

EVIDENCE-BASED MEDICINE AND VALUE-BASED PURCHASING

Operations Management in Action

MultiCare Health System is an integrated delivery system serving communities throughout Washington state. After reviewing its patient populations, it undertook an initiative to lower the costs of care and improve the care experience for pneumonia patients.

This initiative included building an evidenced-based order set and assigning a team of social workers, called personal health partners, to research and improve patient follow-up and communication processes. It also deployed an analytics application to provide near real-time feedback on compliance and performance while offering a single view of patient-specific data across multiple visits and care settings.

The MultiCare team determined that a standardized electronic order set was the easiest and most effective way to define best practices while leveraging informatics to help clinicians “do the right thing.” This effort required bringing their clinicians together to review the evidence on the best practices in the treatment of pneumonia and to arrive at a consensus on the treatment protocols.

Advanced analytics provided new capabilities to correlate processes with outcomes. MultiCare used an analytics

OVERVIEW

The science of medicine progressed rapidly through the latter half of the twentieth century, with advances in pharmaceuticals, surgical techniques, and laboratory and imaging technology promoting the rapid subspecialization of medicine itself. This “age of miracles” improved health and lengthened life spans.

In the mid-1960s, the federal government began the Medicare and Medicaid programs. This new source of funding fueled the explosive growth and expansion of the US healthcare delivery system. However, in this vastly expanded care environment, many new tools and clinical approaches that had little scientific merit were initiated alongside those with great promise. As these clinical approaches were used broadly, they became community standards. At the same time, many simple yet highly effective tools and techniques either fell out of favor or were not used consistently.

In response to these trends, a number of clinicians began the movement that has become known today as evidence-based medicine (EBM). As defined earlier, EBM is the conscientious and judicious use of the best current evidence in making decisions about the care of individual patients. In almost all cases, the broad application of EBM not only improves clinical outcomes for patients but reduces costs in the system as well.

This chapter reviews

- the history, current status, and future of EBM;
- public reporting;
- pay for performance (P4P) and payment reform; and
- value purchasing, including Medicare’s Hospital Value-Based Purchasing (VBP) program

EBM is explored in depth, followed by an examination of how payers use its principles to encourage the use of EBM by clinicians.

(continued)

application that could mine the data related to pneumonia patients and provide near real-time, interactive data that showed the impact of interventions on the high-level outcome metrics: mortality, readmissions, length of stay (LOS), and cost. The feedback generated through these analytic tools provided the platform for continuous improvement in the order sets and protocols.

Through these efforts, MultiCare has realized significant outcome improvements, including the following:

- 28 percent reduction in pneumonia mortality rate
- 23 percent reduction in pneumonia readmissions
- 2 percent decrease in LOS for pneumonia patients
- 6.4 percent reduction in average variable cost per patient

Source: Health Catalyst (2016).

OVERVIEW (CONTINUED)

The operations tools presented in other chapters of this book are introduced in terms of how they are linked to achieving EBM goals. The chapter concludes with an illustration of the chartering of a project team to improve implementation of EBM at Vincent Valley Hospital and Health System (VVH).



On the web at ache.org/books/OpsManagement3

Evidence-Based Medicine

The expansion of clinical knowledge has three major phases. First, basic research is undertaken in the lab and with animal models. Second, carefully controlled clinical trials are conducted to demonstrate the efficacy of a diagnostic or treatment methodology that emerges from the preliminary research. Third, the successful or promising clinical trial results are translated to clinical practice.

The final phase, translation, is where the system frequently breaks down. A major study by the United Health Foundation examined the transfer of clinical research knowledge to the so-called bedside and found that (Ellis 2012)

both quality and actual medical costs for episodes of care provided by nearly 250,000 US physicians serving commercially insured patients nationwide. Overall, episode costs for a set of major medical procedures varied about 2.5-fold, and for a selected set of common chronic conditions, episode costs varied about 15-fold. Among doctors meeting quality and efficiency benchmarks, however, costs for episodes of care were on average 14 percent lower than among other doctors.

The cure for this wide variation in practice is the *consistent application* of EBM. The key tool for doing so is the clinical guideline (Shekelle 2016):

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Clinical practice guidelines are recommendations for clinicians about the care of patients with specific conditions. They should be based upon the best available research evidence and practice experience.

The Institute of Medicine [2011] defines clinical practice guidelines as “statements that include recommendations, intended to optimize patient care, that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options.”

Based on this definition, guidelines have two parts:

- The foundation is a systematic review of the research evidence bearing on a clinical question, focused on the strength of the evidence on which clinical decision-making for that condition is based.
- A set of recommendations, involving both the evidence and value judgments regarding benefits and harms of alternative care options, addressing how patients with that condition should be managed, everything else being equal.

A comprehensive source for such information is the National Guideline Clearinghouse (NGC 2016), a database of evidence-based clinical practice guidelines and related documents that contains more than 4,000 guidelines. NGC is a joint project of the Agency for Healthcare Research and Quality (AHRQ), the American Medical Association, and America’s Health Insurance Plans. In addition, AHRQ (2016b) provides easy-to-use resources for clinicians and patients through its Effective Health Care Program.

