



2016 Scientific Advisory Committee Meeting
Washington State University, Spokane, WA
July 20, 2016

2015 SAC Recommendations & 2016 Overview

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*"Learning from Plutonium
and Uranium Workers"*





2015 SAC's Comments/Recommendations

- Following the 2015 Annual Meeting, the SAC made 7 comments and 10 specific recommendations



2015 SAC's Comments

- Significant progress has been made on designing and populating the databases
- The display of the information contained in the health physics and radionuclide databases is beneficial in encouraging research opportunities
- Amplification for presentations would help
- The strong use of students to support the program is encouraging
- The increased level of participation in a broad range of conferences is encouraging
- The level of communication with DOE HQ is encouraging
- We pleased an effort to prioritize the prospective value of the analysis of tissues



Recommendation #1

Strengthen with WSU Tri-Cities campus and teaching programs



Graduate Research

- Sara de Souza Zanotta Dumit
- B.S. in Pharmacy: Universidade Estácio de Sá (UNESA), Rio de Janeiro, Brazil
- Fall 2014: WSU Pharmaceutical Sciences, PhD student
- Scholarship: CAPES Science without Borders, Brazilian Federal Agency (2014 – 2018)
- Fall 2015: Joined USTUR
- Research Project: Plutonium Decorporation





WSU Graduate Certificate Program in Radiological Protection

- Advisory Board Member: George Tabatadze (2016) and Sergei Tolmachev (2011)
- Internal and Environmental Dosimetry Class: ENVR_SCI 520
 - ✓ Maia Avtandilashvili: *Introduction to IMBA Professional Plus*®
 - ✓ George Tabatadze: *Solid-state Charged Particle Detectors*



Recommendation #2

The staff is technically skilled and proficient in their area of work. We recommend that they continue to broaden their skills in development and promotion of scientific research in use of the data

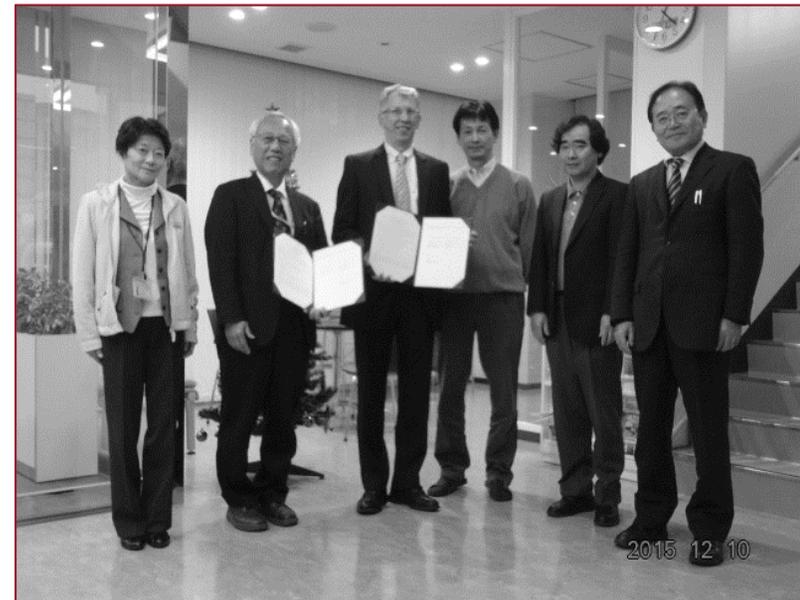
More participation in society meetings and committees

More involvement in university programs and teaching



USTUR/CIRSS Agreement

- **Signed on December 10, 2015:** academic and scientific exchange agreement between WSU through the USTUR and the Central Institute of Radioisotope Sciences and Safety (CIRSS), Kyushu University (Fukuoka, Japan)
- **Purpose:** to promote academic exchange and cooperation in the research and education between two universities





2015 – 2016 Scientific Meeting Presentations

- Podium

- ✓ International Workshop on U, Th, and Pu Sciences (invited) 1
- ✓ Georgian National Academy of Sciences Meeting (invited) 1
- ✓ Columbia Chapter Health Physics Society Meeting (invited) 3
- ✓ 143rd American Public Health Association Annual Meeting 1
- ✓ 61st Annual Radiobioassay and Radiochemical Measurements Conference 1
- ✓ WSU College of Pharmacy Graduate Research Seminar 1
- ✓ 61st Annual Meeting of the Health Physics Society 4

- Poster

- ✓ Brazilian Graduate Student Conference (BRASCON) 1
- ✓ WSU Graduate and Professional Student Association Research Exposition 1



Academic Activities

- Graduate Committee Member (major advisor): WSU Pharmaceutical Sciences PhD project
- Advisory Board Member: WSU Graduate Certificate Program in Radiation Protection
- WSU Department of Environmental Sciences: Internal and Environmental Dosimetry Class (ENVR_SCI 520)
- Visiting Professor: Kyushu University, Central Institute of Radioisotope Sciences and Safety
- Adjunct Professor: Laval University, Department of Chemistry



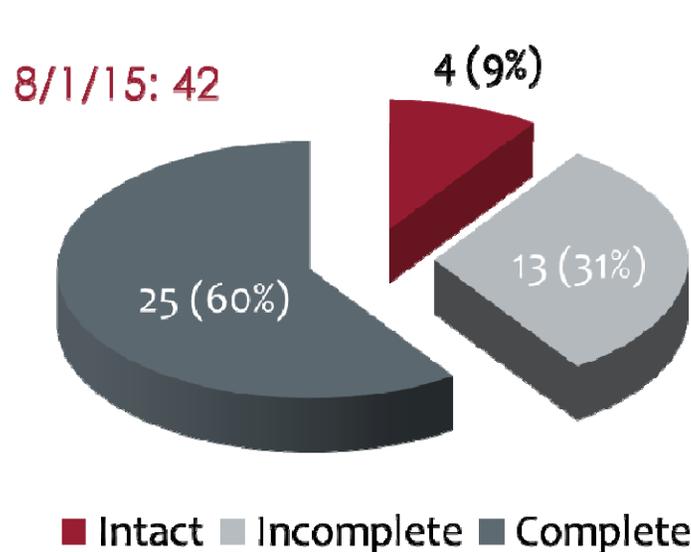
Recommendation #3

The research data needs and uses needs to articulated in a formal document in order to match up with data gaps in the data base and prioritization of future analyses

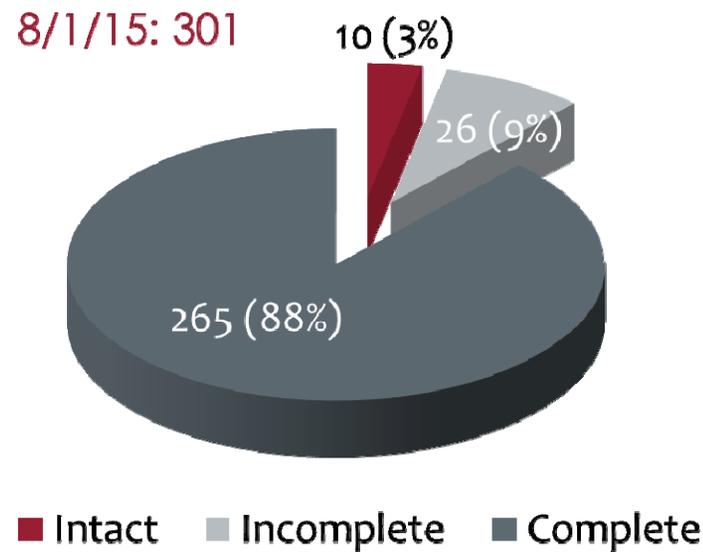
Current Radiochemical Analysis Priorities

- New donations
- Intact – no tissues were analyzed
- Incomplete – only few tissues were analyzed (‘survey’)

Whole-body donations



Partial-body donations





Study Groups

- Refractory PuO₂ inhalation: 22 cases
- Soluble plutonium (UPPU): 12 (26) cases
- Plutonium in wound: 14 cases
- Plutonium-238 biokinetics: 9 cases
- Actinide decorporation therapy: 13 cases
- Plutonium distribution in skeleton: 30 cases
- Uranium nano-particles in brain: 1 case
- Uranium in women: 3 cases
- Beryllium in human: 6 cases



Future Case Prioritization

- Intact partial-body: 0702 (2006), 0695 (2008), 0771 (2008), 0521 (2010); 0410 (2016)
- Refractory PuO₂: 0407 (WB, 2008) 0443 (PB, 2006)
- Soluble plutonium (UPPU): 0631 (WB, 2011) 0745 (WB, 2005)
- Plutonium in wound: 0334 (PB, 2004), 0740 (WB, 2010), 0958 (PB, 2009)
- Decorporation therapy: 0303 (WB, 2008), 0407 (WB, 2008), 0846 (WB, 2008), 0733 (PB, 2003)



Recommendation #4

The use of the data collected in the Registries to support dosimetric research be captured formally in the goals and purposes of the USTUR





