CT Protocol Review
University of Washington

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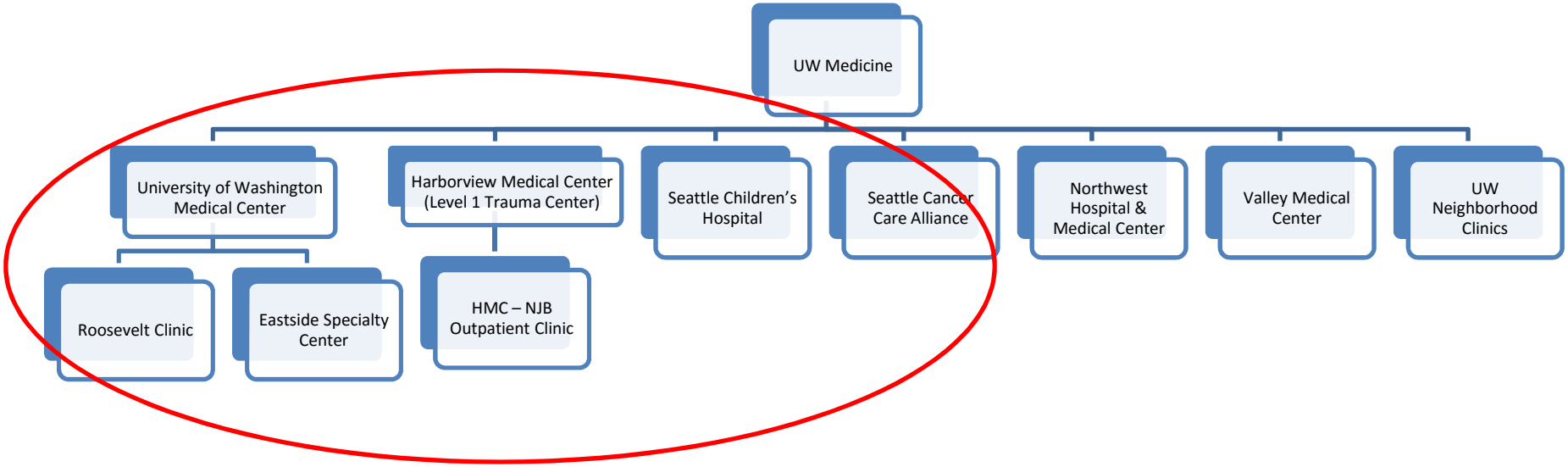
AAPM 2016
Washington DC

OUTLINE

- UW Medicine System
- Diagnostic Physics Section
- How we did CT protocol review
- How it is done now

UW Medicine Network



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CT Protocol Review – How it was done

- Physicist initiated
- Email to the section chief for each section
- Very tedious and slow process
- Complication was trying to do this for across sites
- Physicist, radiologist and 2 lead CT techs, one from each site
- Review paper copies and make changes
- Lead CT supervisor implemented changes

