



VCUHealth™

Part IV:

Institutional Infrastructure for Fluoroscopy Exposure Monitoring & Tracking

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Clinical Radiation Safety Educator*



Disclaimer and Notices.

Nothing specific to declare.
Any product name and the manufacturers mentioned in this presentation and presentations in this symposium do not constitute endorsement by the AAPM, the authors, nor the institutions the authors belong to.

Please jot down the Slide Number where you would like to ask a question at the end of the presentation.



Clinical Radiation Safety Office

Clinical Radiation Safety Initiative and Committee

Vision: To create a best practice for use of ionizing radiation in an academic medical center setting.

Goals:

- Compliance with TJC requirements,
- Create a safe environment for patients, and
- Create a safe working environment for users and staff.

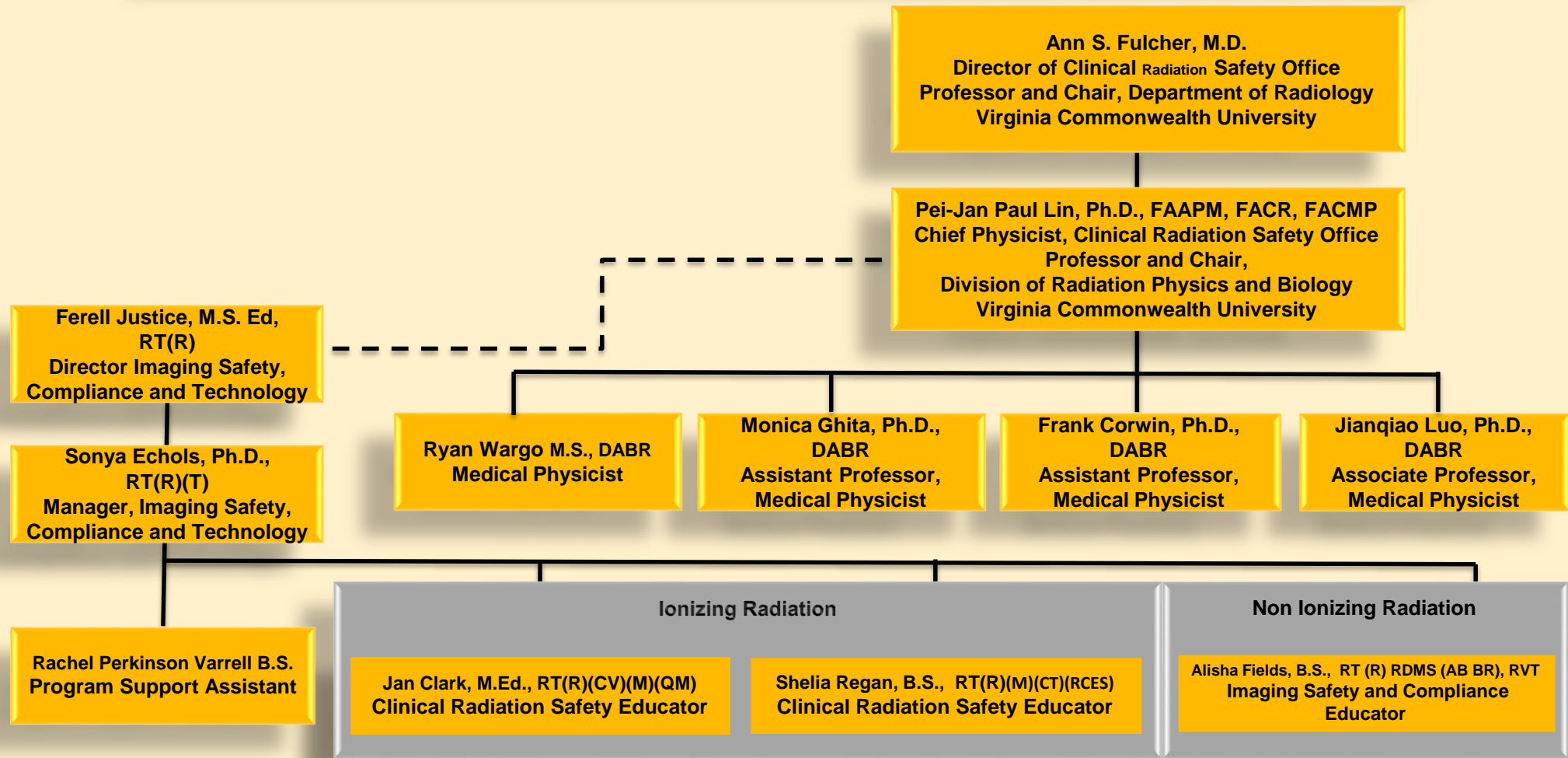
As part of the Initiative, the Clinical Radiation Safety Office and the Clinical Radiation Safety Committee were created to achieve the established vision and goals. Primary intentions of the Clinical Radiation Safety Office include the following Enterprise-wide clinical objectives:

- Provide medical physicist(s) to address clinical matters,
- Provide an educator to convey clinical radiation safety practices,
- Implement and monitor a radiation dosage program,
- Investigate ionizing radiation equipment performance,
- Organize quality control of imaging systems,
- Participate in the design of radiation equipment installations, and
- Contribute clinical and scientific advice and resources to solve Complex issues related to radiation safety.

The Clinical Radiation Safety Committee began meeting in April 2012. This committee meets monthly and addresses clinical radiation safety issues and reports to the Radiation Safety Leadership Committee and the Radiation Safety Committee.



