Radiology Workflow: Understanding Technologists’ Image QC

July 18, 2019
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Outline

• Review the IHE Scheduled Workflow integration profile for radiology
• Discuss components of technologist image review
• Discuss where images are rejected and why

IHE Scheduled Workflow Integration Profile
Integrating the Healthcare Enterprise (IHE)

- An initiative sponsored by:
  - RSNA
  - Healthcare and Management Systems Society

IHE Integration Profiles

- Related to a specific workflow process in the enterprise (often involving several systems)
- Group key transactions together that enable process automation, error reduction, and improved efficiency
- Use accepted standards (DICOM, HL7, etc.) to communicate information between systems

IHE Scheduled Workflow Integration Profile

- Describes a communication workflow for ordering/scheduling procedures, acquiring images, and transferring images to PACs that ensures continuity and integrity of imaging data

https://wiki.ihe.net/index.php/Scheduled_Workflow
IHE Scheduled Workflow Integration Profile

- Defines features that are optional. The end user can choose which they want to use.
  - Thus, the exact implementation of the integration profile will be specific to each institution.

https://wiki.ihe.net/index.php/Scheduled_Workflow

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**HIS** (EPIC)  
Order is created in the HIS and pushed to the RIS

**RIS** (Siemens Syngo Workflow)  
An accession # is assigned to the order

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**HIS** (EPIC)  
Order is created in Department (ID)  
When patient checks in at front desk, the order is assigned to a facility and Syngo status is changed to ID.

**RIS** (Siemens Syngo Workflow)  
Accession # Assigned
Order is created in Department (ID).
Accession # Assigned.

Begin Procedure (BP) -

Images may be reviewed by the technologist at the acquisition workstation. Images deemed "unacceptable" for interpretation may be rejected by the technologist and do not get sent to PACS.
HIS (EPIC)  
RIS (Siemens Syngo Workflow)  
PACS (Agfa IMPAX)

Order is created

In Department (ID)

Begin Procedure (BP)

QA Review

Tech verifies the following:
- All images have transferred to PACS
- Patient information is correct
- HIS/RIS verification passed

NOTE: PACS super-users have the ability to DELETE ("reject") images when the study is in the "QA Review" status. Images are not typically rejected for image quality reasons at this stage (though they could be).

The technologist enters required data in the tech note, such as:
- Patient pregnancy status
- Contrast administered
- Room/unit used
- # Images
- # Views
- Laterality
- History
- Additional Comments

Tech Note
**HIS (EPIC)**

Order is created in Department (ID)

Accession # Assigned

**Begin Procedure (BP)**

Tech Note

**End Procedure (EP)**

**RIS (Siemens Syngo Workflow)**

**PACS (Agfa IMPAX)**

**Modality Workstation**

**QA Review**

**Modality Worklist**

**Dictation Software:**

Powerscribe (Rad)

**NOTE:** The procedure MUST be ended in Syngo before the radiologist dictates, otherwise the dictation cannot be finalized.

**Tech Note**

EP triggers notification to the dictation software and a dictation is assigned to the accession #.

**New**

Tech manually changes status to “New” in PACS after Syngo status is set to “EP”.

“New” exams are routed to radiologist worklists according to:

- **Modality**
- **Sub-Specialty** (manually assigned by tech in Syngo)
- **Priority** (Stat vs. Routine)
**IHE Schedule Workflow Integration Profile**

- **Modality Performed Procedure Step (MPPS) messages**
  - The image manager (PACS) and Order Filler (RIS) are required to accept these messages, but are not required to do anything intelligent with them.
- **Two transactions defined in IHE technical framework:**
  - Modality Procedure Step in Progress
  - Modality Procedure Step Completed

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The image manager (PACS) and Order Filler (RIS) are required to accept these messages, but are not required to do anything intelligent with them.

Two transactions defined in IHE technical framework:
- Modality Procedure Step in Progress
- Modality Procedure Step Completed
Technologist Image Review

Prospective QA
Retrospective QA

Prospective QA

- Assessment of Image Quality:
  - Patient positioning
    - Relevant anatomy is included?
    - Appropriate rotation?
    - Appropriate obliquity?
    - Proper centering?
  - Artifacts
  - Appropriate technique?
Prospective QA

- Technical factors to check (as applicable):
  - Lead markers
  - Skin markers
  - Magnification balls
  - Annotations

Prospective QA

- Verification in PACS:
  - All images transferred and displaying properly
    - Acquired views and exam tags are correct
    - Images oriented properly
    - Annotations displayed
  - Patient information is correct
  - HIS/RIS verification passed
Prospective QA
(at our institution...)

- Who conducts it?
  - the technologist that acquired the images
- When/where in the technologist workflow is it performed?
  - Image quality assessed at the modality workstation
  - Additional technical items assessed in PACS prior to ending the procedure in the RIS

Retrospective QA

- Method for collecting radiologist feedback on image quality (good or bad)
- Process for reviewing cases flagged by the radiologist
- Feedback mechanism for communicating flagged cases to the technologist that acquired the images
These are the fields our radiologists are using:

Selection of a “Keyword” by the radiologist adds the study to a QC worklist:

Additional comments to clarify concerns and/or complaints are encouraged but not required:
QA Tech – Image Review

- QC worklists are reviewed daily by Lead QA Techs
  - Techs are assigned to specific Modality(s) and Department Code(s)

- QC worklists are modality based

QA Tech – Image Review

- Once “X-ray Image Quality and Tech Note” form has been submitted
  - Lead tech removes “Keyword” from the study in PACS
  - Study drops off of the QC worklist
Image Rejection

Image Rejection: Where?

- At the modality
- In PACS
Image Rejection: CCF Workflow

- Images are reviewed for image quality at the modality workstation.
  - Images deemed “unacceptable” for interpretation are rejected at the modality and do not get sent to PACS.

Image Rejection: CCF Workflow

- PACS super-users DO have the ability to reject images from PACS while the study is in “QA Review”.
- Reasons for rejecting images at this stage might include:
  - Images need to be reprocessed
  - Tech FORGOT to delete the image at the modality workstation for poor quality
  - There is an issue on the PACS side with an image (partially transferred or corrupted) and they need to delete and re-send the image.
  - Image was tagged under the incorrect exam tag at the modality.

Key Takeaways

- When a technologist thinks of image QC, it often involves far more than just checking the image quality.
- Images can be rejected at the modality or in PACS.