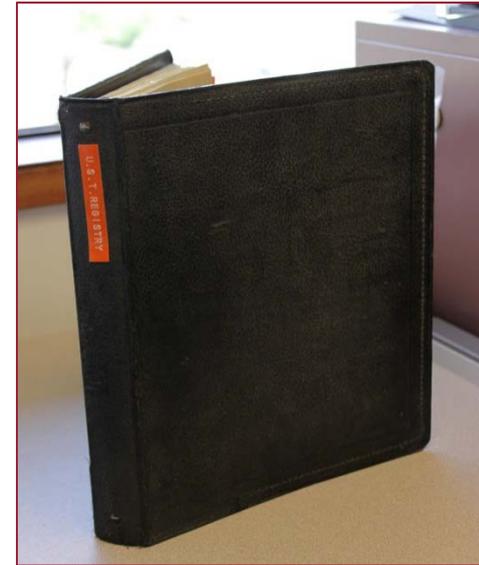
If desired, use the National Death Index to get vital status of recovered Hanford Environmental Health Foundation Registrants, then contact living persons for follow-up; however, try reasonable data search to see if Registrant meets qualification criteria before contacting





SAC 2014: *The Hunt for the Black Binder*

- Bob Bistline's binder, which contains lists of 567 workers who signed autopsy agreements
- Office of Legacy Management (Rocky Flats records)
 - ✓ No binder, but...
 - ✓ A list of Registrants dated 1981
- Found in the USTUR library!





National Death Index Information Request

- NDI information request review:
 - ✓ Expedite
 - ✓ Full
- Preparation of a single data file for on-line submission
 - ✓ NDI-format text file (for expedite review)
 - ✓ Personal information of all 567 Registrants





Recommendation #8

Continue to pursue opportunities for WSU student participation in the USTUR program





Students Involvement

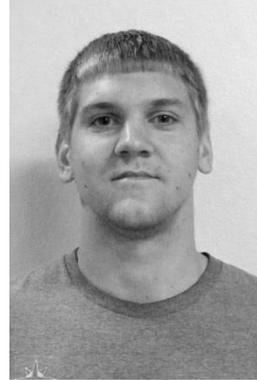
- WSU College of Nursing:



Kathryn Banks



Colette deVries



Michael Funk



Beth Gage



Diana McGlynn

- High School:



Ryan Ashley



Ryan Blake





Recommendation #9

Clarify prioritization of [*tissue*] samples for analysis





Tissue Analysis: *Sample Priority*

\$\$\$:

- Soft Tissues: Lung, Trachea, Thoracic Lymph Nodes (LN), Liver, Kidney, Wound Site/Axillary LN
- Bones: Vertebra (Body and Arch), Rib, Patella

\$\$:

- Soft Tissues: Larynx, Spleen, Brain, GI tract, Skin, Fat, Muscles
- Bones: Calvarium, Sternum, Clavicle, Femur

\$:

- Others





Recommendation #10

Need strategic plan review/revision for long term.
Clarify the value of Registries data now and in the future



FY1996 – FY2005: Long Range Plan



R. L. Kathren (PI)

FY1992 – FY1995: \$1,254,000/y

- Term Plan : 1 – 3 years
- Intermediate Term: 4 – 7 years
- Long Term: beyond 7 years





FY2006 – FY2010: Can You Plan?

A. C. James (PI)

FY2006 – FY2010: \$1,274,000 → \$900,000/y (\$1,004,000/y)

USTUR Core Function (DOE, 2010):

- *Accepting and processing future Registrant donations*
- *Completing radiochemical analysis of previous Registrant donations*
- *Completing the development and population of USTUR databases*

The Registries → data collector with limited research





FY2018 – FY2027 Strategic Highlights

- From data generator to data user/provider
- Restore USTUR (DOE) grant funding: 1.1 – 1.5 M\$
- Conduct high impact research in Radiological Protection
- Active academic involvement and scientific collaboration
- Conduct/promote/support new research
- Contribute to ICRP, NCRP, UNSCEAR, IAEA, etc
- Promote USTUR/NHRTR as unique scientific resource

Value of USTUR/NHRTR data and materials





Recommendation #11

Continue presentations of USTUR data at scientific meetings; have marketing brochures handy





2014 – 2015 Scientific Presentations

- Podium

- ✓ 60th Annual Meeting of the Radiation Research Society (invited) 1
- ✓ 2015 DOE Annual Occupational Medicine Workshop and Webinar (invited) 1
- ✓ 1st International Workshop on Sample/Tissue Archiving of Radiobiology (invited) 1
- ✓ 60th Annual Meeting of the Health Physics Society 3
- ✓ 143rd Annual Meeting of American Public Health Association (upcoming) 1
- ✓ 61st Annual Radiobioassay and Radiochemical Measurements Conference (upcoming) 1

- Poster

- ✓ 15th International Congress on Radiation Research 1
- ✓ 2015 WSU College of Pharmacy Research Day 2





Recommendation #12

Continue collaborative research opportunities





Collaborative Network

USTUR Research Center: Intramural Project

Sergei Y. Tolmachev, PhD, PI & Director, Associate Research Professor

Radiochemistry & Mass Spectrometry

Sergei Y. Tolmachev, PhD & George Tabatadze, PhD

- Expeditious Analysis of Donated Tissues
- Application of New Actinide Separation Techniques
- Application of Advanced Measurement Techniques

Tissue Repository & Databases

Stacey L. McComish, MS & Maia Avtandilashvili, PhD

- National Human Radiobiological Tissue Repository (NHRTR)
- Health Physics, Pathology
- Radiochemistry

Extramural Projects/Collaborations

- AREVA, Richland, WA
- MSU, Denver, CO
- NWU, Chicago, IL
- CERAD, Oslo, Norway
- U. Laval, Quebec, Canada
- Health Canada, Ottawa, Canada
- SUBI, Ozyorsk, Russia

Pacific Northwest National Laboratory

Radiation Detection
Brian Miller, Scientist

Radiological Science
Bruce Napier, Manager

Radiation Biology
William Morgan, Director

Washington State University, Tri Cities

GCP in Radiation Protection
James Pratt, Chair

College of Nursing
Susan Campbell, Director

Center for Countermeasures
Against Radiation
Dunstana Melo, Director

Public Health England
John Harrison, Coordinator

EURADOS: WG7/WG10
Maria Lopez, WG7 Chair
Clemens Woda, WG10 Chair

KIT/Radioanalytical Lab
Bastian Breustedt, Head

“Work for Others”

Key

AREVA – AREVA NP Inc
 MSU – Metropolitan State University
 NWU – Northwestern University
 CERAD – Centre for Environmental
 Radioactivity

SUBI – Southern Urals Biophysics Institute
 GCP – Graduate Certificate Program
 KIT – Karlsruhe Institute of Technology

EURADOS – European Radiation Dosimetry Group
 WG7 – Working Group 7 on Internal Dosimetry
 WG10 – Working Group 10 on Retrospective Dosimetry



