CHAPTER 1

Introduction to Quality Management

KEY TERMS

<table>
<thead>
<tr>
<th>action</th>
<th>effectiveness of care</th>
<th>output</th>
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<tbody>
<tr>
<td>aggregate data</td>
<td>efficacy of care</td>
<td>process</td>
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<td>indicator</td>
<td>efficiency of care</td>
<td>quality assessment</td>
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<td>appropriateness of care</td>
<td>expectation</td>
<td>quality assurance</td>
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<td>benchmarking</td>
<td>FMEA</td>
<td>quality control</td>
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<td>brainstorming</td>
<td>focus group</td>
<td>quality improvement team</td>
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<td>concurrent data</td>
<td>FOCUS-PDCA</td>
<td>Safe Medical Devices Act</td>
</tr>
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<td>continuity of care</td>
<td>HIPAA</td>
<td>Six Sigma</td>
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<td>cost of quality</td>
<td>indicators</td>
<td>sentinel event indicator</td>
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<td>critical path</td>
<td>input</td>
<td>supplier</td>
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<td>customer</td>
<td>Mammography Quality Standards Reauthorization Act</td>
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<td>Deficit Reduction Act</td>
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<td>system</td>
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OBJECTIVES

At the completion of this chapter the reader should be able to do the following:

- Identify the need for quality management in diagnostic imaging
- Discuss the impact of government regulation and The Joint Commission accreditation on quality management
- Explain the differences between quality assurance, quality control, and quality management
- Identify the five steps of a process
- List the various tools of group dynamics
- Explain TJC 10-step monitoring and evaluation process and cycle for improving performance

OUTLINE

History of Quality Management in Radiology 3
- Governmental Action 3
- The Joint Commission 5
- Quality Assurance 6
- Quality Control 6
- Continuous Quality Improvement 7

Process Improvement Through Continuous Quality Improvement 7
- Key Quality Characteristics 8
- Key Process Variables 8
- Problem Identification and Analysis 8
- Group Dynamics 8

Specific Quality Management
- Quality Improvement Processes 10
- TJC 10-Step Process 10
- TJC Cycle for Improving Performance 12
- Other Quality Management/Quality Improvement Models 14
- Summary 16
Diagnostic imaging is a multistep process by which information concerning patient anatomy and physiology is gathered and displayed with the use of modern technology. Unfortunately, numerous sources of variability, in both human factors and equipment factors, can produce subquality images if not properly controlled. This can result in repeat exposures that increase both patient dose and department cost and possibly decrease the accuracy of image interpretation. This in turn can result in decreased customer satisfaction (customers being physicians, vendors, insurance companies, employees, and patients) that ultimately costs the healthcare provider lost business and revenue. The purpose of a quality management program is to control or minimize these variables as much as possible. In a diagnostic imaging department, these variables include equipment; image receptor; processing; viewing conditions; and competency of the technologist, support staff, and the observer or interpreter.

When discussing the quality of particular goods or services (or in our case, the quality of patient care and the diagnostic images that we produce), one must keep in mind the three levels on which quality is determined:

1. Expected quality. This is the level of quality of the product or service that is expected by the customer and may be influenced by outside factors such as prior word of mouth from friends and relatives. A diagnostic imaging professional would likely have the least amount of impact on this level of quality because it is present before the patient comes into the imaging department.

2. Perceived quality. This is the customer’s perception of the product or service. It is based on the customer’s perception of the product or service and is highly subjective and more difficult to measure quantitatively. For patients undergoing diagnostic imaging, their experience (such as how long they had to wait or how they were treated) during the procedures greatly influences their perception of quality. Therefore how well an imaging professional performs his or her respective responsibilities will have the greatest impact on this level of quality. Because perceived quality is often what brings patients back to a hospital or imaging center, it can be more important than the actual quality.

3. Actual quality. This level of quality uses statistical data to measure outcomes and considers all factors that can influence the final outcome (e.g., the quality of the image, accuracy of diagnosis, timeliness of report to primary physician). It also can compare the quality of the product or service with that of a competitor.

Since the early 1980s, healthcare delivery in the United States has undergone dramatic changes that have affected diagnostic imaging departments and their ability to provide quality care. These changes include the following:

- **Advances in technology, equipment, and procedures.** The digitization of radiography, along with expensive technologies such as magnetic resonance imaging (MRI), spiral computed tomography (CT), electron beam tomography, positron emission tomography (PET), digital radiography and fluoroscopy, and single photon emission computed tomography (SPECT), has increased the cost of equipment acquisition, installation, and maintenance.

- **Legislation and government regulations.** Legislation such as the Safe Medical Devices Act (SMDA) of 1980, the Mammography Quality Standards Act (MQSA) of 1992, and the Mammography Quality Standards Reauthorization Act (MQSRA) of 1998 has increased the responsibility of diagnostic imaging department managers and staff to document proper equipment operation and procedures. This is in addition to requirements from the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA) that affect matters ranging from blood-borne pathogens to disposal of processing chemicals.

- **The Joint Commission Accreditation Procedures.** The accreditation procedures of The Joint Commission (TJC) have gone from the philosophy of quality assurance (QA) to one of total quality management (TQM) (explained in more detail later in this chapter).