What are the barriers to the wider application of EBM? Baiardini and colleagues (2009) reviewed the literature and identified 293 potential obstacles to the use of guidelines by physicians. They then grouped these into seven barriers:

1. Lack of knowledge that guidelines exist for a specific condition
2. Lack of familiarity with the details of specific guidelines
3. Disagreement with the guideline recommendations
4. Inability to effectively apply a guideline’s recommendation due to lack of skill, resources, or training
5. Lack of trust in the effectiveness of a guideline to improve outcomes—particularly with an individual patient’s condition
6. Resistance to change and reliance on habits
7. External factors (lack of resources, financial barriers or incentives, organizational factors)

The application of EBM is a two-way street that requires the involvement of the patient as well as the physician. Baiardini and colleagues (2009) also identified the following barriers to patients’ compliance with guidelines:

- Presence of confounding characteristics, such as a psychiatric or psychological comorbidity or lack of social support
- Difficulty in recognizing symptoms and adhering to therapies prescribed for the symptoms
- Complex therapeutic regimens
- Relationship and personal interaction issues between patient and physician

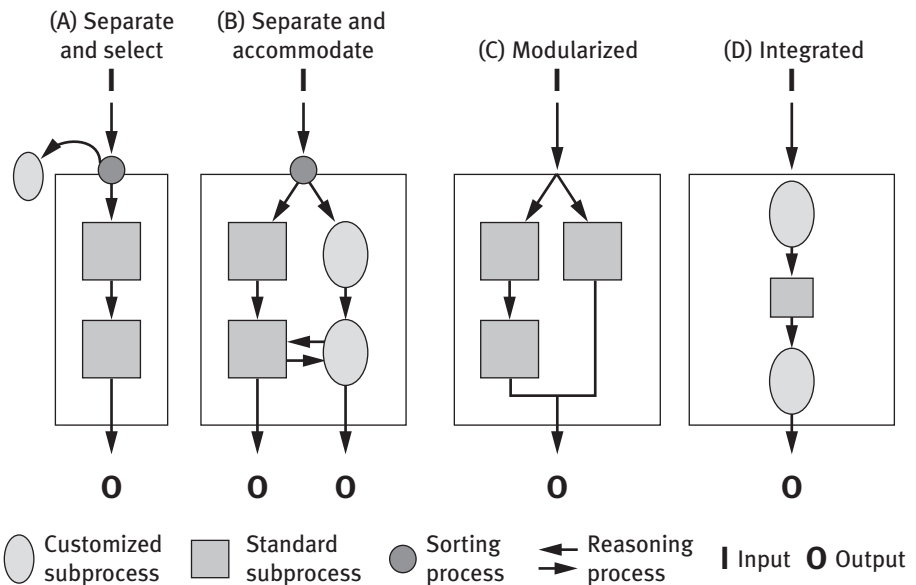
Standard and Custom Patient Care

One historical criticism of EBM is that all patients are unique and EBM is “cookbook” medicine that only applies to a few patients. EBM proponents counter this argument with simple examples of well-accepted and effective clinical practices that are inconsistently followed. A more productive view of the mix of art and science in medicine is provided by Bohmer (2005), who suggests that all healthcare is a blend of custom and standard care. Exhibit 3.1 shows the four currently used models that blend these two approaches.

Model A (separate and select) provides an initial sorting by patients themselves. Those with standard problems are treated with standard care using EBM guidelines. Examples of this type of system are specialty hospitals for laser eye surgery and walk-in clinics operating in pharmacies and retail outlets. Patients who do not fit the provider’s homogeneous clinical conditions are referred to other providers who can deliver customized care (Bohmer 2005).

EXHIBIT 3.1

Four Approaches to Blending Custom and Standard Processes



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Model B (separate and accommodate) combines the two methods inside one provider organization. Duke University Health System, for example, has developed standard protocols for its cardiac patients. Patients are initially sorted, and those who can be treated with the standard protocols are cared for by nurse practitioners using a standard care model. Cardiologists care for the remainder using custom care. However, on every fourth visit to the nurse practitioner, the cardiologist and nurse practitioner review the patient's case together to ensure that standard care is still the best treatment approach (Bohmer 2005).

Model C (modularized) is used when the clinician moves from the role of care provider to that of architect of care design for the patient. In this case, a number of standard processes are assembled to treat the patient. The Andrews Air Force Base clinic uses this system to treat hypertension patients. "After an initial evaluation, treatment may include weight control, diet modification, drug therapy, stress control, and ongoing surveillance. Each component may be provided by a separate professional and sometimes a separate organization. What makes the care uniquely suited to each patient is the combination of components" (Bohmer 2005, 326).

Model D (integrated) combines standard care and custom care in a single organization. In contrast to Model B, each patient receives a mix of both custom and standard care as determined by her condition. Intermountain Healthcare (IHC) employs this model through the use of 62 standard care processes available as protocols in its electronic health record (EHR). These processes cover "the care of over 90 percent of patients admitted in IHC hospitals" (Bohmer 2005, 326). Clinicians are encouraged to override elements in these protocols when it is in the best interest of the patient. All of these overrides are collected and analyzed, and changes are made to the protocol, which is an effective method to continuously improve clinical care.

All of the tools and techniques of operations improvement included in the remainder of this book can be used to make standard care processes operate effectively and efficiently.

EBM and Cost Reduction

EBM has the potential to not only improve clinical outcomes but also decrease total cost in the US healthcare system. Potentially preventable hospitalizations, which might be avoided with high-quality outpatient treatment and disease management, provide just one significant opportunity for financial savings.

