

2012 Scientific Advisory Committee Meeting
Anthony's at Columbia Point, Richland, WA
September 7 - 8, 2012

÷ Health Physics Database ÷ Standardization of Exposure Records and Bioassay Data



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*“Learning from Plutonium and
Uranium Workers”*

Health Physics Database

Goal:

- Standardized and searchable
 - Exposure Records;
 - Bioassay Data;
 - Historical Dose Assessments;
 - Decorporation Treatment Records
- Designed to make the data easily available for scientists studying the distribution and dosimetry of actinides in the human body



Health Physics Database

USTUR Data Entry: Health Physics



United States
Transuranium and Uranium Registries

Intake Type:

Contaminant(s):

Case No

Admin Medical Rad.Chem **Health Physics** Clinical Pathology Next of Kin

Bioassay Summary

Monitoring Type	Count
Feces	2
Urine	20
Lung	1
Skeleton	8
Whole Body	1

Detailed Data

Urine	Feces
Blood	Skeleton
Lung	Liver
Wound	WBC
All Data	
<input type="button" value="Enter Data"/>	

Index

Intake Type:

Contaminant(s):

ICRP 68 Type:

Chemical Form:

HP Entered:

Search Options

Notes:



Health Physics Database

'Incidents' Tab

Possible Intakes Categorized by:

- Incident Indicators

- ✓ Air Sample
- ✓ Bioassay
- ✓ Contamination
- ✓ Criticality
- ✓ Explosion
- ✓ External
- ✓ Fire
- ✓ Hazard Report
- ✓ Nasal Smear
- ✓ Wound

Incident Indicator	Primary Contaminant	Date/Time	Location	Description
Bioassay	Am-241	Start: 3/1/1952 End: 3/1/1954 Exposure Duration: unknown	University of California Berkeley	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 a 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
Bioassay	Ra-226	Start: 2/5/1963 End: 2/5/1963 Exposure Duration: unknown	unspecified	Possible inhalation of Ra-226/Rn-222 (and daughters). Whole Body Count performed on 2/5/1963 found no detectable activity above background. Detection limit for Ra-226 and daughters was 0.002 uCi.
*		Start: End: Exposure Duration:		

- Primary Contaminant
- Date/Time
- Location
- Description



Health Physics Database

'Contamination' Tab

Details on reported contamination incidents

- Modality
 - ✓ Personal
 - ✓ Clothing
 - ✓ Workspace
- Location
- Contaminant
- Measurement Date/Time
- Reported Results
- Decontamination Agents / Results

The screenshot shows a software window titled 'frm_Health_DataEntry : Form' with a 'Contamination' tab selected. The table below represents the data shown in the interface:

Modality	Location	Primary Contaminant	Measurement Date/Time	Inequality	Activity	Unit	Derived Values (dpm or cpm)	Decontamination Agents	Decontamination Results	Comments
Workspace	Sample bag - west side of each hood number 2	Am-241, Pu-239	12/5/1969	>	40000	dpm	4.00E+04 dpm			Associated
Workspace	Large seal out port - backside of sorting hood	Am-241, Pu-239	12/5/1969	>	40000	dpm	4.00E+04 dpm			Associated
Personal	Wound - middle finger right hand	Pu-239	7/27/1968	=	500	dpm	5.00E+02 dpm		Decontaminated	
Personal	Wound site - second finger right hand; direct	Pu, normal	9/21/1970 10:45:00 PM	=	30000	dpm	3.00E+04 dpm		Decontaminated	listed as Pu
Personal	Wound site - second finger right hand; direct	Pu, normal	9/21/1970 10:45:00 PM	=	20000	dpm	2.00E+04 dpm		Decontaminated to <500 dpm	listed as Pu
Personal	Left thumb	alpha	7/3/1968	=	2000	dpm	2.00E+03 dpm		Decontaminated to non-detectable level	
*										



USTUR Health Physics Database

'In Vitro' Tab

Blood, Urine, Fecal, Nasal Smear, Oral Smear Data

- Sample Info
 - Medium
 - Type
- Contaminant
- Collection Time
- Reported Results
 - Value
 - Uncertainty
 - MDA / DL