- **Corporate buyouts and mergers.** Since 1980, more than 1000 hospitals have closed in the United States. Many others have been purchased by “for profit” healthcare organizations or have merged to condense costs or reduce competition, or both.

- **Methods of reimbursement for services rendered.** The previous method of “fee for service” reimbursement of healthcare expenses is rapidly being replaced by managed care plans such as health maintenance organizations (HMOs) and point of service plans such as preferred provider organizations (PPOs). The lower rate of reimbursement from these plans has reduced the operating budgets of many diagnostic imaging departments. In addition, many insurers are now employing radiology benefits management companies (RBMs) to determine the necessity of various diagnostic imaging orders.

These changes have made a quality management program essential to the operation and survival of a diagnostic imaging department. The cost of such a program in the form of personnel time and test equipment is more than offset by the savings from lower repeat rates, less equipment downtime, film and chemical savings in nondigital departments, greater department efficiency, and increased customer satisfaction because waiting time can be reduced. When assessing the effectiveness of a quality management program,
one must consider the cost of quality. This is defined as the expense of not doing things right the first time. In diagnostic imaging departments, this could be considerable because the result could lead to lost business at the very least or the injury or death of a patient at the very worst.

HISTORY OF QUALITY MANAGEMENT IN RADIOLOGY

One of the earliest known methods of evaluating the quality of clinical healthcare by assessing patient outcomes was carried out by Florence Nightingale in the 1860s. She was one of the first to use a systematic approach to collecting and analyzing mortality rates in hospitals. The origins of modern quality management can be traced back to the early 1900s, to the work of an industrial engineer named Frederick Winslow Taylor. Taylor is considered the “Father of Scientific Management” because of his philosophy that the planning function and the execution stage be separate and that numerous individuals be assigned specific tasks within the production process to minimize the complexity of the task. With complexity minimized, the hope was to maximize efficiency because, theoretically, fewer mistakes would occur. Job tasks were broken down into simple, separate steps that could be performed over and over again (i.e., assembly lines). Only specific persons were assigned the task of quality control inspection. This philosophy was common practice, both in American industry and in healthcare settings (including diagnostic radiology), until the 1980s.

During the 1980s, the concept of quality improvement began to gradually replace the concept of scientific management. This concept is credited to W. Edwards Deming and Joseph Juran, who used the quality improvement philosophy to revitalize the economy of Japan after World War II. This concept combines quality control with an overall management philosophy that gives input to all persons involved in the process of creating the specific good(s) or service(s). This concept is discussed in further detail later in this chapter. Many diagnostic imaging departments have been systematically monitoring their equipment and procedures (quality control) since the 1930s, independent of any government regulation or accreditation agency. The main motivations were to save money and increase efficiency and quality of care. Since then, governmental action and policies mandated by the TJC have all but required that an extensive quality management program be implemented by diagnostic imaging departments.

**Governmental Action**

The federal government’s first step toward requiring that diagnostic imaging departments implement quality management programs came in 1968 with the Radiation Control for Health and Safety Act. This law required the U.S. Department of Health, Education, and Welfare (now called Health and Human Services) to develop and administer standards that would reduce human exposure to radiation from electronic products. The Bureau of Radiological Health (BRH) (now called the National Center for Devices and Radiological Health) was given the responsibility for implementing this act. The BRH set forth regulatory action, beginning in 1974, with several amendments to control the manufacture and installation of medical and dental diagnostic equipment to reduce the production of useless radiation. These regulations are contained in the document Title 21 of the Code of Federal Regulations Part 1020 (21 CFR 1020), Title 21 refers to the FDA. In 1978 the BRH published the “Recommendations for Quality Assurance Programs in Diagnostic Radiology Facilities.” The Joint Commission, along with most state public health agencies, has adopted these recommendations into its various policies governing diagnostic imaging departments.

In 1981 the Consumer-Patient Radiation Health and Safety Act addressed issues such as unnecessary repeat examinations, quality assurance techniques, referral criteria, radiation exposure, and unnecessary mass screening programs. It also established minimum standards for accreditation of educational programs in the radiologic sciences and for the certification of radiographic equipment operators. This law motivated many states to enact licensure laws for radiologic technologists. However, there is no legal penalty for noncompliance contained within the law and eight states, plus the District of Columbia, currently have no minimum educational or certification criteria for healthcare workers who perform radiologic procedures. As of the writing of this edition, the eight states are Alabama, Alaska, Georgia, Idaho, Missouri, North Carolina, Oklahoma, and South Dakota. The states of Michigan and Nevada license mammographers but not radiographers, while Wisconsin does not license radiographers but does require American Registry of Radiologic Technologists certification. In September 2000, the Consumer Assurance of Radiologic Excellence (CARE) Act was first introduced in Congress by Rep. Rick Lazio (R-NY) as H.R. 5624. In 2006, the CARE bill was retitled the Consistency, Accuracy, Responsibility and Excellence in Medical Imaging and Radiation Therapy Bill because many of the imaging disciplines included in the CARE legislation are not directly related to radiology. The CARE Act mandates educational and training requirements for all technologists performing imaging procedures (thereby mandating the standards contained in the Consumer-Patient Radiation Health and Safety Act of 1981). In addition to improving the quality of care nationwide, enacting the CARE Act also would save considerable money each year. According to the Radiologic Society of North America (RSNA) journal,