AHRQ (2015) developed a set of **prevention quality indicators (PQIs)** to assist providers in reducing the number of potentially preventable hospitalizations for chronic and acute conditions throughout the United States. A patient who is admitted to a hospital and has a PQI code is an individual whose hospitalization or other severe complication is potentially preventable when good, evidence-based outpatient care is delivered.

Prevention quality indicator (PQI)

A set of measures that can be used with hospital discharge data to identify patients whose hospitalizations or complications might have been avoided with the use of evidence-based ambulatory care.

The PQI system is now integrated with many other federal healthcare improvement efforts (exhibit 3.2).

Chronic Disease Management

One of the most expensive aspects of all healthcare systems is the care of patients with chronic disease (e.g., diabetes, chronic obstructive pulmonary disease, congestive heart failure). Much of the variation in the outcomes of this care can be attributed to providers' and patients' lack of adherence to EBM.

Fortunately, many investigators now look beyond determining which clinical interventions provide good results (e.g., the use of statins) to identifying those systems of care that produce superior results. (Chapter 9 provides more details and examples of the use of business process improvements to achieve high-quality care.)

EXHIBIT 3.2
PQIs and
Other Federal
Initiatives

	Federal Initiatives Using AHRQ QIs*			
	Indicator Module			
	Inpatient (IQI)	Patient Safety (PSI)	Pediatric (PDI)	Prevention (PQI)
HAC Reduction Program	✓	✓		
Hospital Inpatient Quality Reporting Program	✓	✓		
Hospital VBP		✓		
Shared Savings Program				✓
Partnership for Patients	✓	✓	✓	
Healthcare Innovation Awards (CMMI)		✓	✓	✓
Hospital Compare	✓	✓		
ACO: Accelerated Development Learning Sessions (CMMI)		✓	✓	
Home and Community Based Services		✓		✓

* A sample of CMS and CMMI initiatives that use the AHRQ QIs.

Source: Reprinted from AHRQ (2015).

Note: AHRQ = Agency for Healthcare Research and Quality; CMMI = Center for Medicare & Medicaid Innovation; CMS = Centers for Medicare & Medicaid Services; Hospital VBP = Medicare Hospital Value-Based Purchasing program; IQI = inpatient quality initiative; PDI = pediatric initiative; PQI = prevention quality initiative; PSI = patient safety initiative; QI = quality initiative.

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The Chronic Care Model

Dr. Edward Wagner of the MacColl Center for Health Care Innovation, a leader in the improvement of chronic care, has developed one of the most widely accepted models for chronic disease management (Wagner et al. 2001). The first important element of Wagner's chronic care model (CCM) is population-based outreach, which ensures that all patients in need of chronic disease management receive it. Next, treatment plans are created that are sensitive to each patient's preferences. The most current evidence-based medicine is employed, and this process is aided by clinical information systems with built-in decision support. The patient is encouraged to change risky behaviors and improve the management of his health.

The clinical visit itself differs in the Wagner model to allow more time for interaction between the physician and patients with complicated clinical issues. Visits for routine or specialized matters are handled by other healthcare professionals (e.g., nurses, pharmacists, dietitians, lay health workers). Close follow-up, supported by clinical information system registries and patient reminders, is also characteristic of effective chronic disease management (Wagner et al. 2001).

The CCM has now been widely deployed. In a review of 16 studies of the care of diabetes patients, for example, Stellefson, Dipnarine, and Stopka (2013) found

evidence that CCM approaches have been effective in managing diabetes in US primary care settings. Organizational leaders in health care systems initiated system-level reorganizations that improved the coordination of diabetes care. Disease registries and electronic medical records were used to establish patient-centered goals, monitor patient progress, and identify lapses in care. Primary care physicians (PCPs) were trained to deliver evidence-based care, and PCP office-based diabetes self-management education improved patient outcomes.

Patient-Centered Medical Homes

The **patient-centered medical home (PCMH)** concept has emerged as an effective tool in the delivery of care to patients with chronic disease. The Affordable Care Act (ACA) supports this innovation with additional payment for Medicaid patients (§2703). Also known as the healthcare home, the PCMH has proven to be a valuable addition to the care management approach for patients with chronic diseases and is now being funded by both government and private payers.

AHRQ (2016a) defines the PCMH as

a model of the organization of primary care that delivers the core functions of primary health care.

The medical home encompasses five functions and attributes:

1. Comprehensive Care

The primary care medical home is accountable for meeting the large majority of each patient's physical and mental health care needs, including prevention and

Patient-centered medical home (PCMH)

Care that is accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective.

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wellness, acute care, and chronic care. Providing comprehensive care requires a team of care providers. This team might include physicians, advanced practice nurses, physician assistants, nurses, pharmacists, nutritionists, social workers, educators, and care coordinators. Although some medical home practices may bring together large and diverse teams of care providers to meet the needs of their patients, many others, including smaller practices, will build virtual teams linking themselves and their patients to providers and services in their communities.

2. Patient-Centered

The primary care medical home provides health care that is relationship-based with an orientation toward the whole person. Partnering with patients and their families requires understanding and respecting each patient's unique needs, culture, values, and preferences. The medical home practice actively supports patients in learning to manage and organize their own care at the level the patient chooses. Recognizing that patients and families are core members of the care team, medical home practices ensure that they are fully informed partners in establishing care plans.

3. Coordinated Care

The primary care medical home coordinates care across all elements of the broader health care system, including specialty care, hospitals, home health care, and community services and supports. Such coordination is particularly critical during transitions between sites of care, such as when patients are being discharged from the hospital. Medical home practices also excel at building clear and open communication among patients and families, the medical home, and members of the broader care team.

