

Part **4**

**Health System Topics from *Disease Control Priorities*, Third Edition**



## Chapter 10

# Quality of Care

John Peabody, Riti Shimkhada, Olusoji Adeyi, Huihui Wang,  
Edward Broughton, and Margaret E. Kruk



## INTRODUCTION

Just after dawn, Vivej arrives at the hospital with her newborn under her arm to see you. She is 21 years old, two days postpartum, and exhausted after 36 hours of protracted labor. She is worried because she cannot get her firstborn, Esmile, to breastfeed. You learn that she delivered at a birthing clinic near her home and tells you that, even after her water broke, it took more than a day before the birth attendant could deliver her son. Your examination reveals a dire clinical picture: Esmile is lethargic and hypotonic, he has a poor suck reflex, his temperature is 39.8°C, his pulse is 180, and his breathing is labored. You check his white blood count, confirming leukocytosis. A spinal tap shows pleocytosis. You start him on fluids and antibiotics for neonatal sepsis with likely meningitis and quickly turn your attention to Vivej. Her situation is easier to diagnose but no less urgent: she is febrile and tachycardic, her blood pressure is 85/50. You give her fluids and start her on antibiotics. Ultimately, despite your efforts, both mother and child die.

What went wrong? This chapter looks narrowly at these situations—the critical points after access and availability (including affordability) are already accomplished, when patients are in health care facilities that are staffed and equipped with appropriate technology. These are the situations in which the inputs are brought together and it is up to the provider to improve the

health of the patient. Simply put, this chapter looks at the decisions and actions of the provider when seeing a patient. It is at this critical moment when we expect the doctor or nurse, or whoever is caring for the patient, to provide the best possible care by skillfully combining the available resources and technologies with the best clinical evidence and professional judgment.

Esmile and Vivej received poor-quality care at the time of delivery. Several clinical steps were not taken. The prolonged rupture of membranes was not diagnosed in a timely manner. Vivej needed either to have her labor induced or, failing that, to be referred for a cesarean section. Prophylactic antibiotics should have been administered. Just as important, the provider at the birthing center needed support and professional oversight, with guidelines, supervision, or default referral systems in place to provide a path to the best care possible. The multiple failures in this case led to puerperal and neonatal sepsis. At worst, these conditions have a fatality rate greater than one in four; at best, they lead to protracted care, recovery, and clinical expense that could have been avoided. It is possible, however, to imagine providers in a different setting, with the same physical resources, giving better care and avoiding this tragic scenario.

In the next section, we answer the questions raised in this scenario and in countless clinics and hospitals around the world. How much variation is there in the

quality of care? How do we measure clinical practice? How and where has quality been systematically improved and practice variation reduced? What elements of care variation can be addressed by policy and what are the costs? Most important, what can be done to elevate the care given by providers in developing country settings? Our focus, therefore, is on the steps that can be taken to optimize the quality of care for patients like Esmile in pediatrics, Vivej in obstetrics, and other patients receiving care for the clinical conditions considered throughout the nine volumes of the third edition of *Disease Control Priorities (DCP3)*.

## PROBLEM OF VARIATIONS IN QUALITY OF CARE

Health policy makers, researchers, and clinicians recognize the wide variations in access to care (Peabody and others, forthcoming). However, once individuals and populations avail themselves of health care services, variations in health outcomes raise disturbing questions about the quality of care delivered, defined as “the degree to which health services for individuals and populations increase the likelihood of desired outcomes and are consistent with professional knowledge” (IOM 2013, 21). Variations in care entail policy challenges similar to those associated with variations in access, including equity and efficiency (Saleh, Alameddine, and Natafji 2014). In studies comparing clinical practice with evidence-based standards, researchers found that high-quality care is provided inconsistently to large segments of the population (McGlynn and others 2003). For example, a landmark Institute of Medicine report found that, in the United States, medical errors kill more people than traffic accidents (Kohn, Corrigan, and Donaldson 2000).

Many subsequent studies have documented variations in quality of care in low- and middle-income countries (LMICs) (Barber, Bertozzi, and Gertler 2007; Barber, Gertler, and Harimurti 2007; Hansen and others 2008; Loevinsohn, Guerrero, and Gregorio 1995; National Academies of Sciences, Engineering, and Medicine 2015; Peabody, Nordyke, and others 2006; World Bank 2003). In India, studies have found alarmingly low rates of correct diagnosis, limited adherence to treatment guidelines, and frequent use of harmful or unnecessary drugs. In one study, only 31 percent of standardized patients who described symptoms of unstable angina and 48 percent who reported symptoms of asthma were given the correct drugs (Das and Hammer 2014). Even more worrying, providers prescribed an incorrect or harmful treatment to more than 60 percent of patients reporting asthma symptoms.

Clinicians failed to provide even the most basic care—only 12 percent of standardized patients who reported a child with symptoms of dysentery were told to give their child oral rehydration therapy (Das and others 2012). A study of 296 providers in India found that a mere 6 percent followed the six diagnostic standards of the International Standards for Tuberculosis Care (Achanta and others 2013).

Such deficits in quality of care can come from many sources, including gaps in knowledge, inappropriate application of available technology, and inability of organizations to monitor and support care standardization. This striking variation in quality within countries occurs across facilities, among providers, and between specialists and nonspecialists (Beracochea and others 1995; Das and Hammer 2007; Das and others 2012; Dumont and others 2002; Nolan and others 2001; Peabody, Gertler, and Leibowitz 1998; Weinberg 2001; Xu and others 2015).

Some cross-national comparisons have reached the same conclusion. A 2007 DCP-sponsored study that evaluated quality for three common clinical conditions in five countries simultaneously found that the average quality of care was low in every country (61 percent) and the difference in average score between countries was small (ranging from 60.2 to 62.6 percent). However, the quality scores within every country varied widely, ranging from 30 to 93 percent (Peabody and Liu 2007). This wide variation was constant across type of facility, medical condition, and domain of care.

Poor health outcomes are the result of many factors, ranging from the nature and severity of disease to patient behavior and structural elements of care (IOM and National Academy of Engineering 2011; Steinwachs and Hughes 2008; Xu and others 2015). Some factors are not amenable to change (genetic predisposition), while others are slow to affect outcomes (changes in payment incentives). Discouragingly, better access, more infrastructure, and structural measures of quality do not always translate into better health outcomes. Indeed, some structural indexes can be inversely related to health (for example, number of hospital beds versus health status) (Ng and others 2014). Thus, improving the quality of care may well provide the *greatest* sectoral opportunity to improve health outcomes (Peabody and others 2017). Care can be improved quickly and, if based on best evidence, improved care will improve outcomes and lower costs (Scott and Jha 2014). Reducing unwarranted variation and addressing poor-quality provider practices deserve the most urgent attention possible from policy makers (Kirkpatrick and Burkman 2010; Ransom, Pinsky, and Tropman 2000).

Providers, health care systems, governments, and payers are beginning to recognize this urgency and are

seeking innovative, effective ways to improve the quality of care. Metrics and measurement, pathways, clinical checklists, educational interventions, and payment incentives all raise awareness and offer opportunities to provide accountability and improve care. These approaches have been tried in many LMICs, but their effectiveness varies. Changing practice at the system level is difficult and requires coordination, vision, planning, and consideration of how effective, high-impact interventions can be scaled up and applied across an entire system (Massoud and Abrampah 2015). At the level of individual providers, knowledge improvement and acquisition of new skills need to be motivated by both extrinsic and intrinsic factors, which are enabled through access to knowledge and measurement tools that change behavior and ideally are accompanied by peer support (Schuster, Terwoord, and Tasosa 2006; Woolf 2000). We have learned that improved clinical practice requires active participation (not passive learning), peer and leadership support, and communication of relevant feedback (Kantrowitz 2014; Mostofian and others 2015). Multifaceted interventions seem more successful than single interventions, underscoring the importance of practice-level change that focuses on supporting the individual provider (training) and creating a suitable environment for change (accountability).

Even more challenging than finding disease-level interventions for individual providers is identifying health care policies that improve the quality of care for populations. While clinical practice interventions, such as checklists, for acute and chronic diseases work at the provider-patient level, policies need to address group-level practice, for example, through incentives and indirect means. Preventing the deaths of Vivej and Esmile, for example, would have required the timely use of simple uterotonic commodities and prophylactic antibiotics, which might happen with better supervision. An effective policy, however, compels groups of providers to set up the supervision or the training that leads to the *use* of oxytocin or cephalosporins.

In the second edition of *DCP*, the chapter on quality of care largely summarized the emerging policy evidence that better quality could lead to better outcomes (Peabody, Taguiwalo, and others 2006). Just a decade later, every volume in this edition discusses quality of care. We consider in this chapter the different policy interventions that have been tried around the world. We begin with the quality infrastructure that is required for every policy intervention, then expand on the policy framework for changing clinical practice, and use this expanded framework to discuss the challenges, returns, and costs of improved quality.

## QUALITY IMPROVEMENT INFRASTRUCTURE REQUIREMENTS

Clinical solutions are typically not generalizable because they are disease-specific, vary by clinical condition, and rely on the training of health care providers and the context of the health care system (Dayal and Hort 2015). Policy, however, is designed to work at the group level—that is, at scales larger than the individual level. Effective quality improvement policies that work at the group level have several common features, specifically the means to collect information and synthesize it and the means to encourage skills and technologies to be applied in a timely fashion. The following four common policy attributes, detailed below, improve quality:

- Measurement of the clinical activity (including measurement tied to feedback)
- Standards for those measurements (based on scientific evidence for standardizing care)
- Training of providers (including supervision)
- Incentives that align and motivate providers (including financial incentives, but also incentives of professionalism and reputation).

### Measurement

Accurate, affordable, and valid measurements “are the basis for quality of care assessments” (Peabody and others 2004, 771). For too long, routine measures of quality in LMICs relied on structural elements (rosters, catalogs, and inventories of coverage and access), giving little thought to how these elements improve health. Such elements are relatively easy to count and measure, but are only remotely linked to better outcomes. Improving quality requires measurement of the care process—that is, what providers do when they see patients (Ansong-Tornui and others 2007; Peabody, Taguiwalo, and others 2006; Peabody and others 2011).

Measurement of the care process is critical, creating awareness of deficits in practice, gaps in care, and accountability at the individual and system levels, which improves focus and motivation. To serve as an instrument of change and accountability, provider-level measurement needs to be ongoing and cyclical. Transparency of results can increase knowledge and change intentions, but requires a supportive context to be effective (National Patient Safety Foundation 2015).

When coupled with useful feedback and done in a timely manner, measurement is the foundation for improving quality. If the measures are reliable, affordable, and anchored in valid, evidence-based criteria,

quality of care can be followed over time and the impact of policy interventions can be assessed (Felt-Lisk and others 2012). Various quality measures have been developed, each with its own set of advantages and disadvantages. Although no measure is perfect, adequate measures exist, and every health system—from small clinics to national governments—can benefit from measurement. Feedback has the potential to promote improvement, but studies are limited, tending to focus on health care report cards (Baker and Cebul 2002; Dranove and others 2003; Kolstad 2013; Shaller and others 2003), which include public disclosure of quality scores that may not provide the same motivation to improve scores as when feedback is provided privately.

The available methods for measuring performance include provider self-reports, patient vignette simulations, patient self-reports, and reviews of medical records. These methods vary in their ability to capture improvement and account for differences in the type of patients treated (case-mix adjustment). They also vary in their economic feasibility (Epstein 2006; Spertus and others 2003), reliability (repeated measures), validity (against a gold standard), and ability to be “gamed” (Petersen and others 2006). The policy challenge is that performance-measurement methods may need to be developed and adapted to low-resource settings (Engelgau and others 2010). Table 10.1 lists available methods for measuring quality of the care process.

**Table 10.1** Methods for Measuring Quality of the Care Process

Method	Advantage	Issues
Chart abstraction or review of medical record	<ul style="list-style-type: none"> <li>Nearly ubiquitous and theoretically could be obtained after the patient-provider encounter; in practice, record keeping in most LMICs is inadequate</li> <li>Electronic medical record technology: improved uniformity, legibility, communication</li> <li>Records of clinical events</li> </ul>	<ul style="list-style-type: none"> <li>May lack relevant clinical details, especially when written for other purposes, such as legal protection</li> <li>Poor record keeping and documentation lead to incomplete and inaccurate content</li> <li>Illegibility of handwritten notes</li> <li>Inaccuracies in the process of abstracting to produce data suitable for analysis</li> <li>High costs involved in training medical abstractors</li> <li>Variation in documentation practices across providers, facilities, and countries</li> </ul>
Direct observation and recording of visits	<ul style="list-style-type: none"> <li>Records of clinical events</li> <li>First-hand observation of actual encounters</li> </ul>	<ul style="list-style-type: none"> <li>Ethical considerations</li> <li>Need to inform providers and patients, which can induce the Hawthorne effect (bias when participant changes his or her behavior as a result of being evaluated)</li> <li>High cost of training observers</li> <li>Variations across observers</li> </ul>
Administrative data	<ul style="list-style-type: none"> <li>Available in most facilities</li> <li>Ubiquitous and inexpensive to collect when data collection system is in place</li> </ul>	<ul style="list-style-type: none"> <li>Lack sufficient clinical detail</li> <li>Inaccuracies in content</li> <li>Poor data collection or management systems, especially in LMICs</li> </ul>
Standardized patients	<ul style="list-style-type: none"> <li>The gold standard for process measurement</li> <li>Captures technical and interpersonal elements of process</li> <li>Reliable over a range of conditions, providing valid measurements that accurately capture variation in clinical practice among providers across patients</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>Not practical for routinely evaluating quality</li> <li>Limited range of applicability (works best for adult conditions and conditions that can be simulated)</li> </ul>
Clinical vignettes	<ul style="list-style-type: none"> <li>Can measure quality within a group of providers and evaluate quality at the population level</li> <li>Responsive to variations in quality</li> <li>Cases simulate actual patient visit and evaluate physician's knowledge</li> <li>Validated against other methods and criteria for standard-of-quality measurement</li> <li>Useful for comparison studies</li> <li>Easy and inexpensive to administer</li> <li>Ability to collect data independently</li> </ul>	<ul style="list-style-type: none"> <li>Potential resistance of providers to complete the vignettes</li> <li>Different methods for administering vignettes</li> <li>Instrument validation</li> <li>Link to patient-level data</li> </ul>

Sources: Bertelsen 1981; Peabody and others 2004; Peabody and others 2011; Peabody, Nordyke, and others 2006.  
 Note: LMICs = low- and middle-income countries.

The usefulness of any method for measuring process depends on the completeness and accuracy of the data collected—a ubiquitous problem with charts, medical records, and administrative data. Another significant concern is patient case mix, given that different patient characteristics may affect quality (Zaslavsky 2001). Validity and comparability of results across measurement units (individual patients, providers, facilities, and countries) are questionable unless these differences are controlled for through complex instrument design and statistical techniques (Peabody and others 2004). Operational concerns, such as the need for highly trained staff, can increase the cost and complexity of implementing some methods.