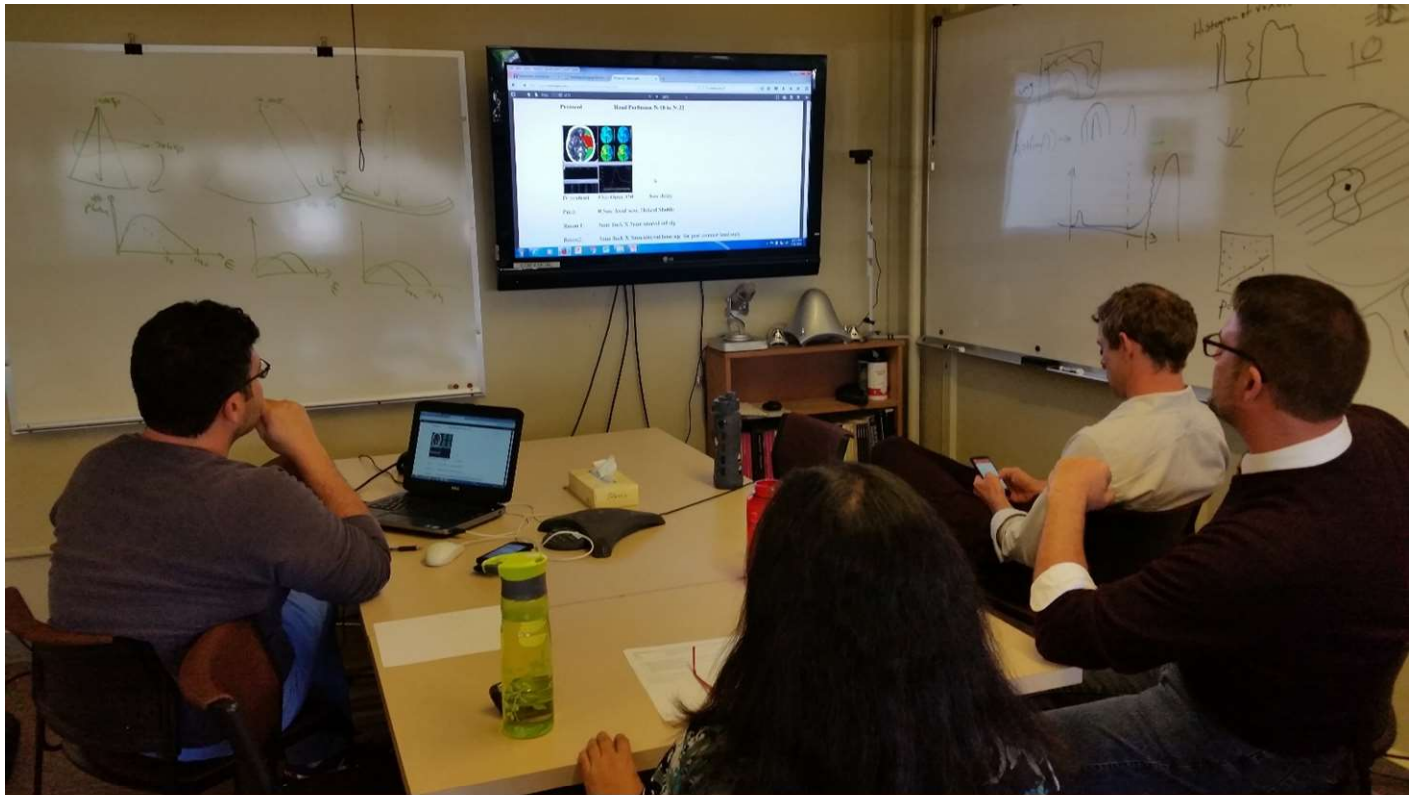
CT Protocol Review – How it is done now

- ACR QC manual - used it to enforce CT protocol review more consistently
- In a letter to Radiology leadership, I highlighted the following:
- One of the responsibilities of the lead CT radiologist is to
  - *Convene a team that includes the supervising radiologist, the medical physicist, and the lead CT technologist to design and review all new or modified CT protocol settings to ensure that both image quality and radiation dose are appropriate.*
  - The benefits of reviewing protocols on a regular basis are:
  - ✓ Eliminating protocols not used
  - ✓ Reviewing protocols known to give high dose to ensure protocol optimization
  - ✓ Adding new protocols if needed
  - ✓ Modifying protocols based on feedback received
  - ✓ Consistent protocols used across sites (if possible)

CT Protocol Review – How it is done now

- A directive was sent from the Radiology QA committee
- Response was very good
- Regular protocol review meetings which are initiated by the section chief
- Radiologist (s), lead CT tech/supervisor, physicist present at these meetings

CT Protocol Review – How it is done now



CT Protocols - Online

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Questions & Comments | Add this page to My Links

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UWMC > Radiology/Imaging Services

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- Interpreter Services
- Environmental Services
- Gift Shop, Espresso and Tea Room
- Patient Care Services
- Emergency Management (Disaster Preparedness)
- Accreditation Readiness

More >

Links to more Resources:

- Radiology Policy and Procedures
- Radiology IT Help Website
- Radiology Disaster Plan
- Radiology Unit Leader Disaster Response Checklist
- Department of Radiology Contact Phone Numbers
- Radiology Transporters Phone Numbers
- Screening Forms
- Request Order Forms

Radiology/Imaging Services

Welcome to UWMC Department of Radiology. We provide the full range of state of the art technology for diagnostic, interventional, and therapeutic services for patients on behalf of referring providers. Our primary focus is that *Patients Are First*. Our world class faculty, technologist and support staff are committed to providing the very best care and service to every patient and their family every time.

