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## Chapter 70

# Improving the Quality of Care in Developing Countries



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Although the quantity rather than quality of health services has been the focus historically in developing countries, ample evidence suggests that quality of care (or the lack of it) must be at the center of every discussion about better health. The following examples are illustrative: In one study evaluating pediatric care in Papua New Guinea, 69 percent of health center workers reported that they checked for only two of the four examination criteria for pneumonia cases. Only 24 percent of these workers were able to indicate correct treatment for malaria. When clinical encounters were observed at aid posts, providers met minimal examination criteria in only 1 percent of cases (Beracochea and others 1995). In a study in Pakistan, only 56 percent of providers met an acceptable diagnostic standard for viral diarrhea, and only 35 percent met the acceptable standard for treatment (Thaver and others 1998).

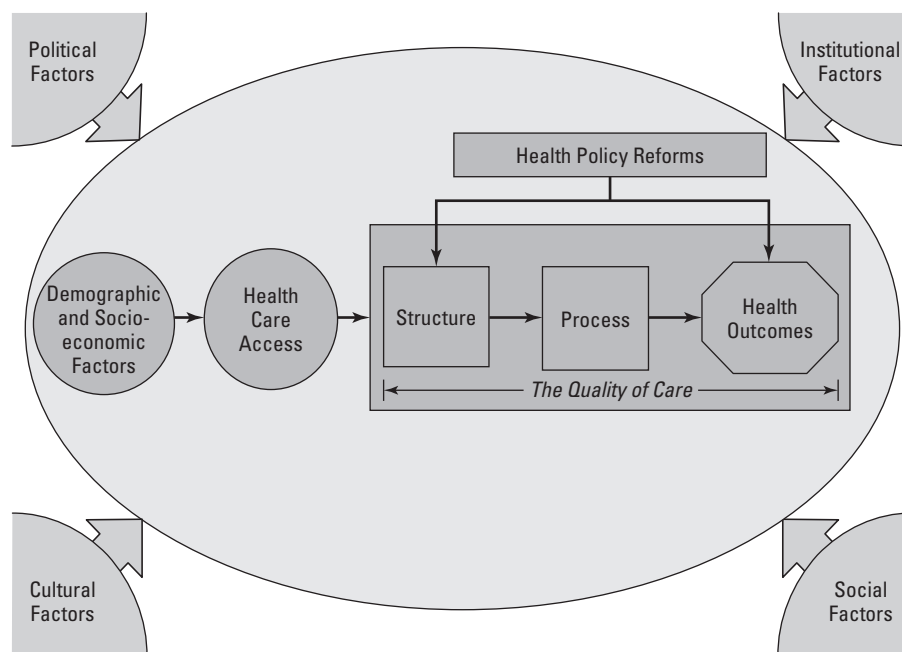
### QUALITY DEFINITION AND POPULATION FRAMEWORK

These deficiencies in quality of care represent neither the failure of professional compassion nor necessarily a lack of resources (Institute of Medicine 2001). Rather, they result from gaps in knowledge, inappropriate applications of available technology (Murray and Frenk 2000), or the inability of organizations to change (Berwick 1989). Local health care systems may have failed to align practitioner incentives and objectives, to measure clinical practice, or to link quality improvement to better health outcomes.

Increasing evidence, much of it developed since the mid 1990s, shows that quality can be improved rapidly. However, to improve clinical practice—and thus quality of care—quality must be defined and measured, and appropriate steps must be taken (Silimper and others 2002). This chapter highlights approaches to improving clinical practice and quality of care that take place over months instead of years. Indeed, better quality can improve health much more rapidly than can other drivers of health, such as economic growth, educational advancement, or new technology.

### Definition and Framework

Health systems provide health actions—activities to improve or maintain health. These actions take place in the context of and are influenced by political, cultural, social, and institutional factors (shown along the edges of figure 70.1). Demographic and socioeconomic makeup, including genetics and personal resources, affect the health status of individuals seeking care. Access to the health care system is required to obtain the care that maintains or improves health, but simple access is not enough; the system's capacities must be applied skillfully. Thus, *quality* means optimizing material inputs and practitioner skill to produce health. As the Institute of Medicine defines it, quality is “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (Institute of Medicine 2001, 244).



Source: Peabody and others 1999.

**Figure 70.1** Quality-of-Care Framework

**Elements of Quality.** Quality comprises three elements:

- *Structure* refers to stable, material characteristics (infrastructure, tools, technology) and the resources of the organizations that provide care and the financing of care (levels of funding, staffing, payment schemes, incentives).
- *Process* is the interaction between caregivers and patients during which structural inputs from the health care system are transformed into health outcomes.
- *Outcomes* can be measured in terms of health status, deaths, or disability-adjusted life years—a measure that encompasses the morbidity and mortality of patients or groups of patients. Outcomes also include patient satisfaction or patient responsiveness to the health care system (WHO 2000).

Structural measures are the easiest to obtain and most commonly used in studies of quality in developing countries. Many evaluations have revealed shortages in medical staff, medications and other important supplies, and facilities, but material measures of structure, perhaps surprisingly, are not causally related to better health outcomes (Donabedian 1980). Although higher technology or a more pleasant environment may be conducive to better-quality care, the evidence indicates only a weak link between such structural elements and better health outcomes (Donabedian 1988). The notable exceptions are cases in which physical improvements either increase access to primary care in very poor settings or increase the volume of a clinical procedure, such as cataract surgery, that is specifically linked to

better health outcomes (Javitt, Venkataswamy, and Sommer 1983). At best, however, structure is a blunt approximation of process or outcomes; structural improvements by themselves rarely improve the health of a population.

Process, by contrast, can be measured with every visit to a provider. Measuring process is difficult, however, particularly in developing countries. The private nature of the doctor-patient consultation, a lack of measurement criteria, and the absence of reliable measurement tools have limited the ability to assess process (Peabody, Tozija, and others 2004). However, new methods are being developed that can provide valid measurements of clinical practice (Thaver and others 1998). In addition, evidence-based clinical studies have steadily revealed which process measures lead to better health outcomes. This combination of ubiquity, measurability, and linkage to health outcomes makes the measurement of process the preferred way to assess quality.

Although good outcomes are the objective of all health actions, outcomes alone are not an efficient way to measure quality for two reasons. The first is the quality conundrum. A patient may receive poor-quality care but may recover fully, or a patient may receive high-quality care for an illness such as cerebral malaria and still not recover. Second, adverse health outcomes are relatively rare and obviously do not occur with every encounter.

