



# Establishing a Peer Review Program for Imaging Technologists

Preston Drew Stingley, MHA, MBA; Ernest Byers, MAIOP; Patricia Doyle, MBA, RT(R);  
Janice Wright, BS, RDMS, RT; Anthony E. Samir, MD, MBBCh; Javier M. Romero, MD



MASSACHUSETTS GENERAL HOSPITAL • DEPARTMENT OF RADIOLOGY • HARVARD MEDICAL SCHOOL

## BACKGROUND

Imaging technologists use their scientific knowledge of anatomy, pathology, and physics to produce diagnostic images. Producing diagnostic images of the highest quality requires training, established protocols, conscientiousness and a desire for excellence. The quality of technologist work varies as a result of differences in knowledge and experience, but also due to varying expectations amongst Radiologists. The need to address variation in Radiologist work quality has long been recognized and addressed by organizations such as the American Board of Radiology, American College of Radiology (ACR), and The Joint Commission through mandatory peer review requirements. However, the same programmatic peer review has not traditionally been applied to technologist work quality.

In Sept 2009, Massachusetts General Hospital Imaging leadership addressed this quality improvement opportunity by establishing a peer review program for Imaging technologists. Prior to this there had been no formal program monitoring and documenting image quality. This report describes implementation of our ongoing Technologist Peer Review program.

The undertaking of this imaging quality initiative began by identifying the five inter-related stages of this engagement. Clarify Expected Outcomes, Identify Critical Players, Define Tasks and Schedules, Execute the Project Plan, and Closure (Figure 1). By utilizing this approach the team was able to fashion a Project Charter to guide the initiative (Figure 2).

Figure 1: Five Stage Project Management Model

There are five inter-related stages of a project, each with a different focus.

