

## **Reducing Unnecessary Scan Acquisitions at Abdominal MRI**

**Primary Authors:** G. Scott Gazelle, MD, MPH, PhD  
C. Daniel Johnson, MD  
Jonathan B. Kruskal, MD, PhD

### **Purpose and Rationale**

This project focuses on reducing the number of unnecessary scan acquisitions at abdominal MRI.

Increasingly, abdominal MRI protocols involve greater numbers of pulse sequences and acquisitions. This results in longer scan times, longer study interpretation times, and adds complexity that can lead to errors.

Simplifying MRI protocols by reducing the number of scan acquisitions could lead to increased efficiency and possibly improved patient outcomes.

### **Project Measures**

**Metric 1** # of scan acquisitions (pulse sequences) per abdominal MRI

### **Baseline Data Collection**

Make a plan for selecting cases. For example, you might want to select a specific indication or protocol (e.g., liver MRI for lesion characterization) or a group of indications that might have similar MRI scanning protocols.

Identify a data collection strategy, including the time period for collecting cases and the total number of cases to be collected. Ideally, consecutive cases meeting the selection criteria (e.g., protocol) will be collected until the desired target number of cases has been collected. An alternative strategy might be to collect the first 5 or 10 cases in consecutive days, or on a specific day of the week.

The number required will vary based on the patient demographics of your practice. A reasonable target would be to end up with approximately 30 cases for each protocol studied (if more than one protocol is included).

### **Data Analysis**

The goal is to identify the average number of scan acquisitions (pulse sequences) for a particular MRI protocol, and to identify opportunities to reduce the number.

The first step should be to identify outliers by identifying those cases in which the number of scan acquisitions is more than 2 standard deviations above the mean. These cases should be further investigated. Things to consider in this investigation would be clinical history provided, physician responsible for the scanning protocol, number of repeated acquisitions, etc.

### **Factors Potentially Influencing Performance**

After analyzing the data, identify opportunities for improvement. Reflect on your practice and identify factors that may have influenced your results. Potential contributors may include:

1. Protocols that have not been optimized.
2. Technologists failing to follow the protocols.
3. Patient factors, such as motion or respiration.
4. Physician or technologist selecting the incorrect protocol.

### **Intervention**

Team members, including radiologists and technologists, should meet to review the data and discuss possible strategies to reduce the number of scan acquisitions and thus total scan time. This might include careful review of root causes and a discussion of optimal protocols.

### **Post Intervention Data Collection**

Using the same data collection strategy as for Baseline Data Collection, collect a similar number of cases and repeat the data analysis. Review the Post Intervention Data with your project team and compare to Baseline Data. Discuss the effect of specific strategies employed. Develop plan for ongoing protocol monitoring.