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Report No. 1

**Measuring Results of
Health Sector Reform
for System
Performance:
A Handbook of
Indicators**

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Abstract

This handbook presents indicators for five key dimensions of health system performance: access, equity, quality, efficiency, and sustainability. These performance measures are considered within a framework that maps the linkages between health sector reform, changes in health system performance, and ultimately, changes in health status. It also provides a rationale for focusing on system performance as one of the principal ways to measure results of health sector reform. Through definitions and discussion of each of the five key dimensions, and then presentation and explanation of the indicators themselves, the handbook attempts to make the indicators understandable, accessible, and usable in a way that will bring the intended results.

The indicators focus on health system performance—as opposed to specific health services, programs, or health status, for which general consensus about indicators already exists—as a way to measure the results of health care reform in low- and middle-income countries. The handbook brings together what is known and practiced in these countries. It makes no value judgement about approaches to health reform, which may vary widely from country to country, system to system. Rather, it is intended to enable local health professionals and donor organizations to design and implement, and then evaluate and refine health sector reforms based on empirical evidence in order to achieve desired results; and to compare the range and type of results that health sector reform is achieving internationally. Finally, the handbook presents a methodology to select most relevant indicators, depending on intended use in individual countries.

Measuring Results of Health Sector Reform for System Performance: A Handbook of Indicators

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Acronyms

GDP	Gross Domestic Product
HMO	Health Maintenance Organization
IEC	Information, Education, and Communication
MCH	Maternal and Child Health
MOH	Ministry of Health
NGO	Non-Governmental Organization
PHC	Primary Health Care
PHR	Partnerships for Health Reform Project
USAID	United States Agency for International Development

Foreword

This handbook was prepared by the Partnerships for Health Reform (PHR) Project at the request of the United States Agency for International Development (USAID), for field testing by PHR in coordination with USAID Missions.

PHR has developed this handbook from a wide range of literature as well as the experience of its own staff and other experts. Because of the relative newness of indicators related to health sector reform in the international health community, PHR plans to conduct a full field discussion of this version of the handbook and conduct systematic in-country trials to collect data, determine practicality, and evaluate host country interpretation and usefulness of the indicators.

Acknowledgments

James Knowles, a health economist on the Partnerships for Health Reform Project, is the principal author of four of the five sets of indicators in this handbook (i.e., those related to access, equity, efficiency, and sustainability). Chris Grundmann of the Partnerships for Health Reform Project and Wayne Stinson of the Quality Assurance Project are the principal authors of the section on quality indicators. Charlotte Leighton, Partnerships for Health Reform Project Deputy for Technical Direction, was the principal author of the overview section and made contributions throughout the handbook document.

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1.0 Overview: Purpose, Definitions, and Framework for This Handbook

1.1 Introduction and Purpose

This handbook presents a series of the most commonly used indicators for five key dimensions of health system performance: *access*, *equity*, *quality*, *efficiency*, and *sustainability*. It places these performance measures in a framework that maps the linkages between health sector reform, changes in health system performance, and, ultimately, changes in health status. It also provides a rationale for focusing on system performance, as a principal way to measure results of health sector reform.

The indicators and discussion focus on health system performance as one of the key dimensions of the impact of health reform, rather than on health reform per se. That is, the indicators are designed to monitor some of the results of health reform; they are not intended to express value judgments about any particular reform approach, policy, strategy, or technique. There are many alternative approaches and technical solutions to the problems that health sector reforms try to address, each with its own set of strengths and weaknesses. While a major objective of health sector reform in many countries is to improve the performance of the health system, interpretation of whether a particular indicator (e.g., percent of government funding allocated to primary and preventive health services, percent of services delivered by the private sector) has changed performance for better or for worse can vary depending on each country's starting point, its reform goals, and its visions about what the health system should be designed to achieve.

In this environment of broad policy and system diversity, what is meant by “health sector reform” and what results it might produce vary relatively widely. There is corresponding uncertainty about how to measure reform results and what indicators are valid for monitoring progress toward achieving health sector reform goals.

This handbook is intended to serve as a vehicle for international discussion and consensus-building on these points—on system performance as a measure of the results of health sector reform, on the principal categories of indicators for health system performance (access, equity, quality, efficiency, and sustainability), and on a set of illustrative, specific indicators for these dimensions of system performance. Section 1.9 of the handbook describes the methodology for consensus-building.

Specific objectives of the handbook are to:

- promote evaluation and monitoring of health sector reform in low- and middle-income countries so that reform policies and practices can be based on empirical evidence and be more likely to achieve intended results;
- provide in a single document many of the indicators that are considered to be most useful for monitoring the results of sector reform that aim to improve health system performance;

- define these indicators in a way that can be widely accepted, understood, and applied consistently across reform programs and countries; and,
- develop consensus among policy makers, program managers, evaluators, researchers, and international donors on a menu of indicators to measure the impacts of health sector reform efforts that are focused on improving efficiency, access, equity, quality, and sustainability.

1.2 Health Sector Reform

The term “health sector reform” is more and more commonly used in international health discussions (Berman, ed., 1995; Dunlop and Martins, eds., 1995; McPake and Kutzin 1996; Leighton 1996; Walt 1994). People use it with a wide range of connotations and diverse set of specific actions or content in mind. Often, people’s understanding of what health reform is, or should do, follows an explicit or implicit view of the health system—whether as a simple schema with three or four components and one or two overall purposes, or a complex set of actors, institutions, flows, and relationships with multiple purposes.

For purposes of this handbook, it is not as important to develop a precise definition as it is to capture the range of goals and scope of action that actual health sector reforms encompass. The definition here is meant to provide a framework that can include a variety of country approaches. Defining specific goals, strategies, and content is what the reform process in each country is all about.

This handbook defines “health sector reform” as a process that seeks major changes at the national level in policies, programs, and practices regarding goals and priorities; laws and regulations; organizational and management structure for health services; and financing sources, mechanisms, and resource allocation. The terms “national” and “sector” are intended to imply the totality of the health care system in a country—that is, preventive, curative and/or public health services; the public and private sectors; primary, secondary and tertiary care. Sector reform also implies a process affecting more than one facility, provider, program, institution or geographic location, though there is no consensus on when changes in one or more individual programs, or one or more districts, for example, “add up” to sector-wide reform.

WHAT IS HEALTH SECTOR REFORM?

Health sector reform is a process that seeks major changes in national policies, programs, and practices through changes in health sector priorities, laws, regulations, organizational and management structure, and financing arrangements. The central goals are most often to improve access, equity, quality, efficiency, and/or sustainability.

Health sector reform is deliberate, planned, and intended to make long-term, permanent changes, rather than ad hoc or emergency action. It is about seeking solutions to major problems in a country’s health care system and involves many actors, institutions, and stakeholders. While most of the health sector problems that reformers identify tend to be relatively “technical,” solutions

require much more than developing or applying the “right” technical answer. Designing and implementing health sector reform is a preeminently political process.