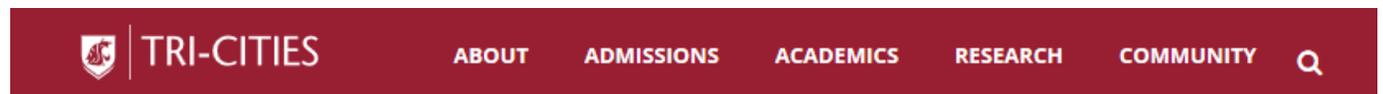
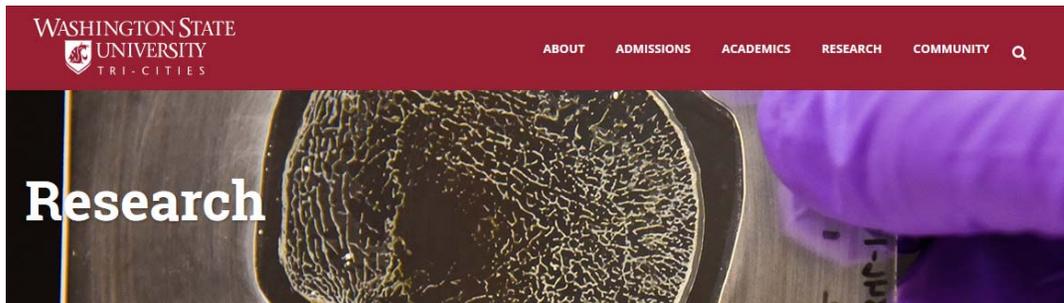
Recommendation #5

Make use of WSU's public affairs office to publicize USTUR accomplishments and human interest stories relative to advancing the mission to improve radiation protection



WSU Tri-Cities

- Maegan Murray, Public relations/communication coordinator, one day visit: WSUTC website, and WSU News
- USTUR Research:



United States Transuranium & Uranium Registries

The United States Transuranium & Uranium Registries (USTUR) is a research program that studies actinide elements deposited within the human body – in persons with measurable, documented exposures to those elements.

The Registries are operated by the Washington State University (WSU) College of Pharmacy, with administrative offices and laboratory facilities in Richland, Washington.

<https://tricitities.wsu.edu/research>



2016 Health Physics Newsletter

- March Issue: R. E. Toohey, SAC Chair
- May Issue: J. Y. Zhou, DOE and S.Y. Tolmachev, USTUR Director
- July Issue: R. L. Kathren, USTUR Director (Retired)

**2016 HPS Annual Meeting
17–21 July 2016, Spokane, Washington**
**61st Health Physics Society Meeting
Program Update**

Chris Shaw and Jack Kraus, Program Committee, Spokane Task Force



The Program Committee is busy working on putting together the 61st Annual Meeting of the Health Physics Society (HPS) to be held 17–21 July in Spokane, Washington. In addition to the plenary and regular sessions, we currently have 15 special sessions planned, some of which are:

- Environmental Radon.
- National Emission Standards for Hazardous Air Pollutants—Airborne Radionuclides.
- Academic, Industrial, Research Radiation Safety.
- The United States Transuranium and Uranium Registries Study (see below).
- Sealed Source Decommissioning and Disposal.

We are also pleased to announce that we will be featuring a NORM/TENORM Industry Day for those interested in naturally occurring radioactive materials/technologically enhanced naturally occurring radioactive material issues, which will be covered in the registration fee for the meeting.

The Program Committee is looking forward to seeing all of you at the meeting in Spokane.

Special Session: Learning From Plutonium and Uranium Workers

R.E. Toohey, CHP, PhD, Chair, USTUR Scientific Advisory Committee

Located in Richland, Washington, the United States Transuranium and Uranium Registries (USTUR) will celebrate its 50th anniversary with a special session at the 2016 Health Physics Society (HPS) Annual Meeting in Spokane.

Although many health physicists may have at least heard of the USTUR, relatively few are familiar with its programs and history of significant contributions to the science underlying internal radiation dosimetry. Studies of plutonium in human tissues obtained at autopsy began as early as 1949 at Hanford, Los Alamos, and Rocky Flats. The idea of a national plutonium registry was discussed at a meeting at Rocky Flats in July 1966 and at another meeting at Hanford in May 1967.



At the USTUR/INRTR laboratory facility, left to right: Sergei Tolmachev (USTUR), Abel Gonzalez (International Commission on Radiological Protection, retired), Ludwig Feinendegen, Mala Avtandilashvili (USTUR), William Morgan (Pacific Northwest National Laboratory (PNNL)), Tony Brooks (PNNL Washington State University), and George Tabatadze (USTUR). Photo courtesy of USTUR

In August 1968 the National Plutonium Registry was established at the Hanford Environmental Health Foundation (HEHF) by the U.S. Atomic Energy Commission with the goal to ensure that the most comprehensive information on workers' exposure to plutonium and other toxicants was collected and retained in one place. Ten years later, the United States Uranium Registry was established at HEHF, and subsequently the National Plutonium Registry was renamed the National Transuranium Registry to reflect growing interest and research in other actinides, such as americium. In 1987 the two

session covers Category 1, 2, and 3 RSS removal and also addresses the need for decommissioning of depleted uranium shielding. If it was used in an RSS device. As time allows during and after the Tuesday-morning special session, the panel members can help with any specific questions you may have about planning for the successful decommissioning and disposal of your RSS.

Topics of other informative and interesting special sessions will include the U.S. Transuranium and Uranium Registries (USTUR), environmental radon, National Emission Standards for Hazardous Air Pollutants (NESHAP)/RADAIR, Academic, Industrial, Research Radiation Safety (AIRRS) Section; Nuclear Weapons (American Academy of Health Physics); and many more. Look for another special session to be highlighted in the June issue of *Health Physics News*!

Once again we will have a full day of general sessions going through Thursday, thanks to all of the high-quality technical abstracts that were submitted. Plan to stay in Spokane through Thursday to ensure that you get to see all of the informative and interesting general sessions on topics like medical health physics, emergency response, and homeland security. For a full list of everything planned for Thursday, please see the [online program](#). Thanks to all of those who submitted abstracts or supported those who did—it is the members of the HPS and everything that you do that allows us to continue to have great and successful meetings. See you all in July!

**USTUR Special Session
Five-Decade Follow-Up of Plutonium and Uranium Workers**

Josey Y. Zhou, Program Manager, U.S. Department of Energy
Sergei Y. Tolmachev, Director, USTUR

The U.S. Transuranium and Uranium Registries (USTUR) is a federal-grant program funded by the U.S. Department of Energy (DOE) Office of Health and Safety. Since 1992 the USTUR has been operated by the College of Pharmacy at Washington State University and located in Richland, Washington. The USTUR and the associated National Human Radiological Tissue Repository are unique resources worldwide for the comprehensive study of the biokinetics and internal dosimetry of actinide elements in the human body. Postmortem measurements of actinides in donated tissues are linked with exposure records, work and medical histories, industrial hygiene records, and bioassay data.

On 19 July the 61st Annual Meeting of the Health Physics Society (HPS) will feature the one-day special session "USTUR: Five-Decade Follow-Up of Plutonium and Uranium Workers." The session starts with a keynote address by Ronald Kathren, "The USTUR: Where We Have Been and Where We Are Going," followed by Gene Carbaugh with "The Atomic Man: Case Study of the Largest Recorded ²⁴¹Am Deposition in a Human." This session will be chaired by Patricia R. Worthington (DOE).

The morning technical session will present five talks highlighting internal research by USTUR scientists. This session will be co-chaired by Carol Jodins (Radiation Emergency Assistance Center/Training Site) and Dursilene Meilo (Lovelace Respiratory Research Institute). The afternoon technical session features five selected USTUR collaborative studies represented by speakers from Germany, Spain, the United Kingdom, and the United States.



Spokane gondolas
Photo courtesy of Gene Carbaugh

This session will be co-chaired by Isaf Al-Nabulsi (DOE) and Ray Guilmette (Ray Guilmette and Associates). The special session ends with a roundtable discussion. It will be led by four former USTUR directors—Byrce Breitenstein, Jr. (1976–1982), Margery Swint (1982–1989), Ronald Kathren (1989–1999), and Ronald Filipij (1999–2009)—and by Jim McClroy, who was in charge of USTUR radiochemistry work from 1975 to 1992. The roundtable will be co-chaired by Dick Toohey (M.H. Chew & Associates) and Sergei Tolmachev (USTUR).

The USTUR special session will be published in a special issue of the *Health Physics Journal*. This will be the fifth special issue of *Health Physics* to focus on

With the great plenary session that has been planned to kick the meeting off, the impressive lineup of special sessions, and all of the great general sessions to follow, don't forget about the Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) Industry Day and poster session! You do not want to miss anything that will be going on at this year's annual meeting in Spokane; there is something for everyone, so if you haven't registered yet, what are you waiting for?

Find all of the [up-to-date meeting information](#) you need in the meetings section of the HPS website today. We look forward to seeing you all in Spokane in July!