Institutions



UNIVERSITÉ
LAVAL



Public Health
England





2015 Activities Overview





Happy McComish Family



Caitlin McComish





FY2016 DOE Grant Renewal

- PI: Sergei Y. Tolmachev
- Grant proposal to manage and operate the USTUR Research Center in FY2016 was submitted to DOE/AU-13
- Period: 4/1/ 2015 – 3/31/2016 (Year 4 of 5)
- Requested budget: \$900,000
- Granted budget: \$900,000
- Year-to-date received: \$675,000
- Support: 6.0 FTE





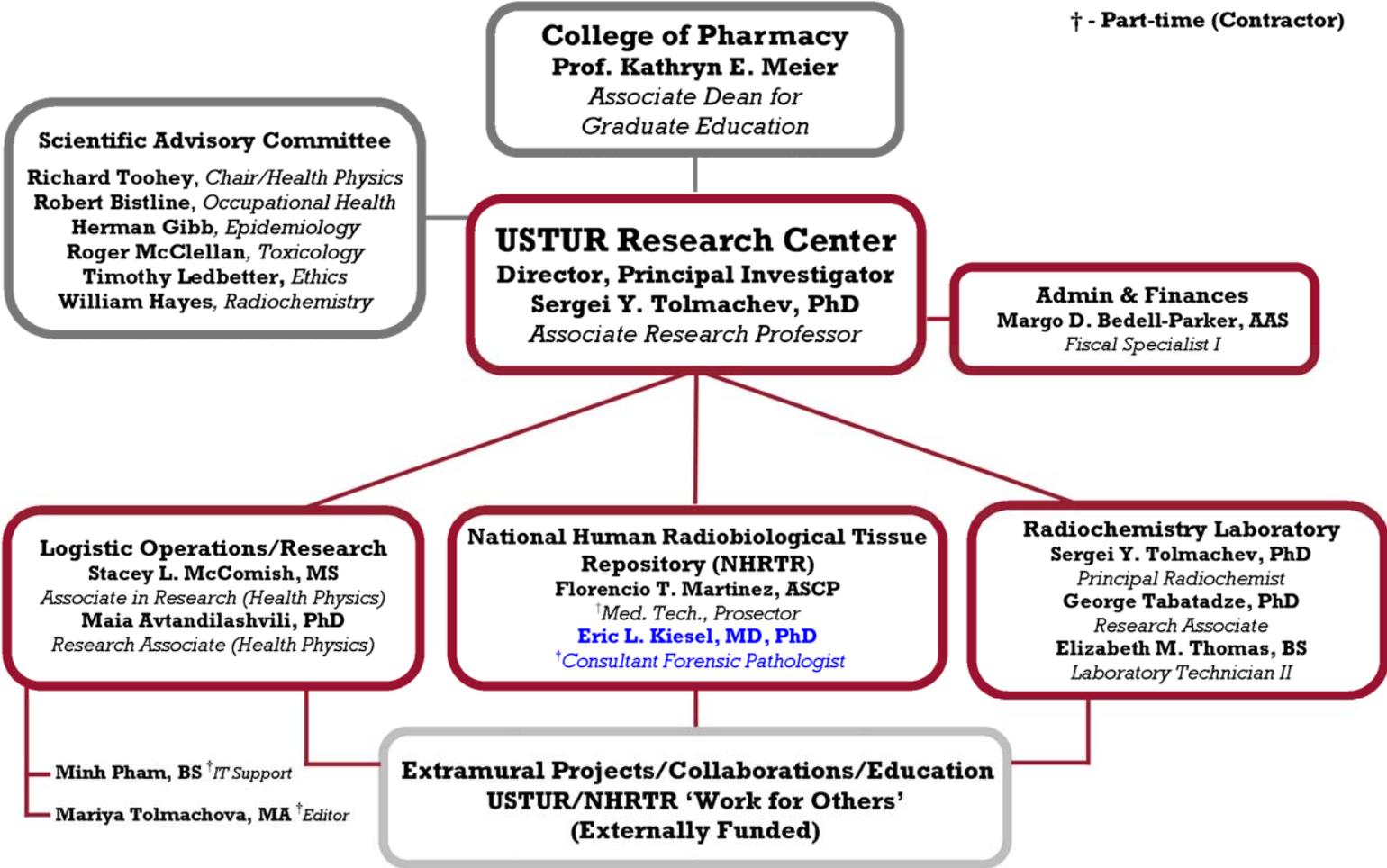
External Funding: *Work for Others*

- PI: Sergei Y. Tolmachev
- DOE: Joint Coordinate Committee on Radiation Effects Research (JCCRER) through Pacific Northwest National Laboratory (PNNL)
- Period: 2/24/2014 – 9/30/2015
- Budget: \$75,000
- Status: Funded
- Available in FY2016: \$20,406
- Support: 0.1 FTE
- Deliverables: Case 0745, Case 0631 (2014), and **Case 0407 (2015)**





USTUR Organization Structure

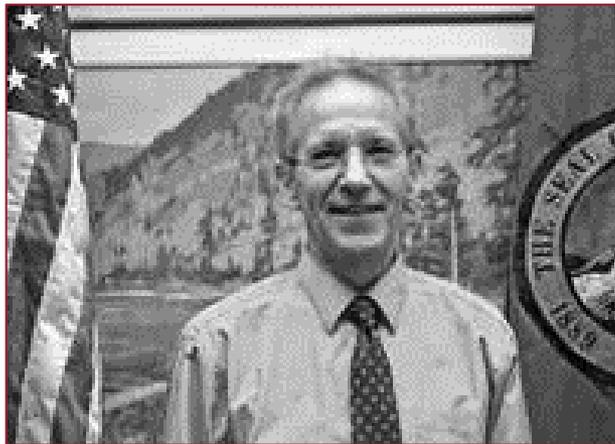




Congratulation and Thank You, Daniel!