1.3 Why and How Countries Are Embarking on Health Sector Reform

Many governments around the world have embarked in recent years on extensive policy and implementation efforts to reform their health sectors. These reforms often center on ways to improve the access, equity, quality, efficiency, and sustainability of health services and systems. These efforts have included debate on the respective roles of the public and private sectors, goals of the health system, and relative merits of curative, preventive, and public health services.

In the course of these reform movements, a good deal of work has been carried out to identify problems in health system performance, causes of poor health status, and specific strategies and techniques for designing and implementing reforms. Governments have undertaken—and international donors have supported—efforts to improve or sustain the performance of specific priority health services (e.g., child health, family planning), types or levels of health providers (e.g., hospitals, district networks), financing and organizational arrangements (e.g., insurance, health maintenance organizations, decentralized district structures), or allocations of public funding (e.g., estimates of burdens of disease and cost-effective health services).

A wide range of stakeholders have an interest in health sector reforms. Their points of view often vary by their role in the health system and on the starting point of the health care systems they are currently functioning in and trying to reform. These range from systems that are completely or largely based on government-financed and government-provided health care services such as socialist and transition economies in the Former Soviet Union, Eastern Europe, and Africa; mixed government, social security, and private sector systems such as those found in Latin America; mixed government, nongovernmental organizations, and nascent for-profit private sector systems in Africa, Asia, and the Near East; and mixed government and “full-fledged” private sector systems in southern Africa, Asia, and the Near East.

In these various systems, in all parts of the world, many government officials, health personnel, health planners and other stakeholders want mainly to increase access and focus on the supply of health services. Economists in ministries of planning and finance, as well as in research institutions, may emphasize efficiency and cost-effective services. Other public health advocates and economists may emphasize equity. Some public health professionals and health program managers may insist on improving quality, health status, and overall national mortality rates regardless of cost. International donors may press for sustainability of programs and projects once their assistance ends. Consumers want access to better health care as they define it, at prices they can afford.

1.4 Why This Handbook Is Needed

In debates about health sector reform, the relationship is not always clear among different kinds of reform strategies, what types of health sector reforms might be expected, and why sector reform might be important to the effectiveness of priority health services and people's health. Corresponding uncertainty also exists about appropriate ways to measure the results of health sector reform efforts, to monitor the effects of policy changes to see if they are achieving the desired results, or to build a body of knowledge that can help to target reforms to better achieve the intended goals.

Relatively solid evaluation experience and consensus about goals and indicators to measure them exist for a variety of specific health services and programs (e.g., immunization, family planning) in low- and middle-income countries. But indicators for health sector reform that seeks to improve system-wide performance are much less well-developed and much more controversial. Various indicators of health system performance have been used widely in Europe and the United States; some have been applied by some specialists in less-developed countries. But much less consensus exists at the policy or the technical level about appropriate indicators to be applied in these countries. And much of the effort that has been undertaken is unfamiliar to the broader international public health community.

This handbook seeks to fill these gaps. The Partnerships for Health Reform Project (PHR)—under its mandate from USAID to provide assistance worldwide with health sector reform and to develop related indicators to measure results—has developed the handbook in an effort to bring together what is known and most commonly practiced among those who have focused on developing and measuring health sector reform aimed toward improving access, equity, quality, efficiency, and sustainability of health systems in low- and middle-income countries.

In filling these gaps, this handbook focuses on indicators of performance at the system (or program) level, rather than on indicators that measure results of health sector reform at the population level (e.g., indicators that are related to people's use of health services, health behavior, or changes in the population's health). This approach reflects PHR's focus on one of the main gaps that exist in measuring and evaluating results of health sector reform. Many other efforts and a good deal of experience exist with indicators that measure health service utilization and health status. For example, other USAID efforts in indicator development are represented by projects that focus on specific health and population services, such as the EVALUATION Project, POLICY Project, BASICS, AIDSCAP, OMNI, and MotherCare. The World Health Organization has also devoted considerable effort to developing frameworks for assessing decentralization, health financing reform, and evaluation issues related to using indicators for health reform.

1.5 Audience and Use

PHR developed these indicators for use by several different audiences, including:

- *Policy makers and program managers* in low- and middle-income countries, who might use the indicators for both policy-making purposes (e.g., to assess their current situation in order to identify where reform actions may be necessary), as well as for program

implementation and policy refinement (e.g., to monitor whether reforms are achieving intended results);

- *Evaluators and researchers*, who might use the indicators to track changes in health system performance in given countries over time and to assess the effectiveness of specific reforms in achieving the desired results across a variety of country settings; and
- *International donors*, who might use selected indicators to measure the results of implementing reform policies they have supported and make international comparisons of the range of possible health reform results and varying levels of system performance that can result from similar reform approaches in different settings.

The handbook is not designed to create “scores” that would directly determine national or international donor budget allocations, create international comparisons that rank countries on a normative scale, establish a single set of standard indicators that might be applied to all countries, or create a fixed list of “acceptable” indicators for the results of health sector reform.

Individual countries or evaluation efforts would not use all indicators simultaneously. For most purposes, users would select a limited set of indicators that are most relevant to the specific health sector reform objectives in the given country setting, as well as to the specific purpose (e.g., monitoring, research, policy development). The final section of this handbook provides a methodology that can be used in developing a short list of indicators tailored to specific purposes and circumstances.

1.6 Conceptual Framework

Most often, ministries of health undertake health sector reform efforts with the goal of improving the performance of their country’s health system so that it will provide greater access to higher quality health services and/or to make it more efficient, equitable, sustainable. Many ministries, service providers, and researchers have identified characteristics that lead to poor performance in their health systems. These characteristics include poor quality, insufficient funding, inefficient use of available resources, inadequate allocation of resources to cost-effective health services, lack of incentives for health workers to provide quality care, inadequate regulation or inappropriate barriers to private provision of health care, inequitable distribution of resources between urban and rural areas and between poor and better-off populations, and high household health expenditures even in the midst of “free care” systems.

Usually the problems that ministries seek to address are interrelated and require a combination of reform strategies. These strategies, in turn, often have impacts on more than one dimension or level of the health system (e.g., on both primary and tertiary care, on both financing and management of service delivery) and on more than one of the reform goals (e.g., on both efficiency and sustainability). They can also have both intended and unintended effects, or positive results for one goal but negative for another. For example, improvements in financial sustainability can have negative results for equity unless there are countervailing measures to protect the poor.

