INTRODUCTION TO HEALTHCARE QUALITY MANAGEMENT

PATRICE SPATH

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This book is dedicated to my sisters, Bobbi Lemme and Margi Morgan. They have never worked in healthcare, and I suspect they've never really understood what healthcare quality is all about. With this book, my intention is to educate my sisters, as well as other novices, about health services measurement, assessment, and improvement.

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FOREWORD

The healthcare industry abounds in print (and multimedia) resources on the topic of quality. A Google search for "healthcare quality books" yielded 19.3 million results in 0.21 seconds—a mind-boggling figure. Some of the results don't refer to books, and many are repetitive, but their plenitude can't be ignored. Despite the large number of healthcare quality *books* available, relatively few *textbooks* on quality management exist for students in the health professions. Even fewer meet the learning needs of emerging healthcare managers. Refining the Google search to "healthcare quality textbooks" decreased the number of results by 98 percent.

Selecting the best textbook for a course is a challenge for most educators. This task is even more challenging when many options are available and equally daunting when there are few. Educators in the health professions need specialized content; as a result, they have fewer textbook choices than their counterparts in general education and other professional disciplines. The number of students pursuing specialized healthcare programs also limits educators' choices; fewer students purchase specialized textbooks, limiting the funds available for textbook development. In particular, educators who develop foundation courses on healthcare quality management can attest to the scarcity of textbooks appropriate in scope and content. This book fills the near-void of textbook options for students pursuing healthcare education at the undergraduate level. Students and educators now have a book filled with case studies and examples that discuss and illustrate the basic principles and techniques for measuring, monitoring, reporting, and improving the delivery and management of healthcare services.

Quality management is an essential curriculum for students of all health professions. It is as applicable to those who manage the delivery of healthcare services as it is to clinicians who perform the diagnostic and treatment services. Managers and clinicians alike must understand the attributes of quality in the context of healthcare, in particular the attributes that influence patients'/consumers' perception of the quality of their service encounters.

Introduction to Healthcare Quality Management is a practical, application-focused text geared toward undergraduates who will enter the healthcare workforce as "doers" rather than planners or evaluators. It presents techniques for measuring quality and safety, collecting and analyzing appropriate data, and using the resulting information to improve health services—critical job skills students will employ throughout their professional careers. The cases, figures, illustrations, and examples that supplement the text are drawn from real-world activities in healthcare organizations and strongly reinforce the concepts presented.

All students, undergraduates in particular, benefit greatly from courses structured around a textbook. Journal articles and online material can be used to incorporate the latest trends; however, the linear flow of concept development, application, and reinforcement usually is better managed with a textbook. Further, if the majority of assigned reading is not content from the textbook, students are apt to perceive the value of the book as less than its purchase price. As a provider of course structure and content appropriate to undergraduate learning objectives, this textbook fulfills both functions.

The book is organized around the basic concepts of quality management—measurement, assessment, and improvement. These concepts are introduced in a historical context and developed systematically in a manner that enables students to understand how they can be applied to various quality management models employed by healthcare organizations. Over the course of their careers, students will be able to transfer this knowledge to new quality management models they encounter. Considering the dynamic history of quality management and the likelihood that new models will emerge, this book offers a highly desirable learning outcome.

From a teaching perspective, the book has many attractive features. The volume of content is appropriate for a typical semester-length undergraduate course, and its chapters can be easily adapted to instructional units. Each chapter includes learning objectives, a list of key words, a running glossary, student discussion questions, related websites, and references/citations for journal articles, texts, and other supporting content. The logical topic sequence introduces basic concepts, applies those concepts, and culminates in more complex issues related to resource utilization and organizational structure. A companion website hosted by the American College of Healthcare Executives enhances the book's stand-alone value by providing additional teaching and learning resources for educators and students.

Students in the health professions will be providers or managers of healthcare services when they graduate and enter the workforce; they also will be consumers of health-

care services. In addition to preparing students for quality management tasks in their professional roles, this book can inform their behavior as healthcare consumers. Their studies about the organizational processes and systems healthcare facilities use to ensure quality and safety can better equip them to serve as healthcare quality advocates for themselves and their families. The chapter on patient safety is particularly relevant to the concept of students as healthcare consumers and consumer advocates.

Ms. Spath is well-qualified to write this book, as she is both a quality management professional and an educator in the health professions. Her years of experience using real healthcare events to ground classroom instruction and employee training to improve healthcare quality offer a perspective enjoyed by few individuals. This rich perspective is further enhanced by her personal commitment to continuous learning and improvement. By combining her personal understanding and experience with knowledge gained through research, Ms. Spath has produced an outstanding textbook uniquely crafted to meet the needs of students in the health professions. It will serve them well as a guide to their quality studies and as a personal resource throughout their healthcare careers.

Donna J. Slovensky, PhD, RHIA, FAHIMA
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PREFACE

Every era presents unique challenges to healthcare organizations, and the start of the twenty-first century has been no different. Today there is unprecedented attention on the quality of health services. Never have healthcare practices been subject to so much public scrutiny, have providers been financially rewarded for complying with best practice standards, or have health insurers refused to pay for the care of patients who experience potentially avoidable complications. These developments are just a few of an ever-increasing number of reasons why quality management is strategically vital to the work of all healthcare professionals. The old ways of measuring and improving performance simply won't suffice; the issues are too complex, and the stakes are too high.

Introduction to Healthcare Quality Management is the culmination of over 25 years of experience as a hospital quality director, trainer and consultant for other quality professionals, and instructor of under- and postgraduate healthcare quality courses. Throughout my career, improvement fads and quality gurus have come and gone. This cycle will continue long after I've retired. My goal in writing this book was to stick to the basics—the principles and techniques common to any healthcare quality initiative. Once students of quality management master these basics, they will be able to adapt to any model of quality they encounter. For individuals seeking advanced degrees, this book is a stepping stone to future learning.

This text is directed to people with little or no clinical healthcare experience. The case studies and illustrations primarily focus on the provision of health services rather than the diagnosis and treatment of patients. Clinical discussions are accompanied by explanatory text to clarify terminology or situations that may be unfamiliar to students. The websites listed at the end of each chapter are a good place to find advanced learning resources, including additional clinical quality management examples.

Throughout my years of teaching quality management to beginners, I've found that vocabulary can be a barrier to learning. A simple concept like measurement of patient complication rates may be difficult for students to understand if they have little healthcare experience. To help them overcome this barrier, I introduce many of the concepts with analogies from everyday life. Once students see the link between what they know and probably do almost every day, they often find related quality principles and techniques easier to understand.

CONTENT OVERVIEW

If you can't define quality, you can't manage it. Accordingly, the text begins with a chapter on the attributes of quality and factors that affect consumer perceptions of quality. The notion of *value*—quality at a reasonable cost—is introduced along with an explanation of how perceived value influences purchasing decisions. Also included are the Institute of Medicine's definition of healthcare quality and the quality characteristics expected of high-performing healthcare organizations. Measurement and improvement of these quality characteristics are reinforced throughout the book.

Chapter 2 begins with a description of the interrelated elements of quality management: measurement, assessment, and improvement. This trilogy provides a framework on which subsequent chapters build. The chapter continues with a discussion on the science of quality and its application in healthcare organizations. Students are introduced to the works of Walter Shewhart, W. Edwards Deming, and other quality pioneers of the manufacturing industry. Healthcare organizations, which have been slow to adopt statistical process control techniques, are beginning to rival other industries in their application of quality management tools. Reasons for these advances in quality management techniques are presented to help students grasp subjects covered in later chapters. Chapter 2 concludes with a summary of external forces that influence healthcare quality management activities.

Chapters 3 through 7 provide step-by-step descriptions of how healthcare quality is measured, assessed, and improved. Chapter 3 begins with an overview of quality measurement and characteristics of worthwhile measurements. The three measurement categories— structure, process, and outcome—are introduced along with numerous examples from a variety of healthcare settings. Also covered are methods for choosing performance measures and constructing measures that yield worthwhile information. Most important, this chapter

introduces students to a critical element of clinical quality management—measurement of clinical decision making using evidence-based guidelines.

Measurement is only the first step in quality management. The measurement results must be evaluated to determine whether performance is acceptable. Performance assessment, the second component of quality management, is covered in Chapter 4. Methods for effective display and communication of data are introduced. The text also covers two report formats: snapshot and trend. Appropriate uses for each type of report and evaluation of results against performance expectations are demonstrated through case studies. In particular, Chapter 4 provides an overview of statistical process control techniques, which are gaining popularity among healthcare organizations as a means of evaluating performance. The impact of unnecessary process variation on quality, methods of measuring variation, and ways measurement can be used to control variation are also discussed. The chapter concludes with a discussion of the factors involved in the next step of quality management—the decision to proceed with an improvement initiative or to continue measuring.

The decision to improve performance sets in motion an improvement initiative. There is no standard process for improving performance. Shewhart's Plan-Do-Check-Act (PDCA) cycle of improvement has been modified and adapted many times since its introduction in the 1920s. Chapter 5 introduces students to the PDCA model and other frameworks commonly used in improvement initiatives. It describes the primary purpose of each model and the differences and similarities among them. Most important, this chapter emphasizes the need for a systematic approach to healthcare quality initiatives. Several project examples take students through the steps of methodical process improvement.

Throughout a process improvement initiative, many decisions must be made. How wide is the gap between expected and actual performance? What is causing undesirable performance? Which problems take priority? How can the process be changed to improve performance? The answers to these questions are gathered through the use of quality improvement tools. Some of these tools are quantitative—similar to the graphs and displays discussed in Chapter 4—and some are qualitative—for example, nominal group techniques, cause and effect diagrams, and flowcharts. Chapter 6 introduces 14 tools of the latter type that are commonly used in improvement initiatives. Practical examples and case studies provide students with the knowledge they need to apply these tools in real-life situations. In Chapter 7, students learn how improvement teams are formed and managed. I discuss common causes of project failure and recommend ways to achieve improvement goals effectively.

Two characteristics of quality patient care—safety and effectiveness—are particularly important in today's performance-oriented, cost-conscious environment. A complete chapter is devoted to each of these subjects. Chapter 8 begins with a discussion of the factors prompting increased public scrutiny of the safety of healthcare services. Using the measurement, assessment, and improvement framework, I demonstrate how patient safety is evaluated and improved. Of particular importance are two safety improvement

tools: (1) failure mode and effects analysis and (2) root cause analysis. Students of quality management should remember that they also are recipients of healthcare services; at the conclusion of this chapter, they discover what they can do as patients to protect themselves from potentially harmful medical mistakes.

Underuse and overuse of healthcare services need to be controlled for quality improvement and cost control reasons. Utilization management activities, described in Chapter 9, are undertaken by healthcare organizations to determine whether they are using resources appropriately. The text reveals tactics purchasers and providers use to prospectively, concurrently, and retrospectively ensure effective use of healthcare services. Like all quality management activities, a systematic approach is needed to control resource use without compromising the quality of patient care. This structured approach is also covered in Chapter 9.

Healthcare quality isn't produced in a vacuum. Organization-wide commitment and an adequately resourced infrastructure are essential to achieving performance excellence. Chapter 10 reintroduces the Baldrige healthcare criteria discussed in Chapter 2 and shows how the organization's quality management system promotes these core values. Contributors vital to the success of the organizational quality program are described, and the elements of a planned and systematic improvement approach are detailed. Most important, Chapter 10 emphasizes the role of a supportive organizational culture in the quality process and concludes with a discussion of cultural factors that can advance or inhibit achievement of quality goals.

Supplemental and Instructional Resources

Each chapter concludes with student discussion questions. Some questions encourage contemplation and further dialogue on select topics, and some give students a chance to apply the knowledge they have gained. Others promote continued learning through discovery and use of information available on the Internet. I hope that upon completion of each chapter, students will feel compelled to address the discussion questions to expand their learning. Additional resources are available to students and instructors on this book's companion website. For access information, e-mail hap1@ache.org.

The hardest part of writing this book was deciding what not to include. In keeping with my original goal of sticking to the basics, some quality topics are not covered in depth or not covered at all. My omissions should not be taken, however, as unimportant to the study of healthcare quality management at the undergraduate level. Supplemental learning materials may be needed depending on course prerequisites and program curricula. The websites listed at the end of each chapter can be used to add topics or augment those insufficiently covered in the text. The information I have included on rapidly changing "hot topics," such as pay-for-performance and value-based purchasing, is purposefully

high level; I feel that current journal articles are students' best resource for these subjects. A firm grasp of the basics—measurement, assessment, and improvement—will better prepare students to deal with any quality management "hot topic" they encounter.

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CHAPTER 1

FOCUS ON QUALITY

LEARNING OBJECTIVES

After reading this chapter, the reader will be able to

➤ recognize factors that influence consumers' perception of quality products and services;

➤ explain the relationship between cost and quality;

➤ recognize the quality characteristics important to healthcare consumers, purchasers, and providers; and

➤ demonstrate an understanding of the varied dimensions of healthcare quality.

KEY WORDS

- ➤ Cost-effectiveness

- ➤ Defensive medicine

- ➤ Healthcare quality

- ➤ Institute for Healthcare Improvement (IHI)

- ➤ Institute of Medicine (IOM)

- ➤ Providers

- ➤ Purchasers

- ➤ Quality

- ➤ Value

Since opening its first store in 1971, Starbucks Coffee Company has developed into an international corporation with more than 6,000 locations in over 30 countries. The company's dedication to providing a quality customer experience is a major contributor to its success. Starbucks' customers expect to receive high-quality, freshly brewed coffee in a comfortable, secure, inviting atmosphere. In almost every customer encounter, Starbucks meets or exceeds these expectations. These experiences are not consistent by chance. Starbucks puts a lot of behind-the-scenes work into its customer service. From selecting coffee beans that meet Starbucks' exacting standards of quality and flavor to ensuring baristas are properly trained to prepare espresso, every part of the process is carefully managed.

A lot of behind-the-scenes work also goes into providing quality healthcare services. Every element in the complex process of healthcare delivery must be carefully managed. This book is about managing quality in healthcare organizations to meet or exceed customer expectations. These expectations include delivering an excellent patient care experience, providing only necessary healthcare services, and doing so at the lowest cost.

1.1 WHAT IS QUALITY?

Quality must be understood before it can be managed. Although people deal with it every day, there is no conclusive definition of quality. Like beauty, quality exists in the eye of the beholder. For instance, to a manufacturer, a quality product is one that conforms to design specifications, has no defects, and performs to the standards customers expect. To retailers, a quality product is one that has a good combination of price and features and appeals to a majority of customers. To consumers, a quality product is one that meets their individual expectations. What one person perceives to be a quality product might not be considered a quality product to another person.

Quality
Perceived degree of excellence

In its broadest sense, quality is an attribute of a product or service. The perspective of the person evaluating the product or service influences his or her judgment of the attribute. Although no universally accepted definition of quality exists, its various definitions share common elements:

- Quality involves meeting or exceeding customer expectations.

- Quality is dynamic (i.e., what is considered quality today may not be good enough to be considered quality tomorrow).

- Quality can be improved.

⊛ **LEARNING POINT**
Defining Quality

A quality product or service is one that meets or exceeds expectations. Expectations can change, so quality must be continuously improved.

Cost-Quality Connection

Value
Something that serves
a useful purpose and is
worth the cost

We expect to receive **value** when purchasing products or services. We do not want to find broken or missing parts when we unwrap new merchandise. We're disheartened when we receive poor service at a restaurant. We're downright irritated when our banks fail to record a deposit and our checks bounce.

How you respond to these disappointing situations depends on how you are affected. If the merchandise is expensive, you'll likely contact the store immediately to arrange an exchange or a refund. If the product is inexpensive, you may chalk it up to experience and vow never to do business with the company again. The same is true for restaurants. Your expectations increase as the price of the food goes up. Yet, if you are adversely affected—for example, you get food poisoning—you'll be an unhappy customer no matter the cost of the meal. The same is true for banks that make mistakes. No one wants the hassle of reversing a bank error, even if the checking account is free. Unhappy clients will look to do business with another bank.

Cost and quality affect the customer experience in all industries. In healthcare, these factors are harder for the average consumer to evaluate. Tainted restaurant food is easier to recognize than an unskilled surgeon. As for cost, everyone agrees that healthcare is expensive. Yet, if someone else is paying for it—an insurance company, the government, or a relative—the cost factor becomes less important to the consumer. If your surgery does not go well, however, you'll be an unhappy customer regardless of what it cost.

In all industries, multiple dynamics influence the cost and quality of products and services. Prices may be influenced by how much the consumer is willing to pay. For example, one person may pay a premium to get the latest and most innovative electronic gadget whereas another person may wait until the price comes down before buying it. If prices are set too high, however, potential buyers may push back and thus affect sales. Apple Inc. experienced this phenomenon in January 2007 with the launch of its newest iPhone. Within two months, the price of an iPhone dropped by $200 (Dalrymple 2007).

As for quality, companies know that poor customer service or inferior products will eventually cause them to lose sales. The U.S. electronic and automotive industries became aware of this fact in the early 1980s when American consumers started buying more Japanese products (Walton 1986). U.S. business and government leaders realized that an emphasis on quality was necessary to compete in a more demanding, expanding world market.

The customer-supplier relationship in healthcare is influenced by slightly different dynamics. For example, consumers may complain about rising healthcare costs, but most are not in a position to delay healthcare services until the price

⊛ **LEARNING POINT**
Cost-Quality Connection

The cost of a product or service is indirectly related to its perceived quality. A quality healthcare experience is one that meets a personal need or provides some benefit (either real or perceived) *and* is provided at a reasonable cost.

comes down. If you break your arm, you immediately go to a doctor or an emergency department to be treated. You are not likely to shop around for the best price or postpone treatment if you are in severe pain.

When healthcare costs are high, the insurance industry or government-sponsored payment systems (such as Medicare and Medicaid) are usually the ones to push back. These groups act on behalf of consumers to keep healthcare costs down. They exert their buying power by negotiating with healthcare providers for lower rates. These groups also watch for overuse of services and will not pay for services considered medically unnecessary. If a doctor admits you to the hospital simply to put a cast on your broken arm, your insurance company probably will question the doctor's decision. Your broken arm needs treatment, but the cast probably can be put on in the doctor's office or in the emergency department. Neither you nor the insurance company should be charged for the higher costs of hospital care if a less expensive and reasonable treatment alternative is available.

The connection between cost and quality is value. Most consumers purchase a product or service because they will, or perceive they will, derive some personal benefit from it. Healthcare consumers—whether patients or health plans—want providers to meet their needs at a reasonable cost (i.e., money, time, ease of use, etc.). When customers believe they are receiving value for their dollars, they are more likely to perceive their healthcare interactions as quality experiences.

1.2 HEALTHCARE QUALITY

What is **healthcare quality**? Each of the three groups most affected by this question—consumers, purchasers, and providers—may answer it differently. Most consumers expect quality in the delivery of healthcare services. Patients want to receive the right treatments and experience good outcomes. Everyone wants to have satisfactory interactions with caregivers. Plus, consumers want the physical facilities where care is provided to be clean and pleasant, and they want their doctors to use the best technology available. Consumer expectations are only part of the definition, however. Purchasers and providers may view quality in terms of other attributes.

Purchasers are individuals and organizations that pay for healthcare services either directly or indirectly. If you pay out-of-pocket for healthcare services, you are both a consumer and a purchaser. Purchaser organizations include government-funded health insurance programs, private health insurance plans, and businesses that subsidize the cost of employees' health insurance. Purchasers are interested in the cost of healthcare and many of the same quality characteristics important to consumers. People who are financially responsible for some or all of their healthcare costs want to receive value for the dollars they spend. Purchaser organizations are no different. Purchasers view quality in terms of **cost-effectiveness**, meaning they want value in return for their healthcare expenditures.

Providers are individuals and organizations that provide healthcare. Provider individuals include doctors, nurses, technicians, and clinical support and clerical staff.

Healthcare quality
The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge

Purchasers
Individuals and organizations that pay for healthcare services directly or indirectly

Cost-effectiveness
The minimal expenditure of dollars, time, and other elements necessary to achieve a desired healthcare result

Providers
Individuals and organizations licensed or trained to provide healthcare

Provider organizations include hospitals, skilled nursing and rehabilitation facilities, outpatient clinics, home health agencies, and all other institutions that provide care. In addition to the attributes important to consumers and purchasers, providers are concerned about legal liability —the risk that unsatisfied consumers will bring suit. This concern can influence how providers define quality. Let's suppose you have a migraine headache and your doctor orders a CT scan of your head to be 100 percent certain there are no physical abnormalities. There may be no medical reason for the test, but your doctor is doing everything possible to avert the possibility of a lawsuit. Your doctor is practicing **defensive medicine**—diagnostic or therapeutic interventions conducted primarily to safeguard the provider against malpractice liability (Manner 2007). Because these interventions incur additional costs, providers' desire to avoid lawsuits can be at odds with purchasers' desire for cost-effectiveness.

Defensive medicine
Diagnostic or therapeutic interventions conducted primarily as a safeguard against malpractice liability

DEFINING HEALTHCARE QUALITY

The similar, yet competing priorities of the various healthcare stakeholders must be considered when defining healthcare quality. This task is not easy. In 1966, Dr. Avedis Donabedian, professor at the University of Michigan in Ann Arbor and renowned health services researcher, noted that healthcare quality is a "remarkably difficult notion to define." Donabedian (1980, 1982, 1985) spent much of his life exploring ways to assess it. The culmination of his remarkable body of work was a series of three volumes on explorations in quality assessment and monitoring.

Before efforts to improve healthcare quality could begin in earnest, a common definition of quality was needed. This definition had to encompass the priorities of all stakeholder groups—consumers, purchasers, and providers. The **Institute of Medicine (IOM)**, a nonprofit organization that provides science-based advice on matters of medicine and health, championed efforts to bring the stakeholder groups together to create a workable definition of healthcare quality. In 1990, the IOM committee charged with designing a strategy for healthcare quality assurance published this definition:

Institute of Medicine (IOM)
A private, nonprofit organization created by the federal government to provide science-based advice on matters of medicine and health

Quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.

This definition has stood the test of time. In 2001, the IOM Committee on Quality of Health Care in America further clarified the concept of healthcare quality. In its report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, the committee identified six dimensions of U.S. healthcare needing improvement. These quality characteristics, listed in Critical Concept 1.1., influence the quality priorities of all stakeholder groups.

⚠ CRITICAL CONCEPT 1.1
Six Dimensions of Healthcare Needing Improvement

- Safety—Care intended to help patients should not harm them.

- Effectiveness—Care should be based on scientific knowledge and provided to patients who could benefit. Care should not be provided to patients unlikely to benefit from it. In other words, underuse and overuse should be avoided.

- Patient-centeredness—Care should be respectful of and responsive to individual patient preferences, needs, and values, and patient values should guide all clinical decisions.

- Timeliness—Care should be provided promptly when the patient needs it.

- Efficiency—Waste, including equipment, supplies, ideas, and energy, should be avoided.

- Equity—The best possible care should be provided to everyone, regardless of age, sex, race, financial status, or any other demographic variable.

Source: IOM (2001).

The IOM healthcare dimensions, together with the 1990 IOM quality of care definition, encompass what most people consider as attributes of healthcare quality. Dr. Donald Berwick (2005), president of the **Institute for Healthcare Improvement**, put this description into consumer terms when he wrote about his upcoming knee replacement and what he expected from his providers:

- Don't kill me (no needless deaths).

- Do help me and don't hurt me (no needless pain).

Institute for Healthcare Improvement
An independent, non-profit organization helping to lead the improvement of healthcare throughout the world

◆   Don't make me feel helpless.

◆   Don't keep me waiting.

◆   Don't waste resources—mine or anyone else's.

CONCLUSION

The excellence of products and services is based on customers' perceptions and needs. Quality involves understanding customer expectations and then creating a product or service that meets those expectations. Quality can be an elusive goal because customer needs and expectations are always changing. To keep up with the changes, quality must be constantly managed and continually improved.

Healthcare organizations are being challenged to improve the quality and value of services. Through a systematic quality management process, they can achieve this goal.

STUDENT DISCUSSION QUESTIONS

1. In your opinion, which companies provide superior customer service? Which companies provide average or mediocre customer service? Name the factors most important to you when judging the quality of a company's customer service.

2. Think about your most recent healthcare encounter. What aspects of the care or service were you pleased with? What could have been done better?

WEBSITES

• American Society for Quality
  www.asq.org
• Institute for Healthcare Improvement
  www.ihi.org
• Institute of Medicine
  http://iom.edu

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QUALITY MANAGEMENT BUILDING BLOCKS

After reading this chapter, the reader will be able to

➤ describe the three primary quality management activities: measurement, assessment, and improvement;

➤ recognize quality pioneers' contributions to, and influence on, the manufacturing industry;

➤ identify factors that prompted healthcare organizations to adopt quality practices originally developed for use in other industries; and

➤ describe external forces that influence quality management activities in healthcare organizations.

KEY WORDS

➤ Accreditation

➤ Accreditation standards

➤ Assessment

➤ Baldrige National Quality Award

➤ Conditions of Participation

➤ Criteria

➤ Data

➤ Health maintenance organization (HMO)

➤ Improvement

➤ Measurement

➤ Misuse

➤ Overuse

➤ Performance expectations

➤ Quality assurance

➤ Quality circles

➤ Quality control

➤ Quality management

➤ Quality planning

➤ Stakeholders

➤ Underuse

Quality does not develop on its own. For quality to be achieved, a systematic evaluation and improvement process must be implemented. In the business world, this process is known as **quality management**. Quality management is a way of doing business that continuously improves products and services to achieve better performance. According to the American Society for Quality (2008), the goal of quality management in any industry is to achieve maximum customer satisfaction at the lowest overall cost to the organization while continuing to improve the process.
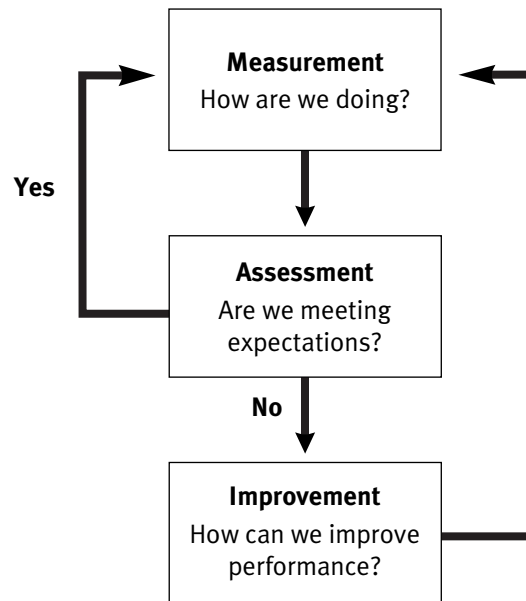
To achieve maximum customer satisfaction in healthcare, authors of the 2001 Institute of Medicine (IOM) report *Crossing the Quality Chasm* recommended eliminating overuse, underuse, and misuse of services (Berwick 2002). **Overuse** occurs when a service is provided even though there is no evidence it will help the patient—for example, prescribing antibiotics for patients with viral infections. **Underuse** occurs when a service that would have been medically beneficial for the patient is not provided—for example, performing a necessary diagnostic test. **Misuse** occurs when a service is not carried out properly—for example, operating on the wrong part of the patient's body.

2.1 QUALITY MANAGEMENT ACTIVITIES

Quality management may appear to be a difficult and bewildering undertaking. While the terminology used to describe the process can be puzzling at first, the basic principles should be familiar to you. Quality management involves **measurement**, **assessment**, and **improvement**—things people do almost every day.

Consider this example. Most people must manage their finances. You must *measure* —that is, keep track of your deposits and debits—to know where you stand financially. Occasionally, you have to *assess* your current financial situation—that is, inquire about your account balance—to determine your financial "health." Can you afford to go out to dinner, or are you overdrawn? Periodically, you must make *improvements*—that is, get a part-time job to earn extra cash or remember to record debit card withdrawals—so that you don't incur unexpected overdraft charges. The purpose of improvement is just as the word implies—to make things better.

The three primary quality management activities—measurement, assessment, and improvement—are parts of a closely linked cycle (see Figure 2.1). Healthcare organizations track performance through various measurement activities to gather information about the quality of patient care and support functions. Results are evaluated in the assessment step by comparing measurement **data** to **performance expectations**. If expectations are met, organizations continue to measure and assess performance. If expectations are not met, they proceed to the improvement phase to investigate reasons for the performance gap and implement changes based on their findings. The quality management cycle doesn't end at this point, however. Performance continues to be evaluated through measurement activities.

Quality management
A way of doing business that continuously improves products and services to achieve better performance

Overuse
Provision of a health service that is more likely to harm than benefit the patient

Underuse
Not providing a health service that might have been medically beneficial

Misuse
Incorrect diagnoses, medical errors, and other sources of avoidable complications

Measurement
Collection of information for the purpose of understanding current performance and seeing how performance changes or improves over time

Assessment
Use of performance information to determine whether an acceptable level of quality has been achieved

FIGURE 2.1.
Cycle of
Measurement,
Assessment, and
Improvement

Quality management activities in healthcare are complex, and the terminology can be confusing. The financial management example used earlier to explain quality management vocabulary also may help clarify basic quality management techniques. For instance, when you check your expenditures on leisure activities over the last six months, you are *monitoring performance*—looking for *trends* in your spending habits. If you decide to put 10 percent of your income into a savings account each month, you are setting a *performance goal*. Occasionally, you'll check to see whether you have achieved your goal; in other words, you are *evaluating performance*. If you decide you need to save more money, you'll implement an *improvement plan*. You'll design a new savings strategy, implement that strategy, and then periodically check your progress. Application of these techniques to healthcare quality management is covered in later chapters.

2.2 QUALITY MANAGEMENT IN INDUSTRY AND HEALTHCARE

The concept of quality management is timeless. To stay in business, manufacturing and service industries have long sought better ways of meeting customer expectations. Healthcare professionals live by the motto *primum non nocere*—first, do no harm. To fulfill this promise, discovering new and better ways to care for patients has always been a priority. Although the goal—quality products and services—is the same regardless of the industry,

Improvement
Planning and making changes to current practices to achieve better performance

Data
Numbers or facts that are interpreted for the purpose of drawing conclusions

Performance expectations
Minimum acceptable levels of quality

methods for achieving this goal in healthcare have evolved somewhat differently than in other industries.

INDUSTRIAL QUALITY EVOLUTION

The contemporary quality movement in the manufacturing industry can be traced to work done by three men in the 1920s at Western Electric Company in Cicero, Illinois. Walter Shewhart, W. Edwards Deming, and Joseph Juran learned and applied the science of quality improvement to the company's production lines (American Society for Quality 2008). Shewhart used statistical methods to measure variations in the telephone equipment manufacturing process. Waste was reduced and product quality was improved by controlling undesirable process variation. Shewhart is referred to as the father of statistical quality control, a method we will explore in Chapter 4.

W. Edwards Deming (1994) learned Shewhart's methods and made measurement and control of process variation one of the key elements of his philosophy of quality management:

◆ Organizations are a set of interrelated processes with a common aim.

◆ Process variation must be understood.

◆ How new knowledge is generated must be understood.

◆ How people are motivated and work together must be understood.

Following World War II, Japanese manufacturing companies invited Deming to help them improve the quality of their products. Over a period of several years, as a result of Deming's advice, many low-quality Japanese products became world class. The Deming model for continuous improvement is described in Chapter 5.

Joseph Juran combined the science of quality with its practical application, providing a framework for linking finance and management. The components of the Juran Quality Trilogy are (Uselac 1993)

◆ **quality planning**—define customers and how to meet their needs,

◆ **quality control**—keep processes working well, and

◆ quality improvement—learn, optimize, refine, and adapt.

(?) DID YOU KNOW?

In the 1950s, W. Edwards Deming, a professor and management consultant, transformed traditional industrial thinking about quality control by emphasizing employee empowerment, performance feedback, and measurement-based quality management.

Quality planning
Setting quality objectives and specifying operational processes and related resources needed to fulfill the objectives

In the 1950s, Juran, like Deming, helped jump-start product improvements at Japanese manufacturing companies. Whereas Deming focused on measuring and controlling process variation, Juran focused on developing the managerial aspects supporting quality. One of Juran's management principles—focusing improvements on the "vital few" sources of the problems—is described in Chapter 4.

Another individual who had a significant impact on contemporary quality practices in industry was Kaoru Ishikawa, a Japanese engineer who incorporated the science of quality into Japanese culture. He was one of the first people to emphasize the importance of involvement of all members of the organization instead of only management-level employees. Ishikawa believed that top-down quality goals could be accomplished only through bottom-up methods (Best and Neuhauser 2008). To support his belief, he introduced the concept of **quality circles**—groups of 3 to 12 frontline employees that meet regularly to analyze production-related problems and propose solutions (Ishikawa 1990).

Ishikawa stressed that employees should be trained to use data to measure and improve processes that affect product quality. Several of the data collection and presentation techniques he recommended for process improvement purposes are covered in chapters 4 and 6.

The science of industrial quality focuses on improving the quality of products by improving the production process. Improving the production process means removing wasteful practices, standardizing production steps, and controlling variation from expectations. These methods have been proven effective and remain fundamental to industrial quality improvement. The work of Shewhart, Deming, and Ishikawa laid the foundation for many of the modern quality philosophies that underlie the improvement models described in Chapter 5.

Following World War II, U.S. manufacturers were under considerable pressure to meet production schedules, and product quality became a secondary consideration. In the 1970s, U.S. executives visited Japan to discover ways to improve product quality. During these visits, Americans learned about the quality philosophies of Deming, Juran, and Ishikawa; the science of industrial quality; and the concept of quality control as a management tool. In 1980, NBC aired a television program titled *If Japan Can . . . Why Can't We?* which described how Japanese manufacturers had adopted Deming's approach to continuous improvement, most notably his focus on variation control (Butman 1997, 163). As a result, many U.S. companies began to emulate the Japanese approach. Several quality gurus emerged, each with his own interpretation of quality management. During the 1980s, Juran, Deming, Philip Crosby, Armand Feigenbaum, and others received widespread attention as philosophers of quality in the manufacturing and service industries.

In 1987, President Reagan signed into law the Malcolm Baldrige National Quality Improvement Act (Spath 2005, 23–25). This national quality program, managed by the U.S. Commerce Department's National Institute of Standards and Technology, established **criteria** for performance excellence that organizations can use to evaluate and improve their

Quality control
Operational techniques and activities used to fulfill quality requirements (*Quality control* and *quality assurance* may be used interchangeably to describe actions performed to ensure the quality of a product, service, or process.)

Quality circles
Small groups of employees organized to solve work-related problems

Criteria
Standards or principles by which something is judged or evaluated

quality. Many of these criteria originated from the quality philosophies and practices advanced by Shewhart, Deming, Juran, and Ishikawa. The annual **Baldrige National Quality Award** was also created to recognize U.S. companies that meet the program's stringent standards. For the first ten years, eligible companies were limited to three categories: manufacturing, service, and small business. In 1998, two additional categories—education and healthcare—were added. The core values and concepts of the Baldrige Health Care Criteria are described in Critical Concept 2.1. In 2002, SSM Health Care, based in St. Louis, became the first healthcare organization to win the Baldrige National Quality Award.

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① **CRITICAL CONCEPT 2.1**   Core Values and Concepts of the Baldrige Health Care Criteria for Performance Excellence

Visionary Leadership: Senior leaders set directions and create a patient focus, clear and visible values, and high expectations. The directions, values, and expectations should balance the needs of all stakeholders. The leaders need to ensure the creation of strategies, systems, and methods for achieving excellence in healthcare, stimulating innovation, and building knowledge and capabilities.

Patient Focus: The delivery of health care services must be patient focused. All attitudes of patient care delivery (medical and nonmedical) factor into the judgment of satisfaction and value. Satisfaction and value are key considerations for other customers, too.

Organizational and Personal Learning: Organizational learning refers to continuous improvement of existing approaches and processes and adaptation to change, leading to new goals and/or approaches. Learning is embedded in the operation of the organization.

Valuing Staff and Partners: An organization's success depends increasingly on the knowledge, skills, creativity, and motivation of its staff and partners. Valuing staff means committing to their satisfaction, development, and well being.

Agility: A capacity for rapid change and flexibility are a necessity for success. Health care providers face ever-shorter cycles for introductions of new and improved health care services. Faster and more flexible response to patients and other customers is critical.

Focus on Future: A strong future orientation includes a willingness to make long-term commitments to key stakeholders—patients and families, staff, communities, employers, payers, and health profession students. Important for an organization in the strategic planning process is the anticipation of changes in health care delivery, resource avail-

> **⚠ CRITICAL CONCEPT 2.1**   Core Values and Concepts of the Baldrige
> Health Care Criteria for Performance Excellence
>
> ability, patient and other stakeholder expectations, technological developments, new
> partnering opportunities, evolving regulatory requirements, community/societal expec-
> tations, and new thrust by competitors.
>
> **Management for Innovation:** Innovation is making meaningful change to improve an or-
> ganization's services and processes and create new value for the organization's stake-
> holders.
>
> **Management by Fact:** Measurement and analysis of performance are needed for an ef-
> fective healthcare and administrative management system. Measurements are derived
> from the organization's strategy and provide critical data and information about key pro-
> cesses, outputs, and results.
>
> **Public Responsibility and Community Health:** Leaders need to emphasize the responsi-
> bility the organization has to the public and need to foster improved community health.
>
> **Focus on Results and Creating Value:** An organization's performance measurements
> need to focus on key results. Results should focus on creating and balancing value for all
> stakeholders—patients, their families, staff, the community, payers, businesses, health
> profession students, suppliers and partners, stockholders, and the public.
>
> **Systems Perspective:** Successful management of an organization requires synthesis and
> alignment. Synthesis means looking at the organization as a whole and focusing on what
> is important, while alignment means concentrating on key organizational linkages among
> the requirements in the Baldrige Criteria.
>
> *Source:* Spath (2005).

HEALTHCARE QUALITY EVOLUTION

Until the 1970s, the fundamental philosophy of healthcare quality management was based
on the pre–Industrial Revolution craft model: Train the craftspeople (physicians, nurses,
technicians, etc.), license or certify them, supply them with an adequate structure (facili-
ties, equipment, etc.), and then let them provide health services (Merry 2003). In 1913,
the American College of Surgeons (ACS) was founded to address variations in the quality

of medical education. A few years later, it developed the hospital standardization program to address the quality of facilities in which physicians worked. Training improvement efforts were also underway in nursing; the National League for Nursing Education released its first standard curriculum for schools of nursing in 1917.

Around the time of Shewhart's work in the 1920s, licensing and certification requirements for healthcare providers and standards for facilities, equipment, and other aspects of healthcare became more stringent. During the time Deming and Juran were advising Japanese manufacturers, the ACS hospital standardization program was turned over to The Joint Commission (2007), the United States' oldest and largest healthcare accreditation group, which evaluates and accredits more than 15,000 healthcare organizations and programs across the nation. The program's **accreditation standards** set a minimum bar for healthcare quality. While the standards stressed the need for physicians and other professional staff to evaluate care provided to individual patients, none of the quality practices espoused by Deming and Juran was required of hospitals. The standards centered on structural requirements and eliminating incompetent people, not measuring and controlling variation in healthcare processes.

The Joint Commission accreditation standards served as a model for provider quality requirements of the Medicare healthcare program for the elderly, passed by Congress in 1965. Through the 1970s, quality requirements in healthcare—whether represented by accreditation standards, state licensing boards, or federal regulations—focused largely on structural details and on the discipline of defective hospitals and physicians (Brennan and Berwick 1996, 50).

The quality revolution affecting other industries in the 1980s also affected healthcare services. In 1980, The Joint Commission added a **quality assurance** (QA) standard loosely based on the work of Deming and Juran (Affeldt 1980). The QA standard required organizations to implement an organization-wide program to (The Joint Commission 1979)

◆   identify important or potential problems or concerns with patient care,

◆   objectively assess the cause and scope of the problems or concerns,

◆   implement decisions or actions designed to eliminate the problems,

◆   monitor activities to ensure desired results are achieved and sustained, and

◆   document the effectiveness of the overall program to enhance patient care and ensure sound clinical performance.

In the early 1980s, following years of rapid increases in Medicare and other publicly funded healthcare expenditures, the government established external groups (known as *peer review organizations*) to monitor the costs and quality of care provided in hospitals and

---

Accreditation standards
Levels of performance excellence that organizations must attain to become credentialed by a competent authority

Quality assurance
Evaluation activities aimed at ensuring compliance with minimum quality standards (*Quality assurance* and *quality control* may be used interchangeably to describe actions performed to ensure the quality of a product, service, or process.)

outpatient settings (IOM 2006, 39–41). These groups used many of the same principles found in The Joint Commission's 1980 QA standard.

Throughout the 1980s and 1990s, healthcare quality management was increasingly influenced by the industrial concepts of continuous improvement and statistical quality control, largely in response to pressure from purchasers to slow the growth of healthcare expenditures. From 1980 to 1992, the cost of healthcare increased from $255 billion to $717 billion, from just under 9 percent of the gross national product in 1980 to 13.1 percent in 1992 (Kaiser Family Foundation 2002, 6–7). Seeking alternative methods to improve healthcare quality and reduce costs, regulatory and accreditation groups turned to other industries for solutions. Soon the quality practices from other industries were being applied to health services.

Today, many of the fundamental ideas behind quality improvement in the manufacturing and service industries shape healthcare quality management efforts. For example, The Joint Commission leadership standard incorporates concepts from the Baldrige National Quality Award Criteria, and the performance improvement standard requires use of statistical tools and techniques to analyze and display data. Professional groups such as the Medical Group Management Association teach members to apply statistical thinking to healthcare practices to understand and reduce inappropriate and unintended process variation (Balestracci and Barlow 1996). The Institute for Healthcare Improvement (2008) sponsors improvement projects aimed at standardizing patient care practices and minimizing inappropriate variation. Case studies illustrating the adaptation of industrial quality science to health services improvement are found throughout this book.

LEARNING POINT
Quality Evolution

The methods and principles guiding healthcare quality improvement efforts have evolved at a different pace than those guiding quality improvement efforts in other industries. Several factors account for this difference. Gradually, healthcare is catching up by applying the best quality management practices of the manufacturing and service industries.

Some industrial quality improvement techniques are not transferrable to healthcare. The manufacturing industry, for example, deals with machines and processes designed to be meticulously measured and controlled. At the heart of healthcare are patients whose behaviors and conditions vary and change over time. These factors create a degree of unpredictability that presents healthcare providers with challenges not found in other industries (Hines et al. 2008).

In addition to adopting the quality practices of other industries focused on reducing waste and variation, healthcare organizations still use some components of the pre–Industrial Revolution craft model to manage quality. Adequate training and continuous monitoring are still essential to building and maintaining a competent provider staff. Structural details are also still important; considerable attention is given to maintaining adequate facilities and equipment.

2.3 EXTERNAL FORCES IMPACTING HEALTHCARE QUALITY MANAGEMENT

Healthcare organizations, like all businesses, do not operate in a vacuum. Many external forces influence business activities, including quality management. Government regulations, accreditation groups, and large purchasers of health services are major influences on the operation of healthcare organizations.

Regulations are issued by governments at the local, state, and national levels to protect the health and safety of the public. Regulation is often enforced through licensing. For instance, to maintain its license, a restaurant must comply with state health department rules and periodically undergo inspection.

Just like the restaurant owner who must follow state health department rules or risk closure, organizations that provide healthcare services or offer health insurance must follow government regulations, usually at the state level. Regulations differ from state to state. If a healthcare organization receives money from the federal government for providing services to consumers, it must comply with federal regulations in addition to state regulations. Both state and federal regulations include quality management requirements. For example, licensing regulations in all states require that hospitals have a system for measuring, evaluating, and reducing patient infection rates. Similar requirements are found in federal regulations (Centers for Medicare & Medicaid Services [CMS] 2001).

Quality management requirements are also found in healthcare accreditation standards. **Accreditation** is a voluntary process by which the performance of an organization is measured against nationally accepted standards of performance. Accreditation standards are based on government regulations and input from individuals and groups in the healthcare industry. Healthcare organizations seek accreditation because it

- ◆ enhances public confidence,

- ◆ is an objective evaluation of the organization's performance, and

- ◆ stimulates the organization's quality improvement efforts.

The Joint Commission's standards have always included quality measurement, assessment, and improvement requirements. All other groups that accredit healthcare organizations and programs also require quality management activities. Table 2.1 lists healthcare accreditation groups and the organizations or programs they accredit. Accreditation is an ongoing process, and visits are made to healthcare organizations at regularly scheduled or unannounced intervals to monitor their compliance with accreditation requirements. While accreditation is considered voluntary, an increasing number of purchasers and government entities are requiring it.

Purchasers of healthcare services also influence healthcare quality management. The largest purchaser of healthcare services is the government. In 2006, CMS spent over $704 billion on patient care (Catlin et al. 2007). In that same year, state and local governments

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Accreditation

A self-assessment and external assessment process used by healthcare organizations to assess their level of performance in relation to established standards and implement ways to continuously improve

spent more than $265 billion on Medicaid and Children's Health Insurance Program enrollees. Healthcare organizations participating in these government-funded insurance programs must comply with the quality management requirements found in state and federal regulations. For example, home health agencies that care for Medicare patients must report to CMS on the quality of care they provide, including information on patients' physical and mental health and their ability to perform basic daily activities (CMS 2006).

Quality management requirements for each provider category are in federal regulations called **Conditions of Participation**. These regulations are a contract between the government purchaser and the provider. If a provider wants to participate in a federally funded insurance program, it must abide by the conditions spelled out in the regulations.

Conditions of Participation
Rules that determine an entity's eligibility for involvement in a particular activity

TABLE 2.1.
Healthcare Accreditation Groups

Accreditation Group	Organizations and Programs Accredited
AABB (formerly American Association of Blood Banks) (www.aabb.org)	Freestanding and provider-based blood banks, transfusion services, and blood donation centers
Accreditation Association for Ambulatory Health Care (www.aaahc.org)	Hospital-affiliated ambulatory care facilities and freestanding facilities, including university student health centers
Accreditation Commission for Health Care (www.achc.org)	Home health care providers, including durable medical equipment companies
American Accreditation HealthCare Commission, Inc. (URAC) (www.urac.org)	Health plans, credentials verification organizations, independent review organizations, and others; also accredits specific functions in healthcare organizations (e.g., case management, pharmacy benefit management, consumer education and support, and disease management)
American Association of Accreditation of Ambulatory Surgery Facilities, The (www.aaaasf.org)	Ambulatory surgery facilities
Commission on Accreditation of Rehabilitation Facilities (www.carf.org)	Freestanding and provider-based medical rehabilitation and human service programs, such as behavioral health, child and youth services, and opioid treatment
Commission on Cancer of the American College of Surgeons (www.facs.org)	Cancer programs at hospitals and freestanding treatment centers
Commission on Laboratory Accreditation of the College of American Pathologists (www.cap.org)	Freestanding and provider-based laboratories
Community Health Accreditation Program (www.chapinc.org)	Community-based health services, including home health agencies, hospices, and home medical equipment providers
Compliance Team, The (www.complianceteaminc.com)	Providers (e.g., pharmacies, home care, podiatrists, orthopedic surgeons) of durable medical equipment, prosthetics, orthotics, and supplies (e.g., diabetic, ostomy, incontinence)

(Continued)

TABLE 2.1.
(*continued*)
Healthcare
Accreditation
Groups

Accreditation Group	Organizations and Programs Accredited
Continuing Care Accreditation Commission (www.carf.org)	Continuing care retirement communities and aging services networks that are part of home, community, or hospital-based systems
Diagnostic Modality Accreditation Program of the American College of Radiology (www.acr.org)	Freestanding and provider-based imaging services, including radiology and nuclear medicine
DNV HealthCare, Inc. (www.dnv.com/industry/healthcare)	Hospitals
Healthcare Facilities Accreditation Program of the American Osteopathic Association (www.hfap.org)	Hospitals, hospital-based laboratories, ambulatory care/surgery, mental health, substance abuse, and physical rehabilitation medicine facilities
Healthcare Quality Association on Accreditation (www.hqaa.org)	Durable medical equipment providers
Intersocietal Commission for Accreditation of Nuclear Medicine Laboratories (www.icanl.org)	Freestanding and provider-based nuclear medicine and nuclear cardiology laboratories
Joint Commission, The (www.jointcommission.org)	General, psychiatric, children's, and rehabilitation hospitals; critical access hospitals; medical equipment services, hospice services, and other home care organizations; nursing homes and other long-term care facilities; behavioral healthcare organizations, addiction services; rehabilitation centers, group practices, office-based surgeries, and other ambulatory care providers; and independent or freestanding laboratories
National Commission on Correctional Health Care (www.ncchc.org)	Healthcare services in jails, prisons, and juvenile confinement facilities
National Committee for Quality Assurance (www.ncqa.org)	Managed care and preferred provider organizations, managed behavioral healthcare organizations, and disease management programs

The quality management requirements found in accreditation standards and government regulations change often, and healthcare organizations must keep up to date on the latest rules. The websites listed in Table 2.1 and those found at the end of this chapter contain information on current accreditation standards and regulations affecting healthcare quality management activities.

Private insurance companies also pay a large amount of health service costs in the United States. Private insurance plans paid over $723 billion to providers in 2006 (Catlin et al. 2007). For the most part, these plans rely on government regulations and accreditation standards to define basic quality management requirements for healthcare organizations. However, some private insurance companies have additional quality measurement and improvement requirements for participating providers. For example, outpatient clinics that provide care for patients in a **health maintenance organization (HMO)** are

Health maintenance organization (HMO)
Public or private organization providing comprehensive medical care to subscribers on the basis of a prepaid contract

often required to report to the health plan the percentage of calls received by the clinic that are answered by a live voice within 30 seconds. The HMO uses this information to measure the quality of customer service in the clinic.

The measurement, assessment, and improvement requirements of private insurance companies are detailed in provider contracts. If a provider wants to participate in a health plan, the provider must agree to abide by the rules in the contract. Some of these rules place quality management responsibilities on the provider.

> ⊛ **LEARNING POINT**
> External Influences
>
> The measurement, assessment, and improvement activities in healthcare organizations are influenced by three external forces: accreditation standards, government regulations, and purchaser requirements.

CONCLUSION

Quality management activities in healthcare organizations are constantly evolving. These changes often occur in reaction to external forces such as regulation or accreditation standard revisions and pressure to control costs. Healthcare quality management is also influenced by other industries. Improvement strategies used to enhance the quality of products and services are frequently updated as new learning emerges. Since their inception in 1982, the Baldrige Quality Program Criteria have undergone several revisions. Healthcare quality management changed in 1998 when the Baldrige Criteria were adapted for use by healthcare organizations. In addition, the science of quality management, once reserved for the manufacturing industry, is now used in healthcare organizations.

The rules and tools of healthcare quality management will continue to evolve, but the basic principles of measurement, assessment, and improvement will remain the same. For instance, many people sort household garbage into two bins—one for recyclable materials and one for everything else. Garbage collection rules have changed, yet the basic principle—removing garbage from the house—is the same. Thirty years ago, people never would have imagined they'd be using wireless devices to make phone calls. The tool has changed, but the basic principle—communicating—has not.

Why should healthcare organizations be involved in quality management activities? Foremost, quality management is the right thing to do. Providers have an ethical obligation to patients to provide the best quality care possible. In addition, all **stakeholders**— consumers, purchasers, regulators, and accreditation groups—are requiring continuous improvement. Competition among healthcare organizations is growing more intense, and demand for high-quality services is increasing. Healthcare organizations that study and

Stakeholders
People, groups, organizations, or entities that can be directly or indirectly affected by an organization's actions, objectives, and policies (In healthcare, key external stakeholders include consumers, purchasers, regulatory agencies, and accreditation groups. Key internal stakeholders include physicians and clinical and nonclinical employees.)

implement quality management techniques will attract more patients than organizations that do not engage in such activities.

Student Discussion Questions

1. How do quality practices that originated in the manufacturing industry differ from the traditional quality practices of healthcare organizations? How would applying the core values and concepts of the Baldrige Health Care Criteria for Performance Excellence improve healthcare quality? See Critical Concept 2.1.

2. Consider the healthcare encounter you described in Chapter 1 (see student discussion question 2). If wasteful practices had been eliminated or steps in the process had been standardized, would you have had a different encounter? How would it have changed?

Websites

- Baldrige National Quality Program
  www.quality.nist.gov
- Centers for Medicare & Medicaid Services
  www.cms.hhs.gov
- Joint Commission, The
  www.jointcommission.org
- Juran Institute
  www.juran.com
- W. Edwards Deming Institute
  http://deming.org

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CHAPTER 3

MEASURING PERFORMANCE

LEARNING OBJECTIVES

After reading this chapter, the reader will be able to

➤ apply structural, process, and outcome measures to evaluate quality;

➤ describe common performance measures of healthcare services;

➤ demonstrate the steps involved in developing performance measures;

➤ identify national groups influencing healthcare performance measurement priorities;

➤ recognize how healthcare organizations select performance measures;

➤ describe the difference between measures of healthcare services and measures of clinical decision making; and

➤ identify the role of balanced scorecards in performance measurement.

KEY WORDS

- ➤ Activity-level measure
- ➤ Agency for Healthcare Research and Quality (AHRQ)
- ➤ Average
- ➤ Balanced scorecards
- ➤ Check sheet
- ➤ Clinical practice guidelines
- ➤ Core measure project
- ➤ Customer service
- ➤ Denominator
- ➤ Evidence-based measures
- ➤ Interrater reliability
- ➤ Line graph
- ➤ Measures
- ➤ Metrics
- ➤ Numerator
- ➤ Outcome measures
- ➤ Percentage
- ➤ Performance
- ➤ Performance measures
- ➤ Pillars of Excellence
- ➤ Process measures
- ➤ Quality indicators
- ➤ Ratio
- ➤ Reliable
- ➤ Sample
- ➤ Structure measures
- ➤ System-level measure
- ➤ Valid
- ➤ Validity

The purpose of measurement is to gather information. For example, the dashboard on my car displays lots of data. I can see how much gasoline is left in my tank, how fast I am traveling, and so on. These **measures** provide me with information about my car and my current driving situation. I decide how to use this information. Do I need to refill my gas tank soon, or can I wait a day or two? Do I need to slow down, or can I speed up a bit? My reaction to the information is partially based on personal choices, such as my willingness to risk running out of gas or incurring a speeding ticket. My reaction to the information is also influenced by external factors, such as the distance to the nearest gas station and the speed limit.

Measures
Instruments or tools used for measuring

Information must be accurate to be useful. If the "check engine" light on my dashboard malfunctions—blinks when there's no problem with the engine—I'll quickly learn to ignore it. Information also must tell me something I want to know; otherwise, I won't pay attention to it. For instance, I don't understand why there is a dial on my car's dashboard that shows the engine revolutions per minute (RPM). This information may be important to someone, but I don't find it useful.

If the information is accurate and useful to me, I need to be able to interpret it. On more than one occasion, my car's speedometer display has mysteriously changed from miles per hour to kilometers per hour, leaving me wondering how fast I'm going. If I want to compare information, the **metrics** must be consistent. Evaluating the gasoline efficiency of two automobiles would be challenging if one rating is reported as "miles per gallon" and the other as "liters per kilometer."

Metrics
Any type of measurement used to gauge a quantifiable component of performance

The purpose of measurement in quality management is similar to the purpose of dashboard indicators. Companies measure costs, quality, productivity, efficiency, customer satisfaction, and so on because they want information. They use this information to understand current **performance**, identify where improvement is needed, and evaluate how changes in work processes affect performance. Like the information displayed on a car dashboard, the data must be accurate, useful, easy to interpret, and reported consistently.

Performance
The way in which an individual, a group, or an organization carries out or accomplishes important functions and processes

If you can't measure it, you can't manage it. Without a gauge that measures fuel level, you won't know when your car needs gas. Without quality metrics, businesses won't know where improvements are needed.