Sample Info		Contaminant(s)	Collection Time	Reported Net Activity (per Collected Sample)			Derived Values						
Type	Volume/Mass		Start	Value	Uncert	MDA	DL	Unit	Activity	Uncert	MDA	DL	Unit
Medium: Urine	Am-241		Start: 8/30/1976 6:00:00 AM	8.80E+06				dpm	Sample Content: 3.96E+06				pCi /sa
Type: Volume/Mass			End: 8/30/1976 6:00:00 AM						Excretion Rate: 6.34E+07				pCi /day
			Effective Sample Period, d:						Total Blood Activity:				pCi
			<input type="checkbox"/> Chelation (within 2 wks of administering)										Creline, s
			<input type="checkbox"/> Sample Period Override										
			<input type="checkbox"/> Manually Enter <MDA										
Medium: Urine	Am-241		Start: 8/30/1976 10:00:00 AM	1.33E+08				dpm	Sample Content: 5.99E+07				pCi /sa
Type: Volume/Mass			End: 8/30/1976 10:00:00 AM						Excretion Rate: 3.36E+08				pCi /day
			Effective Sample Period, d:						Total Blood Activity:				pCi
			<input type="checkbox"/> Chelation (within 2 wks of administering)										Creline, s
			<input type="checkbox"/> Sample Period Override										
			<input type="checkbox"/> Manually Enter <MDA										
Medium: Urine	Am-241		Start: 8/30/1976 2:00:00 PM	6.15E+07				dpm	Sample Content: 2.77E+07				pCi /sa
Type: Volume/Mass			End: 8/30/1976 2:00:00 PM						Excretion Rate: 2.53E+08				pCi /day
			Effective Sample Period, d:						Total Blood Activity:				pCi
			<input type="checkbox"/> Chelation (within 2 wks of administering)										Creline, s
			<input type="checkbox"/> Sample Period Override										
			<input type="checkbox"/> Manually Enter <MDA										
Medium: Urine	Am-241		Start: 8/30/1976 6:20:00 PM	8.60E+07				dpm	Sample Content: 3.87E+07				pCi /sa
Type: Volume/Mass			End: 8/30/1976 6:20:00 PM						Excretion Rate: 1.91E+08				pCi /day
			Effective Sample Period, d:						Total Blood Activity:				pCi
			<input type="checkbox"/> Chelation (within 2 wks of administering)										Creline, s
			<input type="checkbox"/> Sample Period Override										
			<input type="checkbox"/> Manually Enter <MDA										
Medium: Urine	Am-241		Start: 8/31/1976 1:00:00 AM	6.00E+07				dpm	Sample Content: 2.70E+07				pCi /sa
Type: Volume/Mass			End: 8/31/1976 1:00:00 AM						Excretion Rate: 1.15E+08				pCi /day
			Effective Sample Period, d:						Total Blood Activity:				pCi
			<input type="checkbox"/> Chelation (within 2 wks of administering)										Creline, s
			<input type="checkbox"/> Sample Period Override										
			<input type="checkbox"/> Manually Enter <MDA										
Medium: Urine	Am-241		Start: 8/31/1976 4:45:00 AM	1.43E+07				dpm	Sample Content: 6.44E+06				pCi /sa
Type: Volume/Mass			End: 8/31/1976 4:45:00 AM						Excretion Rate: 4.29E+07				pCi /day
			Effective Sample Period, d:						Total Blood Activity:				pCi
			<input type="checkbox"/> Chelation (within 2 wks of administering)										Creline, s
			<input type="checkbox"/> Sample Period Override										
			<input type="checkbox"/> Manually Enter <MDA										
Medium: Urine	Am-241		Start: 8/30/1976 6:00:00 AM	2.89E+08				dpm	Sample Content: 1.30E+08				pCi /sa
Type: 24-hr			End: 8/31/1976 6:00:00 AM						Excretion Rate: 1.30E+08				pCi /day
			Effective Sample Period, d:										Analyzec
			<input type="checkbox"/> Chelation (within 2 wks of administering)										



USTUR Health Physics Database

'In Vivo' Tab

Data associated with *in vivo* (direct) measurements

- Monitoring Target
 - ✓ Whole Body
 - ✓ Lung
 - ✓ Liver
 - ✓ Wound
 - ✓ etc
- Contaminant
- Count Start Time
- Reported Results
- Laboratory / Detectors

The screenshot shows a software interface for Case No. 1060, 'Not Chelated'. The 'In Vivo' tab is active, displaying a table of measurement data. The table has columns for Monitoring Target, Contaminant(s), Count Start Time, Value, Uncert, MDA, DL, Unit, Activity, Uncert, MDA, DL, Unit, Count Length, min, and Comments. The data includes measurements for Cs-137 and gamma-low energy across various monitoring targets like Whole Body, Lung, and Liver, with different detector positions and count start times.

