

# Building a Culture of Continuous Quality Improvement in an Academic Radiology Department

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## Abstract

As we enter a new era of health care in the United States, radiologists must be adequately prepared to prove, and continually improve, our value to our customers. This goal can be achieved in large part by providing high-quality services. Although quality efforts on the national and international levels provide a framework for improving radiologic quality, some of the greatest opportunities for quality improvement can be found at the departmental level, through the implementation of total quality management programs. Establishing such a program requires not only strong leadership and employee engagement, but also a firm understanding of the multiple total quality management tools and continuous quality improvement strategies available. In this article, we discuss key tools and strategies required to build a culture of continuous quality improvement in an academic department, based on our experience.

**Key Words:** Quality, total quality management, continuous quality improvement

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## INTRODUCTION

Incentives for academic radiology departments to continually improve the quality of the care they provide are multifactorial. First, as health care professionals, it is our responsibility to provide patients with appropriate, efficient, and accurate radiologic services while ensuring their safety. To develop loyalty among our patients and referral base, we must earn confidence by providing a consistent, valued service. With the changing landscape of health care in the United States, and the ongoing implementation of pay-for-performance metrics, our procedural reimbursement, maintenance of certification, and accreditation will all likely be at least in part dependent on our ability to demonstrate provision of high-quality care.

Total quality management (TQM) programs have three tiers: quality control, quality assurance, and continuous quality improvement (CQI) [1]. Quality control sets

a baseline of minimum acceptable quality. Quality assurance includes efforts taken to reduce adverse effects of chance occurrences, or error, on product quality, before implementing quality control measures. Quality improvement is an ongoing and proactive process to produce the best product while mitigating the effects of chance.

Efforts to improve quality in radiology are underway on both the national and international stages. Radiology-specific quality improvement efforts include the ACR's National Radiology Data Registry, developed in 2006, which allows practices to compare their performance on several indicators, including CT dose index, report turn-around times, as well as diagnostic performance in areas such as CT colonography and mammography, to that of their peers, both regionally and nationally [2]. Similar benchmarking efforts are being made by CMS through the introduction of imaging efficiency measures in the Hospital Outpatient Quality Reporting Program [3]. Currently, six imaging efficiency measures are used by CMS for payment determinations, and individual hospital performance on these measures is now publicly available [4].

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quality, some of the opportunities with the greatest impact on quality improvement are at the departmental level, through implementation of TQM programs. We discuss how to integrate a CQI process into a radiology department based on our experiences at an academic institution.

The importance of institutional and departmental leadership in the establishment of a CQI program cannot be understated. At the University of Chicago, an institutional emphasis on quality improvement was made through the establishment of the University of Chicago Medicine Quality Committee (UCMQC), a subcommittee of the executive committee of the medical staff. The purpose of the UCMQC is to assess the quality, appropriateness, and efficacy of diagnostic and treatment services with a goal of institutional CQI. This objective can be accomplished through designing, measuring, assessing, and improving the governance, managerial, clinical, and support processes that most affect patient outcomes.

The Associate Chief Medical Officer for Clinical Quality chairs this committee and oversees the Center for Quality, which is comprised of quality analytics and quality performance improvement teams. To facilitate its quality goals, the Center sponsors CQI projects within each department, by providing as much as \$4,000 per year, per department, to fund quality improvement projects or education. Additionally, the Center sponsors an annual medical center-wide “quality fair” to showcase ongoing and completed quality improvement projects and to facilitate learning and idea exchange across departments.

## TOTAL QUALITY MANAGEMENT

To implement a TQM program, one must first understand what defines a quality product. Quality is often assessed through lenses that are user based (consumer preference), product based (precise, measurable product variables), and manufacturing based (conformity to production standards). By ascertaining consumer preference, translating these preferences into measurable variables and ensuring that products are made to specification, a manufacturer or service provider can ensure a high-quality product. Making such determinations is important to not only the consumer but also the provider because they carry important implications for the provider’s reputation, liability, and viability in a competitive marketplace [5,6].

The cost of quality is often categorized into prevention costs, appraisal costs, internal failure costs, and external costs (Table 1) [5]. External costs, which are those related to producing an inadequate product, are unlike the others

Table 1. Costs of quality with radiology MR examples

Costs	Definition	Example
Prevention	Costs associated with reducing the potential for a defective part or service	Time and money spent on MR technologist training and MR protocol standardization
Appraisal	Costs incurred due to product, process, and service evaluations	Time and money spent on departmental review of MR quality, consumer evaluations
Internal	Costs incurred due to the production of defective products or services that are identified before consumer delivery	Inadequate MR examination identified before patient departure → repeat examination, lost scanner time, patient inconvenience
External	Costs incurred after the delivery of defective parts or services to the consumer	Inadequate MR examination/interpretation → patient harm, decreased reputation, decreased consumer loyalty

in that they are unpredictable and at times quite high. For this reason, many companies assert that the cost of poor quality is grossly underestimated and therefore try to minimize external costs through TQM programs.

A TQM program is a management-driven, customer-centered, strategic commitment to quality work and continuous improvement. Key components of implementing such a program include CQI, employee empowerment, benchmarking, and appropriate knowledge and utilization of TQM tools.

## Continuous Quality Improvement Strategies

Some common CQI strategies that are readily applicable in a radiology department include the Plan-Do-Study-Act (PDSA) cycle, and Lean principles.

**Plan-Do-Study-Act.** The PDSA cycle is a well-established model of CQI devised by Walter Shewhart and popularized by Edward Deming (Fig. 1). During the Plan phase, an improvement goal is established and potential causative factors limiting quality are identified. A plan is devised with appropriate process changes to achieve the desired goal. In the Do phase, a small-scale implementation of the plan is performed incorporating adjustments to the service or production process as devised in the Plan phase. During this phase, data are

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