3.1 MEASUREMENT IN QUALITY MANAGEMENT

As shown in Figure 3.1, measurement is the starting point of all quality management activities. The organization uses measurement information to determine how it is performing. In the next step, assessment, the organization judges whether its performance is acceptable. If its performance is acceptable, the organization continues to measure it to ensure it doesn't deteriorate. If its performance is not acceptable, the organization advances to the improvement step. In this step, process changes are made. After the changes are in

FIGURE 3.1.
Cycle of
Measurement,
Assessment, and
Improvement
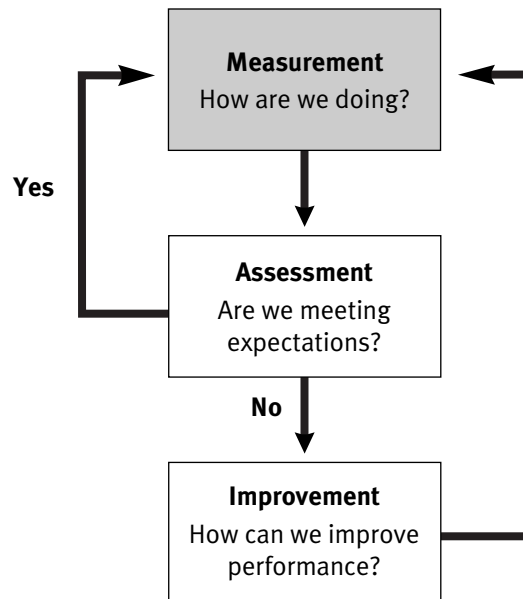
place for a while, the organization continues measuring to determine whether the changes are producing the desired result.

CASE STUDY

The following case study illustrates the use of measurement information for quality management purposes.

The Redwood Health Center is a multispecialty clinic that employs ten care providers—nine physicians and one nurse practitioner. Quality customer service is a priority for everyone in the clinic.

Measurement: How Are We Doing?

Customer service
A series of activities designed to attend to customers' needs

To judge **customer service**, the clinic regularly measures patient satisfaction. A locked, ballot-style feedback box is located in the waiting area. It is clearly labeled: "Please tell us how we're doing. Your feedback will help us make things better." Next to the box is a container holding pens and pencils and a stack of blank feedback forms. There are six questions on the one-page feedback form:

1. What is the date of your clinic visit?
2. How would you rate the *quality of the medical care* you've received? (Please circle one.)

    (poor) 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 (perfect)

3. How would you rate the *quality of the customer service* you've received? (Please circle one.)

    (poor) 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 (perfect)

4. What did you like *best* about this visit?
5. What did you like *least* about this visit?
6. Please suggest one or more ways we could make things better.

At the end of each week, the clinic manager collects the feedback forms from the locked box. The results are tabulated and shared with clinic staff every month.

At one monthly meeting, the clinic manager reports that many patients complain about the amount of time they must wait before they are seen by a care provider. The providers expect clinic staff to bring patients to the exam room within ten minutes of their arrival. To determine whether this goal is being met, the clinic gathers data for three weeks on patient wait times. Patients are asked to sign in and indicate their arrival time on a sheet at the registration desk. The medical assistant then records the time patients are brought to an exam room.

Assessment: Are We Meeting Expectations?

Patient wait time data for the three weeks are tallied. On most days, patient wait times are ten minutes or less. However, the average wait times are longer than ten minutes on Monday afternoons and Thursdays. Further investigation shows that the clinic services a large number of walk-in patients on Monday afternoons. The clinic's nurse practitioner does not work on Thursdays, so physicians must see more patients on those days.

Improvement: What Changes Can We Make?

The wait time data help the clinic pinpoint where improvements are needed. The clinic manager meets with the care providers to discuss ways of changing the current process to reduce bottlenecks and improve customer satisfaction. The physicians ask that fewer patients be scheduled for appointments on Monday afternoons to give them more time to see walk-in patients. The nurse practitioner agrees to work on Thursday mornings.

(*) LEARNING POINT
Measurement and Quality Management

Measurement is an element of all quality management activities. Performance is measured to determine current levels of quality, identify improvement opportunities, and evaluate whether changes have improved outcomes.

Measurement: How Are We Doing?

To test whether these changes have improved outcomes, the clinic continues to gather feedback on overall patient satisfaction and periodically collects and analyzes patient wait time data.

Performance measures
Quantitative tools used to evaluate an element of patient care

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Quality indicators
Measures used to determine an organization's performance over time; also called _performance measures_

Percentage
A numerical expression indicating parts (hundredths) of a whole

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Average
The numerical result obtained by dividing the sum of two or more quantities by the number of quantities; an arithmetic mean

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Ratio
One value divided by another; the value of one quantity in terms of the other

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Validity
The degree to which data or results of a study are correct or true

3.2 MEASUREMENT CHARACTERISTICS

Measurement is a tool—usually a number or a statistic—used to monitor the quality of some aspect of healthcare services. These numbers are called **performance measures** or **quality indicators**. There are many ways to communicate measurement data. Examples of measures and the most common numbers or statistics used to report data for healthcare quality management purposes are shown in Table 3.1.

A measure expressed as a **percentage** is generally more useful than a measure expressed as an absolute number. A percentage more clearly communicates a measure's prevalence in a population. For example, the percentage of nursing home residents who develop an infection is more meaningful than the number of nursing home residents who develop an infection. To provide even more information, both the percentage and number of residents who develop an infection can be reported.

An **average**, sometimes called an _arithmetic mean_, is the sum of a set of quantities divided by the number of quantities in the set. For instance, we can calculate the average nurse salary by adding up all the nurses' salaries and dividing by the number of nurses. In some situations, however, averages can be misleading. For example, if a few of the numbers in the data set are unusually large or small (called _outliers_), they are commonly excluded when calculating an average. The excluded outliers are examined separately to determine why they occurred.

A **ratio** is used to compare two things. For instance, the nurse-to-patient ratio reports the number of hospital patients cared for by each nurse. In the same month, one hospital unit may report a ratio of 1 nurse for every 5.2 patients, while another unit reports a ratio of 1 nurse for every 4.5 patients, while yet another reports a ratio of 1 nurse for every 4.8 patients. A consistently calculated ratio facilitates comparison between units.

Regardless of how a measure is communicated, to be used effectively for quality management purposes it must be accurate, useful, easy to interpret, and consistently reported.

ACCURACY

Performance measures must be accurate. Accuracy relates to the correctness of the numbers. For example, in the above case study, the time the patient entered the clinic must be precisely recorded on the registration sign-in sheet. Otherwise, the wait time calculation will be wrong. Accuracy also relates to the **validity** of the measure. Is it gathering the information it is sup-

Number/Statistic	Measure Example
Absolute number	• Number of patients served in the health clinic
	• Number of patients who fall while in the hospital
	• Number of billing errors
Percentage	• Percentage of nursing home residents who develop an infection
	• Percentage of newly hired staff who receive job training
	• Percentage of prescriptions filled accurately by pharmacists
Average	• Average patient length of stay in the hospital
	• Average patient wait time in the emergency department
	• Average charges for laboratory tests
Ratio	• Nurse-to-patient ratio
	• Cost-to-charge ratio
	• Technician-to-pharmacist ratio

posed to be gathering? For example, the clinic in the case study asks patients to provide feedback on the clinic's performance. One question on the feedback form is, "How would you rate the quality of the customer service you've received?" Each patient who rates the clinic's customer service may have something different in mind when answering the question. Because of these differences, the feedback is not a **valid** measure of just one aspect of clinic performance—for example, just the patient registration process. However, the average customer service rating is a good measure of patients' satisfaction with overall clinic performance.

Valid
Relevant, meaningful, and correct; appropriate to the task at hand

Usefulness

Performance measures must be useful. Measurement information must tell people something they want to know. Computers have made data collection easier, but volume and variety don't necessarily translate to relevance. For instance, the computerized billing system of a health clinic contains patient demographic information (e.g., age, address, next of kin, insurance coverage). The clinic manager could use this information to report several performance measures, such as the percentage of patients with prescription drug insurance

> **⊛ LEARNING POINT**
> Measurement Information
>
> Measurement data are most commonly reported as discrete numbers, percentages, averages, and ratios. The number or statistic used to report the data can influence the interpretation of the measurement information.

benefits or the percentage of patients who live more than 20 miles from the clinic. While this information might be interesting, it won't be helpful for evaluating performance unless it is important or relevant to those using the information.

EASE OF INTERPRETATION

Performance measures must be easy to interpret. Suppose the clinic manager in the case study reported the wait times for each patient on each day of the week. An excerpt from the report for one day is shown in Table 3.2.

Line graph
A graph in which trends are highlighted by lines connecting data points (See figures 3.2 and 3.3 for examples of line graphs.)

The purpose of performance measurement is to provide information, not to make people sort through lots of data to find what they want to know. Having to read through several pages of wait time data to identify improvement opportunities would be tedious. A much better way to report the patient wait time data is illustrated in Figure 3.2. Using a **line graph**, the clinic manager displays the average wait times for the morning and afternoon of each day of the week. The clinic's providers can easily identify trends and improvement opportunities from the graph.

CONSISTENT REPORTING

Performance measures must be uniformly reported to make meaningful comparisons between the results from one period and the results from another period. For example,

TABLE 3.2.
Excerpt from Larger Report of Wait Time Data for Each Patient

Monday	
Patient #1	12 minutes
Patient #2	9 minutes
Patient #3	17 minutes
Patient #4	7 minutes
Patient #5	9 minutes
Patient #6	13 minutes
Patient #7	21 minutes
Patient #8	11 minutes
Patient #9	7 minutes
Patient #10	8 minutes
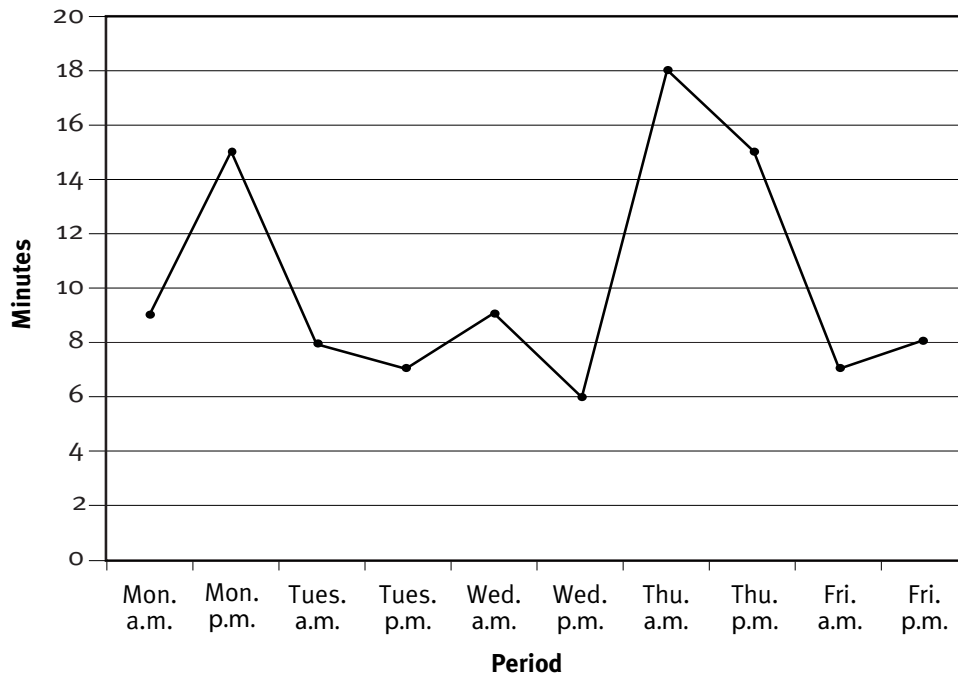
suppose the clinic manager starts calculating patient wait time information differently. He changes the wait time end point from the time the patient leaves the reception area to the time the patient is seen by a care provider. This slight change in the way wait times are calculated could dramatically affect performance results. The care providers would see an increase in average wait times and interpret it as a problem when in fact the increase was caused by the different measurement criteria, not a change in performance. This new measure can be used, but it should be reported separately, as shown in Figure 3.3.

3.3 MEASUREMENT CATEGORIES

Hundreds of measures can be used to evaluate healthcare performance. These measures are grouped into three categories:

◆ **Structure measures**

◆ **Process measures**

◆ **Outcome measures**

Structure measures
Data describing organizational facilities, environment, equipment, policies, and procedures

Process measures
Data describing the delivery of healthcare services

Outcome measures
Data describing the results of healthcare services
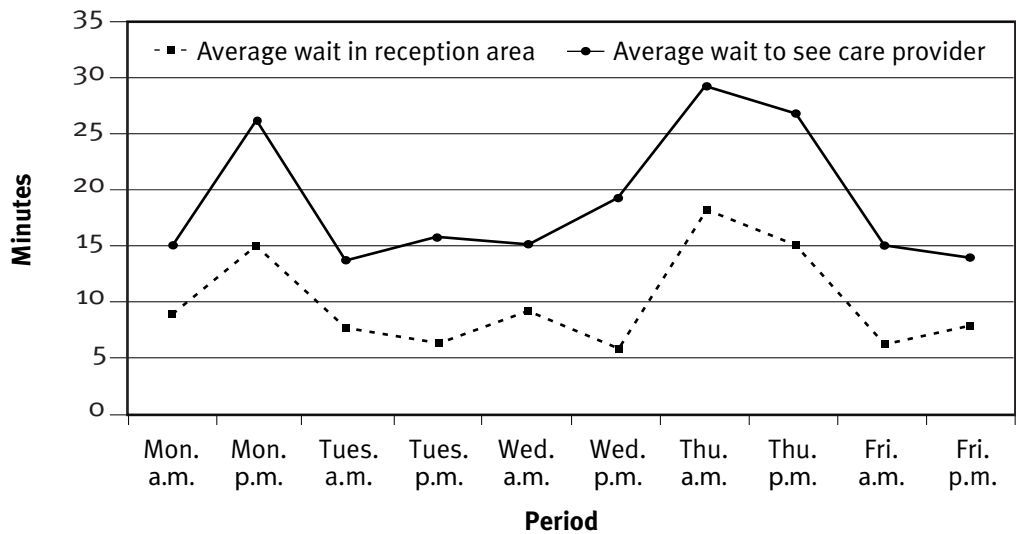
These measurement categories were first conceptualized in 1966 by Dr. Avedis Donabedian (1980). His research in quality assessment resulted in a widely accepted healthcare measurement model that is still used today. Donabedian contended that the three measurement categories—structure, process, and outcome—represent different characteristics of healthcare service. To fully evaluate healthcare performance, Donabedian recommended that performance in each dimension be measured.

The structure of healthcare is measured to judge the adequacy of the *environment* in which patient care is provided. The process of healthcare is measured to judge whether patient care and support functions are *properly performed*. Healthcare outcomes are measured to judge the *results* of patient care and support functions. Performance measures for most products and services would fall into these same categories. Table 3.3 provides examples of structure, process, and outcome measures that could be used to evaluate the performance of an emergency department and a fast-food restaurant.

STRUCTURE MEASUREMENT

Measures of structure evaluate the physical and organizational resources available to support healthcare delivery—the organization's capacity or potential for providing quality services. As such, measures of structure are indirect measures of performance. For example, although a restaurant maintains all food at proper storage temperatures, the possibility of serving spoiled food still exists. An emergency department might have someone available

TABLE 3.3.
Structure, Process, and Outcome Performance Measures

Measurement Category	Performance Measures for an Emergency Department (ED)	Performance Measures for a Fast-Food Restaurant
Structure	Number of hours per day that a person skilled in reading head CT scans is available	Percentage of time food storage equipment maintains proper temperature
Process	Percentage of ED patients ≤13 years old with a current weight in kilograms documented in the ED record	Percentage of hamburger patties cooked to an internal temperature of 160°F
Outcome	Median time from ED arrival to ED departure for patients admitted to the hospital	Median time between food order and delivery to the customer

24 hours per day to interpret special tests, but that person could misread the results. To ensure quality, measures of process and outcome also must be taken.

PROCESS MEASUREMENT

Measures of process evaluate whether activities performed during the delivery of healthcare services are delivered satisfactorily. For instance, if an emergency department has a policy that all patients with confirmed pneumonia receive an antibiotic within two hours of arrival, we would measure caregiver compliance with the policy to determine whether their performance is acceptable.

In healthcare quality management, process measures are most commonly used. Process measures provide important information about performance at all levels in the organization. However, good performance does not automatically translate to good results. In the previous example, even if all patients with pneumonia receive antibiotics within two hours of arrival in the emergency department, some may not recover. For this reason, another dimension of healthcare quality—outcome—must be measured.

OUTCOME MEASUREMENT

Measures of outcome evaluate the results of healthcare services—the effects of structure and process. A common outcome measure is patient satisfaction, an indicator of how well a healthcare facility is meeting customer expectations. Patients' health status is often measured to determine whether treatments were successful. Healthcare facilities also measure patient mortality (death) and complication rates to identify opportunities for improvement. Outcome measures are also used to evaluate the use of healthcare services. Average length of hospital stay and average cost of treatment are two examples of outcome measures that examine the use of services.

To gain an understanding of current performance, healthcare organizations must measure three characteristics: structure, process, and outcome. Structure measures are used to assess the organization's capacity to provide care. Process measures are used to assess whether services are delivered properly. Outcome measures are used to assess the final product or end results.

For example, if a manager of outpatient physical rehabilitation services wants to measure each characteristic of the unit's performance, he or she could ask the following questions:

Structure: Is the unit staffed with a sufficient number of registered physical therapists?

Process: How consistently do therapists measure and document patients' level of pain?

Outcome: What is the rate of patient pain reduction following therapy?

Although measuring health service outcomes is important, the results can be affected by factors beyond providers' control. For example, patient mortality rates at one hospital may be higher than rates at other hospitals because the hospital cares for more terminally ill cancer patients. This healthcare organization may do all the right things but appear to be an underperformer because of the population it serves. When evaluating measurement data, many factors affecting patient outcomes must be considered.

3.4 SELECTING PERFORMANCE MEASURES

Healthcare organizations use two tiers of measures to evaluate performance. Some measures evaluate performance at the system level. The percentage of health clinic patients who are satisfied with the quality of customer services is an example of a **system-level measure**. This measure is a snapshot of overall clinic performance. Because many activities in a health clinic influence the quality of customer service, performance also needs to be evaluated at the activity level to assess patient satisfaction. The percentage of time reception staff telephones patients to remind them of upcoming clinic appointments is an example of an **activity-level measure**.

System-level measure
Data describing the overall performance of several interdependent processes or activities

Activity-level measure
Data describing the performance of one process or activity

Consider how the performance of an automobile is evaluated. A common measure of car performance is the number of miles it can travel per gallon of gasoline. This system-level measure, miles per gallon, is just a snapshot of the car's overall performance, however. Many actions affect an automobile's fuel economy. Activity-level measures can be used to evaluate these actions. For example, average time between engine tune-ups is an activity-level measure of an action that affects car performance. By using a combination of system- and activity-level measures, the owner can judge not only overall fuel economy but also actions (or lack thereof) that might be adversely affecting it.

A mix of system- and activity-level measures allows a healthcare organization to judge whether overall performance goals are being met and where frontline improvements may be needed. The relationship between performance goals and system-/activity-level measures in two healthcare settings is shown in Table 3.4.

Setting	Organization-Wide Performance Goal ⇒	System-Level Measure ⇒	Activity-Level Measures
University student health center	Inform and educate students on wellness and prevention issues relevant to their age group	Percentage of incoming freshmen who are vaccinated for meningococcoccal meningitis within three months of first semester	• Number of hours the vaccination clinic is open each month • Percentage of incoming freshmen who receive written information about the meningococcoccal meningitis vaccine • Percentage of incoming freshmen who complete and return the vaccination survey
Hospital	Reduce incidence of hospital-acquired infections	Percentage of patients who develop an infection while in the hospital	• Rate of staff compliance with hand hygiene procedures • Percentage of central vein line catheter insertions done according to protocol • Percentage of staff immunized for influenza

TABLE 3.4.
Performance Goals and Measures in Two Healthcare Settings

MEASUREMENT PRIORITIES

The system- and activity-level measures used by a healthcare organization for quality management purposes are influenced by external and internal factors. On the external side, numerous government regulations, accreditation standards, and purchaser requirements directly affect measurement activities. The number and type of measures used to evaluate performance vary in proportion to the number of external requirements the organization must meet. Critical Concept 3.1 lists 10 of the 41 performance measures Medicare-certified home health agencies were required to use for quality management purposes in 2008.

> **! CRITICAL CONCEPT 3.1**   2008 Performance Measures for Medicare-Certified Home Health Agencies
>
> • Percentage of patients whose ability to groom themselves improves between start/resumption of care and discharge
>
> *(Continued)*

> (!) **CRITICAL CONCEPT 3.1**   2008 Performance Measures for Medicare-
> Certified Home Health Agencies
>
> - Percentage of patients whose ability to dress themselves (upper body) improves be-
>   tween start/resumption of care and discharge
>
> - Percentage of patients whose ability to dress themselves (lower body) improves be-
>   tween start/resumption of care and discharge
>
> - Percentage of patients whose ability to bathe themselves improves between start/
>   resumption of care and discharge
>
> - Percentage of patients whose ability to use a toilet or commode improves between
>   start/resumption of care and discharge
>
> - Percentage of patients whose ability to walk improves between start/resumption of
>   care and discharge
>
> - Percentage of patients whose ability to feed themselves improves between start/
>   resumption of care and discharge
>
> - Percentage of patients who have received emergency care prior to or at the time of
>   discharge from home health care
>
> - Percentage of patients who are discharged from home health care and remain in the
>   community (rather than an inpatient facility)
>
> - Percentage of patients who are admitted to an acute care hospital for at least 24
>   hours while a home health care patient
>
> *Source*: CMS (2008b).

The performance measurement requirements of the federal government, the largest purchaser of healthcare services, continue to increase in response to quality improvement and cost-containment efforts. Like most purchasers, the Centers for Medicare & Medicaid Services (CMS) is interested in obtaining the most value for its healthcare expenditures. The measures of performance required of healthcare organizations help purchasers assess value in terms of the six Institute of Medicine (IOM 2001) quality aims described in Chapter 1: Healthcare should be safe, effective, patient centered, timely, efficient, and equitable.

State licensing regulations often require healthcare organizations to evaluate struc-tural issues, such as compliance with building safety and sanitation codes. Licensing regu-

lations may also include specific requirements for process and outcome measures. A list of performance data that must be collected by ambulatory surgical treatment centers in Illinois is shown in Critical Concept 3.2.

⚠ CRITICAL CONCEPT 3.2 Illinois Regulations for Data Collection in Ambulatory Surgical Treatment Centers

Each ambulatory surgical treatment center shall collect, compile, and maintain the following clinical statistical data at the facility:

1) The total number of surgical cases treated by the center;

2) The number of each specific surgical procedure performed;

3) **The number and type of complications reported, including the specific procedure associated with each complication;**

4) **The number of patients requiring transfer to a licensed hospital for treatment of complications. List the procedure performed and the complication that prompted each transfer; and**

5) The number of deaths, including the specific procedure that was performed.

Source: Illinois General Assembly, Joint Committee on Administrative Rules (1998).

Certain state and federal regulations apply only to specific healthcare units, such as radiology and laboratory departments. These regulations contain many quality control requirements with corresponding system- and activity-level performance measurement obligations. For instance, any facility that performs laboratory testing on human specimens must adhere to the quality standards of the Clinical Laboratory Improvement Amendments, passed by Congress in 1988 to ensure the accuracy, reliability, and timeliness of patient test results regardless of where the test is performed (U.S. Food and Drug Administration 2005).

The standards of healthcare accreditation groups often contain system- and activity-level performance measurement requirements. Accreditation standards may duplicate those mandated by government regulations and purchasers. However, some measurement requirements found in accreditation standards are unique. For example, organizations accredited by The Joint Commission (2008) are expected to collect data on the timeliness of diagnostic testing and reporting (an activity-level measure) to determine how quickly important test results are communicated to the patient's doctor and where improvement opportunities

Core measure project
Performance measurement project sponsored by The Joint Commission

may exist. They also must participate in the **core measure project**, which involves gathering and sharing measurement results with The Joint Commission. Core measures currently required of accredited organizations can be found on The Joint Commission's website (www .jointcommission.org). As much as possible, The Joint Commission coordinates its core measurement requirements with the measurement activities mandated by CMS to lighten the workload for organizations subject to both groups.

Health plans accredited by the National Committee on Quality Assurance (NCQA) must participate in the Healthcare Effectiveness Data and Information Set (HEDIS) measurement project. HEDIS measures address a broad range of health and customer service issues, including (NCQA 2008)

- ◆ asthma medication use,
- ◆ persistence of beta-blocker treatment after a heart attack,
- ◆ regulation of high-blood pressure,
- ◆ comprehensive diabetes care,
- ◆ breast cancer screening,
- ◆ antidepressant medication management,
- ◆ childhood and adolescent immunization status,
- ◆ communication between physicians, and
- ◆ timely access to care.

In 2008, HEDIS comprised 71 measures across eight domains of patient care. Health plans accredited by NCQA are not required to gather information for all of the HEDIS measures. HEDIS measures currently required for accreditation can be found on the NCQA website (http://ncqa.org).

A growing number of external groups are mandating that healthcare organizations gather specific performance measures for quality management purposes. When selecting performance measures, organizations must consider the most current measurement directives of relevant government regulations, accreditation bodies, and purchasers.

Externally mandated measurement requirements don't always address all of the organization's internal quality priorities. The elements of service an organization wants to

⊛ **LEARNING POINT**
Choosing Measures

Healthcare organizations measure many aspects of performance. Some of the measures are mandated by external regulatory, licensing, and accreditation groups. Some of the measures are chosen to evaluate performance issues important to the organization. Some measures serve both purposes; the measure is required by an external group and provides performance information important to the organization.

measure and the measurement priorities of external groups may differ. Consider a home health agency with a particularly large hospice patient population. Hospice patients have a limited life expectancy and require comprehensive clinical and psychosocial support as they enter the terminal stage of an illness or a condition. The measures required of Medicare-certified home health agencies do not address some of the performance issues unique to hospice patients and their families. Consequently, the home health agency will need to identify and gather its own performance measures of hospice services in addition to collecting the measures required to maintain Medicare certification. Table 3.5 lists examples of performance measures that Redwood Health Center, the subject of the case study presented earlier in the chapter, uses to evaluate various aspects of quality, and explains why the center selected them.

TABLE 3.5.

Clinic Measures of Performance and Their Purposes

Performance Measures	*Reason for Using These Measures*
• Percentage of patients with diabetes who have an annual eye examination • Percentage of pregnant patients screened for human immunodeficiency virus (HIV) • Percentage of adult patients who receive an influenza immunization annually • Percentage of patients with newly diagnosed osteoporosis who receive counseling on vitamin D and calcium intake and exercise	The clinic is required by contract to gather this information and share results with Medicare and two managed care organizations. Also, care providers want to know how the clinic's performance in these measures compares with the performance of other clinics in the state.
• Number of patients who call back after an office visit to clarify instructions • Percentage of charts that have patient medication allergies prominently displayed • Percentage of visits that involve an interpreter (not a family member) to communicate with patients who do not speak English • Percentage of Pap smear samples that are non-diagnostic as a result of improper collection techniques	Care providers want to know whether these important aspects of patient care are in compliance with internal expectations.
• Percentage of patients completing the satisfaction survey who indicate they would refer a friend or family member to the clinic • Percentage of patients completing the satisfaction survey who report being "very satisfied" with clinic services • Rate of no shows (patient does not show up for the appointment) • Number of handicapped patients who complain about an insufficient number of handicap parking spaces	Care providers and the clinic administrator want to know whether patients are satisfied with the clinic's services.

(*Continued*)

Performance Measures	Reason for Using These Measures
• Average number of days between patient request for an annual physical examination and first available physician appointment • Average number of days between patient request for a non-urgent care visit and first available physician or nurse practitioner appointment • Average visit cycle time: total patient time in the clinic from walk-in to walkout • Percentage of phone calls abandoned (customer hangs up while on hold)	Care providers and the clinic administrator want to know whether the clinic is providing efficient, customer-friendly services in a timely manner.
• Percentage by which revenues exceed expenses • Percentage of bills returned to the clinic because of outdated patient demographic information • Percentage of patients who have a copayment and are asked for this payment at the time of service • Average supply costs per patient office visit	The clinic administrator and the business office manager want to know how well the clinic is fairing financially and what can be done to improve net revenues and speed up collection of outstanding accounts.
• Average temperature of the clinic medication/supply refrigerator • Percentage of smoke detectors, fire alarms, and sprinklers in compliance with local fire codes during biannual inspection • Number of medication samples found to be outdated during quarterly inspection of medication sample cabinet • Percentage of equipment maintenance checks performed within two weeks of deadline	The state health department requires the clinic to measure the safety of the environment.

3.5 CONSTRUCTING MEASURES

Creation of performance measures should follow three steps to ensure each one yields information that is accurate, useful, easy to interpret, and consistently reported:

1. Identify the topic of interest.
2. Develop the measure.
3. Design the data collection system.

These steps can be time consuming but are essential to ensuring the measures are useful for quality management purposes.

IDENTIFY TOPIC OF INTEREST

The first step to constructing a performance measure is to determine what you want to know. Consider just one function—for example, taking patient X-rays in the radiology department. This function involves several steps:

1. The patient's doctor orders the X-ray exam.
2. The radiology department schedules the exam.
3. The patient registers upon arrival in the radiology department.
4. The X-ray exam is performed.
5. The radiologist interprets the X-rays.
6. The radiologist informs the patient's doctor of the X-ray results.

To select performance measures for X-ray procedures, consider IOM's (2001) six dimensions of healthcare quality and the corresponding performance questions listed in Table 3.6. Answers to these questions can help the radiology department gauge its performance in each quality dimension. The department will determine which quality characteristics it will need to measure regularly and which questions will provide the most useful

TABLE 3.6.
Quality Dimensions and Performance Questions for Radiology Services

Quality Dimension	Performance Questions
Safe	• How many patients react adversely to the X-ray dye?
	• Are pregnant patients adequately protected from radiation exposure?
Effective	• Are significant (e.g., life threatening) X-ray findings quickly communicated to the patient's doctor?
	• How often are presurgery X-ray findings confirmed at the time of surgery?
Patient centered	• Do patients often complain about a lack of privacy in the X-ray changing rooms?
	• How many patients are greeted by the receptionist upon arrival in the department?
Timely	• How long do patients wait in the reception area before an exam?
	• Are outpatient X-ray reports reported to the patient's doctor in a timely manner?
Efficient	• How often must X-ray exams be repeated because the first exam was not performed properly?
	• Is staff sometimes unable to locate X-ray films when needed because they have been misplaced?
Equitable	• Do uninsured patients receive the same level of service as insured patients?
	• How often is the mobile mammography unit available to people living in rural areas?

TABLE 3.7. Factors to Consider When Selecting Performance Measures		

Factor	Yes	No
Is the measure mandated by government regulations or accreditation standards?	_____	_____
Is reimbursement linked to good performance in this measure?	_____	_____
Is the organization's performance in this measure available to the public?	_____	_____
Does the measure evaluate an aspect of service that is linked to one of the organization's improvement goals?	_____	_____
Does the measure evaluate an aspect of service that is linked to one of the department's improvement goals?	_____	_____
Are affected physicians and staff members likely to be supportive of initiatives aimed at improving performance in this measure?	_____	_____
Are resources available to collect, report, and analyze the measurement results?	_____	_____

answers for measurement purposes. Factors the radiology manager will take into consideration when selecting performance measures for the department are summarized in Table 3.7.

Aspects of service that will be measured to answer performance questions must be stated explicitly. Without this knowledge, measures cannot be developed.

DEVELOP THE MEASURE

Once performance questions have been identified, the next step is to define the measures that will be used to answer the questions. Suppose the radiology manager chooses to answer the question regarding timely reporting of X-ray exam results to patients' doctors. The department policy states that results are to be telephoned or faxed to patients' doctors within 48 hours of their exams. To turn the question into a performance measure, the manager decides to use the percentage of results communicated to doctors within 48 hours of completion of an outpatient X-ray exam.

To ensure he knows what information this measure will provide, the manager rewrites the measure in terms of the data that will be used to calculate it, as follows:

$$\frac{\text{Number of outpatient exam results reported to doctor within 48 hours}}{\text{Total number of exams performed}} \times 100$$

By writing the performance measure in fundamental measurement units, the manager is able to identify the data he needs to generate the measure. The top number in the fraction is the **numerator**, and the bottom number is the **denominator**. To calculate the percentage of results communicated to the doctor within 48 hours of exam completion, the top number is divided by the bottom number and then multiplied by 100.

Examples of performance measures, along with the numerators and denominators that would help answer some of the questions in Table 3.6, are provided in Table 3.8.

Some performance measures, typically structure measures, do not have denominators. For instance, health plans usually want to know whether a hospital is accredited. Evidence of accreditation is a structure measure. Only two measurement results are possible—the hospital is either accredited or not accredited. As another example, a common measure of a healthcare organization's compliance with environmental safety is the number of fire drills it conducts each year. This measure is an absolute number; a denominator is not necessary.

Numerator
The number written above the line in a common fraction to indicate the number of parts of the whole

Denominator
The number written below the line in a common fraction that indicates the number of parts into which one whole is divided

TABLE 3.8.
Performance Questions and Measures for the Radiology Department

Performance Questions	Measure	Numerator	Denominator
How many patients react adversely to the X-ray dye?	Percentage of patients who react adversely to the X-ray dye	Number of patients who react adversely to the X-ray dye	Total number of patients receiving an X-ray dye injection
Are pregnant patients adequately protected from radiation exposure?	Percentage of women of childbearing age who are asked about pregnancy status prior to X-ray exam	Number of women of childbearing age asked about their pregnancy status prior to X-ray exam	Total number of women of childbearing age who undergo an X-ray exam
How often must X-ray exams be repeated because the first exam was not performed properly?	Percentage of X-ray exams repeated because of wrong patient positioning on first exam	Number of X-ray exams repeated because of wrong patient positioning on first exam	Total number of X-ray exams performed
Is staff sometimes unable to locate X-ray films when needed because they have been misplaced?	Percentage of X-ray films that cannot be located within 15 minutes	Number of X-ray films that cannot be located within 15 minutes	Total number of X-ray films requested
Do uninsured patients receive the same level of service as insured patients?	Percentage of service complaints received from uninsured patients	Number of service complaints received from uninsured patients	Total number of service complaints received from all patients
How often is the mobile mammography unit available to people living in rural areas?	Percentage of time mobile mammography unit is available in rural areas	Number of hours the mobile mammography unit is open for business in locations more than 30 miles from the hospital	Total number of hours the mobile mammography unit is open for business

Design a Data Collection System

To ensure that useful and accurate performance information is gathered, **reliable** and valid data sources must be identified. A reliable data source is one that consistently contains the information needed to create the performance measure. A valid data source is one that contains the correct information needed to create the performance measure. A reliable data source is not necessarily a valid one. For example, nurses may consistently document a patient's weight, but if the scale does not function properly, the data in the patient's record are invalid.

Various computerized databases and handwritten documents, such as those listed below, are used to collect data for the numerator, denominator, and other elements necessary to calculate a measure:

◆ *Administrative files.* The organization's billing database is an administrative file often used to gather performance data. This file typically contains information such as patient demographics, codes that identify diagnoses and procedures performed, and charges billed. Count data, such as the number of patients who have X-rays taken, can be gathered from the billing database. Other databases include those maintained by pharmacies and insurance companies.

◆ *Patient records.* Treatment results are found in patient records. Patient records are often the only source of data for outcome measures, such as the percentage of patients who reacted adversely to X-ray dyes. Gathering data from electronic patient records is usually easier and less time consuming than gathering data from paper-based records.

◆ *Miscellaneous business and clinical information.* Performance measurement data may be available from a variety of other sources. These sources include patient and employee surveys, patient care logs maintained by clinics and emergency departments, and the results of special studies, such as observation reviews that evaluate compliance with patient care requirements.

There are advantages and drawbacks to using any data source. For example, patient databases used by pharmacies and health insurance companies may lack pertinent clinical details. Providers' billing databases, designed primarily for financial and administrative uses, often lack information needed to measure quality (e.g., measures requiring a time stamp are not included in most billing databases) (The Joint Commission 2003, 26–27). Patient records may also lack information needed to measure quality. For instance, patient records used by clinics usually include the names of prescribed medications but do not include documentation confirming that the physician counseled the patient about the medication's side effects. If you want to know how often counseling occurs, you would have to collect this information via another source, such as

observation. Observation, however, is a time-consuming activity that does not always produce a complete set of data for performance measurement (Spies et al. 2004). No data source is perfect; there are always trade-offs to consider.

When planning for data collection, first look for existing information sources. Often data are readily available and easily gathered. There may be situations, however, when the data needed to calculate a measure are not easy to obtain and new data sources must be developed. Let's look at our radiology department example to learn how to identify data sources for a performance measure. The radiology manager wants to gather data to determine the percentage of results communicated to patients' doctors within 48 hours of an outpatient X-ray exam. To create this measure, the manager needs to collect two sets of data: (1) the date and time each outpatient X-ray exam is performed and (2) the date and time each outpatient exam report is telephoned or faxed to the doctor. The manager also notes that a calculation is required to generate the measure. He will need to count the number of hours between completion of an outpatient X-ray exam and report to the patient's doctor to determine whether that period is less than 48 hours.

The manager investigates whether the data necessary to create the measure are currently available. Ideally, they are already being collected and will only need to be retrieved to generate the measure. The manager finds that the department's X-ray technicians do document the date and time of each exam in the department's electronic information system. These data will be easy to retrieve. The date and time exam results are reported to the patient's doctor will not be as easy to gather. Upon investigation, the manager discovers that doctors receive outpatient X-ray exam results in two different ways. Sometimes the radiologist telephones preliminary results to the doctor and later faxes the report to the doctor's office. At other times, the radiologist does not telephone preliminary results to the doctor and only faxes the report. Clerical staff in the radiology department document the date and time reports are faxed, but the radiologists do not record the date and time preliminary results are phoned to the doctor. To create the measure, the manager needs the radiologists to enter the date and time of these telephone communications in the department's electronic information system.

To finish designing the data collection system, the manager must make four more decisions. These decisions address the *what, who, when,* and *how* of data collection.

What

What refers to the population that will be measured. Will the denominator represent a **sample** of the population to be measured or the entire population? For some measures, the answer is evident. A calculation determining the percentage of nursing home residents who develop an infection would be inaccurate if only half of the resident population were included in the denominator, unless this half was representative of the whole; for some measures, the entire population doesn't need to be included in the denominator if the data

Sample

A representative portion of a larger group

are derived from a sample that is representative of the entire population. For instance, data on all prescriptions filled by the pharmacist are not necessary to determine the percentage filled accurately. A sample of filled prescriptions can provide reliable measurement data.

The Joint Commission encourages accredited healthcare organizations to use sampling to measure performance, where appropriate. Because they are statistically significant and simple to apply, the following sample sizes are recommended (HRSA/OPR New York Regional Division 2007):

◆ For a population of fewer than 30 cases, sample 100 percent of available cases.

◆ For a population of 30 to 100 cases, sample 30 cases.

◆ For a population of 101 to 500 cases, sample 50 cases.

◆ For a population greater than 500 cases, sample 70 cases.

Who

Interrater reliability
Probability that a measurement is free from random error and yields consistent results regardless of the individuals gathering the data (For example, a measure with high interrater reliability means that two or more people working independently will gather similar data.)

Who refers to the data collectors. Will the manager gather all data needed for performance measurement purposes? Will employees be asked to collect some data? Will information specialists in the organization be asked to retrieve data from administrative databases? If more than one person is responsible for data collection, how will the collectors ensure they are gathering data consistently (i.e., demonstrating **interrater reliability**)?

Once identified, data collectors often need training. They must know what data are necessary to create each measure and how to gather accurate information. For example, what is the definition of "adverse reaction to X-ray dye"? What is documented when a patient reacts adversely? Where it is documented? What should the data collector do if the documentation is ambiguous? If these questions aren't clearly answered, the accuracy and consistency of information gathered for measurement purposes will be jeopardized.

When

When refers to the frequency of data collection and reporting. How often will information be gathered? How frequently will performance measure results be reported? What are the cost implications of different data collection and reporting intervals? These decisions may be left to managers, or the organization may set the reporting frequency (e.g., monthly or quarterly).

How

How refers to the process used to gather data. Several methods are used to retrieve information for performance measures, including questionnaires, observations, electronic database queries, review of paper documents, and check sheets. The case study at the beginning of this chapter described a questionnaire used to gather satisfaction data from clinic patients. Table 3.9 is a form

TABLE 3.9.
Form Used to
Collect Data from
Hospital Patient
Records

Patient's medical record number:	Date of discharge:		
Nursing unit:	Date of record review:		

ASSESSMENT OF PATIENT'S LEARNING NEEDS	**YES**	**NO**	**N/A**
Does the assessment of learning needs based on the admission assessment include the following data:			
• Cultural and religious beliefs?			
• Emotional barriers?			
• Desire and motivation to learn?			
• Physical or cognitive limitations and barriers to communication?			
Is comprehension of education provided to patient and family documented?			
MEDICATION EDUCATION	**YES**	**NO**	**N/A**
Medication education documented in:			
• Patient Education Intervention			
• Nurses' Notes			
Educated patient on food/drug interactions:			
• Coumadin			
• Diuretics			
• Antidiabetics			
PATIENT EDUCATION AND TRAINING	**YES**	**NO**	**N/A**
Is there documentation that the patient and/or family were educated about the following as appropriate:			
• Plan for care, treatment, and services?			
• Basic health and safety practices?			
• Safe and effective use of medications?			
• Nutrition interventions, modified diets, and oral health?			
• Safe and effective use of medical equipment or supplies when provided by the hospital?			
• Techniques used to help reach maximum independence?			
Is there documentation that the patient and/or family were educated about pain, including the following:			
• Understanding pain?			
• The risk of pain?			
• The importance of effective pain management?			
• The pain assessment process?			
• Methods for pain management?			

used by data collectors to record information found in hospital patient records. The information is used to measure nurses' compliance with Joint Commission patient education standards.

The data-gathering process must be carefully planned so the information will be accurate and useful. Let's revisit our radiology department example to learn how data are gathered for one performance measure. To evaluate the efficiency of department services, the radiology manager wants to know how often the radiology file clerk takes longer than

15 minutes to locate an X-ray film. The percentage of X-ray films that cannot be located within 15 minutes will be calculated to answer the manager's question. Because they are too numerous, retrieval time data cannot be gathered for all X-rays filed in the department. The manager decides to measure a sample of the files. Each month, the radiology file clerk will be asked to find the films for 25 randomly selected X-rays performed the previous month. Data will be collected on different days and at different times each month to ensure the results are representative of retrieval on all days.

Check sheet
A form on which data can be sorted into categories for easier analysis (See Figure 3.4.)

The manager will count the number of minutes the radiology file clerk takes to locate each of the films. Using hatch marks, the manager will record the data on a check sheet and tabulate the results. A **check sheet** is a data-gathering tool. The purpose of a check sheet is to facilitate data collection and present the data in a way that enables their conversion to useful information for decision making.
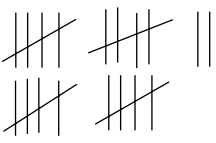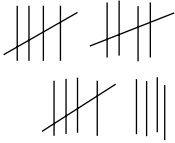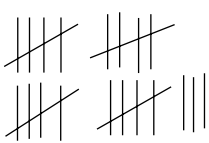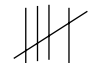
Figure 3.4 is a completed check sheet for a three-month period (each hatch mark represents one film). The percentage of X-ray films that could not be located within 15 minutes is calculated by dividing the number of hatch marks in the second row by 25 (the total number of randomly selected films each month). The performance results for each month are as follows:

- ◆ January: 12 percent of X-ray films could not be located within 15 minutes

- ◆ February: 24 percent of X-ray films could not be located within 15 minutes

- ◆ March: 8 percent of X-ray films could not be located within 15 minutes

Most of the performance measures required by purchasers and external regulatory, licensing, and accreditation groups have gone through a rigorous development and validation process. They have already defined the topic and identified the data necessary to create the measure, so healthcare organizations don't need to start from scratch.

FIGURE 3.4.
X-Ray Film
Retrieval Time
Check Sheet

Retrieval Time	January	February	March
0–15 minutes	‖‖‖ ‖‖‖ ‖ ‖‖‖ ‖‖‖	‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖	‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖
15+ minutes	‖‖‖	‖‖‖ ‖	‖‖

Core Measure	Numerator	Denominator
Percentage of heart failure patients who receive smoking cessation advice or counseling during the hospital stay	Number of heart failure patients who have a history of smoking cigarettes anytime during the year prior to hospital arrival and who receive smoking cessation advice or counseling during the hospital stay	Total number of heart failure patients who have a history of smoking cigarettes anytime during the year prior to hospital arrival
Percentage of heart failure patients (or caregivers) given written discharge instructions or other educational materials	Number of heart failure patients (or caregivers) given written discharge instructions or other educational materials addressing all of the following: • Activity level • Diet • Discharge medications • Follow-up appointment • Weight monitoring • What to do if symptoms worsen	Total number of heart failure patients discharged to their homes

Source: CMS (2008a).

TABLE 3.10.
Operational Definitions for Two Core Measures for Patients with Heart Failure

Table 3.10 shows operational definitions for two of the core measures that Joint Commission–accredited hospitals must use to evaluate the quality of care provided to patients with heart failure (CMS and The Joint Commission 2008). Detailed operational definitions for all core measures can be found on The Joint Commission's website.

Many externally mandated measures are reviewed and approved for use by the National Quality Forum (NQF), a public-private partnership that comprises representatives from provider organizations, regulatory and accreditation bodies, medical professional societies, healthcare purchasers, consumer groups, and other healthcare quality stakeholders. NQF was formed in 1999 for the purpose of developing and implementing a national strategy for improving healthcare quality. Part of this effort has focused on identifying

⁂ LEARNING POINT
Creating Measures

Construction of performance measures involves three main steps:

1. Identify the topic of interest.

2. Develop the measure.

3. Design the data collection system.

These steps can be time consuming but are essential to ensuring the measures are consistent and reliable for quality management purposes. Most performance measures required by purchasers and external regulatory, licensing, and accreditation groups have gone through a rigorous development and validation process.

valid and reliable performance measures to assess quality across the healthcare continuum. Subcommittees of the NQF use four criteria to evaluate the usefulness of performance measures (American College of Surgeons 2007):

- ◆ *Importance*: Is there a gap in performance? Is there potential for improvement?

- ◆ *Scientific acceptability*: Is the measure reliable, valid, and precise?

- ◆ *Usability*: Can measurement information be used to make decisions and/or take actions? Are the performance results statistically and clinically meaningful?

- ◆ *Feasibility*: Can the measurement data be obtained within the normal flow of patient care? Can the measure be implemented by a healthcare organization without undue burden?

Through 2006, NQF (2008) had endorsed more than 300 measures, practices, and other tools for use in evaluating and improving healthcare quality.

3.6 MEASURES OF CLINICAL DECISION MAKING

Many healthcare performance measures are similar to those used in other service industries. Hotels, for example, are service oriented. The measures of quality used by a hotel focus on topics such as customer satisfaction, timeliness of registration and checkout, billing accuracy, and cleanliness. One aspect of healthcare performance not found in other service industries is clinical decision making. *Clinical decision making* is the process by which physicians and other clinicians determine which patients need what and when. For instance, when you have a migraine headache and seek treatment, your doctor decides which tests are needed, if any, and which treatment is right for you.

Healthcare organizations measure both the service aspects of performance and the quality of clinical decision making. The same principles of measurement applicable to the service aspects of healthcare also apply to clinical decision making. Process measures are used to determine whether clinicians are making the right patient management choices. Outcome measures are used to evaluate the results of those choices. Clinical decision-making measures undergo the same three-step construction process: (1) Identify the topic of interest; (2) develop the measure; and (3) design the data collection system.

> **⊛ LEARNING POINT**
> Evidence-Based Clinical Measures
>
> Many of the performance measures healthcare organizations use for quality management purposes are similar to those found in other service industries. One aspect of healthcare not found in most service industries is the clinical decision-making process, which must be evaluated with performance measures derived from clinical practice guidelines developed by medical professional groups. These measures are referred to as *evidence-based measures*.

One factor particular to measures of clinical decision making is the basis for measurement. The radiology manager in the previous case scenario established a departmental performance expectation that file clerks should be able to locate X-ray films within 15 minutes and then measured how often this expectation was met. Performance expectations related to clinical decision making are established in a different manner. Expectations for clinical decision making are often found in **clinical practice guidelines** developed by medical professional organizations. Clinical practice guidelines have been defined as "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances" (Field and Lohr 1990).

Guidelines are important to healthcare quality improvement because they can reduce variations in practice and change physician behavior to promote use of interventions supported by the best evidence available. Guideline recommendations are based on current medical research and professional consensus. For instance, in September 2000 the American Academy of Neurology published a practice guideline on how physicians should evaluate and treat patients with migraine headaches. According to the guideline, tests such as CT scans or magnetic resonance imaging (MRI) are not necessary to treat a typical migraine. However, the doctor may choose to do special testing if the patient does not respond to treatment or if the patient's condition is unusual (Silberstein 2000). These recommendations can be translated into measurable performance expectations.

Another factor unique to measures of clinical decision making is the number of possible measurements. To evaluate the service aspects of healthcare performance, an organization can select from an almost limitless number of measures. Conceivably, each step of every patient care and business process could be measured to determine current performance. Because the resources needed to gather data for these measures would be extensive, organizations set measurement priorities.

Clinical decision making is difficult to measure reliably and often involves uncertainty because many treatments could be effective for a patient. Measurable performance expectations can be established only for clinical decisions supported by clear and generally irrefutable research evidence or expert consensus. For this reason, measures of clinical decision making are referred to as **evidence-based measures**. Most healthcare organizations use evidence-based measures to evaluate the quality of clinical decision making. Some of these measures are mandated by external regulatory and accreditation groups. Table 3.11 lists examples of evidence-based measures that CMS (2008c) encourages physicians to use for quality management purposes.

To promote widespread use of quality measures by the healthcare community, the

Clinical practice guidelines
Systematically developed statements that assist practitioners' and patients' decisions about healthcare provided for specific clinical circumstances

Evidence-based measures
Data describing the extent to which current best evidence is used in making decisions about patient care

? DID YOU KNOW?

In the 1990s, evidence-based medicine emerged as a way to improve and evaluate patient care. This practice combines the best research evidence available with the patient's values to make decisions about medical care. Consideration of all available medical studies and literature that pertain to a patient or a group of patients helps doctors properly diagnose illnesses, choose the best testing plan, and select the best treatments and methods of disease prevention.

TABLE 3.11.
Examples of
Evidence-Based
Performance
Measures

Topic of Interest	Evidence-Based Measure
Management of patients with asthma	Percentage of patients aged 5 through 40 with a diagnosis of mild, moderate, or severe persistent asthma who were prescribed the preferred long-term control medication (inhaled corticosteroid) or an acceptable alternative treatment
Management of patients with non-traumatic chest pain	Percentage of patients aged 40 or older with an emergency department discharge diagnosis of non-traumatic chest pain who had a 12-lead electrocardiogram performed
Management of patients with osteoporosis	Percentage of patients aged 50 or older with a diagnosis of osteoporosis who were prescribed pharmacologic therapy
Management of children with pharyngitis	Percentage of children aged 2 through 18 with a diagnosis of pharyngitis who were prescribed an antibiotic and received a group A streptococcus test for the episode
Management of patients with diabetes mellitus	Percentage of patients aged 18 through 75 with diabetes mellitus whose most recent blood pressure measured less than 140/80 mm Hg

Agency for Healthcare Research and Quality (AHRQ)
The health services research arm of the U.S. Department of Health and Human Services; the lead federal agency for research on healthcare quality, costs, outcomes, and patient safety

Balanced scorecards
Frameworks for displaying system-level performance measures; components of structured performance management systems that align an organization's vision and mission with operational objectives

Agency for Healthcare Research and Quality (AHRQ 2008) sponsors the National Quality Measures Clearinghouse (NQMC), a database of evidence-based performance measures developed by governmental, accreditation, and medical professional groups around the world. To be added to the NQMC, the measures must meet inclusion criteria, including reliability and validity assessments.

3.7 BALANCED SCORECARD OF MEASURES

Originally developed as a framework for measuring private industry performance, **balanced scorecards** (BSCs) are structures healthcare organizations use to evaluate achievement of operational objectives. Many healthcare organizations use some type of BSC to measure system-level performance (Zelman, Pink, and Matthias 2003). In addition to an overall "corporate" strategic scorecard, scorecards can be set up for each business unit in an organization. Scorecard measures are typically sorted into four strategic categories recommended by Kaplan and Norton in 1996:

◆   Customer

◆   Internal business

◆ Learning and growth

◆ Financial

Some healthcare organizations have modified Kaplan and Norton's recommendations and sort their measures into two to eight strategic perspectives (Burd and Gao 2008). For instance, the BSC of the Mayo Clinic in Rochester, Minnesota, covers five perspectives reflecting the clinic's areas of focus, sometimes referred to as **Pillars of Excellence** (Curtwright, Stolp-Smith, and Edell 2000):

◆ Clinical productivity and efficiency

◆ Mutual respect and diversity

◆ Social commitment

◆ External environmental assessment

◆ Patient characteristics

Kaplan and Norton (1996) suggested that a BSC include no greater than five measures for each perspective (in the above clinic's case, a total of no more than 25 measures). Examples of system-level measures in the four traditional BSC categories are provided in Table 3.12. Some of the measures are included more than once in different categories. For instance, measures related to patient satisfaction can be reported for both the customer perspective and the internal business perspective. There is no consistency among healthcare organizations as to the kind and number of measures they report on scorecards or how they categorize them.

Pillars of Excellence
Strategic themes selected by an organization to focus efforts on aspects crucial to its success (For example, Norton Healthcare's [2006] five Pillars of Excellence are people, service, quality, stewardship, and growth.)

Category	Measures
Customer	• Percentage of patients who would recommend the facility
	• Number of new managed care contracts each year
	• Percentage of patients satisfied with services
	• Percentage of payers satisfied with services
	• Number of service complaints
	• Rate of employee turnover/retention rate
	• Percentage of physicians satisfied with services
	• Dollar amount of charitable donations
	• Average number of patients who rate hospital food as "exceeding expectations"
	• Percentage of patients who report their pain was adequately controlled
	• Dollar amount of community donations (e.g., corporate gifts)

TABLE 3.12.
Balanced Scorecard Categories and Examples of System-Level Measures

(*Continued*)

TABLE 3.12.
(*continued*)
Balanced
Scorecard
Categories and
Examples of
System-Level
Measures

Category	Measures
Internal business	• Average patient length of stay
	• Percentage of patients readmitted for same/similar condition
	• Rate of patient falls
	• Rate of medication errors
	• Number of employee occupational injuries
	• Call center response times
	• Cost per case
	• Percentage of occupied beds
	• Percentage of emergency patients seen within 15 minutes of arrival
	• Number of patient complaints
	• Percentage of claims rejected by insurance companies because of inaccuracies
	• Average time from provision of service to bill creation
Learning and growth	• Percentage of capital expenditures spent on key infrastructure targets
	• Dollar amount of employee tuition reimbursement
	• Number of continuing education credits per full-time employee
	• Percentage of clinical staff trained in teamwork
	• Number of new services offered
	• Number of new research projects
	• Rate of employee turnover/retention rate
	• Percentage of staff attending at least one formal training session
	• Percentage of staff with postgraduate qualifications
Financial	• Volume growth by key service lines
	• Dollars generated from new contracts
	• Dollar amount of community donations (e.g., corporate gifts)
	• Growth in net revenues
	• Operating margin
	• Days of cash on hand
	• Days in accounts receivable
	• Debt service coverage ratio
	• Amortization and expense expressed as percentage of net revenue
	• Cost per case
	• Cost per discharge
	• Operating room supply expense per surgical case

CONCLUSION

Measurement is the starting point of all quality management activities and an integral part of the quality management cycle (Figure 3.1). Measurement results, usually numbers or

statistics, are used by decision makers to evaluate the performance of patient care and business processes. To be effective for quality management purposes, measures and data collection systems must be carefully developed, and measurement results must be accurate, useful, easy to interpret, and consistently reported.