The classic framework of structure-process-outcome is well established. However, in recent years the concept of quality has been expanded to include specific aims for improvement. For example, the Institute of Medicine's (2001) landmark report,

## Box 70.1

### The Institute of Medicine's Six Elements of Quality

1. *Patient safety.* Are the risks of injury minimal for patients in the health system?
2. *Effectiveness.* Is the care provided scientifically sound and neither underused nor overused?
3. *Patient centeredness.* Is patient care being provided in a way that is respectful and responsive to a patient's preferences, needs, and values? Are patient values guiding clinical decisions?
4. *Timeliness.* Are delays and waiting times minimized?
5. *Efficiency.* Is waste of equipment, supplies, ideas, and energy minimized?
6. *Equity.* Is care consistent across gender, ethnic, geographic, and socioeconomic lines?

Source: Institute of Medicine 2001.

*Crossing the Quality Chasm*, broadens the concept to include other, more contextual elements to illuminate how process changes can improve care. It focuses on six aims: patient safety, effectiveness, patient centeredness, timeliness, efficiency, and equity (see box 70.1).

**Quality Assessment Perspectives.** We can look at the Institute of Medicine's aims from two perspectives: patient perception, and technical or professional assessment. Patients' perceptions of quality depend on their individual characteristics and affect their compliance, follow-up decisions, and long-term lifestyle changes (Zaslavsky and others 2000). Interpersonal relationships, cultural appropriateness, and gender sensitivity—long thought to be luxuries of wealthier countries—are also major determinants of patient access and utilization in developing countries. These findings have led to the inclusion of patient satisfaction and patient responsiveness as outcome measures.

Technical assessment concerns whether providers meet normative standards for appropriateness of care or adherence to explicit evidence-based criteria. Although patient perception or satisfaction is important, researchers increasingly rely on objective, evidence-based quality criteria that can be more readily linked to better health outcomes at both the individual and the population levels.

**Population-Level Considerations.** Quality is typically assessed through the interaction between individual doctors and patients. However, emerging evidence shows that the average quality of care given by groups of doctors and other providers is an important determinant of overall community health status. For example, in a cross-sectional analysis in the former Yugoslav Republic of Macedonia, researchers found not only that patients' health status was significantly higher in areas where quality was higher but also that the overall self-reported health status of those members of the general population who

had not recently received care was higher (Peabody, Tozija, and others 2004).

Our quality-of-care framework supports these findings. When process is improved among groups of providers, the aggregate improvement in quality leads to better health outcomes for the entire patient population. In addition, resources can be allocated among clinical interventions based on actual effectiveness and the overall impact of care on the population. For example, cancer chemotherapy may be available and may prolong the lives of cancer patients. However, it may result in fewer lives saved than the expansion of coverage of directly observed treatment short-course coverage for tuberculosis patients.

## QUALITY OF CARE IN DEVELOPING COUNTRIES

The process of providing care in developing countries is often poor and varies widely. A large body of evidence from industrial countries consistently shows variations in process, and these findings have transformed how quality of care is perceived (McGlynn and others 2003). A 2002 study found that physicians complied with evidence-based guidelines for at least 80 percent of patients in only 8 of 306 U.S. hospital regions (Wennberg, Fisher, and Skinner 2002). It is important to note that these variations appear to be independent of access to care or cost of care: Neither greater supply nor higher spending resulted in better care or better survival. Studies from developing countries show similar results. For example, care in tertiary and teaching hospitals and care provided by specialists may be better than care for the same cases in primary care facilities and by generalists (Walker, Ashley, and Hayes 1988).

One explanation for variation and low-quality care in the developing world is lack of resources. Limited data indicate, however, that high-quality care can be provided even in environments with severely constrained resources. A study in Jamaica, which used a cross-sectional analysis of government-run

primary care clinics, showed that better process alone was linked to significantly greater birthweight (Peabody, Gertler, and Liebowitz 1998). A study in Indonesia attributed 60 percent of all perinatal deaths to poor process and only 37 percent to economic constraints (Supratikto and others 2002).

Cross-system or cross-national comparisons provide the best examples of the great variation in clinical practice in developing countries. In one seven-country study, researchers directly observing clinical practice found that 75 percent of cases were not adequately diagnosed, treated, or monitored and that inappropriate treatment with antibiotics, fluids, feeding, or oxygen occurred in 61 percent of cases (Nolan and others 2001). Another study compared providers' knowledge and practice in California and FYR Macedonia, using vignettes to adjust for case-mix severity. Although the quality of the overall or aggregate process was lower in FYR Macedonia, a poor country, the top 5 percent of Macedonian doctors performed as well as or better than the average Californian doctor (Peabody, Tozija, and others 2004).

In a study commissioned for this chapter, an international team measured quality in five developing countries (China, El Salvador, India, Mexico, and the Philippines), using the same clinical vignettes at each site. The team evaluated the process for common diseases according to international, evidence-based criteria. Quality varied only slightly among countries. The within-country range of quality of doctors was 10 times as great as the between-country range. Such wide variation strongly suggests that efforts to improve health status must involve policies that change the quality of clinical care.

## POLICY INTERVENTIONS TO IMPROVE QUALITY

The success of quality improvement policies can be measured by their ability to raise the average level of health and reduce variation in quality. Two types of policies are intended to improve quality and thus health outcomes:

- those that influence provider behavior by altering the structural conditions of organization and finance or that involve the design and redesign of health care systems
- those that directly target provider behavior at the individual or the group level.

Within each category, the evidence is examined to see the effect of the policy on the health outcomes of populations.

### **Interventions Affecting Provider Practice by Changing Structural Conditions**

Although structural components such as materials and staff are not strongly linked to outcomes, other components of structure—organization and finance—can influence process

by changing the socioeconomic, legal and administrative, cultural, and information context of the health care system.

**Legal Mandates, Accreditation, and Administrative Regulations.** Legal mandates, accreditation, and administrative regulations affect quality by controlling entry into the practice of health care. These policies include the licensing of professionals and facilities, their accreditation or certification to perform certain procedures, and the formal delineation of functions that various types of health workers can legally perform. Although these policies assume that providers' prior qualifications are good predictors of actual performance in health care delivery, there is little evidence that such policies have a positive effect on process or outcomes. They are more successful at barring unqualified persons from practicing than at ensuring quality among those who are allowed to practice. A review of health sector regulations in Tanzania and Zimbabwe, for example, revealed that the regulations primarily control entry into the market and ensure a minimum standard of quality (Kumaranayake and others 2000).

Hospital accreditation, with its periodic reviews of health facility performance standards, can potentially provide ongoing regulatory pressure for improvement. To date, research has not demonstrated that hospital accreditation programs are linked to improvements in health outcomes. In a randomized controlled trial of a hospital accreditation program in the KwaZulu-Natal province of South Africa, researchers showed a conclusive link between the implementation of the program and improvements in the accreditation standard indicators. However, they were unable to link those indicators to improvements in health outcomes (Salmon and others 2003).

