

EXTERNAL ENVIRONMENT

Learning Objectives

1. Define the ways in which the external environment influences the operation of the healthcare delivery system.
2. Define the healthcare triangle, and demonstrate how it relates to management of healthcare organizations and the healthcare information technology function.
3. Describe the interdependent challenges of cost, quality, and access currently facing the US healthcare system.
4. Analyze the implications of the cost, quality, and access challenges for the management of healthcare information systems.
5. Assess the relative importance of evidence-based management, organizational change, and international comparisons in the current and future management of healthcare delivery organizations.
6. Assess how well healthcare system challenges and their implications align with healthcare information system priorities.

Overview

As Chapter 1 indicates, the future of healthcare information technology (HIT) is now. While the bulk of this textbook addresses management challenges with HIT, some of the greatest challenges faced today are motivated by factors external to the healthcare organization in which most of you will work. This chapter looks at some key elements of the external environment and how that environment influences the healthcare delivery system overall and healthcare informatics in particular. Chapter 3 also addresses external factors but concentrates on government health policy—specifically healthcare reform. In this chapter, we discuss four aspects of the external environment in detail.

First, we examine what we call the *healthcare triangle*: cost, quality, and access. Efforts to address the interrelated challenges of this triangle occupy much of healthcare leadership's and researchers' time and energy. Much research has been done on each of these three elements, and we briefly

introduce the challenges in Chapter 1. Despite these efforts, however, we are still far from identifying a solution to problems caused by any of the three sides of the triangle. Controlling costs, improving quality, and expanding access will continue to represent external challenges to healthcare delivery and HIT management in the years to come.

Second, we explore evidence-based medicine (EBM) and evidence-based management. While EBM was introduced in Chapter 1, the direct implication of this “innovation” was not fully developed. EBM might be considered a response to the challenges arising from the healthcare triangle. By using evidence for decision making in a more direct way, clinical and administrative healthcare leaders will need more intensive and more timely information from the HIT system.

Third, we address the broad issue of organizational change. Restructuring healthcare delivery organizations might be considered a response to the healthcare triangle as well, so we discuss the chief information officer (CIO) role in identifying and implementing broader organizational change.

Fourth, we examine international comparisons of healthcare delivery. The threat or opportunity posed by healthcare delivered outside of the organization or outside of the country must be identified and planned for. Although international threats were briefly addressed in the tourism section in Chapter 1, their implications were not fully analyzed.

Healthcare Triangle

By presenting the three main challenges—cost, quality, and access—facing the healthcare delivery system as an interrelated triangle (Exhibit 2.1), we are suggesting that efforts to achieve goals in any one of the areas will necessarily have an impact on the other two. For example, costs can be controlled easily but not without the resultant reductions in access to care or in quality of care. The challenge is to find ways to achieve goals in the three areas that are satisfactory to all participants. Who pays for care? Who might have limited or no access to care? Who might suffer from less-than-satisfactory quality of care? The answers are often different groups of people. The political considerations in finding a solution are substantial—as was evident in the debate surrounding the healthcare reform legislation passed by the Obama administration, a debate that continued to be a major focus during and long after the 2012 presidential election.

The study of how we measure healthcare systems’ performance in these three areas keeps government agencies, foundations, and consultants busy. An effective way to organize the key elements of the triangle comes from work funded by the Commonwealth Fund (2006). The organization

EXHIBIT 2.1

The Healthcare Triangle: Interrelations Among Cost, Quality, and Access



released *Why Not the Best?* to report the results from its assessment of the US healthcare system’s performance. The analysis posed system questions, which do not directly reflect the performance of any individual organization or provider. However, it used measures that originate from elements of the delivery system. Organizations are going to be asked to provide some of these measures, which will put pressure on HIT. The five dimensions of overall performance and the 15 sub dimensions are presented in Exhibit 2.2.

Interestingly, *Why Not the Best?* reports a wide range of scores across the individual measures. Overall, the US system at that time scored an average of 66 in all measures when compared to a best-practice benchmark (Commonwealth Fund 2006). The implication is that the national healthcare system has achieved 66 percent of the target best-practice rating of 100 percent. Scores for the individual dimensions ranged from a high of 71 percent for both quality and equity to a low of 51 percent for efficiency. The US system scored highest for “adults with chronic conditions given self-management plan” at 89 percent and lowest for “physicians using electronic medical records” at 21 percent.

The point to notice here, however, is that for each of these indicators, the performance data are key, which means that completing a national report card (such as the *Why Not the Best?* publication) will require increased efforts by those responsible for HIT. The consideration of system performance measures will influence the HIT and organizational leadership to collect, analyze, and report a broader range of data than usual. They may have to identify that data for the patients they treat and for the potential patients in their service areas. While much of these data come from traditional sources (e.g., infant mortality rates, childhood immunization rates), other measures are relatively

EXHIBIT 2.2

- Dimensions of Health-care System Performance Assessment**
- Long, healthy, productive lives
 - Preventable mortality
 - Infant mortality
 - Life impacts of poor health
 - Quality
 - Right care
 - Coordinated care
 - Safe care
 - Patient-centered and timely care
 - Access
 - Participation
 - Affordability
 - Efficiency
 - Overuse, inappropriate care, or waste
 - Access and efficiency
 - Variations in quality and costs
 - Insurance in administrative costs
 - Information systems to support efficient care
 - Equity
 - Key roles of coverage, income, and race

SOURCE: Information from Commonwealth Fund (2006).

new to most hospital systems (e.g., chronic diseases under control, use of emergency department for conditions that can be treated by an ambulatory physician). Many of these indicators are based on population characteristics and are not usually items that individual organizations take the responsibility for collecting (e.g., health expenditures spent on administration).