- Snohomish County hires Chief Medical Examiner

<http://edmondsbeacon.villagesoup.com/p/snohomish-county-hires-chief-medical-examiner/1363923>



Dr. Selove consulted the Registries as a forensic pathologist for 20 y





WSU Institutional Review Board

- IRB # 11573-011
 - ✓ United States Transuranium and Uranium Registries, *Annual Renewal (9/3/2014 – 9/2/2015)*: **Approved**
- IRB # 11573-012
 - ✓ United States Transuranium and Uranium Registries, *Amendment (6/9/2015 – 9/2/2015)*: **Approved**
- IRB # 11573-014
 - ✓ United States Transuranium and Uranium Registries, *Annual Renewal (9/3/2015 – 9/2/2016)*: **Under Review (Expedite)**





Accepting Registrant Donations

Stacey L. McComish & Margo D. Bedell





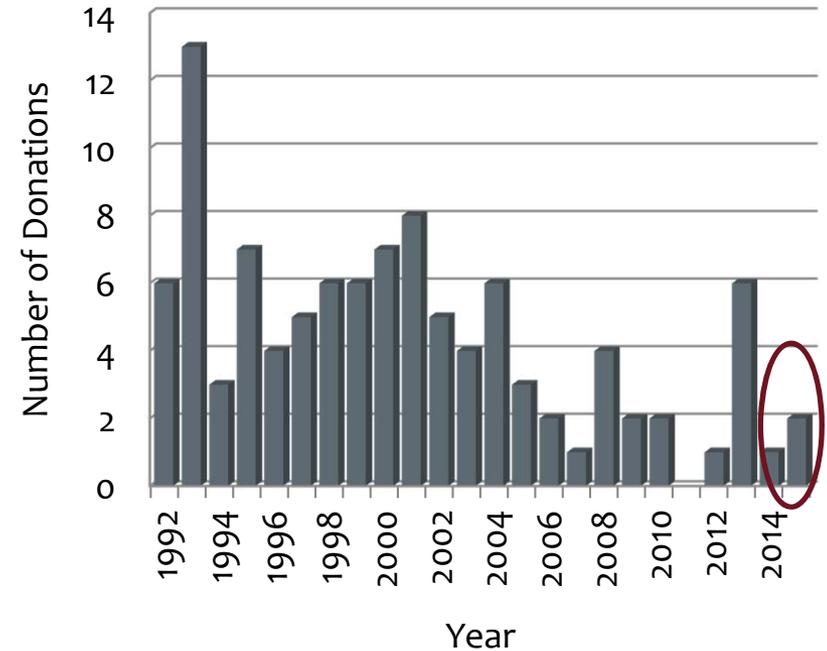
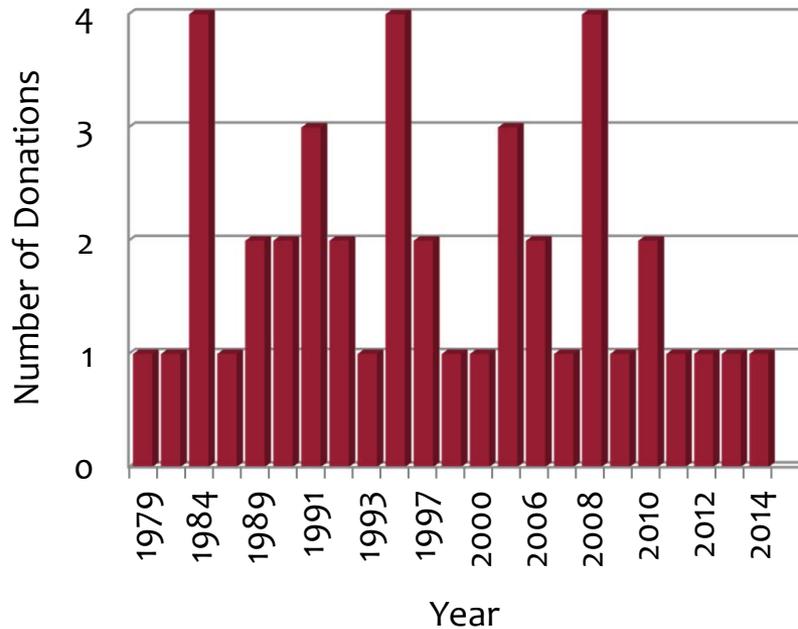
Registrant Donations

- Case 0805 (partial-body, 2014) – $^{239/240}\text{Pu}$
- Case 0377 (partial-body, 2015) – $^{239/240}\text{Pu}$
- Case 0787 (partial-body, 2015) – $^{239/240}\text{Pu}$





Registrant Donation Profiles



Total (at WSU): 42 (26) whole-body donations

301 (104) partial-body donations





National Human Radiobiological Tissue Repository (NHRTR)

*Florencio Martinez, Colette Gable, Diana McGlynn,
Katherine Banks, Elizabeth Gage, Ryan Ashley,
Ryan Blake, Michael Funk & Stacey L. McComish*





NHRTR: Tissue Samples Inventory (1)

- Collection: USTUR
- Dissection, packaging, and THEMIS data entry
- Started: 2007
- Status: Completed (2014)
- 2015 Inventory: 219 (3 new cases)
- THEMIS inventory: 8,961

*From black bags to vacuum-sealed packages
and THEMIS (electronic) inventory*





NHRTR: Tissue Samples Inventory (2)

- Collection: Radium Studies (ANL/MIT/NJRRP)
- Re-packaging and THEMIS data entry
- Started: 2014
- Status: In progress
- THEMIS inventory: 1,401





NHRTR: Histopathology Inventory

- Collection: USTUR
- Items: Histological slides and paraffin blocks
- THEMIS data entry
- Started: 2015
- Status: **Completed 2015**
- THEMIS inventory: 3,419 slides and 635 blocks





NHRTR: Acid Solutions Inventory

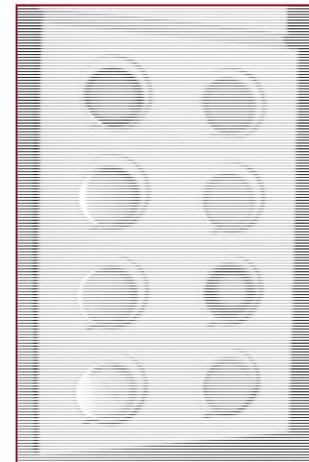
- Collection: USTUR
- Acid solutions: Digested tissues (previously analyzed)
- Re-packaging and THEMIS data entry
- Started: 2012
- Status: **Completed 2015**
- THEMIS inventory: 5,385





NHRTR: Planchets Inventory

- Collection: USTUR
- Planchet: α -counting source
- Batch: Coin-holder with 8 (max) planchets
- Pu/Am/Th/U activity calculation: Planchet
- THEMIS data entry: Batch
- Started: 2014
- Status: **In progress**
- THEMIS inventory: 380





In-house Radiochemistry

Elizabeth M. Thomas & George Tabatadze





Tissue Radiochemical Analysis 2015

- Drying/Ashing
- Digestion/Dissolution
- Radiochemical Separation
- α -source Preparation
- Actinide Measurements