5/26/2016 **Message from Geoff Austin**

Announcements | Other News | UWMC Info

Excellence in Action-Employee of the Month-June 2016-Christina Popchoi
Congratulations, Christina!

Radiology Ice Cream Social
June 30th from 12p-3pm

Excellence in Action-Employee of the Month-April 2016-Chandra Pelton
Congratulations, Chandra Pelton!

Radiology Patient Satisfaction Survey
Survey starts April 18th

Excellence in Action-Employee of the Month-Feb 2016-Anne Gause

Department Information

UWMC Radiology Front Desk
Phone: 206-598-6200
Fax: 206-598-7690

Roosevelt Radiology Front Desk

Phone: 206-598-6868
Fax: 206-598-2847
Box Number: 354755
Hours of Operation:
Monday-Friday 7 a.m. - 5:30 p.m.

Outpatient Appointment

Scheduling Phone: 206-598-7200
Fax: 206-598-7690
Box Number: 359426
Hours of Operation:
Monday-Friday 8 a.m. - 5 p.m.

For Consults

If you are a clinician and need to

CT Protocols - Online

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Radiology Disaster Plan

Radiology Unit Leader Disaster Response Checklist

Department of Radiology Contact Phone Numbers

Radiology Transporters Phone Numbers

Screening Forms

Request Order Forms

Forms

UWMC CT Protocols

UWMC MRI Protocols

UWMC Diagnostic Radiology Protocols

UW Medicine Radiology Patient Website

Contrast Reaction Risk Definitions/Premedication Guidelines and Regimes

Acute Reactions To Contrast Media Algorithm

UW School of Medicine Radiology Website

Lightbox SOM Radiology Intranet

Interventional Radiology Website

On the Road to Successful IV Starts

Verification of Venipuncture skills for Technologists

Insertion and Removal of IV Catheter for Technologists

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APRIL IS RIDE TRANSIT MONTH
Come join the UWMC Radiology Team

Scheduling Phone: 206-598-7200
Fax: 206-598-7690
Box Number: 359426
Hours of Operation:
Monday-Friday 8 a.m. - 5 p.m.

For Consults

If you are a clinician and need to reach a Radiologist, please call 206-598-0101.

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jjbrown2@uw.edu

Andy Strickland
Imaging Informatics Director

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UWMC CT Protocols

To learn more about the CT Protocols, select from the links below

- GU
- Liver / Pancreas
- Neuro
- Vascular
- Abdomen
- Chest
- MSK
- Pediatric
- Dual Energy Body

VCT Protocols

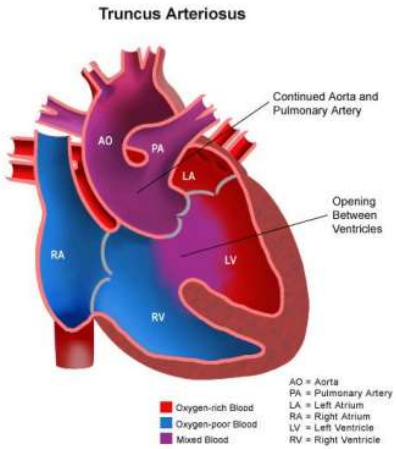
- GU VCT
- Liver / Pancreas VCT
- Abdomen VCT
- Vascular VCT

Post Processing Check Sheets

- CVA10
- TAVR
- CTA Chest

CT Protocols - Online

Protocol # C3 **Chest – PULMONARY EMBOLUS**



Oral contrast: none

IV contrast & Scan sequence: **100cc Visipaque, 50cc Saline chaser**

Test Dose: 15cc visi @ 5cc/sec, 25cc saline @ 3cc/sec
3sec delay calculate peak + 5sec