**Malpractice Litigation to Enforce Legal Mandates** To be effective in promoting quality, malpractice litigation must rely on adequate legal and judicial systems, which are deficient in most developing countries. In India, one of the few developing countries with the appropriate legal structure in place, inclusion of the medical sector under the Consumer Protection Act of 1986 allows victims to receive redress for negligent medical practice. Although improvements have resulted, some argue that the system needs greater involvement of professional organizations to be effective (Bhat 1996).

**Professional Oversight** Peer review is as old as professional societies. The power and the influence of such societies vary widely among countries (Heaton 2000). Large provider organizations, such as hospitals or public health institutions, often routinely collect information on provider practices and patient outcomes and use those data to guide, educate, supervise, discipline, or recognize providers. In the Philippines, public health managers used a checklist of 20 observable behaviors against which health workers in remote provinces were rated. The

performance of providers in facilities where workers were reviewed was significantly better than in comparable facilities that did not adopt the reviews (Loevinsohn, Guerrero, and Gregorio 1995). Others, however, assert that the “quality by inspection” environment engendered by oversight leads to an antagonistic relationship between workers and managers and precludes cooperative problem solving and continuous improvement (Berwick 1989). A qualitative study evaluating supervisor-provider interactions in health care facilities in Zimbabwe found that supervisors were adept at giving technical feedback but were not as proficient at making suggestions for improvement or at working with providers and patients to solve problems (Tavrow, Kim, and Malianga 2002).

**National and Local Clinical Guidelines** In many industrial countries, evidence-based clinical guidelines are used to ensure high-quality care, better health outcomes, and cost-effective treatments. (Examples of institutions supporting this approach are the U.K. National Institute for Clinical Excellence, the U.S. Agency for Healthcare Research and Quality, and the Dutch College of General Practitioners.) Guidelines are typically developed for a clinical disease or symptom. They should be derived from evidence-based criteria resulting from well-designed clinical investigations or expert opinion. Because they are derived from empirical studies, guidelines in developing countries can, in principle, be identical to those in industrial countries. When resource constraints limit transferability, diagnostic and treatment guidelines may have to be modified. Technologies such as x-ray studies have gained widest acceptance in preventive and primary care services, such as integrated management of childhood illness, where they serve both as clinical standards and as educational guides. Including physicians in the development and review of guidelines has proved particularly effective in the challenging process of implementing guidelines.

**Sharing Information on Quality Improvement Technology.** Worldwide interest in quality has given rise to new professional bodies, scientific publications, and institutions dedicated to sharing ideas and innovations in quality improvement. Organizations such as the Robert Wood Johnson Foundation, the Nuffield Trust, and the Institute for Healthcare Improvement cultivate ideas for improvement, bring people and organizations together to learn from each other, and take action to achieve results. Although the sharing of information on quality health care practices has long been an established part of provider education and training networks, the sharing of information on successful systemwide policies for process improvements could potentially accelerate the scale-up of quality practice.

One organization active in developing countries is the Council on Health Research for Development (COHRED),

which promotes, facilitates, and evaluates the Essential National Health Research strategy in such countries as Benin, the Arab Republic of Egypt, and Indonesia. COHRED aims to develop a system of effective health research to improve health services, including quality of care. The Quality Assurance project funded by the U.S. Agency for International Development has studied and shared information about quality in the developing world since 1990. Under the Quality Assurance project umbrella, researchers have studied and implemented quality measurement and improvement interventions and have used these case studies to develop a library of tools and articles to promote global quality improvement.

**Public-Private Provision of Care.** In most health care systems, a professional regulatory framework governs the network of civil servants delivering health care. These civil servants operate alongside autonomous, self-governed, private providers— independent for-profit physicians and health clinics and non-profit nongovernmental organizations (NGOs). Two conclusions arise from the often heated debate about the right balance between public and private services. First, private practitioners provide a significant amount of care in developing countries. Second, though there is no one prescription for striking the right public-private mix, in some cases the public regulatory framework has led to private provision of higher-quality care. The government of Senegal successfully contracted with community-based groups for preventive nutrition services. Eighteen months after nutrition services were implemented, severe malnutrition disappeared among children age 6 to 11 months (Marek and others 1999). The success of the program has led to its expansion nationwide.

**Targeted Education and Professional Retraining.** Continuing medical education is a common approach to improving clinical practice, but it neither changes clinical practice nor advances health outcomes (Davis and others 1995). Newer techniques—targeted education, case-based learning, and interactive and multimodel teaching techniques—have had some success. In Guatemala, distance education targeting diarrhea and cholera case management increased accurate assessment and classification of diarrhea cases by 25 percent. Rehydration did not improve, however, and improvements in counseling were insignificant (Flores, Robles, and Burkhalter 2002). In Tanzania, training staff in the control of acute respiratory infections of young children yielded reductions in under-five mortality within two years (Mtango and Neuvians 1986).

**Organizational Change.** In recent years, organizational change in the health care system has been shown to influence quality of care and to further the six aims of the Institute of Medicine by focusing on the continual design and redesign of

systems. The emphasis is on developing organizational and individual capabilities where they most profoundly affect the process of care. Design and redesign interventions assume that simply adding a new resource or a new process in isolation will not improve care because better care is the product of many processes working together. Although change interventions have not been widely used in the developing world because they require large investments to plan and implement, four related models of organizational change have been successful in changing provider practice in developing nations:

- **Total Quality Management in health care** Advances in business management practices to continually design and redesign systems for quality improvement have been effectively adapted for health systems. In Total Quality Management, also known as *Continuous Quality Improvement*, teams use mutually reinforcing techniques in a cycle of planning, implementing, evaluating, and revising to improve the quality of clinical and administrative processes. These techniques include process mapping, statistical quality control, and structured team activities. In rural Bihar, India, private practitioners who treat sick children were provided with standard case-management information, were given feedback on their performance, and were tracked and monitored over time. This strategy produced significant improvements in practitioners' case-management skills (Chakraborty, D'Souza, and Northrup 2000). In Malaysia, anesthesia safety has been improved through the implementation of consensus-based protocols that emphasize (a) communication among the operating, recovery, and ward team members; (b) individual feedback; and (c) frequent monitoring to identify areas for improvement (Tan 1999).
- **Collaborative Improvement Model** The early success of Total Quality Management techniques has given rise to a related model, the Collaborative Improvement Model. It addresses broad and complex systemic processes within health care systems and has facilitated the scale-up of quality improvements. This model, designed to continuously improve organizational and individual performance, comprises four elements: definition of an aim, measurement, innovation, and testing to see whether the innovation meets the original aim. This approach strikes a pragmatic balance between the need for action and the need to be scientifically grounded. It has been used with success in Peru and the Russian Federation. In Peru, the collaborative improvement model was used by multidisciplinary teams in 41 clinics to design changes aimed at achieving world-class tuberculosis care. The preliminary results have led to impressive changes in the process of care, but it is too early to determine whether they have been effective in improving quality (Berwick 2004).
- **Plan-Do-Study-Act cycle** The Plan-Do-Study-Act (PDSA) cycle calls for action-oriented learning in quality improve-