### **Data Derived from Medical Charts**

Chart abstraction, or review of the medical record, has long been used to measure quality of care. Clinical audits, physician report cards, and profiles are based on chart abstraction. Reliable health records can provide credible evidence of the health status of patients and assist policy makers with developing plans and making decisions to improve health care delivery (Haux 2006). The core strength of the medical record is that it is ubiquitous and could potentially be obtained after each encounter.

Chart reviews, however, suffer from many problems. First, the medical chart must be completed (and found) to proceed with an abstraction. Handwritten notes on paper charts may be illegible. Medical charts may be generated for reasons other than documenting the key clinical events of the visit (for legal protection or obtaining payment) and thus may lack crucial clinical details. Luck and others (2000) found that charts identified only 70 percent of activities performed during the clinical encounter. Even abstracting measures of quality from electronic medical records is challenging given the heterogeneity in record-keeping practices (Ali, Shah, and Tandon 2011; Parsons and others 2012). The costs and logistical challenges of securing medical records, training medical abstractors, and reviewing records can be significant. Throughout acquisition, verification, and abstraction, a process is needed to ensure that the data collected are reliable (Koh and Tan 2005). Beyond these costs and challenges, chart review also suffers from the inability to control for patient case mix and difficulty of comparing physicians caring for different patient populations.

### **Direct Observation and Recording of Visits**

Direct observation and recording of visits are common practices in LMICs (Nolan and others 2001). Some of the most obvious challenges to using direct observation

are the need to staff projects and train evaluators, which can be difficult to scale up. Ethical challenges must be addressed, and both providers and patients must be informed of the observation or recording. Although research performed in Tanzania showed that the Hawthorne effect can disappear after 10 to 15 observations, this notification introduces participation bias when providers change their behavior as a result of being evaluated (Leonard and Masatu 2006). Perhaps a more salient problem is that trained observers are costly, and variation between observers is difficult to remedy. These challenges have stimulated the search for other ways to measure and record what happens in clinical visits.

### **Administrative Data**

Administrative data are available in all but the poorest settings. A data collection system, once established, can provide information on charges and many cost inputs. However, administrative data are assembled for purposes other than improving quality, such as documenting and processing medical claims (Calle and others 2000; Goeree and others 2009), and often lack sufficient clinical detail to be useful in evaluating clinical processes. In a 2004 study, an incorrect diagnosis was recorded 30 percent of the time (although the actual diagnosis was correct). The actual diagnosis was recorded only 57 percent of the time (Peabody and others 2004). As information systems advance, accuracy may improve, but the lack of adequate clinical detail will continue to limit the use of administrative data. Clinical databases such as registries may be helpful but are primarily available only in high-income countries (HICs) and for commercial interests.

Globally, both administrative and clinical health databases are of poor quality, and administrative databases are usually the only resource available in LMICs. Even when available, health information is underused for planning and decision making (Corrao and others 2009), especially in resource-constrained settings (Bosch-Capblanch and others 2009) and when data are paper based or decentralized to the district level (LaFond and Siddiqi 2003). District-level information systems often do not feed information back to the local level (Lippeveld, Sauerborn, and Bodart 2000). Paper-based information systems often generate poor-quality data (Lium, Tjora, and Faxvaag 2008), which weakens confidence in reported progress made toward health care system goals (Kerr and Fleming 2007) and toward the Sustainable Development Goals and the Millennium Development Goals (AbouZahr and Boerma 2005). In the absence of greater attention and resources from government or private

health insurance initiatives, using administrative data to measure and track clinical performance should be done cautiously.

### **Standardized Patients**

Using standardized patients, when unannounced, is the gold standard for measuring process (Luck and Peabody 2002). Trained to simulate patients with a given illness, standardized patients present themselves in a clinical setting to providers who have given their consent to participate in the study. After the visit, the standardized patient reports on the technical and interpersonal elements of the care process. Interest in using standardized patients has been growing in LMICs, with most studies done in China and India (Das and others 2012; Das and others 2015; Mohanan and others 2015; Sylvia and others 2015). Well-trained standardized patients are not susceptible to observation bias (Glassman and others 2000) and, when rigorously monitored, enable comparisons of quality within and between facilities.

However, this method also has major drawbacks, including high costs of training, significant difficulties in large-scale application (consistent training), and limited conditions that actors can reliably portray, for example, excluding surgical and pediatric cases (Felt-Lisk and others 2012).

### **Clinical Vignettes**

The shortcomings of the previous methods have spurred development of more facile methods. One of these, developed in work starting in 1999, is the use of *validated* clinical performance vignettes (Peabody and others 2000). Clinical performance vignettes use a full set of clinical care elements to assess the patient-provider interaction (Glassman and others 2000).

There are many types of vignettes from which to choose—for example, multiple choice versus open-ended, or short case versus full clinical care delivery scenarios—producing variable results at predicting actual practice. Clinical performance and value vignettes have been validated in randomized evaluations against standardized patients in two large trials (Peabody and others 2000; Peabody and others 2004). In these studies, vignette scores for clinical performance and value consistently reflected quality as measured by standardized patients better than abstracted medical records and worked across different health care systems, clinical conditions, and levels of training among randomly sampled physicians.

Various types of vignettes have been used in diverse settings around the world (Canchihuaman and others 2011; Das and Hammer 2005a, 2005b; Holm and Burkhartzmeyer 2015; Jörg and others 2006; Kaptanoğlu

and Aktas 2013; Li and others 2007; Tiemeier and others 2002; Veloski and others 2005). Vignettes are particularly effective in comparative evaluations because the same case or type of case can be presented to many providers simultaneously, and the results can be examined over time. Vignettes have been used in large cross-national studies, such as a six-country policy evaluation in Central Asia and Eastern Europe (Peabody and others, forthcoming). This study, involving 1,039 facilities and 3,121 providers, evaluated quality of care in obstetrics, newborns, and chronic disease. Because vignettes are inexpensive to administer, they are especially well suited for use in resource-poor settings (Peabody, Luck, and others 2014; Peabody, Shimkhada, and others 2014; Peabody, Taguiwalo, and others 2006).

## **Standards**

### **Evidence-Based and Best-Practice Standards**

Much of the early disagreement about what to measure has given way to a consensus that performance should be measured against evidence-based criteria. The scientific literature is replete with evidence-based quality metrics that describe processes as varied as whether a patient's blood pressure is under control, whether a patient is on the correct medication to slow down renal failure, whether the timing of a specific surgery is correct, or whether a diagnostic test is needed. Collectively, clinical care metrics are based on the evidence and the supposition that meeting these metrics results in better outcomes. Critics point out that evidence-based practice has only been established for a limited number of care elements (Contreras and others 2007; Karolinski and others 2009; Vogel and others 2014). However, clinicians routinely rely on best-practice standards, even as high-quality data from well-designed studies continue to emerge and evolve. In practical terms, there will never be a complete set of evidence-based standards, and quality of care will always rely on the best available evidence and local standards.

An important body of evidence-based, best-practice standards in LMICs comes from using surgical and childbirth safety checklists. Checklists have recently been rapidly introduced into LMIC settings, and the evidence indicates that using these evidence-based standards in checklist form improves health outcomes, primarily by setting a quality standard for treatment and facilitating communication within provider teams (Ergo and others 2012). An intervention in Michigan that used a surgical checklist to decrease catheter-related bloodstream infections in hospital intensive care units, for example, led the World Health Organization (WHO) to create the Surgical Safety

Checklist (Pronovost and others 2006). As of 2012, the WHO Surgical Safety Checklist has been adopted by 1,790 health care facilities worldwide (Treadwell, Lucas, and Tsou 2014), helping teams to manage crises, avoid clinical errors, and minimize health risks. However, successful uptake of checklists requires “constant supervision and instruction until it becomes self-evident and accepted” (Sendlhofer and others 2015).

### **Licensing, Certification, and Accreditation**

Provider certification and hospital accreditation were introduced into health care in the early twentieth century and have been adopted globally as a cornerstone of health care quality assurance. The number of health care accreditation programs, including national accreditation systems, is doubling every few years, with as many as 70 programs around the world in 2013 (Saleh and others 2013). Accreditation has expanded beyond hospitals to include primary care, health systems, and laboratories. Additionally, many LMICs are replacing voluntary accreditation from independent organizations with national programs that, in some instances, link accreditation to licensing (Greenfield and Braithwaite 2008; Jovanovic 2005).

However, national licensing and accreditation programs require political commitment, human and financial resources, and planning. This issue is further complicated in LMICs by the complexity of the development of the accreditation process and the dearth of resources for implementing and maintaining a strong accreditation process. Evidence on the effectiveness of accreditation for enhancing clinical outcomes or defining when accreditation is most effective is limited and inconclusive: in a systematic review of the literature, health sector accreditation was consistently associated with professional development and promotion of change, but not consistently associated with quality improvement or other organizational and financial impacts (Greenfield and Braithwaite 2008). One study in the Philippines showed that licensing and accreditation independently and substantively improved clinical practice and health outcomes, but with modest impact (Quimbo and others 2008).

### **Training**

Clinical training starts in medical or other professional schools and continues throughout a practitioner’s professional career. Continuing medical education is often a requirement for licensing or certification and is part of almost every health care system. Continuing education has shown positive impacts on care. In Tanzania, training staff in the control of acute respiratory infections in

young children reduced under-five mortality within two years (Mtango and Neuvians 1986). Physician-reported continuing medical education has been linked to better quality and health status when accountability is included using clinical performance vignettes (Luck and others 2014). A six-nation study linked continuing education to evidence-based practice as measured with simulated patients (Peabody and others, forthcoming). Using a systematic database of quality improvement studies, Rowe and colleagues at the U.S. Centers for Disease Control and Prevention (National Academies of Sciences, Engineering, and Medicine 2015) found that, in LMICs, training and supervision have modest positive effects on provider performance and that strategies may work better when used in combination than when used by themselves. Work by Das and others (2016) on providers in India suggests that better incentives can improve quality without any additional provider training.

Despite its ubiquity, continuing education will not greatly improve the quality of clinical practice or health outcomes (Davis and others 1999; Forsetlund and others 2009). An analysis of 62 studies and 20 systematic reviews found that the “continuing education ‘system,’ as it is structured today, is so deeply flawed that it cannot properly support the development of health professionals” (IOM, Committee on Planning a Continuing Health Professional Education Institute 2010, ix). Davis and others (2006) found that physicians cannot self-assess their skills accurately and suggested that external assessment, scoring, and feedback would drive more effective professional development. Moreover, physicians are often “not trained” to evaluate or use published guidelines and best practices. Passive dissemination of information (publishing guidelines, reading peer-reviewed articles) is generally ineffective at changing practice and is unlikely to change group-wide practice when used alone.

Newer educational techniques—targeted education, case-based learning, and interactive and multimodal teaching techniques—have had more success. Interventions that are multifaceted and include active participation and targeted feedback are much more likely to be effective than single interventions. Engaging clinicians is the key to translating training into improved quality (Mostofian and others 2015). Physicians engaged in hospital initiatives, for example, are much more likely to report successful experiences with quality improvement programs. Methods that require active physician learning (one-on-one meetings, small-group workshops, and programs tailored to a specific clinic) are effective at aligning patterns of physician practice with new clinical guidelines. In Guatemala, distance education that targeted diarrhea and cholera case

management increased the accurate assessment and classification of diarrhea cases by 25 percent (Flores, Robles, and Burkhalter 2002).

### Supervision

Supervision is an established method for assessing quality. The power and influence of peer review supervision, often conducted through professional societies, vary widely among countries (Heaton 2000). Large providers, such as hospitals or public health institutions, often have more resources for collecting information on provider practices and patient outcomes and for using those data to guide, educate, supervise, discipline, or recognize providers. Providers at clinics and primary care facilities also benefit from supervision (Loevinsohn, Guerrero, and Gregorio 1995). Other studies point to the benefits of quality review committees and standing groups that review all hospital deaths. However, oversight can also create an antagonistic relationship between workers and managers that may preclude cooperative problem solving and continuous improvement (Berwick 2002).

### Incentives

#### Demand Incentives

Demand-side interventions, such as conditional cash transfer (CCT) and voucher programs, pay participants (not providers) a stipend for specific behaviors,

for example, attending school, having up-to-date vaccinations, or visiting a health center for prenatal care (box 10.1). Although CCTs do not directly provide incentives to health care providers, they require quality health services, adding a supply- or provider-side component to demand-side interventions. There is also an indirect supply-side incentive when consumers use cash incentives to pay for services. A systematic review of the evidence suggests that CCTs improve the uptake of preventive services by children and pregnant women (Lagarde, Haines, and Palmer 2009).

However, in shorter time frames of months to a year, CCTs have difficulty driving lasting effects and affecting health (Beegle, Frankenberg, and Thomas 2001; World Bank 2003). From a policy perspective, it is also difficult to distinguish the effects of the CCT incentive from the impact of the cash itself, that is, it is unclear whether the behavioral change is associated with the conditional incentive or with an income effect (Fernald, Gertler, and Neufeld 2008). A systematic review of the impact of vouchers found modest evidence that the vouchers improved quality of care (Brody and others 2013). The question that remains is whether there are long-term effects because clinical practice was not improved.

#### Provider Payment

In the past two decades, health care administrators and policy makers in both LMICs and HICs have been using pay for performance (P4P) as a means to improve clinical practice. Although the details of programs vary, health care P4P programs link physician compensation to measures of clinical quality (Epstein, Lee, and Hamel 2004). P4P and other forms of results-based compensation have been used routinely in business settings. The challenge in health, however, is to identify suitable metrics that are under the control of the provider (Werner and Asch 2007). For example, care providers are hard pressed to reduce infant mortality rates that are driven primarily by poverty and nutrition, but they can readily change the frequency of unnecessary cesarean sections.

Even with suitable metrics, isolating and linking P4P changes in practice to better health has been challenging (Atkinson and others 2000; Deroose and Petitti 2003). P4P might be linked, at best, to modest improvements in quality of care (Epstein 2007; Lindenauer and others 2007; Petersen and others 2006; Rosenthal and others 2005). However, most studies are not experimentally designed, and participation in P4P programs is voluntary, leading to selection bias. Although much of the literature on the equivocal benefit of provider incentive systems comes from HICs, the Quality Improvement Demonstration Study (QIDS), carried out in the Philippines as a social policy experiment, provides

#### Box 10.1

#### Progres/Oportunidades

Progres/Oportunidades is a major government initiative that used demand-side interventions (conditional cash transfers) to reduce long-standing poverty and develop human capital within poor households in Mexico (Fernald, Gertler, and Neufeld 2009). The demand incentives were payments to mothers for health behaviors, such as participation in programs like prenatal care, immunizations, and nutrition supplementation, as well as for children's school attendance. The intervention had a broad positive impact on many measures and improved patient outcomes such as stunting and anemia in preschool children (Fernald, Gertler, and Neufeld 2009; Rivera and others 2004). The implication of this work is that, for certain health outcomes, improving access was sufficient to improve outcomes. Although there are no data, this improvement occurred even though clinical practice was (certainly) varied.

strong experimental evidence that P4P can be effective in an LMIC (Quimbo and others 2008) (see box 10.2). Similar results were found in the work by Gertler and Vermeersch (2013).