Measuring performance is not the only approach to addressing the healthcare triangle. Other analysts have looked at combinations of factors as well. Baicker and Chandra (2004) examined the interrelationships among quality of Medicare beneficiaries' care, physician workforce, and spending. They found that states with greater spending actually had lower quality outcomes and that the composition of the physician workforce played a role in effective services and thus resulted in more desirable outcomes. Similarly, Yasatis and colleagues (2009) reported on the link between quality of care and intensity of spending at the hospital level. They found that the relationship was mostly nonexistent and, if significant, was mostly negative.

HIT plays a central role in providing quality care, as explained in this book, and has the potential to improve efficiency and effectiveness. While it

cannot solve efficiency and effectiveness problems, it serves as an important tool for government leaders and leaders of healthcare delivery systems in their efforts to find solutions.

Healthcare Costs

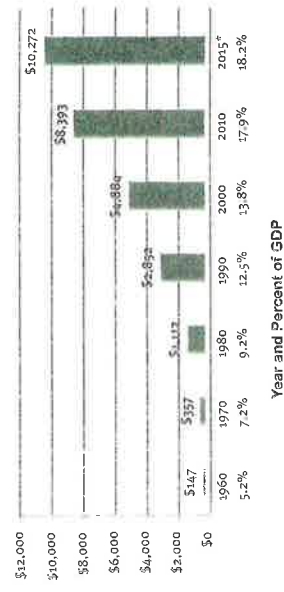
Healthcare costs continue to grow unabated. Government estimates state that the total national health spending reached nearly \$2.6 trillion in 2010 and consumed about 18 percent of the US gross domestic product (GDP) (see Exhibit 2.3). This spending has been increasing steadily in the past 50 years (from \$27.4 billion in 1960) and is expected to reach \$3.3 trillion in 2015 (BLS 2012; CMS 2012b). To put the magnitude of this number into context, Exhibit 2.4 presents the data over time—from 1960 to 2010, including projections for 2015—on a per person (per capita) basis. In 2010, the United States spent \$8,393 per person on healthcare, compared with the \$147 spent per person in 1960; by 2015, we are expected to spend \$10,272 per person. Exhibit 2.3 also shows health spending per capita and as a percentage of GDP for the same time frame (1960–2010). Healthcare expenditures are taking an ever-increasing portion of the goods and services produced in the United States, rising from only 5.2 percent of GDP in 1960 to 17.9 percent in 2010 and to an expected 18.2 percent by 2015.

Exhibit 2.5 analyzes the annual growth in healthcare spending by decade, from the 1970s through 2010 and projected data for 2015 (CMS 2012b). Healthcare spending increased faster than the GDP in all periods presented, although not always by the same amounts. These data suggest that regardless of good or bad economic times, Republican or Democratic presidents, and other factors, the result has been the same: The national health expenditure continues to grow faster than the GDP—the measure of the economy as a whole.

Exhibit 2.6 looks at the aggregate data in detail. It displays the spending by major healthcare delivery category for 2010. Hospital services represented the largest single category of spending at 31.4 percent, followed by physician services at 19.9 percent, prescription drugs at 10.0 percent, and nursing home care at 5.5 percent. It is interesting that research and construction constituted a substantial portion of spending at 5.7 percent. While these categories vary over time, they tend to remain stable for short periods. For example, Exhibit 2.7 presents the same national health expenditures broken down by category—but for 1980. The big differences in this 30-year period (1980–2010) are a decline in the proportion of spending on hospital services (39.3 percent in 1980), an increase in the proportion spent on prescription drugs (4.7 percent in 1980), and a decrease in the proportion of research and construction expenditures (7.9 percent in 1980).

EXHIBIT 2.4

Per Capita
National Health
Expenditure
(NHE) and
NHE's Share of
GDP, 1960–2015

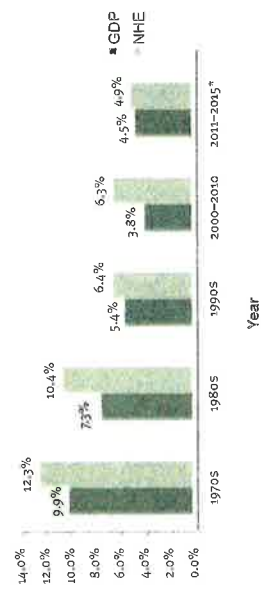


Year and Percent of GDP

* 2015 projection

EXHIBIT 2.5

Annualized
Growth Rates
for NHE and
GDP, 1970–2015



Another way to look at this is in terms of spending per year. Exhibit 2.8 presents the annual spending changes for select major categories, for total national health expenditures, and for GDP from 2000 to 2010. For the overall period, national health expenditures increased at an annual rate of 6.3 percent per year. Hospital services spending rose to slightly higher than the aggregate at 6.7 percent and as did prescription drugs expenditures at 7.6 percent, while physician services spending increased by less than the aggregate at 5.7 percent. National health expenditures and the major categories all increased faster than GDP, which was at 3.8 percent during this ten-year period.

