

WHAM!: Workflow hurdles and methodology

- Identify a specific CT protocol, dose, or workflow challenge from the participant's institution and clearly define its clinical and operational impact.
- Analyze contributing factors to the identified challenge (i.e., dose, workflow, contrast) using a structured problem solving framework (e.g., workflow mapping, protocol review, dose drivers).
- Develop a feasible, evidence-based optimization strategy that can be adapted and implemented within the participant's own CT department addressing a dose, workflow, or contrast problem.

(Below are **edited** questions submitted prior to the 2026 meeting. A special thank you to all who submitted these questions!)

Thought provokers are provided in red.

Clinical/Workflow

Optimizing scanner utilization PROBLEM: We have 6 scanners in our 1240 bed hospital and routinely perform 350-460 CT exams per day. We have siloed scanners with 1 in the Heart Hospital, 1 in the ED (3rd/4th busiest in the country), and 4 in Main CT. I am professionally curious how everyone deals with not only the TATs (*turnaround time*), but also how many scanners and techs there are to manage their throughput. We have optimized our workflows for each are to support the other areas with Main's focus on assisting the ER and the Heart scanner assisting the IP routines, etc. How is everyone managing their challenges?

Do you have different numbers of techs, nursing support, tech assistant at different locations?

How do you track room utilization/throughput/volume now?

Do you struggle with monitor exams?

Are there specific places in the hospital notorious for late transfers?

Pregnancy testing PROBLEM: ER providers do not consistently order labs, or HCGs on age-appropriate biological females. Nurses/ED Clin Techs do not chart IVs. In measuring TATs that have components that are outside CTs purview how does everyone manage their throughput? Is there a multidisciplinary team that tackles, or has tackled this situation? There is so much chaos generated from intradisciplinary lack of knowledge and need. CT has become highly specialized and the rest of the medical community is completely unaware and pushes back constantly.

Age limits for this? How do you change policy for trauma/in-patient/out-patient? How is the test result communicated?

Communicating IV compatibility PROBLEM: The growth in CTA imaging has been exponential over the past 25 years. The knowledge of what is required to perform them safely has not followed into the nursing realm. How does everyone deal with educating other health care providers about our IV requirements for safe and effective delivery of CTA injection rates? Or in general, how do we optimize communication of patient preparation outside radiology within our hospitals?

Email? Regular meetings? How to deal with trainees? Any luck with mandated training during onboarding in other departments? What tech aides do you have in radiology-visual?

Routine chest indication confusion PROBLEM: We were recently told to change our routine Chest w/ protocol. It went from smart prepping in the pulmonary with a 15 second delay (usually always triggered scan right at 15 seconds) to scanning at a fixed delay of 60 seconds. We have tried it on a few patients, but our Radiologists are hesitant for us to switch over to the new protocol. Their main concern is most times you can catch a PE on a patient who is scanned right at the 15 second delay. They fear waiting the 60 seconds doesn't have many benefits. For example, we recently had an outpatient for a CAP w/ and we scanned it the old way (triggering the scan at 15 seconds) The outpatient had a saddle PE that was caught. Would we have seen that if we waited the 60 seconds? What are the benefits to switching this protocol?

It is a slippery slope if we design a protocol to catch non-indicated things...how do we approach this with radiologist who may want an elephant gun protocol?

Streaking in SVC causes issues in earlier timing phases, can this be avoided?

Fixed vs bolus tracking timing for PE PROBLEM: We are having issues with fixed timing delays for PE. The contrast bolus is very inconsistent depending on Heart Rate, IV placement, size of the patient, etc. When we smart prepped with our EVO 64 slice our images were beautiful the majority of the time. When we switched to straight timing we have had more issues with the bolus and having to repeat exams. We did reach out to other sites for brainstorming, and several went back to smart prepping in the atrium due to the same problem. Now that we smart prep again, we have less issues and more consistent bolus.

Where do you bolus track for PE?

Do you use size based contrast bolus for CTPA?

Do you change your timing for injection site (antecubital vs drug port)?

Pregnant pts and PE image quality PROBLEM: A site struggles to consistently achieve diagnostic pulmonary artery enhancement during CT PE examinations performed on pregnant patients. Despite obtaining adequate IV access and using the standard PE protocol, some studies demonstrate poor or inconsistent opacification of the main and peripheral pulmonary arteries, occasionally resulting in limited examinations or repeat imaging. We would like help developing a pregnancy-specific workflow that optimizes contrast volume, injection rate, bolus tracking, scan delay, scan direction, and breathing instructions while minimizing maternal and fetal radiation exposure.”

Do you modify exam coverage with pregnancy?