The large QIDS randomized community-level experiment found greater improvement in health outcomes than previous P4P studies (Peabody and others 2017). This finding may have occurred because most other studies providing incentives to doctors have been conducted in wealthier countries and been nonrandomized, which introduces the possibility of selection bias wherein providers who adopt the incentives may be the most likely to respond and improve their clinical practice anyway (Petersen and others 2006). Three randomized P4P studies conducted in the United States found that rewarding physicians improved outpatient care, such as immunization rates (Fairbrother and others 1997; Fairbrother and others 2001; Kouides and others 1998). However, other randomized studies found that physician P4P had no effect on mammography, other cancer screening, or adherence to pediatric preventive guidelines (Grady and others 1997; Hillman and others 1998; Hillman and others 1999). Three hospital-based studies examining inpatient P4P programs in the United States also included control hospitals. These studies, which focused on adult care in cardiovascular disease, community-acquired pneumonia, and joint replacement, found modest improvements of 2 to 4 percentage points in

outcomes beyond the performance seen in controls (Glickman, Boulding, and others 2007; Grossbart 2006; Lindenauer and others 2007). Although these studies had controls, the interventions were not randomly assigned.

### **Results- and Performance-Based Financing**

Results-based financing (RBF) encompasses various types of interventions that provide demand-side incentives (for example, CCTs), refine provider payments (for example, P4P), and trigger government reforms.

The RBF lending projects financed by the Health Results Innovation Trust Fund and World Bank credits or loans (World Bank 2014) operationalized the concept of RBF at a large scale in many LMICs and intended to provide incentives to policy makers to build and leverage their quality infrastructure as a condition for financing. Since 2008, RBF projects like these have been widely adopted in more than 30 countries, with interventions at the national, subnational, district, facility, and community levels. Operationally, funds are provided to governments at the national and subnational level based on agreed-on disbursement-linked indicators and their established targets (often nation- and state-wide estimates). At the facility level, payments to individual facilities are based on their contracts with fund holders (often district or provincial health authorities). And, increasingly used at the community level, payments are

## **Box 10.2**

### **Impact of P4P on Quality: Results of the Quality Improvement Demonstration Study**

The Quality Improvement Demonstration Study (QIDS) is unique in that it was an explicit policy experiment that randomized communities into pay for performance (P4P) versus universal health coverage versus a true control. P4P improved both quality and outcomes.

QIDS was a large policy experiment conducted in the Philippines among 119 doctors, 3,162 children, and 30 communities, covering about one-third of the country. The communities were randomized into an incentives-based policy program rewarding physicians financially for providing higher-quality care to children than provided by universal health coverage and controls (Quimbo and others 2008). In the communities where doctors were eligible for the bonus payments, the number of children who were not

wasted (underweight for height) increased 9 percentage points relative to control sites. The share of parents reporting at least good health for their children was 7 percentage points higher in P4P sites than in controls (Peabody, Shimkhada, and others 2014).

The introduction of P4P led to improvements in quality of care as measured by clinical case vignettes (Peabody and others 2011). Difference-in-differences model estimations indicated that P4P improved not only the measured quality of physician practice but also health outcomes. The impact of policy can be measured in a relatively short (two-year) time frame when evaluation is integrated into policy making and planning before implementation (Peabody and others 2017), making it possible to measure policy effectiveness and to identify ineffective policies early on.

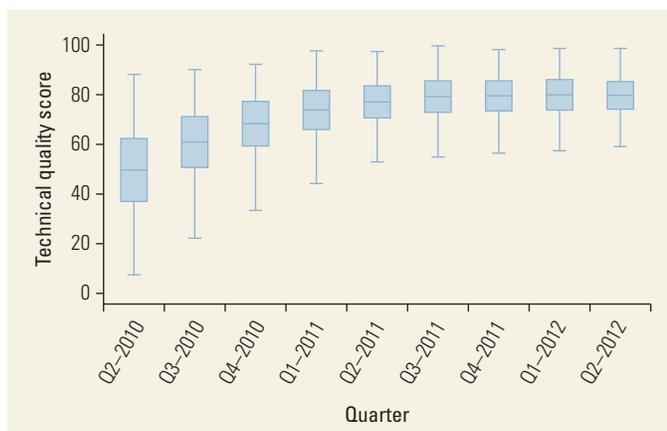
provided to community organizations or community health workers based on RBF contracts with fund holders (often districts or facilities).

A flexible approach, RBF focuses on results:

- Payments linked to results (both demand and supply side) based on context-specific health priorities
- Contracts or agreements that clarify the responsibilities of all stakeholders
- Autonomy for those contracted to be able to use RBF funds to attain the agreed-on results most effectively
- Verification of results to ensure that they are accurate and reliable
- Data sharing to enhance the results, which can be used for planning, design, and implementation
- Community involvement to enhance accountability.

RBF operational data show improvement of quality (especially structural quality) in the RBF programs. Facilities' quarterly quality scores, calculated based on a supervisory checklist, improved in almost all of these programs. In Burundi, for example, quality scores improved significantly during the first two years following rollout of a national RBF program (figure 10.1). In Ethiopia, where RBF was implemented at the national government level, the Ministry of Health undertook Service Availability and Readiness Assessment (SARA) of its primary care facilities on an annual basis to achieve targets associated with disbursement-linked indicators and developed action plans to address weaknesses identified through SARA.

**Figure 10.1** Average Quality Score among All Health Centers in Burundi, 2010–12



Source: Calculations based on operational data from the Burundi Health Sector Development Support Project.

Note: Quality score ("technical quality score") is measured based on a comprehensive supervisory checklist on a quarterly basis. Outlying values are not plotted on this graph.

Impact evaluation studies show positive evidence about the impact of RBF programs on certain dimensions of quality. Several countries, including Argentina, Rwanda, and Zimbabwe, report improvement in quality of prenatal care (Basinga and others 2010; Gertler and Vermeersch 2013; World Bank 2014). Afghanistan demonstrated substantial improvements in quality of examinations and counseling, as well as time spent with patients (Engineer and others 2016). Under Argentina's Plan Nacer<sup>1</sup> incentives-based program, the estimated probability of low birthweight was reduced by 19 percent among beneficiaries, and in-hospital neonatal mortality for babies of enrolled mothers was reduced by 74 percent (Gertler, Giovagnoli, and Martinez 2014).

RBF programs exercise interventions beyond provider performance incentives, such as policy reform, system strengthening, transparency improvement, and management and accountability enhancement. Because of this, establishing the effectiveness of clinical interventions through randomized controlled trials becomes a challenge. How best to use operational data and experiences remains important in disentangling the effects of incentives and the key bottlenecks addressed by RBF.

## LINKING POLICY AND PRACTICE AT THE PLATFORM LEVEL

How do quality infrastructure policies at the government level translate into improved clinical care at the patient level? At its heart, quality improves only when providers deliver the right care to the patient at the right time, do so efficiently, and focus on the patient. However, less variation among a group of providers depends on individual providers treating their patients and their diseases the same way. This section examines how policy and practice come together at the platform level. Specifically, we review the policy elements described above that would be implemented for 11 clinical conditions across four platforms.

We start by looking at where care services are delivered. Delivery occurs through various platforms, from community and public health settings to primary care clinics, first-level hospitals, and the most advanced facilities in every country.

The quality of care will vary in each setting, which means that the policy elements discussed above are relevant to each setting. These policy elements are categorized as quality measurement, practice standards, training management, and incentives.

Table 10.2 shows how each policy element might be implemented across the four delivery platforms.

**Table 10.2** Infrastructure Elements for Improving Quality for 4 Delivery Platforms and 11 Representative Clinical Conditions

Infrastructure elements	Disease or condition	Delivery platforms							
		Community-based services		Primary health centers		First-level hospitals		Referral and specialized hospitals	
		Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics
<i>Quality measurement</i>									
Measurement	Reproductive health	Fertility management, contraception, family planning (information, condom availability, birth spacing)	Coverage rates or service use, provider knowledge, patient behavior (condom use); unintended pregnancy rate	Prenatal, perinatal care; recognition of high-risk pregnancies	Referral rates; folic acid coverage; ability to recognize high risk	Management of labor; vaginal delivery or cesarean section	Provider-level data on practice (vignettes, charts); patient-level data on outcomes (charts, patient reports)	Treatment of birth complications, such as sepsis	Provider-level data on use (vignettes, charts); patient-level data on outcomes (charts, registries, patient reports; mortality rates; readmission rates)
Feedback and accountability	Cardiovascular disease	Use of nutritional and exercise programs	Patient-level awareness of programs; availability of programs	Blood pressure, lipid, diabetes screening; management	Screening at the population level; screening with patient data on blood pressure, lipids	Triage of acute myocardial infarction and treatment of congestive heart failure	Provider-level data on practice; patient-level data on outcomes	Arrhythmias, endovascular procedures, valvular surgery	Provider-level data on use; patient-level data on outcomes
<i>Practice standards</i>									
Evidence-based practice	Sexually transmitted infections	Patient knowledge, safe sex practices	Patient surveys of knowledge, behaviors; provider surveys of clinical knowledge regarding sexually transmitted infections; cultural competency in communication	Syphilis screening, treatment of gonorrhea	Direct observation of successful management and treatment	Pelvic inflammatory disease	Provider-level data on practice; patient-level data on outcomes	Penile, cervical cancer	Provider-level data on use; patient-level data on outcomes

table continues next page

**Table 10.2** Infrastructure Elements for Improving Quality for 4 Delivery Platforms and 11 Representative Clinical Conditions (continued)

Infrastructure elements	Disease or condition	Delivery platforms							
		Community-based services		Primary health centers		First-level hospitals		Referral and specialized hospitals	
		Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics
Checklists, clinical guidelines	Pediatric infectious diseases	Preventive, evidence-based measures to prevent disease	Immunization rates; incidence of disease	Diarrhea treatment, referral	Provider compliance with guidelines (charts, vignettes); provider's ability to diagnose, referral rates	Pneumonia (diagnosis, treatment of bacterial versus viral)	Provider-level data on use; patient-level data on outcomes	Cancer, bacterial meningitis, other serious infections	Provider-level data on use; patient-level data on outcomes
Licensing, certification, accreditation	Infectious disease	Provider hygiene, handwashing; proper disposal of needles	Direct observation of program implementation	Wound care with suturing; aseptic technique; instrument sterilization	Direct observation of explicit management or treatment criteria	Tuberculosis, HIV/AIDS diagnosis and treatment	Expert board review to determine if explicit criteria standards are met	Ebola, SARS, other outbreaks diagnosis and treatment	International body review to determine if explicit criteria are met; retransmission rates
<i>Training, management</i>									
Training	Mental health	Provider and community awareness of mental health; destigmatization of mental health illness	Provider and community attitudes, knowledge using surveys; incidence surveys of mental illness by socioeconomic status; destigmatization of mental health at community level	Acute mental health first aid and triage (suicide prevention, crisis intervention, disaster counseling); screening for ASD	Institutional training outcomes (provider knowledge) for diagnosis and counseling; provider's use of screening for ASD	Emergency care and hospitalization for acute psychosis; treatment and detoxification of substance abuse	Presence of care coordination and team practice with counseling and drug therapies available; provider's ability to diagnose; referral rates; treatment per institutional guidelines	Long-term care for dementia, chronic affective disorders, schizophrenia	Provider-level compliance according to evidence-based care; patient-level data: use of procedures, complications

table continues next page

**Table 10.2** Infrastructure Elements for Improving Quality for 4 Delivery Platforms and 11 Representative Clinical Conditions (continued)

Infrastructure elements	Disease or condition	Delivery platforms							
		Community-based services		Primary health centers		First-level hospitals		Referral and specialized hospitals	
		Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics
Continuing medical education	Diabetes	Patient preventive behaviors: physical activity, healthy eating	Whether continuing medical education requirements are being met; provider knowledge regarding patient programs and ways to engage patient in behavioral change; patient knowledge	Diabetes management with behavioral interventions and medication	Knowledge-based testing	Treatment of renal failure, cardiovascular disease, and consumptive heart failure with medical therapies and medication	Knowledge-based testing; team-based practice measures	Transplant surgery	Provider use rates, provider's ability to identify transplant candidates; patient-level data on mortality, complications
Management	Accidents, injury, trauma	Provider's and patient's knowledge and use of preventive measures for injury (child safety, car seats, water safety; elder safety)	Provider and patient knowledge surveys	Provider's ability to recognize and assess severity of injury or complications	Provider-level data on ability to make correct diagnosis (vignettes), time to treatment, referral rates	Successful surgical treatment of trauma (minor surgery)	Mortality rates, wrong-site surgeries; proper use of surgery or surgical techniques; readmission	Successful surgical treatment of trauma (major surgery); treatment of burns	Mortality rates, wrong-site surgeries; proper use of surgery or surgical techniques; readmission rates
Professional oversight	Cancer	Smoking cessation, hepatitis B immunization rates, school-based human papillomavirus vaccination	Patient-level data on immunization rates, cancer incidence; hospital-based cancer registries	Screening for breast, colon, cervical, lung, and skin cancer	Assessment of provider's knowledge of risk and referral standards (set and disseminated); patient screening rates	Breast, skin cancer diagnosis; clinical staging	Provider's use of biopsies and compliance with treatment protocol	Colorectal cancer care screening (colonoscopy), colectomy, chemotherapy	Provider-level data on use, compliance with guidelines; patient-level data on outcomes

table continues next page

**Table 10.2** Infrastructure Elements for Improving Quality for 4 Delivery Platforms and 11 Representative Clinical Conditions (continued)

Infrastructure elements	Disease or condition	Delivery platforms							
		Community-based services		Primary health centers		First-level hospitals		Referral and specialized hospitals	
		Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics	Outcomes	Metrics
<i>Incentives</i>									
Performance-based remuneration	Orthopedics	Provider's knowledge and communication of preventive behaviors (healthy eating, immunization, healthy lifting); patient's behavior of the same	Provider's and patient's knowledge and behavior surveys; patient participation in preventive health programs; monitoring of physical activity of patients	Care for low-level trauma (simple broken bones), management of low-back pain	Provider's ability to diagnose low-back pain (vignettes); use of certain prescription drugs for pain management	Care for mid-level trauma and fractures	Proper use of surgery, drugs, antibiotics; mortality rate; bleeding during surgery; complications (thromboembolic disease)	Use and success of joint replacement	Proper use of surgery, drugs, antibiotics; mortality rate; bleeding during surgery; complications (thromboembolic disease)
Team-based, multidisciplinary care (global payment)	Malaria	Provider's knowledge and communication of vector control to patient (use of insecticides)	Provider's and patient's knowledge and behavior surveys; patient's participation in preventive health programs; community malaria rates	Provider's ability to recognize malaria rapidly; use of ACT	Provider's ability to diagnose malaria (vignettes), time to treat, proper use of ACT	Provider's ability to diagnose type of malaria (drug resistant or not); proper treatment, long-term follow-up, management	Provider's ability to diagnose malaria, recognize drug resistance; proper use of antimalarial drugs; proper management of relapse	Treatment and management of severe malaria-associated complications (cerebral malaria, renal dysfunction, hepatic dysfunction, acute respiratory distress, anemia, thrombocytopenia)	Patient-level data: mortality rate, complication rate; provider-level data: treatment of complications per evidence-based guidelines

*Note:* Quality interventions provided at lower-level platforms are also provided at higher-level facilities. ACT = artemisinin-based combination therapy; ASD = autism spectrum disorder; HIV/AIDS = human immunodeficiency virus/acquired immune deficiency syndrome; SARS = severe acute respiratory syndrome.