EXHIBIT 2.3

Select National Health Expenditures, GDP, Population, and Price Increases, 1960–2010

Component	1960	1970	1980	1990	2000	2005	2010
National Health Expenditure (NHE)	\$27.4	\$74.9	\$255.8	\$724.3	\$1,377.2	\$2,029.1	\$2,593.6
Research and construction	\$2.6	\$7.8	\$20.1	\$48.7	\$87.5	\$126.5	\$149.0
Health services and supplies	\$24.8	\$67.1	\$235.7	\$675.6	\$1,260.9	\$1,860.9	\$2,444.6
Gov. adm. and net private insurance	\$1.1	\$2.6	\$12.1	\$38.8	\$83.0	\$149.2	\$176.1
Gov. Public Health Act	\$0.4	\$1.4	\$6.4	\$20.0	\$43.0	\$56.2	\$82.5
Personal healthcare	\$23.4	\$63.1	\$217.2	\$616.8	\$1,165.4	\$1,697.2	\$2,186.0
Hospital	\$9.0	\$27.2	\$100.5	\$250.4	\$415.5	\$609.4	\$814.0
Professional services	\$5.6	\$13.0	\$47.7	\$158.9	\$290.9	\$416.9	\$515.5
Physician services	\$2.0	\$4.7	\$13.4	\$31.7	\$62.3	\$87.0	\$104.8
Dental services	\$0.5	\$0.7	\$3.5	\$17.4	\$37.0	\$53.0	\$68.4
Other professional services	\$0.1	\$0.2	\$2.4	\$12.8	\$32.4	\$48.7	\$70.2
Home health care	\$0.8	\$4.0	\$15.3	\$44.9	\$85.1	\$112.5	\$143.1
Nursing homes	\$2.7	\$5.5	\$12.0	\$40.3	\$120.9	\$204.8	\$259.1
Prescription drugs	\$0.7	\$1.7	\$4.1	\$13.8	\$25.1	\$37.2	\$44.8
Durable medical equipment	\$1.6	\$3.3	\$9.8	\$22.4	\$31.6	\$37.2	\$44.8
Other nondurable	186	210	230	254	282	295	309
Population (in millions)	\$526.0	\$1,038.0	\$2,288.0	\$3,037.0	\$3,952.0	\$4,263.0	\$4,526.5
GDP (billion \$)	29.8	39.8	86.3	130.7	172.2	195.3	218.1
General inflation (index)	22.6	36.7	77.6	162.8	260.8	333.2	388.5
Healthcare inflation (index)	5.2%	7.2%	9.2%	12.5%	13.8%	16.1%	17.9%
NHE percent of GDP							

SOURCES: BLS (2012); CMS (2012b)

EXHIBIT 2.6

National Health Expenditure by Major Service Category, 2010

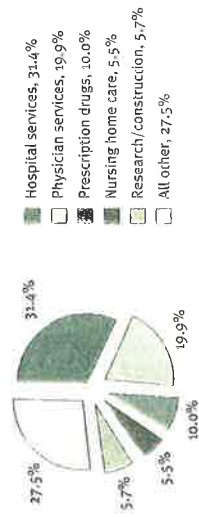
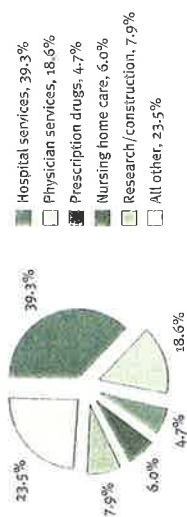


EXHIBIT 2.7

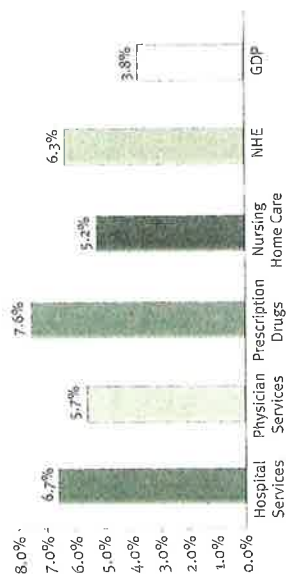
National Health Expenditure by Major Service Category, 1980



To put all of this in perspective and get a better understanding of the factors that contributed to these overall changes in national health expenditures, you can decompose these overall changes into key component parts. Decomposition helps to determine the true magnitude of this overall change in healthcare spending and to aid in seeking solutions. The data in Exhibit 2.3 can be used to decompose the overall health expenditure changes. Exhibit 2.9 is a summary of the decomposition results for the 2000–2010 period. Again, overall national health expenditures increased 6.3 percent per year during this decade. Many factors contribute to this overall result, including the following:

- **Population growth.** During the 2000–2010 period, the US population grew by about 0.9 percent per year. Therefore, health spending per capita increased only 5.4 percent (6.3 percent – 0.9 percent) per year

EXHIBIT 2.8
Annual Changes
in Major Categories, NHE,
and GDP,
2000–2010



during the decade. Population growth accounted for 14.4 percent of overall national health expenditure increases.

- **Inflation for the economy as a whole (measured by the Consumer Price Index).** Inflation was 2.4 percent per year during the 2000–2010 period. Therefore, real or inflation-adjusted health spending per capita went up 3.0 percent per year (6.3 percent [NHE] – 0.9 percent [population] – 2.4 percent [inflation]). Overall inflation increases accounted for 37.3 percent of health spending increases during this period. Of this remaining 3.0 percent per year, a substantial portion can be attributed to price increases for healthcare goods and services relative to general inflation.
- **Higher prices.** The medical care component of consumer prices climbed 4.0 percent during the 2000–2010 period. This increase was 1.6 percent (4.0 percent [medical care prices] – 2.4 percent [inflation]) more rapid than the overall inflation. Higher medical care prices accounted for 1.6 percent per year of the remaining real per capita increase of 3.0 percent per year, leaving a 1.4 percent annual increase unaccounted for. Relative medical care price increases accounted for 25.6 percent of overall health spending increases. The remaining 1.4 percent per year may be the result of two potential categories. One part represents greater spending due to increases in income, and the other part is residual.

