



World Class. Face to Face.

**2008 USTUR Scientific Advisory
Committee (SAC) Meeting
May 9, Red Lion Hotel, Pasco, WA**

Website and Database Development

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***"Learning from Plutonium and Uranium
Workers"***

Overview

- **Website**
- **The Information Management System (THEMIS)**
- **Internal Database: Pathology**
- **Internal Database: Health Physics**



Website

- The USTUR website is designed to disseminate information efficiently.
 - Featured Links
 - USTUR De-identified Registrant Data
- www.ustur.wsu.edu



Website – Homepage

WASHINGTON STATE UNIVERSITY
World Class. Face to Face.

Washington State University College of Pharmacy
United States Transuranium & Uranium Registries

USTUR Mission About Us Registrant Login

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USTUR
 De-identified Data
 Case Narratives
 Radiochemistry
 Health Physics
 Pathology
 NNDTR
 National Human Radiobiological Tissue Repository
 NRA
 National Radiobiology Archives
 Links

LEARNING FROM PLUTONIUM & URANIUM WORKERS

DOE 'Practicum' Voxel Phantom Study at USTUR
Read More »

Advisory Committee Policy/Procedures Faculty/Staff
Graduate Projects Conference Contributions Publications

Google™ Custom Search
Search

2008 Annual SAC Meeting
 The annual USTUR Scientific Advisory Committee (SAC) meeting will be held May 9-10, 2008 at the Red Lion Hotel, Pasco, WA.
 » Meeting Details

Standardizing Bioassay Assessment
 USTUR applies the UK Health Protection Agency's (HPA) IMBA Professional Plus (IPP) software to assess actinide intakes in individual Registrant cases – providing rigorous tests of the IPP methodology.
 » See details

Historical Radium Studies
 Radium dial painters, Radithor, Argonne National Laboratory.
 » Learn about U.S. radium studies

USTUR, Washington State University, 1845 Terminal Dr. Suite 201, Richland, WA 99354-4959 USA, 1-509-946-6870 or 1-800-375-9317



Website – Case Narratives

- Intake
- Health Physics
- Autopsy and Pathology
- Tissue Analysis
- Biokinetic Modeling
- References



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Case Narratives

Radiochemistry

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National Radiobiology Archives

Links

Case Narratives

Radiochemistry »

Health Physics »

Pathology »

Whole Body Donations

0102 »	0193 »	0205	0208 »
0212 »	0213 »	0242 »	0259 »
0262 »	0269 »	0303	0391
0425	0503	0635	0679
0680	0682	0706	0720
0744 »	0745	0769 »	0834
0846	0990	1001	1002 »
1007	1010 »	1028	1053
1054			