Clinical Radiation Safety Office



TASKS

- Build the framework for our Patient Radiation Dose Monitoring Program
 - Establish “Levels” of PSD and Necessary Actions
-
- Primary fluoroscopy dose monitoring system chosen
 - Evidence-based threshold levels that correspond to increasing potential for skin effects established
 - Clear accountability of roles for threshold monitoring, documentation, and patient care identified
 - A systemic infrastructure to manage the patient follow-up process outlined

Evidence Base for VCU Health Criteria

Band	Single-Site Acute Skin-Dose Range (Gy)*	NCI Skin Reaction Grade [†]	Approximate Time of Onset of Effects			
			Prompt	Early	Midterm	Long Term
A1	0–2	NA	No observable effects expected	No observable effects expected	No observable effects expected	No observable effects expected
A2	2–5	1	Transient erythema	Epilation	Recovery from hair loss	No observable results expected
B	5–10	1–2	Transient erythema	Erythema, epilation	Recovery; at higher doses, prolonged erythema, permanent partial epilation	Recovery; at higher doses, dermal atrophy or induration
C	10–15	2–3	Transient erythema	Erythema, epilation; possible dry or moist desquamation; recovery from desquamation	Prolonged erythema; permanent epilation	Telangiectasia [‡] ; dermal atrophy or induration; skin likely to be weak
D	>15	3–4	Transient erythema; after very high doses, edema and acute ulceration; long-term surgical intervention likely to be required	Erythema, epilation; moist desquamation	Dermal atrophy; secondary ulceration due to failure of moist desquamation to heal; surgical intervention likely to be required; at higher doses, dermal necrosis, surgical intervention likely to be required	Telangiectasia [‡] ; dermal atrophy or induration; possible late skin breakdown; wound might be persistent and progress into a deeper lesion; surgical intervention likely to be required

Radiology, 2010 Feb;254(2):326-41, Fluoroscopically guided interventional procedures: a review of radiation effects on patients' skin and hair. Balter S, Hopewell JW, Miller DL, Wagner LK and Zelefsky MJ. <http://www.ncbi.nlm.nih.gov/pubmed/20093507>