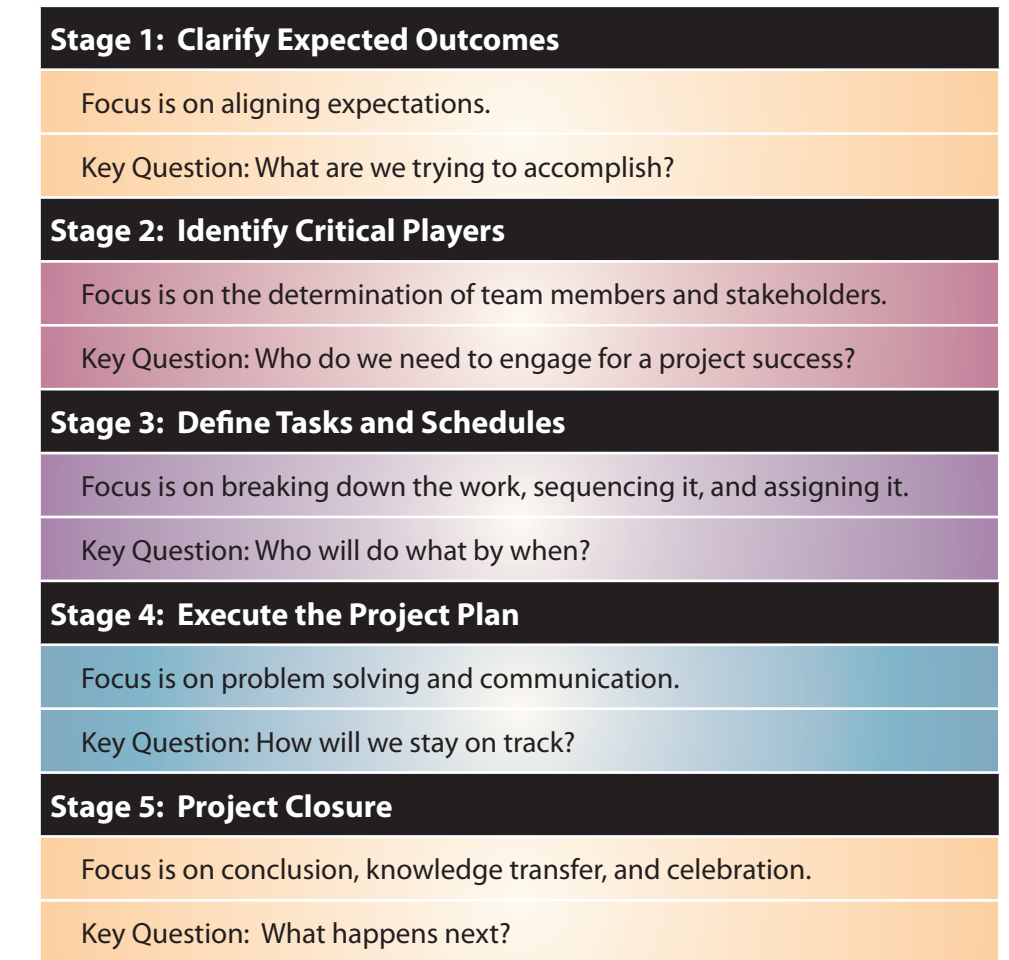
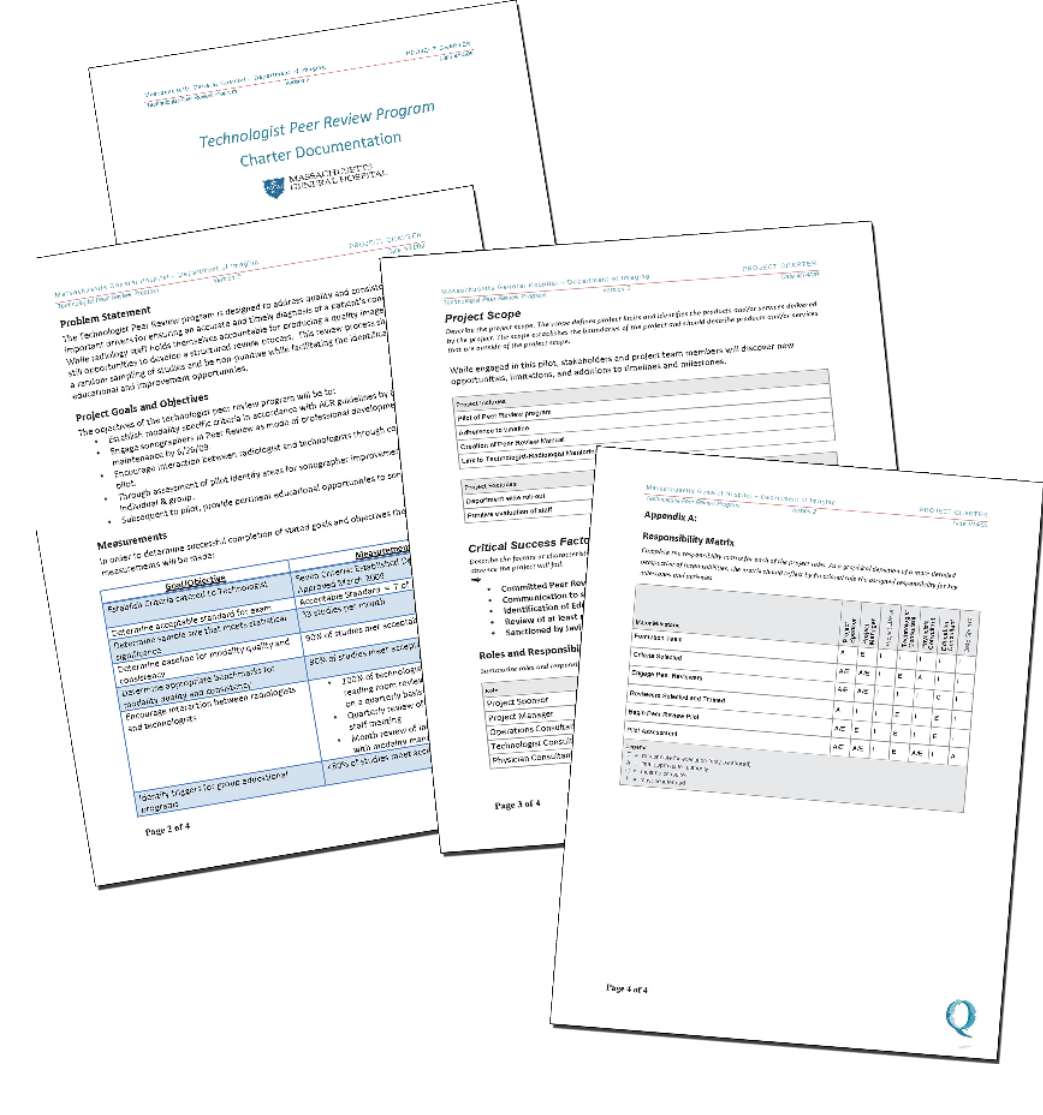