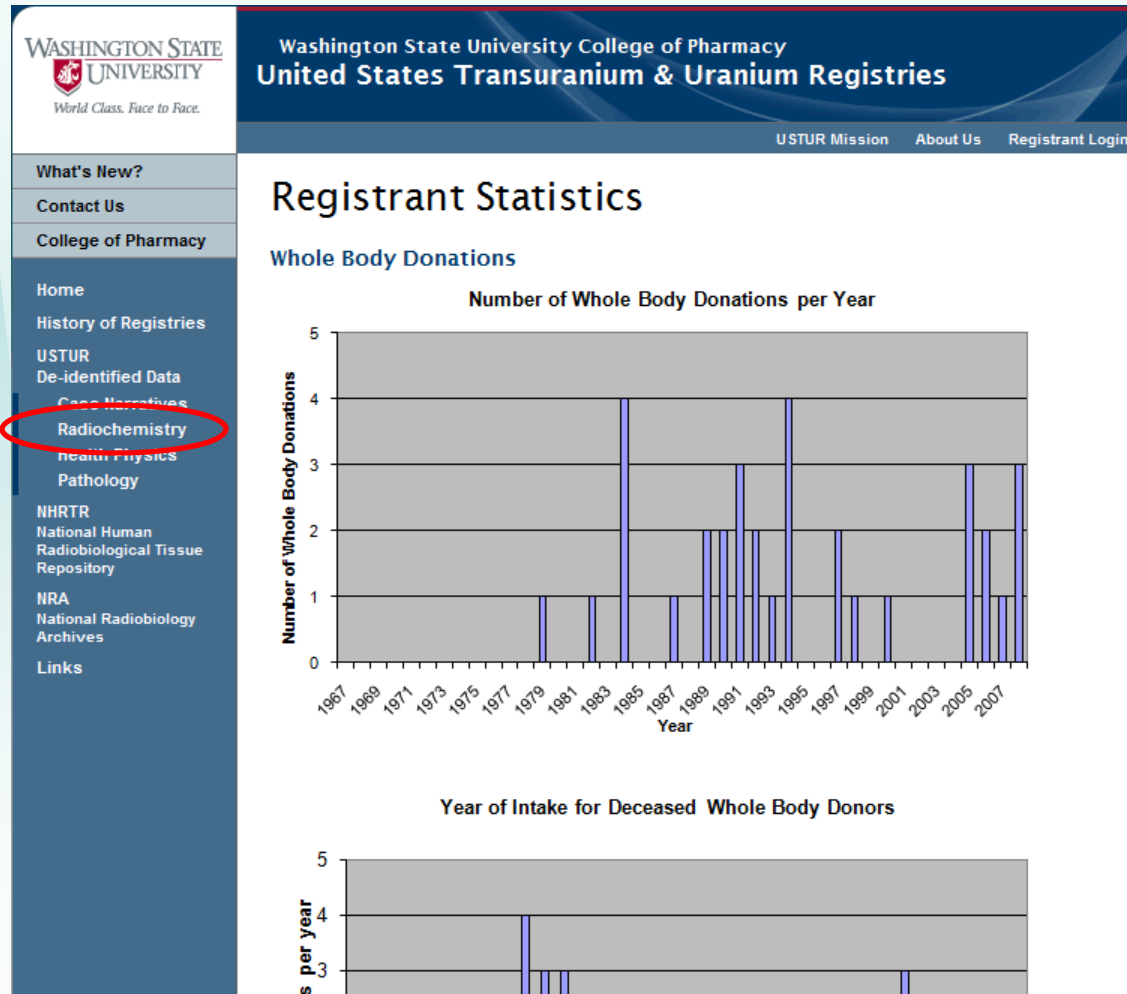
Registrant Statistics: Number of Donations by Year
Year of Intake

Partial Body Donations


0001	0002	0003	0003
0004	0005	0006	0007
0008	0009	0010	0011
0012	0013	0014	0015
0016	0017	0018	0019
0020	0021	0022	0023
0024 »	0025	0026	0027
0028 »	0029	0030	0031
0032	0033	0034 »	0035



Website – Registrant Statistics



Website – Radiochemistry



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National Human

Radiobiological Tissue

Repository

NRA

National Radiobiology

Archives

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Radiochemistry

[Radiochemistry Policies and Procedures »](#)

[Case Narratives »](#)

[Health Physics »](#)

[Pathology »](#)

Whole Body Donations

0102 »	0193	0205	0208
0212	0213	0242	0259 »
0262	0269 »	0391	0303
0425 »	0503	0635	0670 »
0680	0682 »	0706 »	0720 »
0744 »	0745	0769	0834
0846	0990	1001	1002
1007	1010	1028	1053
1054			

Partial Body Donations

0001	0002	0003	0003
0004	0005	0006	0007
0008	0009	0010	0011
0012	0013	0014	0015
0016	0017	0018	0019
0020	0021	0022	0023
0024 »	0025	0026	0027
0028	0029	0030	0031
0032	0033	0034	0035
0036	0037	0038	0039
0040	0041	0042	0043