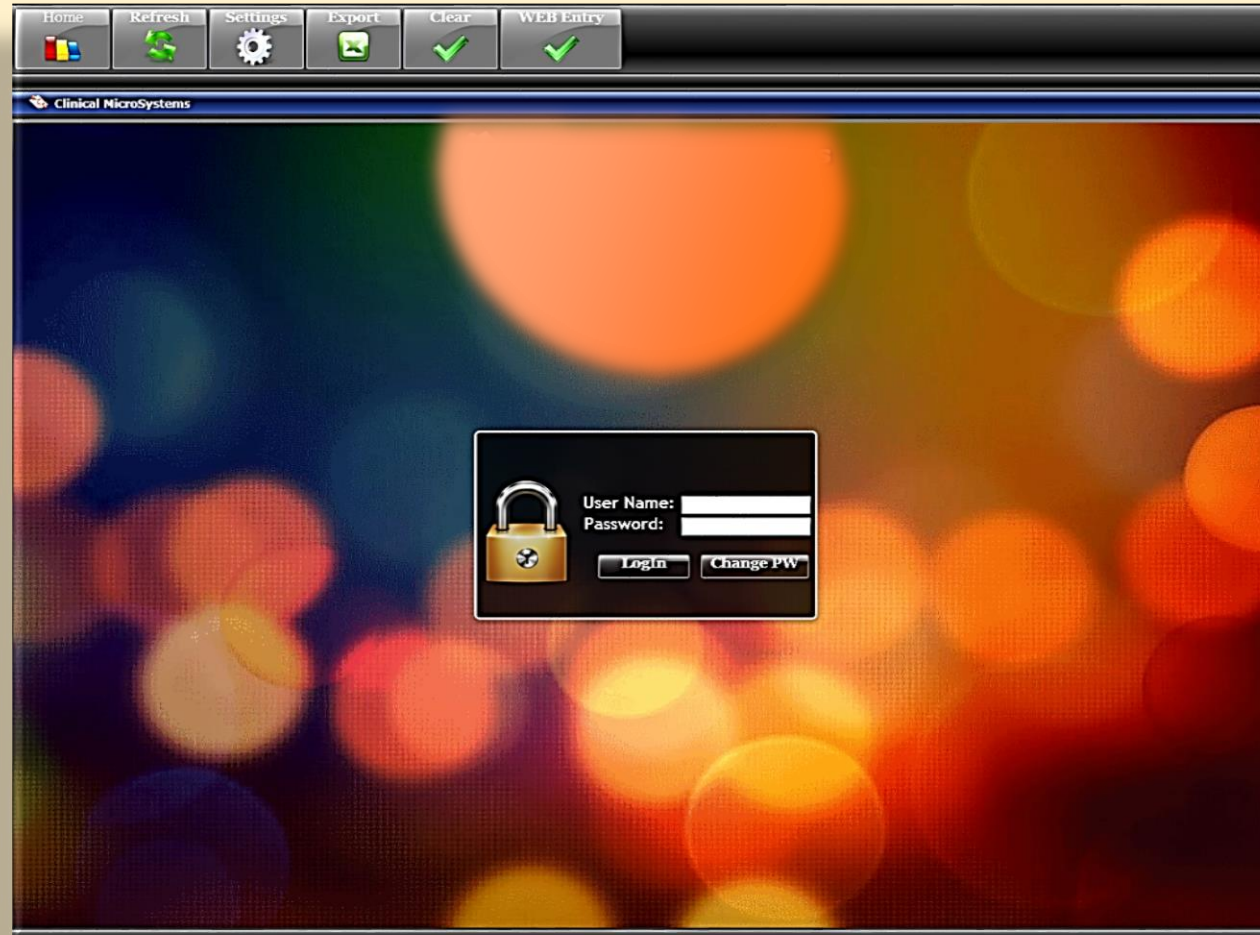
Fluoroscopy Exposure Monitoring Process

Responsibility	Investigation Level (2,000 mGy-5,000 mGy)	Evaluation Level (>5,000-10,000 mGy to a single anatomical area)		Reporting Level (>10,000-15,000 mGy)		TJC Sentinel Event (≥15,000 mGy)	
	Single Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose
CRSO Educators	1. Data collection 2. Investigate for cumulative dose >5,000 mGy	1. Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2. Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's electronic medical record(EMR) when complete 3. Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4. Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process	1. Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2. Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's EMR when complete 3. Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4. Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process	In addition to completing the Evaluation Level criteria: 1. Inform Office of Environmental Health and Safety - Radiation Safety Section	In addition to completing the Evaluation Level criteria: 1. Inform Office of Environmental Health and Safety - Radiation Safety Section 2. Patient Safety Net (PSN) submission	In addition to completing the Evaluation Level criteria, and after Medical Physicist evaluation: Inform the following: 1. Department or Division Director/Chair 2. Department Manager 3. Director of Risk Management 4. Procedural Attending Physician 5. Inform Office of Environmental Health and Safety - Radiation Safety Section	In addition to completing the Evaluation Level criteria, and after Medical Physicist evaluation: 1. PSN submission Inform the following: 1. Department or Division Director/Chair 2. Department Manager 3. Director of Risk Management 4. Procedural Attending Physician 5. Inform Office of Environmental Health and Safety - Radiation Safety Section
CRSO Medical Physicist		1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators
Clinical Area Designee				1. PSN submission 2. Procedural Attending Physician documents event in patient's EMR		1. PSN submission 2. Notify Procedural Attending Physician, Department Manager, and Department/Division Medical Director and/or Chair immediately 3. Procedural Attending Physician documents event in patient's EMR	
Consult				All patients who have potentially sustained radiation skin damage will be followed by the CRSO, with documentation in Cerner. These patients will be monitored per the CRSO Fluoroscopy Patient Follow-Up Process			
RSO				Report occurrences at Radiation Safety Committee meeting			
Risk Mgt						Initiate Root-Cause Analysis. As required, report to The Joint Commission	

Fluoroscopy Exposure Monitoring Process

Investigation Level (2,000 mGy-5,000 mGy)	Evaluation Level (>5,000-10,000 mGy) To A Single Anatomical Area		Reporting Level To A Single Anatomical Area (>10,000-15,000 mGy)		TJC Sentinel Event To A Single Anatomical Area (≥15,000 mGy)	
	Single Dose	Single Dose Cumulative Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose

Dose Monitoring System



Patient Information

Selected Dates

Start Date: 15

End Date: 15

Period:

Search Fields


MRN:

LAB:

Name:

Study:

Search




MRN	AGE (yr)	Sex	Date (mm/dd/yyyy)	Lab	Study Type	RAD	Patient's Name	Total DLP (mGy*cm)	Sum CTDIvol (mGy)	Dose A (mGy)	Dose B (mGy)	PHYSICIAN 1	Accession_Number	Study_Time
	71.32	M	11/22/2017	CT_M3_R1	CT-Vascular^B26_CTA_ABD_PELVIS_DISSECTION (Adult)	4		675	42.25				CT1778361	14:31:06
	71.51	M	01/31/2018	OR_36	Peripheral^Vascular	102				2645			NR1803678	07:24:16
	71.60	M	03/07/2018	OR_31	Peripheral^Vascular	308				3742			NR1808370	10:53:17

Dose Threshold “Alerts”

Investigation Level 2,000 mGy-5,000 mGy

Responsibility	Investigation Level (2,000 mGy-5,000 mGy)
	Single Dose
	1. Data collection 2. Investigate for cumulative dose >5,000 mGy
CRSO Educators	

 pjlin@vcu.edu | Shelia Regan
Pemnet Alert

Patient_
Patient_
Study Date:2017-02-24
Study Time:14:12:27.0000000
Procedure Lab:OR_36
StudyType:Peripheral^Vascular
AlertID:19
mGyValue:>4999
Sum OF Dose A:6679



Sample Patient Dose Alert Log

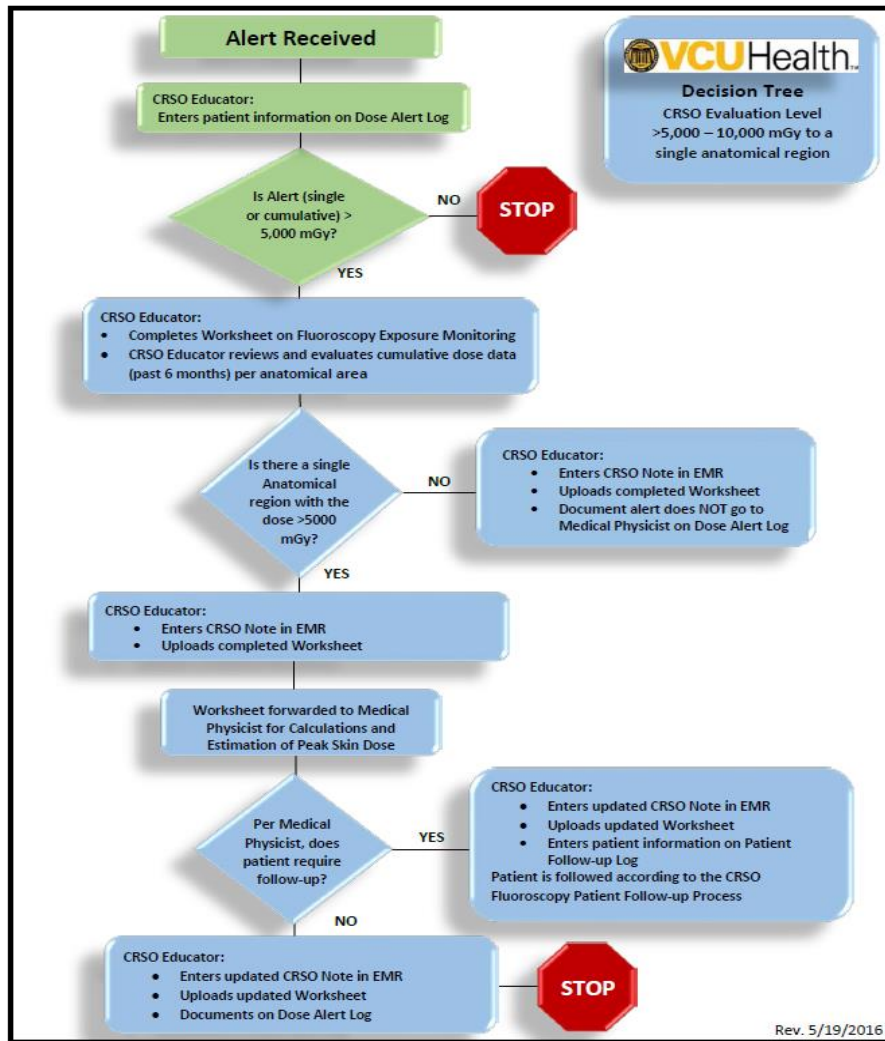
Physicist Assigned	PSN #	Educator Initials	Identifier	MRN	STUDY DATE	PROCEDURE	PHYSICIAN	PT NAME	LAB	SINGLE DOSE A PLANE mGy	6 MON CUM DOSE A PLANE mGy	SINGLE DOSE B PLANE mGy	6 MON CUM DOSE B PLANE mGy	TO PHYS > 5K		
		SLR	J1363		12/20/2017	Fibroid embolization			Angio 1	2342						
FC		SLR	F0992		12/5/2017	IVC with stent placement			Angio 3	6119	7470					12/7/2017
		SLR	R7839		12/28/2017	Embolization of splenorenal shunt			Angio 3	2087						
		SLR	B1413		12/20/2017	common hepatic artery			Angio 4	2624						
		SLR	P1467		12/26/2017	SMA/cealic arteriogram			Angio 4	2240						
		SLR	G6267		12/15/2017	PCI			Cath 1	3952						
MG		SLR	G5520		12/27/2017	PCI			Cath 1	2367	6775					12/27/2017
FC		SLR	G4765		12/5/2017	LHC/PCI			Cath 2	5969	5969					12/7/2017
		SLR	R8906		12/21/2017	LHC			Cath 2	2930						
		SLR	G8200		12/29/2017	PCI			Cath 2	2554						