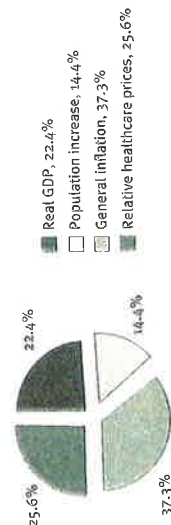
- **Real income increases.** If you assume that health spending goes up at least as rapidly as income does, then real income increases should account for some of the 1.4 percent remaining. Real income (GDP adjusted for inflation) rose 1.4 percent per year during the decade

(3.8 percent [GDP] – 2.4 percent [inflation]). Real GDP accounted for at least 22.4 percent of the total increase. The other part of the 1.4 percent remaining can only be called a residual, but it represents quantity and quality of services. After controlling for population, inflation, relative prices of medical care goods and services, and real income increases, health spending increased by 0.0 percent per year (6.3 percent – 0.9 percent [population] – 2.4 percent [inflation] – 1.6 percent [medical care prices] – 1.4 percent [real GDP]). Quantity and quality increases accounted for essentially 0.0 percent of overall national health expenditures from 2000 to 2010.

This complex decomposition represents more than just an interesting exercise. As underlying causes of expenditure increase change, different solutions will arise. These solutions will affect how HIT leadership must collect and report key data. Decomposition also indicates that in aggregate, greater healthcare spending does not appear to be due to the expansion of services but rather a result of a complex mix of price increases and greater income. Cutting services further will not control expenditure increases; we must look at prices and perhaps the mix of services being delivered for solutions. This is further evidence that the external environment has a major impact on the healthcare system.

As our cost analysis suggests, healthcare expenditure growth will likely continue into the future; this trend is supported by federal government reports (see Exhibit 2.3). This analysis also indicates that not all of the healthcare cost problem can be attributed to healthcare prices or utilization, but both contribute substantially to it. However, cost analyses look backward and do not address the underlying socioeconomic factors that drive increases in spending in a more fundamental manner (Thorpe 2005). Among these

EXHIBIT 2.3
Decomposition of Annual National Health Expenditure, 2000–2010



Real GDP, 22.4%

Population increase, 14.4%

General inflation, 37.3%

Relative healthcare prices, 25.6%

factors are modifiable “population risk factors such as obesity and stress,” although Thorpe (2005, 1436) points out that rising disease prevalence and new medical treatments account for much of the increase as well.

Quality of Care

According to the Institute of Medicine’s (IOM) 1999 landmark report, *To Err Is Human*, medical errors are a leading cause of adverse health consequences in hospitals (see Chapter 1). IOM followed up this study with a 2001 blueprint, *Crossing the Quality Chasm*, designed to help healthcare organizations fix the delivery system. The notion that quality in healthcare matters did not begin with these IOM studies, however. Most quality considerations for healthcare trace their origins to Avedis Donabedian.

He and his vast body of work conceptualized quality as a function of structure, process, and outcome—first in an article titled “Evaluating the Quality of Medical Care” (Donabedian 1966) and later and more formally in the classic book *The Definition of Quality and Approaches to Its Assessment* (Donabedian 1980). His work has become the foundation in that it continues to influence how we think about measurement and improvement of quality. He addressed many of the practical concerns regarding access to and use of patient clinical record data to measure and improve quality. In one of his more recent books, *An Introduction to Quality Assurance in Health Care*, Donabedian (2002) provided a guide to the many complex processes necessary for quality improvement. In his early work, he questioned access to and completeness of information in the traditional medical records (before the electronic medical record) and noted the challenges posed by physician record keeping. He even raised the notion of using direct observation, as opposed to paper records, as a means of collecting reliable, valid, and unbiased data. This innovative thinking occurred before the advent of most of the electronic record technologies that occupy our time today, and it continues to be an important consideration as a recent review of the evidence on the reliability and validity of quality measures suggests that more HIT work will be forthcoming in this regard (Chan, Fowles, and Weiner 2010). We urge you to read Donabedian’s literature, including his 1988 article “The Quality of Care: How Can It Be Assessed?”

Davis and colleagues (2004) reported on the measurement of six domains of quality just from the perspective of the patient:

1. *Patient safety*—patient-reported medical error with serious health consequences
2. *Patient-centeredness*—patient assessment of quality of physician care, especially regarding involvement of the patient in care decisions

3. *Timeliness*—patient-reported waiting time for hospitalizations, elective surgery, and physician appointment
4. *Efficiency*—patient-reported coordination of care
5. *Effectiveness*—patient-reported ability to follow up on care ordered by the physician
6. *Equity*—patient-reported influence of income on ability to receive care

Combining the foundation of quality from Donabedian, the challenges regarding medical errors from the IOM, and the concept of patient-perceived domains from Davis and colleagues led to the conceptualization of quality of care in terms of a more comprehensive set of measures. The Agency for Healthcare Research and Quality currently assists providers and researchers in navigating the complex and expanding quality measurement space by creating and hosting the National Quality Measures Clearinghouse (www.qualitymeasures.ahrq.gov/index.aspx). This comprehensive source of information on quality metrics even includes a tutorial that addresses the desirable attributes of a quality measure; selection of a measure for a particular purpose; use of measures for improvement, accountability, and research; validity of clinical measures; and paradigm for classifying measures (delivery or population based). The source collects and provides documentation for thousands of potential metrics and contains helpful classification schemes. For example, it presents measures by disease/condition, treatment/intervention, and health services administration. Of the 2,105 measures, 212 are listed by the National Committee for Quality Assurance. As an example of the types of information available, Exhibit 2.10 lists the nine items related to childhood immunization status (notice the subtle differences between the nine measures). This set of measurements gives an idea of the complexity of assessing quality.