Website – Radiochemistry

	A	B	C	D	E	F	G	H	I	J	K
1	USTUR Case 0720 - Measured Radionuclide Organ/Tissue Concentrations										
2											
3			Body Weight, kg:	70.3		Age, y:			DOD:		
4			Body Height, cm:	175					Autopsy:		
5			IC89 Predicted Skeletal Weight, kg:	10.1							
6											
7		Sample No.	Organ or Tissue	Wet Weight, g	Activity Concentration, Bq/kg of wet tissue						
8					²³⁹⁺²⁴⁰ Pu		²³⁸ Pu		²⁴¹ Am		
9					Meas.	s	Meas.	s	Meas.	s	
10											
11			Lungs:	1031	1.49E+02	1.59E+00	2.36E+00	1.37E-01	3.10E+01	4.01E-01	
12			LNTH:	20.1	2.90E+03	9.12E+01	4.84E+01	2.36E+00	5.42E+02	2.08E+01	
13	Note		Liver:	1156	6.51E+01	7.34E-01	9.88E-01	5.98E-02	4.03E+00	8.62E-02	
14			Skeleton:	11943	8.50E+00	6.84E-02	1.36E-01	2.75E-03	2.92E+00	2.65E-02	
15			Testes:	59	7.56E-01	4.45E-02	1.99E-02	6.47E-03	1.08E-01	1.36E-02	
16			Kidneys:	260	7.04E-01	3.20E-02	8.36E-03	4.41E-03	3.44E-01	2.63E-02	
17			Massive Soft Tissues:	55999	2.17E-01	2.32E-03	3.80E-03	3.18E-04	7.41E-02	1.24E-03	
18			Axial LN (Right):	1.52	5.06E+01	2.58E+00	8.66E-01	3.47E-01	8.46E+00	1.05E+00	
19			Axial LN (Left):	1.92	2.91E+01	7.45E-01	4.77E-01	9.79E-02	6.82E+00	3.88E-01	
20			Cervical LN (Right?):	1.09	1.08E+00	6.09E-01	-2.53E-01	3.16E-01	4.06E-01	6.56E-01	
21			Total Body:	70471	5.69E+00	3.87E-02	9.08E-02	2.39E-03	1.23E+00	9.62E-03	
22	#4		Pu Isotopic Composition of Intake Material:								
23			Soft Tissue Organs	55999							
24			Brain:	1003	2.32E-01	4.29E-03	3.98E-03	5.84E-04	3.28E-02	1.46E-03	
25			Thyroid:	17.9	1.59E+00	1.42E-01	-2.37E-02	1.87E-02	1.53E-01	6.92E-02	
26			Pancreas:	112	9.53E-01	5.80E-02	1.93E-02	9.66E-03	1.28E-01	2.22E-02	
27			Prostate:	34.9	2.48E-01	2.53E-02	2.24E-03	2.51E-03	1.00E-01	1.22E-02	
28			Pituitary:	0.29	6.54E+00	1.11E+00	9.14E-01	4.49E-01	2.13E+00	9.92E-01	
29			Urinary Bladder:	100	1.93E-01	2.52E-02	5.79E-03	6.48E-03	9.03E-02	2.32E-02	
30			Heart:	490							
31			Aortic Arch:	78.7	7.48E+00	2.13E-01	1.73E-01	2.80E-02	1.44E+00	8.45E-02	
32			Spleen:	207	1.70E+01	3.15E-01	3.00E-01	2.40E-02	3.56E+00	1.08E-01	
33			Larynx:	56.9	2.98E+00	1.14E-01	7.25E-02	1.68E-02	1.34E+00	7.48E-02	
34			Trachea:	42.8	7.83E-01	7.05E-02	1.77E-02	1.45E-02	5.86E-01	6.26E-02	
35											