Evaluation Level >5,000 mGy-10,000 mGy

Responsibility	Evaluation Level (>5,000-10,000 mGy to a single anatomical area)	
	Single Dose	Cumulative Dose
CRSO Educators	<ol style="list-style-type: none"> 1.Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2.Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's electronic medical record(EMR) when complete 3.Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4.Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process 	<ol style="list-style-type: none"> 1.Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2.Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's EMR when complete 3.Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4.Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process
CRSO Medical Physicist	<ol style="list-style-type: none"> 1.Evaluation of raw data values 2.Estimation of Peak Skin Dose 3.Notify Educators 	<ol style="list-style-type: none"> 1.Evaluation of raw data values 2.Estimation of Peak Skin Dose 3.Notify Educators

Responsibility	Investigation Level (2,000 mGy-5,000 mGy)	Evaluation Level (>5,000-10,000 mGy to a single anatomical area)		Reporting Level (>10,000-15,000 mGy)		TJC Sentinel Event (≥15,000 mGy)	
	Single Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose
CRSO Educators	<ol style="list-style-type: none"> 1. Data collection 2. Investigate for cumulative dose > 5,000 mGy 	<ol style="list-style-type: none"> 1.Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2.Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's electronic medical record(EMR) when complete 3.Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4.Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process 	<ol style="list-style-type: none"> 1.Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2.Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's EMR when complete 3.Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4.Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process 	<ol style="list-style-type: none"> In addition to completing the Evaluation Level criteria: <ol style="list-style-type: none"> 1. Inform Office of Environmental Health and Safety - Radiation Safety Section 	<ol style="list-style-type: none"> In addition to completing the Evaluation Level criteria: <ol style="list-style-type: none"> 1. Inform Office of Environmental Health and Safety - Radiation Safety Section 2. Patient Safety Net (PSN) submission 	<ol style="list-style-type: none"> In addition to completing the Evaluation Level criteria, and after Medical Physicist evaluation: <ol style="list-style-type: none"> 1. Department or Division Director/Chair 2. Department Manager 3. Director of Risk Management 4. Procedural Attending Physician 5. Inform Office of Environmental Health and Safety - Radiation Safety Section 	<ol style="list-style-type: none"> In addition to completing the Evaluation Level criteria, and after Medical Physicist evaluation: <ol style="list-style-type: none"> 1.PSN submission 1.Department or Division Director/Chair 2.Department Manager 3. Director of Risk Management 4. Procedural Attending Physician 5. Inform Office of Environmental Health and Safety - Radiation Safety Section
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Consult				All patients who have potentially sustained radiation skin damage will be followed by the CRSO, with documentation in Cerner. These patients will be monitored per the CRSO Fluoroscopy Patient Follow-Up Process			
RSO				Report occurrences at Radiation Safety Committee meeting			
Risk Mgt				Initiate Root-Cause Analysis. As required, report to The Joint Commission			

Evaluation Level Decision Tree




**Investigation Level
(2,000 mGy-5,000 mGy)**

Single Dose

1. Data collection
2. Investigate for cumulative dose >5,000 mGy

Evaluation Level (>5,000-10,000 mGy to a single anatomical area)	
Single Dose	Cumulative Dose
1.Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2.Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's electronic medical record(EMR) when complete 3.Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4.Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process	1.Data collection and evaluation as indicated by CRSO Evaluation Level Decision Tree 2.Document raw data values in Worksheet on Fluoroscopy Exposure Monitoring. Upload to patient's EMR when complete 3.Notify CRSO Medical Physicist as indicated by Decision Tree, using the Worksheet on Fluoroscopy Exposure Monitoring 4.Follow up with patient at Medical Physicist's recommendation, as indicated by the CRSO Fluoroscopy Patient Follow-up Process
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Worksheet on Radiation Exposure Monitoring & Tracking