4. Accessible Services

The primary care medical home delivers accessible services with shorter waiting times for urgent needs, enhanced in-person hours, around-the-clock telephone or electronic access to a member of the care team, and alternative methods of communication such as email and telephone care. The medical home practice is responsive to patients' preferences regarding access.

5. Quality and Safety

The primary care medical home demonstrates a commitment to quality and quality improvement by ongoing engagement in activities such as using evidence-based medicine and clinical decision-support tools to guide shared decision making with patients and families, engaging in performance measurement and improvement, measuring and responding to patient experiences and patient satisfaction, and practicing population health management. Sharing robust quality and safety data and improvement activities publicly is also an important marker of a system-level commitment to quality.

The PCMH model has been shown to increase quality and reduce costs. A University of Minnesota evaluation of the Health Care Homes initiative

in that state found that over a five-year evaluation period, the use of medical homes reduced inpatient admissions by 29 percent and hospital outpatient visits by 38 percent. The study also reported improvements in the quality of care for patients with diabetes, vascular disease, asthma, and depression (Wholey et al. 2016, i, 43).

EBM and Comparative Effectiveness Research

The source of evidence for EBM has long been medical research that is published in respected and refereed journals. However, these studies usually are initiated by a single investigator's interest, and thus the efficacy of many common clinical approaches has never been adequately tested. The medical research community has held historical and understandable biases toward developing technologies that are designed to address intractable diseases and mysterious diagnostic challenges. Many aspects of routine healthcare have therefore never been sufficiently evaluated.

To address this problem, the ACA (and the American Recovery and Reinvestment Act [ARRA]) contained significant policy direction for the establishment and funding of a nonprofit corporation, the Patient-Centered Outcomes Research Institute (PCORI). ACA Section 6301 states that the mission of PCORI is

to assist patients, clinicians, purchasers, and policy-makers in making informed health decisions by advancing the quality and relevance of evidence concerning the manner in which diseases, disorders, and other health conditions can effectively and appropriately be prevented, diagnosed, treated, monitored, and managed through research and evidence synthesis that considers variations in patient sub-populations, and the dissemination of research findings with respect to the relative health outcomes, clinical effectiveness, and appropriateness of the medical treatments, and services.

PCORI's focus is on the application of EBM to specific healthcare technologies and treatments to ascertain which, among alternative therapies for a given medical condition, produce the best clinical outcomes. This specific focus is known as comparative effectiveness research (CER). PCORI's (2014) CER agenda has five priorities:

- Assessing prevention, diagnosis, and treatment options
- Improving healthcare systems
- Communicating and disseminating research
- Addressing disparities across patient populations and the healthcare required to achieve best outcomes in each population
- Accelerating patient-centered outcomes research and methodological research

PCORI complements the work of the National Institutes of Health and AHRQ—both part of the US Department of Health and Human Services (HHS). One of AHRQ’s responsibilities is to assist users of health information technology that is focused on clinical decision support to incorporate research findings into clinical practices and to promote the technology’s ease of use. A major focus for the research topics addressed by PCORI is related to chronic disease management.

Tools to Expand the Use of Evidence-Based Medicine

Organizations that are outside the healthcare delivery system itself, such as payers and government, have used the increased acceptance of EBM as the basis for new programs designed to encourage its implementation. These programs, referred to as **value purchasing**, feature public reporting of clinical results and pay-for-performance (P4P) elements to help third-party payers determine the value delivered by healthcare providers.

Value purchasing

A system using payment as a means to reward providers who publicly report results and achieve high levels of clinical care. Also known as value-based purchasing.

Public Reporting

Although strongly resisted by clinicians for many years, **public reporting** has come of age. The Centers for Medicare & Medicaid Services (CMS) now reports the performance of hospitals, long-term care facilities, and medical groups online at Hospital Compare (www.hospitalcompare.hhs.gov). Many private health insurance plans also report performance and the prices charged by providers in their networks to assist their plan members, particularly those with consumer-directed health insurance products, in choosing how and from whom they receive treatment or preventive care.

Public reporting

A statement of healthcare quality made by hospitals, long-term care facilities, and clinics. May also include patient satisfaction and provider charges.

As with any growing field, a number of issues surround public reporting. The first and most prominent is **risk adjustment**. Most clinicians feel their patients are “sicker” than average and that contemporary risk adjustment systems do not adequately account for this factor in reimbursement. Patient compliance is another challenging aspect of public reporting. If a doctor follows EBM guidelines for diagnosis and treatment but the patient does not take her medication, for example, the public reporting mechanism may trigger an unwarranted poor grade.

Risk adjustment

Raising or lowering fees paid to providers on the basis of factors that may increase medical costs, such as age, sex, or illness.

One anticipated impact of public reporting is that patients will use the Internet to shop for quality healthcare products as they might for an automobile or a television. Currently, however, few patients do so to guide their healthcare buying decisions. That said, clinical leaders do review the public reports and target improvement efforts to areas where they have poor performance compared to their peers.