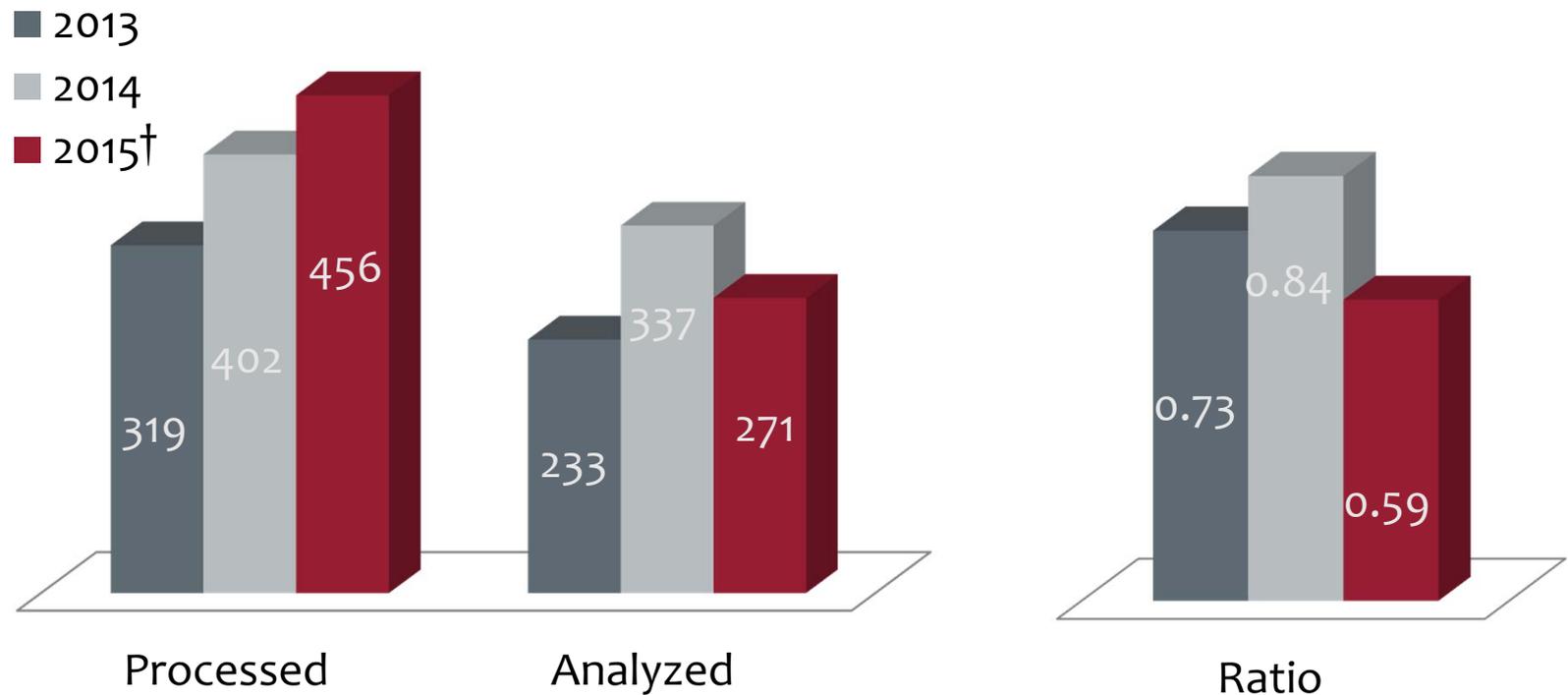
- Analysis Completed 271 (400[†])
- Sample Processed 456 (500)
- Completed/Processed 0.59 (0.8)

[†] – 2015 expected value





Tissue Radiochemical Analysis 2013 – 2015

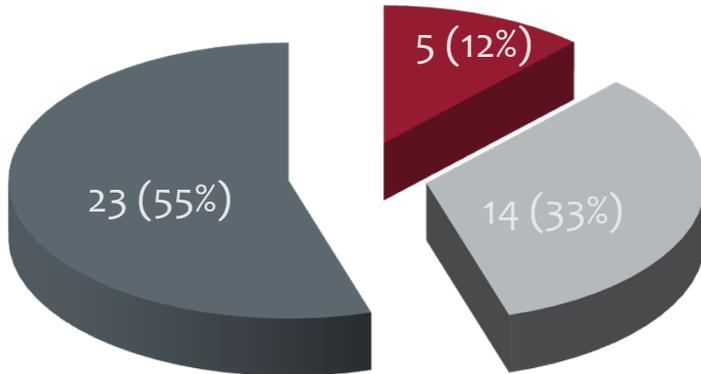


† – excluding 22 MAPEP soil samples



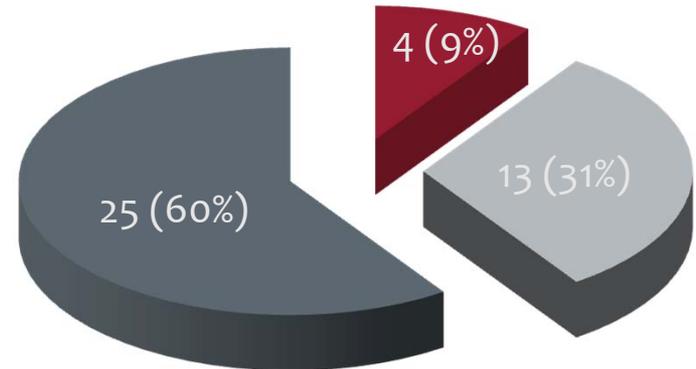
2014 – 2015 Donation Analysis Progress: Whole-Body

9/1/2014: 42



■ Intact ■ Incomplete ■ Complete

8/1/2015: 42

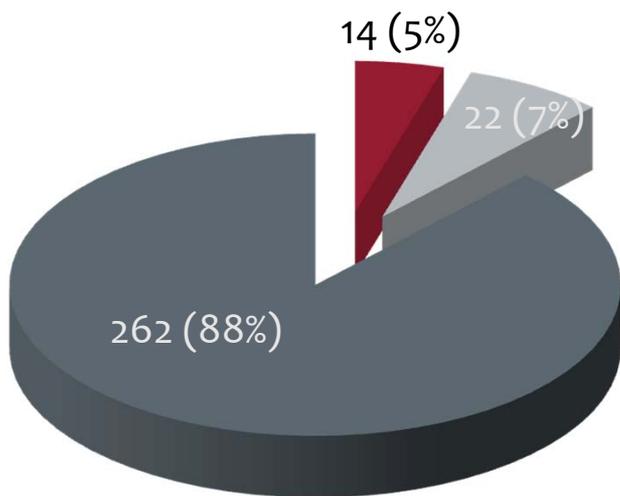


■ Intact ■ Incomplete ■ Complete



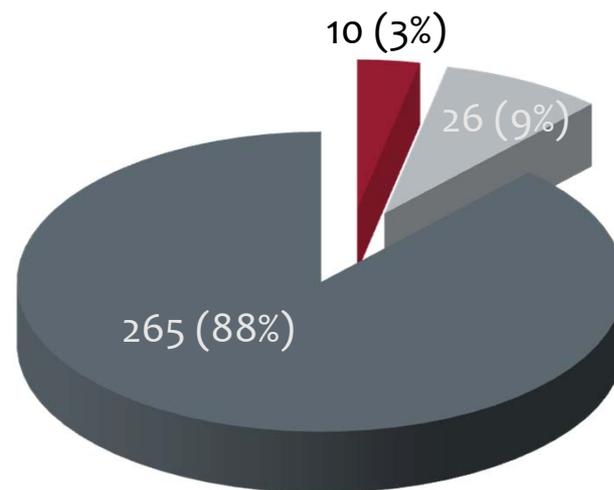
2014 – 2015 Donation Analysis Progress: *Partial-Body*