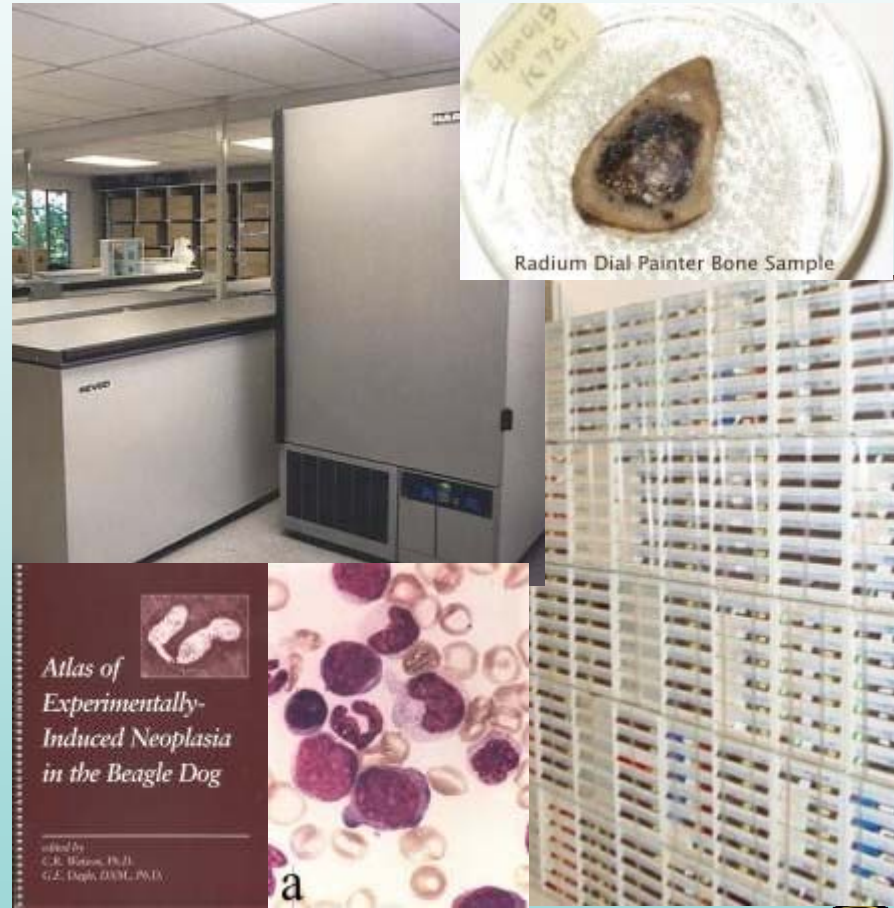
Overview

- Website
- **The Information Management System (THEMIS)**
- Internal Database: Pathology
- Internal Database: Health Physics



The Management Information System (THEMIS) Slide 10

- **THEMIS integrates with a barcode scanner to inventory:**
 - **USTUR tissues, histopathologic slides, and acid solutions.**
 - **National Human Tissue Repository (NHRTR) tissues and bone ash.**
 - **National Radiobiology Archives (NRA) histopathologic slides, tissue blocks, and documents.**



The Management Information System (THEMIS) Slide 11

- Mr. Tim Burrill of R.J. Lee Solutions LLP, the software developer, is currently adapting the 'off-the-shelf' THEMIS software to meet USTUR's specific sample inventory and 'chain of custody' needs.

Washington State University

CHAIN OF CUSTODY DOCUMENT

From Location	To Location	Custody Date
HALL FREEZER 1	TEST AMERICA	4/11/2006 10:42:23 AM

Samples Moved By STACEY L. MCCORD

Sample sent to Test America for acid dissolution

List of Samples Moved

Barcode	USTUR Sample #	Sample Description
08000044	0846-023	desc



The Management Information System (THEMIS) Slide 12

- The software will:
 - Assign a unique barcode to each sample.
 - Allow us to record a sample's mass or volume.
 - Track the sample's current location as it is moved within the NHRTR facility (e.g, from one freezer to another).
 - Track the sample's location as it is 'shipped' to an external laboratory for radiochemical analysis.

The screenshot displays two windows from the THEMIS software. The top window, titled 'THEMIS - [Sample Info]', shows a form for entering sample details. The bottom window, titled 'THEMIS - [Sample History]', shows a log of sample movements and custody.

Sample Info Window:

- USTUR Case #: 0846
- Collection Class: NHRTR
- Collection: USTUR
- External Case #: n/a
- USTUR Sample #: 023
- Barcode: 08000044
- External Sample #: n/a
- Current Location: HALL FREEZER 1
- Parent Item: (empty)
- Date Received: 4/8/2008 2:31:52 PM
- By: Stacey L. McCord
- From: DMS
- Description: desc
- Source Class: PATHOLOGIST
- Seal Pack: Clear Plastic Bag
- Mass Type: Autopsy
- Sample Type: Tissue - Autopsy
- Tissue Type: Gland
- Tissue: Pancreas
- Acid Type: (empty)
- Amount: 126.6 g
- Comments: dissected into pieces for fixation

Sample History Window:

- USTUR Case #: 0846
- USTUR Sample #: 023
- Collection: USTUR
- Description: desc
- Sample Barcode: 08000044
- External Case #: n/a