Further, Davis and colleagues (2004) reported some of the problems with quality and the variability in the level of quality. Doing something about quality requires identifying a methodology and training people to monitor, assess, and improve quality of care. This has led to the formation of a host of associations, programs, and sources that have the common goal of organizing healthcare professionals around the task of improving quality or some aspects of service delivery in the US healthcare system (see Exhibit 2.11). All of these initiatives rely on the HIT function to provide data.

To demonstrate how vital information management is to the future, Senator Max Baucus (D-Montana) proposed in an article that two basic reforms be implemented to improve the system (Baucus 2005). First, the way that providers are paid must be changed to a system that encourages value and efficient, effective, patient-centered care. Second, more spending on (i.e., investment in) information technology is needed. Baucus asserted that these changes would result in a more transparent and value-based healthcare

EXHIBIT 2.10 Sample Measures from the National Quality Measures Clearinghouse

1. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); and one chicken pox (VZV) vaccines by their second birthday (combination #2)
2. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); and two hepatitis A (HepA) vaccines by their second birthday (combination #4)
3. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); and two hepatitis A (HepA) vaccines by their second birthday (combination #4)
4. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); and two influenza (flu) vaccines by their second birthday (combination #6)
5. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); and two or three rotavirus (RV) vaccines by their second birthday (combination #5)
6. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); two hepatitis A (HepA); and two influenza (flu) vaccines by their second birthday (combination #8)
7. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); two hepatitis A (HepA); and two or three rotavirus (RV) vaccines by their second birthday (combination #7)
8. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); two hepatitis A (HepA); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday (combination #10)
9. Childhood immunization status: Percentage of children 2 years of age who had four diphtheria, tetanus, and acellular pertussis (DTaP); three polio (IPV); one measles, mumps, and rubella (MMR); three H influenza type B (HIB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday (combination #9)

SOURCE: Reprinted from Childhood Immunization, National Quality Measures Clearinghouse, www.qualitymeasures.ahrq.gov/browse/by-topic.aspx.

EXHIBIT 2.11

Major Healthcare Quality Improvement Organizations

- Agency for Healthcare Research and Quality (AHRQ): www.ahrq.gov
- Ambulatory Care Quality Alliance (ACQA): www.aqaalliance.org
- American Medical Association Physician Consortium for Performance Improvement (AWA-PCPI): www.ama-assn.org/ama/pub/category/2946.html
- American Society for Quality (ASQ): www.asq.org
- Institute for Healthcare Improvement (IHI): www.ihi.org
- Institute of Medicine (IOM): www.iom.edu
- The Joint Commission: www.jointcommission.org
- Leapfrog Group: www.leapfroggroup.org
- National Association for Healthcare Quality (NAHQ): www.nahq.org
- National Committee for Quality Assurance (NCQA): www.ncqa.org
- National Association for Children's Healthcare Quality (NICHQ): www.nichq.org
- National Quality Forum (NQF): www.qualityforum.org
- Nursing Quality Network: www.nursingqualitynetwork.org

system. He even wrote in the conclusion that "I hope that my colleagues in Congress will see the wisdom of that approach" (Baucus 2005). Today, the message in this article reflects the thinking of a politician considering fundamental reform of the healthcare system. In fact, some of its features appeared in the Patient Protection and Affordable Care Act of 2010.

Since the early days of HIT, the literature has presented evidence of HIT's positive impact on quality. Buntin and colleagues (2011) in a systematic review found that 92 percent of the literature found HIT provided positive or mixed benefits. Among Buntin and colleagues' many findings is that research that examined specific information technology tools was less likely to demonstrate positive results than research that explored comprehensive information technology systems. The evaluation methodology suggests that this should not have been the case. More research on this topic is needed to fully understand the role of HIT on quality of care. Appari and colleagues (2012) conducted a large-scale study of US hospitals and found that institutions that adopted HIT had patients who displayed significantly greater likelihood of adherence to recommended medications (for acute myocardial infarction, heart failure, pneumonia, and surgical care) than patients of non-HIT adopters. Appari and colleagues looked separately at all computerized physician order entry (CPOE) and electronic medication administration record (eMAR) systems. This study suggests HIT's positive impact on quality because adherence to recommended medications is a necessary element in overall quality-of-care improvement.

The complexity of systematically measuring and evaluating HIT impacts makes the studies that do exist somewhat unsatisfying, however.

HIT's effect on outcomes is difficult to identify immediately because several steps occur between the implementation and use of an HIT system and the final clinical outcome; the best system in the world will not work if the operators (physicians) do not use the system correctly. Thus, many studies instead examine the intermediate outcomes, such as adherence to practice guidelines, rather than the patient outcome. For example, Jamal, McKenzie, and Clark (2009) found that most studies (14 out of 17 they reviewed) demonstrated evidence of improved compliance with guidelines but essentially no positive impact on patient outcomes. Similarly, Black and colleagues (2011) found little evidence of HIT's positive impact on quality when they examined a host of systems, including clinical decision support and distant technologies.

Despite substantial progress in measurement and improvement of care, serious caveats exist. Baron (2007) suggests that information technology may not be an easy answer to improvement despite its substantial promise. For example, an electronic health record's failure to adequately structure information means that retrieving and using vital patient data will be difficult for users. In addition, in many ambulatory care settings, neither teams nor resources exist to implement improvement initiatives despite the availability of good data.