Figure 2: Project Charter



## METHODOLOGY

The primary objective of this engagement was to develop a non-punitive structured review process that would facilitate the identification of educational and improvement opportunities, resulting in improved quality. Image quality and consistency are the two key drivers of excellent technologist work performance. In our program, improving image quality and consistency required a joint technologist-radiologist partnership in an area of focus. Our team chose thyroid sonography as the initial exam to focus on due to high patient volume and the goal of standardized protocol. The established peer review oversight team including technologist management and radiologist clinical leadership then jointly specified the optimal desired information and metrics of thyroid sonography quality.

In accordance with ACR guidelines the group established seven modality specific review criteria for selected reviewers to use when scoring the thyroid images. The criteria selected for the review were based on technical standards that recognize safe and effective use of diagnostic ultrasound, in which all of our technologists should have proficient training, skills, and techniques. The review criteria were then uploaded onto a web accessible database application (Figure 3).

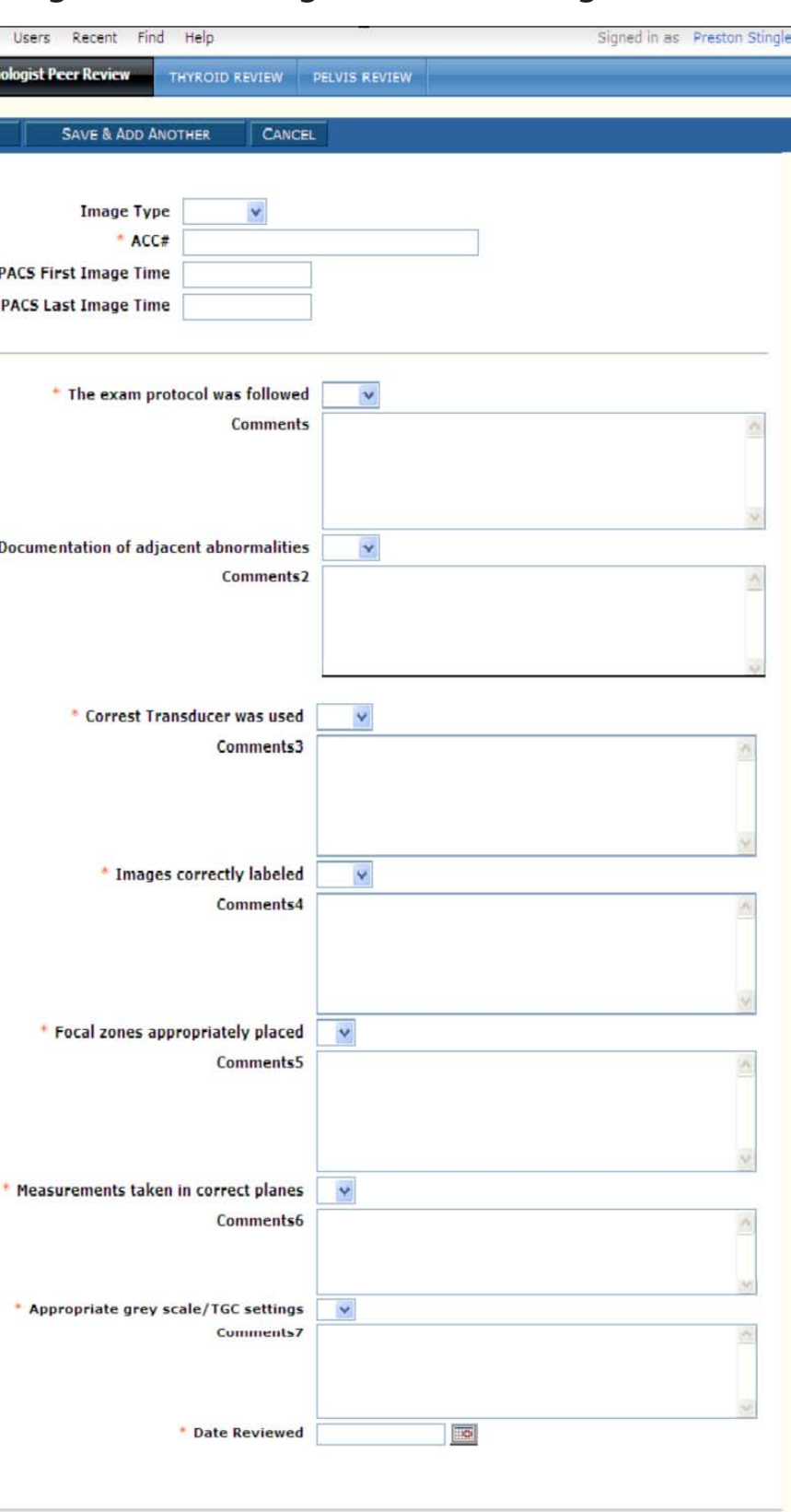
After the team determined the best practice standards for these 7 criteria, an Ideal Image Manual was created. The Ideal Image Manual, comprised of 7 slides visually exemplified the exam specifications required by the radiologists to ensure an accurate interpretation.