VCU Health™

Worksheet on Fluoroscopy Exposure Monitoring Page: 1 of 1

Alert Date: [REDACTED]	CRSD Radiation Exposure Evaluation Level:	Dose Alert Event (mGy) <input checked="" type="checkbox"/> >5,000-10,000 mGy	
Patient Name: [REDACTED]		<input type="checkbox"/> Single Dose 0	<input type="checkbox"/> >10,000-15,000 mGy
Patient MRN#: [REDACTED]		<input checked="" type="checkbox"/> Cumulative Dose 5365	<input type="checkbox"/> >15,000 mGy

Radiation Dose (RAW DATA) Sheet (mGy)

Report Date: June 16, 2016		Raw data last reported on: N/A											
Date	X-ray Room	Head & Neck			Upper Torso			Lower Torso			Lower Extremities		
		CT	Frontal	Lateral	CT	Frontal	Lateral	CT	Frontal	Lateral	CT	Left	Right
Raw Data Last													

Additional Radiation Exposure Received Since Last Reported

6/1	Cath 3					351							
6/13	Cath 4					4117							
6/15	Cath 1					897							
Raw Data Total		0	0	0	0	5365	0	0	0	0	0	0	0

Raw Data Compilation Report Generated By: <i>Shelia Regan</i>	Shelia Regan, B.S., RT-R,M,CT	(804) 828-6605 shelia.regan@vcuhealth.org
		Refer To Medical Physicist: <input type="checkbox"/> NO <input checked="" type="checkbox"/> ES

Medical Physicist's Application of Corrections & Modifications For Estimation of Peak Skin Dose (PSD, mGy)

Report Date: June 17, 2016													
	PSD Previously Reported on	Head & Neck			Upper Torso			Lower Torso			Lower Extremities		
		CT	Frontal	Lateral	CT	Frontal	Lateral	CT	Frontal	Lateral	CT	Left	Right
	Additional Dose Received on					5136							
	Total Peak Skin Dose Received (mGy)	0	0	0	0	5136	0	0	0	0	0	0	0

Peak Skin Dose Calculation Reported By: <i>Pei-Jan Paul Lin</i>	Pei-Jan Paul Lin, Ph.D.	(804) 828-3497 pei-ian.lin@vcuhealth.org
		Patient Followup: <input type="checkbox"/> NO <input checked="" type="checkbox"/> ES

Dose Tracking Form (Rev. 2016-06-17)



Evaluation Level-Electronic Medical Record Documentation

*Type: Clinical Radiation Safety Note *Author: Regan, Sheila
 *Date: 10/23/2015 1551 Status: Unauth
 Subject: Clinical Radiation Safety Event
 Associated Providers: [Redacted] view Modify

Arial 10 [Rich Text Editor Icons]

*** Preliminary Report ***
CLINICAL RADIATION SAFETY NOTE

[Use F3 to navigate to underscores. Use F5 to insert the current date/time]

Examination Description:	_Coil Embolization
Examination Date:	_10-23-2105
Examination Accession #:	_NR1543615
Equipment Room# or Identifier:	_OR 33
Recorded Examination Dose:	Plane A- Single dose for this procedure 3,799 mGy. This triggered a Cumulative dose in Plane A (Frontal) 10,104 mGy (since June 4th, 2015) Plane B -Single dose for this procedure was 1,794 mGy. This triggered a Cumulative dose in Plane B (Lateral) 5,733 mGy (since June 4th, 2015)
Procedural Physician Performing Examination:	[Redacted]
Procedural Attending Physician for Examination:	[Redacted]
Referring Physician for Examination (CT Only):	[Redacted]

Educator's Data Collection, Review and Analysis:
 Collection, review and analysis completed: Yes No Not required

Clinical MicroSystems

Selected Dates: Start Date: 8/21/2016 End Date: 2/21/2017 Period: Custom
 Search Fields: MRN: 8750297 LAB: Name: Study:

Site	Patient's Name	Date (mm/dd/yyyy)	Lab	Study Type	MRN	Dose A (mGy)	Dose B (mGy)	Sum CTDIvol (mGy)	PHYSICIAN I
		1/11/2017 12:00:00 AM	CT_ED#1	CT-Head*MCV_DE_HEAD_CTA (Adult)		0	0	134.51	
		1/11/2017 12:00:00 AM	OR_33	Peripheral*Neuro	1225	469	0	0	
		1/18/2017 12:00:00 AM	CT_CCH11	CT-Head*MCV_HEAD_XCARE (Adult)		0	0	56.24	
		1/18/2017 12:00:00 AM	OR_36	Peripheral*Vascula	2632	908	0	0	
		1/29/2017 12:00:00 AM	CT_ED#1	CT-Head*MCV_HEAD_XCARE (Adult)		0	0	56.24	
		2/20/2017 12:00:00 AM	OR_36	Peripheral*Vascula	1713	377	0	0	

Clinical Notes

Last 100 Documents: 107 out of 108 documents are accessible. (Document)

June 28, 2016
 June 23, 2016
 June 22, 2016
 June 08, 2016
 April 16, 2016
 April 15, 2016
 April 14, 2016
 February 25, 2016
 February 24, 2016
 February 03, 2016
 January 29, 2016
 December 02, 2015
 November 23, 2015
 October 30, 2015
 October 27, 2015
 October 26, 2015
 October 24, 2015
 October 23, 2015

16:05 Anesthesi
 16:00 Nursing I
 15:51 Clinical R
 15:42 Operativ
 14:40 Anesthes
 14:18 Neurosur
 14:08 IntraOp I
 14:05 Operativ
 10:31 Anesthes
 10:27 Neurosur
 10:10 Admissio
 09:57 Neurosur
 00:00 Conditio
 00:00 Order Sh
 October 22, 2015
 October 20, 2015

By type
 By status
 By date
 Performed by
 By encounter

Educator's Data Collection, Review and Analysis
 Collection, review and analysis completed: Yes No Not required

This has been sent to the Medical Physicist for review. 10-23-2015 SLR
 PSN #SI-3908-PSN updated to reflect follow-up information 11-23-2015

Physicist Review:
 Adjusted patient dose: 6,800 mGy Not required
 Physicist Report Up-loaded in to Cerner: Yes No Not required
 Physicist recommends follow-up with patient: Yes No Not required
 Patient Follow-Up: Yes No Not required
 Patient has been scheduled for follow-up. Physicians notified. 10-27-2015 SLR

#1 Follow-Up (30 days): Date: 11-23-2015
 Attempt # 1 2 Letter sent
 Pt said she experienced epilation in a square spot on the back/top of her head. During her follow-up appointment she was told it was from the radiation and that it would grow back. She said it is growing back and is having no issues with it whatsoever. Patient Follow-up Process noted- message sent to Dr. [Redacted] regarding follow-up visit on Dec. 3rd. Will continue to follow patient as scheduled and update according to [Redacted] follow-up.