Healthcare organizations use a combination of system- and activity-level measures to evaluate three dimensions of service: structure, process, and outcome. Many healthcare organizations must gather information for performance measures required by purchasers and external regulatory, licensing, and accreditation groups. In addition, healthcare organizations select performance measures to evaluate aspects of patient care that are important to their strategic goals.

Measurement information alone does not improve quality. In Chapter 4, we will discuss the second step of the quality management cycle—assessment—in which information must be analyzed to determine whether performance is acceptable and to identify areas needing improvement.

STUDENT DISCUSSION QUESTIONS

1. For any healthcare activity, three performance factors can be measured: structure, process, and outcome. Identify one structure measure, one process measure, and one outcome measure that could be used to evaluate the following hospital admission process:

   Upon arrival, the patient reports to the hospital registration or admitting area. The patient completes paperwork and provides an insurance identification card, if insured. Often, patients register before the date of hospital admission to facilitate the registration process. An identification bracelet including the patient's name and doctor's name is placed around the patient's wrist. Before any procedure is performed or any form of medical care is provided, the patient is asked to sign a consent form. If the patient is not feeling well, a family member or caregiver can help the patient complete the admission process.

2. For each measure you selected to evaluate the hospital admission process, describe the measure in fundamental terms. What are the numerator and denominator? If the measure does not require a numerator and denominator, explain why.

3. Suppose the manager of the hospital registration area wants to gather data to report performance results for the measures you've chosen. What data source could be used to gather information for the measures? Why would these data sources be best for gathering reliable data?

4. Query the NQMC (www.qualitymeasures.ahrq.gov) and identify five evidence-based performance measures related to prescribing the correct medications for hospitalized patients. The measure should focus on choosing the right medication for the patient's condition. List each measure, the organization or group that developed the measure, and the date the measure was published.

WEBSITES

- CMS Quality of Care Center
  www.cms.hhs.gov/center/quality.asp
- Glossary of Statistical Terms
  http://stats.oecd.org/glossary
- Joint Commission, The
  www.jointcommission.org
- National Committee for Quality Assurance
  http://ncqa.org
- National Quality Forum
  www.qualityforum.org
- National Quality Measures Clearinghouse
  www.qualitymeasures.ahrq.gov
- Sample Size Calculator
  www.surveysystem.com/sscalc.htm

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CHAPTER 4

EVALUATING PERFORMANCE

LEARNING OBJECTIVES

After reading this chapter, the reader will be able to

➤ identify common ways of reporting measurement data to facilitate performance assessment,

➤ apply methods of interpreting healthcare performance measurement data,

➤ describe the role of performance targets in evaluating performance,

➤ identify common techniques for establishing performance expectations, and

➤ explain how comparative performance data are used for assessment purposes.

KEY WORDS

- ➤ Appropriate
- ➤ Bar graphs
- ➤ Benchmarking
- ➤ Central tendency
- ➤ Common cause variation
- ➤ Control chart
- ➤ Control limits
- ➤ Dashboard
- ➤ Data visualization
- ➤ Frequency distributions
- ➤ Histograms
- ➤ Horizontal axis
- ➤ Judgment
- ➤ Lower control limit
- ➤ Normal distribution
- ➤ Pareto charts
- ➤ Pareto principle
- ➤ Performance comparison
- ➤ Performance expectation
- ➤ Performance gap
- ➤ Performance goals
- ➤ Performance targets

- ➤ Performance trends
- ➤ Pie charts
- ➤ Process variation
- ➤ Radar charts
- ➤ Run charts
- ➤ Scatter diagram
- ➤ Special cause variation
- ➤ Spider charts
- ➤ Standard deviation
- ➤ Standards
- ➤ State of statistical control
- ➤ Statistical process control (SPC)
- ➤ Tabular reports
- ➤ Tampering
- ➤ Upper control limit
- ➤ Vertical axis

Performance assessment is the evaluation stage of quality management. Measurement data have been gathered and now must be reported and analyzed. If an organization constructs measures carefully, collects accurate data, and reports results in a meaningful way, it will produce information useful for decision making.

Assessment involves judging or evaluating measurement data for the purpose of reaching a conclusion. For instance, when I weigh myself, the scale provides useful measurement data. The data allow me to reach a conclusion: Am I losing, gaining, or maintaining my weight? My weight-loss goals influence my **judgment** of the numbers displayed on the scale. I may be pleased to see I've lost three pounds since last week, but if my goal is to lose five pounds, I'll conclude that I need more exercise. A similar assessment process occurs with healthcare performance measurement data. Measurement results are compared with performance expectations to judge the quality of patient care and business services.

Judgment
Formation of an opinion after consideration or deliberation

4.1 Assessment in Quality Management

As shown in Figure 4.1, the assessment step follows performance measurement. In this step, the organization judges whether its performance is acceptable. If its performance is acceptable, the organization continues to measure performance to ensure it doesn't deteriorate. If its performance is not acceptable, the organization advances to the improvement step.
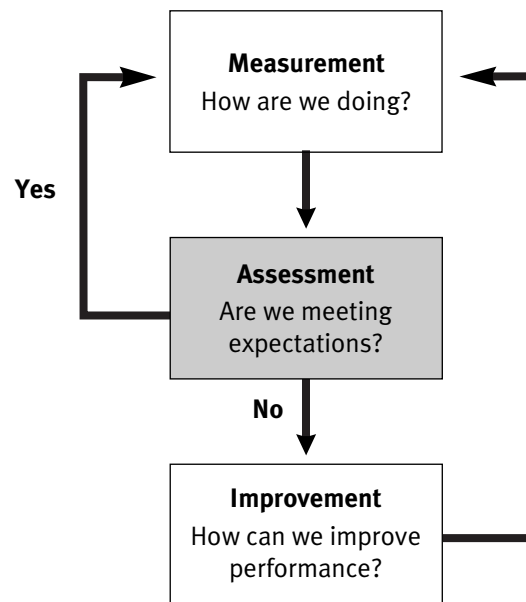
Figure 4.1.
Cycle of Measurement, Assessment, and Improvement

Measurement results are evaluated to determine whether processes are performing as expected. Measurement results are also assessed to judge the impact of improvements. Data alone are not useful, however. Performance goals, external factors, and other conditions must be considered when evaluating measurement results.

Once measurement data are collected and verified for accuracy, assessment can begin. The assessment step involves three activities:

1. Displaying measurement data
2. Comparing actual performance to expectations
3. Determining whether action is needed

4.2 Displaying Data

The first step in analyzing performance data is deciding how the information will be presented or displayed. The data should be reported in a format from which conclusions can be easily drawn. Multiple formats can be used, such as tabulations, graphs, and statistical comparisons. Sometimes, a single data grouping will suffice for analysis purposes.

To display data in an understandable format, three factors must be considered:

◆   The type of data to be reported

◆   The audience

◆   The information's intended use

For instance, to understand how well my weight-loss diet is working, knowing the percentage of weight lost or gained at various points in time may suffice. Alternatively, I may want to keep a daily tally of my weight so I can adjust my eating habits immediately if I am not meeting my goals. I may also want to know the number of hours I exercise each week to better understand the relationship between my fitness habits and weight changes.

More important than the format in which data are displayed, however, is a presentation that provides accurate and reliable information to help the audience answer the following questions:

◆   What is current performance?

◆   Is there a trend in the data?

◆   Should action be taken? What kind of action?

Case Study

The following case study demonstrates how data presentation influences the interpretation of performance measurement data for assessment purposes.

As discussed in Chapter 3, one way the radiology department measures performance is by tracking the number of outpatient X-ray exam reports it communicates to patients' doctors within 48 hours of exam completion. The department then analyzes the measurement results to identify trends, if any. A line graph (also called a *run chart*) of the number of X-ray reports not communicated to patients' doctors within 48 hours of exam completion is shown in Figure 4.2.

A graph of the total number of delayed X-ray reports over time provides limited information. The manager cannot see whether a small or large percentage of reports are delayed. A more meaningful approach would be to graph the percentage of delayed reports—the number of delayed X-ray reports divided by the total number of X-ray reports—as shown in Figure 4.3.
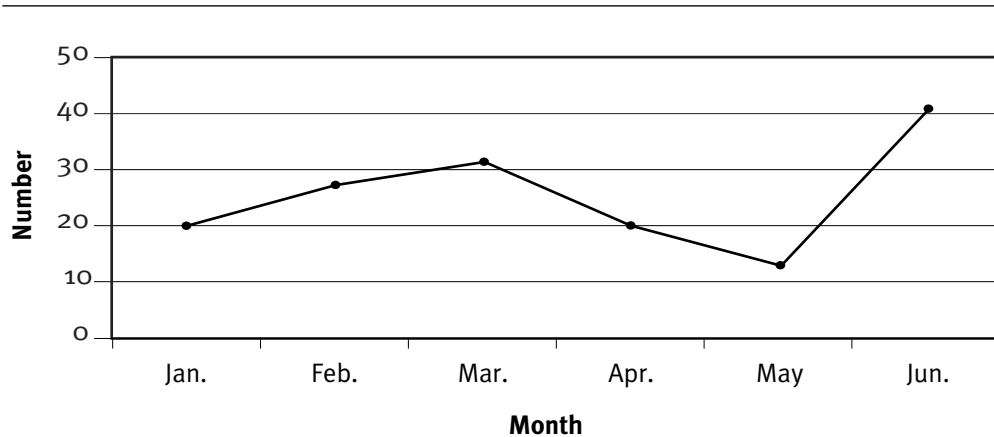
FIGURE 4.2.
Line Graph Showing Number of Outpatient X-Ray Reports Not Communicated to Doctors Within 48 Hours
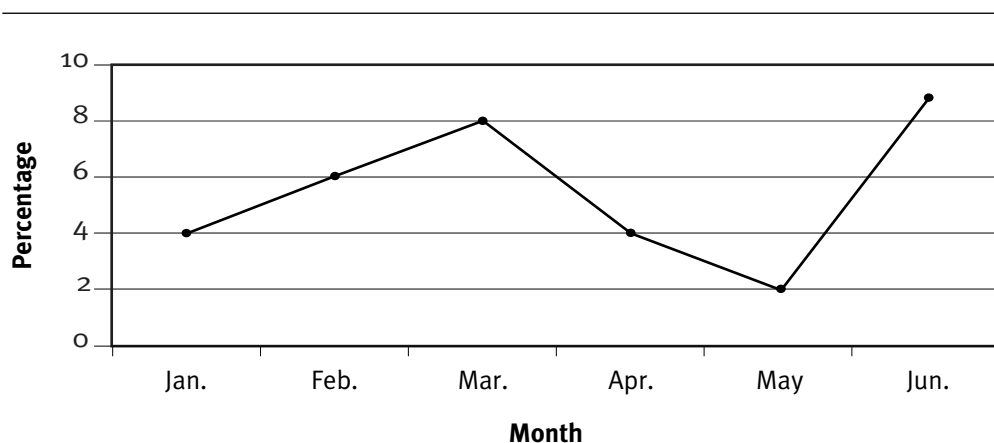
FIGURE 4.3.
Line Graph Showing Percentage of X-Ray Reports Not Communicated to Doctors Within 48 Hours

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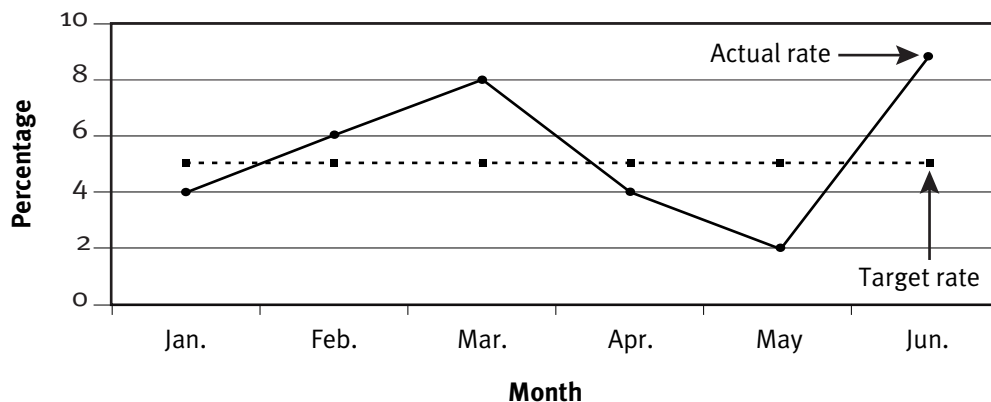
✱ LEARNING POINT
Reporting Results

Assessment involves judging or evaluating measurement data for the purpose of reaching a conclusion. The presentation of the measurement data influences its interpretation for performance assessment purposes. To display data in an understandable form, three factors must be considered: the type of data to be reported, the audience, and the information's intended use.

If the radiology manager wants all outpatient X-ray reports to be communicated to patients' doctors within 48 hours, a tabulation of the number of delayed reports may suffice to show that the performance expectation of 100 percent has not been met. However, if the radiology manager has set a target goal—for example, that no more than 5 percent of the reports will be delayed—the data shown in Figure 4.3 can be presented as a line graph that includes a target line, as shown in Figure 4.4. With this graph, the radiology manager can compare actual performance each month to the **performance expectation**.

Performance expectation
Desired performance; see also *performance goal*

4.3 SNAPSHOT REPORT FORMATS

Some performance reports provide information that represents only a snapshot of time. To create these reports, data are gathered for a certain period and summarized for analysis. Common types of snapshot report formats are tabular reports, pie charts, scatter diagrams, bar graphs, histograms, Pareto charts, and radar charts.

Tabular reports
Performance data organized in a multicolumn, multirow format

TABULAR REPORTS

Tabular reports, sometimes called *data tables*, are commonly used to display numeric data from a snapshot of time. Table 4.1 is a tabular report showing the results of a patient

Survey Questions	Mean Score N = 47	

Overall, how would you evaluate:

1. The quality of the mental health services you received	3.5
2. The helpfulness of the staff members	3.0
3. The courtesy shown you by the staff members	3.8
4. Staff's attention to privacy during treatment sessions	4.0
5. The professionalism of the staff members	3.9
6. The extent to which your mental health needs were addressed	3.6
7. The availability of appointments	3.5
8. The effectiveness of the medication and/or treatment you received	3.8
9. The degree to which staff members respected your confidentiality	4.1
10. Opportunities to participate in decisions about your treatment	3.9

Scale: 1 = Poor   2 = Fair   3 = Good   4 = Very Good   5 = Excellent

satisfaction survey a mental health clinic conducted for two months. A total of 47 patients completed the survey.

When considering tabular reports, keep the following in mind:

◆ Tabular reports are typically used to present performance information in an easy-to-read format.

◆ Audiences may have difficulty comparing findings or identifying associations in tabular reports displaying large amounts of information. For instance, if Table 4.1 listed results from 30 or more satisfaction-related questions, relationships among the lower-scoring questions would be difficult to extricate. Large amounts of data are usually better displayed in a graphic format.

Reporting performance information in the right format is critical to successful quality assessment. In some cases, performance information may be displayed more effectively in a graphic format than in a data table. Charts and graphs can be effective media for conveying information quickly and clearly. From a swift glance, most people can glean meaningful information from pie charts and bar graphs. Graphs tell the story in the data more effectively by creating a picture of the results, sometimes referred to as **data visualization**. Common graphic displays used to report performance data for snapshots of time are described in the sections that follow.

Data visualization
Communication of information clearly and effectively through graphical means

PIE CHARTS

Pie charts portray the contribution of parts to a whole. For example, suppose the mental health clinic discussed earlier does a follow-up telephone survey to tally patients' most common complaints about the clinic. The results of this onetime survey can be displayed in a pie chart, as shown in Figure 4.5.

When considering pie charts, keep the following in mind:

◆   Use pie charts to illustrate distribution or composition of a single variable. The single variable in Figure 4.5 is patient complaints.

◆   Use pie charts only for variables with mutually exclusive values (i.e., no cases are included in more than one category). In the mental health clinic telephone survey, patients could pick only one complaint, which made the categories in Figure 4.5 mutually exclusive.

◆   Avoid using pie charts for variables that have more than five categories.

FIGURE 4.5.
Pie Chart Showing Top Five Patient Complaints and Percentage of Patients Citing Each as Their Top Complaint

N = 47

No child care 9%

No appointment reminders 15%

Lack of parking 28%

Not open on Saturday 22%

Not on bus line 26%
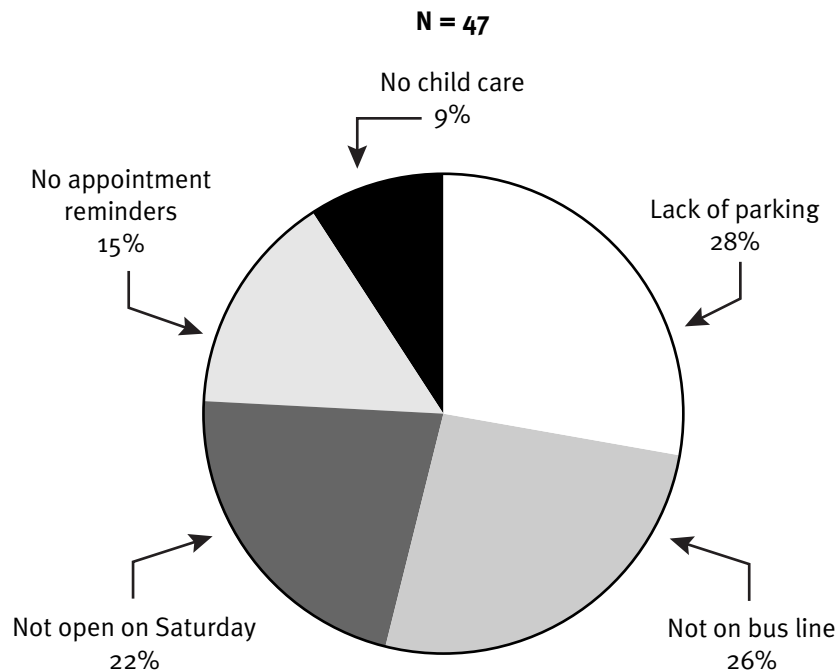
Scatter Diagrams

Scatter diagrams are tools for analyzing relationships between two variables. One variable is plotted on the **horizontal axis** (x-axis), and the other is plotted on the **vertical axis** (y-axis). The distribution of their intersecting points reveals relationship patterns, as illustrated in Figure 4.6. If one variable increases when the other increases, they are positively correlated. If one variable decreases when the other increases, they are negatively correlated. When the points appear to be forming a line, the variables are strongly correlated. The strength of the correlation is a measure of how likely something will occur between them.

Scatter diagrams are often used to dig deeper into the cause of performance problems. For example, suppose a hospital information technology (IT) department uses computer response time as a measure of performance. The manager notices a slow increase in response times and begins to investigate the cause of this performance problem. He looks at several factors and creates scatter diagrams to correlate each factor with computer response times.

Figure 4.7 is the scatter diagram the manager creates to examine the relationship between computer response time (the first variable plotted on the y-axis) and number of

Scatter diagrams
Graphs used to show the correlation between two characteristics or variables (An example of a scatter diagram is found in Figure 4.6.)

Horizontal axis
The x-axis on a graph

Vertical axis
The y-axis on a graph
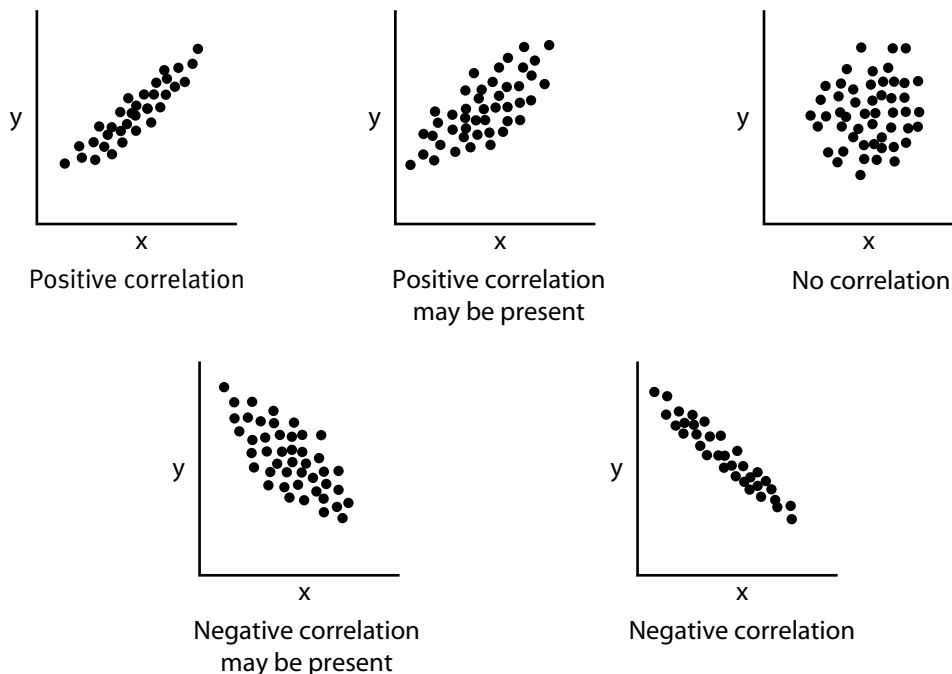
Figure 4.6.
Scatter Diagram Relationship Patterns
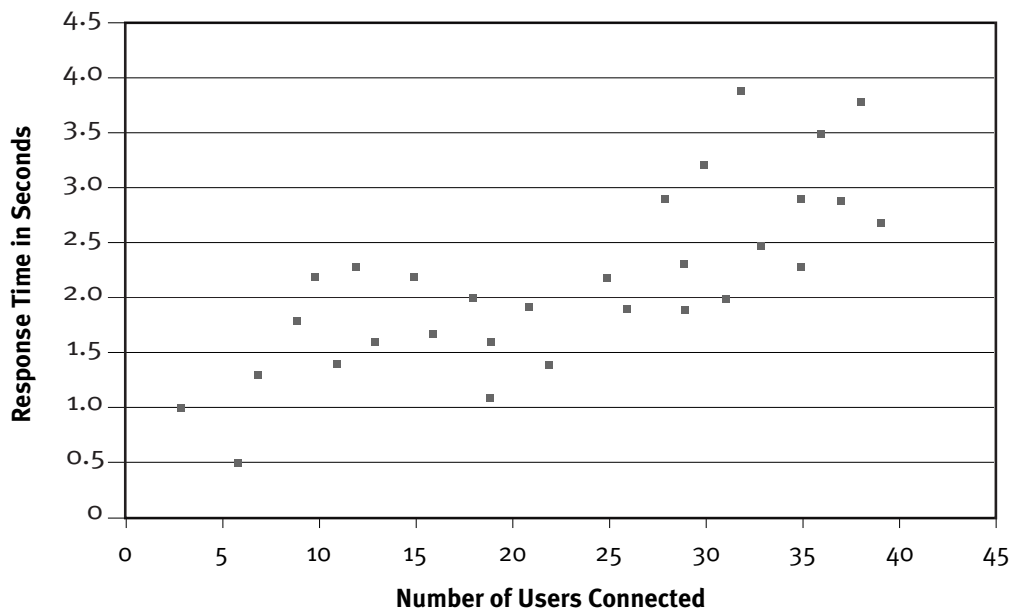
users connected to the computer network (the second variable plotted on the x-axis) for a period of 24 hours. The diagram reveals that response time increases as the number of users increases, indicating a positive cause-and-effect relationship between the two variables. Remember, however, that scatter diagrams only show relationships; they do not prove that changes in one variable cause changes in the other. Scatter diagrams provide clues that help us identify the culprit of the problem. The IT department manager will need to investigate further to confirm the relationship suggested by the scatter diagram.

When considering scatter diagrams, keep the following in mind:

◆ Use scatter diagrams to examine theories about cause-and-effect relationships. The scatter diagram in Figure 4.7 helped the IT department manager identify the causes of a performance problem.

◆ Scatter diagrams usually show one of five possible correlations between the two variables:

• *Strong positive correlation*: The value on the y-axis increases as the value on the x-axis increases.

• *Strong negative correlation*: The value on the y-axis decreases as the value on the x-axis increases.

- *Possible positive correlation*: The value on the y-axis increases slightly as the value on the x-axis increases.

- *Possible negative correlation*: The value on the y-axis decreases slightly as the value on the x-axis increases.

- *No correlation*: No connection is evident between the two variables.

Bar Graphs

Bar graphs, sometimes called *bar charts*, also can be used to display measurement data from a snapshot of time. Audiences can easily compare groups of data included in the chart and quickly assess their implications on performance. One axis of the chart shows the quality attribute being measured, and the other axis represents actual performance results. In Microsoft Excel, vertical bar graphs are called *column graphs* and horizontal bar graphs are called *bar graphs.*

Figure 4.8 is a vertical bar graph that shows average computer response times for a six-month period at each of four hospitals in a regional health system. From the graph, the hospital with the lowest average computer response time is easy to identify and response time performance among the four hospitals is easy to compare.

Bar graphs can also be presented horizontally. One advantage of horizontal bar graphs is more room on the vertical axis for labels, which is useful when the graph contains many bars or when the label descriptors are long. Figure 4.9 is a horizontal bar graph displaying the number of patient falls reported in each hospital unit during a three-month

Bar graphs
Graphs used to show the relative size of different categories of a variable, on which each category or value of the variable is represented by a bar, usually with a gap between the bars; also called *bar charts* (Examples of bar graphs are found in figures 4.8 and 4.9.)
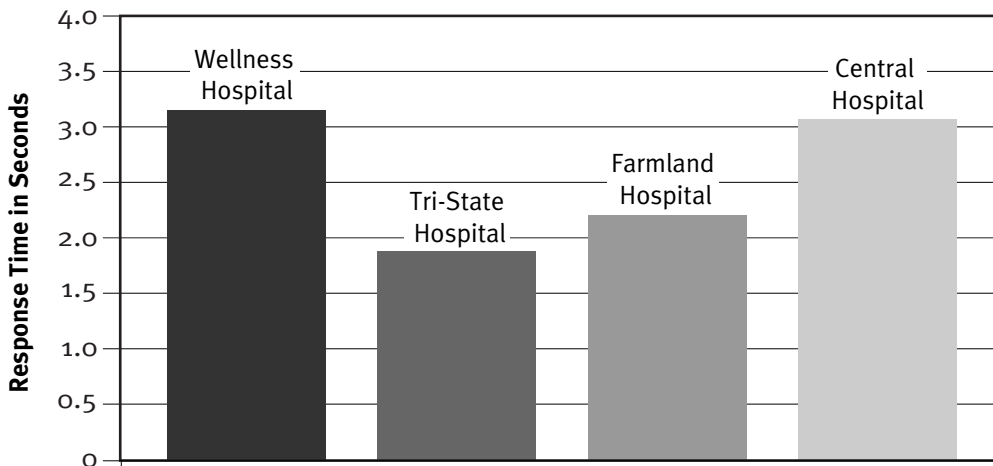
Figure 4.8.
Vertical Bar Graph Comparing Computer Response Times at Four Hospitals for a Six-Month Period
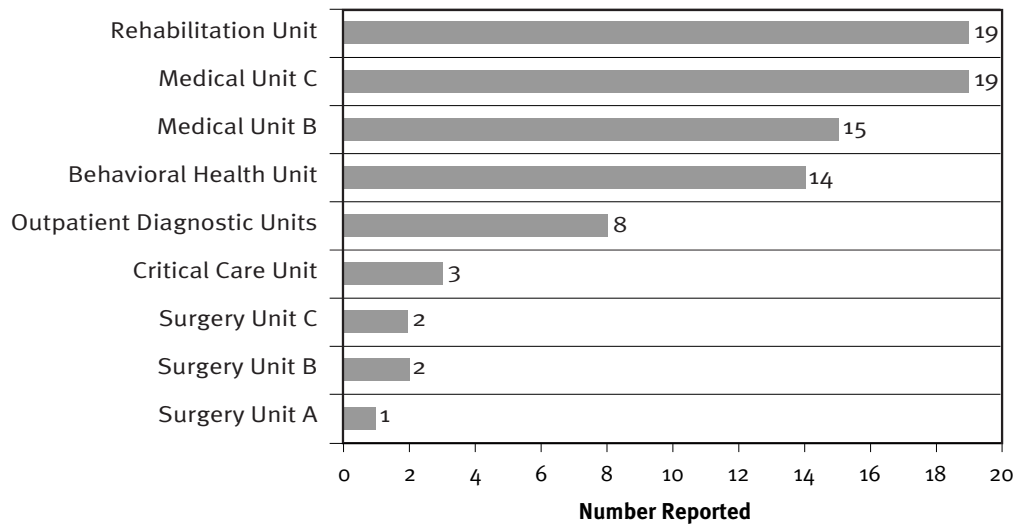
period. The bars are arranged according to length so that units reporting the most incidents are easy to identify.

When considering bar graphs, keep the following in mind:

◆   Bar graphs are an excellent way to show performance results from a snapshot of time.

◆   The height of the bar represents the frequency of that category. In Figure 4.8, the heights of the bars represent the average computer response times at each hospital.

◆   The width of the bars is not relevant, but it should be consistent.

◆   Horizontal bar charts are often used when the labels along the x-axis are too long to fit under vertical columns or a large number of bars are displayed.

Histograms

Graphs used to show the center, dispersion, and shape of the distribution of a collection of performance data (An example of a histogram is found in Figure 4.10.)

Frequency distributions

Classifications of performance data that allow comparison of the results in each category

HISTOGRAMS

Histograms, sometimes referred to as **frequency distributions**, are another type of graph used to show snapshots of performance. Histograms are bar charts that show a distribution of values in ranks along the x-axis. Figure 4.10 is a histogram illustrating the distribution of patient wait times in a clinic. Wait time data were gathered for one week, and the data were grouped into three wait time categories. The number of patients in each category is also shown.
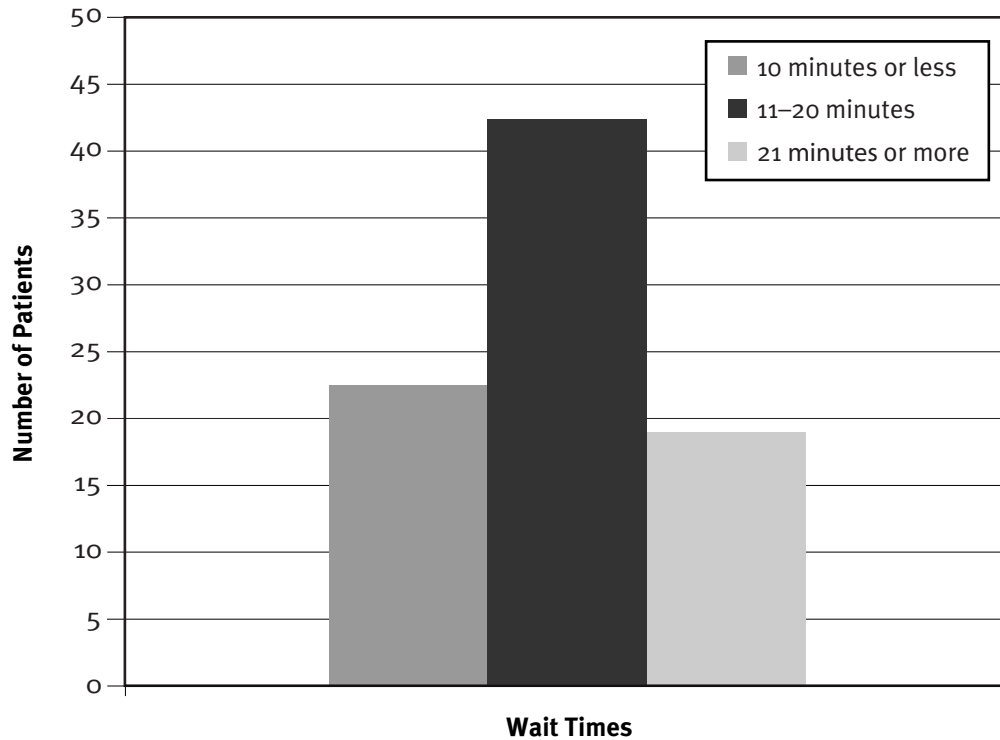
When considering histograms, keep the following in mind:

◆ Use a histogram to display distributions of a variable that can be separated into ranks, such as three-month segments of a year or age ranges.

◆ As shown in Figure 4.10, bars in a histogram should touch one another except when there are intervals along the x-axis indicating no cases in a category.

◆ A histogram is a bar graph that shows the **central tendency** and variability of a data set. It can be used to quickly and easily illustrate the distribution of performance data.

PARETO CHARTS

Pareto charts are similar to histograms, except they sort performance data in order of decreasing frequency and include other annotations (such as a cumulative percentage line) to highlight the **Pareto principle**. The Pareto principle, named after the nineteenth-century

Central tendency
A measure of the middle or expected value of a data set

Pareto charts
Graphs used to show where improvement resources should be applied by revealing the significant few problems from the trivial many

Pareto principle
An 80/20 rule of thumb

Italian economist Vilfredo Pareto, states that for many events, 80 percent of the effects come from 20 percent of the causes (Juran 1974). Joseph Juran, one of the originators of the science of quality, applied the Pareto principle to quality management. Juran advised management to concentrate improvement efforts on the "vital few" sources of problems and not be distracted by those of lesser importance (Scholtes 1992, 2–9). Pareto charts are used to identify the 20 percent of the problems (the "vital few") affecting 80 percent of performance. Resolving these problems should have the greatest impact on performance improvement.

To illustrate how a Pareto chart is used for quality assessment purposes, consider the following situation. Community Hospital starts a new practice to reduce problems related to patient misidentification. At the time of registration, patients scheduled for outpatient diagnostic tests are given an identification (ID) wristband on which their name, birth date, and record number are printed. Technicians in outpatient testing areas use the ID band information to positively identify patients before performing a test. Formerly, only patients admitted to the hospital received an ID band.

Shortly after the new process is implemented, staff members in the outpatient registration area begin to complain about it. Some employees think the ink on the bands smears easily. Others say the bands are not well made and don't always fasten securely to the patient's wrist. Rather than react to random complaints, the manager of outpatient registration decides to gather more information to thoroughly evaluate the situation. The manager asks employees to report ID band problems each time one occurs. At the end of 30 days, the manager tallies the data and creates a Pareto chart, shown in Figure 4.11.

The manager concludes from the data in Figure 4.11 that there are three main problems. A different brand of wristband would solve two of the problems. The department needs one that fastens better and has more space for the patient's identifying information. The third problem—insufficient inventory of large bands—would be solved by keeping more large bands in stock to accommodate larger patients. If these problems are resolved, complaints about ID bands should decrease by more than 80 percent.

When considering Pareto charts, keep the following in mind:

◆ Use Pareto charts to separate the few major problems (the vital few) from the many possible problems (the trivial many). Pareto charts encourage use of data, not perception, to determine which problems are most important.

◆ Arrange performance categories or problems according to their frequency (how many), not their classification (what kind). The order should descend from left to right.

◆ The right vertical axis can be used to measure the percentage of total occurrences in each category, but in some situations, the main problems may be apparent without adding a cumulative percentage trend line.
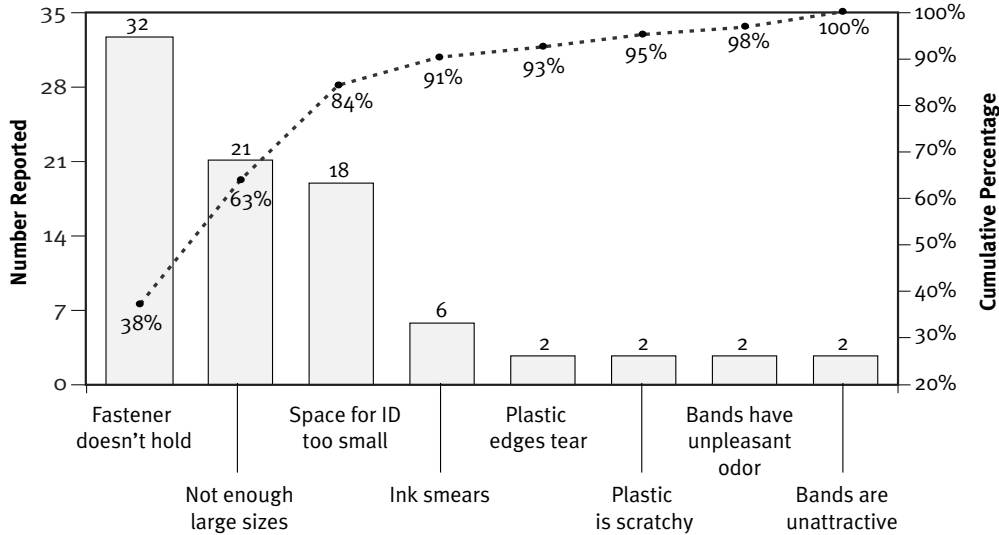
FIGURE 4.11.
Pareto Chart
Showing ID Band
Problems

Radar Charts

Radar charts are used to plot five to ten performance measures for an interval of time, along with performance expectations. Radar charts are sometimes called **spider charts** because of their shape. Figure 4.12 is a radar chart showing patient satisfaction survey results from a healthcare system. The solid line represents the actual results, and the dotted line represents the expected performance or target rates. Printing these lines in different colors makes actual versus expected performance more discernable.

When considering radar charts, keep the following in mind:

◆ Radar charts show areas of relative strength and weakness and also depict overall performance.

◆ In a radar chart, a point close to the center on any axis indicates a low value. A point near the edge is a high value. The center point of the chart in Figure 4.12 is 80 percent, and the edge is 100 percent.

◆ When interpreting a radar chart, check each axis as well as the overall shape to determine overall performance.

Radar charts
Graphs used to display the differences between actual and expected performance for several measures; also called *spider charts* or *diagrams* because of their shape

Spider charts
Graphs used to display the differences between actual and expected performance for several measures; also called *radar charts*

FIGURE 4.12.
Radar Chart
Showing Patient
Satisfaction Survey
Results
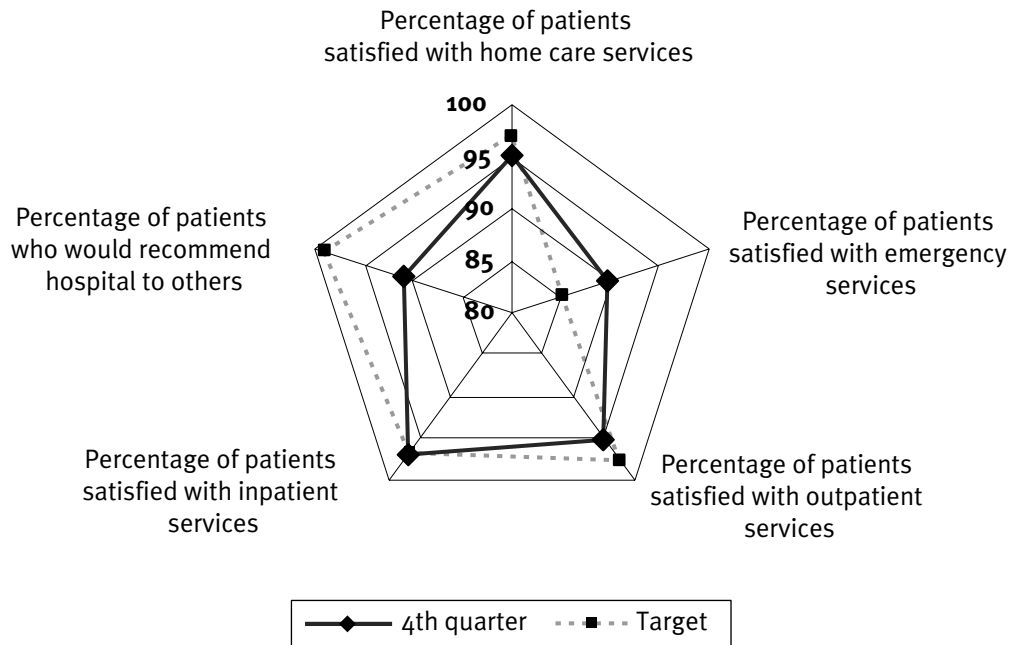
4.4 TREND REPORT FORMATS

While a report of performance from an interval of time can be helpful in some situations, decision making often requires an understanding of performance over time. Quality is a dynamic attribute, so the ability to recognize changes in **performance trends** is important. Common report formats used to display performance results from several periods are described in the sections that follow.

TABULAR REPORTS

Some of the same report formats used to present snapshots of performance data can also be used to display performance trends. Tabular reports are commonly used to display performance measurement data over time. Table 4.2 is an excerpt from a report of system-level measures prepared for the senior leaders of a home health agency. Sometimes referred to as a **dashboard**, this type of report shows a group of performance measures, results for each period, and the performance expectation, or target, for each measure.

Icons or color can be added to the data table to make performance problems more discernable. For example, measurement results not meeting expectations can be printed in red so the audience can easily pinpoint the results of greatest interest.

Performance trends
Patterns of gradual change in performance; the average or general tendency of performance data to move in a certain direction over time

Dashboard
A set of performance measures displayed in a concise manner that allows for easy interpretation

Performance Measures	Target	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
		Results			
Percentage of patients who report adequate pain control	≤90%	94%	85%	90%	92%
Percentage of patients who are admitted to an acute care hospital for at least 24 hours while a home health care patient	≥10%	7%	0.3%	5%	12%
Percentage of home health services delivered on the date scheduled	≤95%	90%	89%	92%	92%

The volume of healthcare performance measurement data is rapidly expanding. For this reason, reports must make assessment of results as easy as possible. An audience may have difficulty absorbing information, spotting patterns, identifying aberrations, and uncovering hidden relationships from a large tabular report. Graphs are usually a better choice for transforming large quantities of performance data into meaningful information. As the old saying goes, a picture is often worth a thousand words, or in this case, a thousand rows of data. Graphs used to be difficult to produce. Today, even complex graphs can be easily created with spreadsheet and graphing software.

Line Graphs

Line graphs, sometimes called **run charts**, can be used to show changes in a performance measurement over time. The case study at the start of this chapter describes the radiology department manager's use of line graphs to measure the number and percentage of outpatient X-ray reports not communicated to patients' doctors within 48 hours of their exams (figures 4.2 and 4.3). By adding a line showing the target rate, the radiology manager was able to see how performance over time compared with expectations (Figure 4.4).

One line graph can be used to report several performance measurement results. Figure 4.13 is a line graph showing the same data reported in Table 4.2. To display data effectively, line graphs should include no more than four measures. If the lines cross significantly, even four measures may be too many. If there are many measures to report, consider spreading the data over more than one graph. To clarify the values along the graph lines, you might want to include data markers. If the report identifies general performance trends, data point markers may not be necessary (see the top two measurement lines in Figure 4.13). If you wish to convey exact numeric results, they can be added to the trend line (see the bottom measurement line in Figure 4.13).

Run charts
Chronological sequences of data that include a horizontal center line; also called *line graphs*

FIGURE 4.13.

Line Graph
Showing Home
Health Agency
Performance
Measures

FIGURE 4.13.
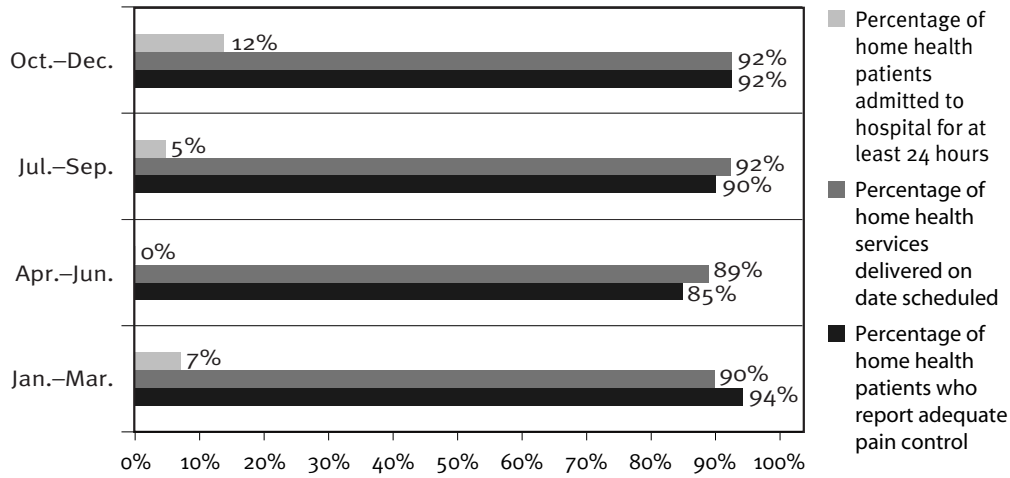Line Graph Showing Home Health Agency Performance Measures
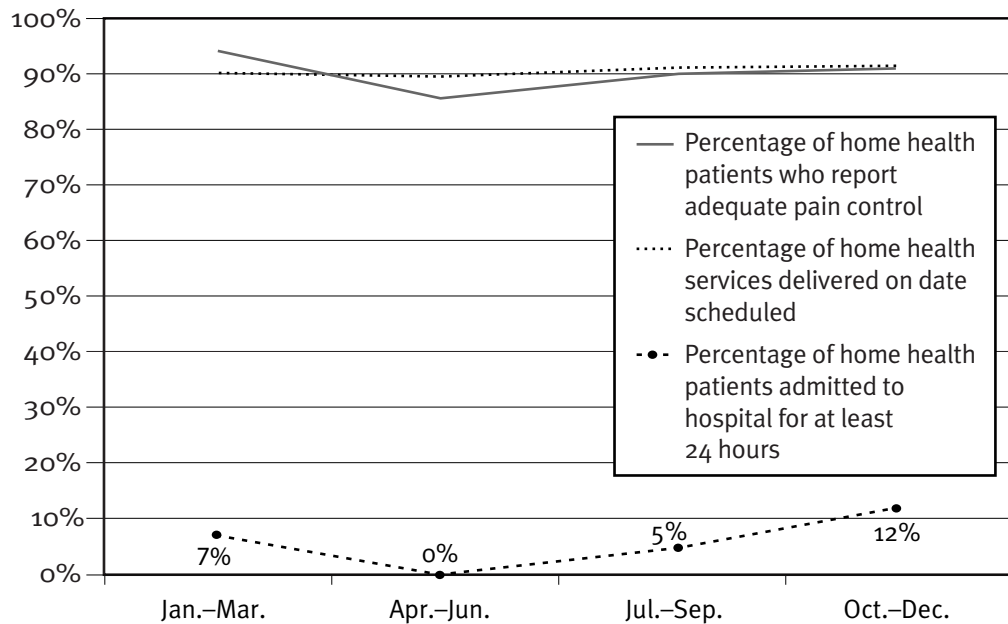
Bar Graphs

Bar graphs can be used to report a snapshot of performance and also display performance data for different periods. The same three home health agency measures shown in Table 4.2 are reported in a horizontal bar graph in Figure 4.14. This chart is called a *clustered bar graph* because it shows the relationship between three clusters of variables (the measurement results) for each of the four periods.

For analysis purposes, performance measurement results can be broken down into meaningful categories. For instance, on-time delivery of home health services could be reported by day of the week, and then the results could be compared from one quarter to the next. Figure 4.15 is a vertical bar graph showing the percentage of home health services delivered when scheduled, reported by day the service was to be provided. When the results are reported by day of the week, the home health director can better see where to focus improvement efforts.

Line graphs and bar graphs are the two most common ways to display performance data over time. For more than four periods, line graphs are usually a better choice. If the audience wants to see general performance trends, bars may work as well as lines. The two graphs can also be combined to communicate different messages. For instance, Figure 4.16 is a 12-month report of the percentage of outpatient X-ray reports not communicated to patients' doctors within 48 hours of their exams. A trend line has been added to show that the overall percentages are decreasing, even though the monthly rates fluctuate.

FIGURE 4.14.
Horizontal Clustered Bar Graph Showing Home Health Agency Performance Measures
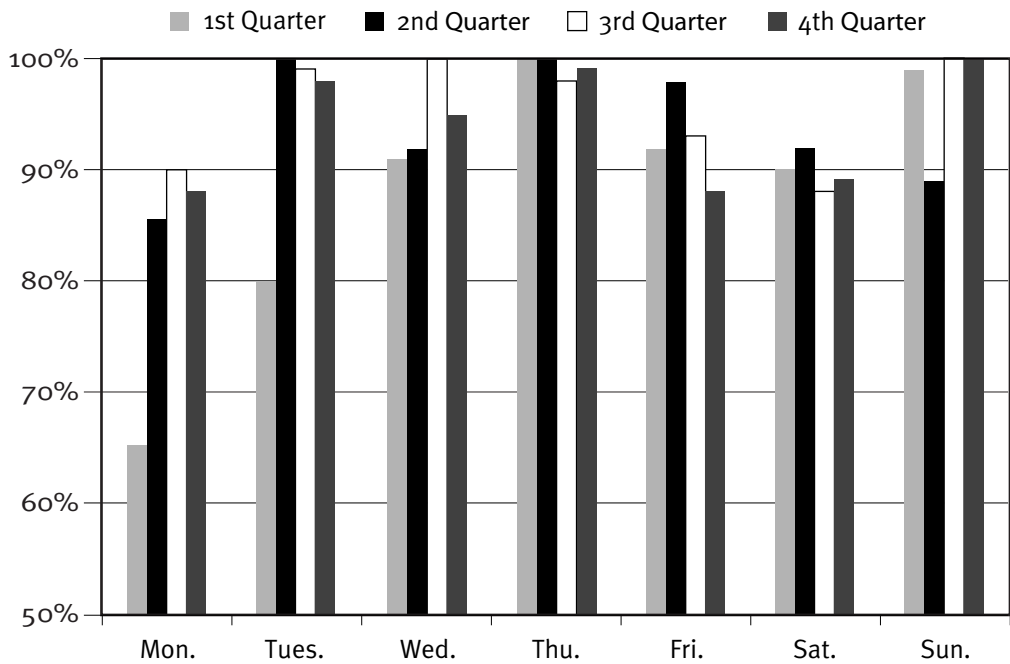
FIGURE 4.15.
Vertical Bar Graph Showing Timeliness of Home Health Service Delivery by Day of the Week

Simplicity is the key to reporting performance measurement data, whether for a single period or many. An uncluttered tabular report or graph usually conveys information more effectively. Several basic principles should be observed when displaying performance results:

FIGURE 4.16.
Bar Graph with
Performance Trend
Line: Percentage
of Outpatient
X-Ray Reports Not
Communicated
to Doctors Within
48 Hours
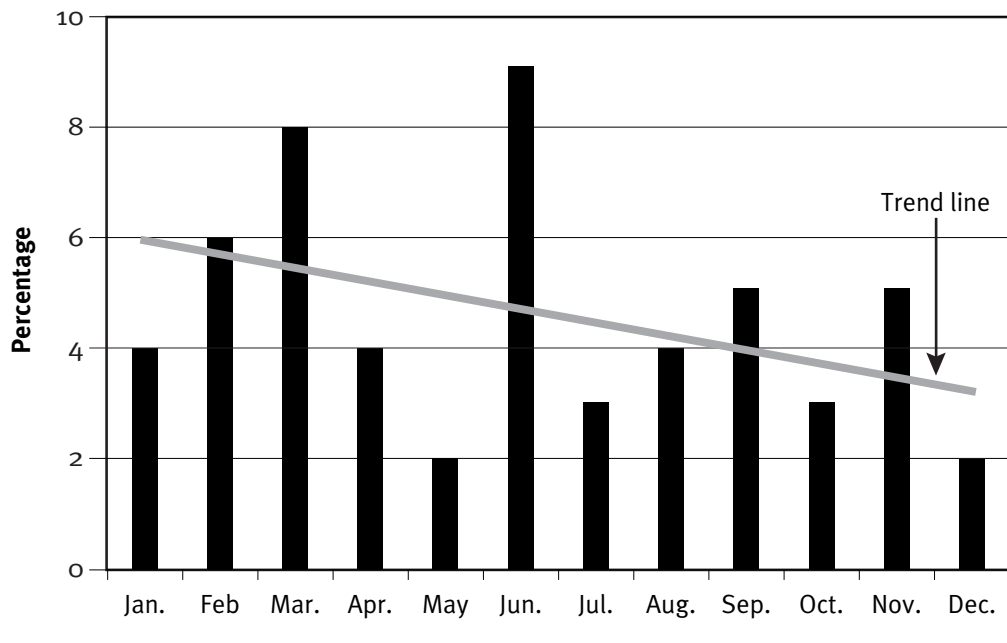
LEARNING POINT
Data Displays

Performance measurement data can be presented in many different ways. Tabular reports and bar graphs can be used to report data for a single period or several. Pie charts, scatter diagrams, histograms, Pareto charts, and radar charts are typically used to report performance data from a snapshot of time. Bar and line graphs are most commonly used to display performance data over time.

- ◆ Make sure the data are accurate and no relevant data are omitted.

- ◆ Minimize the number of measures reported in one table or graph.

- ◆ Ensure that the report is self-explanatory.

- ◆ Use clear and concise labels for the report title, period, legends, and other explanatory information.

- ◆ Use legends or keys to explain data that may be confusing or subject to misinterpretation.

- ◆ Define abbreviations and symbols.

4.5 COMPARE RESULTS TO EXPECTATIONS

Performance measures should be tied to a predefined goal or expectation. Interpretation of measurement results is meaningful only when they are associated with goals. For instance, if I set a weight-loss goal of five pounds per month, I can compare my weight-loss performance

to this goal. If I don't set a target weight, how can I interpret the numbers on my scale? Measurement without defined performance expectations doesn't contribute to quality improvement. A quote from Lewis Carroll's *Alice in Wonderland* best illustrates this concept: "'Cheshire Cat,' she [Alice] began . . . 'would you please tell me which way I ought to go from here?' 'That depends on where you want to get to,' said the cat."

Without performance expectations, performance results cannot be evaluated objectively. Consider the line graph charting hand-washing compliance in Figure 4.17. The percentage of caregivers observed washing their hands prior to patient contact has steadily increased. Does this increase represent good performance? Without knowing the facility's performance goal, all we can say is that more people are washing their hands.

The purpose of quality management is to continuously improve performance. Alice's journey through Wonderland is similar to a healthcare organization's journey of continuous improvement. Like Alice, organizations must define their destination in terms of performance expectations. For targets to be well defined, they must have the following characteristics (easily memorized using the acronym SMART):

Specific
Measurable
Achievable
Realistic
Time-bound
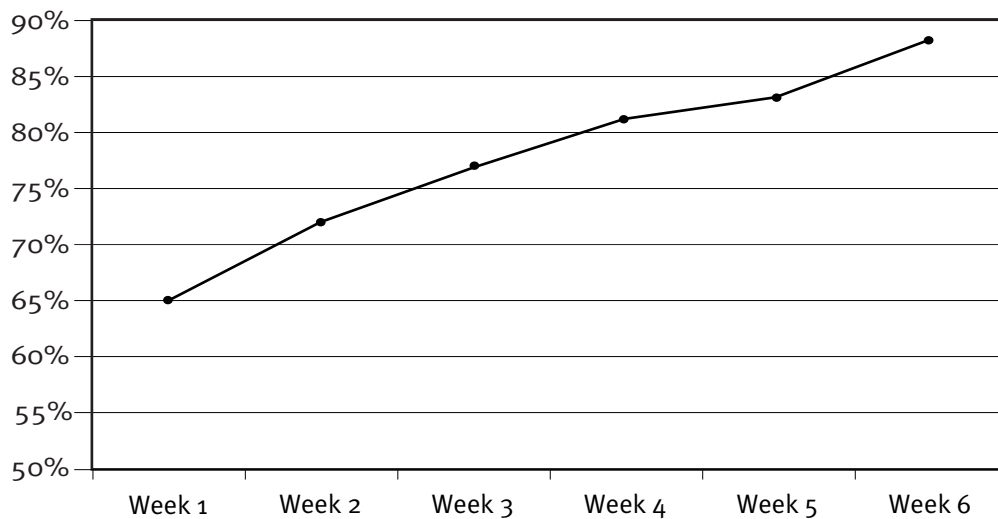
FIGURE 4.17. Line Graph Showing Percentage of People Observed Washing Their Hands

SETTING EXPECTATIONS

Performance expectations should be established for every measure. These expectations are based in part on internal quality priorities, which are often influenced by the needs of stakeholders (e.g., patients and purchasers). For example, clinic patients don't like to wait a long time in the reception area, so a clinic would want wait times to be as short as possible. Purchasers don't want to contract with a hospital that keeps patients hospitalized longer than necessary, so a hospital would want its average patient stay to be equal to or less than that of its competitors.