Scan lung apex to diaphragm @peak + 5sec delay, 5cc/sec
85cc visipaque, 25cc saline @3cc/sec

Breathing technique: Inspiration w/ 7sec delay from breath-hold to start of scan

CT Protocols - Online

Test dose 15cc Visi 5cc/sec, 25cc saline chaser 3cc/sec

Scan Type	Start Loc	End Loc	# of images	Thick Speed	Interval	Gantry Tilt	SFOV	Kv	Ma	Time	DFOV	Recon1	Recon2
Axial 1.0sec	Carina	Carina	14	5.0 1i	0.00	S0	Large	120	50	3.0	To Visualize Pulm A.	Std	None

PE Scan

Scan Type	Start Loc	End Loc	# of images	Thick Speed	Interval	Gantry Tilt	SFOV	kv	ma	Time	DFOV	Recon1	Recon2	Recon3	Recon4
0.4sec to 0.8sec Helical	Lung bases	Lung apex		40mm Detector 0.984:1	0.625	S0	Large Body	120 For BMI >20 100 For BMI <20	NI 35	Peak +5sec	Adjust To cover necessary anatomy	0.625 Std Send to AW server ASIR 30% Coronal Dmpr Chest mip	1.25mm bone Send to PACS	1.25mm std Send to PACS ASIR 30%	2.5mm std Send to PACS ASIR 30%

CT CHANGE CONTROL

Submission Date: 05/11/2016

Proposal: Reduction of max-face doses by 20%

Proposal: Reduce our max face protocols by 20%

Reason for Change: To be within the 75 percentile of ACR recommendation

- **Requested By**: Kalpana

Who does this potential change impact: Patients

Need discussion at CSIC? ☒ Yes ☐ No

When finished with the proposed form, place the document in the "Awaiting Approval" folder in Hemingway, and distribute via Ctchangecontrol@u.washington.edu

Approval:

This proposal was: ☐ Approved ☐ Not Approved

- **Approved by**:
- **Date**:
- **Reason for Denial**:

Who will implement this proposal:

Target Date for Implementation: ☐ ASAP ☐ Routine

Implementation:

Who is responsible for this:

IMPLEMENTATION STEPS: (An empty box assumes "N/A")

	Date	Completed by:	How was this done?
Communication to Leads			
Communication to Techs			
Communication to Radiologists			
Comm. to Residents / Fellows			
Communication to Physicists			
Change on Scanner(s)			
Discussion with Coding /Billing			
Protocols Updated			
Other			

- **Comments**:

Completion:

- **Completed by**:
- **Completion Date**:
- **Reported to CSIC**:

When completed, convert this Word document to a .pdf document, and attach it to an email addressed to Ctchangecontrol@u.washington.edu for circulation. Then move the document to the "Implementation Complete" folder, and update the Excel spreadsheet.

Other Avenues for CT Protocol Review

- Protocol Manager
  - We are a beta site for one vendor who has a CT protocol manager software installed at our site
  - Has potential but still in infancy
  - Advantage would be to compare protocols online for different scanners, review, make changes and hopefully implement from manager on to the scanner

  - Another vendor doing a demo at our site in August

Other Avenues for CT Protocol Review

Dose Watch

Reason for Notification

This alert is triggered by the following event(s):

- Examination $CTDI_{vol}$ is over $CTDI_{vol}$ threshold

Alert Type	Series	Target region	Measure	Value	Warning	Alert
Protocol	3	Head	$CTDI_{vol}$ (mGy)	60.50	51.10	66.93

Study Information

Date / Time: 2016-07-10 - 21:34

Device: erct1

Model:

Reason for Notification

This alert is triggered by the following event(s):

- Examination $CTDI_{vol}$ is over $CTDI_{vol}$ threshold

Alert Type	Series	Target region	Measure	Value	Warning	Alert
Protocol	4	Chest	$CTDI_{vol}$ (mGy)	16.25	14.00	15.16

