Developing a Technologist-Focused Quality Improvement Program

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Background

- Decreased interaction between XR technologists and radiologists regarding image quality in digital age
- Prior attempts to improve quality interrupt work flow and lack systems for continuous improvement
- Our institution
  - Standalone children's hospital, level I trauma center
  - 80K ED visits/year
  - 7K radiographs/month
  - 30 technologists
  - 10 radiologists

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Initial quality intervention

- Standardized template to capture quality errors during report creation incorporated into dictation software

Dose/Fluoroscopic time not given
Field of View
Imaging, Technical, or Metallic Artifact
Incorrect / No Labeling
Incorrect Projection
Magnification
Overexposed
Overlying Artifact
Patient Positioning
Patient Motion
Sequence not provided
Technique NOS
Technique stitching
Technique blurry
Underexposed
View not provided

- Three month pilot, then reviewed data and created checklist to address most common technologist errors

1. Verify proper patient and order
2. Prep patient and exposure field
3. Position and shield patient
4. Set technical factors (Collimate, Perm. Marker and Check Algorithm)
5. Use Presets as starting point and adjust technique appropriately
6. Reduce patient motion / ensure immobilization
7. Alert staff of exposure and make exposure
8. QC images

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Continuous improvement

- Each month captured prior month's errors, reported
  - Total error rate
  - Per-technologist error rate
  - Ascension numbers for all images with errors
    - Reviewed by capturing technologist and technologist supervisor
- Rewards for technologists with error rates < 3%

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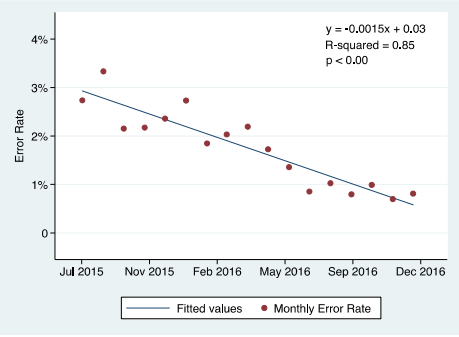
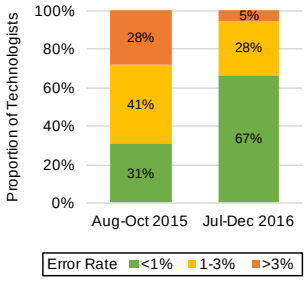
Results: Error Rate

Decrease in Total Error Rate



During the initial 3-month pilot period, the total error rate averaged 2.7% vs. 0.9% in the final 6 months of 2016

Staff Improvement



Proportion of technologists with error >3% decreased from 28% during the initial 3-month pilot to 5% during the final 6 months of 2016

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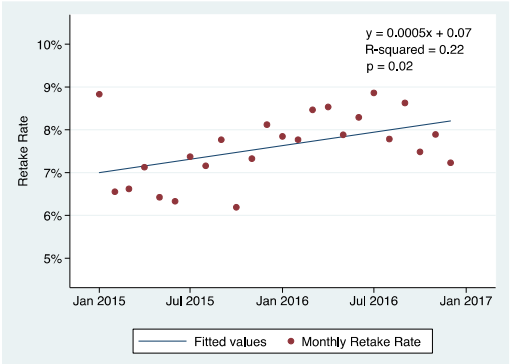
Results: Image Retake Rate



- Ranged from 6.2% to 8.9%
- Upward trend but poor regression fit
- Averaged 7.0% before intervention, 8.0% during intervention

Opportunity for improvement during next QI cycle

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Limitations

- Identifying error requires radiologist participation
- Of 10 radiologists who remained at our institution throughout the intervention, only 6 participated consistently, representing 55% of radiographs.
  - Sensitivity analysis limited to these 6 radiologists: image quality error rates decreased during the intervention, with a regression coefficient of -0.07% (95% confidence interval, -0.14% to 0.00%; P = .04) but poor regression fit, with an R2 value of 0.25.

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Lessons learned

- Develop a quality checklist to address most common sources of error
- Track error at the individual level, with ongoing feedback tied to specific images, rewards for highest performers, and competition to improve
- Minimize disruption to workflow and audit participation
- Ensure no unexpected consequences (i.e. retakes)

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