Government regulations and accreditation **standards** influence an organization's desired performance level. For example, the Occupational Safety and Health Administration regulations relating to employee radiation exposure state that "during any calendar quarter the dose to the whole body shall not exceed 3 rems" (U.S. Department of Labor 1974). Radiation exposure performance expectations in radiology departments are based on these regulations.

Accreditation standards are usually less absolute than government regulations and give organizations more leeway in setting performance expectations. For example, long-term care facilities accredited by The Joint Commission (2008, 246) are required to dispense medications in a timely manner to meet resident needs. The standards do not define the word *timely*. Long-term care facilities are allowed to determine what they consider as timely dispensing.

Except for healthcare services that must comply with absolute standards (such as standards found in government regulations), **performance targets** may be based on one or more of the following: (1) opinion, (2) criteria, and (3) **performance comparison**.

Opinion

Performance targets may be derived from the opinion of those affected by the measure. A determination is made regarding the acceptable or desired level of performance, which then becomes the goal. Judgment is often based on historical performance trends. For instance, the performance data illustrated in Figure 4.16 shows that the percentage of delayed X-ray reports is gradually declining (as evidenced by the trend line). If continued improvement of this process is a departmental goal, the following year the radiology manager would set an expectation that is lower than the current year's average rate. If maintaining the status quo is the goal, the radiology manager would set the same expectation for the following year.

People often question why performance targets are based on opinion rather than set at 0 or 100 percent. Is less-than-perfect performance acceptable? Arguments supporting the ideal of perfection are difficult to contest, but the law of diminishing returns must be taken into consideration when setting performance goals. This law states that a point is

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Standards
Performance expectations established by individuals or groups

Performance targets
Desired performance; see *performance goals*

Performance comparison
Examination of similarities or differences between expected and actual performance

reached in a process beyond which resources or effort put into that process will produce less and less return (Davis 2008). For example, as the number of delayed X-ray reports decreases, situations that are unusually difficult to resolve may remain. The manager must decide whether additional efforts should be directed at achieving zero report delays or whether these efforts would be better directed toward improving low performance in another area.

Criteria

Performance targets should not be based solely on opinions if relevant, professionally defined criteria are available. Professionally defined criteria are found in the standards, rules, and principles that have been developed by authoritative groups, such as clinical practice guidelines (discussed in the previous chapter), consensus statements, and position papers. Compliance with the criteria is usually considered voluntary, but organizations are encouraged to consider them when establishing expected levels of performance. For instance, the American College of Radiology (2007, 42) recommends that the final reports for procedures using fluoroscopy include documentation of the patient's radiation exposure or exposure time. This recommendation may prompt the director of radiology to set a goal of 100 percent compliance with these documentation requirements.

Organizations may have justifiable reasons for deviating from professionally defined criteria. In these situations, performance goals are set at less than 100 percent. For instance, annual retinal (eye) examinations and kidney disease screening are recommended for patients with diabetes (AACE Diabetes Mellitus Clinical Practice Guidelines Task Force 2007), but the tests may not be **appropriate** for some patients because of their age or coexisting conditions. Even when testing is appropriate, some patients may choose not to follow the recommendation. Thus, the performance target for completion of these tests could be set at less than 100 percent to account for factors that affect compliance with the guidelines.

Appropriate
Suitable for a particular person, place, or condition

Performance Comparison

Other organizations' performance is the third influence on quality targets. The use of comparative information to set performance goals is a relatively new phenomenon in healthcare. Before the mid-1980s, hospitals and other providers judged the quality of their performance primarily on the basis of internal historical trends. Organizations reviewed their current performance measurement data and compared the results to their past performance to determine whether their patient mortality rate increased or decreased over the past year, whether patient complaints decreased or increased, and so on. This internal focus has been replaced by abundant, publicly available data on many organizations' achievements. Providers can use this external data to establish internal performance expectations.

TABLE 4.3.
Online Sources
of Performance
Comparison Data

Sponsor	Description of Publicly Available Data
Agency for Healthcare Research and Quality (www.ahrq.gov/qual/measurix.htm)	The National Healthcare Quality Report includes national estimates of nearly 50 performance measures, including dimensions of healthcare quality, stages of healthcare, clinical conditions, settings of care, and access to healthcare.
Centers for Disease Control and Prevention (www.cdc.gov/ncidod/dhqp/surveillance.html)	The National Healthcare Safety Network provides information about healthcare-associated infection rates.
Centers for Medicare & Medicaid Services (CMS) (www.cms.hhs.gov)	CMS provides various performance measurement data, including patient satisfaction data, for hospitals, nursing homes, home health agencies, and dialysis facilities.
Commission on Cancer of the American College of Surgeons (www.facs.org/cancer/ncdb)	The National Cancer Database contains information on cancer care in the United States, including tumor staging and histology characteristics, type of first-course treatment administered, disease recurrence, and survival information.
Commonwealth Fund, The (www.commonwealthfund.org/snapshots)	Performance Snapshots is an authoritative online resource about health system performance related to the six aims for improving the healthcare system articulated by the Institute of Medicine.
Healthcare Cost and Utilization Project sponsored by the Agency for Healthcare Research and Quality (http://hcupnet.ahrq.gov)	The Healthcare Cost and Utilization Project includes health statistics and information on hospital inpatient and emergency department utilization.
Joint Commission, The (www.qualitycheck.org)	Quality Checks are reports on the performance of accredited organizations in key areas of patient care.
National Committee for Quality Assurance (NCQA) (http://hprc.ncqa.org)	NCQA provides health plan and managed behavioral healthcare organization performance measurement results for quality of care, access to care, and member satisfaction with health plans and doctors.

Table 4.3 is a list of online sources of comparative performance data commonly used by healthcare organizations to set performance expectations.

When relevant comparison data are not publicly available, organizations collaborate to share pertinent performance information. For example, over 1,000 acute care hospitals and other healthcare facilities throughout the United States participate in the Maryland Hospital Association's Quality Indicator Project (QIP 2007). Participants can submit data for more than 225 performance measures. In return, the facility receives a confidential report that compares its performance to that of other facilities.

Another source of comparison data is the literature. Published research studies often provide information about performance rates. Keep in mind, however, that data

from literature sources should not be blindly adopted as performance targets. For example, a 2006 study of patient falls in the medical-surgical unit of a large hospital revealed 5.75 falls per 1,000 patient days (Sherood and Good 2006). Could this fall rate be used to set a performance expectation in another hospital with a similar unit? The manager of the similar unit would need answers to several questions to ensure a valid comparison:

◆ What is the study unit's definition of *patient fall*? Do we define *patient fall* the same way?

◆ How reliably did caregivers in the study unit report patient falls? If they did not report falls consistently, would the number of patient falls have been higher if the caregivers had reported more reliably?

◆ The researchers reported the number of patient falls per 1,000 patient days. Do we use the same reporting methodology? Do we count the number of patients who have fallen, or do we count the number of falls? (Each patient could fall more than once.)

◆ Are the patients in the study population similar or dissimilar to our patient population?

◆ Are there differences between our physical environment and that of the study unit?

> **? DID YOU KNOW?**
>
> Informally, benchmarking can be defined as the practice of being humble enough to admit that someone else is better at something and wise enough to learn how to match, and even surpass, him at it. Benchmarking stems from a personal and organizational willingness to continuously improve. A vibrant sense of curiosity and a deep respect for learning are the keys to successful benchmarking and adoption of best practices.

The term *benchmarking* is typically used to describe performance comparison (e.g., "we are benchmarking against other hospitals"), but it involves more than simple comparison to other organizations. **Benchmarking** uses the level of performance achieved by an exemplary or world-class organization as the standard for comparison (Sower, Duffy, and Kohlers 2007). In other words, it functions more like a scoreboard that determines whether an organization is performing above or below standard. This standard may come from an exemplary healthcare organization or from an organization outside the healthcare industry recognized for its superior performance. For example, comparison data from a hotel, a car rental company, or an airline with an excellent check-in procedure could be used to set performance goals for the patient registration process in a hospital or a clinic.

A growing number of opportunities are emerging for healthcare organizations to compare their performance with world-class companies in other industries. One example is the American Customer Satisfaction Index (ACSI 2006), co-sponsored by the American

Benchmarking
Learning about the practices in other companies for the purpose of using them in your own organization

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LEARNING POINT
Performance Goals

Performance goals are quantifiable estimates or results expected for a given period. Performance goals are set at 100 percent for aspects of healthcare that have absolute standards. In the absence of absolute standards, performance targets are based on one or more of the following factors:

- Opinion
- Criteria
- Performance comparison

Performance goals
Operational definitions of the desired state of performance; also called *performance targets* or *expectations*

Statistical process control (SPC)
Application of statistical methods to identify and control performance

Society for Quality and the National Quality Research Center. ACSI is a survey of over 50,000 U.S. consumers who have used various products and services. An organization that participates in this survey can compare its score to that of participating competitors and companies outside its industry.

There are many aspects of healthcare services for which comparison data are not available. Whenever comparison data for a performance measurement are available, the results from other organizations (or world-class companies) should be considered when setting internal performance targets. Organizations that have achieved superior performance demonstrate the possibility that all organizations can do the same. For instance, a small number of hospitals have reportedly reduced rates of catheter-associated bacteremia and ventilator-associated pneumonia to minimal levels for sustained periods (Graves and McGowan 2008). Hopefully, their example will stimulate other hospitals to work toward achieving similarly low infection rates.

4.6 STATISTICAL PROCESS CONTROL

In addition to comparing performance to predefined goals, healthcare organizations are increasingly using **statistical process control (SPC)** to assess performance. This technique is used to highlight variations in performance that should be investigated. Variation in performance can sometimes be a bigger problem than average performance. Consider the following situation: A 450-bed urban hospital uses a centralized call center to schedule all outpatient tests, such as CT and MRI scans and blood tests. Because there are many competitors offering outpatient services in the area, callers typically do not wait on hold for a scheduler for more than 30 to 40 seconds before hanging up. Management views a lost call as lost potential business. The call center regularly measures how long callers wait on hold. The wait time performance goal is an average of 30 seconds or less. The call center meets this performance goal each month, yet many callers still hang up before a scheduler takes their call. Why? Average performance is fine; performance variation is the problem. When schedulers are busy, callers wait too long in the phone queue. Performance looks acceptable when long wait times are averaged together with short wait times. To achieve a better picture of call center performance, management should measure variation in wait times as well as average wait time performance.

Other industries use SPC to analyze variation in performance, and now healthcare organizations are applying these techniques to their measurement data. SPC concepts

and methods are primarily based on the importance of reducing **process variation** to consistently achieve desired results over time. Using SPC methods, performance data are graphically displayed and analyzed to determine whether performance is in a **state of statistical control**. When performance reaches a state of stability and the conditions/factors present at that time continue to be constant, future performance is likely to remain in the same range.

For instance, suppose that every day you plot on a line graph the number of minutes you take to run three miles. After a 30-day period, your daily run times would vary somewhat but would likely remain in a predictable range (some variation is expected in any process). At what point is your run time significantly different from the norm? To answer this question, you use data from the past 30 days to calculate the upper and lower limits of your run time norm. When you plot the current day's time on the graph, you can see whether the time lies in the normal range.

The upper and lower limits of your run time norm are based on the statistical theory of a **normal distribution**. About 68 percent of values drawn from a normal distribution are within one **standard deviation** of the mean, about 95 percent of the values are within two standard deviations, and about 99 percent lie within three standard deviations (Research Methods Knowledge Base 2006). If the upper and lower limits of your normal run time are set at three standard deviations from the mean, you have little chance of registering a run time outside of these parameters.

If your times remain stable (always lie in the normal range), your running performance is in a state of statistical control. The only way you can achieve better run times is to change something fundamental to the process (e.g., run a different route, buy new shoes). Suppose one day your run time is outside the limits of your norm. Because these limits have been statistically calculated on the basis of your past performance, you know that something unusual occurred. You'll want to identify and correct the cause of the longer time.

PERFORMANCE VARIATION

This following example illustrates how SPC is used to determine whether performance is stable (in a state of statistical control) or unstable (out of statistical control). Performance stability is evaluated by looking at the amount of variation.

While working for Western Electric Company in the 1920s, Walter Shewhart recognized that a process can contain two types of variation—one resulting from random causes and one resulting from assignable causes (Best and Neuhauser 2006). W. Edwards Deming later used the expressions **common cause variation** to describe variation resulting from random causes and **special cause variation** to describe variation resulting from assignable causes (Best and Neuhauser 2005). Common cause variation is inherent in every process (i.e., it is always present). The effect of this type of variation on performance is usually minimal and results from the regular rhythm of the process.

Process variation
Fluctuation in process output

State of statistical control
Condition where performance measurement results vary randomly within the control limits

Normal distribution
A spread of information (such as performance data) in which the most frequently occurring value is in the middle of the range and other probabilities tail off symmetrically in both directions

Standard deviation
A measure of the dispersion of a collection of values

Common cause variation
Variation in performance that does not result from a specific cause but is inherent in the process being measured

Special cause variation
Unexpected variation in performance that results from a non-random event

The different types of outpatient diagnostic tests scheduled by the hospital call center described earlier are one example of factors that can create common cause variation in a process. Each test is different, so the time required to schedule them will vary a bit. The call center manager can't change the fact that the tests are different; the differences are just part of the scheduling process and have to be considered when managing call wait time performance.

Special cause variation results from factors that aren't inherent in the process and somehow find their way into it. They infrequently affect the process, but when they do, their impact on performance can be huge. As an example, consider a part-time employee who works in the hospital's call center. Presume this employee is slower at scheduling test appointments than other schedulers. Immediately, you can deduce that the variation in the time callers wait on hold can be attributed to this employee's poor methods. This variation would happen infrequently (when the employee is working), would have a large effect on performance (more callers on hold for longer periods), and is not a normal part of the process. To eliminate this special cause variation, the employee could be dismissed or receive further training.

You'll always find some variation when you measure performance over time. During the performance assessment step, your reaction to this variation is important. Using SPC techniques, you can differentiate between common cause and special cause variation. Suppose you take an average of 29 minutes to run three miles. One day, you take 37 minutes. Does this longer time indicate a special cause variation that should be investigated and eliminated, or does it indicate a common cause variation that does not need to be investigated and eliminated?

One aspect of quality management first articulated by Shewhart (1925) is a phenomenon known as **tampering**. Tampering occurs when something is done in reaction to a performance result without knowing whether the result was caused by natural variation in the process or something unusual. Process changes made in response to an instance of undesirable performance—when it's just normal performance variance—can make things worse.

⊛ **LEARNING POINT**
Performance Variation

Statistical process control (SPC) is used to judge the extent of performance variation and its causes. Common cause variation results from random causes, and special cause variation results from assignable causes. Some variation is always present when performance is measured over time. During the performance assessment step, knowing what type of variation is occurring and how to react to it are important.

Tampering
Doing something in reaction to a particular performance result without knowing whether it is caused by natural variation or something unusual

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SPC Tools

Line graphs and control charts are commonly used SPC tools. Variations in performance data plotted on these graphs are easy to interpret. There are a few basic rules to remember when identifying common cause variation (the process is considered stable) and special cause variation (the process is considered unstable).

Line Graph

SPC techniques can be applied to data displayed in a line graph without calculating upper and lower limits of the normal range. Only the average or mean of the data is calculated and displayed as a center line on the graph. Ideally, the line graph should have a minimum of 15 data points; some statisticians suggest a minimum of 20 data points (Woodall 2000). Performance results plotted on the graph are compared to the center line to locate significant performance shifts or trends. A shift or trend represents potentially unstable performance that needs to be investigated.

A significant shift in performance is evident when one of the following situations occurs:

◆ Seven consecutive data points appear above or below the center line on a line graph with less than 20 data points (ignore data points that fall on the center line).

◆ Eight consecutive data points appear above or below the center line on a line graph with 20 or more data points (ignore data points that fall on the center line).

A significant performance trend is evident when one of the following situations occurs:

◆ Seven consecutive data points move steadily upward or downward on a line graph with less than 20 data points (points may fall on or cross the center line).

◆ Eight consecutive data points move steadily upward or downward on a line graph with 20 or more data points (points may fall on or cross the center line).

The line graph of clinic wait time data shown in Figure 4.18 illustrates how this SPC technique is applied during performance assessment. Starting at week 10, the wait time slightly increases. By week 16, the wait time has increased seven consecutive times—a signal that the upward trend is likely to continue. Like unusual shifts in performance, trends should be investigated.

Control Chart

A line graph that contains a mean line and upper and lower limits of the normal range (known as **control limits**) is called a statistical **control chart**. Developed by Shewhart (1925) in 1924, it has become a primary tool of modern performance assessment. A set of observations (such as your run times for 30 days) is plotted on the control chart along with the mean line (called the center line [CL]), the upper limit of the normal range (called the **upper control limit** [UCL]), and the lower limit of the normal range (called the **lower control limit** [LCL]). The CL almost always represents the arithmetic mean

Control limits
Lines that define the area (set at one, two, or three standard deviations) on either side of the centerline, or mean, of data plotted on a control chart (Control limits reflect expected variation in the data.)

Control chart
A line graph that includes statistically calculated upper and lower control limits (Examples of control charts are found in figures 4.19–4.22.)

*Upper control limit*
Three standard deviations upward from the mean performance (For normally distributed performance results, 99.7 percent should lie between the upper and lower control limits.)

Line Graph of
Clinic Wait Time
Data Displaying a
Significant Trend
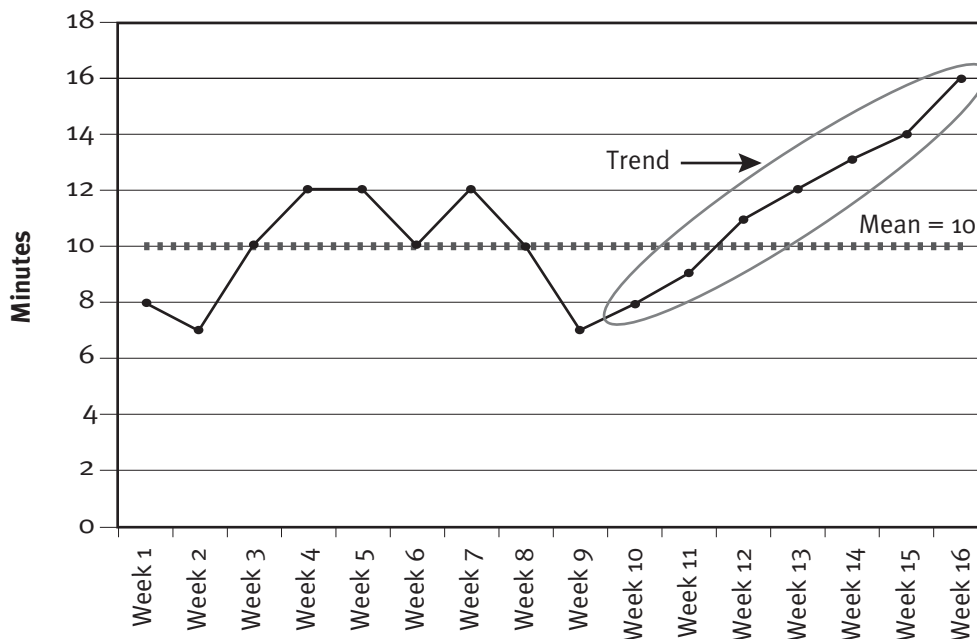
Lower control limit

Three standard devia-
tions downward from
the mean performance
(For normally distrib-
uted performance
results, 99.7 percent
should lie between the
upper and lower con-
trol limits.)

of the data. Shewhart recommended that control limits be set at plus and minus three standard deviations from the mean (Nelson 2003). In situations where performance variation must be kept to a minimum, control limits may be set at plus and minus two or even one standard deviation from the mean.

Figure 4.19 is a control chart showing your hypothetical three-mile run times for a 30-day period. The run times for each day are different, but these differences are normal process variation (common cause variation) because the times are within the statistically calculated upper and lower control limits. Thus, according to the data in Figure 4.19, your performance is in a state of statistical control, meaning your performance is stable and will likely remain within the control limits unless something about the running process changes.

When performance data are displayed on a control chart with statistically calculated upper and lower control limits, the type of variation (common cause or special cause) prompting the changes in performance is easy to determine. Figure 4.20 is a control chart showing performance data from a hospital billing office. Each month, the office counts the number of insurance claims rejected because of incomplete information. The billing office manager has set a performance goal of no more than 60 rejections per month. Some months this target is exceeded, but the manager knows the increases result from common cause variation because the number of rejected claims is not higher than the upper control limit.
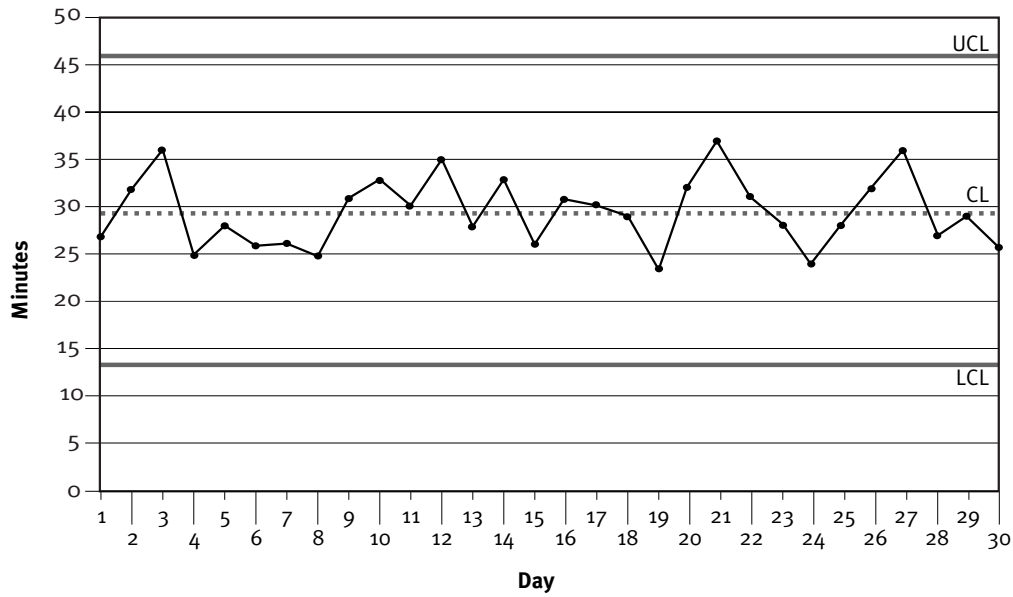
FIGURE 4.19.
Control Chart of
Three-Mile Run
Times
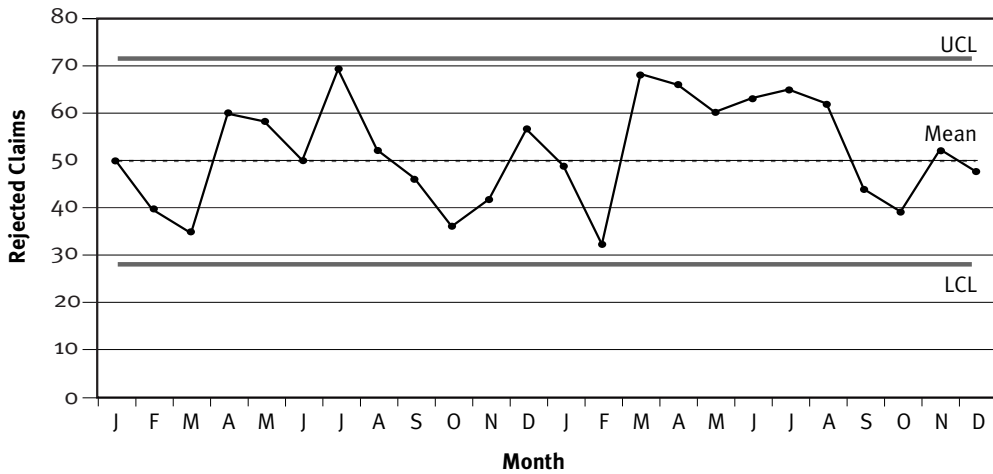
FIGURE 4.20.
Control Chart
of Number of
Rejected Insurance
Claims—Process in
Control

Because performance is in a state of statistical control, the manager knows that the number of rejected claims will eventually decline and that changes to the process are not necessary. Tampering with what appears to be a stable process could make performance worse.

Figure 4.21 is a similar report of rejected insurance claims. Like the previous example, the performance target of no more than 60 rejections per month is exceeded in some months, but in two of these months, the number of rejections is greater than the upper control limit. This increase signals that something unusual—a special cause variation—occurred in those months. When the manager sees that the performance target for that month has been exceeded *and* sees evidence of special cause variation, further investigation is needed. For example, the manager may find that two new employees were not properly trained in April. Training is provided, and the number of rejected claims declines in May. The following March, the number of rejected claims again exceeds the upper control limit—a signal of special cause variation. In early April, the manager investigates and discovers that in mid-March, an insurance company changed its claim submission requirements without notifying the hospital. The situation returned to normal, and as shown by the graph in Figure 4.21, the number of insurance claim rejections in April is again in a state of statistical control.

Control charts are also useful for assessing the impact of performance improvement activities. Suppose the hospital billing office manager changes the performance target for rejected insurance claims from no more than 60 rejections per month to no more than 40 rejections per month. To achieve this goal, employees in the billing office are trained in January to use new claims management software that is electronically linked to the hospital's computerized patient record system. In March, the manager again begins to plot the number of claim rejections each month on a control chart. The center line and upper and lower control limits are recalculated to reflect the lower target. Figure 4.22 shows

FIGURE 4.21.
Control Chart
of Number of
Rejected Insurance
Claims—Process
Not in Control
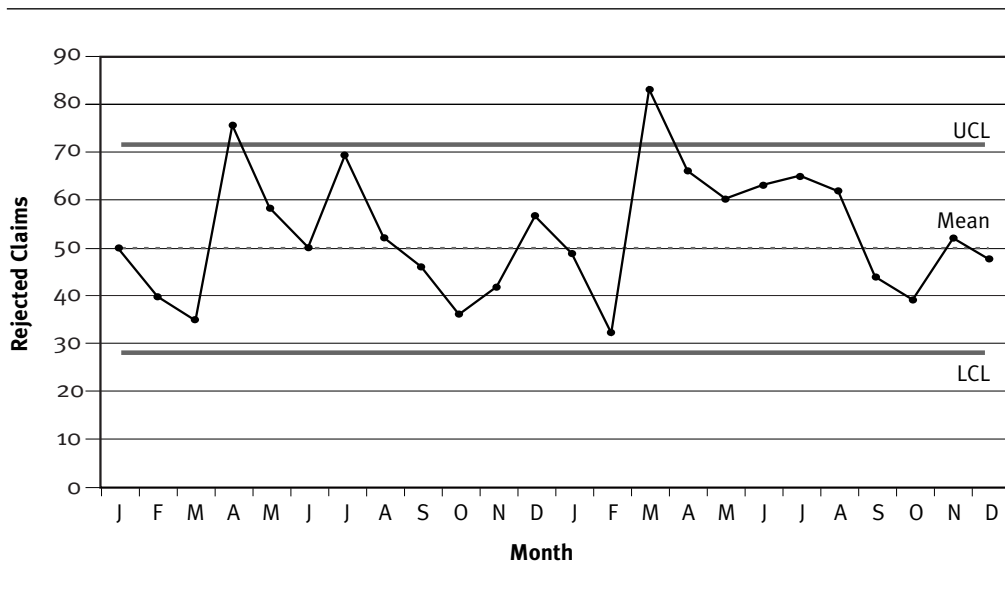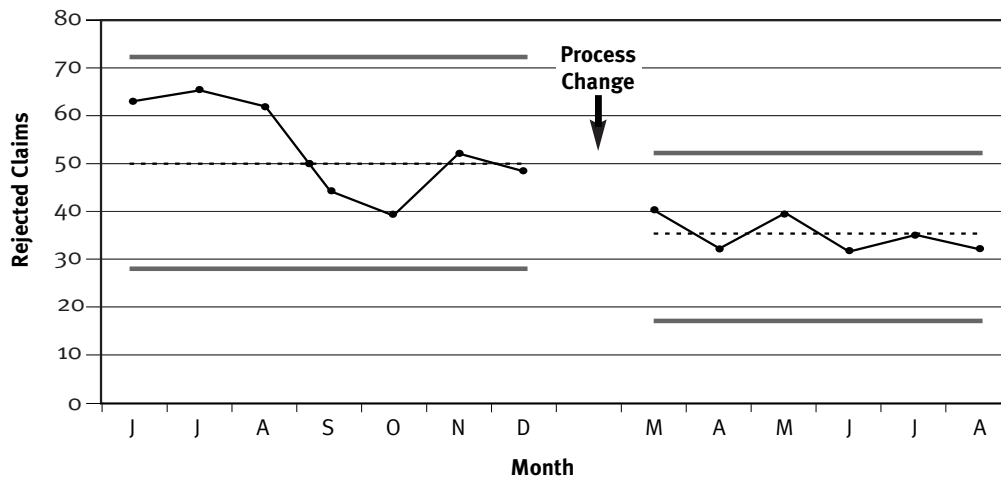
FIGURE 4.22.
Control Chart
of Number
of Rejected
Insurance Claims—
Improvement
Following Process
Change

the performance results from six months prior to the process change and the results following the process change. Not only has the number of claim rejections gone down; performance has also remained in control. The data prove the improvement initiative was successful.

There are several types of control charts (customarily denoted by various letters such as np, p, c, u, $\bar{X}$, and S) appropriate for different situations (Mohammed, Worthington, and Woodall 2008). Selecting the right chart requires an understanding of the type of performance measurement data that will be plotted on the chart. Additional resources on constructing and interpreting control charts appear at the end of this chapter.

4.7 DETERMINE NEED FOR ACTION

In the final phase of performance assessment, the need for further action is decided. At this

> **⊛ LEARNING POINT**
> Statistical Process Control
>
> SPC concepts, techniques, and tools (usually line graphs and control charts) are used to distinguish between common cause and special cause variations in performance. Common cause variation is the result of normal performance fluctuations. If staff consistently follows the same procedures and all else remains unchanged, performance rates will likely exhibit only common cause variation. Unnecessary adjustments made to a process in response to common cause variation could make performance worse. If something unnatural occurs, performance rates will show signs of special cause variation. Special cause variation should be investigated and the problem inducing atypical performance should be fixed.

point, the measurement results have been reported and performance is evident. If measurement data are displayed in a control chart, the extent of performance variation is also

apparent. Any of the following situations might signal the need to advance to the next step—performance improvement.

◆   Performance does not meet expectations; there are no signs of special cause variation.

◆   Performance meets expectations; there are signs of special cause variation.

◆   Performance does not meet expectations; there are signs of special cause variation.

If none of the above situations exists, further investigation is unnecessary. Performance measurement should continue to ensure results don't change. Sustained good performance should be celebrated with staff.

Some opportunities for improvement cannot be acted on immediately. Improvement projects are resource intensive, and an organization's leaders often need to set improvement priorities. Questions to consider when selecting topics for improvement include—but are not limited to—the following (Spath 2005, 191):

◆   Does the issue relate to one of the organization's high-priority improvement goals?

◆   Does the issue pose a substantial risk to the safety of patients or staff?

◆   Will the organization receive substantial negative publicity or loss of license or accreditation if the concern is not addressed?

◆   If the improvement project is not executed, will staff and physician morale deteriorate or will they lose trust in leadership's commitment to quality patient care?

Performance gap
The difference between actual and expected performance

After an organization decides to advance to the performance improvement step, the people involved in the processes affecting performance investigate the problem causing the difference between actual and expected performance (i.e., the **performance gap**). Once the underlying causes are well understood, effective improvement interventions can be designed and implemented. The steps involved in performance improvement are covered in the next chapter.

CONCLUSION

Performance assessment is the evaluation stage of quality management. Measurement data are reported and analyzed in this stage. The purpose of assessment is to determine whether improvement opportunities exist. Performance measurement data can be judged

by comparing results to internally set performance expectations, comparing results to the achievements of other facilities, or determining whether performance is in a state of statistical control. When a gap between expected and actual performance exists or performance is unstable, further investigation is needed to determine the cause. Investigation of the cause is the starting point of performance improvement.

STUDENT DISCUSSION QUESTIONS

1. The CMS Hospital Compare website (www.hospitalcompare.hhs.gov) allows you to compare performance at hospitals throughout the United States. Go to this site and search for hospitals within 100 miles of your location. Which hospitals rate highest in each of the following measurement categories?

    •   Process of care measures

    •   Outcome of care measures

    •   Patients' hospital experiences

2. Explore the CMS Hospital Compare website and review the data for each measurement category. Which performance measures in these categories are most important to consumers of healthcare services? Which performance measures are least important to consumers? Are consumers using the data on the CMS Hospital Compare website to select a hospital? What other factors might influence consumer choice?

3. The Joint Commission Quality Check website (www.qualitycheck.org) provides performance ratings for accredited organizations. Go to this site and look up the hospitals ranked high in performance on the CMS Hospital Compare website. Are the ratings on The Joint Commission's site similar to those reported on the CMS site? Are there differences? Which website provides the most detailed information about performance at the hospitals? Which website is easiest for consumers to use for performance assessment purposes?

WEBSITES

•   Association for Benchmarking in Health Care
    www.abhc.org

- Joint Commission Quality Check
  www.qualitycheck.org
- Maryland Hospital Association Quality Indicator Project
  www.qiproject.org
- Medicare
  www.medicare.gov
- National Association for Quality Assurance Health Plan Report Card
  www.reportcard.ncqa.org

SPC Resources

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CHAPTER 5

CONTINUOUS IMPROVEMENT

LEARNING OBJECTIVES

After reading this chapter, the reader will be able to

➤ explain the purpose of a systematic approach to improving performance,

➤ discuss common performance improvement models,

➤ recognize the similarities and differences among improvement models, and

➤ demonstrate an understanding of the steps in a performance improvement project.

KEY WORDS

➤ Analytic tools

➤ Continuous improvement

➤ Corrective action plan

➤ FADE model

➤ FOCUS-PDCA model

➤ Improvement project

➤ Improvement team

➤ Lean

➤ Lean principles

➤ Muda

➤ Opportunity for improvement

➤ Performance improvement models

➤ Plan-Do-Check-Act (PDCA) cycle

➤ Plan-Do-Study-Act (PDSA) cycle

➤ Process capability

➤ Process diagram

➤ Quality improvement organizations

➤ Rapid cycle improvement (RCI)

➤ Root causes

➤ Six Sigma

➤ Six Sigma quality

➤ Systematic

Performance improvement is the last phase of quality management. Once an **opportunity for improvement** has been identified, something must be done to find and fix the cause of unfavorable performance. Some performance problems can be resolved quickly, such as the two special cause variations in the example about rejected insurance claims in Chapter 4. Other problems require more in-depth evaluation of the complex factors affecting performance. In these situations, a team is formed to carry out an improvement project. This **improvement team** comprises people most familiar with the processes under review. To improve performance, the team must understand the problem and necessary changes.

During an **improvement project**, all factors affecting performance are closely examined. Before changing the process, the improvement team must discover where, when, and why problems occur so that effective solutions can be implemented. To do so, the team uses **analytic tools** to scrutinize the process and select interventions that will produce successful results.

5.1 Improvement in Quality Management

As shown in Figure 5.1, the improvement phase follows performance assessment. Once improvements are implemented, the quality management cycle begins again. The results of process changes are measured and analyzed to determine whether they fixed the performance problem.

Organizations have a finite amount of time, money, and resources to allocate to improvement projects, so they cannot work on improving all processes at once. Two factors influence the decision to initiate an improvement project: the results of performance assessment and improvement priorities. Improvement projects may be initiated when measurement data reveal a gap between expected and actual performance. Improvement projects may also be initiated for other reasons. The following case study describes an improvement project initiated in response to employees' complaints that department meetings are a waste of time.

Case Study

Sunrise Home Health Agency holds monthly meetings with clinical staff who visit patients in their homes. These staff members spend two hours of their busy day attending department meetings, not counting their travel time. The agency director hears staff complaining that the meetings are a waste of time. The director finds the meetings a worthwhile way to share agency news and isn't sure how to make the meetings more valuable to employees. At the next meeting, the director starts a project to improve the value of staff meetings.

At the start of the improvement project, the director states the goal—to improve the value of staff meetings—and the discussion ground rules: All staff members' views are

Opportunity for improvement
A problem or performance failure

Improvement team
A group of individuals who work together to accomplish an improvement objective

Improvement project
An initiative set up to achieve a performance improvement objective within a certain time frame
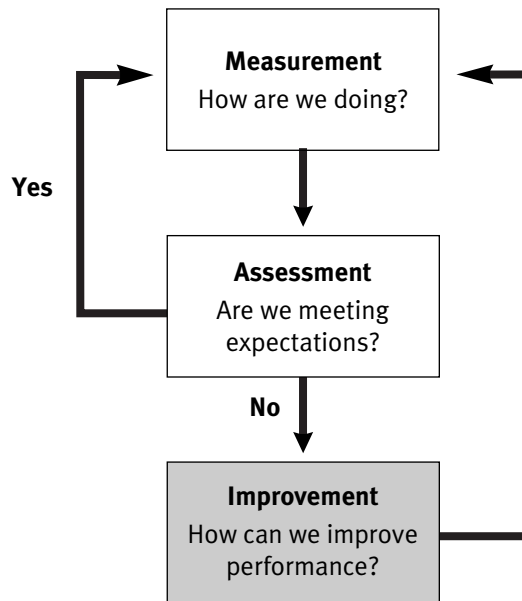
Analytic tools
Qualitative (language) and quantitative (numeric) tools used during an improvement project; often called *quality improvement tools*

important, all ideas will be heard, and all opinions will be valued. The director wants to have an honest discussion and reinforces that everyone should feel comfortable voicing his or her opinions and ideas.

At the first meeting, each person is asked to voice a complaint. The director lists these concerns on a flip chart and then summarizes them:

◆ Meeting agendas are not defined.

◆ Meetings usually don't start on time.

◆ The director rarely asks staff for input on problems.

◆ Problems brought up during meetings are sometimes left unresolved.

◆ Late afternoon is an inconvenient time for meetings.

◆ Meetings should be canceled when there is nothing important to discuss.

◆ Meetings often turn into gripe sessions and accomplish nothing.

◆ Meeting minutes aren't available for staff members unable to attend.

◆ The medical director doesn't attend all the meetings.

◆ Meetings last too long.

Staff members are asked to vote for their top three complaints. The following complaints receive the most votes:

◆ Meetings usually don't start on time.

◆ Late afternoon is an inconvenient time for meetings.

◆ Meetings often turn into gripe sessions and accomplish nothing.

To delve into the cause of these complaints, the director asks the group to answer questions about each concern. Why don't meetings start on time? Why was late afternoon originally chosen as the meeting time? Why can't the meetings be held at a different time? Why do meetings turn into gripe sessions? Answers to these questions help everyone understand why they do not find staff meetings valuable. The director asks the staff members to come up with innovative, unconventional ways to eliminate these complaints.

The group reconvenes the next month to share ideas. Some are inventive. For example, two staff members suggest holding virtual meetings and provide some names of free online meeting services. As for starting meetings on time, the director acknowledges that many people (including himself) are habitually five to ten minutes late.

> **⊛ LEARNING POINT**
> Improvement Projects
>
> Performance improvement projects are initiated when measurement data reveal a gap between expected and actual performance. Projects also may be initiated for other reasons. Improvement project teams include people most familiar with the process under review.

The director suggests that meetings start at the scheduled time even if some people have not arrived. A staff member proposes that meetings be held at noon. To encourage people to attend, the agency could provide lunch. Everyone agrees that a meeting agenda will prevent the discussions from deteriorating into gripe sessions. Two employees recommend that staff be encouraged to submit agenda items.

The director lists the ideas on a flip chart, and the group selects the recommendations most likely to eliminate the top three complaints. The idea of virtual online meetings receives the most support; however, the director points out that this change requires more investigation prior to implementation. He suggests trying the second choice—holding meetings at noon and providing lunch—because it can be implemented right away. The group also decides to make two other changes: Everyone will be asked to submit a topic

for the next meeting agenda. The final agenda will be distributed three days before each meeting, and all meetings will start promptly. In three months, the director will survey the staff to determine whether these changes have made a difference. He will also share information on the virtual online meeting options he will have researched.

5.2 PERFORMANCE IMPROVEMENT STEPS

Systematic
Conducted using step-by-step procedures

Performance improvement projects should be **systematic**. Without a defined process, chaos is likely to ensue and the improvement team might not achieve desired results. A methodical improvement process has several benefits:

◆ Performance problems are permanently solved. The goal of performance improvement is to prevent problems from recurring, not just clean up the mess after something undesirable happens.

◆ Work life quality improves. Performance problems are an annoyance for everyone because they create additional work. People perform better when processes run smoothly.

◆ Communication among employees and managers improves. To solve problems, people from different levels of the organization and from different work groups must work together.

LEARNING POINT
Improvement Project Steps

Opportunities for better performance trigger improvement projects. A typical project incorporates four steps:

1. Define the improvement goal.
2. Analyze current practices.
3. Design and implement improvements.
4. Measure success.

A systematic performance improvement process not only solves problems. People also acquire new habits that help the organization run more smoothly and effectively.

Performance improvement models
Systematic processes used to conduct improvement projects

Over the years, several systematic **performance improvement models** have been created for use in healthcare as well as other industries. All these models incorporate similar steps:

1. Define the improvement goal.
2. Analyze current practices.
3. Design and implement improvements.
4. Measure success.

Primary questions improvement teams should address during a typical project and their corresponding steps appear in Figure 5.2. These questions help project teams focus on the improvement goal. Note that the goal of all typical projects is continuous improve-

STEP 1	STEP 2	STEP 3	STEP 4
How does the process work now?	What can be improved?	How do we improve it?	How do we measure and track performance?
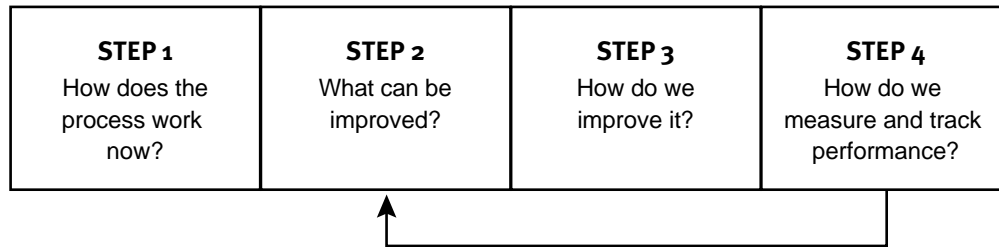
ment. After completing step 4, teams continue to measure performance (step 2) to identify further improvement opportunities. Performance improvement models most commonly used for healthcare improvement projects are described in the sections that follow.

PLAN-DO-STUDY-ACT CYCLE

Walter Shewhart, who developed the concepts and techniques of statistical process control, was one of the first quality experts to discuss a systematic model for continuous improvement. In his book *Statistical Method from the Viewpoint of Quality Control*, published in 1939, he referred to this model as the **Plan-Do-Check-Act (PDCA) cycle** (Best and Neuhauser 2006). Another renowned statistician, W. Edwards Deming, went to Japan as part of the allied occupation after World War II to teach the Japanese industrial quality improvement methods such as statistical process control and systematic process improvement (Best and Neuhauser 2005). Deming modified Shewhart's original model and renamed it the **Plan-Do-Study-Act (PDSA) cycle**. PDSA is the most widely recognized improvement process today (see Figure 5.3). To ensure **continuous improvement**, the steps perpetually cycle and repeat. PDSA is also referred to as its predecessor, PDCA; the *Deming* or *Shewhart model*; and *rapid cycle improvement*. The steps of each phase of the PDSA cycle are described in the sections that follow.

Plan

- ◆ State the objectives of the improvement project.

- ◆ Determine needed improvements.

- ◆ Design process changes to achieve the improvement objectives.

- ◆ Develop a plan to carry out the changes (define who, what, when, and where).

- ◆ Identify data that need to be collected to determine whether changes produced desired results.

Plan-Do-Check-Act (PDCA) cycle
The Shewhart performance improvement model

Plan-Do-Study-Act (PDSA) cycle
The Deming performance improvement model (An example of a PDSA improvement project is found in Table 5.1.)

Continuous improvement
Analyzing performance of various processes and improving them repeatedly to achieve quality objectives
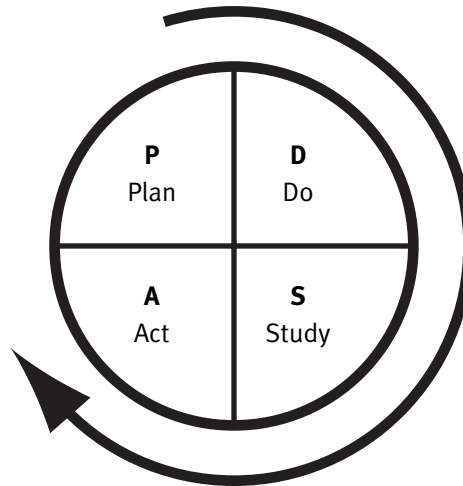
Do

◆   Implement the changes on a small scale.

◆   Document problems and unexpected events.

◆   Gather data to assess the changes' effect on the process.

Study

◆   Analyze data to determine whether the changes were effective.

◆   Compare results with expectations.

◆   Summarize lessons learned during and after implementation of the changes.

Act

◆   If changes were not successful, repeat the PDSA cycle.

◆   If changes were successful, or partially successful, modify them as necessary and implement them on a wider scale.

◆   Predict results.

Each repetition of the PDSA cycle provides greater insight into the problem. This information becomes the basis for continuous improvement. The improvement team learns from its successes and failures and uses this knowledge to plan the next process change.

Summary of a PDSA improvement project appears in Table 5.1. The purpose of the project is to ensure that patients discharged from the hospital know which medications they will continue taking at home, how often they must take the medications, and the side effects they may experience. The hospital initiated the project in response to complaints from former patients and family members about inadequate medication instructions.

		TABLE 5.1.
Plan	**Objective:** To improve patient knowledge of medications to be taken after discharge from the hospital	PDSA Improvement Project
	Plan: Pharmacists will meet with patients within 24 hours prior to hospital discharge to review medications, including the purpose of each medication, how to take the medication and how often, and medication side effects. Completion of this education session will be documented in patients' records.	
	Expected result: Patients will understand medications to be taken at home.	
	Measures: Monitor completion of medication education through review of patient records; monitor level of patient understanding of medications via follow-up call post-discharge.	
Do	For two weeks, pharmacists will educate all patients in the 3-West medical unit who are about to be discharged home.	
Study	Pharmacists educated 42 of the 49 patients discharged home. The 7 patients who were not educated were discharged on a Sunday. Of the 42 educated patients, 39 reported they received appropriate and adequate information about their medications. Two patients did not remember being educated. One patient could not be contacted for feedback.	
Act	Modify the plan for Sunday discharges. Have the discharging nurse educate patients leaving the hospital on Sunday. Implement the modified plan in all patient care units, and consider the following for future improvements:	
	• Evaluate patient experience with a mail survey after the change has been in place for 30 days. Modify the plan as necessary on the basis of survey results.	
	• Evaluate the efficacy of instruction by nurses versus instruction by pharmacists via a mail survey.	
	• Implement a separate PDSA cycle to measure and improve compliance with directive that follow-up calls be made to patients on four or more medications within two weeks of discharge to check their understanding of medications, compliance with dosing schedule, and side effects.	

RAPID CYCLE IMPROVEMENT

Rapid cycle improvement (RCI)
An improvement model that makes repeated incremental improvements to optimize performance

The PDSA cycle is used in **rapid cycle improvement (RCI)** projects. Unlike a comprehensive (and often time-consuming) process analysis, an RCI project incorporates several small process changes and careful measurement of those changes to achieve an improvement goal (Langley et al. 1996). This approach is an accelerated method (usually less than six weeks per improvement cycle) of collecting and analyzing data and making changes based on that analysis. The first cycle is followed by a second improvement cycle to evaluate the effects of the changes on the process.

Suppose an ambulatory clinic wants to improve patient satisfaction by 20 percent during the coming year. An improvement team comprising clinic staff and physicians completes a PDSA cycle for each improvement idea. Some ideas are successful and become office practices. Ideas that fail are discarded. Over a short period, the team completes several PDSA cycles, all linked to the goal of improving patient satisfaction. This RCI process is illustrated in Figure 5.4. Note that the four process changes were made in succession. The PDSA cycle was completed for each change before moving on to the next one. Each of these changes brought the clinic closer to its goal.

FIGURE 5.4.
Incremental Patient Satisfaction Improvements Achieved Through Repeated PDSA Cycles
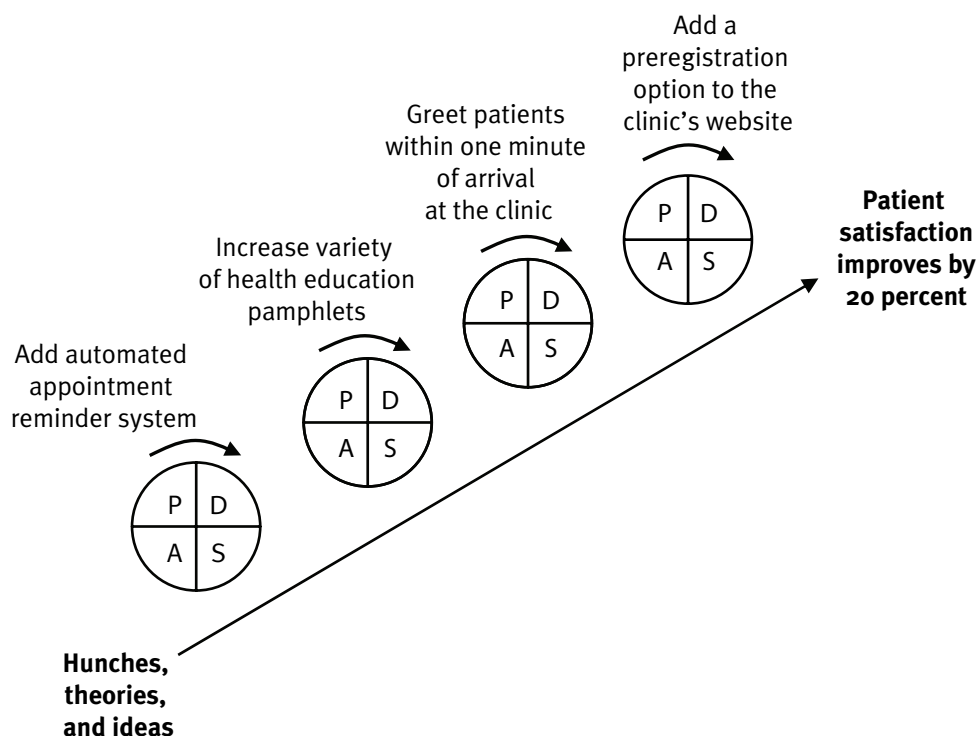
The RCI model is used in many healthcare improvement initiatives, including the breakthrough projects sponsored by the Institute for Healthcare Improvement and the Medicare quality improvement initiatives sponsored by the Centers for Medicare & Medicaid Services and overseen at the state level by **quality improvement organizations**. RCI has been successfully applied to both the business aspects of healthcare delivery and clinical patient care processes.

FOCUS-PDCA

In the early 1990s, Hospital Corporation of America (Nashville, Tennessee) expanded Shewhart's PDCA model by adding preliminary steps known as FOCUS (Batalden and Nolan 1992). The **FOCUS-PDCA model** of performance improvement involves the following steps (Batalden and Stoltz 1993):

◆ FOCUS phase

- **F**ind a process that needs improvement. Define the beginning and end of the process, and determine who will benefit from the improvement.

- **O**rganize a team of people knowledgeable about the process. This team should include employees from various levels of the organization.

- **C**larify the current process and the changes needed to achieve the improvement.

- **U**nderstand the causes of variation by measuring performance at various steps in the process.

- **S**elect actions needed to improve the process.

◆ PDCA phase

- **P**lan the change by studying the process, identifying areas needing improvement, and determining ways to measure success.

- **D**o the change on small scale, and gather data to measure success.

- **C**heck the data to determine whether the change produced desired improvements. Modify the change if necessary.

- **A**ct to maintain the gains. Implement the change if it is working well. Abandon the change if it is ineffective, and repeat the PDCA phase.

FADE

The **FADE model** of performance improvement is an adaptation of the original PDSA/PDCA improvement cycle. FADE was developed by Organizational Dynamics, Inc.

Quality improvement organizations
Groups that contract with the Centers for Medicare & Medicaid Services to monitor the appropriateness, effectiveness, and quality of care provided to Medicare and Medicaid beneficiaries

FOCUS-PDCA model
Performance improvement model developed at Hospital Corporation of America in Nashville, TN

FADE model
Performance improvement model developed by Organizational Dynamics, Inc.

(2006), a global management consulting firm that helps all types of organizations improve quality and productivity and enhance customer satisfaction. The FADE improvement model consists of four phases (The Joint Commission 1991, 59):

- ◆ **F**ocus. Choose a problem, and write a statement to describe it.

- ◆ **A**nalyze. Learn more about the problem by gathering performance data.

- ◆ **D**evelop. Develop a solution for the problem and a plan for implementing the solution.

- ◆ **E**xecute. Implement the plan and monitor results. Adjust the plan as needed.

The FADE model works for all types of performance problems. The following example illustrates how the FADE model can be used to fix a computer problem.

Focus. Occasionally my computer freezes up, and I must turn off the power and restart the computer. The file I was working on usually is lost and cannot be recovered. After enough recurrences, I become annoyed and decide to solve the problem permanently.

Analyze. I review the error logs for the past six months to determine which programs are running when the computer freezes up. This log also tells me the frequency of the problem. I run a system scan to look for device driver conflicts and check the power source. My computer has been making abnormal noises lately, so I check the fan at the back of the computer and discover that it is not running smoothly. I do some research on the Internet and learn that an overheated computer can periodically lock up.

Develop. I use my analysis as the basis for creating a **corrective action plan**. My computer needs a new fan. I also find that I need to update the driver for my video card. To ensure that the problem does not recur, I contact a computer repair company and arrange for an in-home service call.

Execute. The repairman arrives, and I watch him work so I can fix the problem myself next time. He replaces the fan and installs updates for my video and network drivers. Three months later, the problem has yet to return. The solutions worked.

The FADE model of performance improvement is useful for focusing on a problem, analyzing the problem and its causes, developing and implementing a solution, and monitoring success.

Corrective action plan
A proposed solution to fix a problem or a process

LEAN

The improvement models discussed thus far can be used to achieve any type of performance improvement objective. Some improvement models are intended for specific purposes. One such model is the **Lean** model of improvement, which is used to eliminate inefficiencies adversely affecting performance. A Lean process includes only value-added steps and therefore produces little waste. The Lean model of improvement, also called

Lean
A performance improvement approach aimed at eliminating waste; also called *Lean manufacturing* or *Lean thinking*

Lean manufacturing or *Lean thinking*, originated in the Japanese automobile industry, in particular the Toyota Production System (Womack, Jones, and Roos 1990). Lean manufacturing concepts are now used in healthcare to improve efficiency.

Lean principles are applicable to an array of healthcare processes and work settings, from patient care to medical informatics to plant maintenance. Healthcare organizations eliminate waste and thus improve efficiency and quality by applying the five Lean principles of process improvement:

- Value: Identify what is important to the customer and focus on it.

- Value stream: Ensure all activities are necessary and add value.

- Flow: Strive for continuous processing through the value stream.

- Pull: Drive production with demand.

- Perfection: Prevent defects and rework.

