Problem Statement
A high percent (6.1%) of radiographs obtained at UMass Memorial’s busiest outpatient imaging center (ACC) had one or more quality defects. Quality defects can cause interpretation difficulties, repeat imaging, and delayed results negatively affecting patient care and cost.

Scope
Adult, musculoskeletal, plain radiographs (X-Rays) from the ACC.

Background
Musculoskeletal Radiologists have observed a subjectively high number of quality issues on adult, plain radiographs from the ACC site.

Data Gathering for Initial Conditions
Quality defects are organized into categories:
1. Labeling
2. Positioning
3. Field of View
4. Pt. Artifact
5. Exposure
6. Motion
7. Equip. Artifact
8. IT
9. Other

Radiographs with quality defects are entered by category into a database by the participating MSK radiologists at the time of image interpretation.

Initial Conditions
![Graph showing initial conditions at ACC (Nov/Dec 2012)]

Root Cause Analysis
Root cause analysis for top 3 quality defects at ACC

Example for FOV Root Cause Analysis:
1. Most often field of view too large/not centered
2. Technologists too rushed to properly collimate
3. Following instruction from ordering clinician

Goals
1. Reduce quality defect rate at the ACC by 50%.
2. Reduce top three quality defect categories at the ACC by 50% each.

Countermeasures
1. In-service Workshop for ACC Techs: 2/13/13
   A. Explain Quality Scholars Project to Techs
   B. Identify Quality Defects/Root Causes
   C. Review Proper Techniques
2. ACC site visit: 2/15/13
3. E-mail reminder/positive feedback: 4/2/13
4. Reminder cards placed at work areas: 4/16/13

Results: Overall ACC Quality Defects

Conclusions
• Overall defect rate 33% reduction (6.1% to 4.1%). Improving trend with April defects below goal (2%).
• Patient artifact category 38% reduction (32% to 20%). Improving Trend.
• Labeling category 20% reduction (10% to 8%).

Project Benefits/Next Steps
• Increase patient safety and accurate diagnosis by improving radiographic image quality.
• 14 less “call backs” resulting in cost savings.
• Fewer quality issues increase radiologist and technologist efficiency resulting in cost savings.
• Use LEAN principles to address radiographic image quality at other sites (e.g., Memorial, Hahneman, University, etc.).

Background: Typical Examples of Poor Quality Radiographs

Poor Quality
1. Bad Exposure: Grainy
2. Field of View Too Large

Good Quality
1. Good Exposure: Sharp
2. Field of View Appropriate

Poor Quality
1. External Artifacts: Zipper, Buttons
2. No Label

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