Monitoring Target	Detector Position	Contaminant(s)	Count Start Time	Value	Uncert	MDA	DL	Unit	Activity	Uncert	MDA	DL	Unit	Count Length, min	Comments
Whole Body		Unclear	7/10/1986 8:32:04 AM	0				uCi	0.00E+00				pCi	6	Thyroid Spect
Whole Body		Unclear	7/10/1986 8:32:04 PM	0				uCi	0.00E+00				pCi	6	Body Spectru
Lung	chest	Am-241	5/9/1979 9:06:00 AM	0.16				pCi			1.60E+02		pCi		
Whole Body	geometry not specified, whole body assumed	Cs-137	10/14/1960	0.0033				uCi	3.30E+03				pCi	20	
Whole Body	chair geometry, iron room	Cs-137	4/21/1969	0.0012				uCi	1.20E+03				pCi	10	20 keV/chan
Whole Body	chair geometry	Cs-137	8/21/1970	0.0016				uCi	1.60E+03				pCi	10	20 keV/chan
Whole Body		Cs-137	8/21/1970	0.0016				uCi	1.60E+03				pCi		Unit not indic, this data to th
Whole Body		Cs-137	5/9/1979 9:29:00 AM	0.66				pCi	6.60E+02				pCi		
Whole Body	geometry not specified, whole body assumed	gamma-low energy	10/14/1960	3				cpm	3.00E+00				cpm	20	G0K interpret
Whole Body	chair geometry, iron room	gamma-low energy	4/21/1969	80				cpm	8.00E+01				cpm	10	20 keV/chan
Whole Body	chair geometry	gamma-low energy	8/21/1970	23				cpm	2.30E+01				cpm	10	20 keV/chan
Whole Body	chair geometry, iron room	Na-24	4/21/1969	0.00041				uCi	4.10E+02				pCi	10	20 keV/chan
Whole Body	chair geometry	Na-24	8/21/1970	0.00056				uCi	5.60E+02				pCi	10	20 keV/chan



Health Physics Database

'Air Monitoring' Tab

Displays air sampling data

- Contaminant
- Measurement Time
 - ✓ Volume
 - ✓ Sampling Period
- Reported Results

frm_Health_DataEntry: Form

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

Case_No: 0246 Not Chelated

Edit Air Monitoring Lock Air Monitoring Add to Contaminant List

Primary Contaminant	Time Pulled	Location	Sample Period	Unit	AMAD, um	Reported Concentration			Derived Values			Comments	
						Value	Uncert	Unit	Sample Period, d	Conc	Uncert		Unit
fission products	6/26/1954												high air fissor
unclear	9/22/1958	sample gallery											Two high air
Pu-239	11/15/1967 9:00:00 AM		48	hr		2.00E-11		uCi/cc	2.00E+00	2.00E-05		pCi/cc	Air concente 11/15/67 flu 48 hr
Am-241, Pu-239	12/5/1969 8:30:00 AM	incinerator room	24	hr	5.3	1.20E-11		uCi/cc	1.00E+00	1.20E-05		pCi/cc	Air filters char insufficient ve enactromatu
Am-241, Pu-239	12/5/1969 1:00:00 PM	incinerator room	4.5	hr	5.3	1.20E-10		uCi/cc	1.88E-01	1.20E-04		pCi/cc	Air filters char insufficient ve enactromatu
*													



Health Physics Database

'Work Site Assessments' Tab

Interpretation of *in vivo* and *in vitro* measurements into dosimetric quantities

- Quantity
- Contaminant
- Assessment Period
- Reported Estimate
- Material Type:
 - ✓ AMAD
 - ✓ Solubility Class
- Assessment Basis

The screenshot shows a software window titled 'frm_Health_DataEntry: Form' with a tabbed interface. The 'Work Site Assessments' tab is active. The main area contains a table with columns for Quantity, Period Category, Organ/Details, Primary Contaminant, Assessment Period, Reported Estimates (Value, Uncert, Unit), Derived Values (Value, Uncert, Unit), AMAD (µm), Solubility Class, ICRP, and Basis. The table contains five rows of data, all for Am-241 in the Skeleton organ category. The first row shows a reported estimate of 13.7 uCi and a derived value of 1.4E+07 pCi. The second row shows 15 uCi and 1.5E+07 pCi. The third row shows 3.4 uCi and 3400000 pCi. The fourth row shows 0.2 uCi and 200000 pCi. The fifth row shows 12 uCi and 1.2E+07 pCi. The table also includes start and end dates for each assessment period.

Quantity	Period Category	Organ/Details	Primary Contaminant	Assessment Period	Reported Estimates			Derived Values			AMAD, µm	Solubility Class	ICRP	Basis
					Value	Uncert	Unit	Value	Uncert	Unit				
Burden	Instantaneous	Skeleton	Am-241	Start Date: 2/6/1962 End Date: 2/6/1962	13.7		uCi	1.4E+07		pCi				Tibia (2) count or uCi
Burden	Instantaneous	Skeleton	Am-241	Start Date: 2/6/1962 End Date: 2/6/1962	15		uCi	1.5E+07		pCi				Chest (ibs, etc) c 2/6/62 (2.4 uCi)
Burden	Instantaneous	Skeleton	Am-241	Start Date: 2/6/1962 End Date: 2/6/1962	3.4		uCi	3400000		pCi				Pelvis count on 2 uCi
Burden	Instantaneous	Skeleton	Am-241	Start Date: 2/6/1962 End Date: 2/6/1962	0.2	0.3	uCi	200000	300000	pCi				Urinalyses data
Burden	Instantaneous	Skeleton	Am-241	Start Date: 2/22/1972 End Date: 2/22/1972	12		uCi	1.2E+07		pCi				Skull count on 2 uCi
*				Start Date: End Date:										