9/1/2014: 298



■ Intact ■ Incomplete ■ Complete

8/1/2015: 301

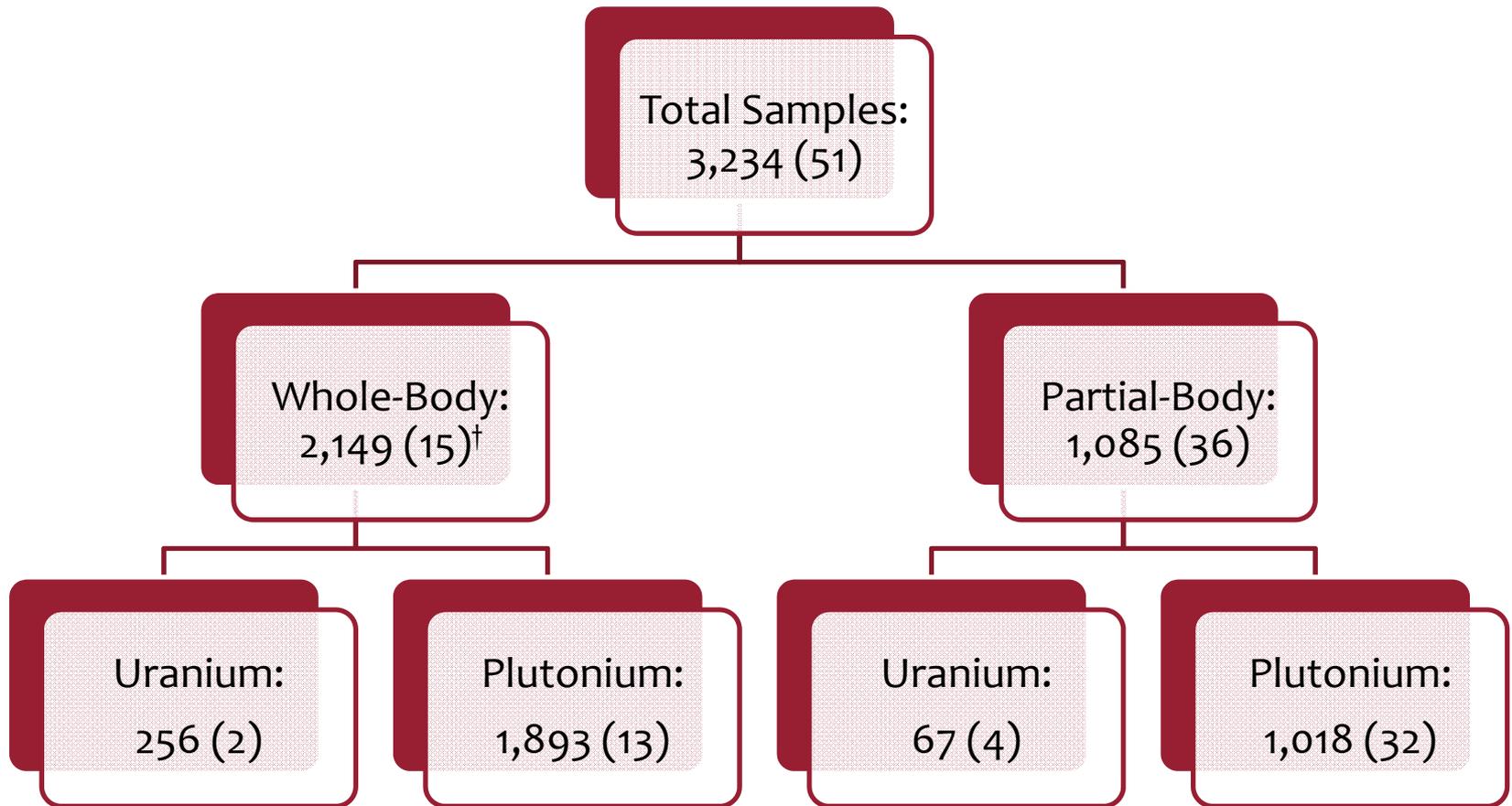


■ Intact ■ Incomplete ■ Complete





Tissue Sample Backlog 2015



† - number of cases excluding Thorotrast





Tissue Sample Backlog: Priority Breakdown

Donation	Status	#	\$\$\$	\$\$	Total
Whole	Intact	3 [†]	60	45	105
Partial	Intact	10	200	150	350
Whole	Incomplete	12 ^{†,‡}	----	90	90
Partial	Incomplete	26	----	390	390
Total		51	260	675	935