#2 Follow-Up (60 days): Date: 12-23-2015
 Attempt # 1 2 Letter sent left message SLR
 Attempt#2 1-4-2016 left message
 Attempt #3 1-29-2016 left message
 1-29-2016 Patient called Patient called back-said she was followed-up by [Redacted] He said the redness was improving and her hair was growing back. She said her hair had fully grown back by the time of our call. She also said she is doing fine-no additional effects.

#3 Follow-Up (120 days): Date: 2-25-2016 Doing great-no side effects. SLR
 Attempt # 1 2 Letter sent

#4 Follow-Up (180 days): Date: 4-28-2016 Left message SLR 5-9-2016 Left message SLR 5-11-206 Patient called-said she is doing fine, no ill effects. SLR
 Attempt # 1 2 Letter sent

1. BEFORE calling: In Cerner, reviewed patient's last medical status with VCUHS.
 Yes No

Evaluation Level - Patient Discharge Instructions

Clinical Radiation Safety Departure Instructions

While you were here at VCU Health System, you had a test that used x-rays. The amount of radiation you got from the x-rays depends on many factors including how long the procedure took or how hard it was to perform.

Most people do not have any problems. You might see some redness on your skin like a sunburn, or see a rash. You may also have hair loss. Over the next few weeks, look at your skin for these changes in the area where your exam was done. If you have changes, call the Clinical Radiation Safety Office at (804)828-6368. They will let you know what to do.

You may also get a call from the Clinical Radiation Safety Office just to see how you are doing. Feel free to call the Clinical Radiation Safety Office if you have questions at (804)828-6368.

Reporting Level >10,000 mGy-14,999 mGy

Responsibility	Reporting Level (>10,000-15,000 mGy)	
	Single Dose	Cumulative Dose
CRSO Educators	In addition to completing the Evaluation Level criteria: 1. Inform OEHS Radiation Safety Office (RSO)	In addition to completing the Evaluation Level criteria: 1. Inform OEHS Radiation Safety Office (RSO) 2. Patient Safety Net (PSN) submission
CRSO Medical Physicist	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators
Clinical Area Designee	1. PSN submission 2. Procedural Attending Physician documents event in patient's EMR	

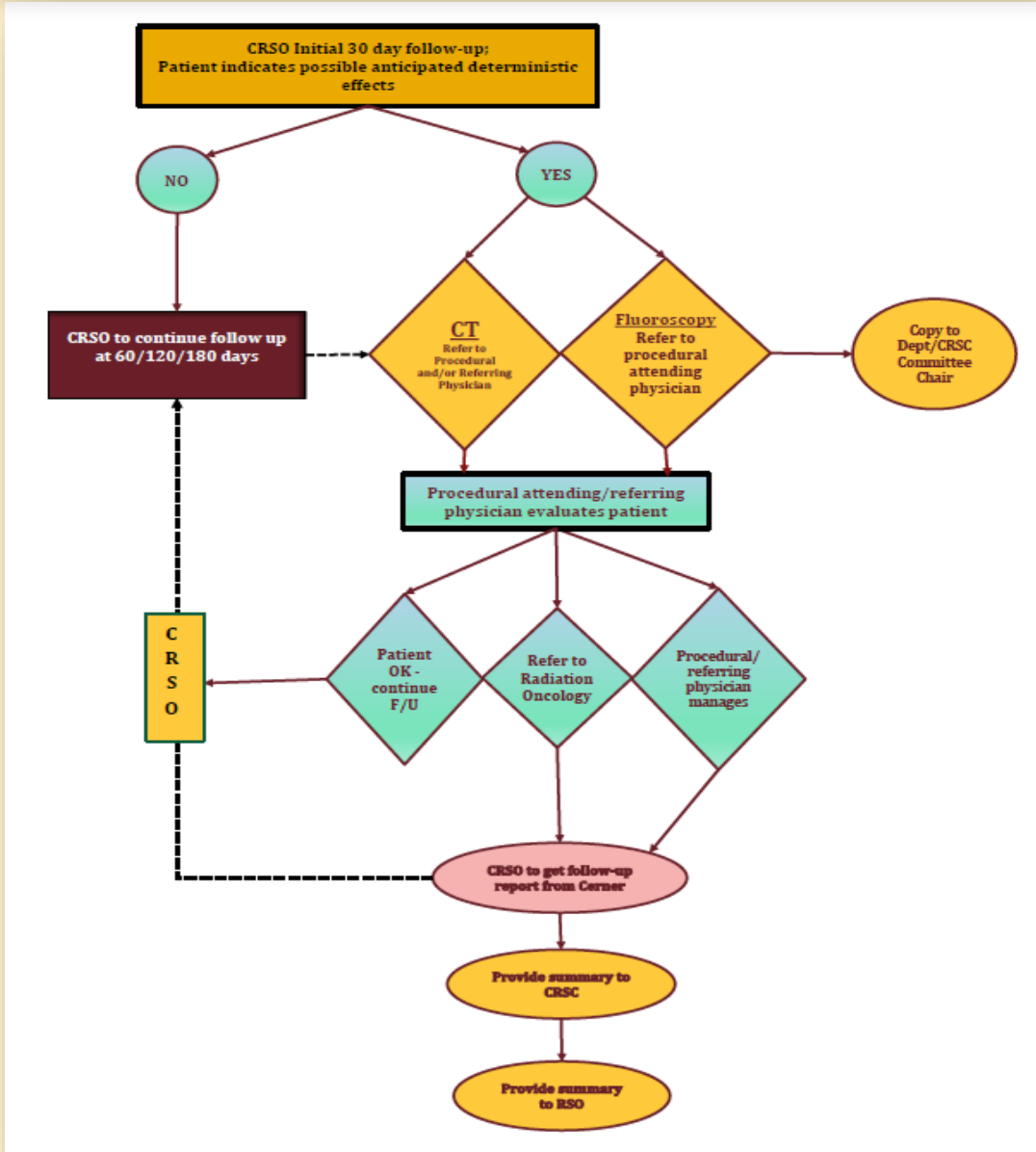
- If single dose exceeds 10,000 mGy, Clinical Area Designee submits a Patient Safety Report
- Per physicist, Educators follow-up with patient and notify OEHS/RSO
- Attending physician responsible to document in patient's electronic medical record.