Health Physics Database

'External' Tab

Summary of external radiation measurements

- Primary Identifier
 - ✓ Penetrating
 - ✓ Skin
 - ✓ Gamma
 - ✓ etc
- Monitoring Period
- Dose Quantity
- Date/Time
- Reported Estimate
- Detector Type

Primary Identifier	Details	Dose Quantity	Date/Time	Reported Results			Derived Values			Detector Type	Comments
				Value	Uncert	Unit	Exposure Period, y	Value	Uncert		
Extremely	Hand	Dose Equivalent	Start: 2/6/1976 End: 2/6/1976	0.17		rem		1.70E-01		rem	Only one date was given in th
Gamma		Dose Equivalent	Start: 2/27/1976 End: 3/31/1976	0.013		rem	9.03E-02	1.30E-02		rem	
Gamma		Dose Equivalent	Start: 3/31/1976 End: 4/30/1976	0.013		rem	8.21E-02	1.30E-02		rem	
Gamma		Dose Equivalent	Start: 11/30/1976 End: 12/30/1976	0.013		rem	8.21E-02	1.30E-02		rem	
Gamma		Dose Equivalent	Start: 1/31/1977 End: 2/28/1977	0.013		rem	7.67E-02	1.30E-02		rem	
Gamma		Dose Equivalent	Start: 3/31/1977 End: 4/29/1977	0.011		rem	7.94E-02	1.10E-02		rem	
Gamma		Dose Equivalent	Start: 4/29/1977 End: 5/31/1977	0.018		rem	9.76E-02	1.80E-02		rem	
Gamma		Dose Equivalent	Start: 5/31/1977 End: 6/30/1977	0.019		rem	8.21E-02	1.90E-02		rem	
Gamma		Dose Equivalent	Start: 9/30/1977 End: 10/31/1977	0.019		rem	8.49E-02	1.90E-02		rem	
Gamma		Dose Equivalent	Start: 10/31/1977 End: 11/30/1977	0.026		rem	8.21E-02	2.60E-02		rem	
WB	Penetrating	Dose Equivalent	Start: 1/6/1970 End: 4/28/1978	1.085		rem	9.31E+00	1.09E+00	1.00E+00	rem	
Gamma		Dose Equivalent	Start: 1/6/1970 End: 4/28/1978	0.977		rem	8.31E+00	9.77E-01		rem	
Neutron		Dose Equivalent	Start: 1/6/1970 End: 4/28/1978	0.108		rem	8.31E+00	1.08E-01		rem	
WB	Penetrating	Dose Equivalent	Start: 6/27/1950 End: 5/24/1978	16.425		rem	2.75E+01	1.64E+01		rem	



Health Physics Database

'Treatment' Tab

- Treatment Type
 - ✓ Chelation
 - ✓ Wound Excision
 - ✓ Wound Irrigation
- Chelating Agent
- Modality
- Date/Time
- Dosage
- Activity Removed

The screenshot shows a web-based data entry form titled 'frm_Health_DataEntry : Form'. The 'Treatment' tab is active, and the case number is 0102, which is marked as 'Chelated'. The form includes a table with the following columns: Treatment, Modality, Date/Time, Dosage, Dosage Unit, Activity Removed, Activity Unit, Activity Removed, Derived Values (Dosage, Activity, Activity Removed, pCi), Comments, and Source. A single record is displayed with the following data:

Treatment	Modality	Date/Time	Dosage	Dosage Unit	Activity Removed	Activity Unit	Activity Removed	Derived Values	Comments	Source
Ca-EDTA	i.v.	8/5/1958	1	g					Medical log states "PS done today. Given 1 gm Versoic i.v. in 500 ml normal saline in 1 hour as a therapeutic trial. To collect urine for next 24 hrs and stools for next 48." Note	PL-1993 Specimen

The form also includes buttons for 'Edit Treatment' and 'Lock Treatment', and a status bar at the bottom indicating 'Record: 1 of 1'.