† - number of cases excluding Thorotrast

‡ - only 6 cases have \$\$-value tissue samples





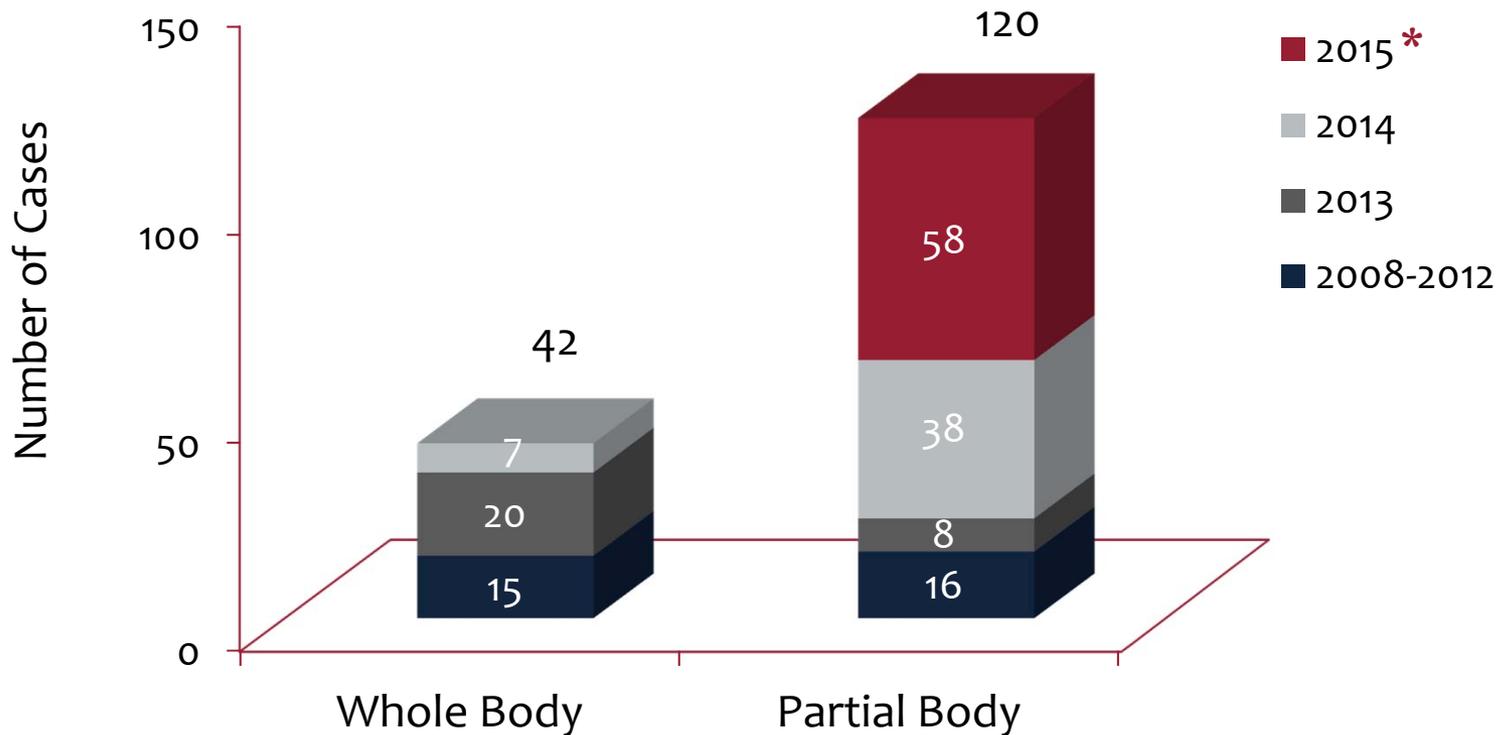
Health Physics Database

Maia Avtandilashvili





Health Physics Database: *Progress*

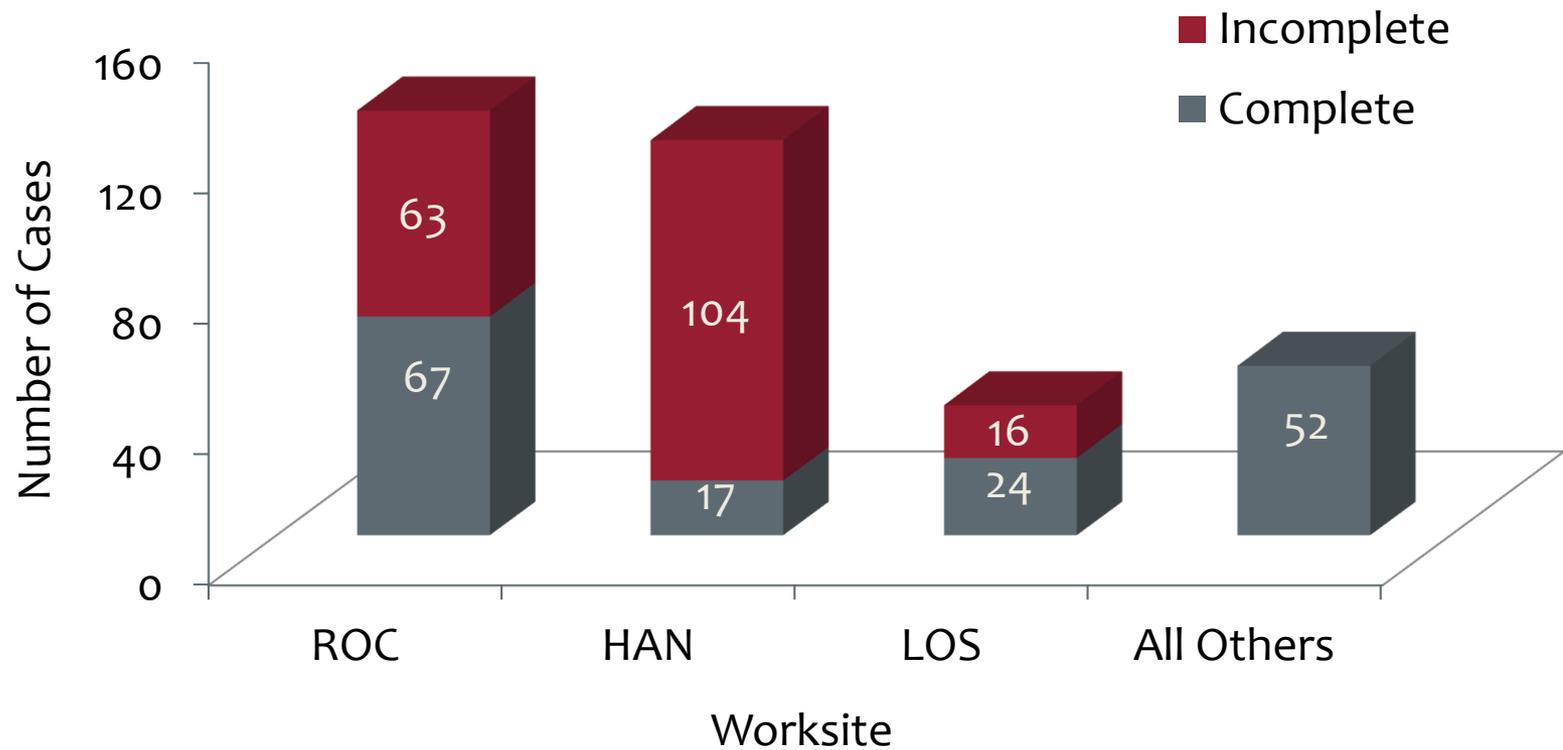


** Including two living Registrants*





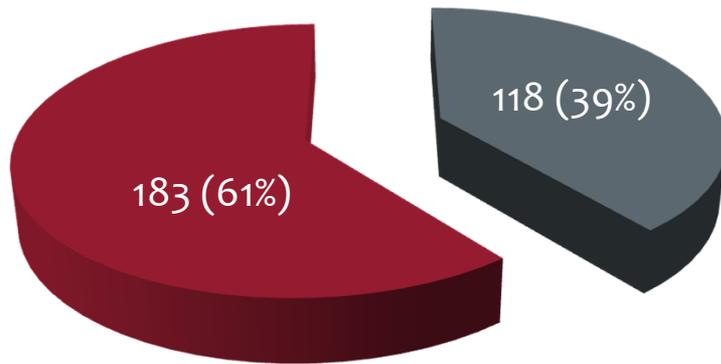
Health Physics Database: *Worksite*





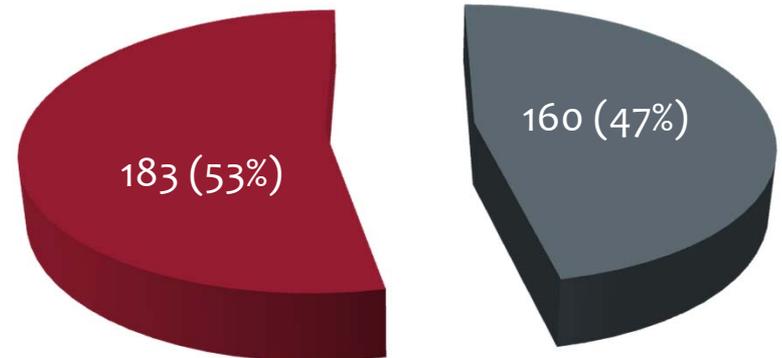
Health Physics Database: *Status 2015*

Partial-Body: 301



■ Complete ■ Incomplete

Total: 343

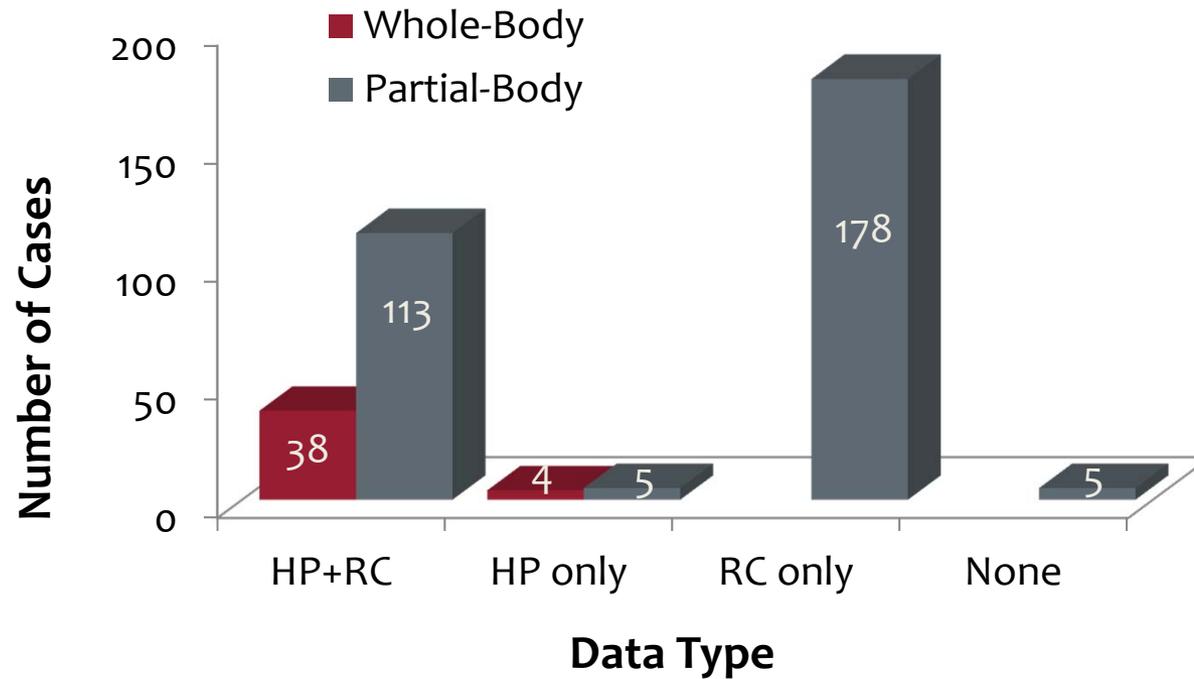


■ Complete ■ Incomplete





Health Physics Meets Radiochemistry





Academic/DOE Outreach

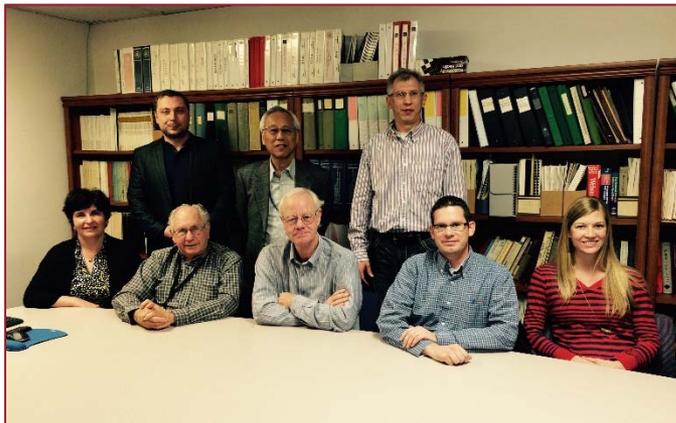
Joey Zhou & Sergei Y. Tolmachev





USTUR/CIRSS Agreement

- Academic and scientific exchange program between the USTUR and the Central Institute of Radioisotope Sciences and Safety (CIRSS), Kyushu University (Fukuoka, Japan)
- Initiated by Prof. Momoshima, CIRSS Director, in November 2014
- Approved by WSU Office of Provost in July 2015
- Official ceremony on December 10, 2015 in Fukuoka, Japan



*Left to right (low): M. Avtandilashvili, A. Brooks, W. Morgan, B. Miller, S. McComish
Up: G. Tabatadze, N. Momoshima, S. Tolmachev*





DOE Officials Visit



Left to right (low): P. Worthington (AU-10), I. Al-Nabulsi (AU-10), and J. Zhou (AU-13);
Up: M. Avtandilashvili, S. Tolmachev, and G. Tabatadze (all USTUR)