Muda, the Japanese term for waste, was coined by the late Toyota production engineer Taiichi Ohno (1988) to describe activities that add cost but no value to a process. The eight types of muda are listed in Table 5.2.

The goal of any Lean project is to create a more efficient process. Except for the application of Lean principles, Lean projects follow steps similar to those of other improvement projects. These steps typically include the following:

1. The performance problem is stated from the process customer's viewpoint. For instance, radiology technicians are physicians' customers. If a Lean project is initiated for the process of completing X-ray exams, the performance problem from the technician's perspective might be "X-ray exams are delayed until illegibly written physician orders are clarified."
2. Current work procedures are examined, and a diagram of the current process is created. The illustration of the current process is based on what is happening in the present, not recollections of what happened in the past or what should be happening. Direct observation is the preferred way to gather this information. The **process diagram** clarifies the cause of the performance problem.
3. Improvement opportunities are identified and quantified. Data are gathered to determine the frequency of the problem and the problem's impact on process customers.
4. **Root causes** of the problem are investigated. A common approach to get to the root of the problem is to ask five times in a series why the problem occurs. (The "Five Whys" performance improvement tool is discussed in the next chapter.)
5. A better way to work is proposed and illustrated in a process diagram. This better way is designed to alleviate the root causes identified in the previous step.

Lean principles
Rules that focus on elimination of waste as a means of improving efficiency and quality: (1) value—identify what is important to the customer and focus on it; (2) value stream—ensure all activities are necessary and add value; (3) flow—strive for continuous processing through the value stream; (4) pull—drive production with demand; and (5) perfection—prevent defects and rework

Muda
The Japanese term for waste, a concept taken from Lean manufacturing (*Muda* is anything that doesn't add value for the customer. Although some muda is inevitable, the goal of a Lean project is to reduce it as much as possible.)

Process diagram
A visual representation of the flow of steps or activities in a process

Root causes
The primary and fundamental origins of undesirable performance

TABLE 5.2.
Eight Categories
and Examples of
Waste (Muda)

Waste Category	Example
Movement	Unnecessary human movement (e.g., staff walking to various places around the work area to obtain supplies)
Waiting	People waiting for something needed to do their work (e.g., a radiologist waiting for a patient to be brought into the exam room)
Overprocessing	Doing more than is necessary to meet requirements (e.g., continuing to care for patients in the hospital when they could be discharged)
Defects	Poor quality work and rework to fix mistakes (e.g., rebilling the insurance company because the first bill contained an error)
Inventories	Inputs to the process that are waiting to be used (e.g., stock of aspirin)
Transportation	Unnecessary movement of people, supplies, equipment, and so forth (e.g., moving patients unnecessarily from one hospital unit to another)
Design	Products and services that process customers view as unnecessary (e.g., making a copy of the patient's insurance card at each clinic visit)
Overproduction	Doing something that doesn't add value (e.g., performing unnecessary tests to prevent a lawsuit for malpractice)

6. An implementation plan is developed. The plan identifies the actions needed to realize the process changes and assigns plan implementation responsibilities. A deadline for completion is set.

7. A follow-up plan is created. This plan predicts performance improvements expected to result from the implemented changes. The expected improvements are defined in measurable terms, and the means of gathering measurement data are specified.

8. After process changes are made, results are compared to the projections made in step 7.

A growing number of cost-conscious healthcare organizations are conducting Lean projects to improve daily operations. When these projects are successful, these organizations achieve more with less; they care for more patients with the same number of staff, in the same (or less) space, at reduced costs. Virginia Mason Medical Center in Seattle, Washington, used Lean techniques to overhaul its business operations. According to the June 3, 2005, edition

of the *Washington Post*, implementation of Lean projects at this 350-bed hospital resulted in savings of $6 million in planned capital investment, freed 13,000 square feet of space, cut inventory costs by $360,000, reduced staff walking by 34 miles a day, reduced the distance supplies travel by 70 miles, shortened bill collection times, and slashed infection rates. In just five months, its cancer center cut chemotherapy preparation time from three hours to less than one hour, allowing it to treat an additional 50 patients per week (Connolly 2005).

SIX SIGMA

Six Sigma is a systematic, data-driven improvement approach aimed at near-elimination of defects from every product, process, and transaction. Six Sigma originated in the manufacturing sector at Motorola and was refined by General Electric, which has a healthcare consulting division. The popularity of Six Sigma is growing in many industries, including healthcare. In the 2007 Quality of Care Survey conducted by the American College of Physician Executives, almost 1 in 5 of the 1,100+ physician leaders who responded to the survey reported using Six Sigma to improve healthcare performance (Martin 2007).

Six Sigma is founded on Shewhart's statistical process control philosophies and a field of statistics known as *process capability studies* (Winton 1999). Sigma (σ) is a letter in the Greek alphabet used to denote variability. For example, let's apply Six Sigma to a hospital's process for creating billing statements. If the process is running at three sigma, almost 7 of every 100 statements are flawed in some way. The calculation from which this ratio is derived is beyond the scope of this text, but in short, the higher the sigma level at which the process is operating, the higher the amount of error-free output.

Reducing performance variability is the essence of Six Sigma. The goal of a Six Sigma project is to create processes that operate within **Six Sigma quality**, meaning the defect rate is less than 3.4 per million opportunities. This rate translates into a process that is 99.9997 percent defect-free. Most healthcare processes operate at three sigma or less (Elgert 2005).

Although Six Sigma projects can include a variety of structured steps, they most commonly follow the five steps of DMAIC (pronounced *dee-MAY-ick*) methodology (Mukherjee 2008):

- ◆ **D**efine the problem.

- ◆ **M**easure key aspects of the process.

- ◆ **A**nalyze the data.

- ◆ **I**mprove the system.

- ◆ **C**ontrol and sustain the improvement.

Six Sigma
A disciplined, data-driven performance improvement approach aimed at reducing process variation for the purpose of eliminating defects (An example of a Six Sigma project is found in Table 5.3.)

Six Sigma quality
Rate of less than 3.4 defects per million opportunities, which translates into a process that is 99.9997 percent defect-free

⊛ **LEARNING POINT**
Improvement Models

Healthcare organizations use various performance improvement models for quality management purposes. The different models share a common thread of analysis, implementation, and review.

A Six Sigma project aimed at improving customer satisfaction with the appointment system at a hospital's imaging center is summarized in Table 5.3.

The following features are key characteristics of the Six Sigma improvement methodology (Barry, Murcko, and Brubaker 2002):

Process capability
A quantitative or qualitative description of what a process is capable of producing

- ◆ *Process variation control.* To achieve near-perfect quality, Six Sigma focuses on reducing the variations that can occur in a process. An improvement opportunity is present when a gap exists between what a process is capable of producing (**process capability**) and what the process currently produces.

- ◆ *Orientation toward results.* The potential impact on performance (financial, clinical, and operational) is projected prior to the start of a Six Sigma project,

TABLE 5.3.
Six Sigma Project Aimed at Improving the Imaging Center Appointment Process

Define the problem	The telephone appointment process at the hospital's imaging center receives low customer satisfaction scores and racks up long hold times.
Measure key aspects of the process	Over the last six months, staff took an average of 2 minutes 18 seconds to answer calls from customers wishing to schedule an imaging study. The center has received numerous customer complaints about long hold times and, as a result, lower satisfaction scores for the telephone appointment system.
Analyze the data	• The imaging center appointment desk receives over 2,000 calls per week. • Average customer satisfaction: 58% • Average hold time: 2 minutes 18 seconds • Phone calls answered in less than 90 seconds: 55% • Overall call abandon rate: 26%; at peak time: 49%
Improve the system	• Staffing changes were made to handle peak times. • Shift start and end times were revised to create a 45-minute overlap between the day and evening shifts. • Registration forms for special imaging studies were modified to make them easier for staff to complete. • The phone menu tree and call handling were improved. • Specifications for a future electronic scheduling system were defined.
Control and sustain the improvement	• Overall average hold time decreased to 39 seconds. • Overall call abandon rate decreased to 11%. • Peak time call abandon rate decreased to 27%. • Call volume decreased by 19% as a result of fewer callbacks. • Further improvements are expected after installation of the electronic scheduling system. The center will continue to monitor performance during and after transition to the new system.

and an evaluation is made at the end to determine whether project goals have been met.

◆   *Use of data.* Detailed information is gathered and analyzed to reveal defects in the process. Once these defects are corrected, the process will operate within Six Sigma quality.

CONCLUSION

Numerous models can be used to improve healthcare processes. Several factors influence the selection of an approach for a project. First, the goal of the improvement project must be considered. Some improvement models work best for eliminating process inefficiencies, whereas others work best for introducing incremental improvements. The prevailing opinion of senior leaders in the organization also should be considered when selecting an improvement model.

Keep in mind that improvement does not end with the implementation of a single improvement model. Any one approach is only a means to the end of continuous improvement. Multiple improvement models should be used to tap into the individual and collective power of physicians and staff members for the purpose of delivering ever higher levels of healthcare quality.

STUDENT DISCUSSION QUESTIONS

1. Many examples of improvement projects conducted by healthcare organizations can be found on the Internet. Find an example of each type of project: PDSA, rapid cycle improvement, FOCUS-PDCA, FADE, Lean, and Six Sigma. What is similar about each project? What is different about each project?

2. Select the improvement model that would work best for the following performance problems. Explain your choices.

    • More than 25 percent of the insurance claims submitted by a clinic are rejected because of mistakes made by the clinic's billing clerks.
    • Patients experience long wait times and delays for outpatient diagnostic services.

- A large number of hospitalized patients develop a wound infection following surgery.
- Labor costs are too high in the radiology department.
- Patients' overall satisfaction with the emotional support provided by nurses is lower than the satisfaction levels reported for other hospitals.
- In a pediatric clinic, many Spanish-speaking patients are unable to communicate by phone with the receptionists and caregivers because of language barriers.

WEBSITES

- Lean and Six Sigma Resources
  www.leanhospitals.org
- Medicare Quality Improvement Community
  www.medqic.org
- Six Sigma Quality Resources
  www.isixsigma.com

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CHAPTER 6

PERFORMANCE IMPROVEMENT TOOLS

LEARNING OBJECTIVES

After reading this chapter, the reader will be able to

➤ describe how quality improvement tools are used throughout an improvement project,

➤ identify commonly used quantitative and qualitative improvement tools,

➤ apply improvement tools in an improvement project, and

➤ explain the difference between improvement models and improvement tools.

KEY WORDS

- ➤ Affinity diagrams
- ➤ Brainstorming
- ➤ Cause and effect diagrams
- ➤ Decision matrix
- ➤ Deployment flowchart
- ➤ Detailed flowchart
- ➤ Five Whys
- ➤ Flowcharts
- ➤ Force field analysis
- ➤ High-level flowchart
- ➤ Improvement plan
- ➤ Interviews
- ➤ Multi-voting
- ➤ Nominal group technique
- ➤ Planning matrix
- ➤ Prioritization matrix
- ➤ Qualitative tools
- ➤ Quality improvement tools
- ➤ Quality storyboard
- ➤ Quantitative tools
- ➤ Questionnaires
- ➤ Response rate

- ➤ Response scales
- ➤ Stakeholder analysis
- ➤ Surveys
- ➤ Survey sample
- ➤ Top-down flowchart
- ➤ Workflow diagram

During an improvement project, various analytic tools are used to discover the causes of undesirable performance and plan solutions. Don't confuse performance improvement models with the analytic tools used throughout an improvement project. Think of the improvement model as the recipe—for instance, the steps you follow when baking a cake. Analytic tools are the ingredients—the materials you use while following the recipe. When baking a cake, you want to use the correct ingredients and add them to the cake mixture at the right time. The same is true for the analytic tools used during an improvement project.

6.1 QUALITATIVE IMPROVEMENT TOOLS

Qualitative tools

Analytic improvement tools used for generating ideas, setting priorities, maintaining direction, determining problem causes, and clarifying processes

Analytic tools are either qualitative or quantitative. **Qualitative tools** are used to generate ideas, set priorities, maintain direction, determine problem causes, and clarify processes. **Quantitative tools** are used to measure performance, collect and display data, and monitor performance. Table 6.1 is a quick reference guide to the common qualitative and quantitative analytic tools used in each step of a typical improvement project. Notice that some tools can be used in more than one step.

The quantitative tools should look familiar; they were discussed in Chapter 3. Quantitative tools are typically used during the preliminary performance assessment phase of quality management to display numeric or measurement information in a manageable and useful form. They also can be used during the actual improvement project for similar purposes.

Quantitative tools

Analytic improvement tools used for measuring performance, collecting and displaying data, and monitoring performance

Qualitative tools are used to present ideas in a manageable and useful form. In other words, they give structure to a set of ideas. Qualitative tools are used throughout an improvement project. Together with quantitative tools, qualitative tools help the improvement team define the goal, understand how the process works, identify improvement opportunities, and create solutions. The qualitative tools listed in Table 6.1 are described the following sections.

BRAINSTORMING

Brainstorming

An interactive decision-making technique designed to generate a large number of creative ideas

Brainstorming is a technique used to quickly generate lots of ideas about a problem or topic. It encourages creative thinking and incites enthusiasm. The case study involving Sunrise Home Health Agency in the previous chapter described two brainstorming sessions. At the first meeting, the staff members used brainstorming to list their complaints. At the second meeting, they used brainstorming to generate solutions.

The most common brainstorming techniques are structured, unstructured, and silent brainstorming. In structured brainstorming, a group leader solicits ideas from group members one at a time. Participants may skip their turn if they don't have an idea. Structured brainstorming is advantageous in that each person has an equal chance to participate, but it is disadvantageous in that it discourages spontaneity and is somewhat restrictive.

	Qualitative Tools	Quantitative Tools
Step 1: Define the improvement goal	Affinity diagram	Bar graph
	Brainstorming	Check sheet
	Decision matrix	Control chart
	Force field analysis	Histogram
	Multi-voting	Line graph
	Nominal group technique	Pareto chart
	Survey	Scatter diagram
		Survey
Step 2: Analyze current practices	Brainstorming	Bar graph
	Cause and effect diagram	Check sheet
	Five Whys	Control chart
	Flowchart	Histogram
	Survey	Line graph
	Workflow diagram	Pareto chart
		Scatter diagram
		Survey
Step 3: Design and implement improvements	Affinity diagram	Bar graph
	Brainstorming	Check sheet
	Decision matrix	Control chart
	Flowchart	Histogram
	Force field analysis	Line graph
	Nominal group technique	Pareto chart
	Planning matrix	Scatter diagram
	Stakeholder analysis	Survey
	Workflow diagram	
Step 4: Measure success	Storyboard	Bar graph
	Survey	Check sheet
		Control chart
		Histogram
		Line graph
		Pareto chart
		Scatter diagram
		Survey

TABLE 6.1.
Quick Reference Guide to Analytic Improvement Tools

Unstructured brainstorming is free-form; participants contribute ideas as they come to mind. Unstructured brainstorming is advantageous in that participants can build on each other's ideas in a relaxed atmosphere. It is disadvantageous in that less assertive or lower-ranking participants (such as non-leadership staff) may not speak up. A few rounds of structured brainstorming followed by unstructured brainstorming may help reticent participants open up.

In silent brainstorming, participants write their ideas on small slips of paper, which are collected and posted for everyone to see. Silent brainstorming is advantageous in that everyone's ideas are captured. In brainstorming sessions where ideas are voiced aloud, ill feelings among team members or fear of disruptive comments may make people reluctant to share their ideas. Silent brainstorming is disadvantageous in that the group does not build the synergy of an open session. Silent brainstorming is often used in combination with other brainstorming techniques.

The result of a brainstorming session is a list of ideas. If this list is too long, the group can narrow it down using another qualitative tool, such as multi-voting or nominal group technique.

Multi-voting

Multi-voting

A group decision-making technique used to reduce a long list of items to a manageable one by means of a structured series of votes

Multi-voting often follows a brainstorming session. It is used to pare down a broad list of ideas and establish priorities. The group in the case study involving Sunrise Home Health Agency in the previous chapter used multi-voting to identify their top three complaints. Multi-voting is a simple and quick method for setting priorities. Which task is most important? What do we need to do first? Which solution will work best? Which improvement goals are most important?

Suppose an improvement team charged with reducing patient wait times in an outpatient clinic has identified several problems that contribute to service delays. They know they can't fix all of these problems at once, so they use multi-voting to determine which problems they should address first. The problems are listed on a flipchart in random order. Team members are given ten self-stick dots (color is irrelevant) and told to place them next to the problems they feel are most urgent. They are instructed to use all ten dots but to place no more than four dots on one problem. When everyone is done, the number of dots next to each problem is tallied. The problems with the highest number of dots are addressed first. A few clear winners usually stand out. Before finalizing the list of high-priority problems, the team may discuss the results to ensure everyone agrees with the selection.

Nominal Group Technique

Nominal group technique

A structured form of brainstorming used to identify and rank issues

Nominal group technique, a more structured form of multi-voting, involves five steps. The following example illustrates the use of nominal group technique to select solutions for a

performance problem. In the first step, the discussion leader states the problem and clarifies it if necessary to ensure everyone understands. In the second step, each team member silently records potential solutions to the problem and does not discuss them with other team members (as in silent brainstorming). In the third step, each person shares one idea with the group, and the discussion leader records the idea on a flip chart. The process is repeated until all solution ideas have been recorded. As in step two, the ideas are not discussed.

In the fourth step, the team clarifies the ideas listed on the flip chart. The discussion leader may ask some team members to explain their ideas. Comments from other members are not allowed during the explanation. The goal in this step is to ensure everyone understands the suggested solutions. In the final step, the team votes on the ideas silently. Team members are asked to select five ideas they think are most effective, record them on separate index cards, and rank them in order of importance. They mark a "5" on the card for most important, "4" for second most important, and so on.

When team members have finished ranking their ideas, the discussion leader collects the cards and tallies the votes. Items that received one or no votes are removed from the list. Items with the highest total point values are most important to the group and should be addressed first.

The primary difference between the results of multi-voting and the results of nominal group technique is that the improvement team considers the total point count for each item (adding up the values of each vote) as well as the number of votes each item received.

AFFINITY DIAGRAMS

Affinity diagrams are used to organize large amounts of language data (ideas, issues, opinions) generated by brainstorming into groupings based on the relationships between data items. This process helps improvement teams sift through large volumes of information and encourages new patterns of thinking. Affinity diagrams also help improvement teams identify difficult, confusing, unknown, or disorganized performance concerns.

To create an affinity diagram, team members write their ideas, issues, or opinions on separate pieces of paper or index cards and scatter them on a large table. Together, and without speaking, the team then sorts related ideas into no more than eight groups. Sorting the ideas into an affinity diagram should be a creative process, so the groups should not be named until later. This categorization process takes from 10 to 20 minutes, depending on the number of ideas.

Once the ideas are sorted, the team names the groups by creating header cards and placing one at the top of each. The name should describe the thread or topic that ties the cards in the group together. Figure 6.1 is a partially completed affinity diagram created by an improvement team in a hospital's business office. The team brainstormed the problems associated with billing errors and grouped these problems into categories.

Affinity diagrams
Charts used by improvement teams to organize ideas and issues, gain a better understanding of a problem, and brainstorm potential solutions

FIGURE **6.1.**
Affinity Diagram

Training	Internal Communication	Insurance Relations
New billing clerks are not adequately trained.	Procedure charges are not consistently captured in IT system.	Insurance companies don't provide timely feedback.
Nurses don't understand the charge process for supplies.	Getting everyone together to fix charge problems is difficult.	There is no consistent procedure for confirming patient's insurance before billing.
Despite training on new IT system, some clerks still have difficulty using it.	Clerks can wait up to two weeks to be informed of billing process changes.	Insurance companies keep hospital billing clerks on hold too long.

Affinity diagrams are useful when the improvement team has a lot of information to sift through. Sorting often reveals new patterns. Affinity diagrams can also be used for brainstorming and categorizing problem solutions.

Cause and effect diagrams
Graphic representations of the relationships between outcomes and the factors that influence them; sometimes called *Ishikawa* or *fishbone* diagrams (Examples of cause and effect diagrams are shown in figures 6.2 and 6.3.)

CAUSE AND EFFECT DIAGRAMS

Cause and effect diagrams are used to identify all possible causes of an effect (a problem or an objective). They are sometimes called *Ishikawa diagrams* after Kaoru Ishikawa, a quality pioneer who created and first used them in the 1960s for quality control purposes (Best and Neuhauser 2008). They are also called *fishbone diagrams* because the lines connecting major cause categories resemble the backbone of a fish. Figure 6.2 is a cause and effect diagram created by an improvement team charged with reducing patient wait times in a clinic.

The first step in creating a cause and effect diagram is to identify the effect to be placed in the box at the right side of the diagram. The effect can be positive (an objective)
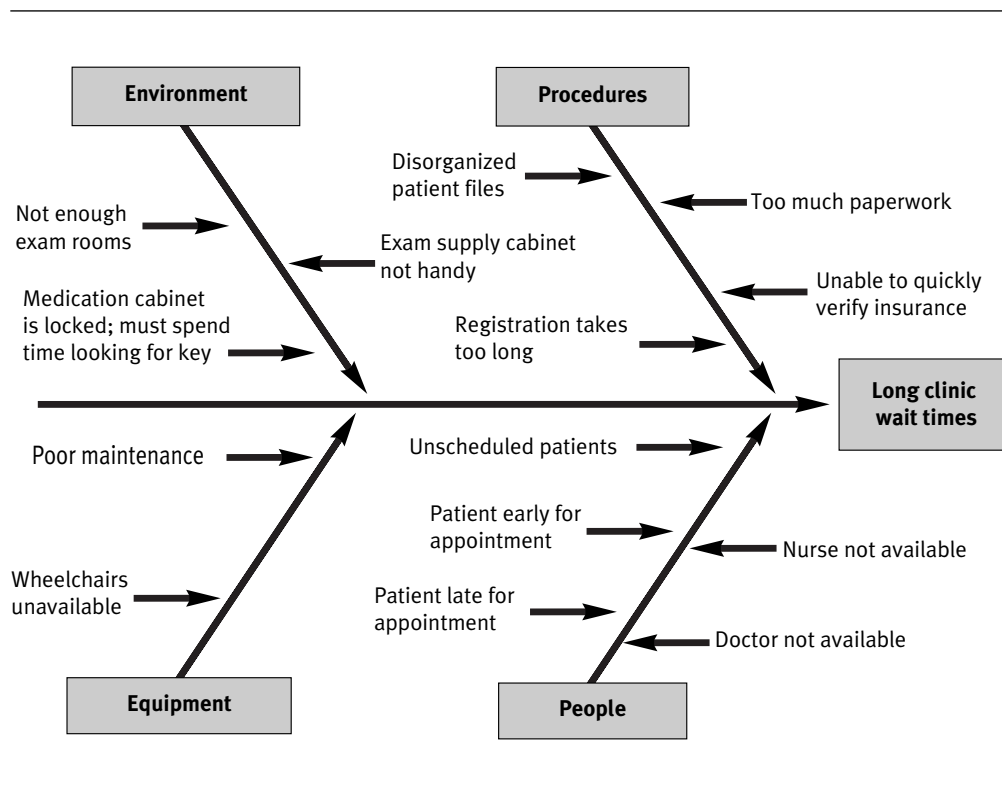
or negative (a problem). The next step is to identify major factors that influence the effect. The *four Ms*—methods, manpower, materials, and machinery—or the *four Ps*—policies, procedures, people, and plant—are commonly used as starting points. More than four factors may be identified for complex topics. The factors are placed in boxes at the end of each rib of the backbone.

Once the major factors are selected, the team identifies and categorizes the significant causes, which are usually identified through brainstorming and group members' knowledge and expertise. After the major causes are positioned on the diagram, the team digs deeper to identify the sub-factors influencing the major causes. Figure 6.3 is a cause and effect diagram that includes the major causes and sub-factors of the problem of poor fuel economy in an automobile.

Improvement teams usually create a cause and effect diagram at the beginning of an improvement project to clarify the problem. They then use quantitative tools to determine the scope of the problem. For instance, the aforementioned clinic generated lots of ideas and presumptions about potential causes of long clinic wait times (Figure 6.2). After completing the cause and effect diagram, the clinic will need to gather data to determine which of the presumed causes are in fact contributing to the problem. These data could be
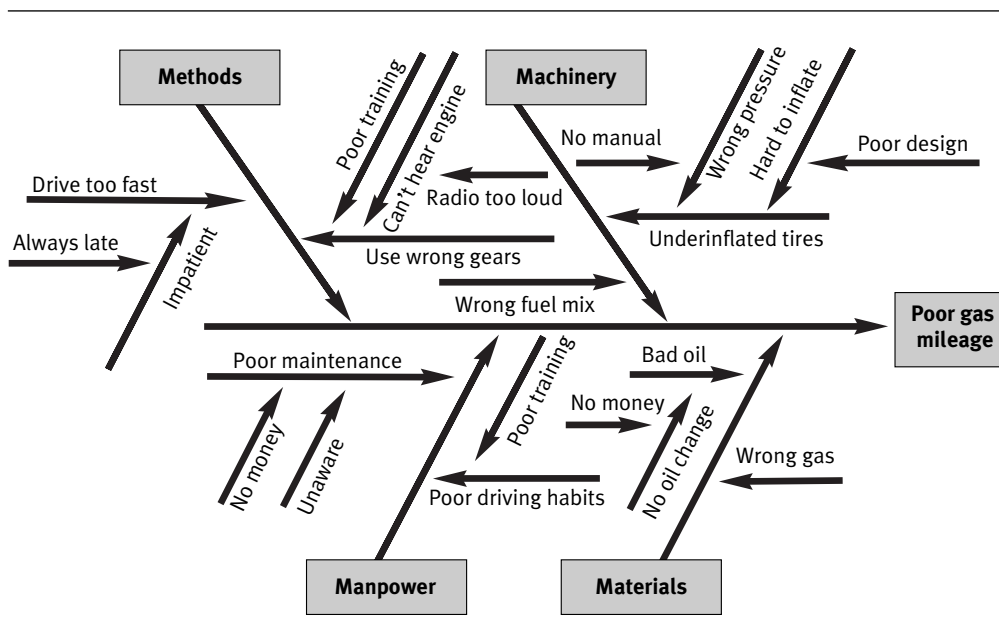
displayed in bar graphs, histograms, Pareto charts, or other graphic or tabular data reports. If the data point to several problems, the team may use qualitative tools such multi-voting or a decision matrix to prioritize them.

DECISION MATRIX

Improvement teams can use a **decision matrix** (sometimes called a *selection* or **prioritization matrix**) to systematically identify, analyze, and rate the strength of relationships between sets of information. This type of matrix is especially useful for looking at large numbers of decision factors and assessing each factor's relative importance. Teams frequently use this tool to select improvement priorities and evaluate alternative solutions.

In the case study involving Sunrise Home Health Agency in the previous chapter, the manager conducted a brainstorming session to solicit ideas on how to make monthly staff meetings more valuable to staff. Suppose the manager used a decision matrix (Table 6.2) to evaluate the suggested solutions more systematically. The staff's recommendations are listed in the first column. The criteria for evaluating each solution are listed across the top of the remaining columns. The manager asks each staff member to score the solutions according to the ranking key. The scores are then tallied, and a group average is calculated for each solution. Solutions with the highest group average are selected for implementation.

The criteria used to evaluate options will differ depending on the purpose of the decision. Selection criteria may come from a previously prepared affinity diagram or from a brainstorming activity. Everyone should have a clear and common understanding of what

Decision matrix
A chart used to systematically identify, analyze, and rate the strength of relationships between sets of information, especially useful for looking at large numbers of decision factors and assessing each factor's relative importance (Table 6.2 is an example of a decision matrix.)

Prioritization matrix
A tool used to identify the most important and most executable items from a large number of ideas or projects

Proposed Solution	Evaluation Criteria				Your Total	Group Average
	Probability of success	Ease of implementation	Cost-effectiveness	Impact on staff satisfaction		
Hold online meetings						
Start meetings on time						
Create meeting agenda						
Allow staff to suggest agenda items						

Ranking key: 4 = excellent; 3 = very good; 2 = satisfactory; 1 = poor

the criteria mean. The selection criteria should be written in a way that makes a high score for each criterion represent a favorable result and a low score represent an unfavorable result. If some decision criteria are more important than others, appropriate weights can be assigned to them. The total score for each alternative is then multiplied by the weight (e.g., 1, 2, 3) assigned to it.

Five Whys

Before developing solutions, teams need to confirm they have found the underlying causes of a performance problem. The **Five Whys** tool helps an improvement team dig deeper into the causes of problems by successively asking *what* and *why* until all aspects of the situation are reviewed and the underlying contributing factors are considered. Usually by the time the team has asked and answered five *why* questions, it will have reached the core problem. Teams often uncover multiple, underlying root causes during this exercise.

Figure 6.4 is an illustration of the Five Whys process for a common problem—water in a sink is draining too slowly. The root cause is eventually discovered by asking *why* repeatedly.

Flowcharts

Flowcharts, sometimes referred to as *process maps*, are used to identify and document the flow or sequence of events in a process or to develop an optimal new process during the

Five Whys
An analysis that delves into problem causes by successively asking *what* and *why* until all aspects of the situation, process, or service are reviewed and contributing factors are considered (An example of a Five Whys analysis is shown in Figure 6.4.)

Flowcharts
Graphic representations of a process (Examples of flowcharts are shown in figures 6.5 through 6.8.)
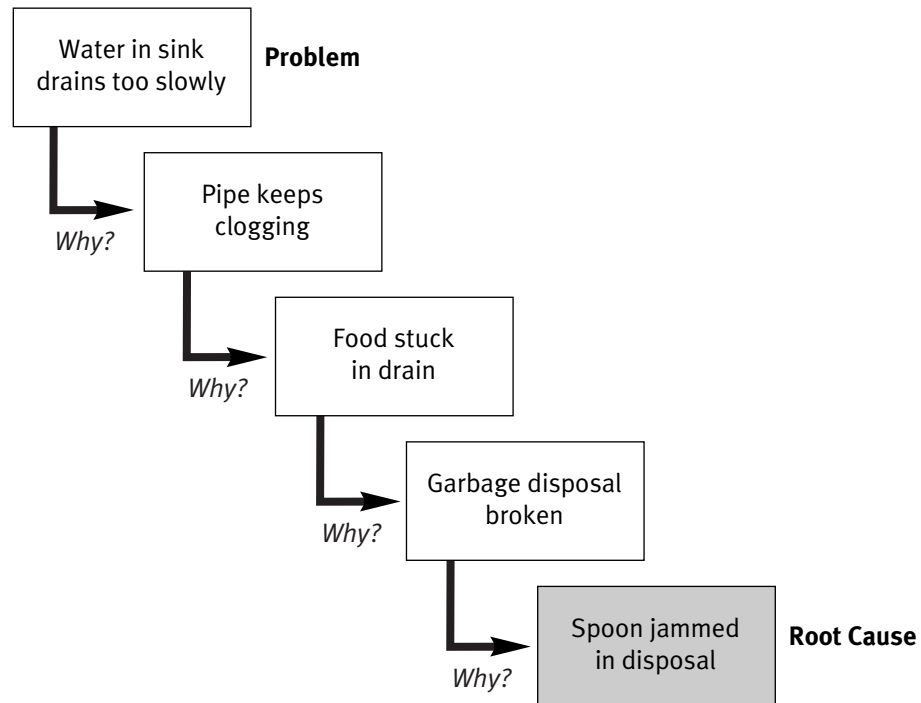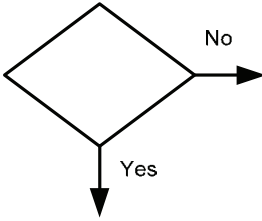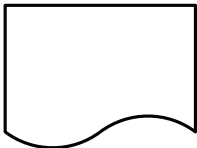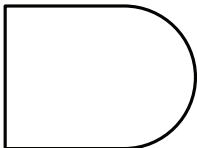
solution stage. They can be used to detect unexpected complexity, problem areas, redundancies, unnecessary steps, and opportunities for simplification. They also help teams agree on process steps and examine activities that most influence performance.

Standard flowchart symbols are shown in Table 6.3. When developing a flowchart, especially in a group environment, the goal is to illustrate the process. Don't waste time debating the best shapes to use. A flowchart that doesn't use these symbols can be just as useful as a chart that does. When designing a flowchart, write the process steps on index cards or sticky notes. The team can then rearrange the diagram without erasing and redrawing the chart.

After identifying the process adversely affecting performance, the improvement team defines the beginning and end of the process and the steps between these two points. It then sequences the steps in the order they are executed. The flowchart should illustrate the process in its current state—the way it is operating at that moment. To test for completeness, the team may validate the flowchart with people outside the team or those who execute the process. When the team is satisfied that the chart represents the process accurately, it asks questions to locate improvement opportunities:

TABLE 6.3.
Standard Flowchart
Symbols

Symbol	Represents
	The start and end of the process
	A task, action, or step in the process
	A decision point in the process
	A document used in the process
	A delay in the process
	The direction or flow of the process steps

◆   Can any steps be eliminated?

◆   Can any steps be combined with others?

◆   Can any steps be simplified?

◆   Can delays in the process be eliminated?

◆   Can rework loops be eliminated?

◆   Can buildup of paperwork be minimized?

◆   Can handoffs between people or departments be streamlined?

The improvement team may create a second flowchart that illustrates the ideal process—the best way to proceed from start to finish. While this step isn't necessary, it can reveal improvement opportunities. The team can examine areas of the current process that differ from the ideal process and speculate on the reasons for the discrepancy.

High-level flowchart
A graphic represen-
tation of the major
steps in a process (An
example of a high-level
flowchart is shown in
Figure 6.5.)

Among the different types of flowcharts, high-level, detailed, deployment, and top-down charts are most commonly used. Figure 6.5 is a **high-level flowchart** of the steps involved in filling a prescription in a retail pharmacy. The process starts when the customer presents the prescription to the pharmacy clerk and ends when the customer receives the medication. This flowchart is considered high level because minor steps in the process have not been included.

FIGURE 6.5.
High-Level
Flowchart of
Retail Pharmacy
Medication
Dispensing Process
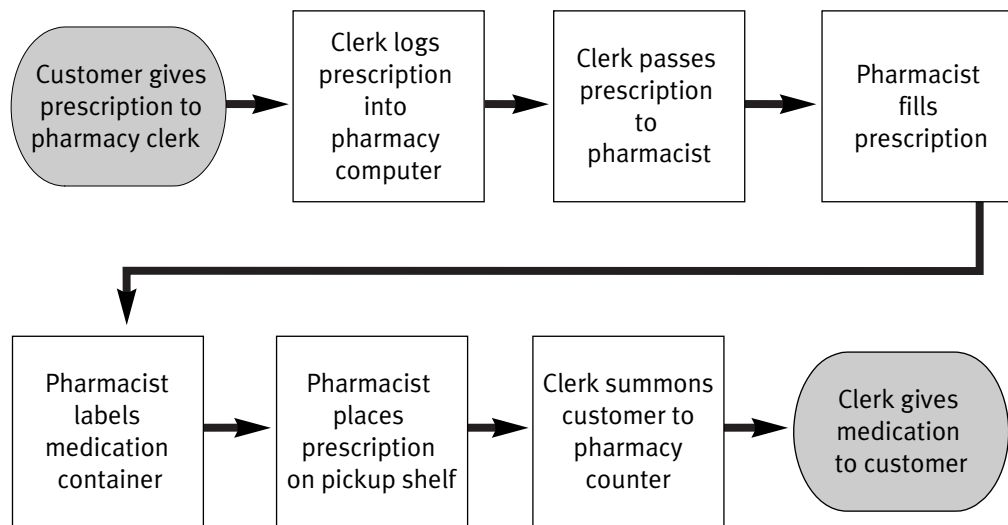
A **detailed flowchart** maps all the steps and activities that occur in the process and includes decision points, waiting periods, tasks frequently redone, and feedback loops. Figure 6.6 is a detailed flowchart of the patient X-ray process. This type of flowchart is particularly useful for looking for problems or inefficiencies. For example, the flowchart in Figure 6.6 shows that delays occur when physician orders are not readily available to the X-ray technician. Delays also occur when X-rays have to be retaken for technical reasons. This flowchart was taken from a Lean project that was implemented to reduce inefficiencies in the process.

From this flowchart, the team identified delays that could be eliminated by shifting some tasks to the radiology department's receptionists. The receptionists could confirm the availability of physician orders before patients enter the X-ray area. The receptionists also could retrieve missing orders and escort patients to and from the dressing room, freeing up even more time for the technician. These changes would streamline the technician's job, increasing productivity.

Another type of chart, a **deployment flowchart**, shows detailed process steps and the people involved in each step. A deployment flowchart is particularly useful for mapping processes in which information or services are passed between people and groups. They also may reveal unclear responsibilities, missing information, and unshared expectations that contribute to performance problems.

Figure 6.7 is a deployment flowchart of an employee training process. To create this flowchart, the improvement team listed the departments involved across the top of the chart. Next, it arranged the process steps in sequence and positioned each step in the column of the department that executes the step. The process steps are connected with arrows to show where the flow lines cross from one column to the next. A handoff occurs each time the flow line crosses from one column to another. The project team focused improvement solutions on the handoffs in the process because these transitions are prone to errors and miscommunication. Delays can happen at handoff points because people may not know when they can expect to receive something or that another group is waiting for them to complete a task.

In a **top-down flowchart**, the major steps in a process are arranged sequentially across the top and the detailed steps are listed under each major step (see Figure 6.8). Unlike a detailed flowchart, a top-down flowchart does not include decision points or other steps that might be causing inefficiencies. A top-down flowchart is useful for viewing the process in a systematic manner to better understand the activities involved and their interconnectedness.

Each type of flowchart has its strengths and weaknesses. To choose the best format for the project, the improvement team needs to understand the reason for creating the flowchart. If the team is unsure about the sub-steps in the process, it should create a high-level flowchart. When the team understands the process sub-steps and wants to better understand how the steps are carried out, it should create a detailed, deployment, or top-down flowchart.

Detailed flowchart
A chart that shows the sequence of activities and steps in a process and decision points (An example of a detailed flowchart is shown in Figure 6.6.)

Deployment flowchart
A chart that shows the steps in a process and identifies the people or groups involved in each step; sometimes called a *cross-functional flowchart* (An example of a deployment flowchart is shown in Figure 6.7.)

Top-down flowchart
A chart on which major process steps are arranged sequentially across the top and detailed steps are listed under each major step (An example of a top-down flowchart is shown in Figure 6.8.)

FIGURE 6.6.
Detailed Flowchart
of the Patient
X-Ray Process

Train Employees in One Department

Training Department	Department Needing Training	Finance Department

Confirm training funds available

Identify number of staff needing training

Select training date

Book meeting room

Arrange catering

Book trainer

Arrange for audiovisual equipment

Photocopy training materials

Notify participants

Run training event

Charge expenses to department budget

FIGURE 6.7.
Deployment Flowchart of an Employee Training Process

FIGURE 6.8.
Top-Down
Flowchart
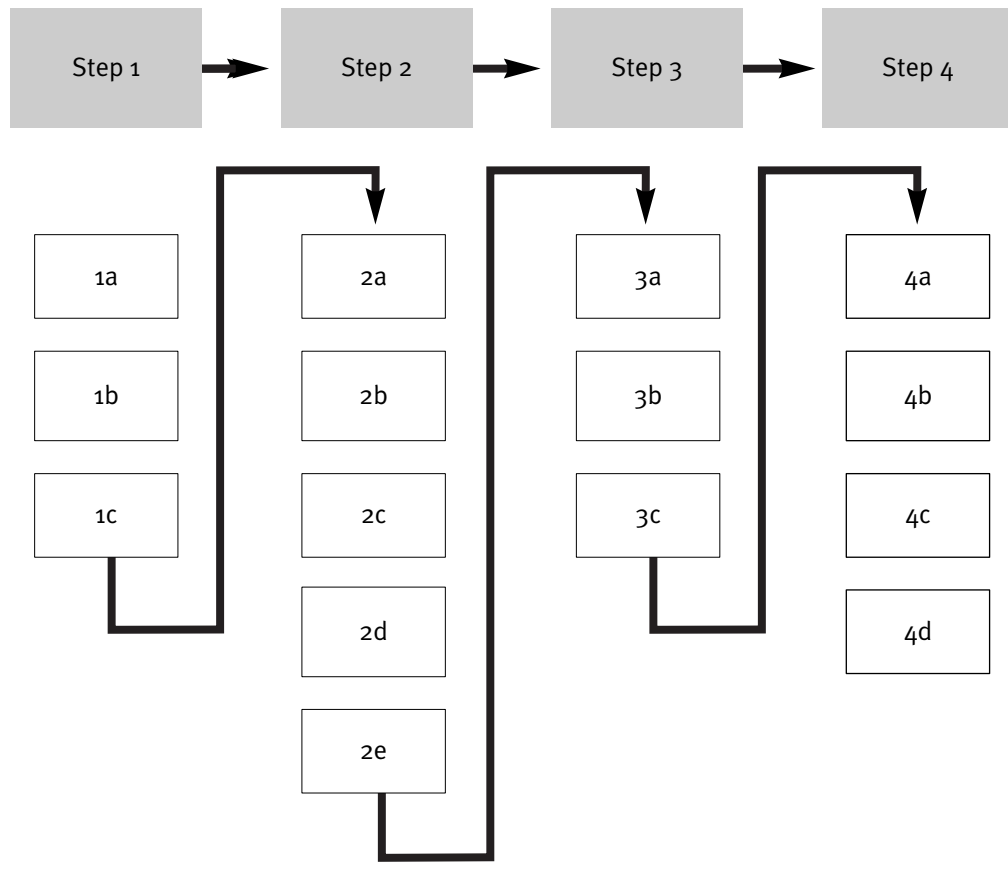
WORKFLOW DIAGRAM

A **workflow diagram** is a visual representation of the movement of people, materials, paperwork, or information during a process. The diagram can also illustrate general relationships or patterns of activity among interrelated processes (such as all processes occurring in the radiology department). Workflow diagrams are used to document how work is executed and to identify opportunities for improvement.

A common type of workflow diagram is a floor plan of the work site. Lines are drawn on the floor plan to trace the movement of people, paper, data, etc., to identify redundant travel and inefficiencies. Figure 6.9 is a floor plan of a hospital pharmacy department. The lines on the floor plan trace the movements of a pharmacy technician during the process of filling a prescription. To create this workflow diagram, staff from the quality department observed traffic flow in the pharmacy at 12:30 p.m. on a typical day.

The technician's movements are chaotic because of the layout of the department. The central medication supply is located in the middle of the pharmacy, and medications that are infrequently prescribed line the back wall of the department. The narrow walkway between the two sections causes delay and congestion because it comfortably accommodates only one person at a time. The resources needed to fill prescriptions are not easily accessible. Two printers in the lower left corner of the department, approximately 26 feet from the medication area, print prescription enclosures. The technicians must travel to this area through a narrow doorway. After studying the workflow in the pharmacy department, several changes were made to the department layout and the prescription receiving process.

Surveys

Surveys are instruments used to gather data or information. The case study at the beginning of Chapter 3 described a survey used at Redwood Health Center to gather satisfaction information from patients. This survey gathered quantitative (numeric rankings) and qualitative (comments) information. There is some debate among researchers as to whether surveys are a quantitative tool, a qualitative tool, or a combination of both. For this reason, surveys are listed as both in Table 6.1.

There are two types of survey: questionnaires and interviews. **Questionnaires** are usually paper or electronic instruments that the respondent completes independently. **Interviews** are conducted with the respondent face to face or over the phone. The interviewer is responsible for documenting the respondent's comments.

Surveys
Questionnaires or interviews used to obtain information from a group of individuals about a process, product, or service

Questionnaires
Forms containing questions to which subjects respond (Table 6.4 is an example of a questionnaire.)

Interviews
Formal discussions between two parties in which information is exchanged

Improvement teams typically use questionnaires to gather people's perceptions of a service or process. These perceptions are not necessarily factual. For instance, suppose an improvement team at Redwood Health Center wants to know how long patients wait in the reception area before they are escorted to an exam room. To determine the number of minutes patients wait, the team will need to devise a system that registers the time patients arrive at the clinic and the time they are taken to an exam room. If the center used a survey to gather wait time data, patients may over- or underestimate the time they spent in the reception area. As another example, consider the CMS Hospital Compare website, which publishes ratings gathered from a patient survey on hospital experiences. One survey question asks: How often did hospital staff tell you what the medicine was for (CMS 2008)? The majority of a hospital's patients might indicate "usually" because they remember talking to staff about their medicine, but an observational study on the subject might show that those conversations rarely included information about what the medicine was for.

Surveys can be a useful tool for gathering the opinions or perceptions of people who are not members of the improvement team. To ensure it gathers the information it needs to complete a project, the team needs to develop questions that will elicit such data. Without adequate planning, the survey results may not yield useful information. Use the following steps as a guide when developing and using surveys:

1. *Define the survey objectives*. Clearly define the purpose or intent of the survey. What are you trying to find out, and why do you need this information? Don't select more than five topics; otherwise, the survey will be too long. People may not respond to a request to complete a long survey. Keep the survey focused on high-priority questions that need to be answered to meet your objectives.

2. *Identify the people to be surveyed*. Whom do you need to survey to gather the information you seek? If you know what group of people you want to survey, you'll be able to determine the best way to gather their responses. Will you distribute the survey at work, or will you mail the survey to participants' home addresses? Will you bring participants together to complete the survey, or would you prefer they complete the survey on their own time?

3. *Select the survey population*. Ideally, you would want to ask everyone with opinions about the topic to respond to the survey. If the population is small (e.g., all employees in the health information management department), you may be able to survey everyone. If you have cost or time constraints, however, you may not be able to survey everyone in a large population (e.g., all nurses who work in the hospital). You may need to settle for a sample of the population, preferably a **survey sample** that is representative of the entire population. Sampling and sample size selection were covered in Chapter 3. The same principles apply when choosing a sample for survey purposes.

4. *Construct the survey*. Create a concise survey that is easy to understand and interpret. Do not include questions that might threaten the respondent. For example,

---

Survey sample
A subgroup of respondents derived from the target population

if you are seeking employee feedback on an improvement plan that might involve staff cutbacks, don't ask a question such as, "Should less productive employees be laid off first?" People who feel threatened by survey questions usually fail to complete the survey or give biased responses. Do not include leading questions (i.e., questions that encourage the respondent to answer the way you want them to), and phrase items objectively. Use common rather than obscure terms, and strive for brevity and clarity.

Select the range of answers (or **response scales**) from which participants can choose. You can include a dichotomous response scale (e.g., Agree/Disagree, True/False, Yes/No) or an interval response scale (e.g., 1 to 5, where 1 is lowest or least likely and 5 is highest or most likely). Surveys commonly include Likert scales, which offer five to seven multiple-choice alternatives (e.g., "to a very great extent," "to a great extent," "to a moderate extent," and so on) (Edwards 1957, 149–52). Other dimensions commonly used include frequency scales (how often something occurs, e.g., frequently–infrequently, never–always, once per day–once per year), scales of agreement (to what degree), and scales of value (how important something is to the respondent).

Response scales
Ranges of answers from which the survey respondent can choose

Word survey questions so that the answers can be graded on a continuum rather than discretely. For example, a scale that measures degrees of agreement with survey statements is a continuum. The answers on the departmental quality assessment questionnaire (Table 6.4) are scaled in degrees (from *strongly disagree* to *strongly agree*). In contrast, a questionnaire that asks respondents to identify sources of problems (e.g., workflow delays, waste, equipment breakdown, understaffing) must be tabulated individually. Scales usually include five to nine points, as most people have difficulty discriminating between the finer differences that would result if the scale were further divided (McDowell and Newell 1996, 18–24). A range that is too restrictive—for example, one that includes only two or three points—usually is equally ineffective and may produce meaningless results.

5. *Test the survey and prepare the final draft.* Even well-designed surveys harbor problems. Improvement teams conduct pretests to identify and correct these problems. To conduct a pretest, prepare a few mock-ups of your survey and recruit volunteers to complete it. When they have finished, ask them for feedback. Did they find flaws or errors in the survey? Were the instructions and questions clear?

After you correct the problems identified by your pretest volunteers, prepare a final copy of the survey for reproduction. Carefully check the final product before distribution. Errors not caught at this step can be costly, especially if you have to discard some of the survey results because of problematic questions or typographical errors.

6. *Administer the survey.* If possible, have all participants complete the survey at the same time. For example, the survey can be conducted at a department staff meeting. When such arrangements cannot be made, surveys can be distributed

This departmental assessment survey contains 22 statements. Respond to each with the number that indicates the extent of your agreement with the statement: 1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = somewhat agree; 5 = agree; 6 = strongly agree.

	Extent of Agreement
1. Work delays are uncommon in this department.	
2. Once the department starts an improvement project, it usually finishes it without undue delay.	
3. There is little waste of materials and supplies.	
4. People reuse or salvage excess materials and supplies whenever possible.	
5. Equipment is maintained and operated at peak efficiency.	
6. This department's equipment rarely requires repair.	
7. This department has sufficient personnel to accomplish its mission.	
8. The personnel turnover rate is low.	
9. Working conditions (noise, heat, light, cleanliness) are excellent.	
10. Work facilities are excellent.	
11. Department staff members are well trained.	
12. Department staff members receive the guidance and assistance they need to accomplish their work.	
13. This department's materials and supplies are well accounted for without unexplained losses.	
14. This department's materials and supplies meet quality specifications.	
15. Department staff members rarely need to shift work priorities to complete jobs.	
16. Department staff members rarely need to redo a job or task.	
17. This department's customers are satisfied with the quality of work/service.	
18. This department's customers seldom complain.	
19. This department's customers are satisfied with the quantity of work/service.	
20. This department's customers are satisfied with the timeliness of work/service.	
21. This department's customers find few errors in the work performed by staff.	
22. This department's customers find the service consistent.	

Response rate
The number of respondents who complete a survey out of the number who received the survey, usually expressed as a percentage; can also apply to individual questions

and returned by hand or internal mail. When completion of the survey is voluntarily, the team should do everything possible to encourage a high **response rate**. Low response rates are unlikely to produce valid, reliable feedback. Acceptable response rates depend on the method of survey distribution (Instructional Assessment Resources 2007):

◆ Mail: 50 percent: adequate, 60 percent: good, 70 percent: very good
◆ Phone: 80 percent: good
◆ E-mail: 40 percent: average, 50 percent: good, 60 percent: very good
◆ Online: 30 percent: average

◆ Paper survey in a group setting: greater than 50 percent: good
◆ Face-to-face interview: 80–85 percent: good

Low response rates are a problem for all organizations. Some people refuse to respond to surveys, while others, for various reasons, cannot participate. A well-designed survey, coupled with incentives and persuasive techniques, can boost response rates. Advance notice of the survey also can increase the number of responses. Personal appeals can help, too. For instance, physicians working at Redwood Health Center are more likely to complete a survey on patient wait times if the physician member of the improvement team approaches them personally to ask for their responses.

The qualitative information gathered through questionnaires and interviews must be summarized for analysis. Often the information has to be translated into quantitative results before it can be used. Results reporting was taken into consideration when the departmental quality assessment survey in Table 6.4 was designed. Each statement corresponds to 1 of 11 quality characteristics (two statements per characteristic). Table 6.5 is a scoring tool designed to tabulate survey results. The sum of the numeric answers to each statement (two per line) is recorded in column two. The average degree of agreement for each quality characteristic is calculated

Statements	Sum of Responses to Statements	Divisor	Average	Quality Characteristic
1–2		2		Work flow/delays
3–4		2		Waste
5–6		2		Tools/equipment
7–8		2		Staffing
9–10		2		Facilities
11–12		2		Training
13–14		2		Supplies
15–16		2		Organization/group structure
17–18		2		Customer quality
19–20		2		Quantity
21–22		2		Reliability
All (1–22)		11		

TABLE 6.5.
Departmental Quality Characteristics Survey Scoring Tool

by dividing the sum in column two by the number of corresponding questions (the divisor shown in column three). The average for the entire survey can also be calculated. These averages can then be reported in a data table or graphed.

Force Field Analysis

Force field analysis
A technique for identifying and visualizing the relationships between significant forces that influence a problem or goal (An example of a force field analysis is shown in Figure 6.10.)

The purpose of **force field analysis** is to determine the potential support for and against a particular plan or idea. Once these "forces" are identified, plans can be devised to strengthen support for the idea and reduce resistance against it. Teams typically use force field analysis during the solution phase of an improvement project but may also use it to prioritize their improvement goals.

Figure 6.10 is a force field analysis completed by an improvement project team in a children's hospital. The goal of the project is to increase parents' participation in the hospital's quality improvement efforts. To achieve this goal, the team suggested that the hospital host quarterly focus groups with the parents of former patients to solicit ways to improve parent satisfaction. The improvement team uses the force field analysis to clarify

FIGURE 6.10.
Force Field
Analysis of
Improvement
Proposal

Proposed solution: The hospital hosts quarterly focus group discussions with parents of former pediatric patients to solicit ways to improve parent satisfaction.

+ Driving Forces	Restraining Forces −
Solution increases parent commitment to hospital ➡	⬅ Team fears sensitive information about the hospital could be disclosed to parents
Solution increases parent satisfaction ➡	⬅ Team fears solution will fail like past efforts have failed
Parents are empowered to communicate their needs ➡	⬅ Team fears administration won't support their ideas
Parents can provide improvement ideas ➡	⬅ Parents don't understand clinical aspects of care
Solution engages customers in hospital quality efforts ➡	⬅ Parents are too busy

Status quo

current and desired participation and identify obstacles that could impede implementation of their proposal. The vertical line at the center of the diagram represents the status quo.

Teams brainstorm to identify the driving and restraining forces and then decide which will most influence the outcome. They develop strategies to minimize the forces against, and strengthen the forces for, the desired outcome. Teams should focus on reducing or eliminating the restraining forces because they are usually more powerful and can prevent the change from being implemented.

STAKEHOLDER ANALYSIS

People usually resist change. If the improvement project team does not deal with this resistance, desired performance improvements may not materialize.

Teams can use a **stakeholder analysis** to identify the individuals or groups that would be affected by a proposed process change. Each stakeholder is considered to determine who would readily accept and who would resist the process changes. Stakeholders can be grouped into four main categories: allies, associates, enemies, and opponents. Not all stakeholders are equal; some have more influence on the outcome of the improvement plan than others. All of these factors are considered in a stakeholder analysis.

The Lean project team that proposed changes to the process of taking X-rays (Figure 6.6) used a stakeholder analysis to better understand how those affected by the change would view the new process. A stakeholder analysis matrix (Table 6.6) helped the team predict each group's influence on project outcomes and its level of support.

The individuals and groups that would be affected by the proposed changes to the process are listed in the first column. The team determines the specific interests these stakeholders have in the new process. The team considers such issues as

Stakeholder analysis
A tool used to identify groups and individuals who will be affected by a process change and whose participation and support are crucial to realizing successful outcomes

- ◆ benefits to the stakeholder,

- ◆ benefits to the stakeholder's patients,

- ◆ changes the stakeholder will have to make, and

- ◆ activities that might cause conflict for the stakeholder.

These issues are recorded in the "Stakeholder Incentives" column.

Next, the team uses the following five-category ranking system to judge each stakeholder's support of the process change:

++   strongly in favor
+   weakly in favor
o   indifferent
–   weakly opposed
––   strongly opposed

Process change: Radiology receptionists will confirm the presence of a physician's order before the patient enters the X-ray area. If necessary, the receptionists will obtain the missing order from the patient's physician. Also, receptionists will escort the patient to and from the dressing room.

Stakeholder	Stakeholder Incentives	Stakeholder Support	Action(s)
Radiology receptionists	• More work for receptionists • Reception area not staffed for extra duties	–	Do time study to determine how this change will affect receptionists' workload
Radiology technicians	• Less clerical work for technicians • Could reduce opportunities to interact with patients	++	Monitor patient satisfaction surveys to determine whether reduced interactions affect radiology department satisfaction scores
Radiologists	• Increased number of X-rays performed each day	++	No action needed; group supports the changes
Physicians who order X-rays	• X-rays completed more quickly • Possible disruptions if receptionist must obtain missing orders	o	Ask radiologists to discuss the benefits of the change with physicians
Radiology manager	• Need to reevaluate staffing at reception desk • Potential to reduce overall costs and improve productivity	+	Manager is skeptical that the change will actually reduce costs or increase productivity; need to evaluate these issues closely during pilot test

After ranking the stakeholders, the improvement team develops strategies for gaining stakeholder support, plans for all possible barriers to success, and decides how each stakeholder should be approached about the proposed change. What kind of information does the stakeholder need? Should the team involve the stakeholder in the project? Could any other groups or individuals influence those opposed to the change? The team records these ideas and actions it must take to further the project in the last column of the matrix.