Equally important, specific technical strategies used to address these performance problems also require political, institutional, and management actions—such as consensus-building, overcoming of bureaucratic constraints, and decentralization of authority—to address the variety of organizational and political obstacles that health sector reform faces. Usually, the technical strategies are not sufficient, by themselves, to achieve the desired goals. Moreover, indicators of system performance may not capture the whole picture of reform results.

Table 1-1 (page 7) illustrates some of the main health sector reform goals that ministries have identified to improve health system performance, along with illustrative strategies and secondary goals or impacts.

For example, raising revenues through user fees may be undertaken primarily with the goal of making some kind of quality improvement or promoting financial sustainability. User fees also have an impact—and can be designed deliberately so—on goals for equity, access, and efficiency. Similarly, most sector reforms related to insurance and user fee systems will affect utilization of different kinds of health services (e.g., curative vs. preventive) at different levels of the system (e.g., hospital vs. health center); how efficiently providers use resources; and whether consumers spend their money for health in a cost-effective way. In addition, the introduction or increase in insurance coverage or user fees is likely to have different impacts on different population groups, therefore affecting equity of financial and geographical access to health services.

This situation makes evaluation of health reform results a complex one and often leads to uncertainty about which indicators to use for which purpose. The conceptual framework underlying the indicators presented in this handbook is designed to shed light on some of these issues and clarify some of the main paths through which health sector reform affects health services, people’s behavior, and, ultimately, the health status of the population.

The framework in Figure 1-1 (page 8) illustrates the main pathways from health sector reform to improved health of the population, including the feedback process by which reforms are periodically adjusted, fine-tuned, and given mid-course corrections. In addition to showing how sector reform can have results for health status, the framework can also be used to trace “backwards” from poor health status indicators to identify some of the obstacles in the health system that reform may need to address before people’s health can be improved. It is designed to place the role of improved system performance in perspective and to set the context for interpreting the indicators in this handbook.

In this framework, health sector reform strategies lead to policy change on a variety of fronts (e.g., legal, financial, organizational). These policy changes, in turn, produce changes in practice related to the inputs (e.g., funding, personnel), processes (e.g., supervision, management), and outputs (e.g., health care services; medications; supplies; health education/information, education, and communication [IEC]) of health systems and programs. Changes in these inputs, processes, and outputs that health reform strategies have produced are what result in changed (improved) system performance (measured by indicators related to access, equity, and so forth) and changed service utilization (measured by population behavioral change using indicators for service utilization, health seeking practice, lifestyle, and so forth).

Together, these two sets of “intermediate” results—changes in system performance and service utilization—are linked directly to changes in the population’s health, as measured by, for

<i>Table 1-1</i> Illustrative Health Sector Reforms: Purpose, Goals, Strategies		
Overall Purpose of Health Sector Reform: Improve Health Status		
Strategy (Technique)	Primary Intended Goal(s)	Secondary Goal or Impact
<p>Change Laws and Regulations</p> <ul style="list-style-type: none"> provide tax waivers for imported public health commodities; permit private practice of medicine; strengthen licensing and accreditation; permit “moonlighting” for public health personnel; clarify insurance regulations to facilitate health insurance 	Access	Financial Sustainability Quality
<p>Raise Revenue</p> <ul style="list-style-type: none"> user fees; insurance plans and prepayment schemes to pool risk and make it easier to mobilize resources for health 	Quality Financial Sustainability	Equity Access Efficiency
<p>Reallocate Resources</p> <ul style="list-style-type: none"> increase MOH budget share for primary health care and cost-effective service packages; reduce government subsidies for hospitals; shift HIV/AIDS treatment out of hospitals 	Efficiency Cost-Effectiveness	Equity Quality Financial Sustainability
<p>Develop Alternative Organization of Service Delivery Resources</p> <ul style="list-style-type: none"> increase role of private providers; establish HMOs; involve employer-based health providers; decentralize MOH responsibilities for health services to regional or district level 	Efficiency Cost-Effectiveness	Access Financial Sustainability

example, changes in mortality or fertility rates. While many other factors in the environment, economy, and society also affect people’s health, Figure 1-1 is limited to illustrating key aspects of the role of the health system. It is also important to note that Figure 1-1 does not illustrate in detail the role or impact of people’s demand and health-related behavior on their health status, or the relationship between health reform and changes in health service demand and behavior.

The framework in Figure 1-1 illustrates primarily the supply side of changes induced by health sector reform. In this framework, pathways through which health reform might affect demand for health services, or health-related behavior change, underlie and are summarized only by the single box for utilization and behavior change (lower right corner of Figure 1-1). The supply-side focus in the framework and in this handbook is appropriate since health sector reform efforts that aim to change system performance—the focus of this handbook—address and are measured primarily by changes in the inputs, processes, and outputs of the supply and provision of health services.

A variety of approaches exist to explain health service demand and behavior changes, depending on the main health service(s) of interest (e.g., family planning, maternal health, child health, preventive, primary or hospital care) and depending on the main perspective and theoretical base for the analysis (e.g., economics, health education, medical anthropology). Relatively little work has been conducted to elaborate these various models in the context of developing evaluation or performance indicators for programs attempting to change demand or behavior. Family planning represents one service for which a relatively systematic attempt to do this has been carried out. (See, for example, Bertrand, Magnani, and Knowles 1995.) Virtually no systematic work, however, has yet been conducted to develop a framework to trace the interaction between health sector reform and changes in demand and health-related behavior. Such an effort is the subject of other PHR work, though beyond the scope of this handbook.

1.7 Types of Indicators in This Handbook

The list of indicators in this handbook does not exhaust those that could be used to measure health system performance. For purposes of generating a baseline for discussion, the handbook includes many of the most common indicators used for each performance dimension, and those for which data might be most readily available. In addition, several indicators can be used to measure more than one dimension of health system performance (e.g., both equity and access) and might have been included in a category other than the one chosen here. The conceptual framework proposed in the handbook is designed as a tool to help develop additional indicators and to classify them in ways that are tailored to country settings and purposes, while remaining consistent with a common evaluation approach.

The list is also not an exhaustive one for measuring the results of health sector reform efforts. For example, the handbook does not include indicators for results of health sector reform efforts designed to affect dimensions other than system performance (e.g., indicators for reforms that seek changes in the policy environment or in specific health, nutrition, and population programs or services).

Indicators in this handbook are primarily interval or continuous measurements, such as numerical values, rates, and percentages (e.g., costs per hospital admission; percent of outpatient visits obtained from the private sector; percent of government health expenditure directed to primary care; percent of patient contacts in which treatment received is consistent with national diagnostic and treatment protocols, including guidelines for client-provider interaction). Many are also dichotomous and are rated “yes” or “no” (e.g., existence of national facility standards, including enforcement mechanisms).