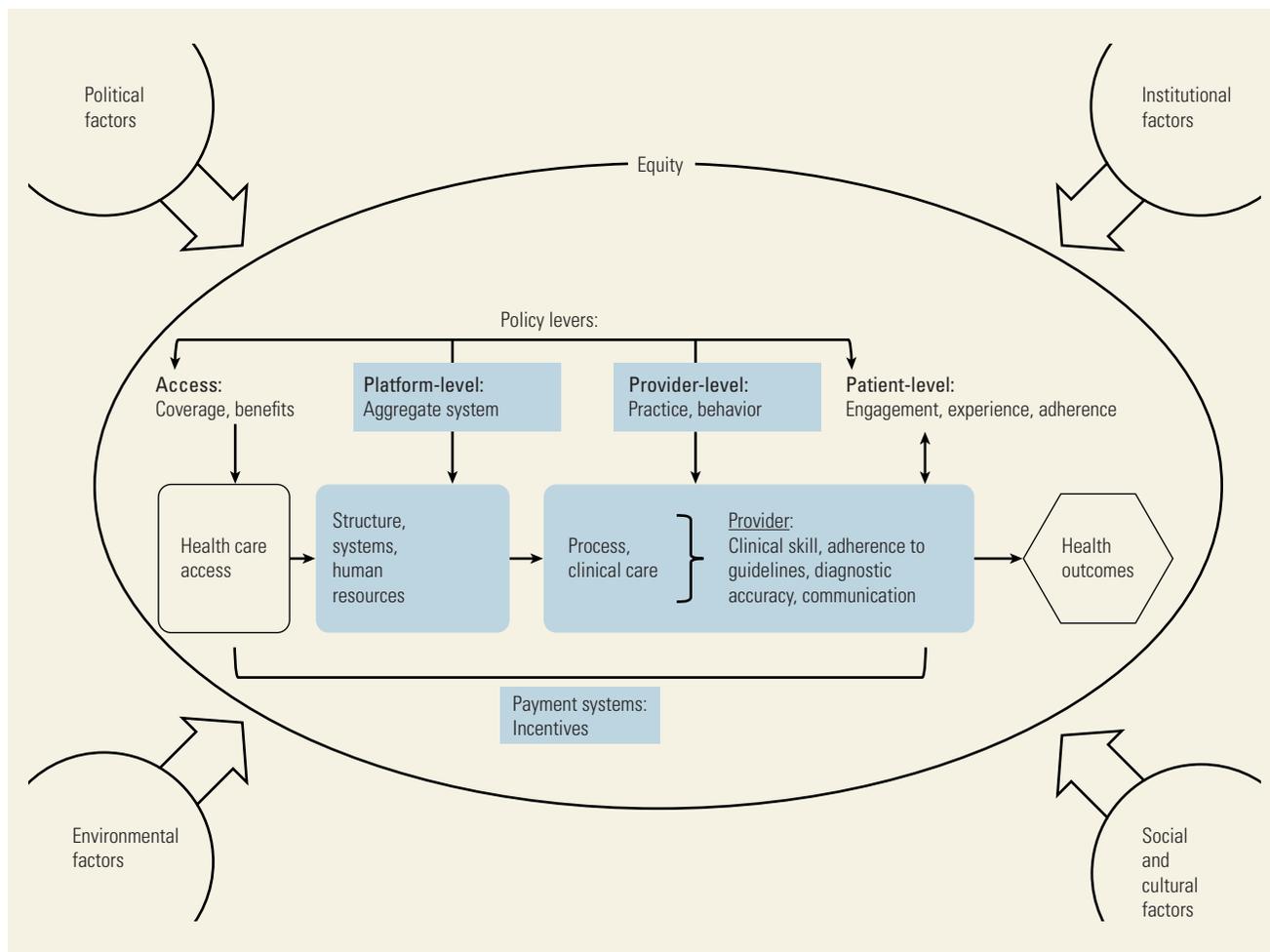
For each element, the table details how quality outcomes and metrics could be operationalized for a given disease or clinical condition. For example, community-based services in reproductive health (a condition) would focus on family planning and fertility management, which can be assessed by metrics of patient behavior (condom use); primary clinics would focus on high-risk pregnancies, which can be assessed using referral rates for women at risk. Outcomes and metrics tend to become more concrete as care progresses across platforms. Primary clinics and first-level hospitals, for example, might require chart-level data or provider-level assessments of skill, knowledge, and practice. Specialized hospitals, where care is more complex (treatment of birth complications) and outcome metrics are more serious (mortality rates), are likely to have more readily available data and better outcomes. A key element of quality improvement, whether at the specialized hospital or community clinic

level, is that the effectiveness of the improvement strategy must be assessed regularly. Recommendations published by the WHO and the International Association for Trauma Surgery and Intensive Care on quality improvement strategies are broadly applicable to all levels of care and types of settings and include strategies such as morbidity and mortality conferences to review errors occurring during the care of patients, panel reviews of preventable deaths, and tracking of complications, adverse events, sentinel events, and errors (WHO, Association for Trauma Surgery and Intensive Care, and International Society of Surgery 2009).

## UPDATED QUALITY OF CARE FRAMEWORK

As shown in figure 10.2, health actions take place in the context of and are influenced by political (laws, governmental stability), cultural and social (societal norms,

**Figure 10.2** DCP3 Approaches to Improving Quality of Care Framework



Note: Blue indicates items discussed in this chapter; DCP3 = *Disease Control Priorities*, third edition.

practices), environmental (natural disasters), and institutional (functioning health departments, corruption) factors. Demographic and socioeconomic makeup, including genetics and personal resources, also affect the health status of individuals seeking care.

The classic construct of structure, process, and outcome is at the core of the framework (Brook, McGlynn, and Cleary 1996; De Geyndt 1995; Donabedian 1980; McGlynn 1997). These three elements are described in table 10.3.

Structure refers to stable, material health care assets (infrastructure, tools, technology, implements), the resources of the organizations providing care, and the financing of that care (levels of funding, staffing, payment schemes, incentives). These factors can be measured inexpensively and data are typically readily available (De Geyndt 1995).

Process captures the interaction between caregivers and patients, including appropriateness of the care delivered, cognitive skill of the provider, and communication (Murray, Gakidou, and Frenk 1999). The private nature of the doctor-patient consultation, lack of measurement criteria, and absence of reliable measurement tools make it difficult to assess process, especially in LMICs (Peabody and others 2004). However, new approaches to measuring process have come a long way toward capturing process measures across settings.

Outcome includes direct measures of health status, death, or disability-adjusted life years as well as patient satisfaction or patient responsiveness to the health care system. Outcome measurement has matured in the past decade with the use of electronic medical records and data registries.

The updated framework in figure 10.2 adds policy levers for improving quality of care and showcases the provider's practice and behavior as well as the unique perspectives of policy makers, physicians, and patients, which are essential to establishing accountability. The early frameworks focused on the lack of structural inputs, whereas recent frameworks look at care processes (Kruk and others 2009). The Institute of Medicine was the first to include additional elements of care regarding safety and efficacy, patient focus, affordability and timeliness, and effectiveness (Berwick 2002; IOM, Committee on Quality Health Care in America 2001). The remainder of this section discusses these elements.

### Safety and Efficacy

Patient safety has not received enough attention in LMICs. Globally, up to 1 in 10 patients is harmed by an adverse incident in a hospital not directly related to his or her clinical care, with approximately US\$6 billion in costs per year (WHO 2008). Even procedures that are not considered high risk in HICs have the potential to lead to harm or poor outcomes in LMICs. For example, up to 1 in 4 cataract surgeries in India results in poor visual acuity (Lindfield and others 2012).

A study on patient safety practices in low-income countries suggests that improved staff-patient communication, use of protocols, control of infections, and standardization between providers can improve overall safety (Lindfield, Knight, and Bwonya 2015). Efficacy of care has an ascendant role in clinical practice as the practice of evidence-based medicine continues to expand. Many new and exciting studies of clinical efficacy are

**Table 10.3** Quality-of-Care Framework

Elements of quality	Description	Subcomponents
Structure	Stable, material characteristics (infrastructure, tools, technology) and resources of the organizations that provide care and the financing of care (levels of funding, staffing, payment schemes, incentives)	<ul style="list-style-type: none"> <li>• Physical characteristics</li> <li>• Management (executive leadership, board responsibilities)</li> <li>• Culture</li> <li>• Organizational design</li> <li>• Information management</li> <li>• Incentives</li> </ul>
Process	The interaction between caregivers and patients during which structural inputs from the health care system are transformed into health outcomes	<ul style="list-style-type: none"> <li>• Making the diagnosis</li> <li>• Providing evidence-based treatment</li> </ul>
Outcomes	Measures of health status, deaths, or disability-adjusted life years (a measure that encompasses the morbidity and mortality of patients or groups of patients); outcomes such as patient satisfaction or patient responsiveness to the health care system	<ul style="list-style-type: none"> <li>• Morbidity</li> <li>• Mortality</li> <li>• Patient satisfaction</li> </ul>

Sources: Glickman, Boulding, and others 2007; Peabody, Taguiwalo, and others 2006.

driving better care, including the use of antibiotic prophylaxis before surgery and the elimination of antibiotics for otitis media.

### Patient Focus

As with efficacy, focus on the patient and his or her perspective has become more prominent, leading evaluations of performance to include satisfaction as a necessary outcome. The availability and growing acceptance of patient satisfaction surveys are striking given that these tools were almost unheard of 20 years ago.

The focus on the patient is important because patients' or users' perspectives determine whether they seek care and where they obtain services (demand). This perspective is based on the individual's own opinions, previous experiences with the health system, and input received from others.

Perception of low quality has been reported as a major factor in the decision not to use or to bypass health services. For example, in a study in Tanzania, 42 percent of women who delivered children in a health care facility in rural parts of the country bypassed the local primary care clinic and delivered directly in a hospital or health center (Kruk and others 2014). This finding is striking because all of them lived near a functioning clinic with delivery services and the sample excluded women referred to a hospital. Primary care clinics tend to have poor infrastructure, lack equipment, and are understaffed, and women may choose care based on their perception of specific factors, such as a provider's attitude or competency and the availability of drugs and medical equipment.

### Affordability and Timeliness

Determining affordability is challenging given that there is no recognized, consistent association between affordability and quality. High-quality care is often assumed to mean more expensive care (Starfield and others 1994). Indeed, early quality improvement efforts were often costly because the quality interventions themselves had to be paid for, and new measures of performance had to be introduced to calibrate the baseline quality and detect subsequent change (U.S. Congress, Office of Technology Assessment 1994).

However, high-quality care is potentially more affordable care because consistent, high-quality, standardized care entails fewer unnecessary tests, less time spent in the hospital, and fewer complications. In the United States, as much as one-third of health care costs are unnecessary, and as much as US\$799 billion in costs is due to unexplained variation in practice and quality (Health

Affairs 2014). Estimates are not available for LMICs, but as much as one-third of health care costs may be due to unexplained variation in quality and unnecessary care in practice. A study in eight countries found that the introduction of surgical guidelines in hospitals led to less variation in quality, better health outcomes, and lower costs (Haynes and others 2009).

### Effectiveness

Effectiveness refers to how well evidence-based practices are followed. Translating promising research findings and evidence, especially results that improve health or lower health care costs, into scalable interventions is challenging. The high stakes—and rare successes—have led to increasing calls for evidence-based policy making. Ideally, evidence-based policy making is based on evaluations of real-world economic effectiveness, allowing a determination to be made of value as well as efficacy.

With this effort has come interest in determining the comparative cost-effectiveness of clinical interventions. Few studies compare policy approaches to quality improvement. Peabody and others (2017) compared a demand-side intervention (universal health coverage for children under age five years) with a supply-side intervention (P4P scheme for physicians) and found that both interventions were effective, reducing wasting by about 9 percent (relative to controls). Costs were notably lower in the supply-side intervention than in the demand-side intervention, suggesting that increasing quality is more cost-effective than expanding insurance benefits in resource-constrained settings.

## CHALLENGES FOR ASSESSMENT

The conversation on quality needs to include issues related to equity, misdiagnosis, perceptions, accountability, and learning from patients, all of which are challenging to assess.

### Equity

Equity is an increasingly recognized part of the quality equation. Inequality—a situation in which poor-quality care is disproportionately provided to people from a particular disadvantaged group—is rampant worldwide (Barber, Bertozzi, and Gertler 2007; Barber, Gertler, and Harimurti 2007; Hansen and others 2008). Socioeconomically disadvantaged groups have poorer access to services and, once they have access, are less likely to receive effective treatment (Garrido-Cumbrera and others 2010; Health Affairs 2011; Rogers 2004).

If they are lucky enough to obtain treatment, they receive poorer-quality care than people from other groups. The impact of quality interventions on equity has not received enough attention in the literature.

### Misdiagnosis

Misdiagnosis, also referred to as diagnostic error, is a significant shortcoming, with worrisome, albeit poorly understood, consequences (box 10.3). For example, a study reported that 5 percent of adults are misdiagnosed during outpatient visits, and about 50 percent of these errors could harm the patient (WHO 2000). Misdiagnosis in breast cancer is as high as 20 percent in some cases (Lozano and others 2006).

Misdiagnosis is likely to be especially high in LMICs (Galactionova and others 2015). A study in India found that only one-third of primary care providers articulated a diagnosis, either correct or incorrect, and when a diagnosis was given, close to 50 percent were wrong (Marchant and others 2015). In an observational study of primary care providers in rural China, the misdiagnosis rate was 74 percent, and clinicians provided medicine that was unnecessary or harmful to 64 percent of their patients (WHO and World Bank 2014). Diagnostic errors occur around the world and in all types of settings, suggesting a need to include misdiagnosis in conceptualizing quality-of-care deficiencies.