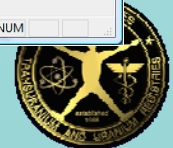
History Log:

Released To:	Received From:	Custody Date:
HALL FREEZER 1	HALL FREEZER 2 - STACEY L. MCCORD	4/11/2008 10:20:40 AM
HALL FREEZER 2	C08000005 (HALL FREEZER 1) - STACEY L. MCCORD	4/11/2008 10:19:30 AM
C08000005 (HALL FREEZER 1)	HALL FREEZER 1 - Stacey L. McCord	4/8/2008 3:01:56 PM
Stacey L. McCord - HAND DELIVERED	DMS	4/8/2008 2:31:52 PM

Comments: sample moved from Hall Freezer 1 to Hall Freezer 2

Accessioned Container C08000005

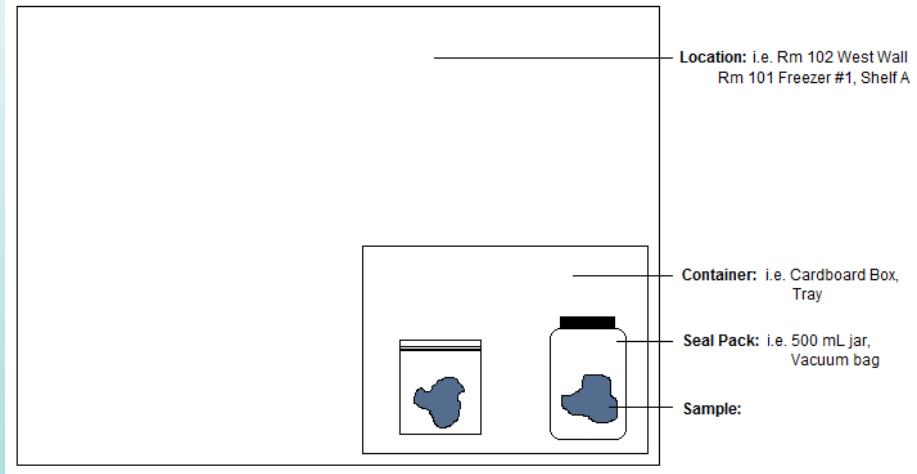
Container Entered



The Management Information System (THEMIS)

Slide 13

- **Sample:** The *sample* is the item that we are inventorying. We have a broad range of samples including frozen tissue samples, acid solutions, histopathology slides, documents, ash, and dried bones.
- **Seal Pack:** The *seal pack* refers to how the sample is packaged. For example an acid solution may be packaged in a 500 mL bottle or a tissue sample might be sealed in a vacuum bag. Other Seal Pack types include: planchet, clear plastic bag, and 55 gal drum.
- **Container:** A *container* can hold multiple samples. Samples can be moved out of (or into) a container, or an entire container full of samples can be moved from one location to the next. If a container is moved, individual sample locations will also reflect the move.
- **Location:** The *location* specifies where a sample or container can be found. Locations are broken into three fields: Facility (i.e. NHRTR, Test America, Northern Az. Univ.), Room #, and Other Details (i.e. Shelf A, Freezer #1).



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Pathology

- **USTUR has sub-contracted a professional nosologist, Carolyn Watkins, to code consistently all death certificates using both Revisions 9 and 10 of the “Post Mortem Observations by International Classification of Diseases” (ICD-9-CM and ICD-10).**
- **147 cases out of 320 have been coded.**



Pathology – ICD coding

- Causes of death are identified and coded.
- The underlying cause of death is determined.
- The top 7 contributing causes of death are identified and ranked according to severity (1 = most severe, 7 = least severe)
- Upon receipt, ICD-9-CM and ICD-10 codes are imported into the USTUR's internal database.