AHRQ (2012) conducted a comprehensive review of the impact of public reporting on the healthcare system. Select findings from its research include the following:

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- Public reporting has a positive impact on mortality reduction and specific clinical outcomes such as pain reduction, decreased pressure ulcers, and increased patient satisfaction.
- Changes in the delivery structure were observed as a result of public reporting, including the addition of new services, policy revisions, departure of surgeons with poor outcomes, and increases in quality improvement activities.
- Public reports seemed to have little to no impact on selection of providers by patients and families or their representatives.
- Public reporting does have an impact in competitive markets, and improvements are more likely to occur in the subgroup of providers with low scores in initial public reports than for those with high or moderate scores.

Pay for Performance and Payment Reform

Another logical tool to expand the use of EBM is the financing system. Many buyers of healthcare are installing P4P systems to encourage providers to deliver EBM care.

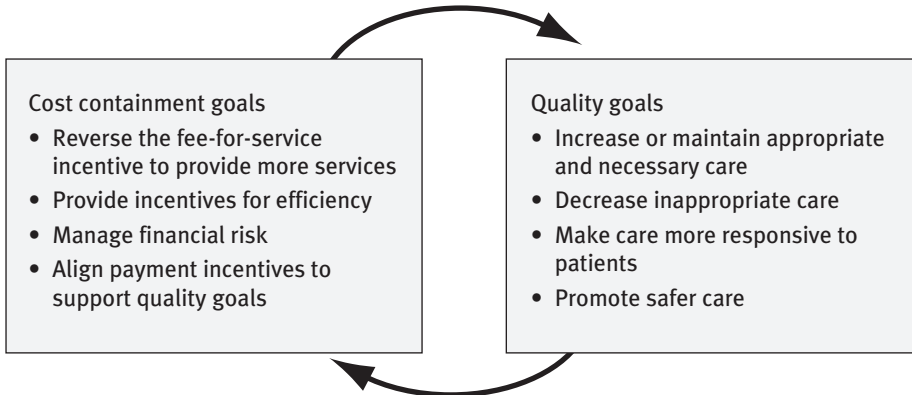
P4P Methods

In general, P4P systems add payments to the amount that would otherwise be reimbursed to a provider. To obtain these additional payments, the provider must demonstrate that he is delivering care that meets clinical EBM goals. These clinical measures can be either process or outcome measures.

Although many providers prefer to be measured on outcomes, this approach is difficult to use, as some outcomes need to be measured over many years. In addition, some providers have a small number of patients in a particular clinical group, so outcome results can vary dramatically. Therefore, process measures backed by extensive EBM literature are used to assess performance in the treatment of many conditions. For example, a patient with diabetes whose blood pressure is maintained in a normal range tends to experience fewer complications than one whose blood pressure is uncontrolled. Blood pressure can be measured and reported at every visit, whereas complications occur infrequently.

In a study sponsored by the National Quality Forum, Schneider, Hussey, and Schnyer (2011) surveyed the breadth of payment reform methods and found nearly 100 implemented and proposed payment reform programs. They then classified these methods into 11 payment reform models. Many of these models are included in the ACA, and the goals for the reforms are illustrated in exhibit 3.3.

Exhibit 3.4 lists and describes each model, and chapter 14 examines how organizations can apply the operations management tools contained throughout this book to succeed financially with any of these payment models.

EXHIBIT 3.3General
Payment Reform
Model

Source: Schneider, Hussey, and Schnyer (2011).

EXHIBIT 3.4Payment Reform
Model Details

Model	Description
1. Global payment	A single per-member per-month payment is made for services delivered to a patient, with payment adjustments based on measured performance and patient risk.
2. ACO shared savings program	Groups of providers (known as accountable care organizations [ACOs]) that voluntarily assume responsibility for the care of a population of patients share payer savings if they meet quality and cost performance benchmarks.
3. Medical home payments	A physician practice or other provider is eligible to receive additional if medical home criteria are met. Payment may include calculations based on quality and cost performance using a P4P-like mechanism.
4. Bundled payment	A single bundled payment, which may include multiple providers in multiple care settings, is made for services delivered during an episode of care related to a medical condition or procedure.
5. Hospital–physician gainsharing	Hospitals are permitted to provide payments to physicians that represent a share of savings resulting from collaborative efforts between the hospital and physicians to improve quality and efficiency.
6. Payment for coordination	Payments are made to providers furnishing care coordination services that integrate care between providers.
7. Hospital P4P	Hospitals receive differential payments for meeting or missing performance benchmarks.
8. Payment adjustment for readmissions	Payments to hospitals are adjusted based on the rate of potentially avoidable readmissions.
9. Payment adjustment for hospital-acquired conditions	Hospitals with high rates of hospital-acquired conditions are subject to a payment penalty, or treatment of hospital-acquired conditions or serious reportable events is not reimbursed.
10. Physician P4P	Physicians receive differential payments for meeting or missing performance benchmarks.
11. Payment for shared decision making	Payment is made for the provision of shared decision-making services.

Source: Schneider, Hussey, and Schnyer (2011).

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Value-Based Purchasing¹

The ACA calls for establishment of a value purchasing program on the basis of much of the research, practical experience, and analysis in both public reporting and P4P described in the previous section. (If portions of the ACA are repealed or changed, value purchasing is likely to remain intact in some form because it is so strongly supported by research.) Medicare's Hospital VBP program is CMS's (2015) answer to that call. Forms of payment such as value purchasing, as alternatives to the traditional fee-for-service (FFS) reimbursement scheme, are accelerating, and soon the majority of financing systems for health services in the United States will move completely from FFS to value purchasing.