ment. Team members using the PDSA model design a quality-improvement intervention (plan), implement it on a small scale (do), evaluate the results (study), and implement or alter the intervention accordingly (act). Often multiple PDSA cycles are necessary before the appropriate improvement method can be identified. All improvement techniques that involve the design and redesign of systems use some form of the PDSA cycle. Successful scale-up of a PDSA prototype is possible with careful leadership oversight. A team of investigators in Russia's Tula province developed a series of successful interventions for adults who have poorly controlled hypertension. The interventions, which were started in 20 clinics, were expanded to 500 clinics within 18 months. The scale-up resulted in a sevenfold increase in patients receiving hypertension management at the primary care level and an 85 percent reduction in admissions for hypertension. In Tver province, the same group addressed problems related to prenatal care. They began with 5 hospitals and scaled up to cover all 42 hospitals and all maternity clinics in the province. The result was a 99 percent reduction in newborns with hypothermia and a reduction in pregnancy-induced hypertension from 44 percent to 6 percent (Berwick 2004). Although the experience of researchers implementing interventions that are based on system redesign in the developing world has been largely positive, it is not clear whether the resources and leadership exist to bring these interventions to scale through country or regional policies. Further evidence is needed concerning the real-world feasibility and cost-effectiveness of system redesign.

- **Internal enabling environment** Creating the right environment for change involves leadership and leadership training, clinicians empowered to make quality improvement decisions, and resources for quality improvement planning activities (Silimper and others 2002). The internal enabling environment in Costa Rica promoted strong leadership that led to the adoption of structural adjustment loans in the early stages of health sector reforms. The loans were used to maintain such public health programs as mother and child nutrition, even though public spending dropped and prices increased dramatically (Peabody 1996). An enabling environment can also be created by teams of individuals, each representing different stakeholder groups (physicians, nurses, staff members, patients, and so forth) or simply by a strong leader with an interest in teamwork and the resources to support a discrete quality improvement function for team members.

### Interventions Directly Affecting Provider Practice

Practitioners are often forced to provide care in uncertain settings. Technical limitations may reduce the ability to diagnose

or predict outcomes, or they may have only probabilistic knowledge about the efficacy of their proposed treatment for a particular patient. The nature of clinical practice is often solitary, and physicians have few available ways to gauge their clinical acumen and skills. Performance-based feedback, however, can reward high-quality care and increase knowledge about appropriate actions. If the feedback mechanism is effective, it can also serve as the basis for establishing systemwide incentives for improving quality of care.

**Training with Peer Review Feedback.** In Mexico City, physician retraining on treatment of diarrhea, combined with the concurrent creation of a peer-review structure, decreased the use of antibiotics and increased the use of oral rehydration therapy (ORT). These improvements continued to be seen in a follow-up evaluation 18 months later (Gutierrez and others 1994). The approach has been effectively expanded to prescribing practices for rhinopharyngitis among primary care physicians, using an interactive training workshop and a managerial peer-review committee (Perez-Cuevas and others 1996).

**Performance-Based Remuneration.** A potentially powerful instrument for accelerating quality improvements involves making payments directly to providers who meet quality standards that are based on process indicators associated with favorable patient outcomes. Systems that tie performance to remuneration use relatively small incentives—equivalent to 3 to 10 percent of the provider's total compensation. Performance-based remuneration has been successfully used in the United States to compensate both private and public providers (McBride, Neiman, and Johnson 2000).

Examples of performance-based incentives come from developing countries too. The Nicaraguan Ministry of Health has implemented a pilot program in six hospitals that offers an incentive bonus (a maximum average of 17 percent of hospital revenue) for facilities that achieve performance targets that include quality measures (Jack 2003). In Haiti, a performance-based payment scheme was set up for NGOs that provided services to the population. The scheme resulted in all three participating NGOs reaching target immunization coverage rates (Eichler, Auxila, and Pollock 2001). Thus, payment for specified and observable performance (in terms of provider effort, client coverage, or health impact on the population) can be usefully applied to NGOs and private providers.

The specific features of performance-based remuneration are crucial. A study evaluating the South African government's experience in contracting with private organizations to operate district hospitals found no cost savings—in fact, the government was spending more than if it provided the services itself. The contracting may have failed because remuneration was not based on specific process or outcome measures. Instead, the

contractor's obligation, the methods of monitoring performance, and the sanctions for nonperformance were only minimally specified (Broomberg, Masobe, and Mills 1997).

**High Volume of Care.** Evidence exists that a high volume of care by individuals or institutions leads to better health outcomes (Habib and others 2004). Physician experience (learning) and practice (repetition) lead to fewer complications, less resource use, and better quality for a variety of procedures, such as cataract surgery and laparoscopy (Brian and Taylor 2001). More complex procedures, including endarterectomy, cancer surgery, and coronary bypass surgery, have shown similar effects.

Volume effects leading to better health outcomes are not confined to surgical procedures (Zgibor and Orchard 2004). Facilities specializing in the care of chronic diseases such as diabetes, myocardial infarction, and heart failure are also associated with better outcomes. Debate exists over how much of the volume effect is due to specialist care. The benefits of high-volume care persist, however, even after controlling for referral and case-mix biases. When carefully trained nonphysicians are substituted for physicians, volume effects persist but can be accomplished at significantly lower costs. In one study, nurse practitioners and physician's assistants were able to provide high-quality care for common outpatient conditions such as hypertension, diabetes, asthma, otitis media, pharyngitis, and back pain at substantially lower costs than that of physicians (Douglas and others 2004).

**Performance-Based Professional Recognition.** Providers work in a community of peers in which professional status, prestige, and recognition are often as valuable as material rewards. Nonmonetary incentives, such as public recognition or disclosure, administrative privileges, and awards from professional organizations, can promote improvements in quality. Uganda, for example, implemented the Yellow Star Program as part of a broader health services improvement project. This program evaluated health facilities on a quarterly basis, using 35 indicators of technical and interpersonal quality, and awarded a large yellow star to facilities that scored 100 percent in two consecutive quarters. The star was then prominently displayed outside the facility.