HOSPITAL: 121 Case # 0217

AUTOPSY REPORT

FAMILY NAME		FIRST NAME		MIDDLE INITIAL	AGE	ATTENDING PHYSICIAN	HOSP
					65		NO
DATE OF ADMISSION	DATE OF DEATH	TIME OF DEATH	DATE OF AUTOPSY		TIME OF AUTOPSY	AUTOPSY NO.	
AUTOPSY COMPLETE <input checked="" type="checkbox"/>		LIMITED: HEAD ONLY <input type="checkbox"/>		TRUNK ONLY <input type="checkbox"/>		PROSECTOR	

ANATOMIC DIAGNOSIS:

104L
I 25.3
I 51.7
I 61.5
I 93.85
R 69.8
D 73.2
K 76.1
N 28.8
K 74.6
J 44.9
J 84.1

- I. ACUTE MYOCARDIAL INFARCTION. ✓
 - A. OCCLUSION AND THROMBOSIS, ANTERIOR DESCENDING BRANCH, CORONARY ARTERY. ✓
 - B. ADVANCED ATHEROSCLEROTIC VASCULAR DISEASE. #40.9
 - C. ANEURYSM, FIBROTIC, LEFT VENTRICULAR APEX. #4.10
 - D. LEFT VENTRICULAR HYPERTROPHY. #29.8
 - E. HEMORRHAGE AND SOTTENING, POSTERIOR ASPECT, LEFT VENTRICLE. #31, #34.90
 - F. MULTIPLE VISCERAL ORGAN CONGESTION. #44.89
 1. SPLEEN. 289.51
 2. LIVER. 573.0
 3. KIDNEYS. 543.89
 4. ADRENALS.
- II. CIRRHOSIS, MICRONODULAR, ADVANCED, LIVER. 571.5
- III. CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH MICROFOCAL GRANULOMATA. 496.2
- IV. HISTORY OF DIABETES MELLITUS. 250.0

TOXICOLOGY: Not performed.

SUMMARY: It is apparent that he died abruptly following thrombosis of the anterior descending branch coronary artery which resulted in acute infarction of a substantial portion of the diaphragmatic aspect of the left ventricle. Extensive damage caused by the previous infarction may have contributed to his demise.

No evidence of neoplasia or adventitial trauma is identified.

PATHOLOGIST

Pathology – Internal Database

ADMIN

Case No.

Admin Medical Rad Chem Health Physics Clinical Pathology NHRTR Solution Registrants Next of Kin

ICD-9-CM Cause of Death

ICD-9-CM	Description	Relation to Death	Source
▶ 188.9	Malignant neoplasm of bladder: Bladder, part unspecified	0	D
427.5	Cardiac dysrhythmias: Cardiac arrest	1	D
197.0	Secondary malignant neoplasm of respiratory and digestive systems: Lung	2	A
197.7	Secondary malignant neoplasm of respiratory and digestive systems: Liver, specified as second	3	A
198.0	Secondary malignant neoplasm of other specified sites: Kidney	4	A
198.7	Secondary malignant neoplasm of other specified sites: Adrenal gland	5	A
403.90	Hypertensive kidney disease: Unspecified: without chronic kidney disease	6	A
492.8	Emphysema: Other emphysema	7	A

ICD-10 Cause of Death

ICD-10	Description	Relation to Death	Source
▶ C67.9	Malignant neoplasm of bladder: Malignant neoplasm: Bladder, unspecified	0	D
I46.9	Cardiac arrest: Cardiac arrest, unspecified	1	D
C78.0	Secondary malignant neoplasm of respiratory and digestive organs: Secondary malignant neoplasm	2	A
C78.7	Secondary malignant neoplasm of respiratory and digestive organs: Secondary malignant neoplasm	3	A
C79.0	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of kidney and renal p	4	A
C79.7	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of adrenal gland	5	A
I12.9	Hypertensive renal disease: Hypertensive renal disease without renal failure	6	A
J43.9	Emphysema: Emphysema, unspecified	7	A

Note: Examiner's Notes reflect the wording used on the autopsy report and/or death certificate. They are intended to supplement, but not supercede, ICD-9-CM and ICD-10 codes.

Record: 28

Examiner's Notes

- ▶ Carcinoma, papillary, urinary bladder (Grade IV) with metastases
- Abscesses, renal cortex, acute, multiple
- Cachexia, severe
- Metastases to adrenal
- Metastases to kidney, bilateral
- Metastases to liver
- Metastases to lung, bilateral

Pathology – Search Form

ADMIN

Case No.