Study Information

Date / Time: 2016-07-29 - 10:14

Device: rtct

Model: LightSpeed RT16

Modality: CT

CT Protocol Review

Using ACR CT Dose Index Registry

2015 Q3Q4

N	RPID
9056	CT HEAD BRAIN WO IVCON
1680	CT ABDOMEN PELVIS W IVCON
1401	CT C SPINE WO IVCON
700	CT NECK ANGIO WO THEN W IVCON
639	CT CHEST PULMONARY ARTERIES W IVCON
610	CT CHEST WO IVCON
479	CT HEAD MAXILLOFACIAL WO IVCON
428	CT L SPINE WO IVCON
357	CT CHEST ABDOMEN PELVIS W IVCON
320	CT T SPINE L SPINE WO IVCON
282	CT HEAD ANGIO WO THEN W IVCON
242	CT CHEST W IVCON
235	CT ABDOMEN WO IVCON
227	CT PELVIS WO IVCON
217	CT NECK W IVCON
196	CT ABDOMEN PELVIS WO IVCON
150	CT T SPINE WO IVCON
141	CT HEAD MAXILLOFACIAL W IVCON
140	CT ABDOMEN PELVIS ANGIO
119	CT LE FOOT WO IVCON

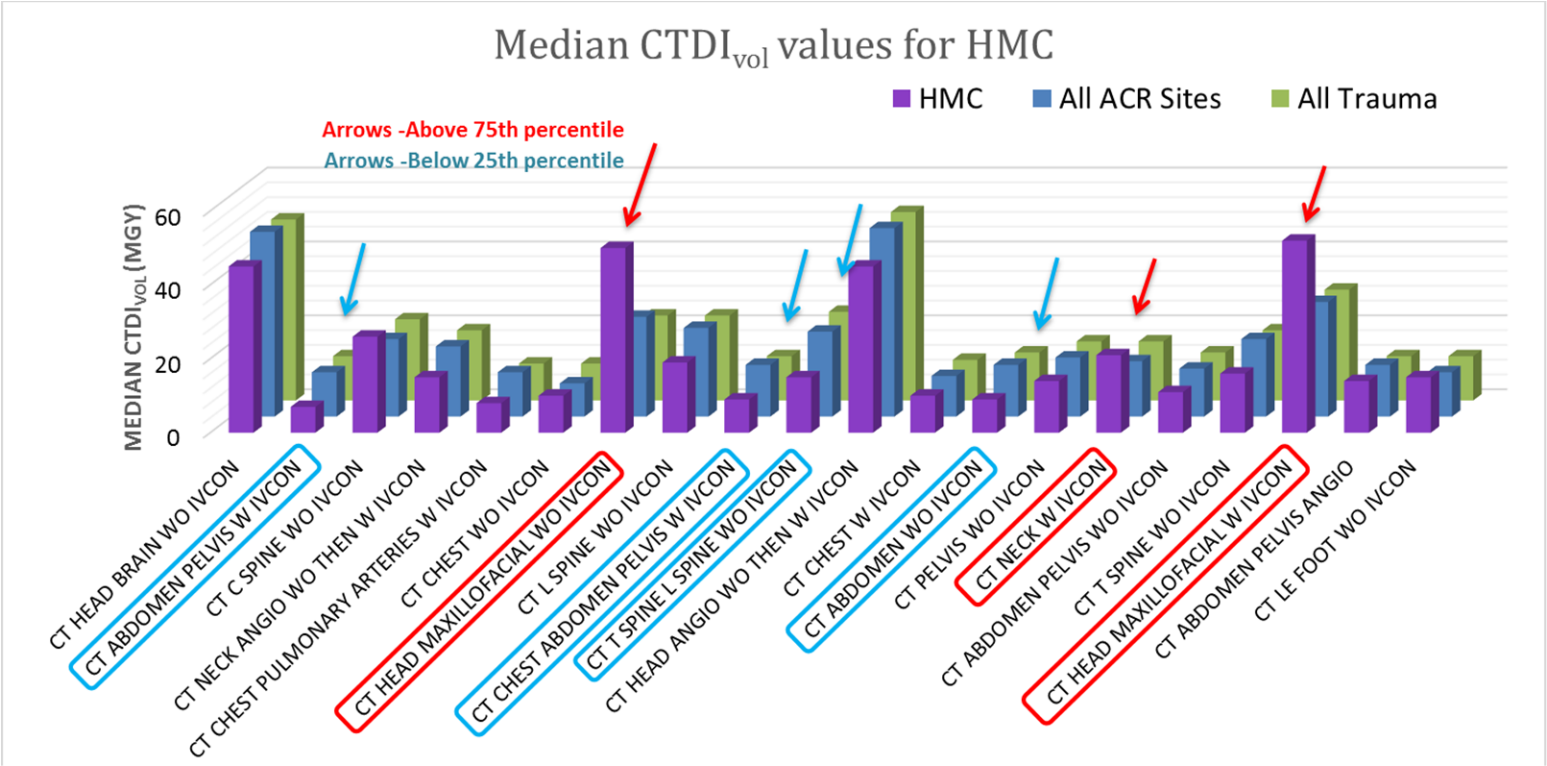
2015 Q1Q2

N	RPID
7030	CT HEAD BRAIN WO IVCON
1702	CT C SPINE WO IVCON
1513	CT ABDOMEN PELVIS W IVCON
730	CT NECK ANGIO WO THEN W IVCON
594	CT CHEST PULMONARY ARTERIES W IVCON
440	CT CHEST WO IVCON
392	CT L SPINE WO IVCON
379	CT HEAD ANGIO WO THEN W IVCON
347	CT HEAD MAXILLOFACIAL WO IVCON
317	CT CHEST ABDOMEN PELVIS W IVCON
309	CT T SPINE L SPINE WO IVCON
217	CT PELVIS WO IVCON
212	CT NECK W IVCON
209	CT ABDOMEN WO IVCON
191	CT ABDOMEN PELVIS WO IVCON
155	CT CHEST W IVCON
133	CT HEAD MAXILLOFACIAL W IVCON
128	CT T SPINE WO IVCON
117	CT CHEST ABDOMEN PELVIS WO THEN W IVCON
109	CT ABDOMEN PELVIS ANGIO