Attempts to score, or rank, health system performance indicators according to standardized rules is largely premature, and is in many cases related to varying views about the goals of a health system. For example, there is no consensus on what percentage of national or governmental funding devoted to primary health care, or to hospital care, is an “appropriate” or “effective” percentage. There is no consensus on ratios of spending on personnel, compared with non-personnel inputs; or on services provided by private sector health care providers, compared with public providers; or on services covered under social or private insurance, compared with direct government provision and financing.

While there may be some agreement on the outer boundaries of these percentages and ratios, no international norm exists. The handbook will revisit this topic during the consensus-building discussions to see if it is possible to identify a select few indicators for which sufficient international consensus exists on norms that could be incorporated into a standardized scoring system.

Indicators presented here are assumed to be empirical measurements of the five dimensions of health system performance (access, equity, quality, efficiency, and sustainability). A “valid” indicator is one which is closely related (i.e., correlated) with the underlying observed factor. Much of the following discussion of individual indicators relates to whether the proposed indicator is a valid indicator of one or more of the dimensions.

1.8 Data Sources

Indicators in this handbook have been designed to require data that are relatively accessible, either in widely available secondary sources that use common definitions across countries (e.g., World Bank or World Health Organization databases, Demographic and Health Surveys) or in host country documents (e.g., ministry of health budgets, management information systems, or health information systems; ministry of plan or finance documents; donor project appraisals and evaluations). In some cases, special surveys of households, health care consumers, or providers may be required.

While multiple sources are likely to be required for any set of 10 or more indicators, users can often develop a short list of indicators for specific purposes that require only modest investment in primary data collection. Costs can also be minimized by developing short lists of indicators that need to be collected only every three to five years.

1.9 Methodology and Consensus-Building

PHR has developed this handbook from a wide range of literature, experience, and practice addressing health sector reform issues, its results, and attempts to measure health system performance change. The Project has consulted a variety of experts and has benefitted from others' efforts to develop indicators and evaluation methodologies for specific health services. Because of the relative newness in the international health community of such an attempt with respect to health sector reform, however, PHR plans to conduct a full field discussion of this version of the handbook. The Project will use this discussion to refine and enrich the indicators presented here, resolve key policy and technical questions, and develop greater consensus and knowledge around a menu of indicators for application in a variety of country settings.

PHR plans to conduct the consensus-building process by holding consultative sessions with intended users—policy makers, program managers, researchers, and international donor representatives—to evaluate the relevance and technical aspects of the indicators proposed here, identify alternatives, and develop consensus. The Project will also conduct a systematic set of in-country trials in representative countries to collect the data, determine practicality, and evaluate host country interpretation and usefulness of the indicators. PHR will also circulate the handbook to a wide number of colleagues in international institutions, and it encourages readers to submit comments, test the indicators, and report on usefulness.

2.0 Indicators for Health System Performance: Access, Equity, Quality, Efficiency, and Sustainability

Indicators of Access

Physical Access

- *Percent of (rural, poor) population residing within X kilometers of a health facility*
- *Percent of (rural, poor) population residing within X kilometers of a health facility providing a package of basic health services*
- *Percent of (rural, poor) population residing within X kilometers of a health facility staffed by a doctor*
- *Percent of (rural, poor) population residing within X kilometers of a pharmacy*
- *Percent of the population residing within X kilometers of a hospital*
- *Percent of population residing within X kilometers of a hospital providing 24-hour emergency (obstetric) care*
- *Percent of population served by 24-hour ambulance services*
- *Percent of health facilities equipped with telephones or radios*
- *Percent of population residing more than X kilometers from a health facility who are covered by outreach services*
- *Population per doctor*
- *Population per nurse*
- *Population per hospital bed*

Economic Access

- *Average total private cost of professionally treated outpatient illness episode as a percent of monthly per capita household income for consumers in the lowest per capita income quintile*
- *Average total private cost of medicines for a typical outpatient illness episode as a percent of monthly per capita household income for consumers in the lowest per capita income quintile*
- *Average total private cost of an average hospital stay as a percent of annual per capita household income for consumers in the lowest per capita income quintile*
- *Average fee charged per outpatient visit by nearest government ambulatory health facility*
- *Average cost per day of hospitalization at nearest government hospital*

2.1 Indicators of Access

2.1.1 Definition of Access

The concept of “access” usually refers to the presence or absence of physical or economic barriers that people might face in using health services. Physical barriers are usually interpreted to mean those related to the general supply and availability of health services and distance from health facilities. Economic barriers are usually interpreted to mean those related to the cost of seeking and obtaining health care, in relation to a patient’s or household’s income. Many of the features of “access” are also included in definitions of the structural aspects of quality of care assessments.

2.1.2 Discussion of Access

Many health sector reform efforts give top priority to improving access and consider it the most important dimension of health system performance to be strengthened. One of the priorities of health sector reform is to expand access to cost-effective health services that maximize impact on health outcomes for the population.

In some cases improving access may imply providing services free of charge or even paying consumers an incentive. For example, incentives have most often been paid to acceptors of family planning services, particularly in Asian countries. In other cases, it may involve bringing services to the consumer’s doorstep, thus reducing time and travel costs to zero.

Reform efforts to improve access can also be compatible, or not, with the goals of efficiency and equity reforms. For example, although proximity to basic health services is desirable, it may not be efficient to allocate sufficient resources for every village to have a health center or hospital. On the other hand, reforms to promote equity may imply targeting efforts to improve geographic accessibility on the poorest communities.

The following indicators relate directly to system, or program level measures of the presence or absence of the most common physical and economic barriers to health services. The ultimate outcome, and success, of addressing these barrier issues would be measured by changes in people’s use of the health services (population measures). The latter indicators will be included in the revised version of this handbook, following the field test.

2.1.3 Indicators of Access

Physical Access

- *Percent of (rural, poor) population residing within X kilometers of a health facility*
- *Percent of (rural, poor) population residing within X kilometers of a health facility providing a package of basic health services*
- *Percent of (rural, poor) population residing within X kilometers of a health facility staffed by a doctor*
- *Percent of (rural, poor) population residing within X kilometers of a pharmacy*

The above indicators are measures of physical access to primary health services. Where physical access is not a problem for urban populations, the indicators should be applied to the rural population only. Alternatively, equity concerns (discussed below) may suggest measuring the above indicators relative to the poor population (e.g., the lowest income quintile).

The particular distance (X) would differ from one setting to another depending on modes of transportation available and quality of roads (3 or 5 kilometers are commonly used distances for the above indicators). Distance measures are most often available in government health statistics and will be increasingly available with the use of geographic information systems. The estimates are most often prepared manually at present, using population census data and maps showing the location of health facilities.

Sometimes, measures of time needed to travel to facilities are used instead of distance, but indicators based on time are sensitive to the mode of transport available. Cost of transportation is sometimes also used, either as an alternative indicator or added to an estimate of the opportunity cost of travel time (sometimes referred to as the “access price”). However, neither time nor travel cost data are as readily available as distance measures.