The Mexican Ministry of Health has implemented a strategy that combines the accreditation and the training strategies discussed earlier with nonmonetary incentives. The National Crusade for Quality in Health Care introduces quality-oriented incentives to health facilities and medical schools. It also includes public recognition in an effort to encourage learning and to change practice. The National Crusade has already generated measurable improvements in the responsiveness of state-level health systems (Secretaría de Salud de Mexico 2003).

Both types of policies examined in this section are associated with better quality and better health outcomes—lower



premature mortality and avoidable morbidity, increased patient satisfaction, and more health-seeking behaviors. When effective, these policies result in increased coverage rates, better prescribing patterns, and increased adherence to clinical guidelines. They can spell the difference between an individual's survival or death, between an individual benefiting from the encounter with the health sector or being harmed by it, and between an individual and society rising from poverty or sinking deeper into it.

## MEASURING QUALITY

Improving quality requires that we measure it accurately. The successful outcomes discussed in the previous section rely on the links between policy and changes in clinical practice. Such links, however, can be created and demonstrated only when valid and reliable measures of process are easily understood, inexpensive to obtain, resistant to manipulation, and related to better health outcomes.

### Measuring Structure

Material measures of structure abound. Numerous facility-based surveys in developing countries have cataloged capital equipment and staffing levels, and financial reports track budgets and expenditures (but rarely production costs). Facility inventories of drugs and supplies are generally available; service utilization figures are routinely reported to national-level authorities. Such measurements, however, are often beside the point. Even when material structural deficiencies are corrected, they are not reliably linked to changes in health outcomes. Measuring the organization and financing of health care is more difficult. Although descriptions of the organization and financing of health systems exist, objective functional assessments of systems (such as patient flows, the patient referral system, or details of the relative pricing of services) are less often available.

### Measuring Process

Technical advances have mitigated longstanding difficulties in measuring process. Five approaches and their strengths and weaknesses merit consideration: chart abstraction, direct observation and recording of visits, administrative data, standardized patients, and clinical vignettes.

**Chart Abstraction.** Chart abstraction, or review of the medical record, has long been used to measure technical quality. Such familiar quality evaluations as clinical audits, physician report cards, and profiles are based on chart abstraction. The core strength of the medical record is that it is ubiquitous and can generally be obtained after each encounter. Chart reviews, however, suffer from problems of legibility when notes are handwritten. Often they are generated for reasons other than recording the actual events of the clinical visit (legal protection

or obtaining payments, for example) and thus lack crucial clinical details. One prospective study showed that charts identified only 70 percent of items performed during the clinical encounter (Luck and others 2000). In a related analysis, 6.4 percent of the items recorded in the chart were false and had never really occurred.

Where resources and infrastructure are sufficient, the electronic medical record (EMR) is becoming a priority for health systems worldwide. EMR technology promotes uniformity, legibility, and communication, which can lead to guideline use and reduce prescription errors. It also holds the promise of managing populations rather than individuals by aggregating patients into groups. However, the EMR has not always lived up to its potential. In many countries, some impressive successes have occurred—as have spectacular failures, costing billions of dollars (McConnell 2004). The great heterogeneity in record-keeping practices, problems with medical records (both paper and electronic), and costs of trained medical abstractors have led to a search for other reliable ways to measure quality.

**Direct Observation and Recording of Visits.** Direct observation and recording of visits is a commonly used approach in developing countries (Nolan and others 2001). Ethically, the provider and the patient must be informed of the observation or recording, which introduces participation bias because provider behavior may change as a result of being evaluated. In addition, trained observers are costly, and variation between observers is difficult to remedy.

**Administrative Data.** Administrative data, collected for purposes of managing the delivery of care, are available in all but the poorest settings. A data collection system, once established, is ubiquitous and can provide information on charges and many cost inputs. Administrative data, however, lack sufficient clinical detail to be useful in evaluating process. In a 2003 study, an incorrect diagnosis was recorded in the data 30 percent of the time (although the diagnosis was made correctly). Overall, these data reflected the actual clinical diagnosis only 57 percent of the time (Peabody, Luck, Jain, and others 2004). As information systems advance, accuracy problems may be mitigated, although the lack of adequate clinical detail will continue to limit the use of administrative data.

**Standardized Patients.** Standardized patients can be a gold standard for process measurement (Luck and Peabody 2002). Trained to simulate illness, standardized patients present themselves unannounced into a clinical setting to providers who have previously given their consent to participate in the study. At the conclusion of the visit, the standardized patient reports on the technical and interpersonal elements of process. Standardized patients are reliable over a range of conditions and provide valid measurements that accurately capture

variation in clinical practice among providers over time. However, they are expensive and useful only for adult conditions and only those conditions that can be simulated. Thus, they are not practical for routinely evaluating quality.

**Clinical Vignettes.** Clinical vignettes were developed explicitly for measuring quality within a group of providers and evaluating quality at the population level. Vignettes are responsive to variation in quality, and providers readily accept them if they are given anonymously (Peabody, Luck, Glassman, and others 2004). More than 20 vignettes have been used in 13 countries around the world. They can be administered on paper, by computer, or over the Internet. Providers are typically presented with several cases. When process is being measured for many providers, each provider is presented with the same case or set of cases, thus eliminating the need for case-mix adjustment. The provider completing the vignette is asked to take a history, do an examination, order the necessary tests, make a diagnosis, and specify a treatment plan. The questions are open ended and include interactive responses that simulate the visit and evaluate the physician's knowledge. In two separate, prospective validation studies among randomly selected providers, vignettes consistently demonstrated greater predictive validity of process than did the abstracted medical record. Vignettes have been validated against the gold standard of standardized patient visits, and they reflect actual clinical practice, not just physicians' knowledge. Vignettes have several other advantages. Because exactly the same case can be given to many providers, vignettes are useful for comparison studies. They are also useful for pre- and postevaluations of policy interventions designed to improve quality. Finally, they are inexpensive to administer and straightforward to score, making them particularly useful in developing countries.

## ECONOMIC BENEFITS AND COSTS OF QUALITY CARE

Policy interventions can lead to higher-quality process of care and can rapidly improve a population's health outcomes, but is quality improvement cost-effective? This section shows that it is. We compare the economic benefits of better quality of care at the individual and population levels with the costs of implementing quality improvement interventions. We then discuss why these interventions not only increase individual and social welfare but also are cost-effective in the long run.