A Little More on the Special USTUR Session

Ronald L. Kathren, CHP

On 19 July, the 61st Annual Meeting of the Health Physics Society (HPS) will feature the one-day special session "USTUR: Five-Decade Follow-Up of Plutonium and Uranium Workers." As the invited keynote speaker ("The USTUR: Where We Have Been and Where We Are Going?") for this special session, I was asked to say a few words in these pages, adding to Dick Toohey's excellent item in the *March Issue of Health Physics News* (page 18) describing the session. Dick knows the United States Transuranium and Uranium Registries (USTUR) well, having the unique distinction of serving as a member of the USTUR Scientific Advisory Committee (indeed he is now the current chair) and as a member of the USTUR staff.

In many respects, the registries were a natural if not unique outgrowth of the discovery of plutonium by Glenn Seaborg who concluded on 25 February 1941, on the basis of extensive testing, that the alpha radioactivity in the sample they had bombarded was attributable to a new element with atomic number 94. Element 94, soon named plutonium, was not found in nature and thus there was no prior human experience with it. But from the outset, there was concern about its radiotoxicity, and animal studies were quickly instituted. Initially, the radiotoxicity was inferred from these studies and by comparison with what was known from the tragic experience of the radium dial painters. But animals are not humans, and there are important anatomical and physiological differences that bear on the establishment of appropriate safety measures and protection standards for plutonium. It is essential to validate the applicability of the animal data to the development of protection standards for humans. But human experimentation is, of course, not an option, and experience available from plutonium workers is very limited and woefully incomplete.

Hence, the Plutonium Registry was created as a unique postmortem autopsy research program. Persons working with plutonium were invited to participate by volunteering for an autopsy after death, which would involve donation of tissues for radiochemical analysis of their plutonium and americium content. We are beneficiaries of those generous volunteers who freely gave tissue donations through autopsy at the close of their natural lives, and to them we owe a great debt of gratitude. The information thus gained enabled the registry to examine the relationship of the causes



The Spokane University District
Photo courtesy of Spokane International Airport

of death in plutonium workers to the amount of plutonium in their tissues and, most importantly, to study the postmortem distribution of plutonium in the tissues of the bodies of persons who had worked with plutonium. These data, along with occupational and health histories and especially exposure data obtained during life, where available, provided a basis for determining the validity of the largely animal-study-based safety standards for both plutonium and its associated daughter products. Over the years, the registries added uranium and the radioactive contrast medium Thorotrast to its study protocol.

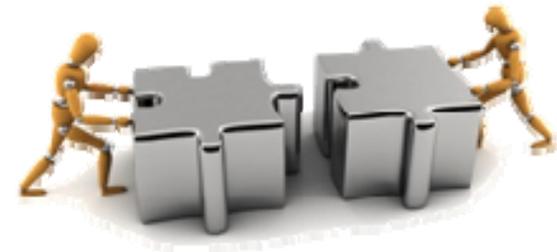
How and what was accomplished, how well the job was done, and the significance for operational





Recommendation #6

Collaboration with the ORNL Center for Radiation Protection Knowledge is recommended for developing data use priorities





Recommendation #7

We recommend a status report on National Death Index Information Request



National Death Index

- NDI data: to determine vital status of HEHF Registrants
- If vital status is established via NDI, any records (e.g. medical, exposure) subsequently obtained would be considered “*followback*”
- NDI requests must be renewed every 5 years. If they aren’t, all NDI data and *followback must be deleted/destroyed*
- Therefore, we are considering other options for determining vital status



Recommendation #8

Research topics presented be put in a form of hypotheses and in a way to demonstrated progress toward the mission





Recommendation #9

Booths at conferences that display inventories of tissues is recommended to spur data use for research purposes



NHRTR Display Inventory

National Human Radiobiology Tissue Repository: *What materials are available?*

U.S. Transuranium and Uranium Registries

USTUR tissue samples were obtained from voluntary donors who were exposed to plutonium, uranium, or americium. USTUR donors authorized the Registries to obtain their individual medical and radiation exposure records for research purposes and to collect tissue sample posthumously. This collection includes frozen and formalin-fixed tissues, tissue blocks, histological slides, and acid solutions.



Copyright 2015 Tagxedo.com
Approximately half of USTUR tissues and acid solutions are skeletal samples.

Investigators may request, in writing, samples for legitimate research purposes.

Argonne National Laboratory

The Argonne National Laboratory (ANL) collection consists of samples acquired from the terminated Radium Worker study at ANL. It includes samples from radium dial painters, the historical plutonium injection studies, as well as artifacts such as radium paint, watch dials, Radithor, and Thorotrast. Tissue samples include frozen (-30 and -70° C), dried and plastic embedded specimens. The collection also contains histological slides from the radium studies.



Los Alamos Scientific Laboratory

This collection consists of acid-dissolved tissues from the U.S. general population. The samples were collected by Los Alamos Scientific Laboratory between 1968 and 1975.



NHRTR Facility



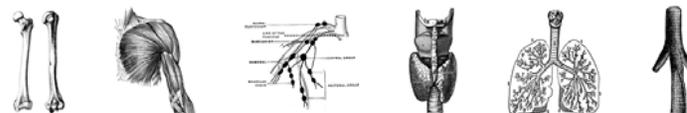
The USTUR Tissue Collection: *Collaborative research opportunities*

The NHRTR holds more than 10,000 tissue samples from 42 whole- and 106 partial-body USTUR donors. Tissues are vacuum packed and stored frozen at -30° C.

Available USTUR Tissues

Type of Tissue	# Cases [†]	# Samples
Alimentary Tract	86	340
Circulatory	119	319
Fat/Muscle/Skin	97	1,924
Finger/Toenails	54	136
Genital	107	173
Glands	109	316
Hair	30	31
Hepatic	124	216
Lymphatic	100	281
Nervous	98	277
Respiratory	119	189
Skeletal	133	4,301
Tracheobronchial	51	100
Tumor	13	15
Urinary	124	214
Other	21	24

[†]Number of Registrant donations for which we have the specified type of tissue.



Images downloaded from Florida Center for Instructional Technology (FCIT). <http://etc.usf.edu/dipart/gallery/760-human-anatomy>



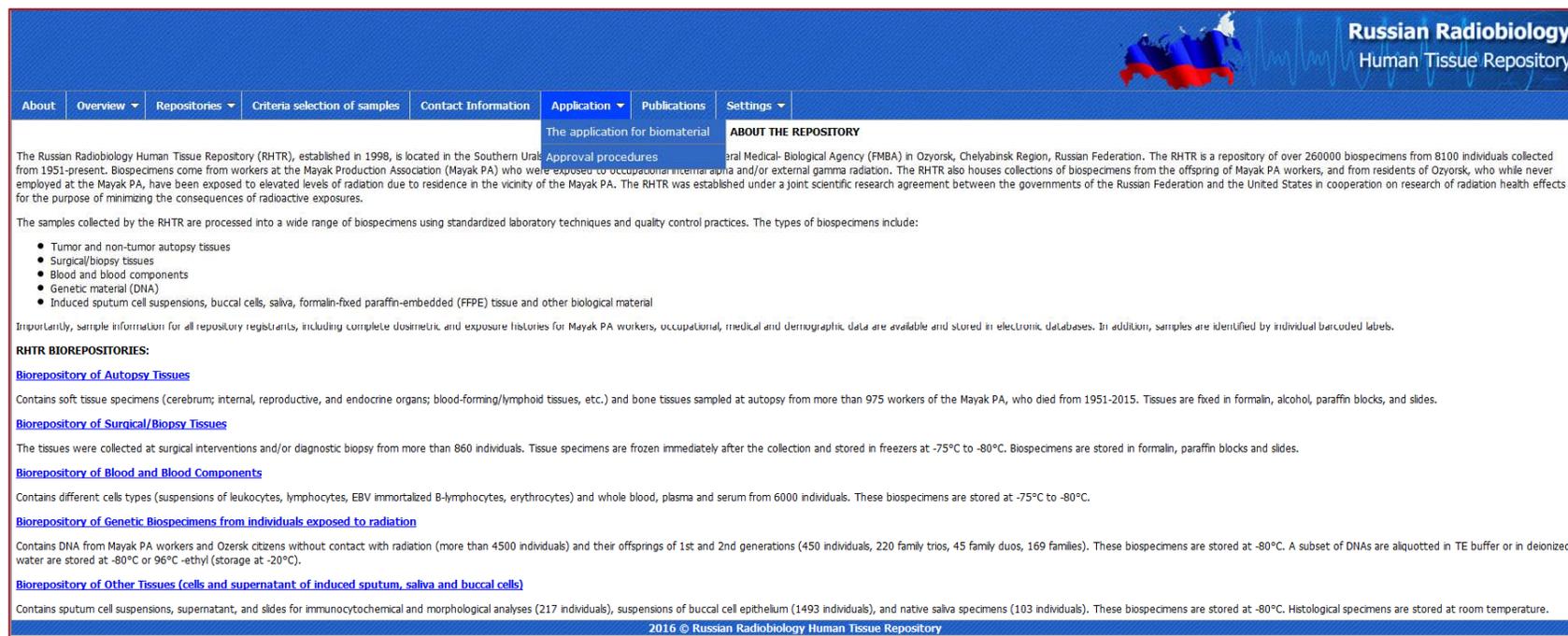


Recommendation #10

Website address the process for gaining access to tissues

Russian Radiobiology Human Tissue Repository

- RHTR: <http://rhtr.subi.su/>
 - ✓ Tissues from 1,898 individuals: 989 (autopsy) and 909 (biopsy)
 - ✓ Application for biomaterial
 - ✓ Approval procedure
 - ✓ Joint Coordinating Committee for Radiation Research – Project 2.8 “Mayak Worker Tissue Repository”