CT Protocol Review

Using ACR CT Dose Index Registry

2015 Q3Q4

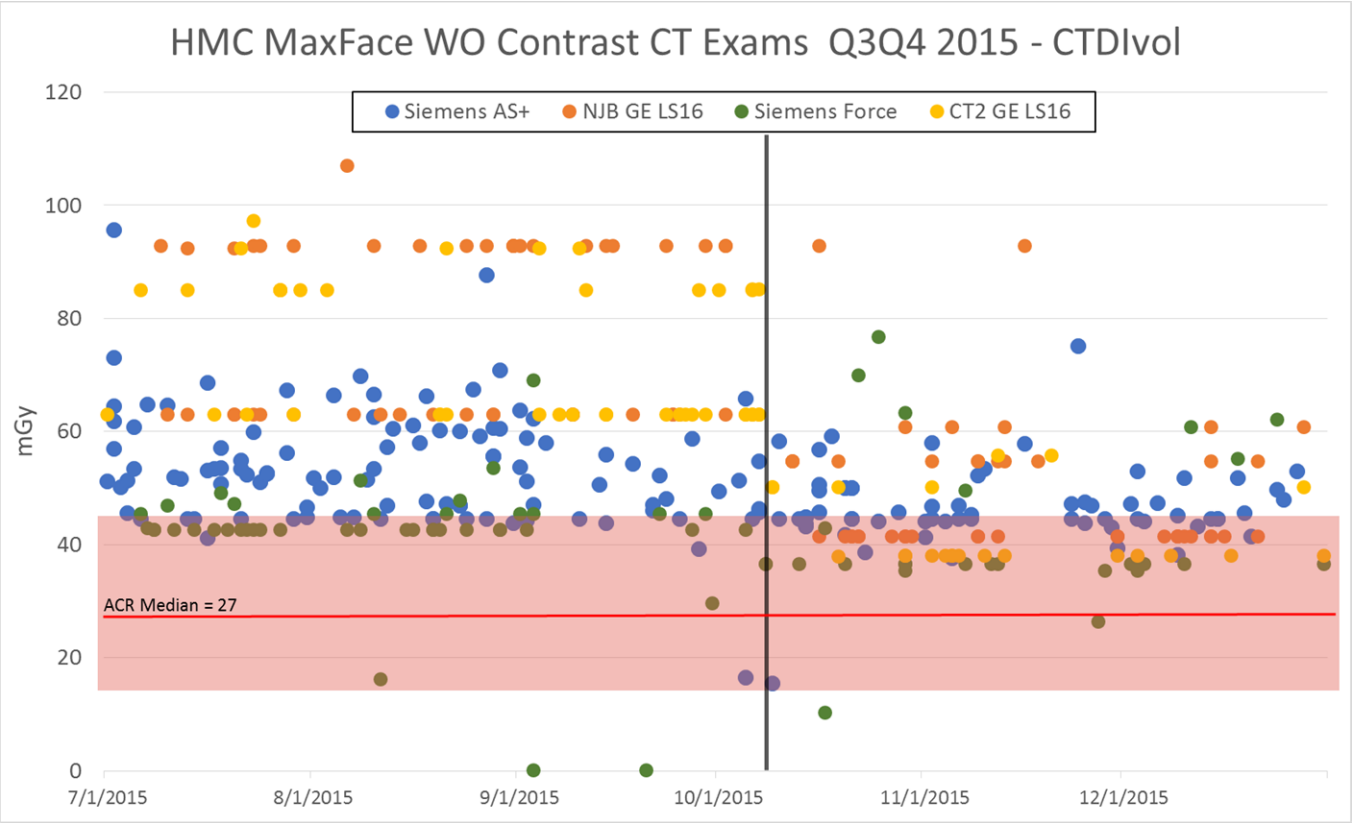


CT Protocol Review

Using ACR CT Dose Index Registry

N	RPID	HMC	All ACR Sites	All Trauma
9056	CT HEAD BRAIN WO IVCON	45	50	49
1680	CT ABDOMEN PELVIS W IVCON	7	12	12
1401	CT C SPINE WO IVCON	26	21	22
700	CT NECK ANGIO WO THEN W IVCON	15	19	19
639	CT CHEST PULMONARY ARTERIES W IVCON	8	12	10
610	CT CHEST WO IVCON	10	9	10
479	CT HEAD MAXILLOFACIAL WO IVCON	50	27	23
428	CT L SPINE WO IVCON	19	24	23
357	CT CHEST ABDOMEN PELVIS W IVCON	9	14	12
320	CT T SPINE L SPINE WO IVCON	15	23	24
282	CT HEAD ANGIO WO THEN W IVCON	45	51	51
242	CT CHEST W IVCON	10	11	11
235	CT ABDOMEN WO IVCON	9	14	13
227	CT PELVIS WO IVCON	14	16	16
217	CT NECK W IVCON	21	15	16
196	CT ABDOMEN PELVIS WO IVCON	11	13	13
150	CT T SPINE WO IVCON	16	21	19
141	CT HEAD MAXILLOFACIAL W IVCON	52	31	30
140	CT ABDOMEN PELVIS ANGIO	14	14	12
119	CT LE FOOT WO IVCON	15	12	12

Deep Dive – Max Face WO IV



SUMMARY

- Directive to review and optimize protocols initially came from physicist
- After ACR released its new QC manual, directive from QA committee instead of physicist.
- Protocol review and optimization team includes radiologist(s), technologist (s) and physicist (s).
- Meet once a month and review by section
- Changes implemented by technologist and protocols updated on scanner and online
- Separate meeting to discuss implementation of new technology – Dual Energy and Iterative Reconstruction
- Also use Dose Watch and ACR CT Dose Index Registry to look for problematic protocols

THANK YOU FOR YOUR ATTENTION

Cruise Ship docked in Skagway, Alaska - Image provided by Kanal