TJC Sentinel Event Level $\geq 15,000$ mGy

Responsibility	TJC Sentinel Event ($\geq 15,000$ mGy)	
	Single Dose	Cumulative Dose
CRSO Educators	In addition to completing the Evaluation Level criteria, and after Medical Physicist evaluation: Inform the following: 1. Department or Division Director/Chair 2. Department Manager 3. Director of Risk Management 4. Procedural Attending Physician 5. OEHS Radiation Safety Office (RSO)	In addition to completing the Evaluation Level criteria, and after Medical Physicist evaluation: 1. PSN submission Inform the following: 1. Department or Division Director/Chair 2. Department Manager 3. Director of Risk Management 4. Procedural Attending Physician 5. OEHS Radiation Safety Office (RSO)
CRSO Medical Physicist	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators	1. Evaluation of raw data values 2. Estimation of Peak Skin Dose 3. Notify Educators
Clinical Area Designee	1. PSN submission 2. Notify Procedural Attending Physician, Department Manager, and Department/Division Medical Director and/or Chair immediately	

- Single event that exceeds 15,000 mGy = Sentinel Event until proven otherwise
- Clinical staff's responsibility to:
 - notify the procedural physician of the high dose
 - alert the department manager and Department/Division Chair
- CRSO Medical Physicists evaluate and report findings to the Educators
- CRSO Educators notify Risk Management and the RSO
- CRSO Educators follow up with the patient according to the Patient Follow-Up and Consultation Process