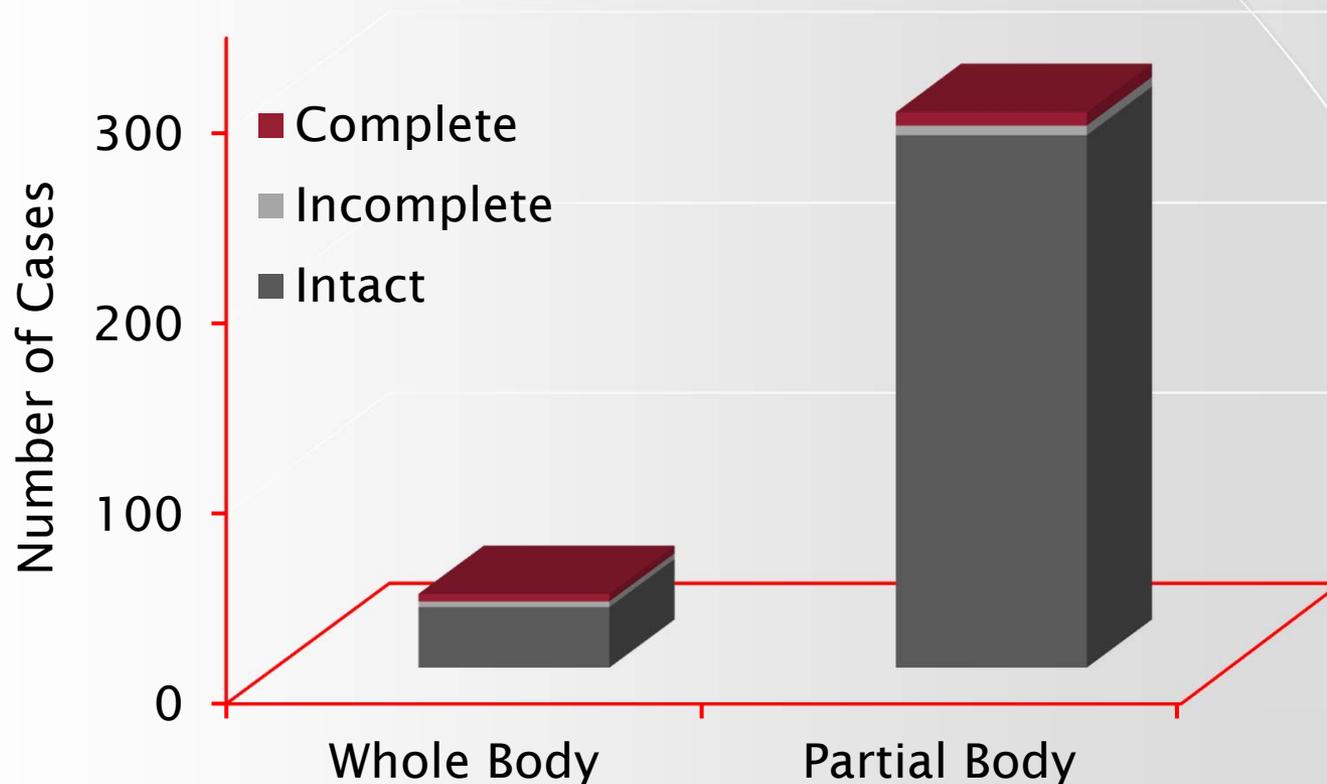
USTUR Registrants

Total Active and Deceased Registrants		414
Living Registrants:		78
	Potential Partial-body Donors:	59
	Potential Whole-body Donors:	12
	Special Studies:	7
Deceased Registrants:		336
	Partial-body Donations:	292
	Whole-body Donations:	39
	Special Studies:	5
Inactive Registrants:		461
Total Number of Registrants:		875