Russian Radiobiology Human Tissue Repository

ABOUT THE REPOSITORY

The Russian Radiobiology Human Tissue Repository (RHTR), established in 1998, is located in the Southern Urals Federal Medical-Biological Agency (FMBA) in Ozyorsk, Chelyabinsk Region, Russian Federation. The RHTR is a repository of over 260000 biospecimens from 8100 individuals collected from 1951-present. Biospecimens come from workers at the Mayak Production Association (Mayak PA) who were exposed to occupational internal alpha and/or external gamma radiation. The RHTR also houses collections of biospecimens from the offspring of Mayak PA workers, and from residents of Ozyorsk, who while never employed at the Mayak PA, have been exposed to elevated levels of radiation due to residence in the vicinity of the Mayak PA. The RHTR was established under a joint scientific research agreement between the governments of the Russian Federation and the United States in cooperation on research of radiation health effects for the purpose of minimizing the consequences of radioactive exposures.

The samples collected by the RHTR are processed into a wide range of biospecimens using standardized laboratory techniques and quality control practices. The types of biospecimens include:

- Tumor and non-tumor autopsy tissues
- Surgical/biopsy tissues
- Blood and blood components
- Genetic material (DNA)
- Induced sputum cell suspensions, buccal cells, saliva, formalin-fixed paraffin-embedded (FFPE) tissue and other biological material

Importantly, sample information for all repository registrants, including complete dosimetric and exposure histories for Mayak PA workers, occupational, medical and demographic data are available and stored in electronic databases. In addition, samples are identified by individual barcoded labels.

RHTR BIOREPOSITORIES:

Biorepository of Autopsy Tissues
Contains soft tissue specimens (cerebrum; internal, reproductive, and endocrine organs; blood-forming/lymphoid tissues, etc.) and bone tissues sampled at autopsy from more than 975 workers of the Mayak PA, who died from 1951-2015. Tissues are fixed in formalin, alcohol, paraffin blocks, and slides.

Biorepository of Surgical/Biopsy Tissues
The tissues were collected at surgical interventions and/or diagnostic biopsy from more than 860 individuals. Tissue specimens are frozen immediately after the collection and stored in freezers at -75°C to -80°C. Biospecimens are stored in formalin, paraffin blocks and slides.

Biorepository of Blood and Blood Components
Contains different cells types (suspensions of leukocytes, lymphocytes, EBV immortalized B-lymphocytes, erythrocytes) and whole blood, plasma and serum from 6000 individuals. These biospecimens are stored at -75°C to -80°C.

Biorepository of Genetic Biospecimens from individuals exposed to radiation
Contains DNA from Mayak PA workers and Ozyorsk citizens without contact with radiation (more than 4500 individuals) and their offsprings of 1st and 2nd generations (450 individuals, 220 family trios, 45 family duos, 169 families). These biospecimens are stored at -80°C. A subset of DNAs are aliquotted in TE buffer or in deionized water are stored at -80°C or 96°C -ethyl (storage at -20°C).

Biorepository of Other Tissues (cells and supernatant of induced sputum, saliva and buccal cells)
Contains sputum cell suspensions, supernatant, and slides for immunocytochemical and morphological analyses (217 individuals), suspensions of buccal cell epithelium (1493 individuals), and native saliva specimens (103 individuals). These biospecimens are stored at -80°C. Histological specimens are stored at room temperature.

2016 © Russian Radiobiology Human Tissue Repository



RHTR: On-line Tissue Request

Russian Radiobiology
Human Tissue Repository

Information Application Publications Settings

Autopsy tissues
 Surgical/biopsy tissues
 Blood and its components

Autopsy tissues

Tissue type

Primary tumor
 Metastases to lymph nodes
 Metastases to other organs

Storage method

Formalin-fixed tissues
 Paraffin blocks
 Slides
 70% ethyl

Choose scope of the samples

Mayak PA workers
 Residents of Ozyorsk, who have been exposed to elevated levels of radiation due to residence in the vicinity of the Mayak PA
 Residents of Ozyorsk, who were never employed at the Mayak PA

ICD-10 Code: Histology: Organ:

Sex: M F Not important Age: from: to: Smoker: Yes No Not important

Work place

Accumulated dose of gamma – exposure, Gy: Reactors
Pu - 239 body burden, kBq: Radiochemical
Plutonium
Other



2016 Activities Brief Overview



50th Anniversary Events

- 2015 Request of funding: \$30,000 (funded in 2016)

DOE sponsored activities:

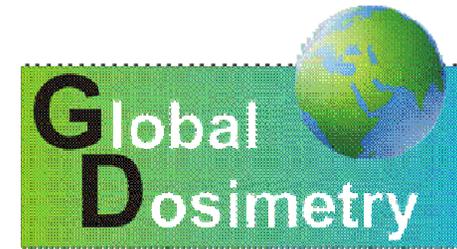
- HPS special session on USTUR's research (2016)
- USTUR booth at the HPS (2016)
- Special issue of Health Physics journal (2017)
- Book of USTUR publications: 1994 – 2017 (2018)





Research Activities

- Actinide Biokinetic Modeling and Dosimetry
- Chelation Therapy Modeling
- Radiation Biomarkers
- Quantitative Microdosimetry
- Beryllium in Human
- Actinide Nanoparticles



Work for Others: JCCRER/PNNL

- Bound Plutonium Study - Part 3: USTUR Case 0407



USTUR-0398-16
February 4, 2016

Case 0407: Refractory Plutonium Distribution in the Upper Airways of the Human Respiratory Tract

Work performed under PNNL/JCCRER Award No 227795

Prepared by S. Y. Tolmachev and M. Avtandilashvili

US Transuranium and Uranium Registries
1845 Terminal Drive, Suite 201
Richland, WA 99354, USA



College of
Pharmacy
WASHINGTON STATE UNIVERSITY

USTUR-0398-16: Refractory Plutonium Distribution in Human Respiratory Tract

Summary

This technical report summarizes analytical work methodology and findings obtained by the United States Transuranium and Uranium Registries (USTUR) from a USTUR whole-body donor - Case 0407 under the agreement with the Pacific Northwest National Laboratory (PNNL, Richland, WA) as part of the DOE Project 2.4 Mayak Worker Dose Reconstruction, of the Joint Coordinating Committee on Radiation Effects Research (JCCRER) collaboration. The distribution of plutonium activity concentration in lung tissues from a USTUR whole-body donor occupationally exposed to refractory, 'high fired' form of plutonium was investigated in this study. The results of this work provide key information on the extent of insoluble plutonium distribution in the upper airways of the human respiratory tract for PNNL/JCCRER project, Award No 227795 under Master Agreement No 193788. Total budget value: \$25,000. Grant duration: October 1, 2014 – September 30, 2015. This report is the single deliverable to the PNNL and is the end point of this work.

Case Selection

For this study, a USTUR whole-body donor (Registrant) – Case 0407 (died 2008) was selected by USTUR personnel based on Registrant's employment history, radiation exposure records, and bioassay data.

Employment and Exposure History

USTUR whole-body donor, Case 0407, was employed as an inspector at a nuclear defense facility over a period of 17 years. He performed his professional duties in the plutonium processing area in the 1960s. A detailed history and biokinetic modeling of this case were described elsewhere (Avtandilashvili *et al.*, 2012; Avtandilashvili *et al.*, 2013). This worker's major inhalation intake of refractory plutonium aerosols resulted from the plutonium glove-box fire accident (Mann and Kirchner, 1967). The 'high fired' PuO₂ particles were generated at a temperature of ~1,800°C. Measured median particle size was 0.32 µm with geometric standard deviation of 1.83.