Real-world practicalities make investigating misdiagnoses a substantial challenge. Methodological problems include the difficulty of aggregating patients with the same diagnosis to overcome the unobserved (and unrecorded) case-mix variation, legitimate disagreements on reference standards for practice, reliance on recorded retrospective data, and challenges of measuring a clinician's cognitive thought processes. Perhaps the biggest methodological challenge is to reach some agreement regarding the correct diagnosis. Short of having a group of experts reexamine the patient, the correctness of diagnoses is difficult to evaluate.

### Perceptions of Quality

Identifying a perspective—or multiple perspectives—from which to assess quality is difficult (Strauss and Corbin 1998; Tafreshi, Pazargadi, and Abed Saeedi 2007; Van der Bij, Vollmar, and Weggeman 1998; Wisniewski and Wisniewski 2005). Judging quality requires balancing the competing viewpoints of many players in the system. For example, payers and purchasers typically judge quality by how well insurance premium dollars are spent for each covered life; patients typically judge quality by how well their individual needs are addressed; and physicians assess quality by their own clinical judgment or training, patient demands, available resources, and cost-controlling mechanisms (Luck and others 2014).

#### Box 10.3

### Misdiagnosis as a Core Element of Poor Quality

Diagnosis is a key determinant of a successful outcome (Freedman and Kruk 2014). Yet the extent of misdiagnosis has not been fully recognized (Jamison and others 2013; Ng and others 2014; OECD 2015; Rockers, Kruk, and Laugesen 2012; WHO 2000). A wrong diagnosis will lead, at best, to unnecessary evaluations and treatment and, at worst, to harmful tests and toxic treatment. Diagnostic errors result in potential delays in treatment, putting the patient at risk (WHO 2000) and leading to severe complications and overtreatment. They are an important cause of preventable morbidity and mortality (Freedman and Kruk 2014; Jamison and others 2013; Ng and others 2014; Rockers, Kruk, and Laugesen 2012).

The field of obstetrics provides a rich opportunity to study misdiagnosis in LMICs. A study examined

the prevalence and consequences of misdiagnosis among 103 obstetrical providers in an urban area of the Philippines using identical vignettes and reviewing each provider's clinical records (Shimkhada and others 2016). The misdiagnosis of three common obstetric conditions—obstructed labor, postpartum hemorrhage, and preeclampsia—was almost 30 percent overall. Providers who misdiagnosed these conditions were more likely to have patients with a complication. Patients with a complication were significantly less likely to be referred to a hospital immediately and were more likely to be readmitted to a hospital after delivery, to have significantly higher medical costs, and to lose more income than patients without a complication.

When different perspectives collide—for example, when physician performance metrics (penalties for high surgical complication rates) are not in the best interest of the patient (a diabetic who is a higher surgical risk and may be turned down for surgery to keep complication rates low)—the patient’s outcomes, including satisfaction, should be given the greatest weight.

### Accountability

Establishing accountability is challenging. It can be difficult to determine which platform is responsible for achieving certain measurement goals and which individuals within each level should be held accountable for those measures (Emanuel and Emanuel 1996; Wachter 2013). The challenge of establishing accountability is tied to the larger challenge of convincing all players that poor quality should not be attributed to an individual clinician. Poor quality cuts across all types of care, facilities, providers, health insurance offerings, geographic areas, and patient populations. Accountability must be established at all levels (Brinkerhoff 2003). Holding physicians accountable may be especially difficult in a fee-for-service environment where individuals are used to being independent, and there are significant methodological, political, and legal obstacles to measuring accountability (Quimbo and others 2008).

A common trap is to let the availability of data determine which system-level metrics are tracked. System accountability is analogous to provider accountability, and metrics must be relevant, reliable, valid, comprehensive, and financially achievable; data availability should not drive the selection of metrics (Hsia 2003). Accountability also means that those who judge quality have the opportunity to go beyond explicit, evidence-based measures of practice or even structure. Recent work points to system- and platform-level accountability for collaboration, local ownership, and shared learning (Boucar and others 2014).

### Learning from Patients

A final, neglected area of quality assessment is health system responsiveness to patients, specifically data on the patient’s experience and satisfaction with care (Bernhart and others 1999). Therefore, improving the patient experience is a stand-alone goal of health systems in the updated framework (Rockers, Kruk, and Laugesen 2012; WHO 2000).

Initiatives such as the current push for universal health coverage assume that people will value and want to fund health benefits, whether through taxes or premiums. Public support, however, is shaped in important

ways by an individual’s health system experiences. For example, in addition to health outcome data, the Organisation for Economic Co-Operation and Development now measures the patient experience, including metrics on wait times, communication, and costs of care.

Methods of obtaining data on the patient experience include exit surveys (in person or anonymous), mailed or online questionnaires, and, increasingly, phone surveys. The large and growing penetration of mobile phones makes it more and more feasible to collect short telephone or mobile Web assessments of the patient experience in LMICs (Solon and others 2009).

## IMPACT OF QUALITY IMPROVEMENT

Global health goals and projections are predicated on assumptions about achieving high coverage and improving the quality of care in high-mortality countries (Jamison and others 2013). Given the lack of high-quality data from LMICs, data from high-income settings are used to predict health gains from expanded coverage in LMICs. These extrapolations do not reflect the real-life impact of quality on use and eventual outcomes in LMICs. Diagnosis and treatment, for example, are often egregiously poor in understaffed, under-resourced and underregulated health systems. Yet it is critical to understand whether health care visits translate into quality health care—both for projecting better health and for estimating the health returns on initiatives such as universal health coverage.

### Influence on Demand for Services and Outcomes

Quality of care is a major driver of use. Various studies have shown that perceived quality of care influences patterns of use—for example, perceptions of poor quality can motivate patients to stay at home or to choose far-away providers perceived to be more competent (Bohren and others 2014; Kruk and others 2009; Leonard 2014). Perceptions of poor quality are a strong factor pushing patients to bypass care, as are users’ assessments of the complexity of their health needs (Akin and Hutchinson 1999; Kruk and others 2014; Leonard, Mliga, and Mariam 2002). In sum, patients in low-income settings increasingly behave like their rich-country counterparts: as active consumers making rational choices about their care rather than as passive beneficiaries of health care.

The demand for quality is likely to grow as coverage expands. Kruk and others (2015) found that, when childbirth at a health facility (that is, in-facility delivery)

exceeds 80 percent of all births in a community, proximity to hospitals, not primary care clinics, matters in predicting delivery of care, potentially because of growing demand for high-quality care that is difficult for low-volume clinics to deliver.

How accurately do patients assess quality? Although patients are well positioned to report on interpersonal or nontechnical quality-of-care issues, such as clarity of communication, respect, confidentiality, and waiting times, they do not have full information with which to gauge the technical quality of care. Doyle, Lennox, and Bell (2013) found that the patient experience of care was positively associated with clinical effectiveness and safety in more than 75 percent of studies. For example, Glickman and others (2010) found that higher patient satisfaction was linked to lower mortality among patients with acute myocardial infarction. Similarly, more satisfied patients had lower 30-day hospital readmission rates and higher adherence to physician recommendations (Boulding and others 2011; Fenton and others 2012). Other research found little correlation between patient ratings of care and chart-measured adherence to standards of care, use of inpatient care, or mortality (Chang and others 2006).

Whether accurate or not, perceptions drive behavior. Patient ratings of quality and satisfaction are also associated with future care seeking, an important consideration given the rise of chronic diseases requiring ongoing contact with the health system (Bohren and others 2014; Groene 2011; Kruk and others 2014; Sun and others 2000). More work is needed to understand which patient assessments are most reliable and the best ways to collect these data.

Patient-reported quality and satisfaction are important indicators of the responsiveness and accountability of health systems (Thaddeus and Maine 1994). Responsiveness, defined as meeting patients' nonhealth expectations, should be a goal of every health system (WHO 2000). Yet recent research has documented disrespectful and abusive treatment of patients in health facilities. For example, nearly 20 percent of women in two districts of Tanzania reported harsh treatment by health workers, including yelling and slapping (Freedman and Kruk 2014). Such treatment leads to a loss of confidence (Kujawski and others 2015). Abusive treatment is distressingly common in other settings as well (Asefa and Bekele 2015; Gourlay and others 2014; Okafor, Ugwu, and Obi 2015; Sando and others 2014).

### Fit between Services and Patient Needs

One promising strategy is to improve the fit between people's expectations and health needs and the health services available to them. This tailoring of care is an

example of patient-centered reform (Groene 2011). For example, when the quality of obstetric care provided at first-level, low-volume facilities is of poor quality, referrals to higher levels of emergency care is inefficient, resulting in excessively high maternal and newborn mortality (Hsia and others 2012; Thorsen and others 2014). Women who deliver in the health system clearly prefer higher-volume, higher-quality facilities, as evidenced by choice of provider. Thus, the answer to improved quality and outcomes may be to establish high-volume maternity health centers or hospital units and provide support for travel to these facilities, rather than to invest more in primary care obstetrics or low-volume, first-level facilities. Focusing on customer service and respect requires paying attention to staffing, training, and supervision.

Health systems that can satisfy people's expectations may experience a double benefit: better health outcomes and greater support for the health system. For example, women who bypassed their first-level clinic and delivered in hospitals rated quality of care more highly than women who delivered in first-level clinics across a wide range of indicators (Kruk and others 2014). Experiencing responsive health services may enhance confidence in government. A multicountry study of LMICs found that a combination of high-quality care and financial risk protection raised the probability of having trust in government by 13 percent (Rockers, Kruk, and Laugesen 2012). More responsive, patient-centered health systems should be a health and political priority.

## COSTS OF IMPROVING QUALITY

Almost all deficits in the quality of care can be addressed if enough resources are made available for the purpose. The question is not, "Can we improve the quality of health care services?" Instead, it is, "How can we use the resources available to achieve that improvement?" Thus, when resource constraints are considered, policy makers will have to choose from a range of interventions, and the question becomes, "What are the most efficient and feasible ways to improve health outcomes?" For example, nosocomial infections could be treated with costly antibiotics, new facilities, and equipment. However, it is likely to be far more efficient to introduce a handwashing protocol, to ensure that providers comply with it, and to develop a rapid response team that can be deployed when infections occur.

The costs of improving quality are different from the costs of the intervention itself. For example, the cost of delivering care to patients with closed fractures requiring internal fixation includes facility costs (patient room,

equipment, sterile supplies), personnel costs (clinicians, support staff), and patient costs (transportation to the facility, time costs). If a high proportion of patients develop nosocomial infections, the cost of quality would be the costs incurred to reduce the risk of facility-associated infection through strategies such as providing training, supervising staff, procuring new cleaning and sterilization equipment, and developing care pathways or checklists.

Cost-effectiveness analysis (CEA) can be used to determine how cost-efficient a quality improvement intervention is. CEAs compare the resources consumed and the effects on the desired outcome of an intervention to improve the quality of care against a valid comparison, which is either business-as-usual or a different intervention. Three results are possible. First, the intervention may fail to improve the outcome of interest and is not cost-effective at any price. Second, the intervention may achieve the intended improvements, but require additional resources, in which case implementation is a matter of willingness to pay for the level of improvement achieved. Third, the intervention may improve health outcomes as a result of better quality while also reducing overall expenditure. Lower cost comes from spending a lesser amount on care or avoiding an expensive complication or an adverse event. Economically, it is best to implement all interventions matching the third result.

There is a dearth of literature on the cost-efficiency of quality of care interventions (IOM, Committee on Quality of Health Care in America 2001). Several difficulties are involved in determining efficiency:

- Inaccurate, incomplete, or unavailable routinely collected data
- Fidelity of the intervention to the outcome stated in research design
- The challenge of choosing comparison groups to isolate the variable of interest
- The difficulty of capturing all of the effects of the intervention to account for positive or negative spill-over effects
- The challenge of calibrating the extent to which the quality improvement can be attributed to the intervention
- The perceived costs and economic consequences meaningful to different audiences
- The difficulty of valuing in-kind contributions
- The difficulty of capturing complexity of a system and the implications for economic evaluation.

Nevertheless, CEA can show substantive returns from better quality. In one study in Niger, high quality from

a quality improvement collaborative conducted in childbirth facilities reduced the overall costs per birth an average of 20 percent (from US\$35 to US\$28); when accounting for the decrease in average clinical costs due to improved efficiency and the reductions in post-partum hemorrhage, the authors determined that the incremental cost of the improvement collaborative was US\$2.43 (Broughton, Boucar, and Alagane 2012). The incremental cost-effectiveness was an impressive US\$147 per disability-adjusted life year averted, compared with US\$870 for the rotavirus vaccine, US\$135 for hypertension treatment, and US\$1,480 for a tobacco tax (Tran and others 2014). Interventions to improve health care quality can also save money as shown in the example of improving uptake of Kangaroo Mother Care for premature and low birthweight infants in Nicaragua (Broughton and others 2013). In this case, the cost of the improvement intervention was less than the cost savings realized from decreased treatment costs resulting from improved adherence to evidence-based standards of care.

Despite the many difficulties in determining efficient ways to address deficits in the quality of health care, it is important to include these cost analyses in every quality improvement intervention. Systematic accounting for the resources and rigorous evaluation of the effects on the outcomes of interest are essential for prioritizing decision making. Basic guidance on what costs to include in economic evaluations and how to analyze cost and effectiveness data is needed to move the field of health care quality forward.

## CONCLUSIONS

In LMICs, quality of care is an emerging conversation. Mostly ignored a few decades ago, studies are now examining health system priorities once access to care has been addressed. Conversations over the past 10 years have largely acknowledged the importance of quality of care in resource-constrained LMICs. Quality of care is discussed in all volumes of *DCP3*.

Quality of care matters because it relates directly to outcomes and can be addressed in a shorter time frame than other policy interventions. The updated quality framework presented in this chapter describes the urgency, connections, and responsibilities for creating quality infrastructure that ties this responsibility to individual providers through the diseases they address and the patients who access care via various health care platforms. The framework is applicable across country settings, emphasizing the fundamental role that providers and patients play in

determining quality. With the growing evidence base on quality improvement efforts around the globe, there is reason for renewed hope that quality can be improved and *done so rapidly*. Successful policies will always be linked to practice on a disease-by-disease basis and will only occur where access to health care is not in question.

## NOTES

World Bank Income Classifications as of July 2014 are as follows, based on estimates of gross national income (GNI) per capita for 2013:

- Low-income countries (LICs) = US\$1,045 or less
- Middle-income countries (MICs) are subdivided:
  - (a) lower-middle-income = US\$1,046 to US\$4,125
  - (b) upper-middle-income (UMICs) = US\$4,126 to US\$12,745
- High-income countries (HICs) = US\$12,746 or more.