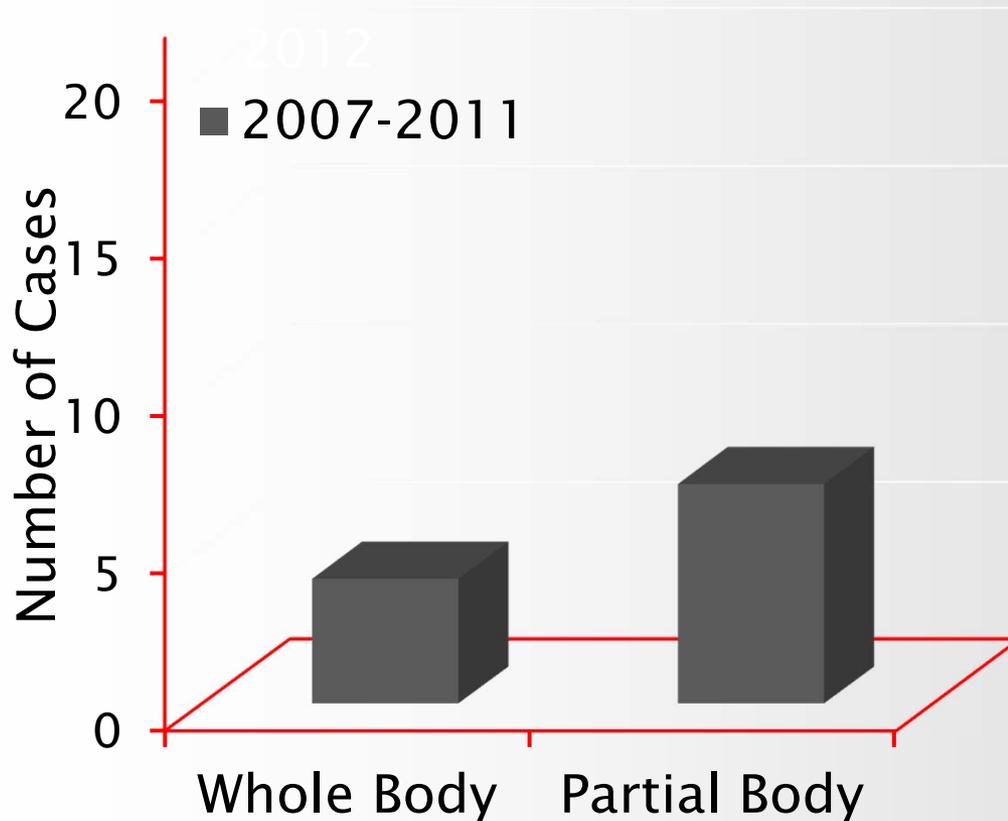
Health Physics Database

Status as of January, 2012



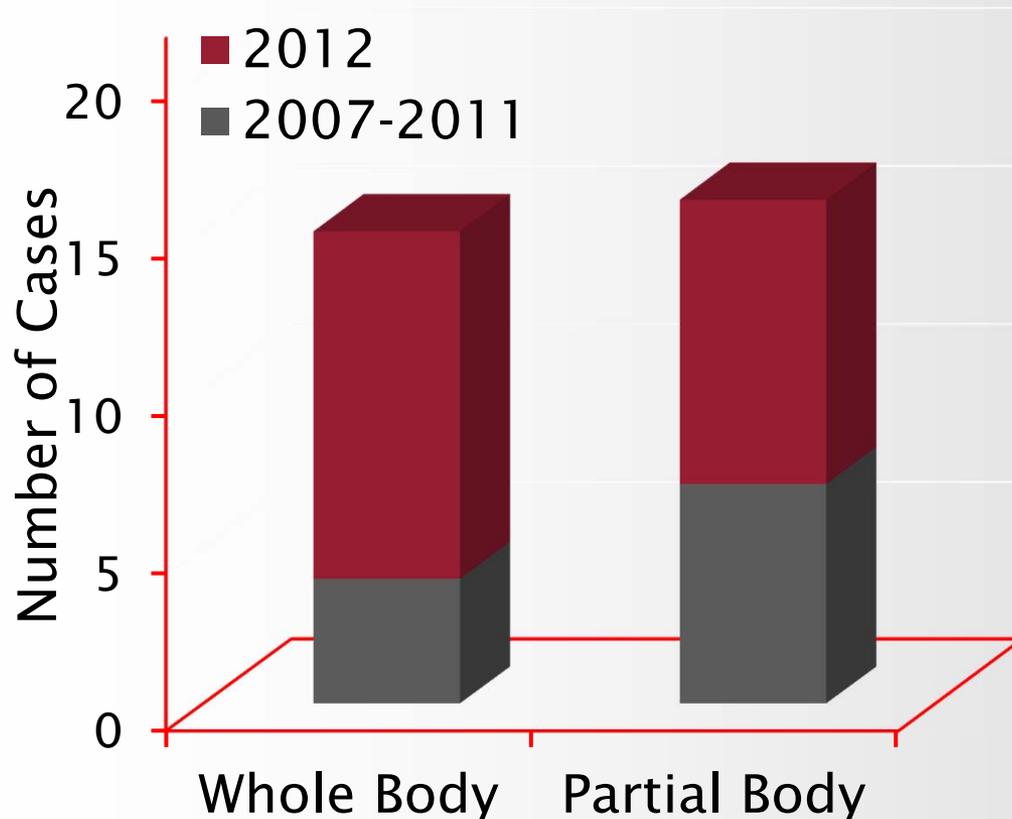
Health Physics Database: Current Status

Completed Cases: 11



Health Physics Database: Current Status