Admin Medical Rad.Chem Health Physics Clinical Pathology NHRTR Solution Registrants Next of Kin

ICD-9-CM Cause of Death

ICD-9-CM Description Relation to Death Source Search Pathology

Search

Search Pathology by ICD code or keyword

Case Number Search

ICD-9-CM code Search

ICD-10_code Search

Keyword Search

*Keyword search identifies pathology records that contain all keywords in either the ICD-9-CM code description or the ICD-10 code description.

Note: Examiner's Notes reflect the wording used on the autopsy report and/or death certificate. They are intended to supplement, but not supercede, ICD-9-CM and ICD-10 codes.

Record:

Pathology – Search Results

ADMIN

Case No. 0028

Pathology Search Results

Case No	Relation to Death	ICD-9-CM	Description	Source	ICD-10	Description	Source
0028	4	198.0	Secondary malignant neoplasm of other specified sites: Kidney	A	C79.0	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of kidney and renal pelvis	A
0038	3	198.0	Secondary malignant neoplasm of other specified sites: Kidney	A	C79.0	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of kidney and renal pelvis	A
0044	0	189.0	Malignant neoplasm of kidney and other and unspecified urinary organs: Kidney, except pelvis	D	C79.0	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of kidney and renal pelvis	D
0091	1	198.0	Secondary malignant neoplasm of other specified sites: Kidney	A	C79.0	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of kidney and renal pelvis	A
0092	0	189.0	Malignant neoplasm of kidney and other and unspecified urinary organs: Kidney, except pelvis	D	C64	Malignant neoplasm of kidney, except renal pelvis	D
0102	1	198.0	Secondary malignant neoplasm of other specified sites: Kidney	A	C79.0	Secondary malignant neoplasm of other sites: Secondary malignant neoplasm of kidney and renal pelvis	A

Record: 1 of 9 (Filtered)

Note: Examiner's Notes reflect the wording used on the autopsy report and/or death certificate. They are intended to supplement, but not supercede, ICD-9-CM and ICD-10 codes.

Record: 28 of 870

Overview

- **Website**
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- **Internal Database: Health Physics**



USTUR Health Physics Database

Goals:

- **Searchable - Eight specialized tabs that contain 179 individually searchable fields:**
 - Incidents
 - Contamination
 - In Vitro
 - In Vivo
 - Air Monitoring
 - Work Site Assessments
 - External
 - Treatment
- **Consistent – Quality Assurance Measures**



Incidents

frm_Health_DataEntry : Form

Incidents Contamination In Vitro In Vivo Air Monitoring Work Site Assessments External Treatment

Case_No: **0102** Chelated

Edit Incidents Lock Incidents Add to Contaminant List

Incident Indicator	Primary Contaminant	Date/Time	Location	Description	Source	Worksite Code
Bioassay	Am-241	Start: 3/1/1952 End: 3/1/1954 Exposure Duration: unknown		The first indication of an intake was in March 1958, when a routine urine sample indicated positive alpha counts. These counts were later determined to be from Am-241. There was no documented event to establish the time of exposure, but it is likely that the intake occurred between March 1952 and March 1954. During this time, the registrant repeatedly manipulated 3-	3/8/79 - Summary report on Registrant's	
Bioassay	Ra-226	Start: End: 2/5/1963 Exposure Duration: unknown	unspecified	Possible inhalation of Ra-226/Rn-222 (and daughters). Whole Body Count performed on 2/6/1963 found no detectable activity above background. Detection limit for Ra-226 and daughters was 0.002 uCi.	4/17/63 - report of whole body counting	
*		Start: End: Exposure Duration:				

Record: 2 of 2

Incidents

- The 'Incidents' tab provides a ready index of possible intake dates by summarizing all radiological incidents that the worker was involved in.
- Incidents are categorized using 'Incident Indicators':
 - Air Sample
 - Bioassay – Used when a high or 'special request' bioassay is the only indicator of an incident.
 - Contamination
 - Criticality
 - Fire
 - Wound
 - Other



Quality Assurance

- **Unit Standardization**
- **Automatic Calculations**
- **Dropdown Menus**

Unit Standardization

- Eliminates unit conversion errors
- Standardized Units are compatible with IMBA
- Database stores both the original (hard-file based) and the standardized values.