Although FFS has served the health industry well for many years, policymakers have come to understand that perverse incentives accompany this type of payment system. Insurer UnitedHealth Group's UnitedHealth Center for Health Reform & Modernization (2012) conducted a review of the many studies on FFS and found three major problems:

- FFS encourages providers to deliver more, and more expensive, services to maximize reimbursement.
- FFS facilitates fragmented and uncoordinated care delivery.
- FFS does not offer incentives for high-quality care.

These problems have been well known for many years, and policymakers have searched for new payment models through Medicare demonstration projects—many of which were included in the ACA. For example, the Medicare Shared Saving Program (§3022 of the ACA) was based on the Physician Group Practice Demonstration (CMS 2011), and the Bundled Payments for Care Improvement Initiative in the Center for Medicare & Medicaid Innovation (§3021) is based on the Acute Care Episode Demonstration (CMS 2016).

Today, alternative payment schemes are founded on one of two distinctive methodologies: bundled payments for services and additional payments or penalties for quality.

Medicare Value Purchasing

As mentioned earlier, the transition from FFS to value-based systems is accelerating. In 2015, Secretary of HHS Sylvia Mathews Burwell announced, "Our goal is for 30% of all Medicare provider payments to be in alternative payment models that are tied to how well providers care for their patients, instead of how much care they provide in 2016. Our goal would then be to get to 50% by 2018." The independent, not-for-profit organization Catalyst for Payment Reform (2014), which evaluates payment systems throughout the United States, found that the percentage of payments meeting its definition of value-oriented payment methods had reached 40 percent for 2014—up from 11 percent in 2013. This accelerated transformation is likely to continue.

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Policy Issues in Value Purchasing

The rapid movement to value purchasing presents a number of policy issues.

Attribution, or Whose Patient Is This?

In a complex delivery system, the connection of one patient's care outcomes to a specific provider can be problematic. The Center for Healthcare Quality & Payment Reform has identified a number of these types of issues (Miller 2014). The following are just a few examples,

- Patients who lack a primary care physician can cause distortions in spending comparisons.
- As a function of EHR system structures, a physician can be assigned accountability for services a patient received from another provider.
- The cost of caring for a patient with a preventable conditions may be assigned to the physician treating the condition rather than the provider who caused it.

Too Many Measures

The use of quality measures as the basis for payment is increasing the complexity of the system. For example, the number of ways that quality is measured has grown dramatically. In 2015, the *Washington Post* reported that 33 different care programs in Medicare used a combined 1,676 reporting measures the previous year (Millman 2015). A 2013 *Health Affairs* study of 23 commercial health plans found 546 distinct quality measures—with very little overlap to Medicare programs (Delbanco 2015).

Unintended Consequences

Complex systems can have unintended consequences. For example, in 2008 the ARRA provided significant funding to assist with the installation of EHRs in hospitals and clinics. A clear aim of this policy was to enable providers to track patients with chronic disease, improve their care, and reduce costs in the system. However, as a consequence of more complete records arising from the use of EHRs, hospitals received \$1 billion *more* in Medicare reimbursements in 2010 than they had five years earlier through improved billing of emergency department coding alone, according to a *New York Times* analysis of Medicare data (Abeslson, Creswell, and Palmers 2012). The article also notes that clinics have similarly changed the way they bill for office visits, increasing their payments by billions of dollars. The consequence of increased Medicare billings was not an aim of the ARRA.

Considering that history, value purchasing's impact on the care system will also likely produce outcomes that have not been anticipated by its architects.

Implications for Operations Management

One clear advantage of FFS was its clean lines of accountability for services—if you provided the service, you got paid. Value purchasing breaks this link as, in many cases, the service provider does not get paid directly. Hence, improved operational structures need to be built to accommodate these payment systems.

Strategy Execution

The value purchasing environment leads to growth in the number of quality improvement projects required to respond to the new incentive opportunities. A useful management strategy is the blended balanced scorecard–strategy mapping approach developed by Kaplan and Norton (2001). This method converts general strategies (e.g., reduce readmission rates) into specific projects (e.g., acquire predictive analytics capability), which are then connected in a strategy map. Each project establishes metrics that then can be displayed as a scorecard. This disciplined execution method is used by many large organizations both inside and outside healthcare. The balanced scorecard methodology is outlined in detail in chapter 4.

Improved Modeling and Analytics

The new environment requires more sophisticated systems of analysis than in the past. While traditional accounting systems were adequate for the Medicare FFS environment, much more detailed costing systems are now needed, such as activity-based accounting. Patient behavior models were historically built on groups (e.g., males over age 65) but now must be built with individual predictive modeling capabilities. Modeling and analytics tools can be used to finely align delivery system resources with patient needs. Analytics is addressed in chapter 8, and activity-based accounting is covered in chapter 14.

Innovation Centers

The new value purchasing environment is also sparking creativity. Many health-care organizations have launched innovation centers to coalesce creative energy toward developing new approaches to care delivery. Innovation centers are addressed in chapter 5.

Clinical Decision Support

One development in the use of guidelines is the spread of clinical decision support systems, which are now becoming a standard part of EHRs. As a clinician accesses a specific patient’s medical record, the automated system provides advice on recommended treatments and needed follow-up (see the Operations Management in Action section at the beginning of this chapter).