### Individual Economic Benefits

Individuals benefit from better quality of care because they are physically, emotionally, and mentally healthier. These benefits can be quantified subjectively by self-report, objectively by

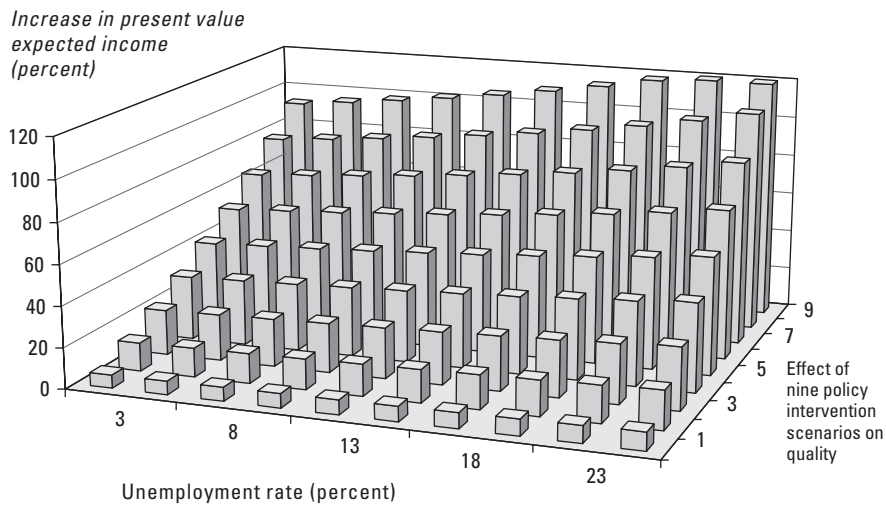
physiological assessments (such as blood pressure), and monetarily by measuring income. Other things being equal, a healthy individual generates more income than one who is often sick. This benefit goes beyond the period of illness. Research on early childhood development has shown that higher-quality prenatal and postnatal care not only decreases mortality but also improves subsequent school performance, which is critical to future labor productivity (Van der Gaag 2000). The monetary benefits of better individual health can be assessed by examining the individuals' expected income in the context of a life cycle model. Expected income depends on the risk of death at various points in time and the corresponding opportunities for educational attainment. This scenario can be simulated by improving quality and then estimating how much the higher quality lowers mortality and increases education attainment, both of which increase an individual's future income (see figure 70.2).

### Social Macroeconomic Benefits

Societies that have healthier populations also have higher levels of human capital and a greater capacity to generate wealth. Higher quality of care for the individual increases society's human capital by reducing both the number of premature deaths (thus increasing the labor force) and the amount of temporary or permanent disability (thus improving worker productivity). Providers and insurers also benefit from lower costs by avoiding unnecessary or inappropriate care. Thus, society benefits from both better health and lower public expenditures for treatment, which can then be reallocated to other productive uses. Interventions that improve quality have an especially high social value when they have large positive externalities (for instance, when better process reduces the incidence of a communicable disease). Sometimes, however, society benefits but some stakeholders do not. For example, physicians who provide better preventive care may experience less demand for their curative services and associated resources.

Several attempts have been made to estimate the correlation between health outcomes and long-term economic growth. The high prevalence of such diseases as malaria has been linked in some studies to a slowing of economic growth by one to two percentage points per year. These studies were severely limited by the number of countries and by the many unobserved factors excluded from the models (Sachs 2001). These limitations suggest another way to estimate the benefits of higher quality on health outcomes and long-term economic growth. Because diagnostic accuracy and treatment of malaria can be improved with better-quality care, improving quality should increase national income through reductions in mortality rates.

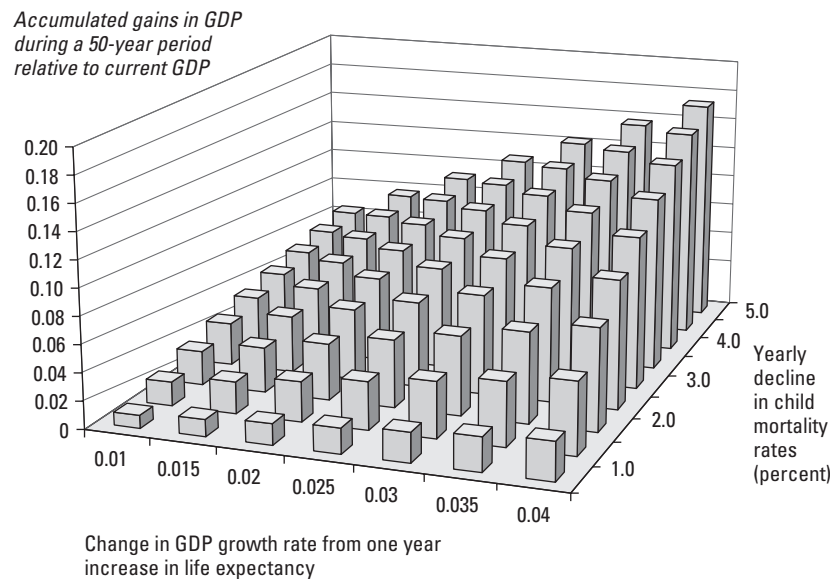
Indeed, cross-country data suggest that a one-year increase in life expectancy is associated with an increase in the gross domestic product (GDP) growth rate of 1 to 4 percentage points (Bloom, Canning, and Sevilla 2001). Our own simulations show



Source: Authors' calculations.

Note: These results model the effect on income of a policy intervention that leads to higher quality. The effect is determined as an increase in the present value of income for varying rates of unemployment. Higher quality is based on nine different scenarios of quality improvement. For each successive scenario, infant mortality rates are reduced by 1 percent and educational attainment is increased by 5 percent. The baseline possibilities are for the Islamic Republic of Iran.

**Figure 70.2** Economic Benefits of a Quality Intervention That Reduces Child Mortality Rates and Leads to Higher Educational Attainment



Source: Authors' calculations.

**Figure 70.3** Gains in GDP Resulting from Reductions in Child Mortality Rates

that quality improvements can result in as much as a 5 percent annual reduction in child mortality rates, which can generate, over 50 years, economic gains equivalent to 18 percent of current GDP (see figure 70.3). Similar results would be obtained if the effect of better quality on morbidity and disability were simulated.

### Economic Costs

Policies that improve the quality of care have both direct and indirect costs. Direct costs relate to the human and physical resources needed to implement the intervention. Indirect costs come from more subtle changes, including alterations in the quantity of health services provided, in provider demand for

various inputs (such as equipment and medication), in the market prices of health care, in government health budgets, and ultimately in the macroeconomy. For interventions at the local level, such as training doctors in a particular region, it is usually sufficient to measure direct costs. Although the level of detail required can be overwhelming when the interventions are complex, the calculations are usually straightforward. The costs of local interventions depend on local prices of such inputs as labor, transportation, training kits, food, space rental, and accommodations. The cost of training providers in the appropriate treatment of childhood illnesses ranges from a low of US\$1 to a high of US\$430 (Santoso, Suryawati, and Prawaitasari 1996).