PLANNING MATRIX

Planning matrix
A diagram that shows tasks that need to be performed to complete an activity, the persons or groups responsible for completing the tasks, and an activity schedule with deadlines for task completion

A **planning matrix** is a diagram that shows tasks needed to complete an activity, the people or groups responsible for completing the tasks, and an activity schedule with deadlines for task completion.

Table 6.7 is a planning matrix for an improvement project involving changes to the patient registration process at Redwood Health Center. In hopes of reducing patient wait

TABLE 6.7.
Planning Matrix for Clinic Registration Change

Task	Responsible Person	Completion Date
Design a self-explanatory clinic registration form and cover letter	Clinic manager	June 1
Share the form and cover letter with a sample of patients to determine whether the average patient would understand how to complete the form	Clinic manager	June 15
Revise the form and cover letter as necessary and send them to a printer for duplication	Clinic manager	June 30
Teach the new procedure to receptionists and staff in charge of scheduling	Front office supervisor	July 10
Provide staff with registration forms, cover letters, and a supply of envelopes	Clinic manager	July 15
Alert mail room staff to the new procedure and provide forwarding instructions for the registration forms they will receive	Front office supervisor	July 15

times, the team decides to implement a change to the registration process for new patients. The clinic will mail a registration form to all new patients who schedule appointments. Patients will be asked to bring the completed form on the day of their appointment. The project seems simple and straightforward, but the planning matrix reveals that the team must complete a number of tasks to implement the change successfully.

Development of a planning matrix is especially useful in that it requires the improvement team to consider every task in the **improvement plan**. Before finalizing the planning matrix, team members should agree on the assignment of responsibility and the completion date for each task.

Improvement plan
A plan to eliminate the cause of undesirable performance or make good performance even better

Quality Storyboard

The series of events involved in a quality improvement project can be summarized in a report called a **quality storyboard**. Storyboards were first used to plan storylines for cartoons. These storyboards comprised a series of panels that illustrated a sequence of changes using pictures, numbers, and words. When placed together in the correct order,

Quality storyboard
A tool that visually communicates the major elements of an improvement project (A mock-up of a quality storyboard is shown in Figure 6.11.)

these panels created a story (Forsha 1995). Likewise, quality storyboards comprise a series of words and pictures that illustrate an improvement project from start to finish. Quality storyboards typically include the following information:

- ◆ Team information (names and roles)
- ◆ Project focus
  - • The opportunity for improvement
  - • Desired results
  - • Method that will be used to measure progress
- ◆ Analysis of current situation
  - • Current process steps (flowchart or workflow diagram)
  - • Problems identified (chart or graph)
  - • Quality improvement tools used to determine problem causes (diagram or chart/graph)
- ◆ Proposed solutions
  - • Actions required to resolve root problem causes (chart/graph)
  - • Description of stakeholders
- ◆ Solutions executed (timeline)
- ◆ Effectiveness of solutions
  - • Qualitative and quantitative results (charts/graphs)
  - • Plan for ongoing monitoring
  - • Next steps
  - • Lessons learned

Quality storyboards communicate more in graphs and pictures than in words. Someone unfamiliar with the improvement project should be able to determine what was done and why by following the logic of the storyboard's graphical displays, data analyses, and conclusions. Storyboards can be formatted as booklets or arranged on a large poster board. Some people use presentation software such as PowerPoint to design storyboards. Slides are created for each panel and printed in booklet or poster format (see Figure 6.11).

Teams usually create quality storyboards at the end of an improvement project for communication purposes, but some teams use them throughout their projects as a visual