Institute for Clinical Systems Improvement and High-Tech Diagnostic Imaging

Clinical decision support can be applied across multiple EHR systems and need not be vendor specific. The Institute for Clinical Systems Improvement (ICSI 2012), for example, undertook a project in 2007 to improve the appropriate utilization of CT (computed tomography), MRI (magnetic resonance imaging), PET (positron emission tomography), and nuclear cardiology diagnostic scans.

ICSI (2009) noted:

[The approach of those organizations we studied] consists of deploying a common set of appropriateness criteria that would be:

- available in the physician's office to provide clinical decision support at the time care is being discussed with the patient and prior to ordering HTDI [high-tech diagnostic imaging] tests
- embedded into an electronic medical record (EMR), or made available via a Web site
- continually enriched and expanded for improved outcomes.

The ordering guidance screen is shown in exhibit 3.5.

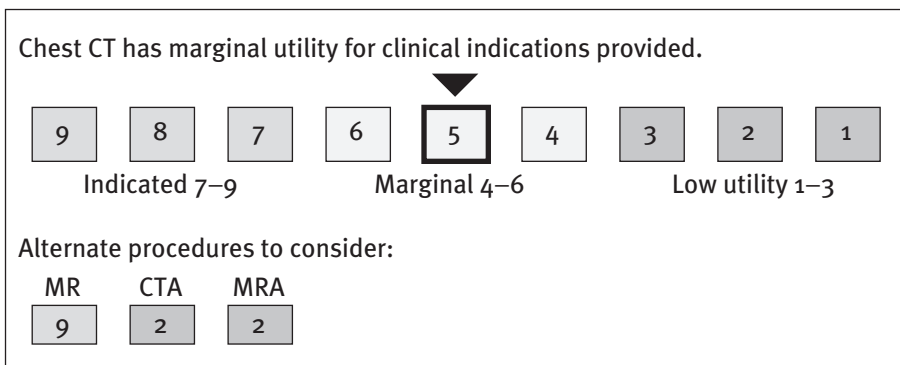
The ICSI (2009) project analysis continues, noting:

[The simple 1 through 9 rating on] the level of diagnostic utility of the provider's selection carries multiple benefits, offering guidance to ordering providers and supporting shared decision making between providers and patients. For those organizations with

EXHIBIT 3.5

Decision Support Process Embedded in Electronic Health Record

Provider sees appropriateness of test and higher utility options—opportunity to engage patient.



Source: Copyright © 2011 Institute for Clinical Systems Improvement. Used with permission.

Note: CT = computed tomography; CTA = computed tomography angiography; MR = magnetic resonance; MRA = magnetic resonance angiography.

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full EHRs, the patient's clinical information is loaded automatically into this system which then makes its recommendation based on guidelines from the American College of Radiology and the American College of Cardiology.

When a test of a value that is below 6 is ordered, additional information is provided to the ordering physician, who may choose to continue and order the test or switch to another. All payers in the system have agreed to make payments no matter what level of test is ordered. In some cases the recommended test is, in fact, more expensive than the test originally ordered.

The project has been successful in making appropriate recommendations to providers. Exhibit 3.6 shows the actual use of HTDI versus the trend that would have been seen had the existing radiology management systems remained in place.

As determined by ICSI (2010):

The summary of the benefits of this system over three years among five large medical groups is:

- \$84 million savings based on reduction of HTDI scans against projected trend line without decision-support
- 11,000 fewer administrative hours for just one medical group by having electronic decision support accepted versus calling the radiology benefits manager
- Decreased exposure to radiation—potentially preventing cancers

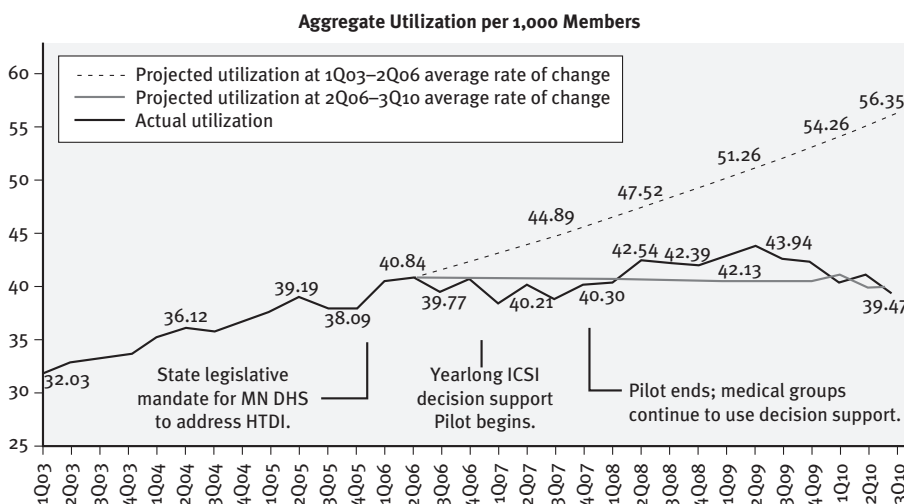


EXHIBIT 3.6
Utilization
of High-Tech
Digital Imaging
(HTDI)—Actual
Versus Trend

Source: Copyright © 2011 Institute for Clinical Systems Improvement. Used with permission.

Note: 1Q03 = first quarter of 2003, 2Q03 = second quarter of 2003, etc.; ICSI = Institute for Clinical Systems Improvement; MN DHS = Minnesota Department of Health Services.