Do you reduce CT dose with pregnancy?

Do you reduce contrast volume with pregnancy?

If yes to reducing contrast volume, do you provide techs with time delay adjust instructions?

PC induced image generation delays PROBLEM: Our emergency department radiologists are complaining of delays between image acquisition and population of studies in PACS for our Photon-Counting CT Scanner. This is most significant for our Panscan protocol which is comprised of a non-contrast Head, followed by a CTA of the Head and Neck, sometimes followed by a venous runoff CAP acquisition. Depending on the exact scanning details and networking status, these take up to an hour to populate in our PACS system. Radiologists want spectral data available which requires using the QuantumPlus scanning mode. We have an offline reconstruction workstation (SyngoVia) and can also perform limited reconstructions on the acquisition workstation but are limited by patient throughput.

Do you make thins and thicks for every image type?

Could you utilize more reformats in place of direct scanner recons for material maps?

Do you generate all spectral images on scanner, on AW as much as possible, or a mix based on protocol?

Do your rads use 3rd party spectral viewers for routine interpretation? (i.e., outside of PACS)

Technical/Physics

Image quality consistency across scanners PROBLEM: I am interested in learning how image quality can be standardized across different scanner platforms. Can task-based image quality assessment be used for this goal? What role could AI and model observers serve in this process? Is measuring image noise and contrast “good enough”?

Who actually measure IQ across scanners for the same protocol and how?

Is noise good enough?

Can we just dial in dose to be the same across scanners and be done?

Can commercial AI CADx CADx providers do QA for us? Experience with IQ complaints from these vendors?

Picking CCTA gating settings PROBLEM: Our cardiac CT program has low volume (a few cases per week), and technologists have limited experience with ECG-gated workflows. In CCTA exams, techs often struggle with selecting appropriate cardiac phases and correcting motion-affected automatic reconstructions, and they rely on radiologists to choose prospective vs. retrospective gating.

Although we've optimized protocol settings based on heart rate and variability, image quality remains inconsistent.

Does your scanner have an advanced tool that can select gating phase range based on presenting HR and HR variability?

When does your site make a switch from pro to retro gating?

What fraction of pts would you say cannot use pro gating on a dual source scanner?

Do you ever wish you had retro gating on your wide axial scanner?

Photon starvation streaking through shoulders in neck protocol PROBLEM: The issue is imaging a trauma neck, we commonly see photon starvation in the shoulder region. Radiologists then complain that the image quality around the shoulders and upper chest is poor. Since it's a trauma protocol, they don't want to increase the scan time. Our protocol uses 120 kV, rotation time 0.5s, Pitch 0.8-1 and tube modulation.

Where else do you see photon starvation streaking?

Does your site use 140 kV for larger shoulder scans?

What about arms down positioning, do you see this artifact there?

Does your site provide positioning instructions for arms and shoulders? How do you provide them?

Pediatric Head protocols PROBLEM: Administration is questioning Leapfrog results specifically adolescent (10-14 & 15-17 age groups) head exams results. Should different adolescent age groups have separate protocols?

How many different size pediatric head protocols does your site use?

For a similar sized head that is pediatric or adult, would you image the same dose and reconstruction settings?

Do you enforce head holder positioning for all non-trauma pediatrics? (there is a dose penalty for table top)

Do you adjust tube potential with patient age/size for neuro brain imaging?

Do you use AEC in the head?

Femoral Anteversion Dose PROBLEM: Our MSK radiologists are interested in creating an optimized Murphy protocol using PCCT and DECT with radiation doses at or near the radiographic level. The current Murphy protocol is built into a GE Revolution and Siemens SOMATOM FORCE CT scanners using 120 kVp SECT and ~10 mGy med. CTDIvol. We are targeting effective doses of ~1 mSv

Do we need to care about extremity only MSK doses...?

Do you enforce small FS size MSK protocols?

How do we figure out how low we can go for protocols that have very low IQ needs like this one?

Photon Counting Sharpness/Focal Spot/Kernel PROBLEM: Radiologists are complaining that routine abdomen–pelvis CT images from a photon-counting detector CT are too blurry/smooth. The scan was reconstructed with a Br76 sharp kernel and Quantum Iterative Reconstruction (QIR) Strength 3 in a patient with BMI 60, effective mAs 335, and CTDIvol 38 mGy.

With PC, focal spot size is critical, do you enforce for protocols that need high resolution?

How do we handle scan dose needs with scan duration and small focal spot needs?

Are you using lower doses in general for PC?

Have you noted any change in spatial resolution with dose on your PC scanner? I.E., with kernel and FS held fixed.