- *Percent of the population residing within X kilometers of a hospital*
- *Percent of population residing within X kilometers of a hospital providing 24-hour emergency (obstetric) care*
- *Percent of population served by 24-hour ambulance services*
- *Percent of health facilities equipped with telephones or radios*

These are similar indicators of access to hospital services (10 or 15 kilometers are commonly used distances for these indicators).

- *Percent of population residing more than X kilometers from a health facility, who are covered by outreach services*

This is an indicator of access to outreach services among the population located in remote areas (3 or 5 kilometers are commonly used distances for these indicators).

- *Population per doctor*
- *Population per nurse*
- *Population per hospital bed*

These are readily available input indicators called “service ratios” which are sometimes used as measures of access. Because health personnel and hospitals are often located predominantly in urban areas and may not be readily accessible to the rural population, these indicators may not be valid measures of access for the rural population.

Economic Access

- *Average total private cost of professionally treated outpatient illness episode as a percent of monthly per capita household income for consumers in the lowest per capita income quintile*

- *Average total private cost of medicines for a typical outpatient illness episode as a percent of monthly per capita household income for consumers in the lowest per capita quintile*
- *Average total private cost of an average hospital stay as a percent of annual per capita household income for consumers in the lowest per capita income quintile*

These indicators measure the economic dimension of access to curative health care. Similar indicators can be defined for preventive care. By including *total* costs (i.e., fees, transport costs, medications), they recognize the fact that formal fees charged by facilities are sometimes a relatively minor part of the total expenditure incurred by households seeking health services. Expenditure on drugs and transportation are often substantially larger.

A separate indicator is also included for total costs of drugs and medications alone, because of the high share of this component of health spending in most household budgets in low- and middle-income countries. Households often purchase drugs directly from pharmacies or informal markets without consulting a provider at a formal health care facility.

The drawback to these indicators is that they require data from a household health expenditure survey. Although in principle such data could be obtained from hospital records, they would not include the substantial private expenditures incurred apart from those paid to the facility (e.g., for medicines, supplies, food, transportation, and lodging).

These indicators focus on estimates of total expenditures for patients in the lowest expenditure quintile, since in many countries fees charged vary with income and because it is at the lowest income level that economic access is considered to be the biggest barrier to seeking and obtaining health care. At higher levels of income, the cost of seeking and obtaining health care is less a barrier and is less often a focus of health sector reforms addressed to “improving access” in low- and middle-income countries.

- *Average fee charged per outpatient visit by nearest government ambulatory health facility*
- *Average cost per day of hospitalization at nearest government hospital*

These indicators measure economic access to health care. They can be readily obtained from health facilities and, in cases where uniform fees are charged, from the central government. They are, however, limited to the formal fee component of the total private cost, which as noted above is typically a relatively small component of the total private cost. In addition, individual health facilities often charge higher fees than those officially sanctioned and/or charge different fees to different clients for the same service. This fee information would have to be matched against other patient income measures to obtain a measure of “affordability” and to assess whether it poses a barrier to access.

Indicators of Equity

- *Ratio of share of government health subsidies received to share of total income received by income group*
- *Ratio of the Gini coefficient for public health care subsidies to that for total income (or total expenditures)*

2.2 Indicators of Equity

2.2.1 Definition of Equity

The concept of equity as it relates to health systems may refer variously to differences in health *status, utilization, or access* among different income, socio-economic, demographic, ethnic, and/or gender groups. Most health sector reform efforts directed toward system performance in low- and middle-income countries concentrate on definitions of equity related to access and utilization.

Probably the greatest proportion of these reforms define “equity” with a primary focus on equality of access to health services. A related question then arises: Should everyone have equal access to all services, or only to a limited set of basic health services? Increasingly, as medical technology has advanced and governments have become aware of their limited fiscal capacity to provide equal access to all health services, the more restricted definition of equality of access to basic health care has come to be more widely accepted.

Nearly equal in emphasis in reform efforts is a definition of equity that refers to inequalities of access and utilization across different income groups—that is, a focus on equity for “the poor,” or “protection of the poor.” From this point of view, reforms to improve equity would target government subsidies on the poor, establish means testing and fee waivers based on income, and/or take action to remove physical access barriers for the poor.

2.2.2 Discussion of Equity

Although there is growing consensus on providing universal (or near universal) access to a basic package of health services (rather than all health services), there is less consensus about which types of services should be in the package. Some reform efforts support a package of basic health services that is limited to those which are most cost-effective in addressing a country’s most important health problems (its “burden of disease”), reasoning that such an approach would provide the greatest health impact per dollar of government spending.

From this point of view, one straightforward indicator of equity would be a measure of access, across the whole population, to the basic health services package. In these cases, it would also be useful to include indicators to measure equity of utilization as well, since demand for the basic, and/or cost-effective, services may or may not increase as physical and economic barriers are reduced, or made negligible. Much of the literature on demand for health care suggests that people have a weak demand for many of these services. If demand does not increase much (i.e., is relatively inelastic) for the cost-effective services, providing universal access to the package would have little impact on utilization and health status.

Other reforms attempting to promote equity focus on efforts to remove economic barriers to the use of any type of health care service people demand. In these efforts, indicators related to availability or coverage of health insurance (which pools financial risk and creates more equity between the sick and non-sick in paying for health care) may be considered appropriate. Indicators related to the effectiveness of geographic targeting of subsidies, income testing (means testing), fee waivers or exemptions for the poor, or other mechanisms to protect the poor (or other vulnerable population groups) would be considered appropriate in reforms to reduce inequity of health service utilization that is based on income inequalities.

2.2.3 Indicators of Equity

If equity is defined mainly in terms of ensuring access in general—or universal access to a package of basic or cost-effective health services in particular—the indicators of access discussed above can be modified and calculated across the population, or, using coverage rates that compare access for different income, to socio-economic, demographic, ethnic, gender, geographic, or other groups considered especially undeserved.

Where income inequities are the main focus, the following indicators can also be used to measure the incidence of subsidies received from government health systems. The following indicators measure population level results of health reforms to improve equity, as distinct from the system, or program, level results included in most of this handbook. Additional indicators of population level results for equity, with a focus on protecting the poor, will be included and discussed in the next version of the handbook, after field testing. Examples include: percent of health service fee exemptions granted to the poorest one-fifth of the population; percent of the poorest one-fifth of the population who seek health care and receive a fee waiver; ratio of poorest one-fifth of the population using health care services to percent utilization by other income quintiles.