Patient Follow-up and Consultation Process

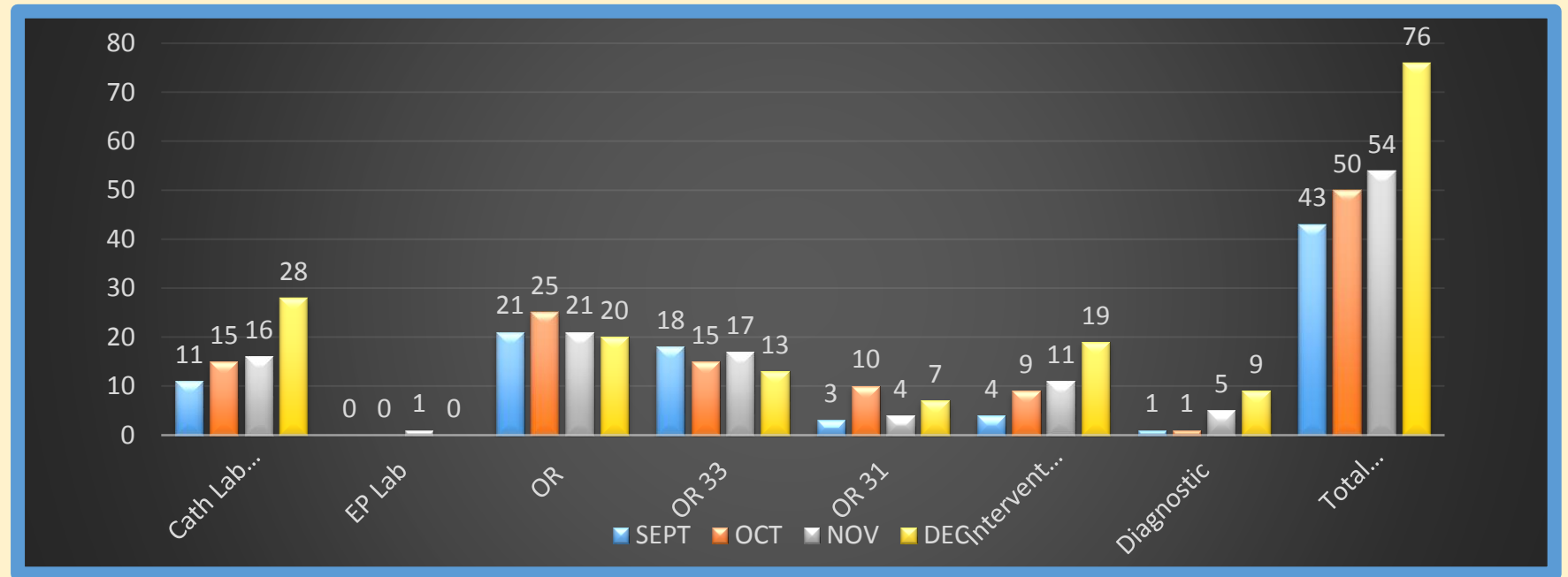


Sample Patient Follow-Up Log

Educator	MRN	Study Date	Procedure	Patient Name	Telephone #	30 DAY COMMENTS	60 DAY COMMENTS	120 DAY	180 DAY	
SLR	1234567	6/4/2016	Cerebral angiogram	Mickey, Mouse	(555)555-5555	7/15/2016 I spoke with his daughter, she is going to call me back after checking with him. He was at dialysis SLR	8/9/2016 Left message SLR	10-26-2016 I spoke with patient's daughter. He is deceased. SLR		
SLR	1234567	6/8/2016	LLE thrombolysis	Mickey, Mouse	(555)555-5556	7/15/2016 I spoke with patient. No noticeable effects. SLR	8/9/2016 I left a message with his sister to call me SLR	10-26-2016 I spoke with this patient. He is not having any ill effects. SLR	12-13-2016 I spoke with patient-he is doing fine. No effects. SLR	
SLR	1234567	6/15/2016	LHC+PCI	Mickey, Mouse	(555)555-5557	7/15/2016 I spoke with patient-no ill effects. SLR	8/29/2016 I spoke with patient. She is not having any skin issues. SLR	10-26-2016 I spoke with patient. She is having no ill effects. SLR	I spoke with patient. She is having no ill effects. SLR	
SLR	1234567	6/17/2016	PCI	Mickey, Mouse	(555)555-5558	7/15/2016 I spoke with patient, no ill effects. SLR	8/29/2016 I spoke with his wife and left a message for him to call back. SLR 8/29/2016 Patient returned my call. He is experiencing no skin effects. SLR	10-26-2016 I spoke with patient's sister. She is going to have the patient call me. SLR	12-13-2016 I spoke with patient. He had had no side effects. SLR	
SLR	1234567	6/16/2016	uterine fibroid embolization	Mickey, Mouse	(555)555-5559	7/15/2016 VM-Mailbox full. Could not leave message SLR	8/29/2016 Left message SLR 8/29/2016 Patient returned my call. She is having no skin effects. SLR	10/26/2016 Left message. SLR	12-13-2016 Left message SLR	
SLR	1234567	8/1/2016	CTO/PCI	Mickey, Mouse	(555)555-5560	Patient is still an inpatient. SLR 9-9-2016 I spoke with patient, he is having no adverse effects. SLR	10/17/2016 I spoke with patient. He is having no ill effects. SLR	12-13-2016 I spoke with patient-he is having no effects. SLR		
SLR	1234567	8/4/2016	Cerebral angiogram	Mickey, Mouse	(555)555-5561	9-9-2016 I spoke with patient-he is having no adverse effects. SLR	10-17-2017 I spoke with Brandon's mother. She said he is having hair loss and addressed it with doctor. He told her he is was from the radiation and they are following it. I advised the patient to call me or doctor if she has any additional questions or concerns. SLR.	12-13-2106 She said his hair has started to "finally grow back and everything appears normal." SLR		This was a potential Sentinel event
SLR	1234567	8/11/2016	Cerebral angiogram	Mickey, Mouse	(555)555-5562	9-9-2016 I spoke with the patient's husband. He will have her call me Monday. SLR	10-17-2016 I attempted to call patient-her voice mailbox has not been set up. SLR	12-13-2016 Left message SLR		
SLR	1234567	8/16/2016	Upper GI	Mickey, Mouse	(555)555-5563	9-29-2016 Left message SLR	10-17-2016 Left message SLR 10-18-2016 Left message SLR 10-18-2016 I spoke with patient-no ill effects SLR	12/13/2016 I spoke with patient, she said she is doing fine. SLR		
SLR	1234567	8/23/2016	Cerebral angiogram	Mickey, Mouse	(555)555-5564	9-29-2016 I called patient X 2-unable to leave message. SLR 10-3-2016 patient is still an inpatient	10-26-2016 Patient is still an inpatient. SLR	12-13-2016 Left message SLR		
SLR	1234567	8/25/2016	multiple Cerebral angiograms	Mickey, Mouse	(555)555-5565	9-29-2016 Pt. is still an inpatient. SLR	10-26-2016 Patient is still an inpatient SLR	12-13-2016 Pt is still an inpatient. SLR		
SLR	1234567	10/18/2016	Percutaneous placement of duodenal occlusion device	Mickey, Mouse	(555)555-5566	12-13-2016 Left message SLR. 12-13-2016 Patient's daughter returned my cal.. He is in a rehab to be discharged any day. SLR	12-13-2016 Left message SLR. 12-13-2016 Patient's daughter returned my cal.. He is in a rehab to be discharged any day. SLR	2-18-2016 120 DAY		
SLR	1234567	10/18/2016	Bronchial artery aneurysm embolization	Mickey, Mouse	(555)555-5567	12-13-2016 Patient said he is not having any effects. SLR	12-13-2016 Patient said he is not having any effects. SLR	2-18-2016 120 DAY		
SLR	1234567	10/26/2016	Angioplasty of celiac artery	Mickey, Mouse	(555)555-5568	12/13/2016 I spoke with patient. She is not having any side effects. SLR	12/13/2016 I spoke with patient. She is not having any side effects. SLR	2-26-2016 120 DAY		

Statistics and Reporting Trends

- Physician
- Location
- Time
- Alert Level
- Procedure Type



	OR/Neuro		EP Lab		Cath Lab		Interventional Radiology		Multimodality		Total by Dose Level
	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose	Single Dose	Cumulative Dose	
Jan 1 – April 30, 2016											
2,000 – 5,000 mGy	72	N/A	0	N/A	63	N/A	23	N/A	0	N/A	158
>5,000 – 10,000 mGy	10	0	0	0	3	0	6	0	0	7	26
>10,000 - 15,000 mGy	1	0	0	0	0	0	0	0	0	2	3
>15,000 mGy	0	2	0	0	0	0	0	0	0	0	2
TOTAL BY AREA	83	2	0	0	66	0	29	0	0	9	189

Summary

- Created an infrastructure to support “The Care of the Patient”.
- Developed a systemic structure to coordinate our incoming data and manage the patient dose monitoring process.
- Established levels of peak skin dose, and set up a threshold breach alert system.
- Built a structured Patient Care Process to follow patients who may need additional care.

Questions