Completed Cases: 31

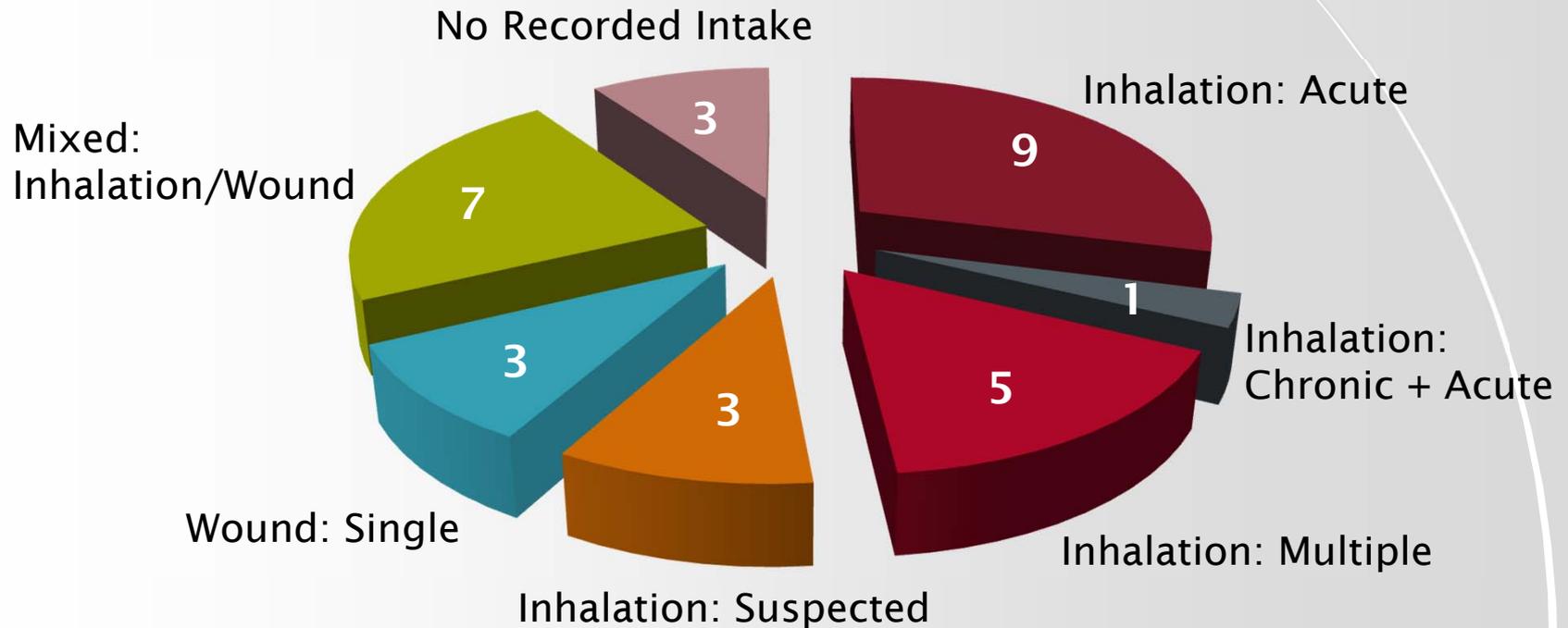


- Whole Body: 15 (39)
 - ROC 9 (9)
 - LOS 3 (11)
 - HAN 2 (8)
 - OAK 1 (2)
- Partial Body: 16 (292)
 - ROC 13 (117)
 - LOS 2 (29)
 - HAN 1 (107)