- *Ratio of share of government health subsidies received to share of total income received by income group*
- *Ratio of the Gini coefficient for public health care subsidies to that for total income (or total expenditures)*

These indicators measure the extent to which the distribution of government health subsidies is “pro-poor” (i.e., redistributes income from the rich to the poor). It is noted that even government health systems which provide significantly higher per capita subsidies to the rich than to the poor may still be pro-poor in the weak sense that the distribution of subsidies is *more equal* than the underlying income distribution.

The calculation of these indicators requires data on government health expenditures (i.e., subsidies) directed to each type of provider (e.g., central, provincial, and district hospitals, polyclinics, health centers, health posts), as well as service data on the number of units of service provided by each type of provider for the same period as the government expenditure data (typically one year). These data are used to calculate unit government subsidies for the services provided by each type of provider. Household data from a health expenditure survey are then used to estimate the number of units of each type of service consumed by different income groups during a given reference period. Such an analysis typically finds that the higher-income groups consume much more of those services which receive higher unit subsidies (i.e., central and provincial hospital services) and accordingly receive a substantially higher share of total government health subsidies than do the poor.

The first of the two indicators listed above compares the shares of health benefits received by each income group to the corresponding shares of income received. The second of the two indicators is similar to the first but provides a single summary measure of the extent to which a government health system is pro-poor. The Gini coefficient is a summary measure of income inequality ranging between zero (complete equality of income distribution) and one (all income received by one person). The Gini coefficient for the distribution of government health subsidies can be calculated in the same way, but unlike the Gini for income it can range between negative one (all

government health subsidies received by the poorest household) and one (all government health subsidies received by the richest household). As long as the indicator (i.e., the ratio of the two Gini coefficients, the value of which is theoretically unbounded) is less than one in value, the government health system is pro-poor.

Indicators of Quality

Structural Indicators

- *Existence of national standards for professional qualifications of health manpower, including enforcement mechanisms*
- *Proportion of health workers possessing basic professional qualifications, including skills for specific primary health care services*
- *Existence of national facility standards, including enforcement mechanisms*
- *Proportion of health facilities meeting basic structural standards, based on the services to be provided*
- *Presence of clear national standards for high priority health services*
- *Proportion of facilities in which current diagnostic and treatment guidelines are available in writing*
- *Presence of a national quality assurance program, including trained staff and established procedures for quality design, monitoring and improvement. Sub-indicators of the presence of effective quality assurance include:*
 - ▲ *Routine review and updating of technical standards*
 - ▲ *Effective methods for communicating standards to the field level*
 - ▲ *Routine application of methods for comparing performance with standards*
 - ▲ *Routine application of data-based problem-solving methodologies*
 - ▲ *Routine application of methods for incorporating community input into system design and management*
- *Proportion of health facilities that did **not** experience drug stockouts during the preceding three months*
- *Proportion of cases in which all recommended drugs are available*

Process Indicators

- *Proportion of clinics in which services are fully integrated, per national standards*
- *Proportion of health workers receiving appropriately timed and effectively conducted supervision, per national policy*
- *Proportion of patient contacts in which treatment received is consistent with national diagnostic and treatment protocols, including guidelines for client-provider interaction*
- *Proportion of referrals made and consummated in accordance with national guidelines and standards*
- *Proportion of clients who know and understand essential actions needed to complete treatments and avoid future preventable conditions*
- *Proportion of clients who follow through to completion of recommended treatments (drop out rate)*
- *Client satisfaction*

2.3 Indicators of Quality

2.3.1 Definition of Quality

“Quality of care” is clearly a multi-dimensional concept and one on which there is as yet no consensus definition (even in the United States). There is, however, a basic reference point that is widely used by experts in the quality of care field. Using this reference, the distinction between structural, process, and outcome dimensions of quality is commonly drawn in the literature. The main proponent of this framework, Arvedis Donabedian, defines quality of care “as that kind of care which is expected to maximize an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts.”(Donabedian, 1980).

In this framework, *process* generally refers to all that happens during the interaction between the health system and the client, including the interpersonal aspects of care delivery, as well as those aspects of the service delivery setting (e.g., clean examination rooms, orderly patient flow) that directly impact the patient. A person hearing a radio message promoting immunization is as much a part of the process of care as is a new mother receiving nutrition counseling at a health clinic. Many efficiency and access indicators, such as those included in this handbook, are also often considered measures of structure in the “quality of care” literature.

Outcome flows from process and refers to “changes in a patient’s current and future health status that can be attributed to the antecedent health care.” Outcome includes patient attitudes (including satisfaction), health-related knowledge acquired by the patient, and health-related behavioral change as possible outcomes. Increasingly, particularly in developed countries, outcome indicators referring to health status are being used as the measures of quality of care, bypassing process and structure measures.

Structure refers to all the other aspects of a health system that support or are related to the interaction between the health system and the client, such as health facilities, insurance systems, medicines, drug distribution systems, management, and supervision.

2.3.2 Discussion of Quality

There are several important links between quality of health care services and health sector reform efforts that many countries are currently undertaking. Many of these links are especially important in improving health system performance.

For example, the ultimate outcome that most health sector reforms are implicitly or explicitly intended to produce—improved health status—is obviously most directly dependent on the quality of care provided. Other aspects of improved system performance discussed in this handbook—access, efficiency, equity, and sustainability—need to support delivery of effective health services, while quality assurance efforts need to assure that the services that are more efficiently provided, equitably available, and sustainable are those that will lead to improved health status.

In addition, a good deal of evidence exists that efforts to improve financial sustainability through introducing user fees in government health care facilities depend on improving quality in those

facilities. That is, patients are willing to pay for services they perceive to have high quality. One of the principal reasons that reform efforts involving user fees do not achieve intended results is a failure to improve quality at the same time.

Similarly, one of the main reasons for introducing measures to raise revenues is to improve quality—often just to make sure that an adequate supply of medicines is available. Adequate supply of medicines is a major element in patient-perceived quality. In situations of frequent stockouts, improving medicine supply is also one of the major factors that improve health worker efficiency and effectiveness. Other typical quality-improving measures for which many health sector reform efforts attempt to raise revenues are to provide funds for transportation for supervision, for outreach, for ambulance service; to provide at least small bonuses for good health worker performance; and to supply anesthetics, laboratory supplies, contraceptives, and vaccines.

One of main constraints that reform efforts face is finding the resources and capacity to improve quality from the point of view of *both* patients and health care professionals. There is in many cases a well-recognized difference between patient-perceived quality improvements and those that health professionals might determine to be improvements. For example, while a basic drug supply is essential, patient demand for medicines may be in conflict with good prescription practice. Patients may not recognize good diagnostic practice, while health care professionals push for better clinical training and equipment.

2.3.3 Indicators of Quality

The following sections present and discuss indicators that are commonly used to measure quality dimensions of the structure and process of health care. Outcome indicators that measure, for example, mortality, morbidity, and fertility changes are not included. As mentioned in the introduction to this handbook, such indicators are commonly available in other sources.