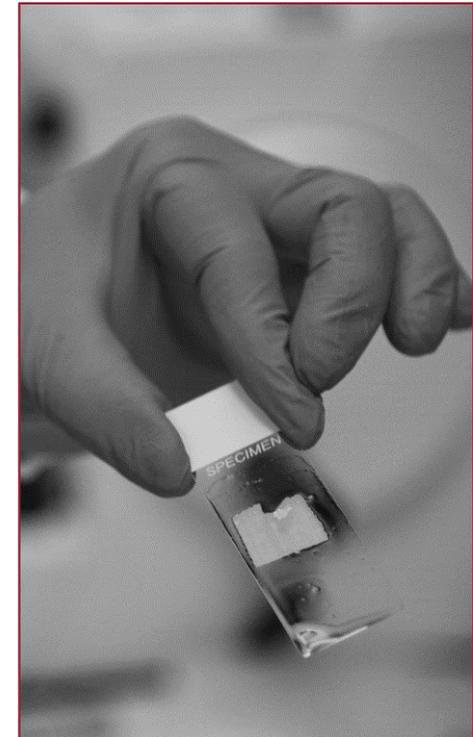
This individual was the second highest exposed of the 23 USTUR Registrants who were involved in this accident. During the fire, he was located in the area with plutonium air concentration of >1,500 Bq m⁻³ without wearing a respirator. Initial plutonium deposition in the lungs was measured at ~15 kBq. This individual was treated with Ca-DTPA immediately after the accident. However, the chelation treatment was found to be ineffective and discontinued after 5 days. Following the accident, this individual was re-assigned to non-plutonium work, and received no further plutonium intakes.

A total of 48 urine samples from this worker was analyzed for gross alpha, plutonium, americium, and uranium from the 1950s through the 1970s. No detectable plutonium activity was measured in urine samples submitted prior to the fire accident. A total of 30 plutonium urinalysis results were obtained after the accident. Of these, 15 were greater than the contemporary minimum detectable activity (MDA). Plutonium activity in the 24-hr urine samples collected over a period of three months following the accident decreased from 1.6 Bq on day 1 to 0.003 Bq on day 63. Urinary excretion during this period was likely still enhanced by the chelation treatment. Of the remaining 19 measurements, conducted over the period of 15 years, only five indicated plutonium activity above the MDA. The average urinary excretion rate was approximately 0.005 ± 0.004 Bq d⁻¹.



Tissue Request: *University of Cincinnati*

- PhD project: *Microdosimetry Analysis of Alpha Particle in Human Tissue by Conventional Histo-Autoradiography*
- Tissues: liver, kidney, spleen and heart
- Case 1053: medical exposure to thorium
- USTUR: histology slide preparation (\$1,500)





Data Request: Los Alamos National Laboratory

- Project: development of actinide chelation model (G. Miller, L. Bertelli, and J. Klumpp)
- USTUR Case 0269 data: information on incidents, bioassay data, information on DTPA treatment, and post mortem tissue radiochemistry analysis results

F106
Created 06/93
Revised 09/11

Statement of Confidentiality

Approved by *Sergei Y. Tolmachev*, Director
September 2011

United States Transuranium and Uranium Registries Statement of Confidentiality

I have read the policies of the USTUR regarding collaborative research, data access, and confidentiality (Policies 106 and 107). I agree to abide by these policies and maintain the confidentiality of the USTUR Registrants and their next-of-kin unless legally required to do otherwise.

Name (please print) _____

Signature _____ Date _____

Approved Data Level Access Assigned: Level 1 Level 2 Level 3

Not Approved Reason: _____

Director's Signature _____ Date _____

USTUR Policies and Procedure Manual

P106
Created 06/92
Revised 01/13

Scientific Collaboration and Data Access

Approved by *Sergei Y. Tolmachev*, Director
January 2013

This policy applies to research collaboration with other scientists and institutions, and to sharing Registries' data and materials with others.

Collaboration with other institutions is encouraged

To maximize the scientific worth and output of the unique materials and data under its purview, the Registries encourages and actively seeks collaboration with other investigators and institutions. Collaboration is sought to complement rather than duplicate the capabilities of the Registries, and to facilitate the efforts of the Registries in achieving its primary goal. Collaboration may take the form of joint evaluations of data, tissues, or other Registries materials, preparation of articles for peer-reviewed literature, or preparation of joint research proposals to a potential sponsor.

Definition of collaborative researchers

Data, tissue and other unique materials collected by the Registries may be made available to other scientists under the following conditions:

1. Potential research collaborators must submit to the Registries a written proposal that describes the specific materials requested, and includes the proposed usage of the requested materials.
2. Research collaborators must provide written assurance that the Registries' policies with respect to human subjects, informed consent, privacy of the Registrants and their next-of-kin, and national security will be followed as agreed in Form 106.
3. Research collaborators must furnish copies of the approval documents issued by their Institutional Review Boards.

Dissemination of Registries' data and biological materials

Registries' data are classified into three levels, based on the potential for identification of the donors and dissemination of the data to other researchers. Access to the data will be restricted as follows:

Level 1: Data include personal identifiers and specific dates of events with specific sites of employment. These data are available, by written request, to medical and radiation protection groups from the worksites of the Registrants. Access to these data is restricted by site. For example, medical and radiation protection personnel at a work site may access data of Registrants only from that site. Signed confidentiality statements (Form 106) must be received from the responsible person(s) at the sites requesting data.

Level 2: Data include no personal identifiers; however, specific dates of events and general descriptions of the sites of employment are included. These data are available to collaborative researchers as defined above.

Level 3: Data include no personal identifiers, only general times of employment and radiologic events, and general information regarding worksites. These data are available on the USTUR website (www.ustur.org).

USTUR Policies and Procedure Manual

P107
Created 06/92
Revised 09/11

Publications

Approved by *Sergei Y. Tolmachev*, Director
September 2011

This policy applies to all publications of the United States Transuranium and Uranium Registries. All collaborative researchers are subject to this policy.

Peer-reviewed publication of scientific findings is encouraged

It is the policy of the Registries to encourage publication of scientific findings and the associated data upon which these findings are based as expeditiously as practicable. Peer-reviewed scientific literature is the preferred vehicle for this purpose. To expedite publication further, preliminary results may be published in Registries Annual Reports, or in special topical reports.

Publication in peer-reviewed literature includes the following articles, notes, abstracts, letters to the editor, other technical communications, or oral presentations of findings that have undergone independent review for scientific content and merit, given at scientific and technical meetings. Publication by the Registries scientific staff is encouraged, and, in keeping with the true spirit of academic freedom, does not require external or internal prior approval. The author(s) is(are) responsible for the scientific content of the publication, and for ensuring that there is no breach or violation of confidentiality, or other legal and ethical requirements.

Privacy of Registrants must be maintained

The USTUR has pledged confidentiality to the Registrants and their next-of-kin, and that pledge will pertain to all publications. No publicity available or open-literature publication shall be made in which Registrants are identified by name or other personal identifiers without the prior consent of the Registrant, or the legally

responsible next-of-kin, unless legally required by law, regulation, or court order.

Specific dates of radiological or medical incidents, specific dates of employment, or the exact place of employment shall not be used in publications. Also, the use of specific descriptions of radiological incidents, health conditions, or causes of death should be avoided if they might assist a reader in the identification of a subject. Such information will be presented in general terms so that an individual reading the publication would be forced to perform additional research in order to identify the research subject. For example, times of events shall be stated as time (days, months, years) before or after the beginning of work, the end of work, or death. An individual might be classified as working at Rocky Flats, Hanford, or other sites, but no specific work location or employer will be identified.

Approval may be required for non-peer-reviewed publications

The author(s) is(are) responsible for obtaining the Registries' approval of press releases and publications that do not undergo external scientific peer review prior to release or distribution. Customarily, it is the responsibility of the senior author to obtain the approval. This should not be construed to impose any constraints on formal or informal communications between Registries staff and external persons on technical or scientific matters, and applies only to 1) documents specifying Registries policy or administrative practice, or making commitments of Registries