1. A program that delivers insurance for maternal and child health services to uninsured families.

## REFERENCES

- AbouZahr, C., and T. Boerma. 2005. "Health Information Systems: The Foundations of Public Health." *Bulletin of the World Health Organization* 83 (8): 578–83.
- Achanta, S., J. Jaju, A. M. Kumar, S. B. Nagaraja, S. R. Shamrao, and others. 2013. "Tuberculosis Management Practices by Private Practitioners in Andhra Pradesh, India." *PLoS One* 8 (8): e71119.
- Akin, J. S., and P. Hutchinson. 1999. "Health-Care Facility Choice and the Phenomenon of Bypassing." *Health Policy and Planning* 14 (2): 135–51.
- Ali, M. K., S. Shah, and N. Tandon. 2011. "Review of Electronic Decision-Support Tools for Diabetes Care: A Viable Option for Low- and Middle-Income Countries?" *Journal of Diabetes Science and Technology* 5 (3): 553–70.
- Ansong-Tornui, J., M. Armar-Klemesu, D. Arhinful, S. Penfold, and J. Hussein. 2007. "Hospital Based Maternity Care in Ghana: Findings of a Confidential Enquiry into Maternal Deaths." *Ghana Medical Journal* 41 (3): 125–32.
- Asefa, A., and D. Bekele. 2015. "Status of Respectful and Non-Abusive Care during Facility-Based Childbirth in a Hospital and Health Centers in Addis Ababa, Ethiopia." *Reproductive Health* 12 (1): 33.
- Atkinson, S., R. L. R. Medeiros, P. H. L. Oliveira, and R. D. Almeida. 2000. "Going Down to the Local: Incorporating Social Organisation and Political Culture into Assessments of Decentralised Health Care." *Social Science and Medicine* 51 (4): 619–36.
- Baker, D. W., and R. D. Cebul. 2002. "Should Consumers Trust Hospital Quality Report Cards?" *Journal of the American Medical Association* 287 (24): 3206–07.
- Barber, S. L., S. M. Bertozzi, and P. J. Gertler. 2007. "Variations in Prenatal Care Quality for the Rural Poor in Mexico." *Health Affairs (Millwood)* 26 (3): 310–23.
- Barber, S. L., P. J. Gertler, and P. Harimurthi. 2007. "Differences in Access to High-Quality Outpatient Care in Indonesia." *Health Affairs (Millwood)* 26 (3): 352–66.
- Basinga, P., P. J. Gertler, A. Binagwaho, A. L. B. Soucat, J. R. Sturdy, and others. 2010. "Paying Primary Health Care Centers for Performance in Rwanda." Human Development Network Chief Economist's Office and Africa Region Health, Nutrition and Population Unit, World Bank, Washington, DC.
- Beegle, K., E. Frankenberg, and D. Thomas. 2001. "Bargaining Power within Couples and Use of Prenatal and Delivery Care in Indonesia." *Studies in Family Planning* 32 (2): 130–46.
- Beracochea, E., R. Dickson, P. Freeman, and J. Thomason. 1995. "Case Management Quality Assessment in Rural Areas of Papua New Guinea." *Tropical Doctor* 25 (2): 69–74.
- Bernhart, M. H., I. G. Wiadnyana, H. Wihardjo, and I. Pohan. 1999. "Patient Satisfaction in Developing Countries." *Social Science and Medicine* 48 (8): 989–96.
- Bertelsen, J. 1981. "Who Should Abstract Medical Records? A Study of Accuracy and Cost." *Evaluation and the Health Professions* 4 (1): 79–92.
- Berwick, D. M. 2002. "A User's Manual for the IOM's 'Quality Chasm' Report." *Health Affairs (Millwood)* 21 (3): 80–90.
- Bohren, M. A., E. C. Hunter, H. M. Munthe-Kaas, J. P. Souza, J. P. Vogel, and others. 2014. "Facilitators and Barriers to Facility-Based Delivery in Low- and Middle-Income Countries: A Qualitative Evidence Synthesis." *Reproductive Health* 11 (1): 71.
- Bosch-Capblanch, X., O. Ronveaux, V. Doyle, V. Remedios, and A. Bchir. 2009. "Accuracy and Quality of Immunization Information Systems in Forty-One Low-Income Countries." *Tropical Medicine and International Health* 14 (1): 2–10.
- Boucar, M. L., K. Hill, A. Coly, S. Djibrina, Z. Saley, and others. 2014. "Improving Postpartum Care for Mothers and Newborns in Niger and Mali: A Case Study of an Integrated Maternal and Newborn Improvement Programme." *British Journal of Obstetrics and Gynaecology* 121 (Suppl 4): 127–33.
- Boulding, W., S. W. Glickman, M. P. Manary, K. A. Schulman, and R. Staelin. 2011. "Relationship between Patient Satisfaction with Inpatient Care and Hospital Readmission within 30 Days." *American Journal of Managed Care* 17 (1): 41–48.
- Brinkerhoff, D. 2003. *Accountability and Health Systems: Overview, Framework, and Strategies*. Bethesda, MD: Partners for Health Reformplus Project, Abt Associates.
- Brody, C. M., N. Bellows, M. Campbell, and M. Potts. 2013. "The Impact of Vouchers on the Use and Quality of Health Care in Developing Countries: A Systematic Review." *Global Public Health* 8 (4): 363–88.
- Brook, R. H., E. A. McGlynn, and P. D. Cleary. 1996. "Measuring Quality of Care." *New England Journal of Medicine* 335 (13): 966–70.

- Broughton, E. I., A. M. Boucar, and D. Alagane. 2012. "Cost-Effectiveness of a Quality Improvement Collaborative for Obstetric and Newborn Care in Niger." *International Journal of Health Care Quality Assurance* 26 (3): 250–61.
- Broughton, E. I., I. Gomez, N. Sanchez, and C. Vindell. 2013. "The Cost-Savings of Implementing Kangaroo Mother Care in Nicaragua." *Revista Panamericana de Salud Publica* 34 (3): 176–82.
- Calle, J. E., P. J. Saturno, P. Parra, J. Rodenas, M. J. Pérez, and others. 2000. "Quality of the Information Contained in the Minimum Basic Data Set: Results from an Evaluation in Eight Hospitals." *European Journal of Epidemiology* 16 (11): 1073–80.
- Canchihuaman, F. A., P. J. Garcia, S. S. Gloyd, and K. K. Holmes. 2011. "An Interactive Internet-Based Continuing Education Course on Sexually Transmitted Diseases for Physicians and Midwives in Peru." *PLoS One* 6 (5): e19318.
- Chang, J. T., R. D. Hays, P. G. Shekelle, C. H. Malean, D. H. Solomon, and others. 2006. "Patients' Global Ratings of Their Health Care Are Not Associated with the Technical Quality of Their Care." *Annals of Internal Medicine* 144 (9): 665–72.
- Contreras, G. Y., B. S. Olavaria, S. M. Pérez, D. P. Haemmerli, M. L. Cafferata, and others. 2007. "Practices in the Care of the Low-Risk Delivery in Hospitals in Southern Chile." *Ginecología y Obstetricia de México* 75 (1): 24–30.
- Corrao, S., V. Arcoraci, S. Arnone, L. Calvo, R. Scaglione, and others. 2009. "Evidence-Based Knowledge Management: An Approach to Effectively Promote Good Health-Care Decision-Making in the Information Era." *Internal and Emergency Medicine* 4 (2): 99–106.
- Das, J., and J. Hammer. 2005a. "Which Doctor? Combining Vignettes and Item Response to Measure Clinical Competence." *Journal of Development Economics* 78 (2): 348–83.
- . 2005b. "Which Doctor? Combining Vignettes and Item Response to Measure Doctor Quality." Policy Research Working Paper 3301, World Bank, Washington, DC.
- . 2007. "Location, Location, Location: Residence, Wealth, and the Quality of Medical Care in Delhi, India." *Health Affairs (Millwood)* 26 (3): 338–51.
- . 2014. "Quality of Primary Care in Low-Income Countries: Facts and Economics." *Annual Review of Economics* 6 (1): 525–53.
- Das, J., A. Holla, A. Das, M. Mohanan, D. Tabak, and others. 2012. "In Urban and Rural India, A Standardized Patient Study Showed Low Levels of Provider Training and Huge Quality Gaps." *Health Affairs (Millwood)* 31 (12): 2774–84.
- Das, J., A. Holla, A. Mohpal, and K. Muralidharan. 2016. "Quality and Accountability in Healthcare Delivery: Audit-Study Evidence from Primary Care in India." *American Economic Review* 106 (12): 3765–99.
- Das, J., A. Kwan, B. Daniels, S. Satyanarayana, R. Subbaraman, and others. 2015. "Use of Standardised Patients to Assess Quality of Tuberculosis Care: A Pilot, Cross-Sectional Study." *The Lancet Infectious Diseases* 15 (11): 1305–13.
- Davis, D. A., P. E. Mazmanian, M. Fordis, R. Van Harrison, K. E. Thorpe, and others. 2006. "Accuracy of Physician Self-Assessment Compared with Observed Measures of Competence: A Systematic Review." *Journal of the American Medical Association* 296 (9): 1094–102.
- Davis, D. A., M. A. O'Brien, N. Freemantle, F. M. Wolf, P. Mazmanian, and others. 1999. "Impact of Formal Continuing Medical Education: Do Conferences, Workshops, Rounds, and Other Traditional Continuing Education Activities Change Physician Behavior or Health Care Outcomes?" *Journal of the American Medical Association* 282 (9): 867–74.
- Dayal, P., and K. Hort. 2015. "Quality of Care: What Are Effective Policy Options for Governments in Low- and Middle-Income Countries to Improve and Regulate the Quality of Ambulatory Care?" Policy Brief 4 (1), Asia Pacific Observatory on Health Systems and Policies, WHO, Geneva.
- De Geyndt, W. 1995. "Managing the Quality of Health Care in Developing Countries." Technical Paper 258, World Bank, Washington, DC.
- Derose, S. F., and D. B. Petitti. 2003. "Measuring Quality of Care and Performance from a Population Health Care Perspective." *Annual Review of Public Health* 24 (1): 363–84.
- Donabedian, A. 1980. "Methods for Deriving Criteria for Assessing the Quality of Medical Care." *Medical Care Review* 37 (7): 653–98.
- Doyle, C., L. Lennox, and D. Bell. 2013. "A Systematic Review of Evidence on the Links between Patient Experience and Clinical Safety and Effectiveness." *BMJ Open* 3 (1): e001570.
- Dranove, D., D. Kessler, M. McClellan, and M. Satterthwaite. 2003. "Is More Information Better? The Effects of 'Report Cards' on Health Care Providers." *Journal of Political Economy* 111 (3): 555–88.
- Dumont, A., L. De Bernis, D. Bouillin, A. Gueye, J. P. Dompnier, and others. 2002. "Maternal Morbidity and Qualification of Health-Care Workers: Comparison between Two Different Populations in Senegal." *Journal de Gynécologie, Obstétrique, et Biologie de la Reproduction (Paris)* 31 (1): 70–79.
- Emanuel, E. J., and L. L. Emanuel. 1996. "What Is Accountability in Health Care?" *Annals of Internal Medicine* 124 (2): 229–39.
- Engelgau, M., K. Okamoto, K. V. Navaratne, and S. Gopalan. 2010. "Prevention and Control of Selected Chronic NCDs in Sri Lanka: Policy Options and Action." HNP Discussion Paper 2010, World Bank, Washington, DC.
- Engineer, C. Y., E. Dale, A. Agarwal, A. Agarwal, O. Alonge, and others. 2016. "Effectiveness of a Pay-for-Performance Intervention to Improve Maternal and Child Health Services in Afghanistan: A Cluster-Randomized Trial." *International Journal of Epidemiology* 45 (2): 451–59.
- Epstein, A. M. 2006. "Pay for Performance in the United States and Abroad." *New England Journal of Medicine* 355 (4): 406–08.
- . 2007. "Pay for Performance at the Tipping Point." *New England Journal of Medicine* 356 (5): 515–17.

- Epstein, A. M., T. H. Lee, and M. B. Hamel. 2004. "Paying Physicians for High-Quality Care." *New England Journal of Medicine* 350 (4): 406–10.
- Ergo, A., L. Paina, L. Morgan, and R. Eichler. 2012. *Creating Stronger Incentives for High-Quality Health Care in Low- and Middle-Income Countries*. Report for the Maternal and Child Health Integrated Program (MCHIP). Washington, DC: U.S. Agency for International Development (USAID).
- Fairbrother, G., S. Friedman, K. L. Hanson, and G. C. Butts. 1997. "Effect of the Vaccines for Children Program on Inner-City Neighborhood Physicians." *Archives of Pediatrics and Adolescent Medicine* 151 (12): 1229–35.
- Fairbrother, G., M. J. Siegel, S. Friedman, P. D. Kory, and G. C. Butts. 2001. "Impact of Financial Incentives on Documented Immunization Rates in the Inner City: Results of a Randomized Controlled Trial." *Ambulatory Pediatrics* 1 (4): 206–12.
- Felt-Lisk, S., G. Ferry, R. Roper, M. Au, J. Walker, and others. 2012. "Sustainability, Partnerships, and Teamwork in Health IT Implementation: Essential Findings from the Transforming Healthcare Quality through IT Grant." AHRQ Publication 12-0075-EF, Agency for Healthcare Research and Quality, Rockville, MD.
- Fenton, J. J., A. F. Jerant, K. D. Bertakis, and P. Franks. 2012. "The Cost of Satisfaction: A National Study of Patient Satisfaction, Health Care Utilization, Expenditures, and Mortality." *Archives of Internal Medicine* 172 (5): 405–11.
- Fernald, L. C., P. J. Gertler, and L. M. Neufeld. 2008. "Role of Cash in Conditional Cash Transfer Programmes for Child Health, Growth, and Development: An Analysis of Mexico's Oportunidades." *The Lancet* 371 (9615): 828–37.
- . 2009. "10-Year Effect of Oportunidades, Mexico's Conditional Cash Transfer Programme, on Child Growth, Cognition, Language, and Behaviour: A Longitudinal Follow-up Study." *The Lancet* 374 (9706): 1997–2005.
- Flores, R., J. Robles, and B. R. Burkhalter. 2002. "Distance Education with Tutoring Improves Diarrhea Case Management in Guatemala." *International Journal of Quality Health Care* 14 (Suppl 1): 47–56.
- Forsetlund, L., A. Bjorndal, A. Rashidian, G. Jamtvedt, M. A. O'Brien, and others. 2009. "Continuing Education Meetings and Workshops: Effects on Professional Practice and Health Care Outcomes." *Cochrane Database of Systematic Reviews* 2 (2): CD003030.
- Freedman, L. P., and M. E. Kruk. 2014. "Disrespect and Abuse of Women in Childbirth: Challenging the Global Quality and Accountability Agendas." *The Lancet* 384 (9948): e42–44.
- Galactionova, K., F. Tediosi, D. de Savigny, T. Smith, and M. Tanner. 2015. "Effective Coverage and Systems Effectiveness for Malaria Case Management in Sub-Saharan African Countries." *PLoS One* 10 (5): e0127818.
- Garrido-Cumbrera, M., C. Borrell, L. Palència, A. Espelt, M. Rodríguez-Sanz, and others. 2010. "Social Class Inequalities in the Utilization of Health Care and Preventive Services in Spain, a Country with a National Health System." *International Journal of Health Services* 40 (3): 525–42.
- Gertler, P., P. Giovagnoli, and S. Martinez. 2014. "Rewarding Provider Performance to Enable a Healthy Start to Life: Evidence from Argentina's Plan Nacer." Working Paper 6884, World Bank Group, Washington, DC.
- Gertler, P., and C. Vermeersch. 2013. "Using Performance Initiatives to Improve Medical Care Productivity and Health Outcomes." Working Paper 19046, National Bureau of Economic Research, Cambridge, MA.
- Glassman, P. A., J. Luck, E. M. O'Gara, and J. W. Peabody. 2000. "Using Standardized Patients to Measure Quality: Evidence from the Literature and a Prospective Study." *Joint Commission Journal on Quality Improvement* 26 (11): 644–53.
- Glickman, S. W., W. Boulding, M. Manary, R. Staelin, M. T. Roe, and others. 2010. "Patient Satisfaction and Its Relationship with Clinical Quality and Inpatient Mortality in Acute Myocardial Infarction." *Circulation: Cardiovascular Quality and Outcomes* 3 (2): 188–95.
- Glickman, S. W., W. Boulding, R. Staelin, J. Mulgund, M. T. Roe, and others. 2007. "A Framework for Quality Improvement: An Analysis of Factors Responsible for Improvement at Hospitals Participating in the Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the ACC/AHA Guidelines (CRUSADE) Quality Improvement Initiative." *American Heart Journal* 154 (6): 1206–20.
- Goeree, R., L. Levin, K. Chandra, J. M. Bowen, G. Blackhouse, and others. 2009. "Health Technology Assessment and Primary Data Collection for Reducing Uncertainty in Decision Making." *Journal of the American College of Radiologists* 6 (5): 332–42.
- Gourlay, A., A. Wringe, I. Birdthistle, G. Mshana, D. Michael, and others. 2014. "'It Is Like That, We Didn't Understand Each Other': Exploring the Influence of Patient-Provider Interactions on Prevention of Mother-to-Child Transmission of HIV Service Use in Rural Tanzania." *PLoS One* 9 (9): e106325.
- Grady, K. E., J. P. Lemkau, N. R. Lee, and C. Caddell. 1997. "Enhancing Mammography Referral in Primary Care." *Preventive Medicine* 26 (6): 791–800.
- Greenfield, D., and J. Braithwaite. 2008. "Health Sector Accreditation Research: A Systematic Review." *International Journal for Quality in Health Care* 20 (3): 172–83.
- Groene, O. 2011. "Patient Centredness and Quality Improvement Efforts in Hospitals: Rationale, Measurement, Implementation." *International Journal for Quality in Health Care* 23 (5): 531–37.
- Grossbart, S. R. 2006. "What's the Return? Assessing the Effect of 'Pay for Performance' Initiatives on the Quality of Care Delivery." *Medical Care Research and Review* 63 (1): 29S–48S.
- Hansen, P. M., D. H. Peters, A. Edward, S. Gupta, A. Arur, and others. 2008. "Determinants of Primary Care Service in Afghanistan." *International Journal for Quality in Health Care* 20 (6): 375–83.
- Haux, R. 2006. "Individualization, Globalization, and Health: About Sustainable Information Technologies and the Aim