Structural Indicators

- *Existence of national standards for professional qualifications of health manpower, including enforcement mechanisms*
- *Proportion of health workers possessing basic professional qualifications, including skills for specific primary health care services*

Health systems need clear standards regarding professional qualifications, indicating what types of personnel are authorized to perform what services and what initial and continuing education they must have. Such standards should apply equally to the private and public sectors. Standards should normally apply to specific technical functions, e.g., family planning training for those providing family planning services, and training for integrated management of childhood illness for those involved in pediatric care. In addition, means for facilitating or enforcing compliance, (normally including in-service education and sometimes professional peer review and/or formal certification) need to be implemented.

Evaluators will develop locally appropriate methods for measuring the current status of manpower standards, based on the relative importance of different personnel. The proportion of health workers meeting these standards may be gauged through periodic surveys and should be specified for individual technical functions.

- *Existence of national facility standards, including enforcement mechanisms*
- *Proportion of health facilities meeting basic structural standards, based on the services to be provided*

Health systems should also move toward clear standards for different types of facilities, based on the services to be provided therein. These standards should indicate staffing numbers and qualifications for particular services, equipment types, and functional characteristics, and required infrastructure features. Enforcement mechanisms may extend to formal accreditation, though less formal methods of bringing inadequate facilities up to standard may be equally or more effective.

The presence/absence of such standards and enforcement mechanisms may be measured dichotomously. The proportion of facilities meeting standards is most commonly measured through surveys but may sometimes be measured through accreditation results.

- *Presence of clear national standards for high priority health services*
- *Proportion of facilities in which current diagnostic and treatment guidelines are available in writing*

Health care providers require clear technical guidance regarding diagnostic and treatment procedures, and trainers and educators need standard curricula to ensure consistency. These standards need not be identical to those promoted internationally; however, they should reflect knowledge of international research and best practice. Mechanisms should also be in place for periodic review and updating of standards. It is equally essential that trainers and supervisors communicate standard guidelines to health care providers.

The presence or absence of such standards may be ascertained through senior-level interviews of national program managers and training school directors. The availability of written standards at service delivery levels must be verified through direct observation.

- *Presence of a national quality assurance program, including trained staff and established procedures for quality design, monitoring, and improvement*

Both public and private health systems require routine methods for monitoring and improving the quality of care, based on national standards. These methods need *not* take the form of an identifiable operational unit, and, in fact, the presence of such a unit should not be equated with field application of quality assurance principles (quality design, quality monitoring, process improvement, and consumer consultation). Initially, it is also not essential that all health services participate.

Sub-indicators of the presence of effective quality assurance include:

- ▲ *Routine review and updating of technical standards*
- ▲ *Effective methods for communicating standards to the field level*
- ▲ *Routine application of methods for comparing performance with standards*
- ▲ *Routine application of data-based problem-solving methodologies*
- ▲ *Routine application of methods for incorporating community input into system design and management*

The effective presence of a quality assurance system is best judged through questioning of district- and lower-level personnel. Evaluators may also review both client and system records; their accuracy and completeness contribute to and manifest the thoroughness of quality review and improvement.

- *Proportion of cases in which all recommended drugs are available*
- *Proportion of health facilities that did **not** experience drug stockouts during the preceding three months*

Health facilities require dependable supplies of key pharmaceuticals, including vaccines, contraceptives, and essential drugs, based on national policy. Individual clients must also be able to obtain recommended drugs, either at the clinic itself or through affordable private or public purchase. Availability at the clinic level should not be equated with personal availability, especially where many such drugs are sold either “unofficially” or through private or public channels.

The proportion of facilities meeting this requirement may be judged by interviewing service providers. However, individual availability must be ascertained by asking a sample of recent clients.

Process Indicators

- *Proportion of clinics in which services are fully integrated, per national standards*

This may be interpreted as an indicator of either structure or process. However, the important point is that consumers perceive that all services to be provided at a particular facility are readily available during any session in which the facility is open.

This indicator *may* be obtained by interviewing providers; however, experience suggests that providers exaggerate availability while the perceptions of potential users are what determines actual utilization.

- *Proportion of health workers receiving appropriately timed and effectively conducted supervision, per national policy*

Supervision is potentially one of the most efficient means for communicating and enforcing national quality standards as well as for learning about and resolving field problems, but it is also commonly one of the least effectively conducted support services. The frequency of supervision encounters may contribute less to worker performance than the technical content and context (supportive vs. punitive) of such visits.

Supervisory reports cannot be relied upon for accurate data; rather, assessors must interview workers and observe encounters.

- *Proportion of patient contacts in which treatment received is consistent with national diagnostic and treatment protocols, including guidelines for client-provider interaction*

This—in addition to utilization by those in need—is a fundamental indicator of health system efficiency and effectiveness. Correct diagnosis of both primary and secondary conditions is obviously essential to ensure correct therapy. It should reflect adequate medical history, good physical work up, and appropriate lab tests, where indicated. Effective treatment requires identification of appropriate therapy, per national standards, plus whatever actions may be needed (e.g., drug provision or prescription, referral, client counseling), to ensure that therapy is carried out. Effective client-provider interaction is essential to obtain the requisite medical history, to ensure that non-observable treatments are properly completed, and to encourage appropriate preventive behavior and/or return to the clinic when required.

This indicator normally applies only to specified services; that is, measurements pertain to specific health care interventions rather than to health care as a whole. Direct observation of individual case management, while not without potential biases, is generally considered the “gold standard” of quality assessment; however, client interviews and record reviews may be more efficient in specific services or settings. Special research-based quality assessments may be necessary for periodic measurement but must not be allowed to “drive out” routine quality assessment. Supervisory reports, as well as carefully guided peer review and other forms of routine self-assessment, may provide indicative point-in-time or locational data, but their precision may be inadequate for statistical comparisons.

- *Proportion of referrals made and consummated in accordance with national guidelines and standards*

At least three aspects of referral are critical: appropriate identification and direction for individual cases; prompt transfer to the higher level institution; and good reception and intake at the receiving end. Referral for emergency cases (obstetrics, dehydration, fever) is normally most critical; however, assessors may also consider referral for special non-emergency needs (e.g., preventive care, family planning).

Satisfactory methods for routine measurement have not been developed; thus, special studies building on direct observation of case management may be required.

- *Proportion of clients who know and understand essential actions needed to complete treatments and avoid future preventable conditions*
- *Proportion of clients who follow through to completion of recommended treatments (dropout rate)*
- *Client satisfaction*

These may be considered as either process or outcome indicators but are included here, because what the client knows and does is often essential for effective treatment. This is especially true for such preventive/long-term therapies as those for immunizations, tuberculosis treatment, oral rehydration, nutrition, contraception, and safe motherhood.