USTUR Policies and Procedure Manual



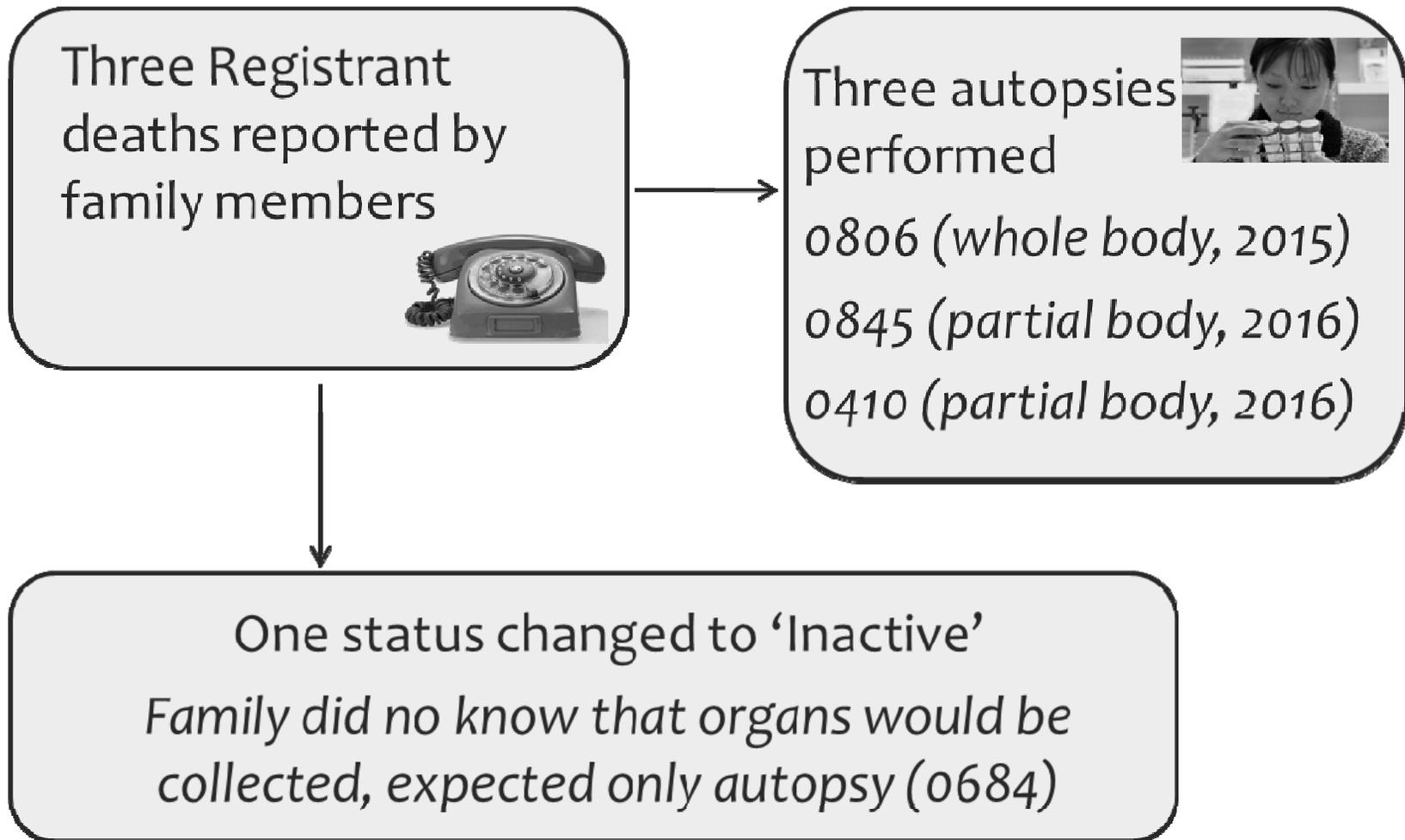


Accepting Registrant Donations

Stacey L. McComish & Margo D. Bedell



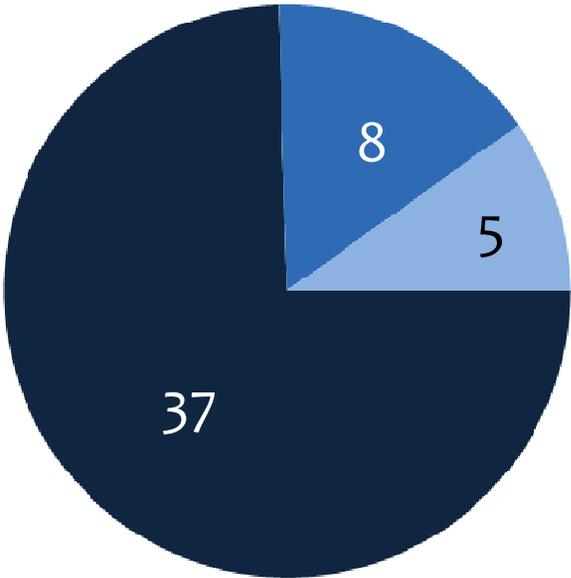
Registrant Donations





Registrant Statistics

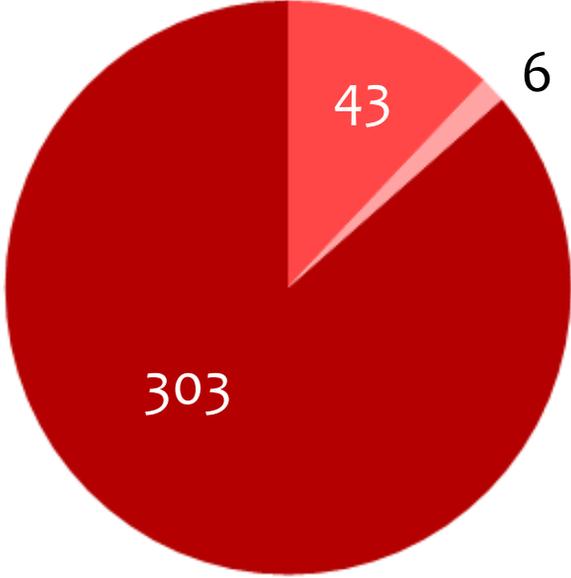
Living (50)



+

Deceased (352) = 402

- Partial-Body
- Whole-Body
- Special



Inactive Registrants: 477





Health Physics Database

Maia Avtandilashvili

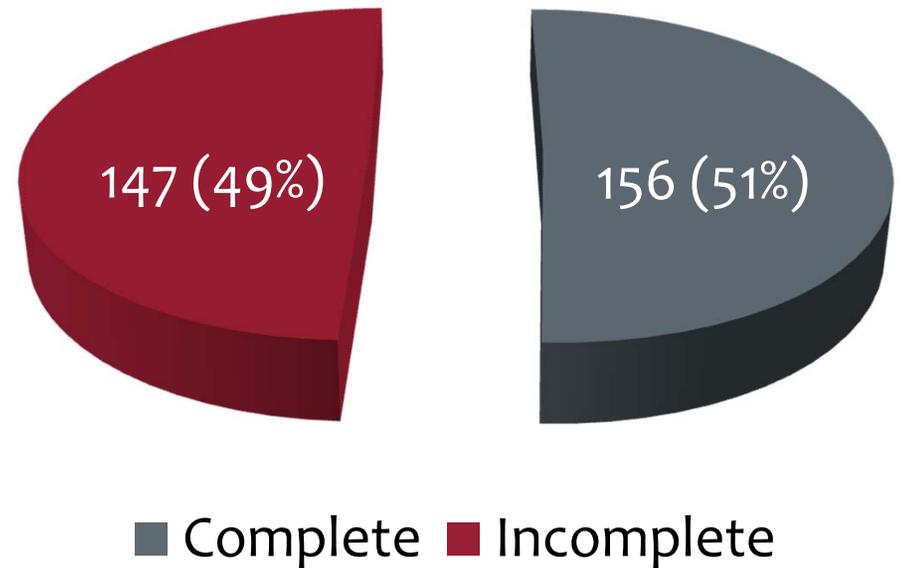
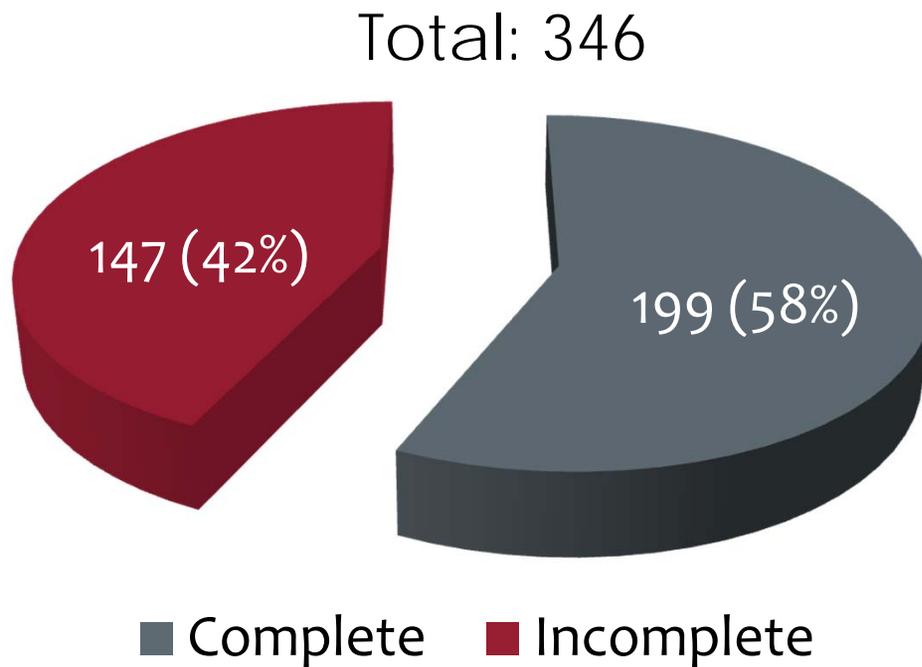
M. Avtandilashvili. Health Physics Database Progress Report



Health Physics Database: *Status 2016*

- Whole-body: 43 (Completed)

Partial-Body: 303





National Human Radiobiological Tissue Repository (NHRTR)