Left to right (low): M. Avtandilashvili (USTUR)
M. Moury (AU-1), S. McComish, M. Bedell;
Up: G. Tabatadze, and S. Tolmachev (all USTUR)





USTUR Scientific Tours



Left to right: S. Tolmachev (USTUR), Erick Sheerer, Brandon Williamson, Brian Stickney, and Brian Harkins (all Hanford Office of River Protection)



Left to right: S. Tolmachev, A. Gonzales, L. Feinendegen, M. Avtandilashvili, W. Morgan, A. Brooks, and G. Tabatadze





Internal Research Projects 2014 – 2015

- Published
 - ✓ Uranium Distribution in Human Body: R. L. Kathren
 - ✓ Uranium Hexafluoride Modeling: M. Avtandilashvili
- Ongoing
 - ✓ Modeling Multiple Intakes: M. Avtandilashvili
 - ✓ Testing NCRP Wound Model: M. Avtandilashvili
 - ✓ Uranium Missing Dose: S. L. McComish
 - ✓ Radionuclide Bone Microdosimetry: G. Tabatadze
 - ✓ From Single Bone to Total Skeleton: S. Y. Tolmachev





External Research Projects 2014 – 2015

- Published
 - ✓ SR μ XRF Application for Actinide Distribution: Ghent University (Belgium)
 - ✓ ^{241}Am Skull Measurement: EURADOS WG-7 (EU)
- Ongoing
 - ✓ Plutonium Bound Fraction: PHE/DOE JCCRER Project 2.4
 - ✓ Estimation of Skeleton Activity: SUBI/DOE JCCRER Project 2.4
 - Three papers prepared for special issue of Radiation Protection Dosimetry journal on Mayak Workers Dosimetry System (MWDS-2103)*
 - ✓ iQID - Digital Autoradiography: PNNL
 - ✓ ^{241}Am Ca-DTPA Chelation Therapy: Karlsruhe Institute of Technology (Germany)