Team Members
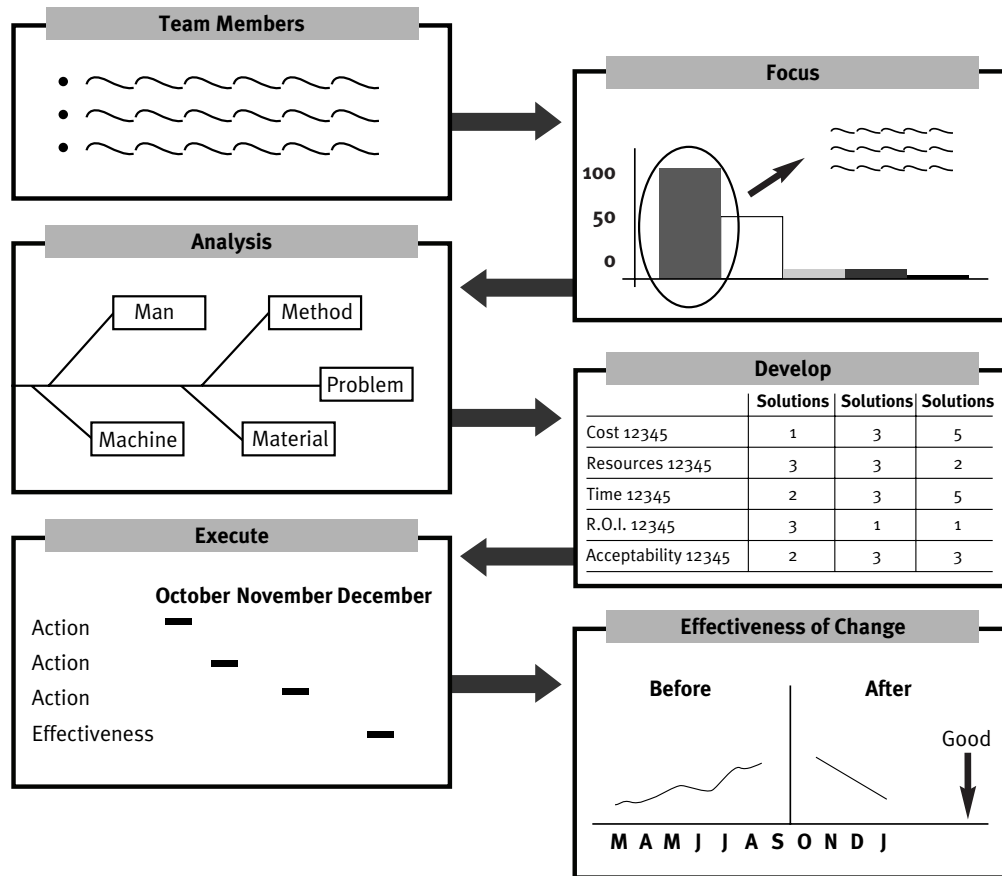
- ~~~~
- ~~~~
- ~~~~

Focus

100
50
0

Analysis

Man   Method
Problem
Machine   Material

Develop

	Solutions	Solutions	Solutions
Cost 12345	1	3	5
Resources 12345	3	3	2
Time 12345	2	3	5
R.O.I. 12345	3	1	1
Acceptability 12345	2	3	3

Execute

October November December

Action
Action
Action
Effectiveness

Effectiveness of Change

Before   **After**

Good

M A M J J A S O N D J

record of their progress. Quality storyboards also keep team members focused on the project goal. To create a quality storyboard for use during an improvement project, section off and label areas on a large poster board to display the team's progress for each step. Include areas for the project goal, names of team members, the work plan, activities undertaken during problem analysis and the results of those activities, solution(s) selected, solutions implemented and the results of those implementations, and other interesting or relevant information. If you are using **quality improvement tools** (e.g., flowcharts, cause and effect diagrams, matrixes, graphs), include them on the storyboard as well. Performance measures, data collection forms, and graphs displaying the results are also useful inclusions. After implementing and evaluating your solution, condense the information on the storyboard and use it to communicate the improvement project story to the rest of the organization.

Quality improvement tools
The diagrams, charts, techniques, and methods used in quality improvement work; also called *analytic tools*

Conclusion

Some quality problems can be easily solved in the course of everyday management. The solutions to more complex performance problems must be determined methodically. Several models can be used to conduct an improvement project. Although each model is different, all approaches involve analysis of current practices, implementation of solutions, and review of the solutions' effectiveness.

Teams use analytic tools throughout improvement projects to determine the causes of undesirable performance and to implement changes that result in measurable improvements. Some tools are quick and simple to use, while others are more complex. In most cases, experience gained from past initiatives informs a team's decision about the tools best suited for different phases of an improvement project.

Successful project outcomes hinge on the project team's ability to address complex problems systematically and the cooperation of professionals and departments in an organization. The third essential element, careful project management, is covered in the next chapter.

Student Discussion Questions

Imagine you are the supervisor of the health information management (HIM) department in a large outpatient clinic. This department manages patient records. Complaints about your department are becoming more frequent and intense. Some clinic employees have complained that the HIM department takes too long to retrieve patient records. Others have expressed dismay over the rudeness of HIM staff. You decide to talk about these problems with employees throughout the clinic.

The clinic's receptionists respond to you defensively. They tell you that the HIM staff won't answer the phone and that they want some backup when they are busy with patients. You talk to the HIM staff and find their stories are just as negative. They say they are being charged with more responsibilities but have no additional help. They also complain that the receptionists transfer calls that they should be handling. The clinic's nurses are also upset with the HIM staff; they claim the department does not help them locate patient charts, causing long wait times for patients. The clinic's physicians say they cannot assume additional tasks to alleviate the situation because their days are already chaotic.

1. What quality improvement tool would you use to identify possible reasons for the increase in complaints about the HIM department?

2. What quality improvement tool would you use to gather information to confirm the reasons for the complaints about the HIM department?

3. You hypothesize that complaints spike on certain days of the week. What quality improvement tool would you use to analyze this theory?

4. The HIM staff tallies information about the causes of complaints. What quality improvement tool would you use to prioritize the problems?

5. What quality improvement tool would you use to define the current process for retrieving patient records?

6. You believe that cooperation between the clinic receptionists and HIM staff would improve if phone responsibilities were more clearly defined. To whom would you assign the task of defining roles and responsibilities?

7. After redesigning the record retrieval process, you want to monitor the effectiveness of your actions. What quality improvement tool would you use to determine whether the number of complaints has decreased?

Websites

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  www.qualitytools.ahrq.gov
- FreeQuality
  www.freequality.org
- Institute for Healthcare Improvement, Quality Improvement Tools
  www.ihi.org/IHI/Topics/Improvement/ImprovementMethods/Tools
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  www.socialresearchmethods.net/kb
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  www.hospitalmedicine.org

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CHAPTER 7

IMPROVEMENT PROJECT TEAMS

After reading this chapter, the reader will be able to

➤ explain the role of improvement project participants,

➤ discuss the purpose of a team charter,

➤ recognize beneficial and disruptive team behaviors,

➤ apply leadership skills to manage team meetings effectively,

➤ describe stages of team development, and

➤ identify strategies for preventing improvement project failures.

KEY WORDS

- ➤ Charter
- ➤ Facilitator
- ➤ Gantt chart
- ➤ Ground rules
- ➤ Improvement team
- ➤ Independents
- ➤ Inputs
- ➤ Leadership
- ➤ Outputs
- ➤ Problem statement
- ➤ Process owners
- ➤ Sponsor

I f improvement models are the recipe and improvement tools are the ingredients, where does the improvement team fit into this analogy? When I bake a cake, I work alone; I do not need a group of people to help me. I could not work alone, however, if I had to prepare a banquet for 50 guests. I'd need a team of people to help cook the meal. The more complex the process—whether it's cooking or improving health service quality—the greater the need for teamwork. When improvement opportunities are identified, a group of people known as an **improvement team** is assembled. By following an improvement model and using improvement tools, the team works together to accomplish improvement goals. This team's success hinges on effective project management.

Improvement team
A group of individuals working together to implement an improvement or solve a problem

  A formal team need not be assembled for every improvement opportunity. The case study at the beginning of Chapter 3 describes an initiative to reduce patient wait times at Redwood Health Center. The clinic manager did most of the work for this project. The manager gathered data on patient wait times, shared those data with other people in the clinic, and informally discussed ways of reducing wait times. An improvement team was not formed for the project. Likewise, for the improvement initiative involving patient identification wristbands at Community Hospital in Chapter 4, a project team was not formed to resolve the problems people were having with the bands. After collecting information about band defects, the manager fixed the problem on her own. The case study about Sunrise Home Health Agency at the beginning of Chapter 5 is yet another example of an informal initiative. The manager and clinical staff members used regular staff meetings to revise the meeting process.

  Some performance problems cannot (and should not) be solved individually or informally and require the attention of a dedicated improvement project team that includes several people familiar with the systems and processes that need to be changed. A project team should be created when the improvement goal is more likely to be achieved through the coordinated efforts of people with varying knowledge, skills, and perspectives. The greatest improvement potential lies in problems that involve different professions and departments. The team's role is to analyze and eliminate undesirable, unpredictable, or unworkable performance situations. Once the improvement project is complete, the team is disbanded.

  People at all levels in the organization may be part of an improvement project team. Because projects usurp employees' primary work responsibilities, time spent away on an improvement initiative had better produce measurable performance gains. This chapter describes ways to increase the likelihood that formal improvement projects will be successful.

7.1 PROJECT PARTICIPANTS

When the best approach to an improvement opportunity is a formal project, a team of people is chosen to fill the following roles:

◆ Sponsor

◆ Team leader

◆ Facilitator

◆ Recorder

◆ Timekeeper

◆ Team members

These roles are summarized in Table 7.1. These roles may vary, but at a minimum, each project has a sponsor, a team leader, and team members. Involvement of the other roles depends on the organization's resources and the scope of the project.

SPONSOR

The project **sponsor** is the individual or group that decides to initiate an improvement project. If the improvement project involves more than one department, a **leadership** representative or a quality oversight committee should sponsor the project. (The role of quality oversight committees is covered in Chapter 10.) If the project affects activities in only one department or unit, the manager of that area usually serves as the sponsor.

Sponsor
An individual or group who supports, guides, and mentors an improvement project team; serves as a link to the organization's leadership; removes barriers; and acquires the resources a team needs to achieve successful outcomes

Leadership
An organization's senior leaders or decision makers

TABLE 7.1.
Roles of Improvement Project Participants

Project Participant	Role
Sponsor	Charters the improvement team, provides initial improvement goals, monitors team progress, and supports the team
Team leader	Coordinates project assignments and communication with outsiders, removes barriers, and keeps the project on track
Facilitator	Helps manage discussions about the process during team meetings, usually by asking questions (e.g., How do we want to make this decision? What things can we agree on?)
Recorder	Captures ideas, decisions, action items, and assignments on a flipchart or whiteboard for later transcription into a written summary of the project
Timekeeper	Keeps track of time during project meetings
Team members	Participate in discussions, decision making, and other team tasks such as gathering data, analyzing information, assisting with documentation, and sharing results

The sponsor clearly defines the performance problem that needs to be solved by writing a **problem statement**—a description of the situation. The problem statement influences many aspects of the project, including the makeup of the team and expectations. In addition, a clearly communicated problem statement establishes project boundaries so that problem-solving activities do not escalate into larger issues or wander into unrelated topics.

The project goal should include measurable performance expectations. For instance, the manager at Community Hospital hoped to achieve an 80 percent reduction in staff complaints about patient identification bands by making some process changes. The project sponsor sets these expectations and also defines the time frame for achieving them. An explicit project goal with clearly stated, measurable expectations and time frames focuses the improvement efforts.

Once the goal is clear, the sponsor identifies people who need to be included in the project. If the sponsor already has someone in mind to serve as the team leader, that person may help the sponsor select these key people. The following questions can guide their selection:

◆ Where is the problem occurring?

◆ What tasks are involved?

◆ Who carries out these tasks?

◆ Who determines how the tasks should be done?

◆ Who provides the **inputs** to these tasks?

◆ Who uses the **outputs** of these tasks?

The people chosen for the team should have personal and detailed knowledge of some part of the performance problem. They also must be willing and able to attend team meetings and make time for work that may need to be done between meetings. Once the project is under way, the team may ask additional members to participate if critical expertise is needed or a key group is not represented. The team should not become too large; the ideal size is five to ten members. To keep the team from expanding beyond the ideal size, some individuals may serve as consultants and attend meetings only when their expertise is needed.

In an ideal project initiation, the sponsor creates a written **charter** incorporating all the aforementioned elements: the project goal, a description of the system or process to be improved, the time frame for project completion, deliverables, measures, project scope, and team members. Figure 7.1 is a charter for a project aimed at improving the employee hiring process in a county-operated emergency medical service (ambulance) company.

Problem statement
A statement that defines and supports an improvement goal

Inputs
Products, services, or information flowing into a process

Outputs
Products, services, or information produced by a process

Charter
A written declaration of an improvement team's purpose (An example of an improvement project charter is found in Figure 7.1.)

Problem Statement

- During the last fiscal year, 342 applications were received for paramedic or emergency medical technician (EMT) vacancies. In this same period, 49 applicants (14% of the applicants) were hired and began employment with Grant County Emergency Medical Services (EMS).
- The current hiring process for EMTs and paramedics averages 87 days with a range of 7 to 212 days from time of application.
- As of February, EMS Operations are understaffed by 17% (47 vacancies for EMTs and paramedics).
- Understaffing causes an increase in EMS operational overtime, field training idle time, and system and administrative workload.

Goal

A 5% or lower vacancy rate for EMTs and paramedics

Project Scope

Individuals who apply for a paramedic or EMT position with Grant County EMS

Out-of-Project Scope

- Existing paramedic or EMT employees who are promoted or return to full-time status
- Vacancies for other positions

Measures

- Current vacancies
- Current overtime standby utilization
- Hiring process intervals (in days) and cost

- Applicants (count)
- Applicant status (percentage of overall applicants)
- Range of application date to start date

Deliverables

Within six months:

- Increase the hire rate of qualified applicants from 14% to 30%
- Reduce annualized cost of EMS overtime and standby time to less than $280,000
- Reduce cost per new hire (recruiting, advertising, and assessing) to no more than $300

Sponsor	Robert Jones, Director, Public Safety
Team Leader	Larry McNeill, Deputy Chief, EMS Training
Team Members	• Jackie Gregory, Administrative Services • Todd O'Brien, Human Resources • Michael Fine, EMT • Gary Young, Paramedic
Team Facilitator	Sally Steward, Manager, Information Services

When expectations are unclear or too broad, an improvement project can flounder. At one hospital, for example, staff members voiced concerns about the safety of the process of ordering, dispensing, and administering chemotherapy medications. An interdisciplinary team was chartered, which included representatives from the hospital's inpatient, out-

patient, adult, and pediatric areas (physicians, nurses, pharmacists, and laboratory staff). Over a four-month period, the team developed a top-down flowchart of the process, which ultimately was diagrammed as 21 steps, each with multiple sub-steps. Upon review, the team realized the enormousness of the project and discovered that each area had its own way of executing tasks. The charter the team developed at the outset of the project was too broad and was stalling the project. The team decided it would address only the adult outpatient population and limited the project to the medication administration phase, where most of the problems were occurring. Once the project scope and focus were better defined, the improvement initiative proceeded more quickly.

Charters keep teams focused and on track during projects. Team members may want to revisit the charter periodically to remind themselves of the project's boundaries and the objectives of the improvement effort. If the team receives new information during the project or if situations change, it may need to renegotiate its objectives or boundaries.

The sponsor supports the team throughout the project, monitoring progress and clearing obstacles that may arise. The sponsor acts as a sounding board for improvement ideas but does not become overly involved in the details of the team's work. At the end of the project, the sponsor reviews the team's improvement actions and ensures the solutions are effectively implemented.

Team Leader

The team leader organizes the project, chairs team discussions, keeps the project focused on the improvement goal, establishes the meeting schedule, and serves as a liaison between the team and the sponsor. Often team leaders are **process owners**—supervisors, managers, or physicians in the work area most affected by the improvement project. The leader is considered a full-fledged member of the team.

The team leader should be familiar with the improvement model to be used during the project and various improvement tools. The leader should also be skilled at managing group interactions and running a project. Some organizations assign a quality resource adviser to interdepartmental improvement projects. This person is familiar with performance improvement principles and serves as an internal consultant. The quality resource adviser helps the team understand the purpose of the project, the desired results, and team roles and responsibilities. When there is no quality adviser for the project, the team leader takes on these responsibilities.

Process owners
Individuals ultimately responsible for a process, including its performance and outcomes

(?) DID YOU KNOW?

A team leader's abilities and characteristics influence the outcome of an improvement initiative. Studies have demonstrated the importance of the following leadership factors (Turner and Müller 2005):

- Problem-solving ability
- Results orientation
- Energy and initiative
- Self-confidence
- Perspective
- Communication
- Negotiation skills

FACILITATOR

The **facilitator** supports the team leader. The facilitator assists with team-building activi-
ties, keeps meeting discussions and the entire project on track, and ensures deadlines are
met. The facilitator should be an objective team resource and detached from the process
being improved. As a neutral party, the facilitator is particularly effective at engaging every-
one on the team and helping the group reach consensus on controversial issues.

The facilitator works with the leader to plan meetings, structure tasks and assign-
ments, and incorporate quality improvement tools into the project. The facilitator knows
what data to gather, how to gather it, and how to present the results in a meaningful
graphic or tabular form.

In cases where the project is not overly complex, one person may assume the dual
role of team leader and facilitator. Research suggests, however, that multifaceted healthcare
improvement projects involving several departments and professions benefit from having
a facilitator who is not also responsible for leading the project (Ovretveit 1999).

RECORDER

The recorder, or note taker, documents activities throughout the project. This position is
usually assigned to one or more team members. During meetings, recorders are responsible
for writing the team's ideas, decisions, and recommendations on a flipchart or whiteboard.
Recorders also create meeting minutes and distribute them to team members before the
next meeting. The team uses the minutes to recall previous ideas, decisions, the rationales
behind decisions, actions to be taken, the people responsible for executing those actions,
and the schedule according to which those actions will be carried out.

TIMEKEEPER

The timekeeper keeps the team on track during meetings. If the time allotted for a discus-
sion point is exceeded, the timekeeper alerts the group. The team then decides whether
to accelerate the discussion, defer the item to another meeting, or end the discussion. In some
cases, the leader functions as the timekeeper, or this role may be assigned to the facilitator or an-
other team member.

⊛ LEARNING POINT
Project Participants

An improvement project involves several roles. At a minimum,
each project includes a sponsor, a team leader, and team mem-
bers.

TEAM MEMBERS

Team members share responsibility for achieving
the improvement goal. Members participate in

discussions, decision making, and other team tasks, such as data collection. Each team member should represent a program, department, or work unit significantly affected by the process to be improved or the problem to be solved. Ideally, team members should have a basic understanding of quality improvement principles, but familiarity with this topic is not a prerequisite for team membership.

Inclusion of one or two **independents**—members with little or no knowledge of the process—can also be useful. Because independents have no vested interest in the problem, they may provide a fresh and creative perspective. Some healthcare improvement projects also benefit from customer input. For example, if a hospital team is working to improve security in the newborn nursery, a woman who recently delivered a baby in the facility can be included as a team member. The recent patient may be made a permanent member of the team or serve part time by attending meetings only when her input is needed.

7.2 Team Meetings

At the first meeting, the team leader uses the project charter to introduce and explain the project goal and scope. He or she should discuss the charter openly to prevent misunderstandings. Any confusion or disagreement should be resolved at the first meeting.

The team leader also provides an overview of the project timeline at the first meeting. Figure 7.2 is a **Gantt chart** showing the approximate start and finish times for the steps of an improvement project. A Gantt chart is a specialized bar graph used to display a project or an activity. For example, an improvement team may create a Gantt chart showing a timeline for the implementation of a performance solution.

The first meeting is also a good time to set **ground rules** for team conduct—directives stating how team members are expected to communicate in meetings, make decisions, resolve conflicts, and so forth. Critical Concept 7.1 lists examples of improvement team ground rules. Teams usually adopt only a few key ground rules; however, there are no strict limitations to the number (Brelin et al. 1994, 63).

> **CRITICAL CONCEPT 7.1**
> Improvement Team Ground Rules
>
> - Participate by sharing your own opinions and experiences.
>
> - Contribute but do not dominate.
>
> - Actively listen and consider the opinions of others.
>
> - Stay focused on the improvement goal.
>
> *(Continued)*

Independents
Improvement team members who have little or no knowledge of the process under consideration and have no vested interest in the outcome of the project

Gantt chart
A bar graph that illustrates a project schedule (An example of a Gantt chart is found in Figure 7.2.)

Ground rules
Established guidelines for how an improvement team wants to operate; norms for behavior (Examples of ground rules are found in Critical Concept 7.1.)

CRITICAL CONCEPT 7.1
Improvement Team Ground Rules

- Avoid side conversations.

- Respect other people's time (e.g., arrive on time, don't leave early, return from breaks promptly).

- Complete assignments to which you have committed.

- Speak one at a time.

- Leave rank at the door; all team members are equal.

- Address conflict by dealing with the issue, not the person.

- Turn off cell phones and pagers.

- Be a participant, not a lurker.

- Have fun, but not at the expense of someone else's feelings.

- Be physically and mentally present during meetings.

- Listen, listen, listen, and respond.

- Allow for some mistakes; acknowledge them, let go, and move on.

- Accept conflict and its resolution as necessary catalysts for learning.

- Be open-minded to new thoughts and different behaviors.

- Honor confidentiality.

- Accept diversity as a gift.

- Begin and end all meetings on time.

- Share in the responsibilities of the recorder.

- Criticize ideas, not individuals.

Some organizations have a core set of ground rules for all improvement projects. From this set, teams are usually allowed to select the rules they wish to observe. If the organization has no such set of rules, the leader solicits ideas from the team by asking them to describe acceptable team behaviors. When the list is finalized and everyone understands

	March	April	May	June	July	August	September	October
Develop project charter	■							
Appoint improvement team		■						
Kick off project— first team meeting		◆						
Analyze current practices			■					
Gather performance data			■	■				
Identify improvement opportunities— second meeting					◆			
Solicit solution ideas from colleagues					■			
Finalize solutions— third meeting						◆		
Implement solutions on a trial basis						■		
Evaluate the effect of solutions— fourth meeting							◆	
Roll out successful solutions								■
Redesign ineffective solutions—fifth meeting								◆

FIGURE 7.2.
Gantt Chart for an Improvement Project

the ground rules, members individually acknowledge that they agree to abide by the group behaviors. Posting the rules on a large sheet of paper in the meeting room is an effective way of reminding group members of the rules they agreed to follow.

IMPROVEMENT PROJECT LENGTH

The time needed to complete an improvement project varies. Some projects are elephant-size, and some are bite-size. Table 7.2 is a timeline for completion of a project involving signage in a hospital. At this hospital, patients occasionally have difficulty finding the out-patient testing departments. Although there are signs leading the way, patients may not be able to read the signs or the signs may be unclear. The director of the patient registration department brought this concern to the attention of the chief operating officer, who then sponsored a project to resolve the problem.

TABLE 7.2.
Timeline for an
Improvement
Project

Timeline	Activities
Week 1	The team meets for two hours to discuss project objectives and set ground rules. The members brainstorm reasons why patients might get lost when trying to find the outpatient testing departments. To determine whether these assumptions are correct, the members will gather data over the next seven days. Some members will evaluate the current signs, and some members will interview staff in the testing areas and patients to gain their perspective.
Week 2	The team meets for two hours to review the collected data. In three locations, the signs are not at eye level, making it more difficult for people to see the signs. People who are having an electrocardiogram (ECG) may not recognize that they need to go to the ECG unit. Five of the interviewed patients have limited English proficiency and cannot read the signs. Several staff members confirmed that lack of English proficiency was a major cause of the problem. The team came up with three solutions: • Place all signs at eye level • Describe outpatient departments and testing areas in terms that laypeople can understand • Color code departments/testing areas (Lines of the corresponding color will be painted along the wall to lead patients to the different areas.) The team drafts an implementation plan for each of these solutions.
Weeks 3–7	• Team members identify signs using terminology that laypeople may not understand. New signs with patient-friendly terminology are manufactured. • Maintenance staff moves existing signs to eye level and hangs all new signs at eye level. • Colors are assigned to each testing area. Maintenance staff paints lines of the corresponding color along the walls leading from the registration area to the various departments. The team leader monitors the activities to ensure the solutions are implemented as expected.
Week 8	The team meets for one hour to discuss the solutions' effectiveness. Members agree to gather information to evaluate the success of the solutions. Some members will evaluate the new signs, and some members will interview staff in the testing areas to gain their perspective.
Week 9	The team meets for one hour to review data collection results. All signs are now at eye level. The director of the patient registration department reports that patients are pleased with the color coding and no patients are having difficulty finding the outpatient departments. Staff in the testing departments reports similar findings. The project is deemed a success.

Not all projects are completed quickly. A project team at the University of Wisconsin Hospital and Clinics was formed for the purpose of improving the use of intravenous pumps to deliver patient medications (Tosha et al. 2006). The 22-member team included representatives from anesthesiology, biomedical engineering central supply, industrial engineering, internal medicine, nursing, and pharmacy. The team met for 46 hours over four and a half months to describe the process, identify improvement opportunities, and design solutions, and then took additional time to implement the solutions (Tosha et al. 2006).

Whether the project is long or short, the team should meet regularly; otherwise, enthusiasm for achieving the improvement goal will diminish. The project sponsor must stay informed of the progress of the initiative and intervene when things are moving too slowly.

THE LEADER'S RESPONSIBILITIES

The team leader manages project meetings. This responsibility involves activities that ensure meetings are well run, including

- preparing the meeting agenda and distributing it at least one day in advance,

- keeping the meeting focused on the agenda,

- encouraging participation by all team members,

- fostering an environment in which team members feel safe expressing their ideas, and

- distributing the last meeting's minutes before the next meeting.

The leader's responsibilities are not glamorous, but they keep meetings running smoothly and prevent them from becoming sloppy and unproductive. Without a leader's guidance and preparation, team members may come to meetings unprepared and fail to follow up on decisions made at prior meetings. Absent a clear agenda, meetings are likely to veer off track. When meetings deteriorate, issues are left unresolved and team members become frustrated. In their frustration, they may stop showing up for meetings. The responsibility of keeping meetings focused does not rest on the team leader alone, however. All team members must cooperate to ensure successful meeting outcomes.

To minimize disruptions, meetings should flow in an orderly manner and include the following elements:

1. A brief overview of the agenda, including the primary objective of the meeting
2. A short update (no longer than five minutes) on work completed since the last meeting, including a synopsis of any major obstacles encountered

3. A group assessment of overall progress, including a review of the improvement project timeline
4. Brief discussion/reflection on the team's functioning as a group
5. Assignment of action items to be accomplished by the next meeting

LEARNING POINT
Effective Meetings

Strong leadership is essential to a well-functioning improvement project. One of a team leader's first activities is to help the group establish ground rules and ensure the team abides by them. While team meetings are an essential part of the improvement project, meetings that lack focus, drag on, or are unproductive can be a source of frustration. Not only the leader but all team members are responsible for keeping meetings on track.

If team members talk or have questions about something that is not on the agenda, the leader can write the topic on a big piece of paper marked "Issues Bin" or "Parking Lot." The team can discuss these issues later or defer them to the next meeting. To keep the meeting moving along, the leader may need to make arbitrary decisions about Parking Lot issues. If time allows, the leader can ask the group whether it wants to park the issue or discuss it.

7.3 TEAM DYNAMICS

There is always some tension between people who come together to accomplish a common goal. For instance, when my relatives plan our annual family reunion, they always disagree on the date, location, or other details. At least one contrarian in the group wants everything his or her way. My uncle interrupts to voice his opinions. My older sister doesn't say a word until everyone is in agreement. When she finally speaks, she complains about the decision. In the midst of this turmoil, I wonder why we bother to have reunions. In the end, though, they turn out to be lots of fun and worth the effort.

An improvement team is like a family. Each member of the team brings his or her values, beliefs, and personal agendas to the project. Some people show up at the first meeting thinking they already know what the problem is and how it should be fixed. Some team members are unwilling to express their opinions when a manager or leader is in the room. Some members want to be sure the improvement solutions won't require too much extra work. These people typically advocate easy-to-implement solutions even though other improvement actions might produce better results. The team leader, assisted by the facilitator, is responsible for managing this diverse group of people.

One of the team leader's greatest challenges is moving the improvement team though the stages of team development. In the 1960s, psychologist B. W. Tuckman (1965) identified four stages that all teams go through to become productive:

◆ *Forming*: The team meets and works together for the first time.

◆ *Storming*: Team members "jockey" for position and struggle for control.

◆ *Norming*: Team members adjust to one another and feel comfortable working together.

◆ *Performing*: The team begins to function as a highly effective, problem-solving group.

Typical team characteristics and the role of the leader at each stage of development are summarized in Table 7.3. As mentioned earlier, if a facilitator has been assigned

Stage	Team Characteristics	Role of Team Leader
Forming Members are concerned about inclusion and acceptance.	• Interactions are polite and superficial; open conflict is rare. • Group thinking (conformity of opinion) tends to dominate. • Members rely on the leader for direction. • Project goals are not clear.	The leader's role is primarily directive. He or she introduces the team members to the project and shares project goals and the timeline for completion. The leader helps team members become acquainted and allows time for members to get comfortable with one another, while still moving the project along. Ground rules are established.
Storming Members want to be heard and begin to assert control.	• Participation increases; members want to exercise some influence on the improvement project. • Group thinking decreases; open conflict increases. • Members look more critically at the improvement process and question how and why decisions are made. • Members may challenge the team leader directly or indirectly.	The leader clarifies the team's role in achieving project goals and addresses conflicts as they surface. Ground rules are reviewed and enforced. The purpose of the improvement project is revisited. The leader engages the project sponsor in resolving conflicts that cannot be effectively handled within the team structure.
Norming Members have a good understanding of the improvement process and want to accomplish the project goals.	• Members are more friendly and supportive of one another. • Ground rules that may have been overlooked in the beginning are now taken more seriously. • Subgroups may be formed to move the project along faster. • Conflict is handled openly and constructively.	The leader encourages members to spend less time on idea generation and more time on decision making. He or she keeps the team on track toward the improvement goals and provides time for discussion and feedback.
Performing Members are highly effective problem solvers.	• All contributions are recognized and appreciated. • Members develop a sense of cohesiveness and team identity. • Project goals are achieved. Members may look for additional improvement opportunities.	The leader takes a less directive and more supportive role as members actively take responsibility for achieving the improvement goals.

TABLE 7.3.

Team Characteristics and the Role of the Team Leader Through the Four Stages of Development

to the team, he or she will help the leader with team-building and project management responsibilities.

The rapidity of a team's progression through the four stages depends on the composition of the team, the capabilities of the team leader and members, and the tasks to be performed. One thing is certain, however—no team passes through the storming stage quickly. This stage is uncomfortable, but this discomfort and conflict are prerequisites to successful project outcomes. When the leader is not able to help the team work through the storming phase, members are less likely to voice different perspectives. The success of the improvement project is jeopardized if team members can't work as a cohesive group.

Improvement teams do not develop as neatly and sequentially as these stages imply. Teams can cycle from one stage to another relatively easily or become stuck in one stage. The team leader must identify where the team is along the development path and move it to the next phase with minimal fuss and resistance. Leaders with good team facilitation skills are better able to help teams progress through the stages.

> **⁕ LEARNING POINT**
> Team Development
>
> Improvement teams mature experientially and in stages; designating a group of individuals to function as a team is only the first step in team development. Development of a group of people into a team takes time, commitment, and energy. To achieve desired outcomes, teams must establish and focus on common goals ahead of personal needs.

7.4 Sustain the Change

Once a problem has been fixed, the problem must stay fixed. "I thought we solved that problem two years ago" is an utterance often heard in healthcare organizations. Financial and human resources are constantly expended on improvement projects and system redesign, yet familiar problems seem to creep back in to disrupt the performance of key processes. Managers trying to improve performance sometimes make mistakes that could have been avoided with forethought and some knowledge of improvement pitfalls.

Change Behaviors

When process improvements come undone, the cause often can be traced back to the attitudes or behaviors of the people doing the work—behaviors that should have been modified but weren't. Process improvement efforts tend to focus on standardizing or streamlining work steps and sometimes overlook the human part of the process. For instance, nurses in a hospital that implemented a bar-coded patient identification system to reduce medication errors found the process too cumbersome and began to take shortcuts (Koppel et al. 2008). The nurses made duplicate copies of patient wristbands so they could check the bar codes at the nursing station rather than in patient rooms. This shortcut significantly raised the potential for medication

errors. Modification of attitudes and behaviors is just as important as a more efficient process. Otherwise, people will lapse into the old way of doing things and the new process will have no chance of becoming a habit.

Why don't people follow through and adopt desired process changes? Five main factors that affect performance are listed in Table 7.4. Interventions that must be done to achieve compliance with process changes vary according to the performance issue. The cause of undesirable performance must be understood before taking action.

TEST REDESIGNED PROCESSES

Changes to processes are often implemented without a clear understanding of how the change affects other parts of the system—the people, other processes, and services. Testing the impact of redesigned processes on performance is a crucial step in all the improvement models described in Chapter 5. One way to assess improvements is to test process changes on a small subset of patients or activities (five to ten) before they are implemented. If the changes achieve the intended goals, they can be applied to all patients or activities.

Performance Factor	Possible Interventions
Expectations Do people know what they are supposed to do?	• Provide clear performance standards and job descriptions. • Create channels to communicate job responsibilities.
Feedback Do people know how well they are doing?	• Offer timely information about people's performance. • Use mistakes as learning opportunities.
Physical environment Does the work environment help or hinder performance?	• Make sure people are able to see, hear, touch, and feel what is necessary to do the job. • Correct problems causing environment, supply, or equipment complaints.
Motivation Do people have a reason to perform as they are asked to perform? Does anyone notice?	• Frequently provide reinforcement to people while they are learning new tasks. • Apply consequences (positive or negative) to change behaviors toward the desired direction.
Required skills and knowledge Do people know how to perform the task?	• Ensure people have the skills needed to perform the work. • Provide access to learning opportunities.

TABLE 7.4.
Performance Factors and Possible Interventions

Quantitative and qualitative data should be collected during the pilot phase of a process change. This information helps the project team see the effect changes will have on related activities and systems. The information gathered during the pilot can also convince others of the value of adopting the changes throughout the organization. Testing does not end at the pilot phase, however. After changes have been implemented for a short time, the team again must determine how well they are working.

Don't Overlook Education

Knowledge, diligence, effort, focus, resources, and effective leadership are all essential to the achievement of performance improvement goals. Leaders would be unwise to announce improvement priorities and then expect the improvements to automatically materialize. This approach wouldn't work. People must first be educated in the performance improvement skills they need to get the job done. Just as cheerleading won't improve a football team's chances of winning, announcements from leadership alone won't create sustainable improvements. Project teams need encouragement from leaders, but everyone involved in process improvement also needs to be able to use basic quality tools and techniques.

Conclusion

As healthcare processes have become more complex, teams of people working in various aspects of the delivery system must be personally involved in improving them. To achieve improvement goals, the team environment must foster interaction and open communication. Such an environment promotes generation of new ideas and continuous improvement. Effective teams share many characteristics. Respect for other team members is essential. Cooperation as a team requires trust, focusing on—and believing in—the end goal, arguing less, and exploring more.

In the early stages of a team's existence, members are dependent on the initiative of the team sponsor and leader. As the team develops, it begins to take responsibility for the success of the project. Each member fully participates, suggests improvements, challenges other members when needed, and supports the established ground rules.

Student Discussion Questions

1. Of the ground rules listed in Critical Concept 7.1, which three do you think are most important for a team to adopt, and why? When choosing the rules, consider your past experiences working with a team or a decision-making group.

2. If you were the team leader of the group described in the following case study, how would you refocus and remotivate the team toward the improvement goal?

> When members were recruited for the improvement project, they were clearly told that the team's work would be additional to their regular work responsibilities but that they had to treat it as a high priority. Assignments would have to be completed on time, and people would be required to attend meetings. Despite these clear expectations, by the third week of the project, team members started arriving late to meetings. They made excuses for not having completed their assigned tasks and were neglecting to return the leader's phone calls.

WEBSITES

- Healthcare Improvement Skills Center
  www.improvementskills.org
- Medicare Quality Improvement Community (MedQIC)
  www.qualitynet.org

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CHAPTER 8

IMPROVING PATIENT SAFETY

KEY WORDS

- ➤ Accident
- ➤ Adverse event
- ➤ Critical failures
- ➤ Criticality
- ➤ Error
- ➤ Failure
- ➤ Failure mode and effects analysis (FMEA)
- ➤ Failure modes
- ➤ Faulty system design
- ➤ Hazard analysis
- ➤ Hazards
- ➤ High-risk activities
- ➤ Human factors science
- ➤ Incident reports
- ➤ Incidents
- ➤ Medical errors
- ➤ Medication error
- ➤ Mistake-proofing
- ➤ Near miss
- ➤ Organizational culture
- ➤ Patient safety
- ➤ Patient safety organizations (PSOs)

- ➤ Proactive risk assessment
- ➤ Reportable events
- ➤ Risk
- ➤ Risk analysis
- ➤ Risk reduction strategies
- ➤ Root cause
- ➤ Root cause analysis (RCA)
- ➤ Safeguards
- ➤ Safety
- ➤ Sentinel event
- ➤ Strategy
- ➤ System
- ➤ Systems approach
- ➤ Vigilant
- ➤ Work systems

Although all healthcare professionals espouse the principle "First, do no harm," patients are occasionally harmed by caregivers' actions (or inactions). The Institute of Medicine's (IOM 2000) report *To Err Is Human: Building a Safer Health System* estimated that 44,000 to 98,000 Americans die each year as a result of preventable **medical errors**. IOM calculated the cost of medical errors, in terms of lost income, disability, and healthcare costs, at about $29 billion per year, not to mention the incalculable emotional cost of losing a loved one. The publication caused a public outcry that led to increased attention on **patient safety**.

In 2003, the Agency for Healthcare Research and Quality (AHRQ 2008) began tracking select measures to determine the level of patient safety in the United States. Data from 2005 revealed several opportunities for improvement:

◆ Adverse drug events in the hospital related to frequently used medications affected 6.89 percent of Medicare patients who received warfarin to 13 percent of Medicare patients who received intravenous heparin.

◆ A bloodstream infection developed in 1.47 percent of hospitalized Medicare patients who received a central venous catheter.

◆ A pressure ulcer (patch of deteriorated skin) developed in 20.7 percent of short-stay (30 days or less) nursing home residents.

◆ Among heart attack patients, the median time from hospital arrival to initiation of thrombolytic (blood thinner) therapy was 43 minutes, well above the national target of 30 minutes set by the American College of Cardiology and the American Heart Association.

8.1 SAFETY IN HEALTHCARE

In the 2001 IOM report *Crossing the Quality Chasm: A New Health System for the 21st Century*, safe healthcare is one of the six dimensions of healthcare quality. Healthcare facilities have had **safety** programs in place for many years. The purpose of these programs is to provide an environment in which **hazards** are eliminated or minimized for employees, staff, patients, and visitors. Safety is promoted via several activities, including risk management, emergency preparedness, hazardous materials management, radiation safety, environmental safety and hygiene, security, and preventive maintenance. Historically, however, there has been no organized, **systems approach** to the prevention of medical errors that cause harm to patients.

The prevention of mistakes in healthcare is not something new but rather something taken for granted. For the most part, it has been entrusted to individuals; the physicians, nurses, technicians, clerical staff, and others who provide care for patients or

Medical errors
Preventable adverse events or near misses related to medicine

Patient safety
Actions undertaken by individuals and organizations to protect healthcare recipients from being harmed by the effects of healthcare services; also defined as freedom from accidental or preventable injuries produced by medical care

Safety
The quality or condition of being safe; freedom from danger, injury, or damage

Hazards
Events, actions, or things that can cause harm

Systems approach
A methodical procedure used to identify factors that cause errors and then reduce or minimize them

Error
An unintended act (either of omission or commission) that produces an undesirable result or significant potential for an undesirable result

Faulty system design
Work system failures that set up individuals who work in that system to fail

Incidents
Events or occurrences that could have led or did lead to undesirable results

Root cause
The most fundamental reason for the occurrence of an actual or a potential event

System
A set of interdependent elements that interact to achieve a common aim

Organizational culture
Prevalent patterns of shared beliefs and values that provide behavioral guidelines or establish norms for conducting business

Work systems
Sets of interdependent elements, both human and nonhuman (e.g., equipment, technologies) that interact to achieve a common aim

support patient care activities have been expected to do the right thing—correctly—every time. When an **error** occurred, the person involved usually was blamed for being careless, incompetent, or thoughtless. Organizations focused on training and hiring competent people, believing they would be less likely to make mistakes. This reliance on healthcare professionals to perform faultlessly was misguided.

While the development of a competent staff is important, poor working conditions can make even the finest professionals prone to error. Investigations of mishaps such as the Three Mile Island and Challenger disasters have found that "accidents are generally the outcome of a chain of events set in motion by **faulty system design** that either induces errors or makes them difficult to detect" (Leape et al. 1995; emphasis added). Faulty system design is also a factor in most medical **incidents**. While an individual may have made a mistake, the **root cause** of that mistake probably lies in the design of the patient care **system**.

Healthcare professionals' activities are influenced by multiple factors, including **organizational culture**, personal attitudes and qualifications, composition of the work group, physical resources, and design of **work systems** and processes. Consider the event described in Critical Concept 8.1. Although the radiology technician erred by not responding to what the patient was saying, this mistake was encouraged by faulty equipment and a departmental procedure that failed to consider the possibility of an equipment malfunction.

> ⓘ **CRITICAL CONCEPT 8.1**
> Patient Care Event Resulting in Patient Harm
>
> A patient tells the radiology technician that she is feeling heat from the X-ray equipment.
>
> The technician dismisses the patient's concerns and continues with the exam because the X-ray procedure states that the machine should be turned off only if the equipment's malfunction warning bulb lights up. Because the mechanical warning system failed, the patient suffers burns.

Accident research in other industries has shown that people's ability to catch and correct mistakes is not infallible (Reason 2001). Even the most explicit procedure or most exacting preventive maintenance schedule cannot eliminate the possibility of human error. Healthcare professionals watch for errors and usually catch and correct them before patients are harmed, but if faulty system design causes numerous little mistakes, healthcare professionals can easily pass over a few without noticing. According to one research study, hospital nurses encounter about one problem per hour that prevents them from continuing their tasks (Tucker and Edmondson 2003). Examples of problems include missing supplies, information, and medications. The nurses must resolve these problems. In systems that are so

problem-prone, even highly competent, **vigilant** nurses are unlikely to catch every error.

Healthcare systems that depend on perfect human performance are fatally flawed. Mistakes can happen to anyone. In general, they result from circumstances beyond the conscious control of the perpetrator. To improve patient safety, systems and processes must be examined to see if changes are needed to reduce the chance that a patient will be harmed. The goal is to lessen the **risk** of errors. If an error does occur, however, reliable safeguards should prevent the mistake from reaching the patient. If the error does reach the patient, response mechanisms should act quickly to reduce the amount of harm to the patient.

Patient safety improvement initiatives are an important component of a healthcare organization's overall quality management effort. These initiatives focus primarily on the clinical aspects of patient care, but the same techniques used to protect patients from harm can be applied to any work activity, including billing, patient registration, plant maintenance, and housekeeping. Techniques for preventing human errors are based on **human factors science**, which originated in the military during World War II (Wickens et al. 1997). These techniques have been used for many years in other industries to increase productivity and reduce accidents.

> **⊛ LEARNING POINT**
> Healthcare Safety
>
> Traditionally, healthcare organizations have relied on the people providing patient care to prevent errors. However, processes that rely on perfect human performance are fatally flawed. An organized, systems improvement approach is needed to prevent errors that cause harm to patients.

Accident
An unplanned, unexpected event, usually with an adverse consequence

Vigilant
Carefully observant or attentive; on the lookout for possible problems

Risk
The possibility of loss or injury

Human factors science
Study of the interrelationships between humans, the tools they use, and the environment in which they live and work

8.2 Preventing Mistakes

Most mistakes are not intentional but occur because a process is complex. Even simple patient care processes are complex in terms of the variables involved. Consider, for example, the hospital process of obtaining a blood specimen for laboratory testing illustrated in Figure 8.1.

The variables in this process include the method used to order the test (handwritten or electronic), the patient's location, the method used to collect the specimen, the type of vials used to store the blood, the method of laboratory analysis, the manner in which results are reported, and much more. Considering all of these variables, the results are likely to be inaccurate at least some of the time.

Test ordered → Test completed → Results reported → Results reviewed

Figure 8.1.
High-Level Flowchart of Hospital Laboratory Testing

At best, the process can be changed to make errors impossible. We encounter examples of **mistake-proofing** every day. Here are just a few:

◆   Heating devices that shut off automatically so they are not left on all day

◆   Circuit breakers that trip when circuits are overloaded

◆   Computer disks that have overwrite protection

◆   Lawn mower motors that shut off when the operator lets go of the handle

Unfortunately, elimination of all possible chances for error is not always feasible. In such cases, patient care processes should be redesigned so the chances of harmful errors are minimized. By adding **safeguards** to a process, the likelihood of causing patient harm can be greatly reduced. Table 8.1 provides examples of patient care mistakes and safeguards that catch and correct them before they reach the patient.

TABLE 8.1.
Mistakes and
Safeguards
That Prevent
Patient Harm

Mistake	Safeguard
A surgeon starts to close a patient's surgical incision at the completion of an operation for extensive bowel repair, not knowing that a surgical sponge has been left inside the patient.	The scrub nurse does a sponge count and discovers one is missing. The surgeon locates the sponge inside the abdomen and removes it before closing the incision.
A phlebotomist starts to draw blood from the left arm of a patient, not knowing that the patient has just undergone a mastectomy on the left side and should not have blood drawn from that arm.	A red wristband on the patient's left arm alerts the phlebotomist that the left arm should not be used for blood draws.
A hospital dietary worker delivers an unmarked food tray to a patient room. He assumes he is delivering the tray to the correct room because it is the last tray on the cart and the patient in the room is the only patient in the nursing unit who has not received a meal.	A large sign indicating "nothing by mouth" is hung by the patient's bed. The dietary worker sees the sign and does not leave the food tray for the patient.
A physician prescribes a medication without knowing that the patient is allergic to it.	The pharmacist reviews the patient's medication history and discovers the mistake. The pharmacist contacts the physician, and the physician prescribes a different medication.

High-risk activities usually incorporate several safeguards. Figure 8.2 is an illustration of a hospital's medication administration process and errors that could occur at various stages. Notice the reviews along the way that catch and remedy those mistakes. When these safeguards don't work as intended, mistakes can reach the patient. To further safeguard patients, healthcare organizations are adopting many of the error prevention strategies and techniques used in other industries.

Patient safety is one component of an organization's quality management activities. The same basic cycle of measurement, assessment, and improvement used in other quality management activities applies to patient safety initiatives. The safety of patient care is measured, the measurement results are assessed, and improvements are made.

High-risk activities
Tasks or processes known to be error-prone or that have potential for causing significant patient harm should an error occur

8.3 MEASURING PATIENT SAFETY

The purpose of patient safety performance measurement is to discover and fix problems before an **adverse event** occurs. Measures of patient safety are like canaries in coal mines; they warn of risky situations before a mishap occurs. Patient safety measures are no different from other healthcare performance measurements. Many of the measures described in Chapter 3 alert the organization to situations that are a potential safety threat to patients. Examples of patient safety topics and the system-level measures used to assess corresponding performance are shown in Table 8.2.

> (*) **LEARNING POINT**
> Reducing Patient Care Mistakes
>
> Techniques for eliminating and reducing errors that occur in the delivery of patient care are based on human factors science, which has been used for years in other industries to prevent worker accidents.

Incident reports, sometimes called *occurrence reports*, are paper or electronic forms used to document potential or actual patient safety concerns. Employees are asked to complete a report whenever a patient is involved in an event that has caused or has the potential to cause injury. The following are examples of **reportable events**:

 ◆ Error that occurs during the delivery of patient care (e.g., medication administration mistake, treatment error)

 ◆ Development of a condition seemingly unrelated to a patient's disease (e.g., infection, pressure ulcer)

 ◆ Adverse or suspected adverse reactions to a treatment, medication, or blood transfusion

 ◆ Serious injury or unexpected death of a patient

 ◆ Patient fall

Adverse event
Any injury caused by medical care

Incident reports
Instruments (paper or electronic) used to document occurrences that could have led or did lead to undesirable results (An example of an incident report is shown in Figure 8.4.)

Reportable events
Incidents, situations, or processes that contribute to, or have the potential to contribute to, a patient injury, or that degrade the provider's ability to provide safe patient care

A physician writes a prescription for a hospitalized patient, not knowing the patient is allergic to the medication.

↓

The pharmacist reviews the prescription. → Error discovered. Mistake remedied.

↓

The pharmacist does not discover the physician's error and dispenses the medication to the nursing unit. The accident trajectory continues.

↓

A nurse receives the medication from the pharmacy and reviews it for appropriateness/accuracy prior to administration. → Error discovered. Mistake remedied.

↓

The nurse does not discover the physician's error and approaches the patient to administer the medication.

↓

The nurse identifies the medication to the patient. → Error discovered. Mistake remedied.

↓

The patient receives the medication to which he is allergic.

Source: Spath (2001). Used with permission.

Topic of Interest	Measure
How often do patients develop an infection as a result of surgery?	Number of surgical cases in which patients developed an infection following surgery per 100 procedure days
How often do patients develop an infection as a result of a central venous catheter insertion?	Average number of hospital-wide central venous catheter infections per 1,000 catheter line days
How often do patients develop pneumonia as a result of being on a ventilator?	Rate of pneumonia detected per 1,000 ventilator days in the intensive care units
How often do patients have an adverse reaction to a medication?	Average number of adverse drug events per 1,000 doses
How often do patients experience a sentinel event?	Number of sentinel events per 10,000 adjusted patient days*
How often do patients fall?	Number of falls per 10,000 adjusted patient days*
How often do patients experience a medication error?	Number of medication errors per 1,000 doses of medication

* Adjusted patient days is a quantity calculated by the financial department that is based on the sum of inpatient days and financial equivalent patient days, which is determined by applying a formula to outpatient treatments. Therefore, inpatients and outpatients are accommodated in this quantity.

◆ Malfunction of a medical device resulting in actual or potential patient injury

◆ Diagnostic or testing problem (e.g., delay in testing or reporting, **failure** to report significant abnormal results, wrong test ordered)

Failure
Compromised function or intended action

An example of a form used to report the circumstances surrounding a patient fall is shown in Figure 8.3. The individual who witnessed, first discovered, or is most familiar with the incident usually completes the report. The reporter does not include his or her judgment on the cause of the event, only facts. The names of witnesses to the event and the employee involved in the incident (if not the reporter) are typically included in the report.

The incident reporting process is not standardized among healthcare organizations. Facilities may define reportable events differently or use different mechanisms to document events. To streamline the reporting process, some organizations have created Web-based incident reporting tools and telephone hotlines.

Prompt identification of patient incidents enables an organization to immediately investigate the circumstances of the incident and, if necessary, modify the process or

FIGURE 8.3.

Patient Fall
Incident Report

Patient name: _____ Room # _____ Age: _____ Gender: _____
Admission date: _____ Date of fall: _____ Time of fall: _____

Ask the patient:	
Do you remember falling?	✸ Yes ✸ No (If the patient cannot respond, his or her family may be able to provide information.)
Were you injured?	✸ Yes (How and where?) ✸ No
What were you doing when you fell?	
Other information:	
Was the nurse call light on?	✸ Yes (Include number of minutes call light was on.) ✸ No
The activated call light belonged to:	✸ Patient ✸ Roommate
Contributing factors (Specify all.)	✸ Medication: ✸ Equipment: ✸ Footwear: ✸ Confusion: ✸ Urgency of bladder/bowels: ✸ Environmental issues:
Was the patient following the risk for falls protocol?	✸ Yes ✸ No
Any other information from patient, family, or staff	
Number of hours since last patient assessment	
Has this patient previously fallen during this stay?	✸ Yes ✸ No
Age	
Injury	✸ Yes ✸ No
Did staff witness the fall?	✸ Yes ✸ No
Was the patient identified as at risk for falls?	✸ Yes ✸ No
What fall prevention interventions were used?	
Was the patient physically restrained?	✸ Yes ✸ No

environment to prevent similar occurrences in the future. Incident reports are also used to identify patterns of events that indicate unsafe conditions. Various departments and committees in the organization review these reports on a regular basis. A bar graph of the types of incidents that occurred in a hospital over the course of one month is shown in Figure 8.4.

FIGURE 8.4.
Bar Graph of
Patient Incidents

Number of Incidents for the Month of July

To ensure that staff members report patient incidents, managers must strive to maintain an environment that encourages people to report mistakes, admit problems, have different opinions, and exchange ideas. Experience has shown that when employees fear reprisal, they are less likely to report patient incidents and the organization thus loses a valuable source of information about patient safety. This finding is consistent with what has been discovered by officials of the NASA Aviation Safety Reporting System and the British Airways Safety Information System. These groups identified the following five practices as important to increasing the quantity and quality of employee incident reports (O'Leary and Chappell 1996):

◆   Protect people involved against disciplinary proceedings (as far as practical).

◆   Allow confidential reporting or de-identify the reporter.

◆   Separate the agency or department collecting and analyzing the reports from those that have the authority to institute disciplinary proceedings and impose sanctions.

◆   Provide rapid, useful, accessible, and intelligible feedback to the reporting community.

◆   Make reporting easy.

An increasing number of healthcare facilities are required to report patient incidents to entities outside the organization. More than half of the states have implemented regulations that require healthcare organizations to report certain types of serious incidents to the state health department. Some of these states publicly report the number of each type of incident. More important, state patient incident databases are a means of identifying the underlying causes of risks and hazards in patient care through analysis of events occurring at many facilities. Lessons learned through this analysis are often publicly shared. Several entities that manage state incident reporting systems are listed in the website resources at the end of this chapter.

Ultimately, there will be a national reporting system for patient safety incidents. In 2005, the federal government passed the Patient Safety and Quality Improvement Act (Patient Safety Act), which included plans to develop a national database of patient incident information. The Patient Safety Act made possible the creation of a nationwide network of **patient safety organizations (PSOs)** for the purpose of gathering and analyzing information about patient incidents from providers in all states. To qualify as a PSO, an organization must have expertise in identifying risks and hazards in the delivery of patient care, determining the underlying causes, and implementing corrective and preventive strategies. As of this writing, AHRQ, the federal entity responsible for administering the PSO provisions of the Patient Safety Act, is starting the PSO selection process.

LEARNING POINT
Safety Measurement

The fundamental principles of performance measurement apply to patient safety. To encourage employees to report events that have caused or have the potential to cause injury to patients, organizations must reassure their staffs that they won't be disciplined for unintentional mistakes.

Patient safety organizations (PSOs)
Associations that have expertise in identifying risks and hazards in the delivery of patient care, determining the underlying causes, and implementing corrective and preventive strategies

---

8.4 IMPROVING PATIENT SAFETY

Projects aimed at improving patient safety follow the same steps as any other project:

1.   Define the improvement goal.
2.   Analyze current practices.

3. Design and implement improvements.
4. Measure success.

Any of the models described in Chapter 5 could be used to improve patient safety. For instance, just as rapid cycle improvement (RCI) was used to improve patient satisfaction (Figure 5.4), an outpatient clinic could use RCI to reduce prescription errors.

Two improvement models not described in Chapter 5 are used by healthcare organizations for the explicit purpose of making patient care safer: failure mode and effects analysis and root cause analysis. These patient safety improvement models are described below.

Failure Mode and Effects Analysis

Failure mode and effects analysis (FMEA) is a **proactive risk assessment** technique that involves a close examination of a process to determine where improvements are needed to reduce the likelihood of adverse events (McDermott, Mikulak, and Beauregard 1996). The technique is considered proactive because the improvement project is undertaken to prevent an adverse event. The FMEA technique promotes systematic thinking about the safety of a patient care process in terms of the following questions:

◆   What could go wrong?

◆   What will be the result if something goes wrong?

◆   What needs to be done to prevent a bad result when something does go wrong?

Risk or hazard potential is part of every process. The goal of an FMEA project is to find these hazards and make process changes to reduce the risk of error. FMEA is a formal and systematic assessment process, but individuals informally use FMEA almost every day. Here is an example:

> You want to go to a music concert, expecting to buy a ticket at the door.
> What could go wrong: The concert will be sold out.
> Result: You'll miss the concert, plus you'll be disappointed because you've waited several years for this band to come to your town.
> Prevent the bad result: Buy a ticket in advance.

FMEA has been used to conduct safety system evaluations in manufacturing, aviation, computer software design, and other industries for many years. Now healthcare organizations use the technique to evaluate and improve the safety of patient care activities. Hospitals and skilled nursing facilities accredited by The Joint Commission (2008c, 87; 2008d, 28) are required to periodically conduct prospective risk assessments for patient safety improvement

Failure mode and effects analysis (FMEA)
Systematic assessment of a process to identify the location, cause, and consequences of potential failure for the purpose of eliminating or reducing the chance of failure; also called *failure mode, effects, and criticality analysis* (FMECA) and *healthcare failure mode and effects analysis* (HFMEA) (An example of a completed FMEA is shown in Figure 8.7.)

Proactive risk assessment
An improvement model that involves identifying and analyzing potential failures in healthcare processes or services for the purpose of reducing or eliminating risks that are a threat to patient safety

purposes. The FMEA improvement model is the most common technique used to comply with this standard (American Society for Healthcare Risk Management 2002).

    The six steps of an FMEA project are sequenced similarly to those of the Plan-Do-Study-Act improvement model (see Figure 8.5). FMEA projects are undertaken by a team that has experience with the process under study; it regularly carries out the activities and knows where the potential for error exists. The FMEA project team may also include people who have no experience with the process to gain a different perspective.

    An FMEA project begins with the development of a clear understanding of the process. The team develops a flowchart to visualize each of the steps. Next, the team conducts a **hazard analysis**, which involves a brainstorming session to develop a list of all failures that could occur in each step. The first two steps in the process of ordering laboratory tests for hospitalized patients are shown in Figure 8.6. Listed below each step are the **failure modes** or errors that could occur.

Hazard analysis
The process of collecting and evaluating information on hazards associated with a process

Failure modes
Different ways a process step or task could fail to provide the anticipated result

FIGURE 8.5.
FMEA Steps in Relationship to PDSA Cycle

After all potential failure modes or mistakes have been identified for each step, the team determines the risk or **criticality** of each failure mode to prioritize them for elimination. A criticality score is assigned to each potential failure on the basis of the following criteria:

Criticality
Ranking of potential
failures according to
their combined influ-
ence of severity and
frequency and prob-
ability of occurrence

◆   *Frequency*: the probability that the failure will occur

◆   *Severity*: the degree of harm the patient would experience if the failure occurred

◆   *Detection*: the likelihood that the failure will be detected before patient harm occurs

Each of these criteria is rated on a scale of one to five, with one as the lowest possible rating and five as the highest. Once the rating process is complete, a criticality score is assigned to each potential failure. This score is calculated by multiplying the frequency score by the severity score by the detection score. Table 8.3 is an FMEA worksheet for the first step in the

TABLE 8.3.
FMEA Worksheet

Step	Potential Failure	Effect	Frequency	Severity	Detection	Criticality Score
Test ordered	Wrong test ordered by physician					
	Patient not properly prepared for test					
	Incomplete order for test					

laboratory test ordering process. After recording in column three the effect the potential failure would have, the team completes the scoring process. The potential failures with the highest criticality scores are considered the **critical failures** most in need of prevention.

Once the critical failures are identified, the team needs to determine what would cause these potential failures so preventive actions can be taken. The following list provides examples of questions the team can ask about the critical failures to discover their root causes:

◆   Who might experience this problem? Would all the people who do the work experience it or just some of them?

◆   What is the specific problem? For example, referring to the laboratory ordering process, what information is the physician likely to omit when ordering a test?

◆   Where might the failure occur? Where would the failure be unlikely to occur?

◆   When would the problem likely happen (during certain times or days of the week)? When wouldn't the problem happen?

◆   Why might the failure occur? Why doesn't it occur all the time?

◆   How many times has the problem occurred in the past? How can the process be changed to eliminate or reduce the chance this problem will occur?

Table 8.4 is an action planning worksheet the team can use to brainstorm ways the process can be changed to reduce the chance of failure, help people perform their jobs correctly, and help people identify and correct the failure before a patient is harmed.

The remaining steps of the FMEA project are the same as those of any improvement project. The process changes are implemented and tested to determine whether the desired results have been achieved. In an FMEA project, the desired result is reduction or elimination of critical failures. If the process changes reduce or eliminate the possibility that the critical failures will occur—the desired result of an FMEA project—they are incorporated into the process. Changes that don't produce the desired result are evaluated to determine why they didn't work, and new process changes are developed and tested.

FMEA projects are usually undertaken for processes involving high-risk patient care activities prone to failure; however, they can be used to reduce failure in any process. Figure 8.7 is a completed FMEA for the process of collecting patient demographic and insurance information in a large ambulatory health clinic for women.

⊛ **LEARNING POINT**
  FMEA

FMEA is a prospective risk assessment technique used to reduce high-risk process failures. The probability and likelihood of detecting a failure is combined with an estimate of the impact of the failure to produce a criticality score. This score helps teams prioritize failures for elimination.

Critical Failure	Prevention		Detection
	Reduce the chance for failure	**Help people perform their jobs correctly**	**Identify and correct the failure before the patient is harmed**
Physician ordered the wrong test			
Patient was not properly prepared for the test			
The order for the test was incomplete			

TABLE 8.4.

Action Planning Worksheet

Members of the FMEA team included the registration area supervisor, two registration clerks, the manager of the patient accounts office, and the patient financial counselor. The clinic business manager served as team leader.

Several variations of the FMEA model described here are being used in healthcare organizations. The Veterans Health Administration created a model called Healthcare Failure Mode and Effects Analysis™ to conduct proactive risk analyses (U.S. Department of Veterans Affairs 2007). Some healthcare organizations use a proactive **risk analysis** model called failure mode, effects, and criticality analysis. All models have similar characteristics.

ROOT CAUSE ANALYSIS

Root cause analysis (RCA) has been used for many years in other industries. NASA's (2003) use of RCA to investigate the Space Shuttle Columbia disaster is just one example. Safety improvement teams use RCA after an adverse event has occurred to determine system deficiencies that led to the event. The six steps involved in RCA follow the Plan-Do-Study-Act Cycle (Figure 8.8).

Since 1996, organizations accredited by The Joint Commission have been required to conduct an RCA following a sentinel event. A **sentinel event** is an incident in which death or serious harm to a patient occurred. The word *sentinel* reflects the egregiousness of the injury (e.g., surgery performed on the wrong patient) and the likelihood that investigation of the event will reveal serious safety problems (Wachter 2008, 276). The Joint Commission also encourages facilities to conduct an RCA following a near miss. A

Risk analysis
The process of defining, analyzing, and quantifying the hazards in a process, which typically results in a plan of action undertaken to prevent the most harmful risks or minimize their consequences

Root cause analysis (RCA)
A structured process for identifying the underlying factors that caused an adverse event

Sentinel event
An adverse event involving death or serious physical or psychological injury (or the risk thereof) that signals the need for immediate investigation and response

Process Step	Potential Failure Mode	Potential Effect	Severity of Effect	Probability of Failure	Detection of Failure	Criticality Score
Verify patient's mailing address and phone number	Registration clerk does not verify address and phone number.	Billing statement is sent to the wrong address; physician is unable to contact patient if necessary after patient leaves clinic.	4	4	5	80
	Registration clerk enters demographic information incorrectly.	Billing statement is sent to the wrong address; physician is unable to contact patient if necessary after patient leaves clinic.	4	3	5	60
	Patient gives registration clerk incorrect information.	Billing statement is sent to the wrong address; physician is unable to contact patient if necessary after patient leaves clinic.	4	3	5	60
Verify patient's insurance information	Wrong insurance company is billed.	Payment delay	5	3	3	45
	Registration clerk does not perform verification of insurance benefits.	Payment delay	5	4	3	60

Rating Key

Severity rating scale:

1 = No effect
2 = Minimal effect
3 = Moderate, short-term effect
4 = Significant, long-term effect
5 = Catastrophic effect

Probability rating scale:

1 = Highly unlikely/never happened before
2 = Low/relatively few failures
3 = Moderate/occasional failures
4 = High/repeated failures
5 = Very high/failure almost inevitable

Detection rating scale:

1 = Almost certain to be detected and corrected
2 = High likelihood of being detected and corrected
3 = Moderate likelihood of being detected and corrected
4 = Low likelihood of being detected and corrected
5 = Remote likelihood of being detected and corrected

Critical Failure	Root Causes	Actions Intended to Eliminate/Reduce Failure or Mitigate Effects	Measures of Success
Registration clerk does not verify address and phone number.	Clerks are not trained and do not receive continuing education on use of address verification capabilities of registration computer system.	• Provide address verification training for registration staff • Educate registration staff on importance of address verification and demonstrate correct way to document that verification was performed	• Percentage of billing statements returned because of invalid address
Registration clerk does not perform verification of insurance benefits.	Management does not hold registration clerks accountable for insurance verification.	• Implement policies and procedures that hold registrars accountable for verification of patient's insurance • Continue to educate registration staff on importance of insurance verification • Implement incentives for registration staff to verify insurance benefits	• Percentage of accounts for which registration clerk does not verify patient insurance benefits • Percentage of accounts with incorrect insurance identification and group numbers • Percentage of accounts billed to wrong insurance company

FIGURE 8.8.
RCA Steps in
Relationship to
PDSA Cycle

near miss is an incident that did not result in death or injury but could have; only by chance was the patient not harmed. Since 1996, several states have enacted regulations similar to The Joint Commission's standards. These regulations require healthcare facilities to conduct formal investigations of serious adverse events.

Like FMEA, the RCA process is similar to what people do almost every day. For example, a strange sound from my car (a symptom) indicates something is wrong. Symptoms are not the cause of the problem; they are signals that something may be wrong. Turning up the radio to mask the strange sound won't fix the faulty water pump (root cause) causing the sound. My car problem will continue until the root cause is corrected. The same is true for problematic patient care processes. Delivery of the wrong medication to a hospitalized patient (a symptom) signals that something is wrong with the medication administration process. If the people involved in giving medications don't

Near miss
Any process variation that does not affect the outcome or result of an adverse event but carries significant chance of an adverse outcome if it were to recur; also known as a *close call*

Medication error
Any preventable event
that may cause or lead
to inappropriate medi-
cation use or patient
harm while the medica-
tion is in the control
of the healthcare pro-
fessional, patient, or
consumer

find and fix the root cause of the mistake, another **medication error** is likely to occur in the future.

RCA begins promptly after a sentinel or adverse event. Like all improvement projects, a team of people is assembled to conduct the investigation. The team comprises people who witnessed the event and people with expertise in the processes involved. In some organizations, managers or senior leaders may also work with the RCA team. Ideally, the team leader is someone who has experience using the RCA investigation technique.

Critical Concept 8.2 is a description of a wrong-site surgery event. An arthroscopy should have been performed on the patient's right knee, but the procedure was done on his left knee. The RCA team for this event comprises the people directly involved in the procedure (surgeon, anesthesiologist, surgical nurses, and surgery scheduling clerk) and the managers of the admission and surgical areas. The team's first task is to determine what happened by collecting and inspecting physical evidence (such as equipment, materials, and safety devices) and reviewing documentary evidence (paper or electronic media). The team also asks the people directly and indirectly involved in the event to provide their perspectives. These discussions may occur in a team meeting, or people may be interviewed individually. Ultimately, the team develops a picture of the event and creates a high-level flowchart to illustrate the steps leading up to it (Figure 8.9).

> **ⓘ CRITICAL CONCEPT 8.2**
> Description of Wrong-Site Surgery Event
>
> A 62-year-old man had an arthroscopy procedure performed on his left knee instead of his right knee. Three weeks prior to the surgery, the orthopedic clinic telephoned the hospital to schedule the man's procedure. At that time, the front office staff in the clinic mistakenly scheduled a left knee arthroscopy (the wrong knee). The surgery scheduling clerk at the hospital faxed a surgery confirmation form to the clinic. Per hospital policy, the clinic is supposed to review the information on the form, verify the accuracy, and fax the signed confirmation back to the hospital. The clinic staff was busy and did not fax the confirmation back.
>
> On the day of the surgery, the patient's paperwork indicated that the surgery was to be performed on his left knee, per the original phone call from the clinic. The surgery schedule, a document used to plan the day's activities in the operating area, also indicated that the patient was to have a left knee arthroscopy. The man was taken to the preoperative holding area, where a nurse spoke with him about his upcoming procedure. Relying only on the surgery schedule, the nurse asked the patient to

CRITICAL CONCEPT 8.2
Description of Wrong-Site Surgery Event

confirm that he was having an arthroscopy on his left knee. The man told the nurse that he had been experiencing pain in both knees and that he'd eventually need procedures on both of them. He thought he was scheduled for surgery on his right knee that day but that perhaps the doctor had decided to operate on his left knee instead. The nurse did not read the history and physical examination report that the patient's doctor brought to the hospital that morning. If she had read this report, she would have noticed that it had right knee surgery scheduled that day.

The anesthesiologist examined the patient in the preoperative holding area. When asked about the procedure, the man was confused about which knee was to be operated on that day. The anesthesiologist wrote 'knee arthroscopy' in his notes in the patient's record. The patient was taken into the operating room, where the surgeon was waiting. The surgeon spoke with the patient about the upcoming procedure on his right knee, and the patient signed a consent form indicating that surgery was to be performed on the right knee that day. The surgeon marked his initials on the man's right knee in ink to designate the surgery site.

The anesthesiologist and scrub nurse readied the room for the procedure. The patient was anesthetized and fell asleep. Thinking the man was having surgery on his left knee, the nurse placed a drape over his right knee, not noticing the surgeon's initials. The left knee was placed in the stirrup and prepped for the procedure. The nurse then asked everyone in the room to confirm that the man was the correct patient and that he was having an arthroscopy on his left knee. Everyone in the room said "yes" except the surgeon, who was busy preparing for the procedure. Distracted, he nodded his head in agreement. The nurse documented on the preoperative checklist that the patient's identity, procedure, and surgery site had been verified.

The surgeon performed the arthroscopy on the knee that had been prepped—the left one. When the patient awoke in the surgical recovery area, he asked the nurse why he felt pain in his left knee and told her the procedure should have been performed on his right knee. The nurse notified the surgeon, who immediately informed the patient and his family about the mistake.

Next, the team looks for the root causes of the event. This step is more involved than the Five Whys tool described in Chapter 6. First, the RCA team determines the causal factors. Causal factors are situations, circumstances, or conditions that collectively,

with other causes, increased the likelihood of the adverse event. The team identifies several such factors for the wrong-site surgery event:

◆ The orthopedic clinic phoned the patient's surgery reservation to the hospital. According to procedure, the clinic also should have confirmed the surgery reservation and provided a hard copy of it to the hospital, but it did not. Team discussion reveals that many surgeons' offices don't comply with this step.

◆ The surgeon failed to provide a copy of the patient's history and physical examination to the hospital at least 72 hours prior to surgery (as required by procedure). Without this document, the admissions and surgery scheduling clerk was unable to double-check the accuracy of the planned surgery prior to the patient's arrival.

◆ The nurse relied only on what was written on the surgical schedule to confirm the surgery site. The patient's history and physical report (which the surgeon brought to the hospital on the day of the surgery) indicated the patient was to undergo a right knee arthroscopy, but the nurse did not read this report.

◆ The patient had a history of pain in both knees. The surgeon told him that eventually an arthroscopy would need to be performed on both knees. When the nurse and the anesthesiologist questioned the patient, he appeared confused about which knee was to be operated on that day.

◆ The surgeon correctly marked the patient's right knee as the surgery site. However, the scrub nurse placed drapes over the right knee and prepared the left knee for the procedure. The nurse had already set her mind to the fact that a left knee arthroscopy was to be performed and didn't notice the surgical site marking on the patient's right knee.

◆ Prior to starting the arthroscopy, the scrub nurse asked everyone in the room to confirm the left knee as the surgery site. Everyone replied "yes" except the surgeon, who was busy at the time. He just nodded his head in agreement. According to procedure, everyone in the room is supposed to stop what he or she is doing and verbally confirm the correct site.

◆ The surgeon proceeded with the left knee arthroscopy, not noticing that he was working on the wrong knee.

The team uses a cause and effect diagram like the one in Figure 8.10 to sort the causal factors into problem categories.

Once the team is satisfied that it has identified all causal factors, it identifies the root causes. Root causes are the most fundamental reasons the event occurred. To discover the

FIGURE 8.10.
Cause and Effect Diagram for Wrong-Site Surgery

root causes, the team asks "why" questions about each of the causal factors. For example, why didn't the clinic provide a hard copy of the confirmed surgery reservation as required? Why didn't the nurse double-check the intended procedure by reading through the patient's history and physical report? Why didn't anyone stop to reconfirm the correct surgery site when the patient exhibited confusion about the surgery he was having? Why didn't the scrub nurse notice the surgical site marking on the right knee before covering it up with a drape? This questioning process continues until the team identifies the system problems that underlie the causal factors. System problems take many forms (Vincent 2003):

◆ Organization and management (e.g., policies and standards, organizational culture, values and priorities)

◆ Work environment (e.g., staffing levels, workload, skill mix, resource availability, managerial support)

◆ Team (e.g., communication, team leadership, willingness to seek help)

◆ Individual staff members (e.g., knowledge and skills, motivation and attitude)

◆ Task (e.g., availability and use of standardized procedures)

Since January 1995, The Joint Commission has been gathering information on the root causes of sentinel events. As of March 2008, The Joint Commission (2008e) has reviewed 4,977 sentinel events that occurred in accredited healthcare organizations. The most common root cause of sentinel events is inadequate communication between care providers or between care providers and patients/families. Other leading root causes include incorrect assessment of a patient's physical or behavioral condition and inadequate leadership, orientation, or training (The Joint Commission 2008b, 47).

The RCA team involved in investigating the event described in Critical Concept 8.2 determines the following system problems to be the root causes of the wrong-site surgery:

◆ During the surgery site verification step, members of the surgical team did not actively communicate with each other.

◆ Management does not ensure that members of the surgical team consistently comply with the standardized surgery site verification procedures.

◆ Surgeons' offices are not held accountable for not complying with the hospital's surgery scheduling procedures and history and physical exam report requirements.

◆ Perceived pressure for productivity (the need to start all procedures at the scheduled time) discourages members of the surgical team from interrupting

the process when something unusual occurs (such as a patient expressing confusion about the surgery he is having).

An adverse event usually has no more than four root causes. If the team identifies more than four, questioning should continue until the fundamental reasons are apparent.

> Now that the root causes of the sentinel event have been identified, the team develops solutions to prevent such an event from occurring again. The Joint Commission uses the phrase **risk reduction strategies** to describe the actions required to reduce or eliminate root causes. Risk reduction strategies are divided into three broad action categories:

Risk reduction strategies
Actions undertaken to reduce or eliminate the root cause of an adverse event (Examples of risk reduction strategies are found in Table 8.5.)

◆ Eliminate the chance of failure

◆ Help people perform their jobs correctly

◆ Help people identify and correct mistakes before patients are harmed

Examples of strategies in each category are described in Table 8.5.

> The remaining steps of the RCA project are the same as those of any improvement project. The risk reduction strategies are implemented and tested to determine whether desired results have been achieved. If the strategies are successful, they are made permanent. Strategies that don't achieve the desired results are evaluated to determine why they didn't work, and new strategies are developed and tested.

⊛ LEARNING POINT
Root Cause Analysis

Root cause analysis is an accident investigation technique undertaken to find and fix the fundamental causes of an adverse event. It is similar to any improvement method that follows the steps of the Plan-Do-Study-Act cycle.

> FMEA and RCA are not exclusively used for improving the safety of patient care processes. Just as the FMEA improvement model can be used to conduct a prospective risk assessment of any process, the RCA model can be used to investigate the cause of any process failure.

8.5 PATIENT ENGAGEMENT IN SAFETY

A patient safety observation by authors of the IOM (1999) report *To Err Is Human* involved the role of patients in preventing medication errors:

Patients themselves also could provide a major safety check in most hospitals, clinics, and practice. They should know which medications they are taking, their appearance, and their side effects, and they should notify their doctors of medication discrepancies and the occurrence of side effects.

Action Category	Examples of Risk Reduction Strategies
Eliminate the chance of failure	• Change the process to prevent failures • Restructure tasks so that error-inducing behavior is no longer performed • Automate the process to reduce the role of human involvement • Purchase error-proof equipment
Help people perform their jobs correctly	• Create visible displays of acceptable actions • Conduct pre-action inspections using checklists or other reminders • Educate staff and monitor compliance • Standardize the process • Reduce the number of steps in the process, thus reducing the chance of error • Make ergonomic changes (e.g., improve lighting, reduce workplace clutter) • Maintain equipment according to manufacturers' recommendations (e.g., regularly monitor compliance with routine maintenance schedules)
Help people identify and correct mistakes before the patient is harmed	• Train people to better recognize and deal with unusual situations • Create specialized teams of people who are coordinated and prepared to deal with unusual situations

In 2003, the National Quality Forum called for more research regarding the ways providers can facilitate the role of patients in reducing their chance of experiencing a medical error. Since then, a growing body of research suggests patients and their family members can be additional safeguards in the healthcare system (Spath 2008b). Here are just some of the ways patients can make their hospital experience safer:

◆   Observe/ask caregivers to perform patient identity checks before administration of treatments

◆   Keep a list of prior medical history, current treatments, and allergies, and share this list with caregivers at admission

- Know how often staff should change wound dressings, and when/how/whom to ask for a dressing change

- Know the type, dosage, and frequency of administration for medications; ask caregivers to explain prescribed medications to verify that they are correct; if incorrect, question the caregiver's decision to administer the medication

- Observe/ask whether caregivers have washed their hands

- Monitor the cleanliness of the equipment and the environment and report problems

- Be informed about the usefulness of changing position in the hospital bed, and ask for position changes if they aren't made as required

- Request help when getting out of bed, or ask for an assistive device (e.g., cane or walker)

- Confirm that caregivers know what the doctor has ordered

- Ask about equipment to understand what different sounds or noises mean; alert caregivers if there appears to be a problem

In 2002, The Joint Commission joined with AHRQ, the American Medical Association, and other national groups to promote involvement of consumers in patient safety efforts. As of this writing, The Joint Commission (2008a, 22) requires accredited organizations to encourage patients' active involvement in their care as a patient safety **strategy**. Caregivers are required to communicate with the patient and family about all aspects of care and encourage them to report concerns about safety.

Strategy
Action designed to lower the risk of failure

Some forward-thinking healthcare organizations are not only sharing information with patients and partnering with them for safety purposes but also including them in advisory groups to solicit safety improvement suggestions. At Dana-Farber Cancer Institute in Boston, patient and family representatives participate in a number of quality and patient safety–related committees (Joint Commission Resources 2006). Likewise, the patient safety oversight committee at Passavant Area Hospital in Jacksonville, Illinois, includes three laypeople from the community. This committee reviews the hospital's patient safety measurement results and discusses solutions to safety problems (Spath 2008a). Dana-Farber and Passavant are two of many organizations embracing consumers as safety partners. Openly

> ✳ **LEARNING POINT**
> Patient Safety
>
> Patients and family members can promote their safety by speaking up when something appears unsafe or out of the ordinary. In some organizations, patients and family members are involved in internal quality management efforts.

soliciting the consumer perspective on healthcare quality management, including safety improvement, is a relatively new phenomenon gaining in popularity.

CONCLUSION

For many years, healthcare organizations have relied primarily on people performing their jobs correctly to protect patients from unintended harm. Decades of research, mostly from other industries, has proven that most accidents are caused by capable but fallible people working in dysfunctional systems. Healthcare organizations are now borrowing techniques from other industries and using a systems approach to improve patient safety.

Patient safety is only one dimension of healthcare quality, yet it receives a lot of attention from regulators, purchasers, and accreditation groups. As consumerism in healthcare grows, patients are expecting to take a more active role in safety. Consumers' involvement in safety improvement is becoming a major contributor to healthcare organizations' quality management efforts.

Patient safety includes the same basic quality management components: measurement, assessment, and improvement. Two improvement models, FMEA and RCA, are often used to reduce the chance that harmful mistakes will occur.

STUDENT DISCUSSION QUESTIONS

1. Go through the steps of an FMEA project for the process of taking a bath (see Figure 8.11). Use a worksheet like the one in Figure 8.7 to document your ideas.

FIGURE 8.11.
Flowchart of
Process of Taking
a Bath

Fill bathtub with water	Get towel, washcloth, and other supplies, and place them near tub	Take off your clothes	Get into bathtub and wash up	Exit bathtub and dry off	Put on your clothes

When completing the FMEA, consider your own bathing experiences and what other people may have told you about their experiences. Be creative; there are no wrong answers.

2. Read the description of the wrong-site surgery event in Critical Concept 8.2 and the root causes identified by the team that conducted the RCA. Conduct a literature and Internet

search for risk reduction strategies aimed at preventing wrong-site surgeries. Which of these strategies would help prevent a similar event from occurring at the hospital described in Critical Concept 8.2?

WEBSITES

- Agency for Healthcare Research and Quality Patient Safety Network
  www.psnet.ahrq.gov
- Consumers Advancing Patient Safety
  www.patientsafety.org
- Grout, J. R. 2007. *Mistake-Proofing the Design of Health Care Processes*. AHRQ Publication No. 07-P0020. Rockville, MD: Agency for Healthcare Research and Quality.
  www.ahrq.gov/qual/mistakeproof
- Maryland Office of Health Care Quality
  www.dhmh.state.md.us/ohcq/index.html
- National Patient Safety Foundation
  www.npsf.org
- Patient safety organizations
  www.pso.ahrq.gov/index.html
- Pennsylvania Patient Safety Authority
  www.psa.state.pa.us
- Safety Leaders Organization sponsored by the Texas Medical Institute of Technology
  www.safetyleaders.org
- VA National Center for Patient Safety
  www.va.gov/ncps/index.html
- Web M&M: A case-based journal and forum on patient safety
  http://webmm.ahrq.gov

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CHAPTER 9

MANAGING THE USE OF HEALTHCARE RESOURCES

After reading this chapter, the reader will be able to

➤ describe the purpose of utilization management;

➤ discuss utilization management measurement, assessment, and improvement activities;

➤ recognize the role of physicians and nonphysicians in managing the use of healthcare resources;

➤ describe how clinical practice guidelines are used for utilization management purposes; and

➤ identify sources of comparative healthcare utilization data.

KEY WORDS

- ➤ Case managers
- ➤ Clinical paths
- ➤ Concurrent review
- ➤ Discharge planning
- ➤ Managed care organizations
- ➤ Medically necessary
- ➤ Overuse
- ➤ Pay-for-performance systems
- ➤ Physician advisor
- ➤ Preadmission certification
- ➤ Prospective review
- ➤ Protocols
- ➤ Retrospective review
- ➤ Underuse
- ➤ Utilization
- ➤ Utilization management (UM)
- ➤ Utilization review

***Q**uality management* is a broad term that encompasses many healthcare performance measurement, assessment, and improvement activities. Patient safety, the topic covered in the previous chapter, is one component of quality management. This chapter introduces another component of quality management—utilization management. The activities involved in utilization management are somewhat different from those involved in patient safety and other performance improvement initiatives.

9.1 Utilization Management