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

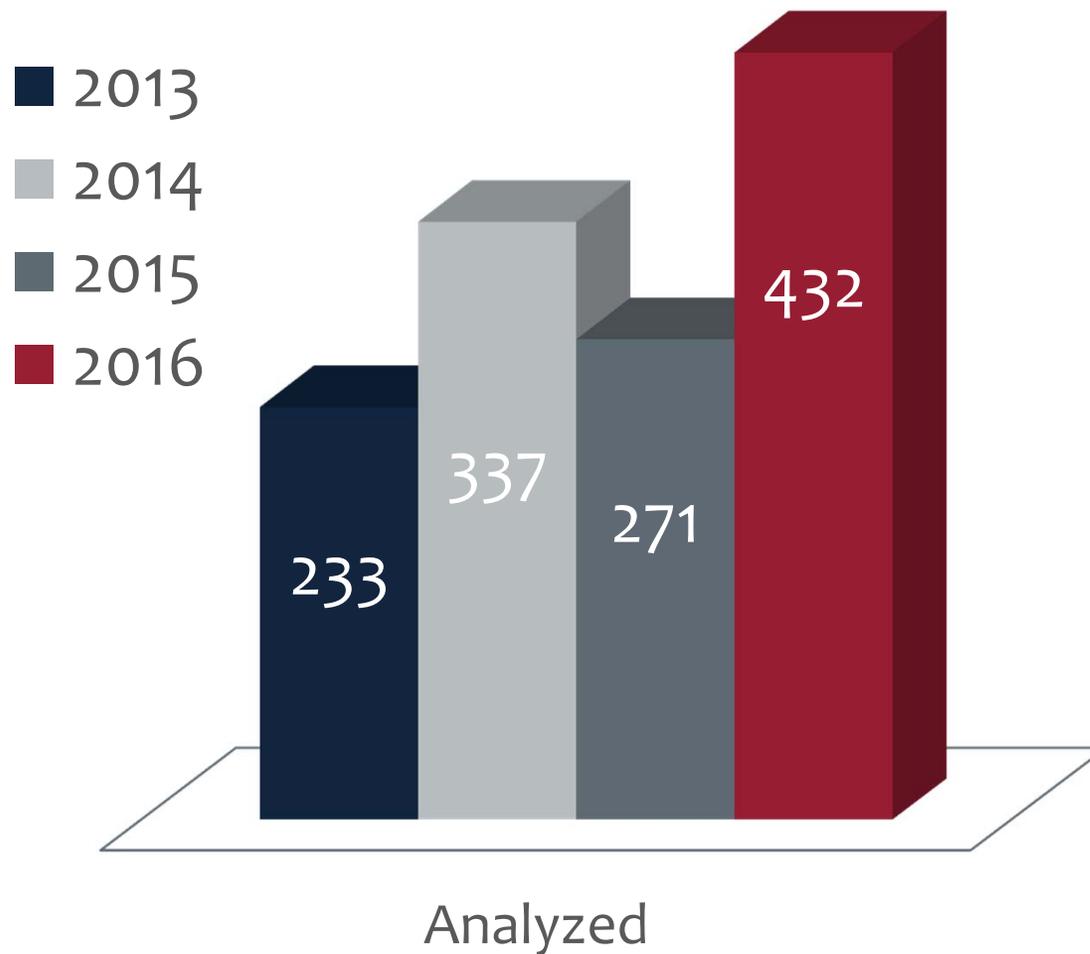
S.L. McComish. USTUR Registrant Statistics and NHRTR



In-house Radiochemistry

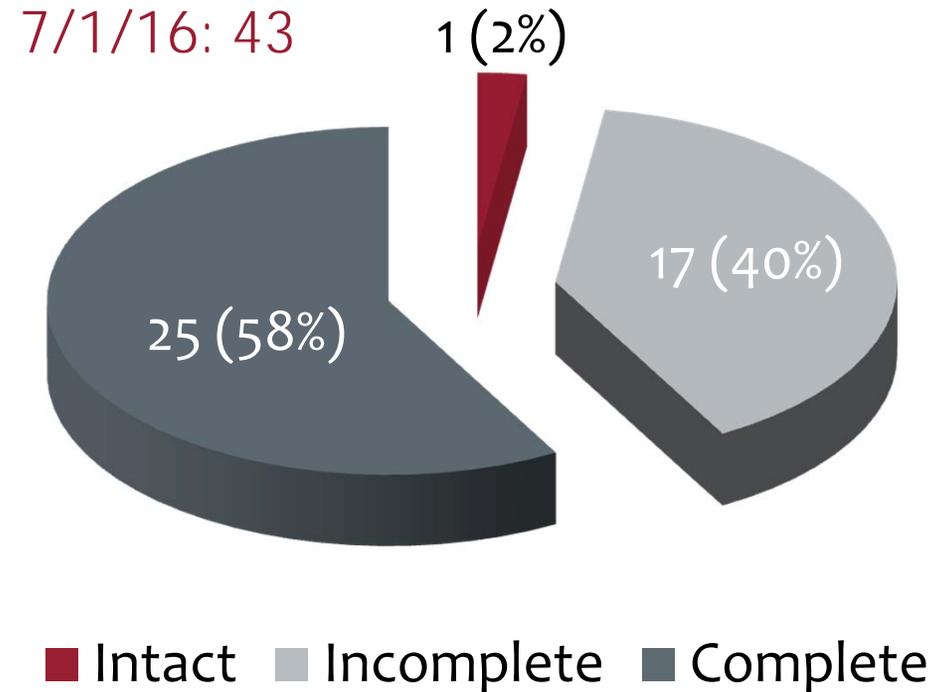
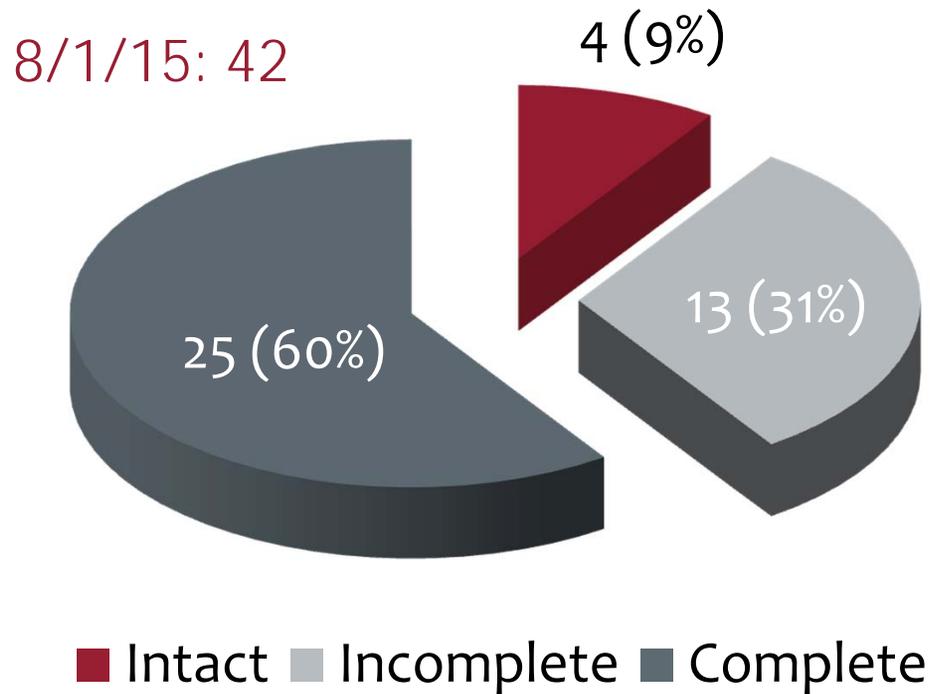
Elizabeth M. Thomas & George Tabatadze

Tissue Radiochemical Analysis 2013 – 2016





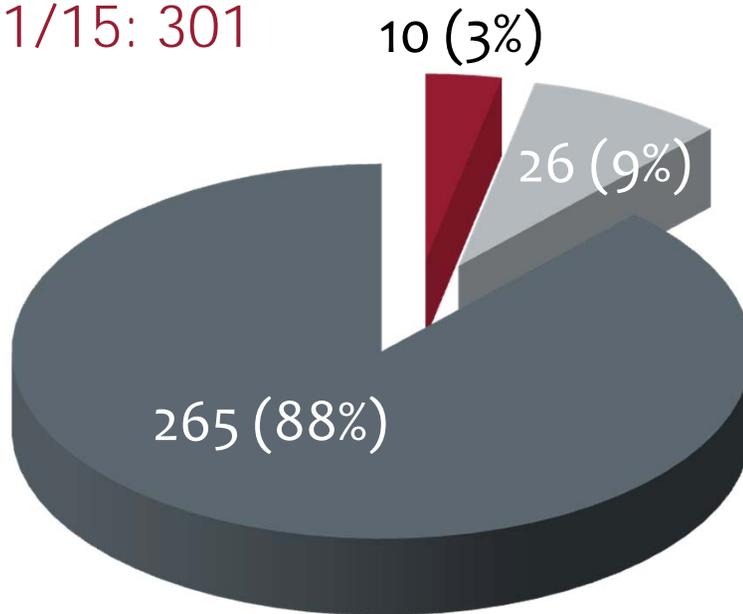
2015 – 2016 Donation Analysis Progress: Whole-Body





