MRI Department Efficiency: Process and Protocol Improvement

The Problem
- Inappropriate time slots for a complicated network of MRI exams.
- Outdated and insufficient distribution of exams across available MRI scanners.
- Unnecessary length of exams.
- Problematic scheduling process.
- Inaccurate and incomplete scheduling questions and instructions.
- Cumbersome ordering system.

Aim/Goal
To improve the process of ordering, scheduling, and performing an MRI in a busy, academic medical center. Efficiency will be measured by time savings, magnet capacity and availability, potential revenue and cost savings to the hospital.

The Interventions
- Reviewed statistics from June 2013; a month demonstrating an average total number of exams for the MRI department. Statistics collected included:
  - Number and type of exams
  - Magnet capacity and availability across all scanners
  - Comparison of allotted exam time to actual time to complete exam
- Each subspecialty section (Neuro, MSK, Body, Breast) identified any problems with exams and proposed protocol updates that included:
  - Parameter adjustments to improve scan time and reproducible quality
  - Subtraction of sequences
  - Reorganizing the order of sequences for optimal workflow
- After reviewing the above data and evaluating the actual gradient time for each exam, each subspecialty section determined the appropriate time slot every exam should fit into and decided to update scheduled time slot increments from 20 minutes to 15 minutes resulting in 15, 30, 45, 60, or 75 minute time slots.

The Interventions (cont.)
For all adjustments to work appropriately the following needed to be done:
- Patient order entry (POE) and online medical record (OMR) needed to be reconfigured to help ordering physicians find and order the appropriate exam more easily.
- Scheduling questions were updated to find safety contraindications up front, preventing those exams from getting scheduled at all. The updated questions also enable schedulers to better find the scanner that works best for the patient.
- Patient instructions were revised to ensure patients arrive on time with the correct preparation.

The Results/Progress to Date
- Updates were made to ordering systems POE and OMR making it easier for referrers to find the type of exam they are looking to order. In turn, having the correct exam ordered allows exams to be placed into the correct time slots by the scheduler.
- The network of MRI exams has been restructured to make it less complicated.
- Available time slots were updated across scanners and the availability for each type of exam was restructured and redistributed across all scanners.
- Image quality has improved and exam length is projected to shorten from an average of 47.8 minutes per exam to 44.3 minutes per exam, equal to an overall time savings of 253 total hours for the month.
- With the possibility of approximately 257 more exams per month, potential revenue increase may yield almost $2.5 million yearly for the Medical Center (at $800 per scan & 75% fill rate).

Lessons Learned
- Focused process improvements in MRI protocols, scheduling and ordering have the potential to significantly increase throughput in the MRI department.
- When properly identified, MRI protocol adjustments can considerably improve image quality and the overall patient experience with shorter exam times and fewer repeats.

Next Steps
- Continue to find ways to improve the efficiency of MRI processes and protocols.
- Educate referring physicians to help get the correct order the first time.
- Implement pre-approval processes.
- Run new data and evaluate the effectiveness of the adjustments and check for revenue gain.

For More Information Contact
Ines Cabral-Goncalves
icabral@bidmc.harvard.edu