Access to Care

In addition to the quality of care challenges, the US healthcare system suffers from myriad problems related to individuals with poor access to care. As with quality, the concept of access can be addressed in many ways, making full understanding and finding viable solutions difficult (ACHE 2008; Feinson 2004). One type of access problem, for example, may arise from people living in remote, rural parts of the country that do not have healthcare facilities and personnel close by. "Close by" can apply to distance or travel time. Crowding also can present an access barrier. If available facilities are underdeveloped to meet the needs of the local population, crowding can result. Other access barriers stem from the interrelated issues of lack of insurance, fear of public programs, literacy and cultural competency, and transportation (Feinson 2004). For this discussion, we primarily consider the financial aspects of access challenges.

Many residents in the United States have no health insurance, making obtaining care a cost-prohibitive undertaking. As described in Chapter 1, although the number of uninsured decreased in 2011, it remains a large population—comprising about 48.6 million people (Exhibit 1.1). One thing is certain, US residents consistently rank access at or near the top of "the most urgent" healthcare-related concerns, as reported by the Gallup organization (Saad 2009).

People without access to care are, generally, those without insurance. Because they do not have a usual source of care, the uninsured consistently exhibit behaviors that contribute to poor health outcomes, which ironically often cost more. Specifically, those without insurance (Families USA 2012)

- use the emergency department as the regular source of care
- obtain few (if any) health screenings and preventive care,
- often delay or completely forgo medical services,
- are typically sicker and may die earlier than those with insurance, and
- pay more for medical care.

Problems of the uninsured are systems challenges, but they manifest in clinical care, and thus HIT, directly. A number of studies have demonstrated that lack of insurance and variations in the type of insurance have a negative impact on the stage of diagnosis and care for patients with cancer (Bradley et al. 2008; Farkas et al. 2012; Halpern et al. 2007). Other views exist, however, in that the uninsured are not uniform; in fact, many of them could pay for insurance, pay for care, and receive substantial healthcare (O'Neill and O'Neill 2009). The challenges of insurance, access to care, and cost/quality outcomes are at the center of the Patient Protection and Affordable Care Act, which is discussed in more detail in Chapter 3.

The bottom line is that as solutions to access-to-care barriers for uninsured individuals emerge, the US healthcare system will face a capacity problem. With improved access, more people (perhaps 25 to 30 percent of the population) will gain meaningful access to basic care and insurance. This will strain the public health and emergency systems, on which many Americans rely, to provide adequate care (Book 2005, 579).

Impact of the Healthcare Triangle on HIT

A host of external factors related to cost, quality, and access will influence healthcare delivery organizations. Importantly, each factor has direct implications for HIT. The real issue, however, is whether the growth of cost per se genuinely constitutes a problem. Are we getting value for this investment in healthcare goods and services? Many studies explore this problem and propose solutions, including a 2010 Institute of Medicine report titled *The Healthcare Imperative: Lowering Costs and Improving Outcomes*. Any review of the literature will demonstrate that identification of and solutions to cost increases dominate the published articles, and these studies (e.g., Cuder, Rosen, and Vijan 2006) suggest that investments in healthcare have been relatively cost-effective overall.

Improving quality requires greater accuracy, reliability, and timeliness of clinical information at the individual patient level (Merzger, Ame, and

Rhoads 2010). As quality improvement efforts take hold, organizations will need to be able to collect and share information across components of their systems. Identification of best practices involves sharing of information across units and institutions. Further, delivery organizations will increasingly be required to provide access to high-quality care to meet the needs of patients in their communities. These may not be patients in the traditional sense; thus, reliably obtaining information about them is essential. Sources, validation, and security of this information will pose future challenges to HIT. Organizations must adopt greater standards of transparency in reporting quality and cost information (Aron and Pogach 2009). However, if the challenges of improving quality from HIT investments prove too great a barrier as we have observed, the likelihood of sharing information across systems is in doubt.

Similarly, access involves a number of challenges that HIT must address. First, expanded access to 30 to 50 million more people strains delivery systems and HIT's ability to collect, monitor, and report across a host of environments. Second, by nature, many of the currently uninsured are challenging to serve. Often, they have different, more complex acute and chronic medical problems than those with insurance. On average, they are less likely to have higher education, positive home environment, and nutritional history or prior medical records at a healthcare facility. These make the newly insured less likely to comply with forms/paperwork or general medical treatment. Gathering data and validating data are, thus, more difficult.

From a cost perspective, access and quality further increase cost pressures. Efforts at reducing duplicate tests and procedures, eliminating fraud and abuse, reducing excess administrative costs, and redesigning processes all entail HIT involvement.

Evidence-Based Management

As defined in Chapter 1, EBM is a systematic approach to diagnosis and treatment that encourages the physician to formulate questions and seek answers from the best available published evidence. Relatedly, the past decade witnessed a corresponding increase in the emphasis on *evidence-based management* (Kovner, Fine, and D'Aquila 2009; Pfeffer and Sutton 2006; Walshe and Rundall 2001). In fact, Kovner, Fine, and D'Aquila's book *Evidence-Based Management in Healthcare* suggests that this topic has become mainstream in the training of future healthcare leaders. While experience, judgment, intuition, and a good sense of the political environment are still critical skills, administrative decision making increasingly relies on information. While some may discount the value of information in the management process—stating that management is still more an art than a science—the

other end of the spectrum are the technocrats who argue that management and information are inseparable and that all management decisions need to be completely rational and based entirely on an analysis of comprehensive information. The resulting revision in the method of managerial decision making that relies more on data has now become part of the culture of health-care organizations (Center for Organization, Leadership, and Management Research 2006). This new culture relies heavily on organizational information systematically gathered, stored, analyzed, and reported by a wide array of health informatics professionals. Many of the challenges emerging for EBM will also arise for evidence-based management—the management application of the EBM concept.