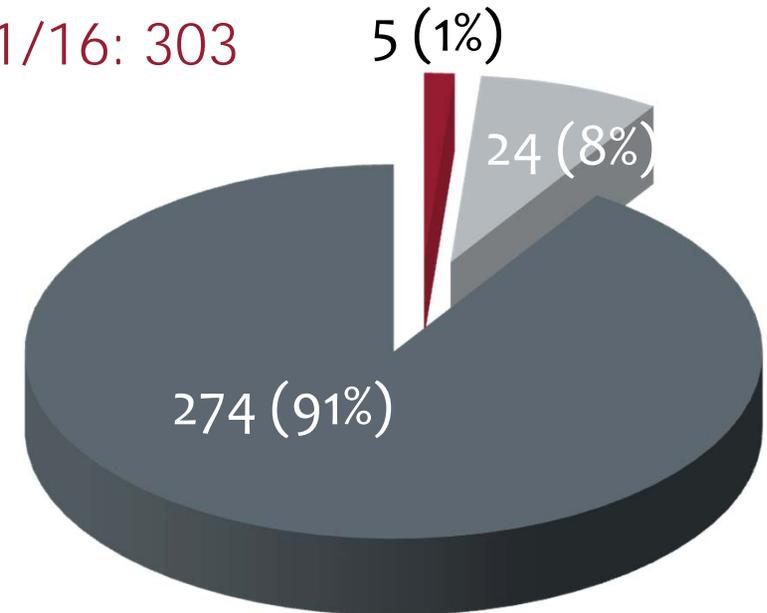
2015 – 2016 Donation Analysis Progress: Partial-Body

8/1/15: 301



■ Intact ■ Incomplete ■ Complete

7/1/16: 303



■ Intact ■ Incomplete ■ Complete

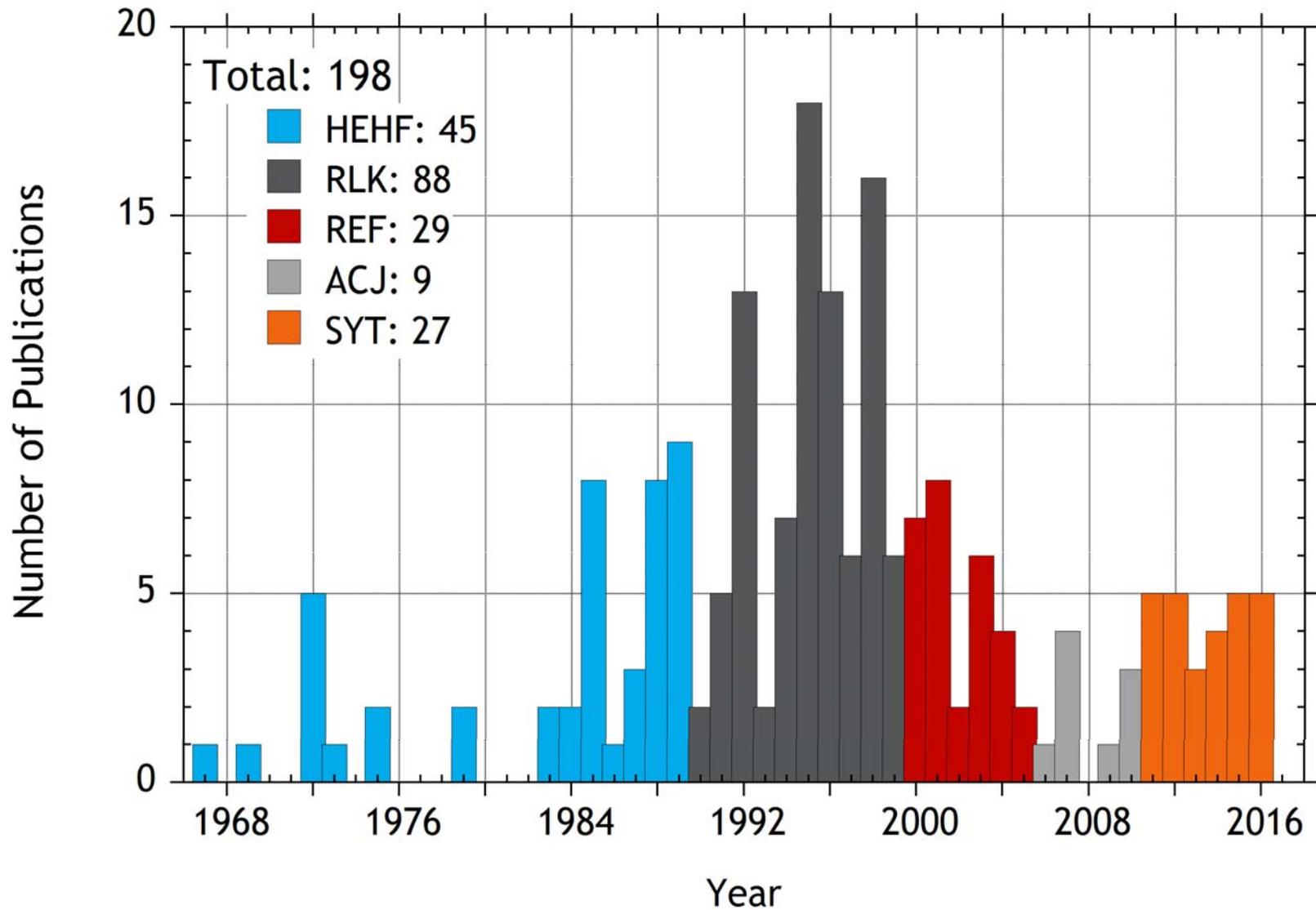


Publications 2016

- Full-Paper
 - ✓ Japanese Journal of Health Physics 1
 - ✓ Radiation Protection Dosimetry (0.913) 5
- Editorial
 - ✓ Health Physics News 3
- Abstract
 - ✓ Health Physics (1.271) 9



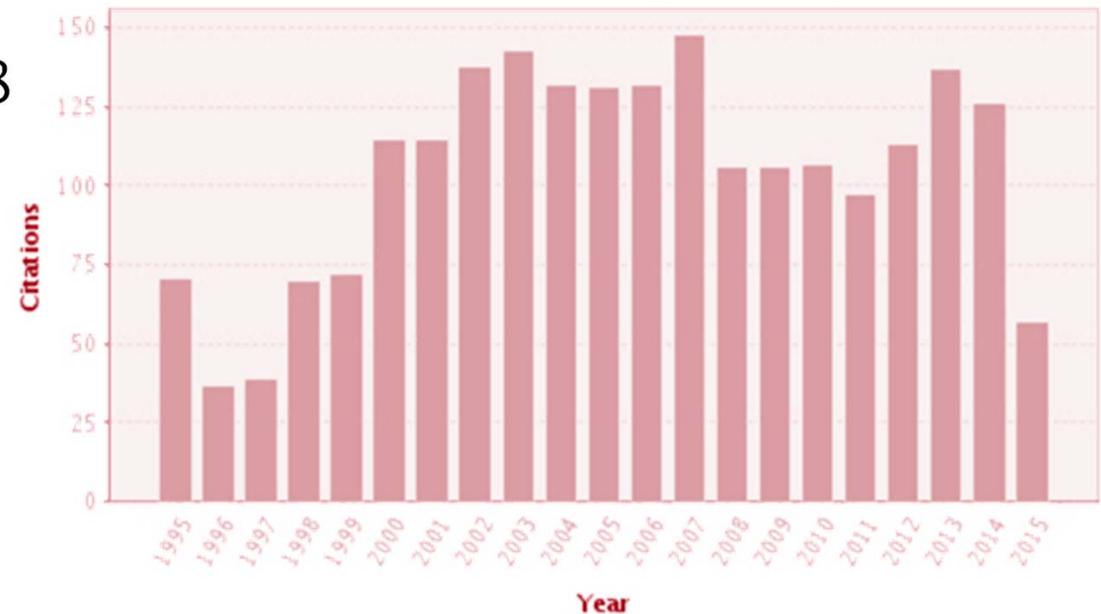
Publications 1967 – 2016





Citations 1980 – 2016

- ResearcherID: I-1056-2013
- Platform: Web of Science
- Peer-reviewed publications: 198
- Cited articles: 165
- Times cited: 2,447
- Average citations: 14.8
- h-index: 27





Professional Services

- Advisory Board: Herbert M. Parker Foundation
- Technical Board: Kyushu Environmental Evaluation Association (Japan)
- Editorial Board
 - ✓ Austin Biometrics and Biostatistics
 - ✓ Japanese Journal of Health Physics
- Professional Committee: Health Physics Society International Collaboration
- Professional Society
 - ✓ Health Physics Society
 - ✓ Radiation Research Society
 - ✓ European Radiation Dosimetry (EURADOS) WG-7 on Internal Dosimetry
- *Ad-hoc* Review
 - ✓ PLOS One (3.057)
 - ✓ Radiation Protection Dosimetry (0.894)
 - ✓ SpringerPlus (0.982)



Student Awards

- 2016 Health Physics Society Travel Grant
 - ✓ free meeting registration
 - ✓ complimentary hotel room
 - ✓ funds to assist in travel to the annual meeting
- 2016 Columbia Chapter Health Physics Society Scholarship: \$1,000



Thank you