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The Future of Evidence-Based Medicine and Value Purchasing

One challenge of the increasingly widespread use of EBM is the fact that it is based on averages resulting from clinical studies of many patients. No specific patient is ever completely average, and clinicians frequently vary from guidelines to compensate for this difference. As described next, Optum Labs is a leading example of how big data can be used to address this challenge.

The second major obstacle that arose with the increased use of EBM relates to the clinicians themselves. What systems can be created to support professionalism and fair compensation and yet encourage the use of the most current and effective healthcare methods and technologies? A brief look at physician compensation and process improvement later in this section helps set the stage for answering this question, which we return to throughout the remainder of the book.

Optum Labs

Very large databases are now being created to more fully research the impact of EBM. Optum Labs is a partnership of Optum and the Mayo Clinic that, as of 2016, included 19 additional industry partners. A key asset of Optum Labs is its high-quality, integrated healthcare database, which contains deidentified claims and clinical data for more than 150 million people, gathered from multiple health plans and healthcare providers. The database also includes plan enrollment information, medical and pharmacy claims, and lab results from multiple payers that have been integrated across care settings and longitudinally linked at the patient level. This database allows Optum Labs to perform fine-grained CER.

An Optum Labs Example: Diabetes

Wallace and colleagues (2014) offer an example of Optum Labs' effectiveness in diabetes management:

Metformin is consistently recommended as the initial intervention for patients newly diagnosed with uncomplicated type 2 diabetes. However, there are a number of choices for second-line medication treatment, including older sulfonylurea drugs and newer oral agents plus insulin.

An observational study using the Optum Labs database that compared alternative medication management strategies across 37,501 patients showed similar effects for all drugs in achieving glucose control, longevity, and overall quality of life. However, the cost of this benefit was less in patients who were treated with sulfonylureas. These drugs were also associated with a longer interval until insulin was required than was the case when other oral agents were used. These findings are being translated into potential revisions of guidelines used by care providers.

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As the size and scope of these large databases increase, the ability to perform highly detailed analysis will improve. These new studies will lead to ever more precise evidence-based guidelines and accurate clinical effectiveness data.

Physician Compensation and Value Purchasing

A major emphasis of value purchasing is to change physician behavior through payment systems. Physician compensation is a complex and frequently controversial topic in healthcare organizations, and value purchasing alone will not resolve this challenge. Because CMS and private payers continue to introduce many new metrics and publicly reported quality measures, an organization might be tempted to directly link physician payment to these metrics—this linkage may actually be happening in some small practices.

However, in large systems, the number and complexity of the metrics and their relationship to all the supporting clinical systems render both accountability and transparency difficult. A basic rule of compensation systems is that the “line of sight” should be clear between a goal and a reward; value purchasing does not allow line of sight to be achieved easily.

In a report created for the Medicare Payment Advisory Commission, Zisner and colleagues interviewed 15 senior leaders of integrated health systems on reimbursement models and the alignment of incentives in physician compensation (Zisner 2013). A key finding was that stability in provider compensation was a major factor in retaining and recruiting physicians. Zisner comments that to bring about such stability, payment systems must “disconnect” how the organization is paid from how the physician is paid. Although quality outcomes are important, many physicians in integrated systems have other obligations, such as treating expanded panels of patients, managing mid-level practitioners, and teaming with colleagues to manage the care of complex patients. Hence, compensation needs to take into account payment for the many actual duties of physicians today.

A clear strategy outlined in the ACA is to encourage the formation of systems of care. To respond effectively to value purchasing will take teams of highly skilled clinicians and process improvement personnel working diligently to meet the performance goals. The remaining chapters in this book provide the tools for this ongoing journey.

Vincent Valley Hospital and Health System and Pay for Performance

The leaders of VVH felt they had a number of opportunities to succeed with the Medicare Hospital Value-Based Purchasing program. They began by creating a project team to improve the care of patients with pneumonia. The specific measures the team targeted for improvement were those delineated in the VBP:

- Pneumonia patients assessed and given pneumococcal vaccination
- Pneumonia patients whose initial emergency department blood culture was performed prior to the administration of the first hospital dose of antibiotics
- Pneumonia patients given smoking cessation advice and counseling
- Pneumonia patients given initial antibiotic(s) within six hours after arrival
- Pneumonia patients given the most appropriate initial antibiotic(s)
- Pneumonia patients assessed and given influenza vaccination

The operations management tools and approaches detailed in this book were used to improve performance for each of these measures, culminating in chapter 15, which describes how VVH accomplished this goal.

Conclusion

The use of EBM to develop systems of care is becoming well accepted by most clinicians. Clinical results are being made transparent and easily accessible to the general public. Payers are implementing systems that reward value, and providers are installing clinical decision support systems to help in their practice. The effective use of EBM identifies high-performance healthcare organizations, and its widespread use is a key to the provision of high-quality, cost-effective care throughout the world.

Discussion Questions

1. In addition to those mentioned in the chapter, what are some examples of a care delivery setting offering a mix of standard and custom care?
2. Access the CMS Hospital Compare website and review three local hospitals' quality scores. At which hospital would you choose to receive care, and why? Which hospital would you choose for your parents or your children? Did your answers differ? Why or why not?
3. Review the 11 payment reform methodologies (exhibit 3.4) and rank them on two scales: ability to improve quality and ability to reduce healthcare inflation. Provide a rationale for your ranking.
4. What are three strategies to maximize P4P revenue?

Note

1. Portions of this section were adapted from McLaughlin (2015) with permission from the American College of Healthcare Executives.

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