- of Medical Informatics." *International Journal of Medical Informatics* 75 (12): 795–808.
- Haynes, A. B., T. G. Weiser, W. R. Berry, S. R. Lipsitz, A. H. Breizat, and others. 2009. "A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population." *New England Journal of Medicine* 360 (5): 491–99.
- Health Affairs. 2011. "Achieving Equity in Health." Health Policy Brief, October 6.
- . 2014. "Geographic Variation in Medicare Spending." Health Policy Brief, March 6.
- Heaton, C. 2000. "External Peer Review in Europe: An Overview from the ExPeRT Project. External Peer Review Techniques." *International Journal for Quality in Health Care* 12 (3): 177–82.
- Hillman, A. L., K. Ripley, N. Goldfarb, I. Nuamah, J. Weiner, and others. 1998. "Physician Financial Incentives and Feedback: Failure to Increase Cancer Screening in Medicaid Managed Care." *American Journal of Public Health* 88 (11): 1699–701.
- Hillman, A. L., K. Ripley, N. Goldfarb, J. Weiner, I. Nuamah, and others. 1999. "The Use of Physician Financial Incentives and Feedback to Improve Pediatric Preventive Care in Medicaid Managed Care." *Pediatrics* 104 (4, Pt 1): 931–35.
- Holm, M., and H. Burkhartzmeyer. 2015. "Implementation of a Phased Medical Educational Approach in a Developing Country." *Global Health Action* 8 (November): 29882.
- Hsia, D. C. 2003. "Medicare Quality Improvement: Bad Apples or Bad Systems?" *Journal of the American Medical Association* 289 (3): 354–56.
- Hsia, R. Y., N. A. Mbembati, S. Macfarlane, and M. E. Kruk. 2012. "Access to Emergency and Surgical Care in Sub-Saharan Africa: The Infrastructure Gap." *Health Policy and Planning* 27 (3): 234–44.
- IOM (Institute of Medicine). 2013. *Announcement. Crossing the Quality Chasm: The IOM Health Care Quality Initiative*. Washington, DC: Health and Medicine Division, National Academy of Sciences, Engineering, Medicine.
- IOM, Committee on Planning a Continuing Health Professional Education Institute. 2010. *Redesigning Continuing Education in the Health Professions*. Washington, DC: National Academies Press.
- IOM, Committee on Quality of Health Care in America. 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academies Press.
- IOM and National Academy of Engineering. 2011. "Healthcare System Complexities, Impediments, and Failures." In *Engineering a Learning Healthcare System: A Look at the Future, Workshop Summary*, edited by C. Grossmann, W. A. Goolsby, L. Olsen, and J. M. McGinnis, 117–70. Washington, DC: National Academies Press.
- Jamison, D. T., L. H. Summers, G. Alleyne, K. J. Arrow, S. Berkley, and others. 2013. "Global Health 2035: A World Converging within a Generation." *The Lancet* 382 (9908): 1898–955.
- Jörg, F., N. Borgers, A. J. Schrijvers, and J. J. Hox. 2006. "Variation in Long-Term Care Needs Assessors' Willingness to Support Clients' Requests for Admission to a Residential Home: A Vignette Study." *Journal of Aging and Health* 18 (6): 767–90.
- Jovanovic, B. 2005. "Hospital Accreditation as Method for Assessing Quality in Healthcare." *Archive of Oncology* 13 (3–4): 156–57.
- Kantrowitz, B. 2014. "The Science of Learning." *Scientific American* 311 (2): 68–73.
- Kaptanoğlu, A. Y., and I. Aktas. 2013. "Measuring Quality of Care Using a Vignette-Based Survey in Turkish Hospitals." *Korean Journal of Critical Care Medicine* 1 (1): 5–7.
- Karolinski, A., P. Micone, R. Mercer, L. Gibbons, F. Althabe, and others. 2009. "Evidence-Based Maternal and Perinatal Healthcare Practices in Public Hospitals in Argentina." *International Journal of Gynaecology and Obstetrics* 105 (2): 118–22.
- Kerr, E. A., and B. Fleming. 2007. "Making Performance Indicators Work: Experiences of U.S. Veterans Health Administration." *British Medical Journal* 335 (7627): 971–73.
- Kirkpatrick, D. H., and R. T. Burkman. 2010. "Does Standardization of Care through Clinical Guidelines Improve Outcomes and Reduce Medical Liability?" *Obstetrics and Gynecology* 116 (5): 1022–26.
- Koh, H. C., and G. Tan. 2005. "Data Mining Applications in Healthcare." *Journal of Healthcare Information Management* 19 (2): 64–72.
- Kohn, L. T., J. M. Corrigan, and M. S. Donaldson, eds. 2000. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academies Press.
- Kolstad, J. T. 2013. "Information and Quality When Motivation Is Intrinsic: Evidence from Surgeon Report Cards." *American Economic Review* 103 (7): 2875–910.
- Kouides, R. W., N. M. Bennett, B. Lewis, J. D. Cappuccio, W. H. Barker, and others. 1998. "Performance-Based Physician Reimbursement and Influenza Immunization Rates in the Elderly. The Primary-Care Physicians of Monroe County." *American Journal of Preventive Medicine* 14 (2): 89–95.
- Kruk, M. E., S. Hermosilla, E. Larson, and G. M. Mbaruku. 2014. "Bypassing Primary Care Clinics for Childbirth: A Cross-Sectional Study in the Pwani Region, United Republic of Tanzania." *Bulletin of the World Health Organization* 92 (4): 246–53.
- Kruk, M. E., S. Hermosilla, E. Larson, D. Vail, Q. Chen, and others. 2015. "Who Is Left Behind on the Road to Universal Facility Delivery? A Cross-Sectional Multilevel Analysis in Rural Tanzania." *Tropical Medicine and International Health* 20 (8): 1057–66.
- Kruk, M. E., M. Paczkowski, G. Mbaruku, H. de Pinho, and S. Galea. 2009. "Women's Preferences for Place of Delivery in Rural Tanzania: A Population-Based Discrete Choice Experiment." *American Journal of Public Health* 99 (9): 1666–72.
- Kujawski, S., G. Mbaruku, L. P. Freedman, K. Ramsey, W. Moyo, and others. 2015. "Association between Disrespect and Abuse during Childbirth and Women's Confidence in Health Facilities in Tanzania." *Maternal and Child Health Journal* 19 (10): 2243–50.
- LaFond, A., and M. Siddiqi. 2003. "Second International RHINO Workshop on Enhancing the Data Quality and Use

- of Routine Health Information at District Level.” RHINO (Routine Health Information Network), Mpekweni Sun, Eastern Cape, South Africa, September 29–October 4.
- Lagarde, M., A. Haines, and N. Palmer. 2009. “The Impact of Conditional Cash Transfers on Health Outcomes and Use of Health Services in Low- and Middle-Income Countries.” *Cochrane Database of Systematic Reviews* 4 (October): CD008137.
- Leonard, K. L. 2014. “Active Patients in Rural African Health Care: Implications for Research and Policy.” *Health Policy and Planning* 29 (1): 85–95.
- Leonard, K. L., and M. C. Masatu. 2006. “Outpatient Process Quality Evaluation and the Hawthorne Effect.” *Social Science and Medicine* 63 (9): 2330–40.
- Leonard, K. L., G. R. Mliga, and D. H. Mariam. 2002. “Bypassing Health Centres in Tanzania: Revealed Preferences for Quality.” *Journal of African Economics* 11 (4): 441–71.
- Li, L., Z. Wu, Y. Zhao, C. Lin, D. Detels, and others. 2007. “Using Case Vignettes to Measure HIV-Related Stigma among Health Professionals in China.” *International Journal of Epidemiology* 36 (1): 178–84.
- Lindenauer, P. K., D. Remus, S. Roman, M. B. Rothberg, E. M. Benjamin, and others. 2007. “Public Reporting and Pay for Performance in Hospital Quality Improvement.” *New England Journal of Medicine* 356 (5): 486–96.
- Lindfield, R., A. Knight, and D. Bwonya. 2015. “An Approach to Assessing Patient Safety in Hospitals in Low-Income Countries.” *PLoS One* 10 (3): e0121628.
- Lindfield, R., K. Vishwanath, F. Ngounou, and R. C. Khanna. 2012. “The Challenges in Improving Outcome of Cataract Surgery in Low- and Middle-Income Countries.” *Indian Journal of Ophthalmology* 60 (5): 464–69.
- Lippeveld, T., R. Sauerborn, and C. Bodart. 2000. *Design and Implementation of Health Information Systems*. Geneva: WHO.
- Lium, J. T., A. Tjora, and A. Faxvaag. 2008. “No Paper, but the Same Routines: A Qualitative Exploration of Experiences in Two Norwegian Hospitals Deprived of the Paper-Based Medical Record.” *BMC Medical Informatics and Decision Making* 8 (2): PMC2245928.
- Loevinsohn, B. P., E. T. Guerrero, and S. P. Gregorio. 1995. “Improving Primary Health Care through Systematic Supervision: A Controlled Field Trial.” *Health Policy and Planning* 10 (2): 144–53.
- Lozano, R., P. Soliz, E. Gakidou, J. Abbott-Klafter, D. M. Freehan, and others. 2006. “Benchmarking of Performance of Mexican States with Effective Coverage.” *The Lancet* 368 (9548): 1729–41.
- Luck, J., and J. W. Peabody. 2002. “Using Standardised Patients to Measure Physicians’ Practice: Validation Study Using Audio Recordings.” *British Medical Journal* 325 (7366): 679.
- Luck, J., J. W. Peabody, L. M. DeMaria, C. S. Alvarado, and R. Menon. 2014. “Patient and Provider Perspectives on Quality and Health System Effectiveness in a Transition Economy: Evidence from Ukraine.” *Social Science and Medicine* 114 (August): 57–65.
- Luck, J., J. W. Peabody, T. R. Dresselhaus, M. Lee, and P. Glassman. 2000. “How Well Does Chart Abstraction Measure Quality? A Prospective Comparison of Standardized Patients with the Medical Record.” *American Journal of Medicine* 108 (8): 642–49.
- Marchant, T., R. D. Tilley-Gyado, T. Tessema, K. Singh, M. Gautham, and others. 2015. “Adding Content to Contacts: Measurement of High-Quality Contacts for Maternal and Newborn Health in Ethiopia, North East Nigeria, and Uttar Pradesh, India.” *PLoS One* 10 (5): e0126840.
- Massoud, R., and N. Abrampah. 2015. “Scaling-Up of High-Impact Interventions.” In *Improving Aid Effectiveness in Global Health*, edited by E. Beracochea, 139–47. New York: SpringerVerlag.
- McGlynn, E. A. 1997. “Six Challenges in Measuring the Quality of Health Care.” *Health Affairs (Millwood)* 16 (3): 7–21.
- McGlynn, E. A., S. M. Asch, J. Adams, J. Keeseey, J. Hicks, and others. 2003. “The Quality of Health Care Delivered to Adults in the United States.” *New England Journal of Medicine* 384 (26): 2635–45.
- Mohanan, M., M. Vera-Hernandez, V. Das, S. Giardili, J. D. Goldhaber-Fiebert, and others. 2015. “The Know-Do Gap in Quality of Health Care for Childhood Diarrhea and Pneumonia in Rural India.” *Journal of the American Medical Association Pediatrics* 169 (4): 349–57.
- Mostofian, F., C. Ruban, N. Simunovic, and M. Bhandari. 2015. “Changing Physician Behavior: What Works?” *American Journal of Managed Care* 21 (1): 75–84.
- Mtango, F. D., and D. Neuvians. 1986. “Acute Respiratory Infections in Children under Five Years: Control Project in Bagamoyo District, Tanzania.” *Transactions of the Royal Society of Tropical Medicine and Hygiene* 80 (6): 851–58.
- Murray, C. J., E. E. Gakidou, and J. Frenk. 1999. “Health Inequalities and Social Group Differences: What Should We Measure?” *Bulletin of the World Health Organization* 77 (7): 537–43.
- National Academies of Sciences, Engineering, and Medicine. 2015. *Improving Quality of Care in Low- and Middle-Income Countries*. Washington, DC: National Academies Press.
- National Patient Safety Foundation. 2015. *Shining a Light: Safer Health Care through Transparency; Report of the Roundtable on Transparency*. Boston, MA: National Patient Safety Foundation.
- Ng, M., N. Fullman, J. L. Dieleman, A. D. Flaxman, C. J. Murray, and others. 2014. “Effective Coverage: A Metric for Monitoring Universal Health Coverage.” *PLoS Medicine* 11 (9): e1001730.
- Nolan, T., P. Angos, A. J. Cunha, L. Muhe, S. Qazi, and others. 2001. “Quality of Hospital Care for Seriously Ill Children in Less-Developed Countries.” *The Lancet* 357 (9250): 106–10.
- OECD (Organisation for Economic Co-Operation and Development). 2015. *Health Care Quality Indicators*. Paris: OECD.
- Okafor, I. I., E. O. Ugwu, and S. N. Obi. 2015. “Disrespect and Abuse during Facility-Based Childbirth in a