The Peer Review Team then established requirements and competencies to select technologists to take part in the reviewing process, based upon experience, aptitude, and good departmental standing (Figure 4). For the ultrasound peer review the peer reviewers were asked to sign a confidentiality agreement outlining vital importance to the on-going workplace culture and atmosphere that the technologists maintain the highest level of professionalism, confidentiality, and unbiased perspective in their work. The reviewers were then informed of the program goals and educated on the established Ideal Image Manual.

Figure 4: Ultrasound Peer Reviewer Requirements and Competency

- Registered sonographer.
- 3-5 years of scanning experience.
- Good standing within department-no corrective action.
- Demonstrates ability to produce ACR quality exams. Consistently meets all ACR criteria for images. Fully meets expectations of customers (radiologists).
- Understands physics of creating a quality image (Selecting correct transducer, using appropriate gain settings).
- Detail-oriented and follows through on completing all elements of the exam, reviewing clinical history, reviewing previous images and reports, follows protocol, correctly labels images, places inclusions on images, ensures timely transmission of images for permanent archive.
- Accepts responsibility for special assignments that serve the Ultrasound division.
- Identify & utilize effective communication skills with various audiences (radiologists, referring physicians and peers).
- Provide solid documentation and record-keeping.
- Maintain confidentiality of project details and willingly signs confidentiality statement.
- Reviews 10 exams with scoring comparable to previously scored images in baseline group of exams.
- Active educator /preceptor who demonstrates the ability to accept and offer constructive criticism.

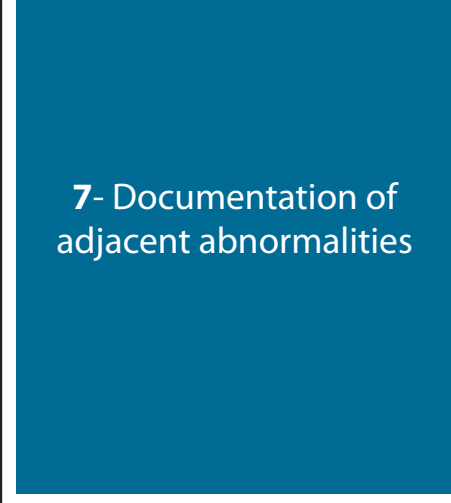
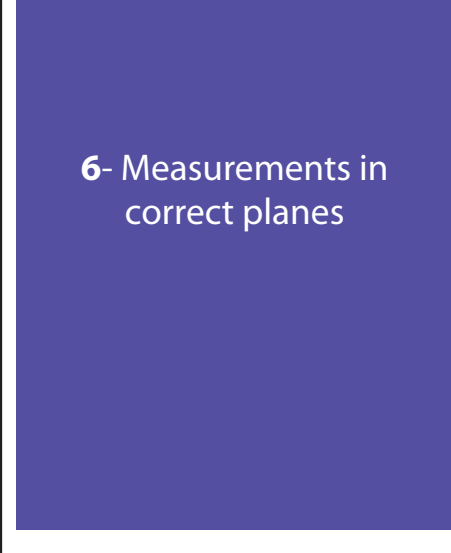
Figure 3. Technologist Peer Reviewing Criteria