The most obvious example of the potential value of evidence-based management is in reducing the high levels of variation in management (and clinical) practices observed across healthcare delivery organizations. Over the last 40 years, a growing body of evidence regarding variation in care points to the problems that variations generate (Wennberg and Gittelsohn 1973). The investigations and evidence mounted, and Gawande (2009) wrote an accessible article that clarifies the evidence and importance of these variations. If we manage patients and organizations without valid, reliable information, then healthcare costs rise and quality falls (Fisher, Bynum, and Skinner 2009; Fisher et al. 2003).

Organizational Change

The stress of the evolving environment has been a major driver of organizational change along a number of dimensions (Bigalke, Copeland, and Kackley 2011). These changes fall into a number of categories but include some key elements:

- Securing information from physicians, hospitals, and post-acute providers regarding safety, quality, and healthcare outcomes
- Employing scientific evidence for recommended treatment protocols
- Facilitating coordination of care across entities with greater investment in information technologies
- Actualizing consumer decision making by providing choices in type of care and location of care delivery

Each of these strategies involves the use of information technology in new ways; they currently strain HIT operations and will continue to generate strain in the future. The first bullet in particular poses technical and political challenges for HIT as it entails gathering information from multiple sites. These data are collected from entities that are separate geographically,

culturally, and by ownership. Interoperability is a necessary step in enabling that to happen, and even the government recognizes that true interoperability is a work in progress (see www.healthit.gov/providers-professionals/eht-interoperability for a discussion of this topic and revisit it from time to time for updates).

Much of what is envisioned in today's healthcare reform appears similar to the managed care initiatives pushed as a solution to cost issues in the early 1970s. Back then, organizations responded to the growth of managed care by consolidating (Cuellar and Gertler 2003), purchasing medical practices (Morrisey et al. 1996), and improving efficiency and effectiveness (Endtoven and Singer 1996). Managed care, which flourished in the 1990s, was designed to help contain costs by providing financial incentives to squeeze out inefficiency in the delivery system. However, another way to contain costs is not just to provide care but to truly make the system more efficient. Much of the growth of managed care was not due to consumers choosing it as the preferred method of service. People selected managed care options to avoid paying higher premiums in alternative insurance plans (Gillmer and Kronick 2005). Consumer backlash to managed care arose because of fear of restrictions on access to care. This sentiment was fueled by physicians who did not support managed care because its plans placed limitations on the delivery of care and reduced physician reimbursement (Ginsburg 2005). Health maintenance organizations, in particular, came under heavy criticism from consumers and physicians. The political battle over the Patient's Bill of Rights, which was developed in response to the managed care restrictions, is a reflection of these consumer and physician concerns. Whether the current responses to health reform can avoid the problems of the managed care era is open to speculation.

The managed care movement did not end with the criticisms we mentioned. Accountable care organizations, bundled payments, and other elements of the healthcare reform legislation suggest that basic tenets of managed care survived—but under different terminology. Some form of assigning responsibility to providers for the full continuum of care, rather than for individual units of service, will be part of the healthcare future. For HIT, the implications are staggering. Collecting, storing, retrieving, and analyzing patient data across this continuum require increases in the amount of data and changes in the types of data needed (e.g., inpatient, outpatient, rehabilitation, prescription drug). Furthermore, as stated, these data will come from separate entities. Leaders of HIT must become more strategic in assessing many data-related options and meeting the changing needs of their organization (Chapter 4 addresses this in depth).

A potential fundamental change in the healthcare landscape might come from an international comparison of outcomes, costs, and efficiency.

Again, a growing body of evidence suggests that the US healthcare system does not measure up to international comparisons across a host of dimensions:

- **Overall.** Patient perspectives suggest that the US system does not compare well or favorably with the systems of a select set of English-speaking countries (Davis et al. 2004), such as Australia, New Zealand, Canada, and the United Kingdom, all of which outperform the United States from the patients' perspective; some might argue, however, that even in English-speaking countries, responses to common questions may not have exactly the same meaning.
- **Outcomes.** Most of the comparisons of outcomes point to problems in the US system. The Commonwealth Fund's "National Scorecard on the U.S. Health System Performance" presents a broadly consistent set of comparisons. For example, the percentage of "sicker" adults reporting a medical, medication, or lab error in 2008 for select developed countries reveals that the US rate (at 32 percent) was double the rate of the best-performing country—the Netherlands (at 16 percent)—and was substantially above the second "worst" performer—Australia (at 28) (Schoen and How 2011).
- **Access.** As most of the American populace expect, access is poorer in the United States. For example, the percentage of adults reporting at least one of three access problems was 40 percent in the United States versus 34 percent in New Zealand and 9 percent in the United Kingdom (Schoen and How 2011). The three access problems indicated in the report were not getting care because of cost, did not fill prescriptions because of cost, or skipped prescription doses because of cost.
- **Efficiency.** In terms of efficiency, the United States scored worse compared with other countries across a number of measures. For example, the percentage of adults who went to the emergency department (in the previous two years) for a condition that could have been treated by a primary physician was 26 percent for the United States versus 21 percent for Canada (the next highest) and 6 percent for Germany (the lowest among the reported countries) (Schoen and How 2011).
- **Expenditures.** Health spending was highest in the United States. Data are not available (as of this writing) for 2013 but have been reported for 2009. In 2009, adjusting for cost of living, spending per capita was \$7,960 in the United States versus \$5,352 in Norway, \$5,144 in Switzerland, \$4,363 in Canada, and \$3,487 in the United Kingdom (Squires 2012).