- Low-Income Country?" *International Journal of Gynecology and Obstetrics* 128 (2): 110–13.
- Parsons, A., C. McCullough, J. Wang, and S. Shih. 2012. "Validity of Electronic Health Record–Derived Quality Measurement for Performance Monitoring." *Journal of the American Medical Informatics Association* 19 (4): 604–9.
- Peabody, J. W., L. DeMaria, S. N. Nguyen, O. Smith, A. Hoth, and others. Forthcoming. "Quality of Care in Six Eastern European Countries Using Clinical Performance and Value Vignettes: A Cross-Sectional Study." *Bulletin of the World Health Organization*.
- Peabody, J. W., P. J. Gertler, and A. Leibowitz. 1998. "The Policy Implications of Better Structure and Process on Birth Outcomes in Jamaica." *Health Policy* 43 (1): 1–13.
- Peabody, J. W., and A. Liu. 2007. "A Cross-National Comparison of the Quality of Clinical Care Using Vignettes." *Health Policy and Planning* 22 (5): 294–302.
- Peabody, J. W., J. Luck, L. M. DeMaria, and R. Menon. 2014. "Quality of Care and Health Status in Ukraine." *BMC Health Services Research* 14: 446.
- Peabody, J. W., J. Luck, P. A. Glassman, T. R. Dresselhaus, and M. Lee. 2000. "Comparison of Vignettes, Standardized Patients, and Chart Abstraction: A Prospective Validation Study of 3 Methods for Measuring Quality." *Journal of the American Medical Association* 283 (13): 1715–22.
- Peabody, J. W., J. Luck, P. Glassman, S. Jain, M. Spell, and others. 2004. "Measuring the Quality of Physician Practice by Using Clinical Vignettes: A Prospective Validation Study." *Annals of Internal Medicine* 141 (10): 771–80.
- Peabody, J. W., R. J. Nordyke, F. Tozija, J. Luck, J. A. Munoz, and others. 2006. "Quality of Care and Its Impact on Population Health: A Cross-Sectional Study from Macedonia." *Social Science and Medicine* 62 (9): 2216–24.
- Peabody, J. W., S. Quimbo, J. Florentino, R. Shimkhada, X. Javier, and others. 2017. "Comparative Effectiveness of Two Disparate Policies on Child Health: Experimental Evidence from the Philippines." *Health Policy and Planning* czw179. doi:<http://dx.doi.org/10.1093/heapol/czw179>.
- Peabody, J. W., R. Shimkhada, S. Quimbo, J. Florentino, M. Bacate, and others. 2011. "Financial Incentives and Measurement Improved Physicians' Quality of Care in the Philippines." *Health Affairs (Millwood)* 30 (4): 773–81.
- Peabody, J. W., S. Shimkhada, S. Quimbo, O. Solon, X. Javier, and others. 2014. "The Impact of Performance Incentives on Health Outcomes: Results from a Cluster Randomized Controlled Trial in the Philippines." *Health Policy and Planning* 29 (5): 615–21.
- Peabody, J. W., M. M. Taguiwalo, D. A. Robalino, and J. Frenk. 2006. "Improving the Quality of Care in Developing Countries." In *Disease Control Priorities in Developing Countries*, second edition, edited by D. T. Jamison, J. G. Breman, A. R. Measham, G. Alleyne, M. Claeson, D. B. Evans, P. Jha, A. Mills, and P. Musgrove. Washington, DC: World Bank.
- Petersen, L. A., L. D. Woodard, T. Urech, C. Daw, and S. Sookanan. 2006. "Does Pay-for-Performance Improve the Quality of Health Care?" *Annals of Internal Medicine* 145 (4): 265–72.
- Pronovost, P., D. Needham, S. Berenholtz, D. Sinopoli, H. Chu, and others. 2006. "An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU." *New England Journal of Medicine* 355 (26): 2725–32.
- Quimbo, S. A., J. W. Peabody, R. Shimkhada, K. Woo, and O. Solon. 2008. "Should We Have Confidence If a Physician Is Accredited? A Study of the Relative Impacts of Accreditation and Insurance Payments on Quality of Care in the Philippines." *Social Science and Medicine* 67 (4): 505–10.
- Ransom, S. B., W. W. Pinsky, and J. E. Tropman, eds. 2000. *Enhancing Physician Performance: Advanced Principles of Medical Management*. Tampa, FL: American College of Physician Executives.
- Rivera, J. A., D. Sotres-Alvarez, J. P. Habicht, T. Shamah, and S. Villalpando. 2004. "Impact of the Mexican Program for Education, Health, and Nutrition (Progresa) on Rates of Growth and Anemia in Infants and Young Children: A Randomized Effectiveness Study." *Journal of the American Medical Association* 291 (21): 2563–70.
- Rockers, P. C., M. E. Kruk, and M. J. Laugesen. 2012. "Perceptions of the Health System and Public Trust in Government in Low- and Middle-Income Countries: Evidence from the World Health Surveys." *Journal of Health Politics, Policy, and Law* 37 (3): 405–37.
- Rogers, W. A. 2004. "Evidence-Based Medicine and Justice: A Framework for Looking at the Impact of EBM upon Vulnerable or Disadvantaged Groups." *Journal of Medical Ethics* 30 (2): 141–45.
- Rosenthal, M. B., R. G. Frank, Z. Li, and A. M. Epstein. 2005. "Early Experience with Pay-for-Performance: From Concept to Practice." *Journal of the American Medical Association* 294 (14): 1788–93.
- Saleh, S. S., M. S. Alameddine, and N. M. Natafqi. 2014. "Beyond Accreditation: A Multi-Track Quality-Enhancing Strategy for Primary Health Care in Low- and Middle-Income Countries." *International Journal of Health Services* 44 (2): 355–72.
- Saleh, S. S., J. Bou Sleiman, D. Dagher, H. Sbeit, and N. Natafqi. 2013. "Accreditation of Hospitals in Lebanon: Is It a Worthy Investment?" *International Journal for Quality in Health Care* 25 (3): 284–90.
- Sando, D., T. Kendall, G. Lyatuu, H. Ratcliffe, K. McDonald, and others. 2014. "Disrespect and Abuse during Childbirth in Tanzania: Are Women Living with HIV More Vulnerable?" *Journal of Acquired Immune Deficiency Syndromes* 67 (Suppl 4): S228–34.
- Schuster, R. J., N. A. Terwoord, and J. Tasosa. 2006. "Changing Physician Practice Behavior to Measure and Improve Clinical Outcomes." *American Journal of Medical Quality* 21 (6): 394–400.
- Scott, K. W., and A. K. Jha. 2014. "Putting Quality on the Global Health Agenda." *New England Journal of Medicine* 371 (1): 3–5.

- Sendlhofer, G., N. Mosbacher, L. Karina, B. Kober, L. Jantscher, and others. 2015. "Implementation of a Surgical Safety Checklist: Interventions to Optimize the Process and Hints to Increase Compliance." *PLoS One* 10 (2): e0116926.
- Shaller, D., S. Sofaer, S. Findlay, J. Hibbard, D. Lansky, and others. 2003. "Consumers and Quality-Driven Health Care: A Call to Action." *Health Affairs (Millwood)* 22 (2): 95–101.
- Shimkhada, R., O. Solon, D. Tamondong-Lachica, J. W. Peabody. 2016. "Misdiagnosis of Obstetrical Cases and the Clinical Cost and Consequences to Patients: A Cross-Sectional Study of Urban Providers in the Philippines." *Global Health Action* 9 (1): 32672.
- Solon, O., K. Woo, S. A. Quimbo, R. Shimkhada, J. Florentino, and others. 2009. "A Novel Method for Measuring Health Care System Performance: Experience from QIDS in the Philippines." *Health Policy and Planning* 24 (3): 167–74.
- Spertus, J. A., M. J. Radford, N. R. Every, E. F. Ellerbeck, E. D. Peterson, and others. 2003. "Challenges and Opportunities in Quantifying the Quality of Care for Acute Myocardial Infarction: Summary from the Acute Myocardial Infarction Working Group of the American Heart Association/American College of Cardiology First Scientific Forum on Quality of Care and Outcomes Research in Cardiovascular Disease and Stroke." *Circulation* 107 (12): 1681–91.
- Starfield, B., N. R. Powe, J. R. Weiner, M. Stuart, D. Steinwachs, and others. 1994. "Costs vs. Quality in Different Types of Primary Care Settings." *Journal of the American Medical Association* 272 (24): 1903–08.
- Steinwachs, D. M., and R. G. Hughes. 2008. "Health Services Research: Scope and Significance." In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*, edited by R. G. Hughes, 8–43. Rockville, MD: Agency for Healthcare Research and Quality.
- Strauss, A., and J. Corbin. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. 2nd ed. Newbury Park, CA: Sage.
- Sun, B. C., J. Adams, E. J. Orav, D. W. Rucker, T. A. Brennan, and others. 2000. "Determinants of Patient Satisfaction and Willingness to Return with Emergency Care." *Annals of Emergency Medicine* 35 (5): 426–34.
- Sylvia, S., Y. Shi, H. Xue, X. Tian, H. Wang, and others. 2015. "Survey Using Incognito Standardized Patients Shows Poor Quality Care in China's Rural Clinics." *Health Policy and Planning* 30 (3): 322–33.
- Tafreshi, M. Z., M. Pazargadi, and Z. Abed Saeedi. 2007. "Nurses' Perspectives on Quality of Nursing Care: A Qualitative Study in Iran." *International Journal of Health Care Quality Assurance* 20 (4): 320–28.
- Thaddeus, S., and D. Maine. 1994. "Too Far to Walk: Maternal Mortality in Context." *Social Science and Medicine* 38 (8): 1091–110.
- Thorsen, V. C., T. Meguid, J. Sundby, and A. Malata. 2014. "Components of Maternal Healthcare Delivery System Contributing to Maternal Deaths in Malawi: A Descriptive Cross-Sectional Study." *African Journal of Reproductive Health* 18 (1): 16–26.
- Tiemeier, H., W. J. de Vries, M. van Het Loo, J. P. Kahan, N. Klazinga, and others. 2002. "Guideline Adherence Rates and Interprofessional Variation in a Vignette Study of Depression." *Quality and Safety in Health Care* 11 (3): 214–18.
- Tran, B. X., V. M. Nong, R. M. Maher, P. K. Nguyen, and H. N. Luu. 2014. "A Systematic Review of Scope and Quality of Health Economic Evaluation Studies in Vietnam." *PLoS One* 9 (8): e103825.
- Treadwell, J. R., S. Lucas, and A. Y. Tsou. 2014. "Surgical Checklists: A Systematic Review of Impacts and Implementation." *BMJ Quality and Safety* 23 (4): 299–318.
- U.S. Congress, Office of Technology Assessment. 1994. *Identifying Health Technologies that Work: Searching for Evidence*. OTA-H-608. Washington, DC: U.S. Government Printing Office.
- Van der Bij, J. D., T. Vollmar, and M. C. Weggeman. 1998. "Quality Systems in Health Care: A Situational Approach." *International Journal of Health Care Quality Assurance* 11 (2): 65–70.
- Veloski, J., S. Tai, A. S. Evans, and D. B. Nash. 2005. "Clinical Vignette-Based Surveys: A Tool for Assessing Physician Practice Variation." *American Journal of Medical Quality* 20 (3): 151–57.
- Vogel, J. P., A. M. Gülmezoglu, G. J. Hofmeyr, and M. Temmerman. 2014. "Perspectives on Elective Induction of Labor." *Clinical Obstetrics and Gynecology* 7 (2): 331–42.
- Wachter, R. 2013. "Personal Accountability in Healthcare: Searching for the Right Balance." *BMJ Quality and Safety* 22 (2): 176–80.
- Weinberg, N. 2001. "Using Performance Measures to Identify Plans of Action to Improve Care." *Joint Commission Journal on Quality and Patient Safety* 27 (12): 683–88.
- Werner, R. M., and D. A. Asch. 2007. "Clinical Concerns about Clinical Performance Measurement." *Annals of Family Medicine* 5 (2): 159–63.
- WHO (World Health Organization). 2000. *World Health Report 2000: Health Systems, Improving Performance*. Geneva: WHO.
- . 2008. *Summary of the Evidence on Patient Safety: Implications for Research*. Geneva: WHO.
- WHO, Association for Trauma Surgery and Intensive Care, and International Society of Surgery. 2009. *Guidelines for Trauma Quality Improvement Programmes*. Geneva: WHO.
- WHO and World Bank. 2014. *Monitoring Progress towards Universal Health Coverage at Country and Global Levels: Framework, Measures, Targets*. Geneva: WHO; Washington, DC: World Bank.
- Wisniewski, M., and H. Wisniewski. 2005. "Measuring Service Quality in a Hospital Colposcopy Clinic." *International Journal of Health Care Quality Assurance* 18 (2–3): 217–29.
- Woolf, S. H. 2000. "Changing Physician Practice Behavior." *Journal of Family Practice* 49 (2): 126–29.

- World Bank. 2003. *World Development Report 2004: Making Services Work for Poor People*. Washington, DC: World Bank.
- . 2014. *Health Results Innovation Trust Fund Annual Report 2014*. Washington, DC: World Bank.
- Xu, Y., Y. Liu, T. Shu, W. Yang, and M. Liang. 2015. “Variations in the Quality of Care at Large Public Hospitals in Beijing, China: A Condition-Based Outcome Approach.” *PLoS One* 10 (10): e0138948.
- Zaslavsky, A. M. 2001. “Statistical Issues in Reporting Quality Data: Small Samples and Casemix Variation.” *International Journal for Quality in Health Care* 13 (6): 481–88.