In the early 1980s, the American Hospital Association defined **utilization management (UM)** as planning, organizing, directing, and controlling healthcare products in a cost-effective manner while maintaining quality of patient care and contributing to the organization's goals (Spath 2005, 139). In other words, providers and payers use UM to eliminate underuse and overuse of **medically necessary** healthcare services.

Fundamentally, the purpose of UM is to ensure patients receive necessary medical services at the least cost. In any business transaction, buyers don't want to pay for something they don't need, and they don't want to pay for top-shelf products when something less expensive will work just as well. For instance, when your car needs an oil change, you don't want to buy extra parts or high-performance oil blends you don't need. You are paying the entire bill in this transaction, so you decide what is necessary. You may consider the mechanic's recommendations, but you also know that the mechanic's desire for profit could motivate him or her to suggest unnecessary products or services.

In healthcare, the buyer-seller relationship is somewhat different. First, an insurance company often pays the majority of the bill, whereas the patient pays nothing or only a small portion of expenses. Health insurers are the primary buyers of healthcare services, and like all buyers, insurers don't want to pay for unnecessary care. Healthcare customers—patients—rely almost solely on physicians and other providers to decide which services are necessary. Profit considerations could also influence healthcare recommendations; however, the average patient cannot distinguish between necessary and unnecessary services, putting him or her at a disadvantage. Likewise, the average patient cannot recognize **underuse** of services—situations in which beneficial services are not being provided. Fortunately, those in the best position to judge medical necessity—practitioners and healthcare organizations—actively evaluate services to prevent over- and underuse.

The importance of appropriate use of healthcare services was reiterated in the 2001 IOM report *Crossing the Quality Chasm: A New Health System for the 21st Century*. Effective healthcare—

Utilization management (UM)
Planning, organizing, directing, and controlling healthcare products in a cost-effective manner while maintaining quality of patient care and contributing to the organization's goals

Medically necessary
Appropriate and consistent with diagnosis and, according to accepted standards of practice in the medical community, imperative to treatment to prevent the patient's condition or the quality of the patient's care from being adversely affected

Underuse
Failure to provide appropriate or necessary services, or provision of an inadequate quantity or lower level of service than that required

? DID YOU KNOW?

The United States spends more on healthcare than on food or housing. By 2015, U.S. health spending is projected to double from over $2 trillion to nearly $4 trillion per year—from 17 percent to 20 percent of the gross national product.

provision of services based on scientific knowledge to all who may benefit but not to those not likely to benefit—is one of the six dimensions of quality described in the report.

9.2 DEFINING APPROPRIATE SERVICES

Many healthcare decisions are easily made. For instance, a patient with a broken arm needs bone realignment and a cast. Some medical decisions are not so obvious, however. To be able to practice UM, purchasers and providers must have a way of judging the appropriateness of services. Until recently, only physicians decided whether services would benefit their patients.

In the early 1970s, researchers studied how physicians cared for patients with the same problem. John Wennberg, MD, a Dartmouth Medical School expert in geographic variation in healthcare delivery, uncovered substantial evidence of **overuse**—unneeded healthcare. In one analysis, for example, despite a lack of discernable improvements in health in the higher-spending locations, he found that 70 percent of children who grew up in Stowe, Vermont, had tonsillectomies by age 15, compared to 10 percent of children from the neighboring town of Waterbury (Wennberg and Gittelsohn 1973). Similarly, approximately 50 percent of men in Portland, Maine, had prostate surgery by age 85, compared to about 10 percent of men in Bangor (Wennberg, Gittelsohn, and Shapiro 1975). These studies tended not to label **utilization** as appropriate or inappropriate, but the variability of the results suggested that many services were unnecessary. These findings caused purchasers to strengthen UM efforts.

Clinical practice guidelines were introduced in Chapter 3 as the basis for creation of evidence-based performance measures and a means of standardizing clinical decision making. Health insurers encouraged the development of clinical practice guidelines and standardization of care for UM purposes of reducing the provision of unnecessary services. Researchers found that where there is strong professional consensus on the appropriate use of particular services, such as surgery for cancer of the bowel or hospitalization for hip fracture, utilization varies less. Where consensus is low, for example, on the need for hysterectomy and prostatectomy, utilization varies more (Caper 1984).

To jump-start the guideline development effort, in 1990 the Agency for Healthcare Research and Quality (AHRQ)—then known as the Agency for Health Care Policy and Research—published a methodology for developing guidelines and began sponsoring clinical practice guideline development task groups (Field and Lohr 1990). Within a few years, medical, nursing, and allied health professional groups developed their own practice guidelines, and the federally sponsored task groups were phased out. As of this writing, 2,425 clinical practice guidelines are catalogued on the AHRQ-sponsored National Guidelines Clearinghouse (2009) website. These guidelines help purchasers, healthcare organizations, practitioners, and consumers identify medically necessary services. For instance, in 2007 the American College of Physicians and the American Pain Society jointly

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Overuse

Provision of healthcare services that do not benefit the patient and are not clearly indicated, or are indicated in excessive amounts or in an unnecessary setting

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Utilization

Use of medical services and supplies, commonly examined in terms of patterns or rates of use of a single service or type of service, such as hospital care, physician visits, and prescription drugs

published a guideline addressing the diagnosis and treatment of low back pain. Authors of this guideline discourage clinicians from routinely ordering imaging and other diagnostic tests for patients with nonspecific low back pain (Shekelle 2008).

Although there are hundreds of clinical practice guidelines, there are still many conditions for which there is insufficient evidence to use as a basis for judging treatment appropriateness. In these situations, physicians have considerable latitude in making treatment decisions. For this reason, variation in the services provided to patients with similar conditions is still evident (Wennberg et al. 2005; Baicker, Buckles, and Chandra 2006). In theory, healthcare purchasers, including the Centers for Medicare & Medicaid Services (CMS), pay only for items and services that are reasonably necessary for the diagnosis and treatment of an illness or injury. In situations where no practice guidelines exist, decisions are based on the best available evidence and professional consensus (CMS 2008). CMS's legal authority to make coverage decisions stems from section 1862 of the Social Security Act, which states: "No payment may be made...for any expenses incurred for items or services...which are not reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the function of a malformed body member" (U.S. Department of Health and Human Services 2008).

CMS and other purchasers go through a rigorous process to decide whether services are appropriate and should be reimbursed. Highmark Blue Cross Blue Shield (BCBS), one of the largest BCBS plans in the country, has a thorough process for gathering information, assessing new technologies, and making coverage decisions. Highmark bases its coverage decisions on a contractual definition that evaluates medical necessity according to the following criteria (Hill, Hanson, and O'Connell 2000). The service must be

◆ appropriate for symptoms, diagnosis, and treatment of a condition, illness, or injury;

◆ provided for diagnosis, direct care, or treatment;

◆ in accordance with standards of good medical practice;

◆ not primarily for the convenience of the member or member's provider; and

◆ the most appropriate supply or level of treatment that can be safely provided to the member.

Purchasers and healthcare organizations also use clinical practice guidelines to identify underuse. For instance, a good deal of evidence emphasizes the importance of annual eye and foot examinations and HbA1c tests (tests that monitor blood sugar levels) for patients with diabetes (National Diabetes Education Program 2004). The 2007 *National Healthcare Quality Report* published by AHRQ (2008b) revealed that from 2000 through 2005, approximately 50 percent of diabetic patients over age 40 received these

⊛ LEARNING POINT
Appropriate Services

The purpose of UM is to ensure patients receive only medically necessary services at the least cost. Clinical practice guidelines, research evidence, and professional consensus are used to identify over- and underuse of healthcare services.

services. As this example illustrates, underuse presents opportunities to improve the quality of medical care.

Providers and purchasers are encouraging consumers to become familiar with clinical practice guideline recommendations and to consider them when making health-related decisions. Informed consumers can participate as partners in their own healthcare and help reduce over- and underuse of services.

9.3 UTILIZATION MANAGEMENT FUNCTIONS

Utilization review
Assessment of the medical necessity, efficiency, and appropriateness of healthcare services and treatment plans on a prospective, concurrent, or retrospective basis

UM involves the three basic quality management activities—measurement, assessment, and improvement. **Utilization review** is the term typically used to describe the measurement and assessment tasks, whereas UM is a broad term that encompasses all three activities.

All healthcare organizations are engaged in or affected by one or more of these UM activities. Since the enactment of Medicare and Medicaid programs in the mid-1960s, hospitals have been required to have an internal process for evaluating the necessity of services and reducing unnecessary services. Process requirements, although updated from those of the 1960s, still exist in the Medicare Hospital Conditions of Participation. For Medicare and Medicaid patients, hospitals are currently required to assess the medical necessity of admission to the institution, duration of stay, and professional services furnished, including drugs and biologicals (CMS, U.S. Department of Health and Human Services 2008a).

UM requirements are found in the CMS regulations for most organizations that provide federally funded patient care. For instance, long-term care facilities are required to evaluate each resident's drug regimen to ensure that only necessary medications are being administered. The regulations define an unnecessary drug as any drug used (CMS, U.S. Department of Health and Human Services 2008b)

- ◆ in excessive doses (including duplicate drug therapy), or

- ◆ for excessive duration, or

- ◆ without adequate monitoring, or

- ◆ without adequate indications for its use, or

- ◆ in the presence of adverse consequences that indicate the dose should be reduced or discontinued, or

- ◆ in any combination of these ways.

The Joint Commission accreditation standards do not specifically state that health-care organizations must engage in UM activities, although they do refer to certain UM functions. For instance, the hospital leadership standards encourage the use of clinical practice guidelines to improve quality and utilization (The Joint Commission 2008c, 88). Home health agencies accredited by The Joint Commission (2008b, 144) are required to review physician orders and prescriptions for appropriateness and accuracy before providing care, treatment, or services. Ambulatory surgery centers accredited by The Joint Commission (2008a, 130) are required to collect and analyze data on the appropriateness of care.

Whether or not an organization is required to conduct internal UM activities, all providers are affected by the UM activities of health insurers. For instance, physicians may need to obtain prior payment approval from a patient's insurance company for expensive services or experimental treatments. Critical Concept 9.1 lists examples of questions physicians must answer when requesting Medicare reimbursement for the cost of a semi-electric hospital bed for a patient who is living at home with a debilitating condition (CMS 2007).

> (!) **CRITICAL CONCEPT 9.1**   Questions Affecting Medicare
> Reimbursement for Semi-Electric Hospital Bed
>
> 1. Does the patient require positioning of the body in ways not feasible with an ordinary bed because of a medical condition expected to last at least one month?
> 2. Does the patient require, for the alleviation of pain, positioning of the body in ways not feasible with an ordinary bed?
> 3. Does the patient require the head of the bed to be elevated more than 30 degrees most of the time because of congestive heart failure, chronic pulmonary disease, or aspiration?
> 4. Does the patient require traction that can be attached only to a hospital bed?
> 5. Does the patient require a bed height different than that of a fixed-height bed to permit transfer to a chair, a wheelchair, or standing position?
> 6. Does the patient require frequent changes in body position and/or have an immediate need for a change in body position?

Some insurers require hospitals to keep them informed of the condition of hospital-ized health plan participants. Health plans want to ensure patients are discharged as soon as they no longer need hospital services. All health insurers measure the cost of care, and some use these data to select and contract only with cost-efficient providers (Private Sector

Advocacy Unit, American Medical Association 2006). Other health insurers, including Medicare, are experimenting with **pay-for-performance systems** that provide financial rewards to providers who achieve certain cost and quality performance expectations (National Committee for Quality Health Care 2006). As the costs of healthcare delivery continue to increase, no provider is exempt from UM efforts.

9.4 Measurement and Assessment

The measurement and assessment component of UM (i.e., utilization review) examines the appropriateness of healthcare services. The purpose of these activities is to

- ◆   ensure services are medically necessary and appropriate, and

- ◆   promote delivery of services in the most cost-effective setting.

Utilization can be reviewed before a patient receives services (**prospective review**), during the delivery of services (**concurrent review**), or after the patient receives services (**retrospective review**).

Prospective Review

The purpose of prospective review is to judge the appropriateness of a service before it is rendered to prevent unnecessary use. For instance, an insurance company may refuse to authorize payment for a magnetic resonance imaging (MRI) exam of a patient's back if the patient has a diagnosis of nonspecific low back pain. According to current guideline recommendations, this study would not be considered medically necessary (Shekelle 2008). The insurance company would likely request additional information about the patient's condition before agreeing to pay for this study. Hospitals and other providers often conduct prospective or **preadmission certification** reviews to determine whether a patient's condition warrants a service or admission to a facility.

Concurrent Review

Nurses or other specially trained professionals perform concurrent reviews to assess what is happening in the moment. Such review ensures services are appropriate for the patient and being provided in the least costly setting. In a hospital, a patient's condition and need for hospitalization are assessed at admission and throughout the hospital stay. When the patient no longer requires hospital services, discharge is arranged by the physician. Although nonphysicians are often involved in evaluating the medical necessity of hospital services, the patient's physician makes the final treatment decisions.

Pay-for-performance systems
Performance-based payment arrangements that control costs directly or indirectly by incenting providers to improve quality and reduce inappropriate utilization

Prospective review
A method of determining medical necessity and appropriateness of services before the services are rendered

Concurrent review
An assessment of patient care services that is completed while those services are being delivered to ensure appropriate care, treatment, and level of care

Retrospective review
A method of determining medical necessity and appropriateness of services that have already been rendered

Preadmission certification
Review of the need for medical care or services (e.g., inpatient admission, nursing home admission) that is completed before the care or services are provided

Table 9.1 is a summary of a patient's hospital stay for an abdominal hysterectomy (removal of the uterus). Her hospital admission is considered medically necessary because this procedure could not be performed in an outpatient setting. The patient continues to stay in the hospital for several days after the surgery. Up to and including day three, the patient receives services (intravenous fluids and pain medications) she could not receive at home. Her postoperative condition also needs to be frequently evaluated because she may experience complications. Her hospital stay up to and including day three is considered medically necessary. On day four, the patient is able to eat, and her condition is improving. As expected, the patient is weak, but she is able to walk a short distance on her own. She has not had a bowel movement, but she is passing gas, indicating adequate bowel function. At this point, the patient probably can be discharged safely (Rardin, Weisman, and Kim 1999).

TABLE 9.1.
Summary of a Patient's Hospitalization

Day 1 Monday	The patient is admitted for an abdominal hysterectomy. The surgery is performed the morning of admission. The patient is given intravenous (IV) fluids and pain medications postoperatively. The oral heart medications she was taking prior to surgery are restarted. Her temperature is 99.9 degrees in the late evening.
Day 2 Tuesday	The patient is receiving IV medication for pain control. She is started on a liquid diet at lunch but is also still on IV fluids. She is able to sit at the edge of the bed and can ambulate to the bathroom with assistance. Her temperature has returned to normal.
Day 3 Wednesday	In the morning, the patient's IV fluids are discontinued and she is switched to oral Vicodin for pain control. She is eating and tolerating a light soft diet. She is still weak and unable to walk more than six feet without tiring. The patient is passing flatus (gas) but has not had a bowel movement. Her temperature is normal.
Day 4 Thursday	The patient is eating and tolerating a light soft diet. Her bowel tones indicate activity and she is passing flatus, but she still has had no bowel movement. Her temperature is normal. She is able to walk by herself to the nursing station and back to her room.
Day 5 Friday	In the morning, the patient eats a regular meal and tolerates it well. She has a bowel movement after lunch. She is receiving her heart medications and her pain is adequately controlled with Tylenol. She is able to walk without assistance, and her temperature is normal. Her physician writes an order for her to be discharged on Saturday.
Day 6 Saturday	The patient is medically stable, and she is discharged in the morning to her daughter's home.

On day four, the nurse reviewer contacts the patient's physician to determine why she has not been scheduled for discharge. The physician knows that the patient's daughter won't be home to care for her until Saturday morning. He doesn't want the patient to leave the hospital until that time. While this justification is understandable, her stay beyond day four is not considered medically necessary. The patient can leave the hospital and be cared for at home by another family member or a home health aide. In this situation, the hospital may not be reimbursed by the patient's insurance company for days five and six of her hospital stay.

Sending this patient home from the hospital before Saturday morning may seem mean-spirited, but considering that overuse of expensive medical services is one of the factors driving up healthcare expenditures, timely discharge is crucial. If everyone doesn't do his or her part to reduce overuse (including patients and providers), healthcare expenditures will continue to rise faster than inflation and consume an even larger part of our nation's resources.

The Medicare Conditions of Participation require hospitals and other healthcare facilities to review the medical necessity of patient admissions and continued stays (CMS, U.S. Department of Health and Human Services 2008a). Facilities may also be contractually obligated to do these reviews for other health insurers. When the patient is no longer receiving medically necessary services or when necessary services are being provided in a more costly setting, a nurse reviewer encourages the patient's physician to discontinue services or provide services in a less expensive environment. For instance, patients with a condition that requires long-term intravenous medications do not necessarily require hospitalization. These services can be provided at a lesser cost in a long-term care facility or by a home health agency.

Physician advisor
A practicing physician who supports utilization review activities by evaluating appropriateness of admissions and continued stays, judging the efficiency of services in terms of level of care and place of service, and seeking appropriate care alternatives

If the patient's physician does not agree with the reviewer's judgment, a **physician advisor** may become involved in the concurrent review process. Physician advisors are practicing physicians who care for patients in the same organization. They are appointed for utilization review purposes and charged with fostering cost-effective practice among other physicians. Concurrent review by a physician advisor creates an opportunity for peer-to-peer discussion about the best use of resources for a patient. If the nurse reviewer had asked a physician advisor on day four to become involved in the case described in Table 9.1, the patient may have been discharged sooner.

Concurrent reviews are conducted in all provider settings, but the process varies according to the setting. For instance, for Medicare to pay for home care services, patients must need services that only a licensed nurse (either a registered nurse or a licensed practical nurse) can perform safely and correctly, or require physical or speech-language therapy. Patients also must be homebound, meaning they are normally unable to leave home unassisted; when they leave home assisted, it must be to obtain medical care or for short, infrequent nonmedical reasons, such as to attend religious services (Medicare Payment Advisory Commission 2008). Home health nurse reviewers periodically evaluate

the medical needs and homebound status of patients receiving services to ensure they are following Medicare reimbursement guidelines.

RETROSPECTIVE REVIEW

Retrospective review occurs after patients receive services. In a retrospective review, performance is measured to identify opportunities to reduce over- and underuse of services. Some of the measures are system-level measures. For example, Figure 9.1 is a line graph showing the average length of stay for Medicare patients at one hospital over a period of three years. The graph shows that each year, the hospital's average length of stay is longer than the national average. This system-level measure suggests that the hospital needs to examine its management of Medicare patients more closely.

The cost of care, another system-level measure, is also evaluated to determine whether it is within a reasonable range. Figure 9.2 is a line graph showing the cost of care for Medicare patients hospitalized for treatment of pneumonia over a period of three years. The graph shows that the hospital's average cost of hospitalization is slightly higher than the national average in 2006 and even higher in 2007. These results suggest that the hospital needs to analyze and correct the causes of this disparity.

One type of cost analysis is done at the cost center level. Cost centers are accounting tools used to group or categorize similar charges. For instance, room charges for patients in the intensive care unit (ICU) are grouped in the ICU cost center, room charges for patients in regular nursing units are grouped into the regular cost center, and so on. Cost center comparison data for 2007 are shown in Figure 9.3. This graph shows that the average costs for ICU and surgical care at the study hospital were higher than the average costs in the same categories at other hospitals. The hospital created an improvement team of physicians, nurses, pharmacists, and respiratory therapists to identify where costs could

FIGURE 9.1.
Line Graph Showing Average Length of Stay Data for Medicare Patients

Line Graph
Showing Average
Cost of Care Data
for Medicare
Patients with
Pneumonia

FIGURE 9.2. Line Graph Showing Average Cost of Care Data for Medicare Patients with Pneumonia

FIGURE 9.3.
Bar Graph Showing
2007 Cost Center
Comparisons for
Medicare Patients
with Pneumonia

FIGURE 9.3. Bar Graph Showing 2007 Cost Center Comparisons for Medicare Patients with Pneumonia

be reduced. By making some patient management changes, such as transferring patients to a regular nursing unit earlier in their hospitalization, the hospital was able to bring the overall costs of care closer to the national average in 2008.

Higher-than-expected costs are not always caused by overuse of services or inefficiencies. For example, another hospital discovered that its costs for treating Medicare patients with renal (kidney) failure were higher than other hospitals' costs. An improvement team of physicians, nurses, and other clinicians examined the treatment, looking for unnecessary services and inefficiencies. Instead, they found a quality concern. Patients with renal failure had a higher complication rate than similar patients at other hospitals. In the complication index illustrated in Figure 9.4, the national norm, or average complication rate, is expressed as the number 1. The hospital's complication rates for each year were above this norm, which explained the hospital's higher costs; more resources were needed to treat the complications. To reduce costs, the team needed to find and correct the cause of the high complication rate.

Comparison of patient cost and outcome data among facilities has become easier over the past few years as the amount of information available in the public domain increases. The website of the Healthcare Cost and Utilization Project (HCUP) sponsored by AHRQ contains the largest collection of hospital care data in the United States. The HCUP database includes a wide range of hospital measures that can be sorted by diagnosis or procedure (AHRQ 2008a):

> ✳ **LEARNING POINT**
> Utilization Review
>
> The purpose of utilization review is to ensure services are medically necessary and appropriate and to promote delivery of patient care in the most cost-effective setting. Utilization is reviewed prospectively, concurrently, and retrospectively.

FIGURE 9.4.
Line Graph Showing Complication Index for Patients with Renal Failure

◆   Number of discharges

◆   Length of stay

◆   Total charges

◆   Total costs

◆   Aggregate charges

◆   Percentage of patients who died in the hospital

◆   Discharge status

◆   Percentage of patients admitted through the emergency department

◆   Percentage of patients admitted from another hospital

◆   Percentage of patients admitted from a long-term care facility

The HCUP data can be used to evaluate hospital utilization, access, charges, quality, and patient outcomes at the national and state level. The site's user-friendly data query tools make finding relevant information for comparison purposes easy.

9.5 UTILIZATION IMPROVEMENT

Providers use information gathered during concurrent and retrospective review to identify improvement opportunities. The purpose of the improvement initiative described in the previous section was to reduce the cost of care for patients with pneumonia, but not all utilization improvement activities are focused on cost reduction. For instance, one hospital found that inpatient rooms were not being fully utilized. After patients were discharged, the empty rooms would not become available for new patients for a long time. Patients were being held in the emergency department until they could be accommodated—not a good use of hospital resources. To address the problem, the hospital's utilization review committee chartered a rapid cycle improvement project. During the investigation, the improvement team discovered that the housekeeping department was not adequately staffed in the late afternoons, when most inpatients are discharged. Consequently, the number of untidy patient rooms was the highest when the fewest housekeepers were on duty. A housekeeping discharge work team was created and scheduled to work from 10 a.m. to 8 p.m. The team's sole function was to clean the rooms of discharged patients. After implementing this change, the average time needed to clean a patient room decreased from 75 to 45 minutes and emergency patients no longer had to wait so long for an inpatient bed to become available.

The improvement phase of UM is closely integrated with other quality management activities. Often, improving quality also reduces costs. For instance, the goal of a Lean improvement project is to eliminate waste from a process. Less waste means less cost. In the example above, moving patients quickly from the emergency department to

inpatient beds not only improves utilization of hospital beds but also helps patients receive the inpatient services they need more quickly.

Utilization improvement also involves reducing underuse of needed services. Patients should be receiving care considered appropriate for their diagnosis, type of illness, or condition. To further this goal, job aids can be created for caregivers. Job aids are performance support tools used in all types of industries to provide information that helps people do their jobs. In healthcare, job aids can be designed to promote the use of evidence-based patient care practices. Job aids designed for this purpose usually take three forms: reminders, **clinical paths**, and standards of care.

Reminders are usually short forms or stickers attached to patient records to remind the healthcare provider to perform a certain task. Reminders are useful if underuse is the result of provider forgetfulness or focus on other tasks. For instance, stickers can be placed on the clinic records of patients with diabetes to remind physicians to do annual eye and foot examinations and order HbA1c tests.

Clinical paths are best practices for managing patients (Spath 1994). Also known as *critical paths* or *care paths*, these tools remind caregivers of interventions and milestones expected to occur during an episode of care. Table 9.2 is a clinical path for pediatric

Clinical paths
Descriptions of key patient care interventions for a condition, including diagnostic tests, medications, and consultations, which, if completed as described, are expected to produce desired outcomes

TABLE 9.2.
Inpatient Appendectomy Clinical Path for Children (non-ruptured appendix)

	Phase I Emergency Department to Immediately Prior to Surgery	Phase II Post-Anesthesia Recovery Unit to Discharge
Consultations	• Anesthesia • Surgical	
Tests	• Complete blood count • Metabolic panel • Urinalysis, including pregnancy test per protocol • Abdominal ultrasound as indicated	
Treatments		• Give oxygen per nasal cannula to maintain oxygen saturation ≥92% • Pulse oximetry if receiving oxygen • Wean to room air as tolerated • Incentive spirometry every 1 hour × 24 hours, while awake, and then every 6 hours while awake • Remove surgical dressing 24 hours after surgery
Medications	• Cefoxitin 40 mg/kg/dose every 6 hours (maximum = 2 mg per dose) For pain: • Morphine sulfate 0.05 mg/kg IV every 2 hours as needed for moderate to severe pain • Morphine sulfate 0.1 mg/kg IV every 2 hours as needed for severe pain if pain is unrelieved by lower dose • Acetaminophen 15 mg/kg (maximum = 650 mg/dose) rectally or orally every 4 hours as needed for mild pain or temperature of >101.5°F (oral)	• Cefoxitin 40 mg/kg/dose every 6 hours (maximum = 2 mg per dose); discontinue after 4 doses • Arrangements made for home IV antibiotic therapy if IV antibiotic therapy not completed in hospital For mild pain: • Ketorolac 0.5 mg/kg (maximum = 30 mg per dose) IV times 1 (loading dose) then Ketorolac 0.25 mg/kg (maximum = 30 mg per dose) IV every 6 hours times 7 doses • If patient tolerates oral intake, discontinue Ketorolac and give Ibuprophen 10 mg/kg (maximum = 600 mg per dose) orally every 6 hours for the remaining 7 doses, then every 6 hours as needed for pain; or • Acetaminophen 15 mg/kg (maximum = 650 mg/dose) rectally or orally every 4 hours as needed for pain or temperature of >101.5°F (oral)

(*Continued*)

TABLE 9.2.
(*continued*)
Inpatient
Appendectomy
Clinical Path for
Children (non-
ruptured appendix)

	Phase I Emergency Department to Immediately Prior to Surgery	Phase II Post-Anesthesia Recovery Unit to Discharge
Medications *continued*		For moderate to severe pain: • Morphine sulfate 0.05 mg/kg IV every 2 hours as needed for moderate to severe pain • Morphine sulfate 0.1 mg/kg IV every 2 hours as need for severe pain if pain is unrelieved by lower dose; or • Acetaminophen with hydrocodone (500 mg/5 mg) ___ tabs orally every 4 hours as needed if tolerating oral fluids (maximum = 8 tabs in 24 hours) • Metoclopraminde 0.15 mg/kg (maximum = 10 mg/dose) IV every 6 hours as needed for nausea or vomiting
Activity	• Assist with care • Activity as tolerated	---⟶ • Out of bed to chair in a.m. • Advance ambulation as tolerated • May resume bathing/showering 48 hours post-op
Nutrition/ Intravenous Therapy	• Nothing by mouth • Lactated Ringer's 20 ml/kg IV over 30 minutes, then Dextrose 5 Lactated Ringer's (D5LR) at twice maintenance rate for weight _____ ml per hour	• Clear liquids if bowel sounds present, no abdominal distention, no nausea/emesis; no carbonated beverages • Advance to regular diet as tolerated • D5LR at 1½ maintenance rate for weight _____ ml per hour • IV bag/tubing change every 96 hours • Discontinue IV when oral intake adequate
Assessments	• Routine vital signs and pain assessment • Record intake and output each shift	---⟶ • If patient develops a temperature of >100°F (oral), notify physician ---⟶ • If no urine output in 8 hours, without bladder distention, give IV bolus of Lactate Ringer's 20 mg/kg x1; if patient does not void within 4 hours, notify physician • Check incision • IV site inspection with dressing changes per protocol
Activity	• Assist with care • Activity as tolerated	---⟶ • Out of bed to chair in a.m. • Advance ambulation as tolerated • May resume bathing/showering 48 hours post-op • Cough and deep breathe with vital signs
Teaching	• Explain diagnostic tests to patient/family • Begin teaching plan for appendectomy and general surgical care as indicated	---⟶ • Continue teaching plan • Explain discharge instructions

Source: Spath (2009). Used with permission.

✳ LEARNING POINT
Utilization Improvement

Improving utilization of healthcare resources involves the same principles as any quality improvement initiative. Opportunities for improvement are identified, and actions are taken to achieve utilization goals.

patients admitted to the hospital for surgical removal of a non-ruptured inflamed appendix. The episode of care is divided into two phases. Phase I begins at admission to the emergency department and ends at the time of surgery. Phase II begins at admission to the post-anesthesia recovery room after surgery and ends with the child's discharge from the hospital. The recommended actions for physicians, nurses, and other caregivers are sorted into the nine intervention categories listed in the first column.

CRITICAL CONCEPT 9.2   Standard Home Health Orders for Patients Who Have Undergone Total Joint Replacement

Standard orders for total joint patients/home health agency
(Check all that apply.)

❑ Standard post-total joint home health care (see below)

1. Physical therapy evaluation and treatment
2. TED hose, on 24 hours/day; remove for inspection
3. Nurse to see total hip replacement patients on the day of discharge for safety/hip precautions evaluation
4. For total knee replacement patients: ice bag to knee for pain as needed; provide patient with icing and elevation instructions brochure
5. Notify physician if pain and/or swelling increases, drainage increases, fever >101°F
6. General diet, unless otherwise noted
7. Activities as tolerated; patient should be taught to change position every hour
8. Incision care: wound may be open to air if no drainage; patient may prefer covering it with telfa and paper tape; no adhesives for knees
9. Patient may shower; allow water to run over uncovered incision; do not allow patient to sit in tub
10. Teach patient pain management, following guidelines in pain medication handout
11. Ferrous gluconate: 324 mg orally three times a day or Chromagen as ordered pre-op
12. Multivitamins: 1 tab orally every morning
13. Lortab (Vicodin) tab: 1 orally every 4–6 hours as needed for severe pain
14. Tylenol 325 mg tab: 1 orally every 4–6 hours as needed for pain or elevated temperature
15. Colace: 100 mg orally twice a day

❑ Coumadin: __ mg orally, daily at 4 p.m. or bedtime
❑ Darvocet N 100 mg: 1 orally every 4 hours as needed
❑ Disalcid 500 mg: 1 orally every 6 hours as needed
❑ PT/INR lab test on Monday, Wednesday, Friday during first week, then every Monday and Thursday; follow Coumadin protocol sheet; call physician's office on Monday or when order change is needed
❑ Weight-bearing status: _____
❑ Remove staples on: _____
❑ Follow-up appointment with Dr. _____ in _____ weeks
❑ Occupational therapy evaluation and treatment
❑ Other: _____

Source: Spath (2001, 89). Used with permission.

Protocols
Formal outlines of care;
treatment plans

Discharge planning
Evaluation of patients'
medical and psycho-
social needs for the
purpose of determining
the type of care they
will need after dis-
charge from a health-
care facility

Case managers
Experienced healthcare
professionals (e.g.,
doctors, nurses, or
social workers) who
work with patients,
providers, and insurers
to coordinate medi-
cally necessary and
appropriate healthcare
services

Standards of care are job aids that provide step-by-step instructions on how to perform tasks. These instructions are usually found in checklists, treatment **protocols**, and physician order sets. Critical Concept 9.2 is a list of interventions that a home care agency would typically provide to patients recently discharged from the hospital following a total joint replacement. Discharge physicians use the form to order home care services for patients. Physicians are more likely to order services that are medically necessary when they are provided a preprinted list of home care recommendations.

9.6 DISCHARGE PLANNING

Most aspects of UM are invisible to healthcare consumers. Only occasionally are patients affected by prospective and concurrent review activities. The most transparent aspect of UM is discharge planning. **Discharge planning** is a process by which patient needs are met as they transfer from one environment to another. The process involves the patient, family, friends, caregivers, and agencies. For example, after leaving the hospital, patients may need in-home nurse visits or outpatient physical therapy. Discharge planning activities ensure that patients' medical needs are anticipated and arranged before they leave the hospital.

The care provided to patients as they transition from one environment to another can be fragmented and haphazardly coordinated. Two areas that are particularly problematic are communication between caregivers in different settings and patient education about medications and other therapies (Greenwald, Denham, and Jack 2007; Boockvar et al. 2004; Barnsteiner 2005). Inadequate discharge planning can adversely affect the quality and cost of patient care. For this reason, accreditation groups and health insurers, including Medicare, have required for many years that healthcare organizations provide discharge planning services for patients. Often organizations employ **case managers** (primarily nurses and social workers) to oversee discharge planning activities for patients with special needs. In some facilities, case managers perform utilization review tasks along with discharge planning duties. In other facilities, case managers work closely with utilization review staff but do not have specific utilization review responsibilities. The tasks involved in discharge planning are summarized in Table 9.3.

CASE STUDY

The following case study illustrates discharge planning for a patient who will require post-hospital medical services.

Mr. Jones, who is 67 years old, is scheduled for hip replacement surgery by his orthopedic surgeon. Because hospitalization will be short, planning for his discharge begins before admission. The hospital preadmission nurse telephones Mr. Jones to gather information about his medical condition, social situation, and potential post-hospital needs. The hospital case manager then uses this information and the following questions to assess Mr. Jones's needs:

Activity	Tasks
Initial patient assessment	• Gather history (social and medical) • Evaluate medical condition and treatment needs • Assess support systems (e.g., home environment, community resources, family needs)
Plan for continuing care	• Identify short- and long-term patient care needs • Prioritize needs according to input of patient and family • Consider available human, financial, and material resources • Update plan according to patient's condition
Implement plan	• Arrange for services and support that patient requires after discharge • Provide patient and family information about post-discharge treatment plan, services, and support
Evaluate	• Follow up with patient or family after discharge to assess whether plan was successful and ensure that no problems arose after discharge that have not been addressed

TABLE 9.3.
Discharge Planning Activities and Related Tasks

◆ Can Mr. Jones return to his preadmission situation?

◆ Will his ability to care for himself change after discharge?

◆ Will he need home care services?

◆ Will he need to go to a nursing home or another facility at discharge?

◆ Which post-hospital services will he need?

◆ Does he have mental health or social needs?

Before Mr. Jones arrives at the hospital, the case manager already has a good idea of his discharge needs. The information gathered through this initial assessment will be used to create a plan for his discharge, which is discussed with Mr. Jones and his wife soon after admission. The case manager anticipates that Mr. Jones will need physical therapy after leaving the hospital, which can likely be arranged through home health services. However, he may need to spend a few days in a long-term care facility before going home. His wife is apprehensive about her husband going to a nursing home, as she thinks people go there to die. The case manager reassures Mrs. Jones that patients who have had a hip replacement commonly stay at

a nursing home for a short time to undergo physical therapy. Mrs. Jones would prefer that her husband return home after his surgery but understands that his physician knows what is best for him. The case manager promises to keep Mr. and Mrs. Jones informed of any changes to the discharge plan.

While Mr. Jones recovers from his surgery, the case manager discusses his post-hospital needs with the surgeon, his nurses, and other caregivers. The case manager needs to stay informed of Mr. Jones's status so arrangements can be made for services he'll require after discharge. Three days after his hip replacement, the surgeon tells the case manager that Mr. Jones can be discharged the next day. Mr. Jones's medical condition is stable, and his wife will be at home to care for him, so they decide against sending him to a nursing home. Physical therapy can be provided by a home health agency. The case manager discusses the discharge plans with Mr. Jones and his wife. She expresses concern about being able to assist her husband with bathing and other routine activities. The case manager suggests that a home care aide help Mrs. Jones a few days per week, in addition to the physical therapist's regular home visits. By the end of Mr. Jones's third day in the hospital, everything is ready for his discharge. The case manager has arranged for physical therapy to start the day after he goes home. The case manager provides the home health agency with information about Mr. Jones's medical condition, including his current medications and his tolerance of physical therapy treatments in the hospital.

Before leaving the hospital, Mr. Jones and his wife receive discharge instructions from his nurse. These instructions include

- ◆ a list of medications Mr. Jones will be taking (the dosage, times, and frequency) at home and the potential side effects of these medications;

- ◆ the date of Mr. Jones's follow-up appointment with the surgeon;

- ◆ home care instructions, such as activity level, diet, restrictions on bathing, and wound care;

- ◆ signs of infection or worsening condition, such as pain, fever, bleeding, difficulty breathing, or vomiting;

- ◆ an explanation of the physical therapy and home aid services that have been arranged; and

- ◆ a contact, in case of an emergency or if questions arise.

While Mr. Jones was in the hospital, his surgeon was in charge of his care, so his primary care physician needs to know what occurred during the hospitalization. Within 48 hours of Mr. Jones's discharge, the hospital's health information management department provides his doctor with copies of pertinent hospital records. These records include

◆ a summary of the hospital stay, including tests and surgeries performed and results;

◆ a list of medications Mr. Jones will be taking, including the dosage and frequency;

◆ his discharge instructions; and

◆ the plan for home health services.

Five days after Mr. Jones's discharge, the hospital case manager telephones him to inquire about his progress and answer any questions. The case manager discovers that physical therapy treatments began on the scheduled day and that the home care aide has visited one time to help him with bathing and other self-care activities. Mr. Jones has no questions about his medications and reports that he has a follow-up appointment with his surgeon the next day. Mrs. Jones is satisfied with her husband's progress but would like the case manager to arrange meals-on-wheels for him to lessen her burden. The case manager takes care of this request later in the day.

LEARNING POINT
Discharge Planning

Discharge planning streamlines patient care by coordinating healthcare services as patients move from one environment to another. Continuity of care is particularly important for patients who have ongoing medical needs.

Discharge planning is a systematic approach to ensuring effective utilization of patient care resources and a smooth transition from one environment to the next. It also organizes care activities suited to the patient's needs. These features support the goal of patient-centered care—one of the healthcare quality characteristics identified as important by IOM (2001). The evaluation stage of discharge planning is the feedback loop through which effectiveness of the discharge process can be measured.

9.7 UTILIZATION MANAGEMENT STRUCTURE

Healthcare organizations use several individuals and groups to accomplish UM goals. The Medicare Conditions of Participation require hospitals to have a utilization review committee to carry out utilization-related functions (CMS, U.S. Department of Health and Human Services 2008a). At least two committee members must be doctors of medicine or osteopathy. Physician advisors are usually members of this committee, as well as nonphysician representatives from UM, case management, nursing, and fiscal services. All providers that care for Medicare patients—hospitals, long-term care facilities, home health agencies, rehabilitation facilities, and so on—are required to conduct UM activities, but only some are required to designate a UM committee.

CRITICAL CONCEPT 9.3
Hospital Utilization Management Plan

OBJECTIVE

The purpose of the utilization management (UM) plan is to describe the hospital's process for ensuring that patient care is being provided in the most efficient and cost-effective manner possible. To achieve this goal, professional services are reviewed to determine the medical necessity of admissions and appropriateness of setting, medical necessity of extended stays, and medical necessity of services (medications, treatments, tests, etc.).

STRUCTURE AND SCOPE

1. The medical staff quality improvement committee oversees all UM functions. This committee is composed of six active physician members representing medical, surgical, and emergency services. There is also representation from hospital administration, case management, quality management, and health information management. The committee meets monthly.

   1.1 No committee member shall have a direct financial interest in the hospital.

   1.2 No committee member may conduct a review of a case in which he/she was professionally involved in the care of the patient.

   1.3 At least two physician members will serve as physician advisors to assist with concurrent review activities and other UM support functions requiring physician input.

   1.4 Hospital staff delegated responsibilities for utilization management activities include case managers, social workers, and clinical documentation specialists.

2. The UM program includes review of patients with Medicare and Medicaid insurance as well as patients with any other health insurance for which the hospital is required to conduct UM. Reviews include an evaluation of the medical necessity of the admissions, duration of stays, adequacy of clinical documentation, and professional services furnished.

REVIEW AND SUPPORT ACTIVITIES

1. Preadmission review: Preadmission reviews shall be performed prior to admission to determine the appropriateness of the proposed admission.

   1.1 The case manager or preadmission reviewer will obtain information on the patient's admission diagnosis, signs, symptoms, and plan of treatment to determine the medical necessity of admission and appropriateness of setting.

   1.2 Recommendations for alternative settings or other treatment options will be provided to the patient's physician when the patient does not meet medical necessity guidelines for inpatient admission.

CRITICAL CONCEPT 9.3
Hospital Utilization Management Plan

2. Admission review: Admission reviews shall be completed within one working day of admission to determine the appropriateness of admission.

    2.1 The case manager will review the patient's medical record for documentation of diagnoses and procedures, signs, symptoms, orders, and plan of care to determine if medical necessity guidelines are met for inpatient admission.

    2.2 If the admission is medically necessary, the case is approved for admission and a next review date is assigned.

    2.3 If the admission is not medically necessary, the patient's physician is contacted for additional information.

        2.3.0.1 If the reason for inpatient admission is not apparent after contacting the patient's physician, the case is referred to a physician advisor for review.

3. Continued stay review: The continued stay review is performed on a regular basis according to an assigned review date.

    3.1 The case manager reviews the patient's record for documentation supportive of the need for continued hospital stay.

    3.2 If hospitalization is still medically necessary, case is approved for continued stay and next review date is assigned.

    3.3 If hospitalization does not appear to be medically necessary, the patient's physician is contacted.

        3.3.0.1 If the reason for continued hospitalization is not apparent after contacting the patient's physician, the case is referred to a physician advisor for review.

4. Physician advisor reviews: Physician advisors will review cases upon referral from a case manager, social worker, or clinical documentation specialist. Reasons for referral include, but are not limited to:

    4.1 Documentation in the patient's medical record does not support the need for admission or continued stay in the hospital.

    4.2 The plan of treatment is not consistent with the patient's diagnosis.

    4.3 The patient's diagnosis is not adequately reflected in the record documentation.

    4.4 The services, treatments, tests, or medications ordered for the patient do not coincide with the patient's documented diagnosis or condition.

    4.5 Delay in provision of services by the patient's physician.

(Continued)

> **CRITICAL CONCEPT 9.3**
> Hospital Utilization Management Plan
>
> ----
>
>   4.6 Hospital has received notice from the patient's health plan that the admission or
>   continued stay may not be medically necessary.
>   5. Discharge planning: Discharge planning is a collaborative process between care-
>   givers to ensure appropriate outcomes and continuity of care.
>   5.1 The initial discharge planning assessment is documented by the patient's nurse
>   within 12 hours of admission. The physician, the patient, the person acting on the
>   patient's behalf, or any member of the healthcare team may identify discharge needs
>   and make referrals to a case manager for more intense discharge planning.
>   5.2 The formal discharge plan shall be developed and documented by a case manager
>   or a social worker. The plan shall be developed in a timely manner to minimize
>   delays in discharge. The plan shall be reassessed if other factors affect the con-
>   tinuing care needs and appropriateness of the discharge plan. The patient and/or
>   caregiver shall participate in the discharge planning process, and final plans shall
>   be communicated to the patient or caregiver.
>   5.3 The discharge plan will be implemented prior to the patient's actual discharge.
>   Referrals shall be made as appropriate (e.g., home care, infusion, hospice, skilled
>   nursing, rehabilitation, long term acute, therapy). If the patient is referred to an-
>   other facility, agency, or outpatient service, pertinent medical information is pro-
>   vided to allow for follow-up care.
>   5.3.0.1 If the reason for inpatient admission is not apparent after contacting the
>   patient's physician, the case is referred to a physician advisor for review.

The Medicare Conditions of Participation also require hospitals to have a written UM plan (CMS, U.S. Department of Health and Human Services 2008a). This plan details UM functions. Critical Concept 9.3 is the UM plan of a small hospital. The concurrent and retrospective review requirements in this plan reflect the requirements of the Medicare Hospital Conditions of Participation. In this small hospital, UM functions are delegated to individuals and committees that also have quality management responsibilities. More detail on the quality management structure in healthcare organizations is presented in Chapter 10.

All **managed care organizations** accredited by the National Committee for Quality Assurance (NCQA 2008) must have a written UM plan, and many state regulations governing health plans have similar requirements. A health insurer's UM plan describes the policies and

Managed care organizations
Health plans that use managed care arrangements and have a system of providers that contract with them

procedures used by UM staff to identify instances of over- and underuse of healthcare services and the process for approving and denying payment for services. To meet accreditation standards of NCQA and the American Accreditation Health-Care Commission, Inc., only clinical professionals who have appropriate clinical expertise in the treatment of a health plan member's condition or disease can deny or reduce payment for a service.

A health plan's UM committee is chaired by the plan's medical director. This committee is typically responsible for

◆ monitoring providers' requests to render healthcare services to its members;

◆ monitoring the medical appropriateness and necessity of healthcare services provided to its members;

◆ reviewing the effectiveness of the utilization review process and revising the process as needed; and

◆ writing UM policies and procedures that conform to industry standards, including methods, timelines, and individuals responsible for completing each task.

⊛ LEARNING POINT
UM Plan

A UM plan defines the structure and function of an organization's UM activities. This document usually describes

• the purpose and scope of UM activities;

• structure and accountability;

• procedures for evaluating medical necessity, access, appropriateness, and efficiency of services;

• mechanisms for detecting under- and overuse;

• clinical practice guidelines and protocols used in decision making; and

• outcome and process measures for evaluating the effectiveness of UM activities.

Conclusion

Provider UM requirements have been in place since the inception of Medicare in the 1960s. Although the function has changed, the goal remains the same: to provide appropriate patient care in the least costly setting.

UM is a component of an organization's quality management efforts. All healthcare organizations are involved in or affected by UM activities. UM applies the basic principles of performance measurement, assessment, and improvement to minimize costs and use healthcare resources effectively.

STUDENT DISCUSSION QUESTIONS

1. Use the most current information in the Healthcare Cost and Utilization Project (http://hcupnet.ahrq.gov) database to answer the following questions:

   a. What are the nationwide average length of hospital stay and average hospital costs for patients with the following diagnoses?

      • Abdominal pain

      • Acute myocardial infarction

      • Chronic obstructive pulmonary disease and bronchiectasis

      • Diabetes mellitus with complications

   b. What are the nationwide average length of hospital stay and average hospital costs for patients who underwent the following procedures?

      • Cesarean section

      • Hip replacement, total and partial

      • Hysterectomy, abdominal and vaginal

      • Percutaneous coronary angioplasty (PTCA)

   c. If data are available for your state, what are your state's average length of hospital stay and average costs for patients with the diagnoses in (a) and for patients who underwent the procedures in (b)?

2. A hospital's UM committee discovers that the rate of cesarean section births at the hospital is higher than the rate at other hospitals in the region. A higher percentage of women at other hospitals are having vaginal deliveries. The UM committee wants to evaluate the medical necessity of cesarean section births at the hospital using clinical practice guidelines on this topic. Go to the website of the National Guidelines Clearinghouse (www.guidelines.gov) to find the most current guideline recommendations that address the indications for a cesarean section birth.

3. What UM practices does your health insurance company follow to control costs and ensure provision of medically necessary services? This information may be available in your insurance benefits booklet or on your health plan's website. If you do not have health

insurance, go to the website of any major health insurance company and list the practices this company follows to control costs and ensure provision of medically necessary services.

WEBSITES

- AHRQ: *Pay for Performance: A Decision Guide for Purchasers*
  www.ahrq.gov/QUAL/p4pguide.htm
- Commonwealth Fund: Health System Performance Snapshots
  www.commonwealthfund.org/snapshots
- Healthcare Cost and Utilization Project
  www.hcupnet.ahrq.gov
- National Guidelines Clearinghouse
  www.guidelines.gov

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CHAPTER 10

ORGANIZING FOR QUALITY

LEARNING OBJECTIVES

After reading this chapter, the reader will be able to

➤ identify groups responsible for quality in a healthcare organization,

➤ describe typical participants in healthcare quality management activities,

➤ explain the purpose and content of a quality management plan,

➤ recognize aspects of organizational culture that influence the effectiveness of quality management, and

➤ discuss strategies for overcoming environmental characteristics inhospitable to quality improvement.

Key Words

➤ Governing body

➤ High-performing healthcare organization

➤ Organizational culture

➤ Organized medical staff

➤ Performance excellence

➤ Quality management plan

➤ Quality management system

➤ Risk management

Quality does not happen by accident. Organizations must make an intentional effort to measure, assess, and improve performance. Not only must an organization's board of trustees and senior management be committed to quality; they also must create a framework for accomplishing quality activities and an environment that supports continual improvement. Active and personal board involvement in quality and patient safety oversight is a factor that contributes to building a **high-performing healthcare organization** (Lockee et al. 2006).

An organization's **governing body**—the board of trustees—is ultimately responsible for the quality of healthcare services (U.S. Department of Health and Human Services 2007). The board exercises this duty through oversight of quality management activities. If a healthcare provider does not have a board of trustees (for example, in the case of a limited partnership physician clinic), the legal owners of the business assume this responsibility.

Although the day-to-day activities of measurement, assessment, and improvement are delegated to senior leaders, physicians, managers, and support staff, the board's oversight role can greatly influence quality. For example, board members set the approach to handling quality issues. In addition, the questions trustees raise can lead to new insights or inform the board and management of actions they need to take (McGinn and Davé 2007).

To accomplish quality management functions, healthcare organizations have a **quality management system** or framework that defines and guides all measurement, assessment, and improvement activities. This infrastructure can be organized in many ways. Variables that affect the organization of the quality framework include

- the type of organization,

- the size of the organization,

- available resources,

- the number and type of externally imposed quality requirements, and

- internal quality improvement priorities.

> **(?) DID YOU KNOW?**
>
> Avedis Donabedian, physician and professor of public health at the University of Michigan from 1966 to 1989, became internationally known for his research on healthcare improvement. Prior to his death on November 9, 2000, he identified "the determination to make it work" as the most important prerequisite to ensuring quality of care: "If we are truly committed to quality, almost any mechanism will work. If we are not, the most elegantly constructed of mechanisms will fail" (Donabedian 1988).

Small healthcare providers, such as outpatient clinics and university student health centers, typically have informal quality management infrastructures; the clinic manager performs most, if not all, quality management activities and reports information directly to the clinic owner or medical director. Large regional health systems that include several hospitals as well as non-hospital providers usually have formal, well-defined quality frameworks.

Sidebar definitions:

High-performing healthcare organization
An organization that is committed to success and continually produces outstanding results and high levels of customer satisfaction

Governing body
The individuals, group, or agency with ultimate legal authority and responsibility for the overall operation of the organization; often called the *board of trustees*, *board of governors*, or *board of directors*

Quality management system
A set of interrelated or interacting elements that organizations use to direct and control the implementation of quality policies and achieve quality objectives

Many healthcare organizations are required by accreditation standards or govern-
ment (federal and state) regulations to have a plan that explains their method of fulfilling
quality management activities. Some standards and regulations have explicit requirements
regarding plan content and the structure of improvement activities. For instance, health-
care facilities in Pennsylvania must have a patient safety committee that includes two resi-
dents of the community, who are served by, but are not agents, employees, or contractors
of, the facility (Commonwealth of Pennsylvania 2002). The Joint Commission (2008, 76)
accreditation standards do not require a written plan, but they do require that organiza-
tions have a systematic approach to performance improvement. Although written plans
are not required, most accredited organizations have them to illustrate the organization
of internal quality management activities. Good business sense dictates the importance of
having a written, board-approved **quality management plan** that describes the organiza-
tion's quality infrastructure and required quality management activities.

10.1 QUALITY MANAGEMENT SYSTEM

Healthcare organizations' quality management systems vary according to their governance
and management structure. In general, the following six groups typically fulfill quality
management roles:

◆ The board, which oversees and supports measurement, assessment, and im-
provement activities

◆ Administration, which is responsible for the organization and management of
measurement, assessment, and improvement activities

◆ Coordinating committee (or individual), which directs measurement, assess-
ment, and improvement activities

◆ Medical staff, which develops and participates in measurement, assessment,
and improvement activities related to performance of physicians and other
medical professionals who practice independently

◆ Departments, which develop and participate in measurement, assessment, and
improvement activities related to nonphysician performance

◆ Quality support services, which assist all groups in the organization with mea-
surement, assessment, and improvement activities

THE BOARD

The governing body or board, usually called the board of trustees, board of governors, or
board of directors, is a group of people who have ultimate legal authority and responsibil-

ity for the operation of the healthcare organization, including quality management activities. Board of trustee involvement in quality management activities includes, but is not limited to, the following responsibilities:

◆ Defining the organization's commitment to continuous improvement of patient care and services in the organization's mission statement

◆ Prioritizing the organization's quality goals (with administration and the medical staff)

◆ Incorporating the results of assessment and improvement activities in strategic planning

◆ Learning approaches to and methods of continuous improvement

◆ Providing financial support for measurement, assessment, and improvement activities

◆ Promoting healthcare quality improvement

◆ Evaluating the organization's progress toward its quality goals

◆ Reviewing the effectiveness of the quality management program

ADMINISTRATION

The responsibility for implementing quality management activities throughout the organization lies with administration—the chief executive officer, the chief operating officer, the vice presidents, and other senior leaders. In contrast to the board's high-level role, administration ensures that day-to-day quality management operations are meeting the organization's needs. Administration's involvement in quality management activities includes, but is not limited to, the following responsibilities:

◆ Defining the organization's quality management infrastructure

◆ Assigning quality management responsibilities and holding people accountable for fulfilling them

◆ Allocating the resources necessary to support quality management activities

◆ Encouraging those who use or provide the organization's services to participate in quality management activities

◆ Promoting physician and employee education about the concepts and techniques of quality management

- ◆ Using performance data for strategic planning purposes and to design and evaluate new services or programs

- ◆ Identifying opportunities for performance improvement and helping to achieve these improvements (with the medical staff)

- ◆ Keeping the board informed of quality and patient safety issues

COORDINATING COMMITTEE

The quality coordinating committee, often called the *quality council*, *performance improvement committee*, or *quality and patient safety committee*, guides all measurement, assessment, and improvement activities. Sometimes an individual rather than a committee fulfills this role. The coordinating committee's involvement in quality management activities includes, but is not limited to, the following responsibilities:

- ◆ Meeting periodically to direct the activities of the organization's quality management program

- ◆ Setting expectations, developing plans, ensuring implementation of processes to measure, and assessing and improving the quality of the organization's governance, management, clinical, and support processes by

  - • analyzing summary reports of system- and activity-level measures of performance and performance improvement activities, and providing reports of these analyses to the board of trustees;

  - • setting improvement priorities and chartering interdepartmental, multidisciplinary improvement teams;

  - • directing resources necessary for measurement, assessment, and improvement activities;

  - • establishing quality goals for the organization, with board approval; and

  - • coordinating and communicating all quality management activities throughout the organization

- ◆ At least annually, overseeing evaluation of the quality management program's effectiveness in meeting the organization's quality goals, and revising strategy where necessary

- ◆ Communicating quality management activities to the board of trustees

- ◆ Ensuring that the quality management infrastructure and activities meet accreditation and regulatory requirements

Teaching Hospital	Neighborhood Health Clinic
• Chief operating officer	• Medical director
• Vice president of medical affairs	• Senior staff nurse
• Vice president of nursing	• Clinic manager
• Vice president of clinical support services	• Director of health information management
• Medical staff president	
• Director of quality	

TABLE 10.1.
Composition of Quality Coordinating Committee in Two Organizations

Typically, the quality coordinating committee comprises physicians, nurses, other clinicians, and administrative representatives, but its composition depends in part on the size of the healthcare organization. Most important, the people who oversee and are accountable for quality in the organization should be included. Table 10.1 lists examples of committee members for two types of organizations—a major teaching hospital and a neighborhood health clinic.

MEDICAL STAFF

The Medicare Conditions of Participation (COPs) for Hospitals and Joint Commission accreditation standards require that hospitals have an **organized medical staff**. A hospital's medical staff comprises physicians, dentists, and other professional medical personnel who provide care to the hospital's patients independently. The theory behind the quality role of the organized medical staff is that lay members of the board are neither trained nor competent to judge the performance of physicians and other medical professionals. Therefore, the medical staff is delegated the responsibility of evaluating the quality of patient care provided by physicians and other medical professionals and advising the board of the results. The board retains legal authority to make final decisions.

The Medicare COPs and Joint Commission standards require that medical personnel have bylaws and rules/regulations that establish mechanisms by which they accomplish their tasks. The medical staff infrastructure for accomplishing its quality management responsibilities are found in these documents. The Joint Commission (2008, 138) standards require, at a minimum, the formation of a medical staff executive committee to represent physicians in the organization's governance, leadership, and performance improvement functions. Additional medical staff committees or groups may be formed to fulfill other quality management functions. For instance, in Chapter 3, students were introduced to clinical decision making—the process by which physicians and other clinicians determine which patients need what and when. The medical staff is responsible for evaluating the appropriateness of physicians' clinical decisions.

Organized medical staff
A formal organization of physicians and dentists with the delegated responsibility and authority to maintain proper standards of medical care and plan for continued betterment of that care

Critical Concept 10.1 is an excerpt from one hospital's medical staff regulations that describes the quality management duties of the pharmacy and therapeutics committee. One of the duties of this committee is to evaluate whether physicians are overusing, underusing, or misusing medications.

> ⓘ **CRITICAL CONCEPT 10.1**   Quality Management Responsibilities of a Hospital's Pharmacy and Therapeutics Committee
>
> - The Pharmacy and Therapeutics Committee, in collaboration with the Pharmacy Department Director, is responsible for developing and implementing hospital-wide policies and procedures for medication use.
>
> - The Pharmacy and Therapeutics Committee, in collaboration with the Pharmacy Department Director, is responsible for developing and implementing a formulary (list) of approved drugs to be used at the hospital.
>
> - The Pharmacy and Therapeutics Committee, in collaboration with the Pharmacy Department Director, monitors all aspects of pharmaceutical care to ensure appropriateness and quality including, but not limited to
>
>   — evaluation and reduction of adverse drug reactions,
>   — evaluation and reduction of medication errors, and
>   — evaluation and improvement of medication use.
>
> - The Pharmacy and Therapeutics Committee sponsors educational programs for the medical staff on topics related to the appropriateness and quality of medication use.
>
> Medical staff involvement in quality management activities includes, but is not limited to, the following responsibilities:
>
> - Providing leadership oversight for the physician-related aspects of quality management
>
> - Measuring, assessing, and improving clinical aspects of patient care
>
> - Evaluating the clinical competence of physicians and other medical professionals who care for patients independently in the organization
>
> - Identifying opportunities to improve patient care and helping to achieve these improvements (with all departments in the organization)
>
> - Reporting the results of quality management activities to the medical staff, oversight committees, and the board

In organizations that do not have an organized medical staff, the medical director or the governing board assumes physician-related quality management responsibilities. For instance, the Medicare COPs (2004) for freestanding ambulatory surgery centers require the facility to have "a governing body that assumes full legal responsibility for determining, implementing, and monitoring policies...so as to provide quality health care in a safe environment."

DEPARTMENTS

All departments and services in a healthcare organization participate in quality management activities. Managers of these departments and services are responsible for overseeing performance in their respective areas. Manager involvement in quality management activities includes, but is not limited to, the following responsibilities:

◆ Providing leadership oversight for departmental quality management activities

◆ Measuring, assessing, and improving clinical and operational performance

◆ Ensuring the competence of people working in the department

◆ Identifying opportunities to improve performance in the department and throughout the organization, and helping to achieve these improvements

◆ Reporting the results of departmental quality management activities to departmental staff, oversight committees, and the board

QUALITY SUPPORT SERVICES

Many individuals in a healthcare organization assist with quality management activities. Their job titles and areas of expertise vary considerably among organizations. A list of common quality-related positions follows. In smaller organizations, the responsibilities described in the list may be combined. In some cases, only one or two employees may support all of the organization's quality management activities.

◆ *Quality director*. The quality director is the administrative head of quality management functions and may be a member of the organization's senior administrative team. The quality director serves as an internal consultant and assists the organization with measurement, assessment, and improvement activities. The director often manages a department of data analysts and other staff who support quality management functions.

◆ *Patient safety coordinator*. In response to the increased emphasis on patient safety improvement (covered in Chapter 8), some healthcare organizations

have appointed a patient safety coordinator (or patient safety officer). Oversight of patient safety improvement activities may include evaluating patient incident data, facilitating root cause analyses and other patient safety improvement projects, and coordinating the flow of patient safety information throughout the organization.

◆ *Physician quality advisor.* Some organizations appoint a physician as a full- or part-time advisor to the quality management program. Organizations that have a medical director may assign quality advisor duties to that position. The physician quality advisor provides input to the senior administrative team and to the medical staff on issues related to physician performance measurement and improvement activities. The quality advisor works closely with the quality director and the president of the medical staff to ensure appropriate medical staff participation in quality management activities. The physician quality advisor may also serve as an advisor for utilization management (UM) activities.

◆ *Case manager/utilization reviewer.* Case managers and utilization reviewers are responsible for facility-wide UM activities (covered in Chapter 9). These individuals conduct prospective, concurrent, and retrospective reviews to determine appropriateness of medical care and gather information on resource use. In addition, they assist with discharge planning to coordinate patient services between caregivers and provider sites.

◆ *Patient advocate.* The patient advocate is the primary customer service contact for patients and staff members for the resolution of customer service problems related to a patient's healthcare experience. The patient advocate participates at all levels of the quality management program.

◆ *Risk manager.* The risk manager coordinates the organization's **risk management** activities. The goal of risk management is to protect the organization from financial losses that may result from exposure to risk. This goal is achieved through initiatives aimed at preventing harm to patients, visitors, and staff. In addition to other duties, the risk manager may be responsible for maintaining the organization's patient incident report system and may serve as the organization's patient safety officer.

◆ *Infection control coordinator.* The infection control coordinator, usually a nurse, provides surveillance, education, and consulting services for physicians and staff in matters related to prevention of patient infections. The infection control coordinator gathers data for infection-related performance measures and is also responsible for facilitating the implementation of government regulations and accreditation standards relevant to infection control.

Risk management
The act or practice of dealing with risk, which includes planning for risk, assessing (identifying and analyzing) risk areas, developing risk-handling options, monitoring risks to determine how risks have changed, and documenting the overall risk management program

♦ *Compliance officer.* In recent years, some healthcare organizations have added a compliance officer to the quality team. This person interprets accreditation standards and government regulations pertaining to quality management and helps physicians and staff adhere to all standards and regulations.

♦ *Data analyst.* Data analysts are responsible for gathering and reporting performance measurement information. These individuals may have a clinical background (e.g., nursing or therapy) or a nonclinical background (e.g., health information management). Some data analysts may report to the quality director, and some may be employed in other departments. Several data analysts are needed to support quality management activities in large healthcare organizations. In a survey of its hospital customers, CareScience (now part of the Premier healthcare alliance) found that 50 to 90 hours per month were needed to collect data for just three of the Joint Commission core measure sets (heart attack, heart failure, and pneumonia), and another 23 hours per month were needed to analyze the data (Anderson and Sinclair 2006).

The increasing scope and volume of quality management activities are affecting the quality support workforce in healthcare organizations. More than half of the 36 hospitals interviewed in a 2005 study had in the past year substantially increased the number of full-time equivalents devoted to performance measurement and improvement activities (Pham, Coughlan, and O'Malley 2006). Many medical groups participating in Medicare quality measurement activities also have hired additional staff to support the program (Medical Group Management Association 2007).

Providers are not the only group adding support staff to meet quality management expectations. More than 90 percent of managed care organizations (MCOs) produce and submit performance data to the National Committee for Quality Assurance (Turk 2000). These MCOs invest significant resources in data collection and have hired additional staff to review patient records. State and national groups that receive data from providers and MCOs have added support staff to analyze and report aggregate results for the growing number of quality measures. Nearly all state health agencies have increased staffing to conduct performance management activities aimed at improving the quality and outcomes of public health services (Public Health Foundation 2003).

> ⊛ **LEARNING POINT**
> Quality Infrastructure
>
> Every healthcare organization has a quality infrastructure designed to fulfill the goals of quality management. As the complexity of the organization increases, so does the need for a formal, well-defined quality infrastructure. Six groups typically involved in an organization's quality management activities are the board of trustees, administration, a coordinating committee, the medical staff, departments, and quality support services.

10.2 QUALITY MANAGEMENT PLAN

The document describing the organization's structure and process for measuring, assessing, and improving performance may be called a *quality management plan*, a *performance improvement plan*, a *quality and patient safety plan*, or a number of other descriptive titles. For purposes of this discussion, the term *quality management plan* will be used. Regardless of the title of the document, the purpose of the plan is the same—to serve as a blueprint for quality and patient safety in the organization. At a minimum, the plan includes the following elements:

◆   A quality statement

◆   A description of the quality management infrastructure

◆   Details of performance measurement, assessment, and improvement activities

◆   An evaluation of the effectiveness of quality management activities

QUALITY STATEMENT

The quality statement describes the goal to which all quality management activities are directed. The quality statement reflects the organization's ideals—what it wants for patients and the community. An organization's quality statement often incorporates its mission, vision, and values. Here is the quality statement of a medical university hospital:

> The major objective is to obtain patient outcomes of the highest quality and to provide services that meet or exceed the expectations of our customers.

The board and administration jointly develop the quality statement. In facilities with an organized medical staff, physicians are also involved in its creation.

QUALITY MANAGEMENT INFRASTRUCTURE

The plan describes each of the organization's quality management stakeholders and their responsibilities. Some plans describe infrastructure and stakeholder activities in great detail and are several pages long. Plans do not need to describe every element, however. Quality management responsibilities are often specified in employee job descriptions, and duplicating these statements in the quality plan is redundant. In general, the quality management plan should be sufficiently detailed to convey the organization's approach to quality management. At a minimum, the description of the infrastructure should include:

◆   major stakeholders (individuals and groups) and expectations for their partici-
pation in quality management functions, and

◆   committee structure (e.g., committees involved, committee chairs and mem-
bers, meeting frequency, methods of communicating quality management
activities throughout the organization).

Drawing an organizational structure diagram may help depict the relationships be-
tween individuals, groups, and committees. Some organizations draw diagrams to show the
flow of performance information among individuals, groups, and committees. Figure 10.1
illustrates the flow of performance information in a hospital.

PERFORMANCE MEASUREMENT, ASSESSMENT, AND IMPROVEMENT ACTIVITIES

Items to be measured and the execution of assessment and improvement activities are
detailed in the quality management plan. The improvement model also may be docu-
mented, as well as the groups that charter and participate in improvement projects. In
some organizations, the quality plan is fairly standard and doesn't change often. Each year
the plan is reviewed and updated to reflect infrastructure changes and new regulatory or
accreditation requirements, but the fundamentals remain the same. Elements of the qual-
ity program that frequently change, such as quality improvement priorities, measures of
performance, and sources of performance data, are described in appendixes to the plan or
in other organizational documents.

FIGURE 10.1.
Flow of
Performance
Information in
a Hospital

In other organizations, the quality plan is a working document that includes a description of all performance measures the organization uses, sources of performance measurement data, and annual quality improvement priorities or goals. Critical Concept 10.2 lists examples of quality goals established at one hospital that are expected to be achieved over the upcoming year. New or updated goals are set for the following year, and the quality plan is revised to reflect those changes. The organization's performance measures and information sources are also frequently updated.

(!) CRITICAL CONCEPT 10.2
Hospital Performance Improvement Goals for 2009

- Improve access to care in perioperative services, the emergency department, and ambulatory clinics

- Improve resource utilization by reducing hospital lengths of stay and hospital readmissions

- Improve patient satisfaction throughout the organization

- Reduce the rate of pneumonias in patients on ventilators

- Reduce the rate of central line and urinary tract infections

- Improve communication among caregivers during patient care handoffs inside and outside the organization

- Reduce the rate of cesarean sections

- Improve staff and physician satisfaction with the electronic information system

- Reduce the rate of medication errors

EVALUATION OF THE EFFECTIVENESS OF QUALITY MANAGEMENT ACTIVITIES

Periodically, usually annually, the coordinating committee evaluates overall quality management performance by determining whether the quality infrastructure has been effectively improving organizational performance, and making changes as necessary. The coordinating committee also determines whether the organization has met the year's quality goals and uses its findings to plan the following year's quality management activities.

Critical Concept 10.3 is a quality plan template that can be customized to suit the needs of a healthcare organization that lacks an organized medical staff structure, such as an outpatient clinic, a freestanding ambulatory surgery center, or a nursing home.

CRITICAL CONCEPT 10.3 Quality Plan Template for Organizations That Do Not Have Organized Medical Staffs

Quality Statement

The purpose of quality management activities is to improve clinical and operational processes and outcomes through continuous measurement, assessment, and improvement activities. The quality program of *(insert organization name)* strives to ensure that all aspects of healthcare service, whether clinical or nonclinical, are designed for optimal performance and patient safety and delivered consistently across the organization.

Quality Infrastructure and Responsibilities

The governing body of *(insert organization name)* has overall responsibility for the quality program and delegates operational responsibilities through the management structure.

The objectives of the quality program are to

- establish a system for ongoing monitoring of performance to identify problems or opportunities to improve patient care, operational performance, and customer satisfaction;

- resolve identified problems and improve performance using quality improvement principles and techniques;

- ensure that performance improvement actions are taken and the effectiveness of the actions are evaluated;

- refer unresolved performance deficiencies to the medical director (or management structure, as appropriate) for resolution; and

- maintain a consistent and systematic approach to quality improvement that involves planning activities, enacting plans, monitoring performance, and acting on improvements and deficiencies.

A quality management committee, consisting of *(insert the number and type of positions reflective of your organizational structure)*, is responsible for coordinating and integrating all measurement, assessment, and improvement efforts. The committee reports its findings to the medical director and management for review or implementation and problem resolution at that level, or for referral to the governing body, if indicated.

(Continued)

CRITICAL CONCEPT 10.3   Quality Plan Template for Organizations That Do Not Have Organized Medical Staffs

Other organization representatives involved directly and indirectly in quality management activities include managers, members of the clinical and nonclinical staffs, and administrative support staff. Appropriate staff members are involved in activities within the sphere of their responsibilities and expertise.

The quality management committee is responsible for identifying measures of performance for important aspects of patient and operational services. Organizational representatives are responsible for ongoing monitoring and evaluation of performance and resolution of problems affecting their areas of responsibility. These activities are reported at least quarterly to the quality management committee for analysis, further study, or implementation (as necessary).

Recommendations and actions of the quality management committee are documented and forwarded to the governing body.

The quality management committee periodically reviews organization-wide quality management activities to ensure the goals of the quality program are being met and performance is continuously improving. At least annually, the quality plan is reviewed and revised as necessary.

LEARNING POINT
Planning for Quality

Every healthcare organization has a quality management infrastructure. An effective infrastructure begins at the board level and cascades vertically and horizontally to levels throughout the organization. The size, function, and number of components that support quality management activities vary according to the size of the organization and the types of healthcare services it provides. A healthcare organization's quality management infrastructure is documented in its quality management plan.

10.3 A HOSPITABLE ENVIRONMENT

To improve quality, an organization must have the will to improve, the capacity to translate that will into positive change, the infrastructure necessary to support improvement, and an environment hospitable to quality. The last factor—environment—relates to the organization's culture. *Culture* is a system of shared actions, values, and beliefs that guides the behavior of an organization's members. The corporate culture of a business setting is one example of such a system. Edgar H. Schein (1986), a clinical psychologist turned organizational theorist, identified three levels of **organizational culture**:

◆ Level 1: Observable culture—the way things are done in the organization

◆ Level 2: Shared values—awareness of organizational values and recognition of their importance

◆ Level 3: Common assumptions—realities that members take for granted and share as a result of their joint experiences

The organizational culture at all three levels is pivotal to successful continuous improvement. Culture influences the manner in which quality management is implemented and executed. Cultural tone—whether trust or fear, collaboration or isolation, interdependency or autonomy—affects the way senior leaders, managers, physicians, and employees interact in the quality management process. Quality leaders have long recognized the importance of culture as a driver of **performance excellence**. Several of the 14 quality principles espoused by W. Edwards Deming (1986) more than 25 years ago (see Chapter 1) address the cultural aspects of quality improvement:

◆ Help people do a better job

◆ Drive out fear

◆ Break down barriers

◆ Restore pride of workmanship

◆ Make quality everyone's job

In a culture committed to quality, senior leaders and managers lead by example and encourage an environment of open, candid dialogue and continual improvement. The people who do the work are actively involved; management seeks their views and listens to what they have to say. Everyone in the organization is clear on the expected level of performance and receives feedback on progress. People are acknowledged and recognized for the contributions they make to further the organization's quality goals. People trust and have confidence in leadership's determination to continuously improve organizational performance.

The relationship between a supportive quality culture and an organization's ability to achieve aggressive improvement goals has been substantiated numerous times (Scott et al. 2003; Mannion, Davies, and Marshall 2005; Scott-Cawiezell et al. 2005a; Baker, Day, and Salas 2006; Bradley et al. 2005). In 2004, for instance, the Commonwealth Fund published the results of a study that identified supportive quality culture as a key factor contributing to the success of four high-performing U.S. hospitals. Top-performing

Organizational culture
The set of beliefs, values, and norms that represent the character of an organization and provide a context for its actions

Performance excellence
Term introduced by Tom Peters and Robert Waterman in their book *In Search of Excellence* (1982) to refer to an overall way of working that balances stakeholder concerns and increases the probability of long-term organizational success

hospitals demonstrated a high degree of motivation and commitment to ensuring quality patient care. This commitment was reflected in and nurtured by (Meyer et al. 2004, vi–vii)

◆ active leadership and personal involvement on the part of the senior team and the board of trustees,

◆ an explicit quality-related mission and best-in-industry quality improvement targets,

◆ standing and ad hoc quality committees,

◆ regular reporting of performance measures with accountability for improved results, and

◆ promotion of a safe environment for reporting errors.

A 2005 study of quality performance in Colorado nursing homes found that leaders in better-performing homes emphasized the importance of quality communication and teamwork among staff and clear standards and expectations. Leaders focused on recognizing and expressing appreciation for staff (Scott-Cawiezell et al. 2005b).

There is no "correct" culture. A culture that works in one organization may not work in another. A culture's suitability depends on how well it supports the organization's quality management goals. Is the culture undermining quality improvement efforts? Some red flags that signal incompatibility are:

◆ tolerance of poor communication, corner-cutting, and poor performance;

◆ acceptance of improper procedures, complacency, and inefficiency;

◆ lack of trust;

◆ sacrifice of quality or patient safety to save money or time; and

◆ comments such as, "Nobody ever listens to me" or "This is the way we do things around here."

Organizational culture is the root of many performance problems. If any of these red flags exist, the organization's leaders must identify inhospitable attributes of the culture and modify the values, beliefs, and actions that affect the success of quality management activities. By nurturing the culture to an appropriate level, the organization will reap the rewards of quality management. Aspects of culture often found in high-performing organizations are summarized in Critical Concept 10.4.

> **⊙ CRITICAL CONCEPT 10.4**
> Characteristics of a High-Performing Culture
>
> - Senior leaders and managers communicate and support high-quality performance through words and actions.
>
> - Open communication is practiced; people are free to voice opinions, share ideas, and make decisions.
>
> - Conflict and disagreement are dealt with openly.
>
> - People are dedicated to continuous improvement; higher quality goals are set once initial goals are met.
>
> - People know what they are accountable for, take ownership of their responsibilities, and continuously strive to perform better.
>
> - People support one another; the concept of teamwork is apparent throughout the organization.
>
> - Individual and collective performance is monitored, reinforced, and corrected on an ongoing basis.
>
> - Individual and team successes are acknowledged and celebrated.
>
> - Individual competencies are systematically developed on an ongoing basis.
>
> - Employees constantly learn from the best practices of top-performing organizations.
>
> - Performance excellence is pursued for its own sake.

Cultural change can be difficult and time consuming to achieve because culture is rooted in the collective history of an organization and in the subconscious of its staff. In general, cultural change is instituted through the following steps:

◆ Uncover core values and beliefs, including both stated goals and goals embedded in employee behaviors. Two sources of healthcare organization culture surveys are listed in the website resources at the end of the chapter.

◆ Look for cultural characteristics that are undermining the organization's capacity to continuously improve. Conduct a series of focus groups with a representative sample of survey participants to identify areas needing change

and practical interventions that will make a difference. Turn this information into a comprehensive cultural change action plan.

◆ Establish new behavioral norms that demonstrate desired values.

◆ Repeat these steps over a long period. Emphasize to new hires the importance of the organization's culture. Reinforce desirable behavior.

⊛ LEARNING POINT
Environment That Supports Quality

An organization's environment—its culture—influences the success of quality management activities. Leaders must create a culture that supports their organization's goals and, when necessary, change that culture to encourage continuous improvement.

Throughout most of his life, nineteenth-century French chemist Louis Pasteur insisted that germs were the cause of disease, not the body. Not until the end of his life did he come to believe the opposite. After reaching this conclusion, he declined treatment for potentially curable pneumonia, reportedly saying, "It is the soil, not the seed" (Spath and Minogue 2008). In other words, a germ (the seed) causes disease when our bodies (the soil) provide a hospitable environment. This bacteriology lesson is relevant to the performance improvement efforts in healthcare organizations. The organization's culture (the soil) must provide a hospitable environment for quality management activities (the seeds) to succeed.

CONCLUSION

Healthcare quality is not dependent only on the efforts of well-meaning frontline employees. The organization's leaders must systematically channel and manage the efforts to achieve optimal organizational performance. Healthcare organizations should have an appropriate quality management structure that operates at all levels and has the power to evaluate and improve all aspects of patient care and services.

Defining the quality management infrastructure and activities in a written document demonstrates the organization's formal commitment to quality. A written plan clearly communicates to employees the organization of quality management activities and the groups or individuals responsible for quality components.

Organizing for quality also involves creating a supportive organizational culture in which performance can flourish. Culture—the collective values, beliefs, expectations, and commitments that affect behavior at all levels—should further the quality goals of the organization. A culture built on trust and support will achieve high performance. Organiza-

tions will reap the most benefits from quality management when managers and employees value the process; encourage open, candid dialogue; support career growth; and pursue improved personal and organizational performance.

In the 2001 report *Crossing the Quality Chasm: A New Health System for the 21st Century*, the Institute of Medicine (IOM) identified six dimensions of U.S. healthcare that need improving. Not only did the report provide a basis for defining healthcare quality; it also created a significant challenge for the healthcare industry. How can we make healthcare safer, more effective, patient centered, timely, efficient, and equitable? National policy changes and new regulations and standards have limited influence on what actually happens at the front lines of patient care. Addressing the challenge of improving healthcare quality requires that every organization continuously measure, assess, and improve performance.

STUDENT DISCUSSION QUESTIONS

1. Some healthcare organizations post their quality plan on the Web. Search the Internet for quality plans from two different types of healthcare organizations (e.g., hospital, long-term care facility, ambulatory clinic, health plan). You may need to use search terms other than *quality management plan*, such as *performance improvement plan*, *patient safety plan*, or *quality plan*. Summarize the similarities and differences between the two plans.

2. Consider the cultural assumptions and beliefs underlying a perfectionist mentality. Perfection is always expected; mistakes aren't allowed. This assumption can create an environment inhospitable to quality improvement. How would you change that perception?

WEBSITES

- AHRQ Hospital Survey on Patient Safety Culture
  www.ahrq.gov/qual/hospculture
- Corporate Responsibility and Health Care Quality: A Resource for Health Care Boards of Directors
  www.oig.hhs.gov/fraud/docs/complianceguidance/CorporateResponsibilityFinal%20 9-4-07.pdf
- Great Boards: Promoting Excellence in Healthcare Governance
  www.greatboards.org

- Organized Medical Staff Section of the American Medical Association
  www.ama-assn.org/ama/pub/category/21.html
- Safety Attitude Questionnaires and Safety Climate Surveys developed by the University of Texas Center of Excellence for Patient Safety Research and Practice
  www.uth.tmc.edu/schools/med/imed/patient_safety/survey&tools.htm

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