## TECHNOLOGIST PEER REVIEW CRITERIA & IDEAL IMAGE MANUAL

### Ideal Image Review Criteria

1. Protocol was followed
2. Correct transducer used
3. Image correctly labeled
4. Appropriate gain settings
5. Focal zones appropriately placed
6. Measurements in correct planes
7. Documentation of adjacent abnormalities



### Thyroid Exam Protocol

**RL Side**  
SAG with and without measurement  
TRV mid gland  
SAG mid gland

**LL Side**  
SAG with and without measurement  
TRV mid gland  
SAG mid gland

**3D Sweeps**  
Superior to inferior  
Try to take including anterior  
Down to CCA (when possible to include including any  
Down to sub-clavian vessels  
Try to take including anterior  
Try to take including inferior  
Try to take including inferior  
Try to take including inferior  
Try to take including inferior

**NOTE:** For anterior gland use Steric probe to obtain full length of the gland.  
**NOTE:** Scan lateral to the gland needs to look for lymph nodes. If present, measure in SAG and TRV. Images of lymph nodes should be labeled.  
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## DATA COLLECTION RESULTS

The reviewer group then used the selected seven modality specific review criteria and Ideal Image Manual to review a statistically significant baseline sample set of 33 anonymized randomly selected thyroid sonograms. The reviewers were provided set time frames over the course of 3 weeks to access a PACS workstation and review the selected studies. Simultaneously, all technologists reviewed an electronic communication regarding the initiation of the peer review process and were asked to complete a baseline Likert Scale survey about their personal confidence and their confidence in their peers' ability to produce high quality thyroid sonography images.

Following the collection of the baseline review data and survey results, clinical leadership educated the technologists using the Ideal Image Manual to convey best practices of quality and standardization. This provided the post baseline foundation for adherence to best practice standards. After allowing time for the technologists to acclimate to the new best practice standards, a second round of 33 anonymized randomly selected thyroid sonograms were reviewed by the same original reviewer team. The results were reviewed amongst the team of reviewers and repeated one month later to validate sustainment, identify trends and areas for additional in-service education.

At the end of the third review, a second Likert Scale survey asking the same questions was issued to the staff to gauge any changes in staff perception of confidence in producing excellent thyroid sonogram images. Both the peer reviewing results and survey results were discussed between the radiologists and technologists at subsequent staff meetings. The role groups were able to discuss points of clarification in the radiologist's expectations as the technologist's customers of images being produced. These in-services allowed the team to focus in on the criteria that the reviewers identified as uniform areas of improvement needing supplemental education from the radiologists to the technologists.

The team collected both qualitative and quantitative data for the program. A survey measuring technologists' subjective confidence and confidence in their peers was taken pre and post implementation by all staff. As the technologists were provided additional education through both the Ideal Image Manual and the radiologist lead in-services, their confidence and the confidence in their peers' ability to produce high quality thyroid sonography images increased sharply (Figures 6-7).

The Ideal Image Manual and seven peer reviewing criteria illustrated the agreed upon best standards for Image Protocol, Documentation of Adjacent Abnormalities, Transducer Usage, Image Labeling, Grey Scale/TGC Settings, Placement of Focal Zones, Measurements in Correct Planes. The baseline results prior to education were compared to those post education implementation. Both ordinal logistic regression methods of measurement showed positive changes due to education and standardization. The corresponding trends from increased exposure to radiologist lead education and the provision of educational materials is demonstrated in the following figures (Figure 8-9).