The direct and indirect costs of interventions at the central or local government level are harder to quantify. Expanding training programs to all public providers, enforcing standards for private and public providers, changing payment systems, and developing policies to protect consumers against malpractice are macro-level interventions that have direct program-level costs. They affect the economy as a whole by changing the allocation of public resources and the relative prices of goods and services. Macroevaluations of health policy interventions are seldom conducted, even though systemwide interventions are likely to have the highest effect on quality and health-related benefits.

### **Cost-Effectiveness of Improved Process**

Two interventions that vividly illustrate the cost-effectiveness of improvements in clinical practice and outcomes have been chosen: detection and treatment of acute respiratory illnesses and appropriate drug use and treatment for diarrhea.

**Better Treatment of Pneumonia in Children.** Part of the high mortality from childhood pneumonia in the developing world can be explained by poor-quality care, which is defined as the inability either to accurately diagnose or to treat the disease. Our prototype intervention has two cost components: the cost of implementing an educational activity for providers and the cost of treating nonsevere and severe childhood pneumonia. The former component is based on a study and uses conservative high-end cost estimations (Kelley and others 2001); the latter is the midpoint from another study (Stansfield and Shepard 1990). The number of lives saved depends on the effect of the intervention—that is, the change in the percentage of cases diagnosed and treated; the prevalence rate of both types of pneumonia; the population covered by each provider; the case-fatality ratio; and the effectiveness of the treatment. Both the case-fatality ratio and the effectiveness ratio were fixed at middle values suggested by earlier work (Stansfield and Shepard 1990). For the other parameters, a large range of variation was considered, producing 450 scenarios. Finally, six

impact levels were considered, which were based on two previous studies (Chakraborty, D'Souza, and Northrup 2000; Mtango and Neuvians 1986).

The analysis showed that, under average conditions, improving quality of care for conditions of acute respiratory illness can be very cost-effective. When the baseline quality is low and the disease prevalence is high, an intervention that raises quality has a cost-effectiveness ratio of US\$132 to US\$800 per life saved; if the policy intervention is ineffective or the prevalence of pneumonia is low, the average cost of saving a life could be more than US\$2,000. When 60 percent of cases are already appropriately diagnosed and treated, the cost-effectiveness ratio rises to US\$5,000 per life saved.<sup>1</sup>

**Better Treatment of Diarrhea.** Diarrhea remains one of the leading causes of childhood morbidity and mortality in the developing world. The diarrhea incidence rate among children in resource-constrained countries can reach six to seven episodes per year (Thapar and Sanderson 2004). ORT is the accepted standard of care for acute diarrhea. Unfortunately, a large proportion of cases are still treated with nonrehydration medication, including antibiotics and antidiarrheals. Improved diagnosis of dehydration and reduced use of unnecessary medications, however, lead to better outcomes.

Various interventions can make sizable changes in the diagnostic and prescribing patterns of providers. Verbal case review, combined with a package of additional intervention referred to as INFECTIONOM (Information, Feedback, Contracting with Providers to Adhere to Practice Guidelines, and Ongoing Monitoring), increased the proportion of cases treated correctly from 16 percent to 48 percent (Bloom, Canning, and Sevilla 2001). One study reports that small group, face-to-face interventions reduced antimicrobial prescriptions by 16 percent and antidiarrheal prescriptions by 7 percent among a group of providers treating acute diarrhea in Indonesia (Santoso, Suryawati, and Prawaitasari 1996). The same study showed that formal seminars reduced antimicrobial use by 10 percent and antidiarrheal use by 7 percent. On the basis of these studies, an average cost per intervention was used, ranging from US\$25 to US\$125.

The savings from switching to a less costly treatment (instead of antibiotics, for example) were subtracted from the direct costs that are related to implementing the training activity. Because other savings, such as those related to a lower use of inpatient services, were ignored, the estimates are conservative. Savings could be greater: Two years after an ORT unit was established at the Kamuza Central Hospital in Malawi, 50 percent fewer children with diarrhea were admitted to the pediatric ward, and those admitted required 56 percent less intravenous fluid for rehydration (Martines, Phillips, and Feachem 1990).

Again, the number of lives saved depends on the disease prevalence; the effect of the policy on treatment quality; the

population covered by each provider; the average case-fatality ratio, which was set at 6 per 1,000 on the basis of Snyder and Merson (1982); and the effectiveness of the treatment. For the latter parameter, reductions in mortality rates following ORT treatment of 40 to 60 percent and reductions in effectiveness ratios of 5 to 100 percent have been reported (Shepard, Brenzel, and Nemeth 1986). Accordingly, the effectiveness ratio was set at 80 percent. As before, alternative values for the other parameters were adopted, generating 450 scenarios.

Educational interventions to improve the quality of care for treatment of diarrheal diseases are also highly cost-effective. In general, the cost of saving a life through educational interventions is less than US\$500 and could be as low as US\$14. Scenarios with high cost per life saved (more than US\$6,000) are when prevalence rates are low or when implementation costs for quality-related interventions are high.

Although the data available to estimate the costs and benefits of health outcomes and process are limited, these simulations, combined with published reports of successful policy interventions, clearly show the cost-effectiveness of interventions that improve health outcomes through better quality of care. However, reliable measures of quality are necessary to design and evaluate these interventions.

## RESEARCH AGENDA ON QUALITY

Most of the issues discussed throughout this chapter represent important topics for research. Establishing a research agenda requires prioritizing both the type of research and the topics to be studied. Quality-of-care research must also strike a balance between relevance to decision making and excellence in scientific rigor (Frenk 1992).

Observational studies are needed to document the extent and correlates of quality at various levels: individual providers, institutional providers, health care systems, and whole populations. Apart from offering much-needed basic descriptions (especially in developing countries), these studies can test specific indicators of the dimensions of quality and can compare the measurement approaches discussed earlier.

Intervention studies introduce planned changes into health care settings and assess their consequences. It is fundamentally important that intervention studies compare one provider group or policy alternative with another. In addition, control groups must be used so that any observed change can be attributed to the intervention itself rather than to another source of variation. The external validity of studies is often undermined by the choice of highly specific sites, making it difficult to generalize the findings and to build a body of sound evidence. If randomized trials cannot be conducted, the preferred option is quasi-experimental studies with clear control groups and longitudinal designs (Peabody and others 1999).

Such studies should be complemented by cost-benefit and cost-effectiveness analyses. Sometimes, in public health emergencies, for example, control groups may not be practical or ethical, in which case real-time operations research is an acceptable substitute.