Reported Results					Derived Activity (pCi)			
Value	Uncert	MDA	DL	Unit	Value	Uncert	MDA	DL
14.1	0.1			nCi	1.41E+04	1.00E+02		
<input type="checkbox"/> Reported <MDA								
		0.002		uCi			2.00E+03	
<input checked="" type="checkbox"/> Reported <MDA								
1				dpm	4.50E-01			
<input type="checkbox"/> Reported <MDA								



Unit Standardization

- **Incidents**
 - No conversions necessary
- **Contamination**
 - Activity – dpm or cpm
- **In Vitro**
 - Activity – pCi
 - Excretion Rate – pCi/day
 - Total Blood Activity – pCi
 - Nuclide Mass - μg
 - Sample Period – day
 - Volume – mL
 - Mass (wet) – gram
- **In Vivo**
 - Activity - pCi
- **Air Monitoring**
 - Concentration – pCi/cc or MPC
 - Sample Period – day
- **Work Site Assessments**
 - Absorbed Dose – rad
 - Body/Organ Burdens – pCi
 - Dose Equivalent – rem
- **External**
 - Absorbed Dose – rad
 - Dose Equivalent – rem
 - Exposure – R
- **Treatment**
 - Dosage – gram
 - Activity Removed - pCi



Automatic Calculations

- **User-entered hard file data is used to calculate derived quantities**
 - **Effective Sample Period**
 - **Effective Sample Period = End Time – Start Time**
 - **Activity per sample (pCi)**
 - **Derived Activity = Conc · Volume Collected**
(when not reported in activity units)
 - **Excretion Rate (pCi/day)**
 - **Excretion Rate = Activity/Sample Period**
 - **Total Blood Activity**
 - **Total Blood Activity = Conc · 5300 mL**



Automatic Calculations

- Chelation Cases are flagged if the 'Treatment' tab contains a chelation record.
- In Vitro records are flagged if the sample was collected within 7 days of chelation treatment.

Incidents Contamination In Vitro In Vivo Air Monitoring Work Site Assess

Case_No: **0102** Chelated

Edit In Vitro Lock In Vitro Add to Contaminant Lis

Sample Info	Primary Contaminant	Collection Ti
Medium: Feces Type: 24-hr Chelation: <input checked="" type="checkbox"/>	Am-241	Start: 8/5/1958 End: 8/6/1958 Effective Sample Period, d:
Medium: Urine Type: 24-hr Chelation: <input type="checkbox"/>	Am-241	Start: 3/27/1958 End: 3/28/1958 Effective Sample Period, d:

Incidents Contamination In Vitro In Vivo Air Monitoring Work Site Assessments External Treatment

Case_No: **0102** Chelated

Edit Treatment Lock Treatment

Treatment	Modality	Date/Time	Dosage	Dosage Unit	Activity Removed	Activity Unit	Deriv
Ca-EDTA	i.v.	8/5/1958	1	g			1

Dropdown Menus

- Consistent nomenclature, abbreviations, and spelling, are vital to a searchable database.
- Dropdown menus eliminate 'typos' and ensure consistent nomenclature by forcing the user to select from a finite list of values.

The screenshot displays a web application interface with a navigation bar at the top containing tabs: Incidents, Contamination, In Vitro (selected), In Vivo, Air Monitoring, and Work Site. Below the navigation bar, the 'Case_No:' is 0102, and the status is 'Chelated'. The main form area is divided into sections for 'Sample Info', 'Primary Contaminant', and 'Collection'. The 'Sample Info' section includes dropdown menus for 'Medium' (Feces) and 'Type' (24-hr), and a checkbox for 'Chelation'. The 'Primary Contaminant' section includes a dropdown menu for 'Am-241' which is open, showing a list of options: Am-241, Am-241, Pu, Am-241, Pu-238, Am-241, Pu-239, Am-241, Pu-241, Am-242, Am-242m, and Am-243. The 'Collection' section includes dropdown menus for 'Start' (6/2) and 'End' (6/2), and a checkbox for 'Effective Period, d:'.

User Manual

- A work in progress...
- <http://www.ustur.wsu.edu/PolicyProcedures/DataEntryHP/index.html>

Washington State University College of Pharmacy
United States Transuranium & Uranium Registries

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User Manual

USTUR health physics database

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