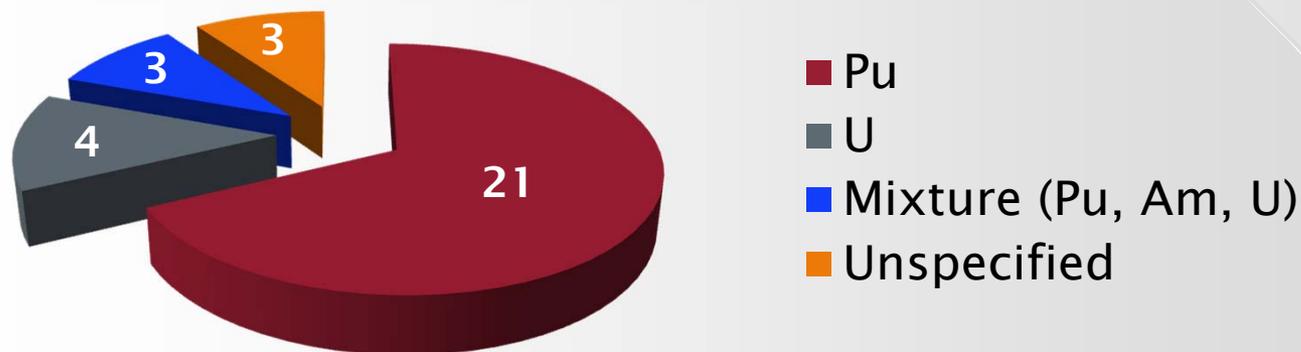
Health Physics Database: Current Status

Completed Cases By Intake Type

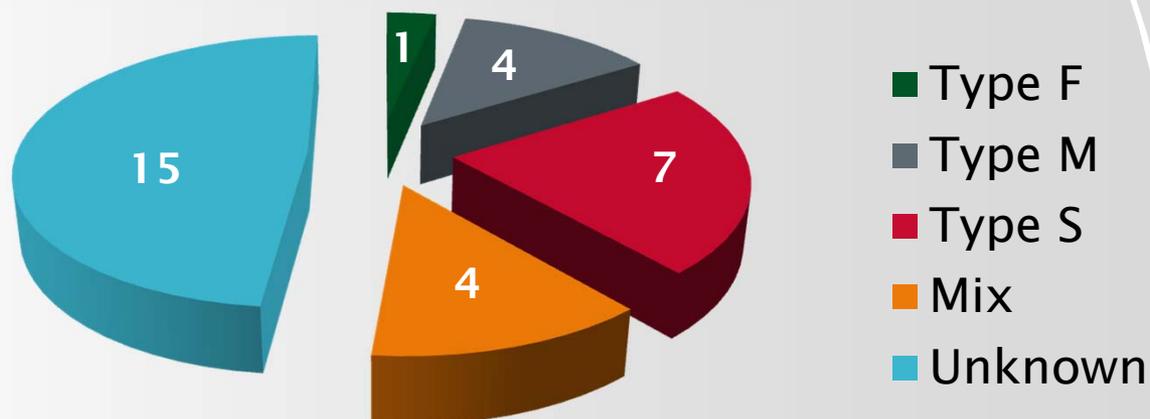


Health Physics Database: Current Status

Completed Cases By Contaminant



Completed Cases By Solubility Class



Number of Records: Whole Body Cases

Case Number	0205	0407	0425	0456	0503	0706	0720	0744	0990	0631	0680
Incidents	1	3	28	1	4	4	30	61	12	8	14
Contamination	0	7	18	0	0	0	27	71	8	0	4
Ext. Dosimetry	142	223	84	386	43	17	307	541	741	2	0
<i>In-Vitro</i> Bioassay	36	110	63	24	44	234	251	298	287	88	232
Blood	0	7	0	0	0	0	1	3	1	0	1
Feces	0	20	0	0	0	0	0	0	15	0	1
Urine	36	83	63	24	44	234	250	293	271	8	17
Other	0	0	0	0	0	0	0	2	439	80	213
<i>In-Vivo</i> Bioassay	12	215	43	21	16	220	332	365	439	21	34
Liver	3	23	4	1	0	18	11	8	18	3	8
Lung	8	184	37	19	16	176	309	287	379	11	11
Skeleton	0	1	0	0	0	0	0	0	0	4	3
Whole Body	0	0	0	0	0	0	0	0	0	0	4
Wound	0	0	2	0	0	26	4	55	15	0	0
Other	1	7	0	1	0	0	8	15	27	6	8
Air Monitoring	0	2	10	0	0	0	19	57	4	0	0
Work Site Asses.	10	6	5	6	5	8	194	195	247	579	17
Treatments	0	5	0	0	0	7	0	2	0	0	0
Total	201	571	251	438	112	490	1160	1590	1738	698	301



Number of Records: Partial Body Cases

Case Number	0023	0024	0027	0029	0030	0031	0032	0033	0636
Incidents	27	0	3	8	5	6	4	27	6
Contamination	43	0	6	7	1	1	0	31	0
Ext. Dosimetry	160	30	113	117	1	1	112	145	111
<i>In-Vitro</i> Bioassay	56	3	109	28	39	137	12	23	116
Blood	2	0	0	1	0	0	0	0	0
Feces	0	0	0	0	0	0	0	0	0
Urine	54	3	109	27	39	137	12	23	116
Other	0	0	0	0	0	80	0	0	0
<i>In-Vivo</i> Bioassay	24	0	3	5	3	13	8	13	4
Liver	2	0	1	0	1	0	2	2	0
Lung	2	0	2	3	2	0	4	6	3
Skeleton	0	0	0	0	0	0	0	0	0
Whole Body	0	0	0	0	0	0	0	0	0
Wound	18	0	0	0	0	13	0	5	1
Other	2	0	0	0	0	0	2	0	0
Air Monitoring	24	0	11	3	0	3	0	19	0
Work Site Asses.	13	1	2	3	2	4	2	3	385
Treatments	2	0	0	0	0	13	0	0	0
Total	349	34	247	171	51	178	138	261	622



Data Entry Priorities

- New Donations
- Incomplete Cases
- Whole Body Cases: ROC, LOS, HAN
- Partial Body Cases



Thank you for your attention

Questions?