In the area of research topics, top priority should be given to quality monitoring and assurance strategies to gain an understanding of exactly what the health system is contributing to society and at what cost. Quantifying the associated costs of different variants of quality monitoring and assurance strategies should also be a high-priority item on the quality research agenda. The second priority should be to increase the evidence base regarding the effects on provider behavior of public policies concerning quality of care and whether they lead to better health outcomes. We need to learn more about the long-term effects of different contracting and remuneration policies on providers' practices and the consequent results of such policies for health outcomes. Finally, we need to understand how contracting and remuneration policies affect problems unique to the developing world, such as the use of doctor substitutes and the migration of skilled providers to wealthier countries.

## CONCLUSION

Good quality means that providers are able to manage an individual's or a population's health care by timely, skillful application of medical technology in a culturally sensitive manner within the available resource constraints. Eliminating poor quality involves not only giving better care but also eliminating underprovision of essential clinical services (systemwide microscopy for diagnosing tuberculosis, for example); stopping overuse of some care (prenatal ultrasonography or unnecessary injections, for example); and ending misuse of unneeded services (such as unnecessary hysterectomies or antibiotics for viral infections). A sadly unique feature of quality is that poor quality can obviate all the implied benefits of good access and effective treatment. At its best, poor quality is wasteful—a tragedy in severely resource-constrained health care systems. At its worst, it causes actual harm.

Despite the urgency of improving health in developing countries, quality of care has been largely ignored. Both providers and patients agree this must change, but how can this goal be reached? From the information marshaled for this chapter, we can draw five conclusions:

- Better quality leads to better health outcomes in developing countries.
- Process, the proximate determinant of health outcomes, can be measured in valid and reliable ways, such as clinical vignettes and electronic medical records.

- Measured in the above ways, the process of care in developing countries is poor.
- The process of care can be improved in the short term.
- Policies affecting structural conditions, including the actual process of care or the continual design and redesign of the health care system, have been shown to be effective in developing countries.

We believe that two broad strategies would help to rapidly improve health care quality in developing countries:

- encouraging explicit comparative research on outcomes and process
- disseminating empirical findings on quality variation.

### **Encouraging Explicit Comparative Research on Outcomes and Process**

Comparisons highlighting different outcomes can be compelling. For example, when 30-day mortality rates for coronary artery bypass surgery at various facilities were disclosed in the United States, care started to shift from many low-volume hospitals to high-volume hospitals (Chassin 2002). In developing countries, comparisons show that the insured are more likely to have cesarean sections than are the uninsured (Barros and others 1991). Although critics of comparative analysis are justified in saying that systems and populations vary, such criticism misses an important point: Differences in outcome highlight possibilities that help in the search for the underlying causes of poor quality. Although poor quality may have many causes, one of them is almost always poor clinical practice, which can be remedied. We also favor a league or summary table approach to making comparisons. In this approach, the providers being compared agree on criteria before prospective assessments are done. The data for the comparison should be of the highest quality; the league tables themselves should be easy to interpret; and the findings should be rapidly available (Devers, Pham, and Liu 2004). The league table itself should be set up at the regional, national, and international levels so that a variety of benchmarks are available.

Implementing quality comparisons will greatly facilitate the process of policy evaluation and cost-benefit analysis and help indicate directions for future research. Access to accurate, consistent quality-of-care data will compel external funders, such as the World Bank, to build quality assurance into their lending and development programs. As major health programs such as the Global Fund to Fight AIDS, Tuberculosis, and Malaria are scaled up around the world, mechanisms to measure and improve care quality will grow more important.

### **Disseminating Empirical Findings on Quality Variation**

Public dissemination of information on quality, particularly in low-literacy countries, does not seem to create the individual-

based choice market that many have envisaged. Instead, it motivates managers and providers to undertake changes that improve the delivery of care (Schneider and Lieberman 2001). Outside pressure—perceived or real—appears to extend the quality debate beyond traditional boundaries, allowing for innovative collaborations and “out of the box” thinking (Devers, Pham, and Liu 2004). Nongovernmental and private organizations involved in health care delivery should also be required to report basic quality measures, perhaps as a condition for funding, thus ensuring that similar pressure to improve quality is exerted outside the public sector.

Public dissemination can create shock waves when poor quality is “discovered,” leading to popular demand to increase quality. For example, findings of widespread medical errors in the United States, estimated to have resulted in as many as 98,000 deaths per year, launched the medical safety revolution (Institute of Medicine 2001). Dissemination among physicians and surgeons by means of report cards and ratings has been effective at changing clinical practice. One advantage of dissemination among providers is that the results can be more refined and technical than ratings meant for wider audiences. Dissemination is the responsibility of public research and public initiative. Because dissemination is inherently controversial, it requires public financing—even more than other public goods (Jamison, Frenk, and Knaul 1998).

Ultimately, improving quality is about value. In health care, price is not a reliable proxy for quality and cannot be used as a guide. Because patients and consumers cannot directly observe quality, their ability to demand high-quality services is limited, and they are often left to settle for a market that has suboptimal equilibrium and poor quality of care. In addition, providers often lack knowledge of optimal treatments and technologies and thus are not aware of how they can produce higher-quality care. Because the provider-patient interaction is so private and personal, quality of care is hard to observe and to measure. New measurement tools, however—such as clinical vignettes and the electronic medical record—are being developed and improved. As research links care with outcomes and cost inputs, we can expect to have more accurate and reliable data about clinical practice for use in making quality assessments.

Investments in quality, however, must be judged critically as well. When we invest in quality, an investment can be beneficial but can come at a cost. So while quality goes up, value can go up or down—or costs can go up while quality actually goes down or stays the same, thus pushing the value of care down and undermining other efforts to improve quality. Finally, as we showed for acute respiratory illness and diarrhea, quality can go up and costs go down, thus increasing overall value. Examples of this optimal outcome must be actively sought out and reported, because the success of a given investment cannot be known in advance (Berwick 2004).

Improving health status does not have to rely solely on macroeconomic growth or other long-term development indicators. Health outcomes can be rapidly improved in the short term by ensuring the appropriateness of the circumstances or setting under which the health care encounter occurs (structural improvement) or by increasing the likelihood that health care providers behave in ways most beneficial to patients under the prevailing circumstances (process improvement). However, this improvement will not occur spontaneously or routinely, despite the best intentions of beneficiaries, providers, and governments. Quality improvement tools and technologies and information on successful quality improvement policies must be consistently shared among developing countries to build local capacity. Funding and incentives must also be consistent with high quality. Finally, the political will to ensure that quality becomes a top priority on the health reform agenda must be sustained.

## NOTE

1. As a reference, if the average expected value of a life is close to US\$30,000, even the highest cost-effectiveness ratio found in the analysis (US\$12,000 per life saved), would imply a cost-benefit ratio below 50 percent, assuming an initial average wage of US\$1,000 growing at 2 percent per year, a 5 percent discount rate, and unchanged mortality rates.

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