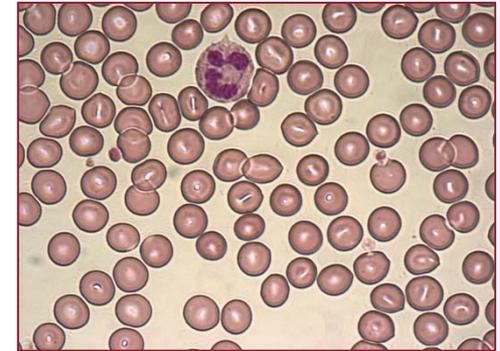


NHRTR Materials Use: *Biodosimetry*

- Requested by REAC/TS

Pelger-Huët Anomaly (PHA) in blood cells

- Study of Radium Dial Painters
- Internal exposure to ^{226}Ra and ^{228}Ra
- Exposure in 1915 – 1925
- Exposure time 4 – 208 weeks
- Bone marrow dose 0.1 cGy – 3,400cGy
- Peripheral blood slides prepared in 1970 – 1975
- Available at NHRTR in 2015



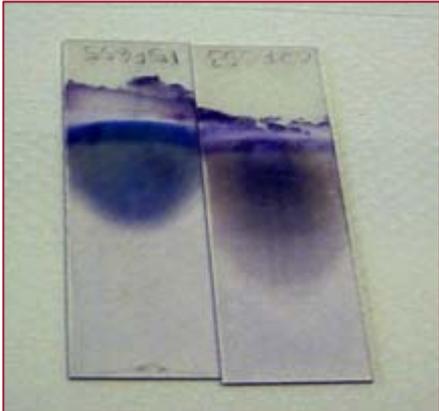
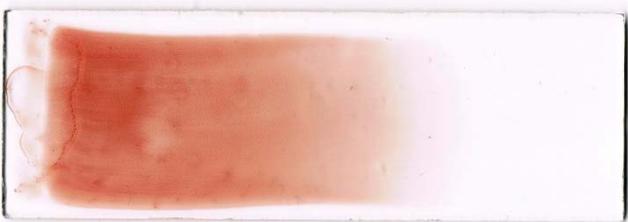
Can be seen 100 y post exposure!!! – permanent biomarker





NHRTR: Blood Smears

- 450 blood smears were sent to Dr. Ron Goans (REAC/TS)



Blood smears THEMIS inventory

Sample Info Print Delete Case Info Attach Previous Next Close

Case #	Sample #	Collection	Current Location	
00-007	001	ANL: Ra dial painters	REAC/TS n.a. n.a.	History
Barcode: 14004056	Collection Class: NHRTR	External Case #: 00-007	External Sample #: n/a	Notebook
Date Entered: 9/18/2014 2:06:37 PM	By: Stacey L. McCord	From: ANL	Source Class: n.a.	
Seal Pack: Slide Box	Sample Type: Slide	Status: Histopathology	Initial:	
Tissue Type: Circulatory	Tissue: Blood	Acid Type:	Prepared:	
Notes: blood smear; slide position #70; nobarcode on sample. 9/18/14, slm.				Parent Item:





Journal Publications

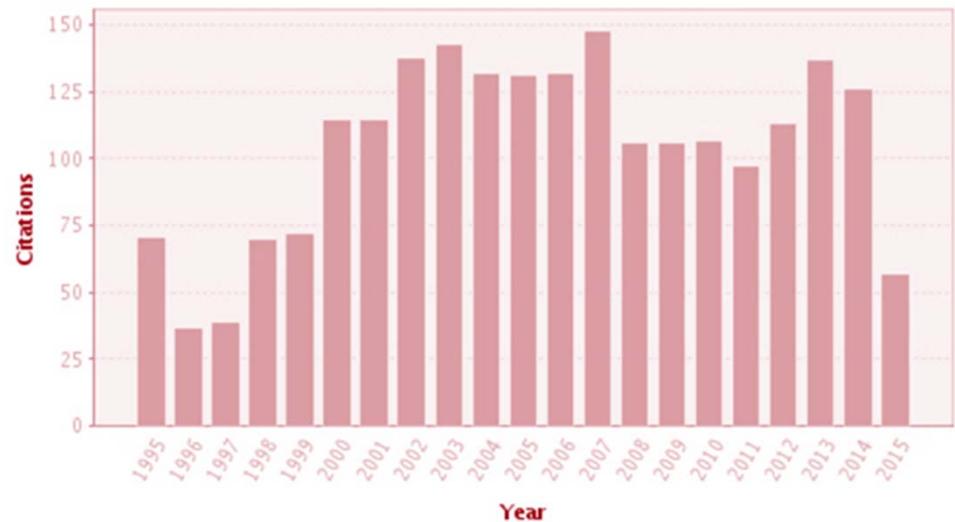
- Full-Paper
 - ✓ Analytical and Bioanalytical Chemistry (3.436) 1
 - ✓ Journal of Radiological Protection (1.702) 1
 - ✓ Health Physics (1.271) 1
 - ✓ Radiation Measurements (1.213) 1
- Editorial
 - ✓ International Journal of Radiation Biology (1.687) 1
 - ✓ Health Physics News 1
- Abstract
 - ✓ Health Physics 3





Bibliography and Citation

- ResearcherID: I-1056-2013
- Platform: Web of Science (since 1980)
- Peer-reviewed publications: 279
- Cited articles: 182
- Times cited: 2,360
- Average citations: 12.97
- h-index: 27





Professional Activities/Services

- Visiting Professor: Kyushu University, Radioisotope Center (2015 – 2016)
- Adjunct Professor: Laval University, Department of Chemistry (2014 – 2017)
- Advisory Board Member: WSU Graduate Certificate Program in Radiation Protection (2013 – 2015)
- Editorial Board Members:
 - ✓ Austin Biometrics and Biostatistics (2014 – 2016)
 - ✓ Japanese Journal of Health Physics (2013 – 2017)
- Committee Members:
 - ✓ HPS International Collaboration Committee (2015 – 2018)
- Society Members:
 - ✓ Health Physics Society
 - ✓ Radiation Research Society
 - ✓ European Radiation Dosimetry Group (EURADOS) WG-7 on Internal Dosimetry
- Ad-hoc Reviewers:
 - ✓ Radiation Protection Dosimetry





2015 Take Home Message

- Acceptation of three (3) new donations
- Analysis of 271 tissue samples
- Elimination of five (5) intact cases: 19 (2014) vs 14 (2015)
- Receiving of \$25,000 of external money
- Completion Health Physics database for 56 donations
- Completion of USTUR acid solutions inventory
- Involvement of seven (7) students
- Nine (9) publications and seven (7) presentations



Thank you



Annual BBQ with friends and families