International comparisons may present a competition challenge for US healthcare delivery. If medical tourism—defined as "overseas travel for

medical, cosmetic and dental health care" (Medical Tourism Corporation 2012)—increased, it might directly address the challenges of the healthcare triangle. According to the marketing materials of Medical Tourism Corporation, the value of medical tourism is that it enables people to

- save on medical costs;
- avoid the long wait for medical services in their home country;
- get better quality medical care or diagnostic services;
- protect their privacy.

These benefits are not totally documented at this point, but the threat of medical tourism and its potential advantages exists. Much is still being considered, and the data reported on volume and growth are too unreliable for now. (For an interesting overview of these issues, see India Knowledge@Wharton [2011].) What we do know is that at least some of the results from the United States's adverse performance in international comparisons may be due to less-than-adequate use of HIT in its healthcare system (Anderson et al. 2006). Anderson and colleagues document that while delivery organizations in the United States employ fewer resources (e.g., beds, nurses, physicians) per capita, they spend more than twice as much as other OECD (Organisation for Economic Co-operation and Development 2007) countries. The authors argue that a major portion of that performance difference can be explained by the following factors (Anderson et al. 2006):

- The United States is at least a decade late in making HIT a national initiative. Germany started at a national level in 1993.
- The United States has not relied on a centralized government role in motivating HIT adoption.
- The United States invests significantly less per capita on HIT. Data suggest that in 2005 the United States had invested \$.43 per capita. Norway had invested \$11.31 per capita, Germany had invested \$21.03 per capita, and Canada had invested \$31.85 per capita.

These estimates point to the potential reasons the United States lag the rest of the developed world in cost, quality, and access measures. However, they also point to a great potential for improvement with the assistance of a concerted HIT leadership and management.

Summary

Change is occurring rapidly in healthcare. While much of that change will be internal to the technologies and processes in healthcare delivery organizations, much will be derived from forces external to the organization and

even external to the United States. Major forces of change that have a direct impact on the application of HIT include (1) the healthcare triangle, (2) growth of evidence-based management for decision making, (3) the need for healthcare organizational change, and (4) greater emphasis on international comparisons for performance assessment.

These environmental trends present challenges to healthcare leaders overall but to HIT leadership particularly. Addressing the healthcare triangle must involve improved access to and use of health information and HIT. These challenges involve not only internal operational responses but also the need to interface with organizations and agencies outside of the host institution. Hospitals, physician practices, and other elements of the provider network must learn to gather, store, retrieve, and analyze information more efficiently. Organizational leaders are learning to use data as evidence in making decisions; thus, they will demand more reliable and valid data, presented in understandable formats and in a timely manner. Further, information from external organizations (regionally and nationally) will need to be integrated and made available to those clinical and administrative decision makers as the decision frameworks expand. Finally, comparisons and competition from international providers may enlarge the scope of the information required.

Web Resources

A number of organizations (through their websites) provide more information on the topics discussed in this chapter:

- American Health Quality Association (www.ahqa.org) is a national membership organization that promotes and facilitates fundamental changes designed to improve the quality of healthcare.
- American Society for Quality (<http://asq.org/index.aspx>) is a global organization that focuses on using tools and ideas to make the world better.
- The Commonwealth Fund (www.commonwealthfund.org/About-Us.aspx) has the broad charge to "enhance the common good." Its mission is to improve access, quality, and efficiency in the healthcare system with special emphasis on low-income, the uninsured, minority Americans, young children, and the elderly.
- Henry J. Kaiser Family Foundation (www.kff.org) is a leader in health policy analysis and communication dedicated to providing a trusted, independent analysis of key policy issues. While it has many key agenda items, cost and coverage are central to its work and are a great source of data and analysis.

- Institute of Medicine (www.iom.edu/About-IOM.aspx) is an independent, nonprofit organization that provides authoritative advice to decision makers and the public on healthcare issues. With a strong clinical focus, IOM has specific initiatives in coverage and access to care as well as quality and patient safety.
- National Quality Measures Clearinghouse (www.qualitymeasures.ahrq.gov/index.aspx) is the source of comprehensive information on quality measures for healthcare.
- Robert Wood Johnson Foundation (www.rwjf.org/en/about-rwjf.html) is a large philanthropy devoted to the public's health. Among its many topics are cost of care, quality of care, and access/barriers to care.

Discussion Questions

1. Why do national concerns over cost of care affect those responsible for managing information systems within healthcare institutions?
2. Why do national concerns over quality of care affect those responsible for managing information systems within healthcare institutions?
3. Why do national concerns over access to care affect those responsible for managing information systems within healthcare institutions?
4. What information would you assemble for healthcare leadership in your organization to monitor healthcare cost? Would that differ if you work in a hospital versus a physician practice or other organization?
5. What information would you assemble for healthcare leadership in your organization to monitor healthcare quality? Would that differ if you work in a hospital versus a physician practice or other organization?
6. What information would you assemble for healthcare leadership in your organization to monitor healthcare access? Would that differ if you work in a hospital versus a physician practice or other organization?
7. What organizational challenges do you anticipate with changes necessary to control cost, improve quality, and expand access in your organization?
8. How much synthesis of external information will be necessary for effective evidence-based management? Who is best able to provide that synthesis?