Figure 8: Mean Average Scores Amongst All Reviewers For all Sample Cases

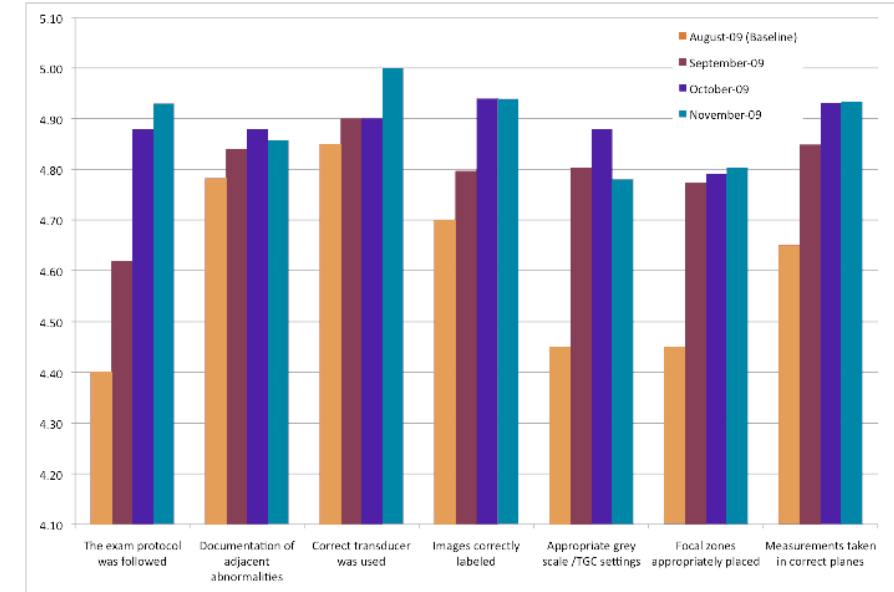


Figure 6: When performing an exam I am certain that I am meeting all 7 Peer Review Criteria

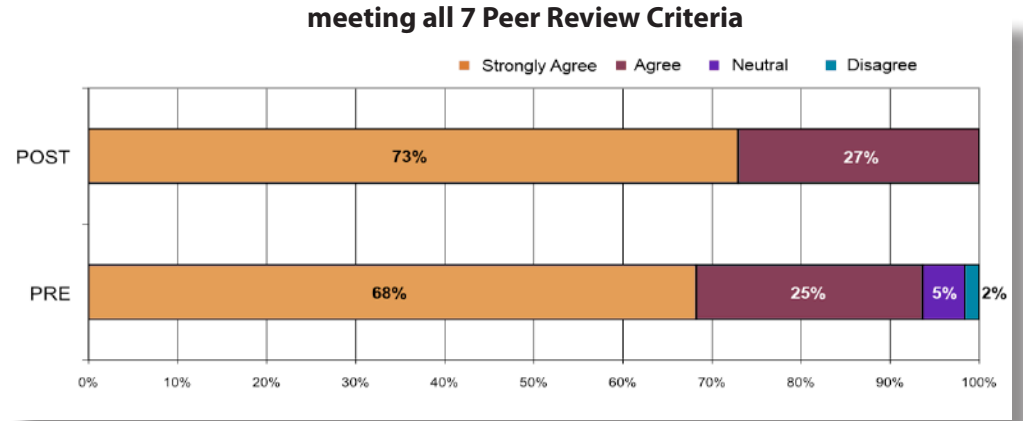


Figure 7: Sonographers are certain that they are meeting all 7 Peer Review Criteria when performing an exam

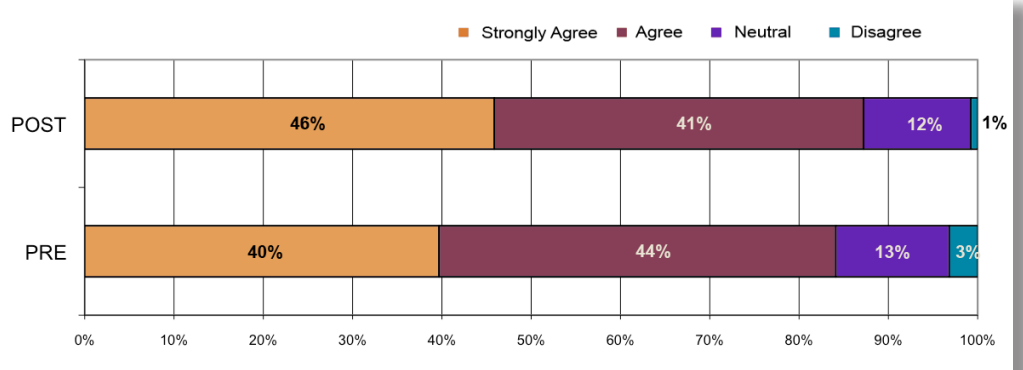
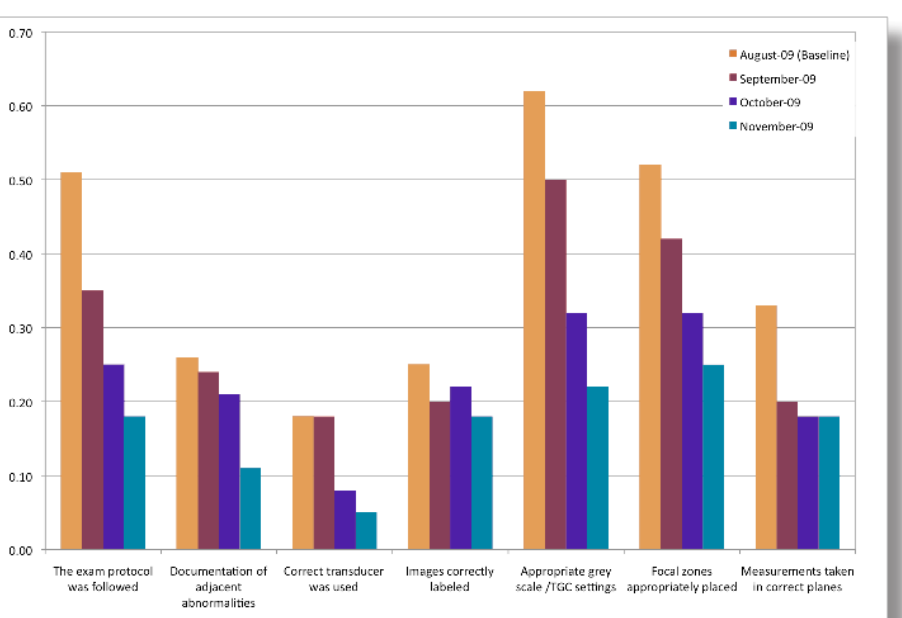


Figure 9: Aggregate Variance Amongst Reviewers Per Sample Case



## CONCLUSION & ESTABLISHING STANDARD NEXT STEPS

Communication, Education, and Standardization all are driving factors leading to increased image quality and all are addressed in this program. Directly engaging technologists in peer review served as a mode of professional development and program maintenance. The results encouraged further interaction between radiologists and technologists and triggered non-punitive and pertinent educational and improvement opportunities for technologists.

Since the initial development this program has spread to three areas of operation and to four specified examination types. To enable adoption to other clinical areas the team fashioned a Peer Review Development Standard Workbook that contained the necessary sequential elements of implementation (Figure 10). Following the aforementioned methodology of deployment, review, and follow-up, the team has seen significant increases in not only the staff's confidence in their own and their peers' ability to produce quality images, but the review results show that they are meeting the standards set forth by the radiologists.

## REFERENCES

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Figure 10: Peer Review Process Steps

Description	Participants	Time Frame
Establish Peer Review oversight team, Operations Manager, Technical Manager, Director and Physician Stakeholder (s)	Peer Review team members	Weekly meetings
Establish criteria list (no more than 10 elements) in accordance with the guidelines and standards of the American College of Radiology- (ACR)	Peer Review team members	6-8 weeks prior to go live
Conduct Baseline scoring assessment of images with established ACR criteria	Technical and Operations Managers	6-8 weeks prior to go live
Establish criteria for selection of Peer Reviewers	Peer Review team members	6-8 weeks prior to go live
Communication to division technologists, including peer reviewer selection criteria and strategic intent	Selected Division of Radiology	6-8 weeks prior to go live
Select Peer Reviewers	Peer Review team members	4 weeks prior to go live
Engage Peer Reviewers in confidentiality, expectations and responsibilities	Director of Operations, Operations Manager and Technical Manager	< 4 weeks prior to go live
Establish agreement on criteria and ideal image manual to guide reviewers (approved by radiologists)	Peer Review team members	< 4 weeks prior to go live
Specify delivery method of randomly selected exams and set deadline expectation	Peer Review team members	< 4 weeks prior to go live
Set mid- month check in date	Peer Review team members	< 2 weeks prior to go live
Begin Peer Review	Selected Peer Reviewers	First of the Month
Mid- month check-in with Peer Reviewers (on-going for the first three months)	Peer Review team members	Mid Month
End of month review (on-going for the first three months)	Peer Review team members	End of Month
Post first three months of peer review data. Provide educational review with technologists and physicians	Division/Director/Operations Manager-Physician (s) stakeholder	Post first three months of Peer Review data
Follow-up Technologist Criteria Survey	Division Operation/Technical Manager/QME project managers	< 2 weeks post Educational Review with staff