Several conceptually similar but very different indicators are required, measuring client knowledge, client practice, and the general ability of the service provider to respond to community needs and preferences. The latter, labeled here as “client satisfaction,” may refer either to attitudes of

specific clients about an individual encounter or to more general community attitudes toward service providers. Dropout rates (defined broadly to include more general compliance problems) reflect both service provision (technical content, communication, client satisfaction) and individual characteristics not easily accounted for in standard protocols. All indicators in this group pertain to the link between communities and facilities, especially providers' ability to support community and individual needs and preferences.

Client knowledge and satisfaction with specific encounters may be efficiently assessed immediately after the encounter by interviewing clients on exit. Population-based surveys, with special questions for recent clinic users (two-week recall) are more costly but provide better information regarding effects on behavior. Dropout rates may be obtained through record review at the clinic level, but may be overestimated where record keeping is inadequate or clients have multiple follow-up sources; in any case, population-based surveys provide better information regarding both dropout and more general compliance issues.

While the indicators in this group are useful, they must be interpreted cautiously. Client behavior is subject to multiple influences, not just knowledge, and knowledge itself may deteriorate over time. Also, "satisfaction" measures the gap between expectations and reality and may decrease rather than increase as quality improves. (Indeed, quality improvement strategies based on consumer education actively seek to articulate latent community concerns and increase "dissatisfaction.")

Indicators of Efficiency

- *Outpatient visits per hour of physician labor (or per physician)*
- *Outpatient visits per hour of nurse labor (or per nurse)*
- *Ratio of outpatient visits to personnel costs (i.e., unit personnel costs)*
- *Cost per outpatient visit (or Operating cost per outpatient visit)*
- *Cost per hospital bed-day (or per hospital admission or per hospital discharge)*
- *Percent of outpatient visits obtained from the private sector*
- *Private hospital beds as percent of total*
- *Personnel expenditure as a percent of total recurrent health expenditure*
- *Expenditure on drugs and supplies as a percent of total recurrent health expenditure*
- *Number of nurses per doctor*
- *Number of nurses per hospital bed*
- *Number of doctors per hospital bed*
- *Ratio of average salary of government health worker (e.g., doctor, nurse, technician) with a given level of experience to the income of a comparable private sector health worker*
- *Salaries of government health workers are paid on time (yes/no)*
- *Adequate performance incentives exist for government health personnel (yes/no)*
- *Generic drug expenditure as a percent of total drug expenditure*
- *Government health system uses basic drug list for procurement (yes/no)*
- *Percent of government recurrent health budget spent on public health services*
- *Primary health care expenditure as a percent of recurrent costs*
- *Percent of total government drug expenditures allocated to primary care facilities*
- *Fees are charged in all facilities (yes/no)*
- *Fee levels promote efficiency (yes/no)*
- *Referral system functions effectively (yes/no)*
- *Average length of hospital inpatient stay*
- *Hospital bed occupancy rate*
- *Percent of insured enrolled in plans which use copayments and deductibles, managed care plans, or plans subject to global budgeting*

2.4 Indicators of Efficiency

2.4.1 Definition of Efficiency

Traditionally, as applied to individual health providers or programs, efficiency has three dimensions—technical, economic, and allocative—related to how, and which, health care services are produced. These concepts can also be applied to measuring health system performance.

For purposes of clear presentation of the concept, “efficiency” as defined below is presented without extensive mention of the quality of health care services provided. When applied to health care providers or systems, efficiency is often interpreted to include notions of “effectiveness” of the health care service. Similar indicators are also often used to measure efficiency and to measure the process aspects of “quality of care” assessments. This handbook discusses quality of care measures under a separate category because separate indicators are needed to measure quality, efficacy, or effectiveness. Findings from both efficiency and quality indicators need to be considered when evaluating overall health system performance.

A health provider is *technically* efficient when it produces the maximum physical output of (effective) services (e.g., number of visits) for given levels of inputs. Technical inefficiency is common in public health systems and is most often due to failures in management and supervision.

A health provider is *economically* efficient if it uses input combinations (e.g., doctors, nurses, drugs) that permit it to produce a given level of (effective) services at least cost. In the long run, economic efficiency also requires that providers operate at a scale which allows them to produce at the lowest possible unit cost (although in markets of limited size, such optimal scale may not be feasible). Economic inefficiency is also often found in situations where managers have little or no control over the combinations of inputs they use, and where facilities are constructed to serve markets which are too small to support an optimal scale of services.

A health provider is *allocatively* efficient when it allocates resources to activities in which they have the highest value (i.e., when the level of output of each service produced is such that the marginal social cost of the last unit produced is equal to its marginal social value). The health system allocates resources efficiently if it produces the optimal mix and level of health services, where “optimal” means that the most health value for the most people is obtained for the cost incurred (each service is provided up to the point where its marginal social cost is equal to its marginal social value).

2.4.2 Discussion of Efficiency

There is broad consensus concerning the usefulness and interpretation of two of these dimensions of efficiency: those which are most closely related to technical and economic efficiency. The reason for the consensus is that both of these dimensions relate to different ways of using resources to produce specific health services (i.e., quantity of services obtained from given inputs, cost of a given level of output) and assume that the service should be produced. Indicators for technical and economic efficiency are straightforward and do not imply a value judgment about the underlying merit of the service itself.

The consensus breaks down with respect to appropriate indicators of allocative efficiency, especially when applied to the health sector as a whole, primarily because of the underlying value judgment about the relative merits of different health services. Primarily these relative merits depend on whether they are judged from the perspective of health care professionals or health care consumers.

For example, proponents of some approaches to health sector reform are critical of governments which allocate a high share of resources to hospital care, as opposed to allocating a high share of resources to primary and preventive care. From this point of view, an efficient allocation of public sector resources (and related indicators) is one that concentrates on devoting substantial shares of resources to primary and preventive health care services that might improve overall measures of the population's health status (e.g., national child mortality rates, maternal mortality rates, and fertility rates).

Other reform efforts may not object to allocating a high share of public funding for hospital care because they judge a service's merits by what consumers demand (i.e., mainly curative and hospital care). These reform initiatives would concentrate on (and use indicators related to) the importance of pooling risks to pay for hospital services (i.e., financing of social insurance), which have the highest financial risk for households.

2.4.3 Indicators of Efficiency

- *Outpatient visits per hour of physician labor (or per physician)*
- *Outpatient visits per hour of nurse labor (or per nurse)*
- *Ratio of outpatient visits to personnel costs (i.e., unit personnel costs)*

These are indicators of "labor productivity" (i.e., output per unit of labor input) and are often used because they are relatively easy to measure (i.e., they can be constructed from service statistics on the number of visits and administrative information on staff hours worked or number of staff working in a facility). Labor productivity indicators may be valid indicators of any or all of the various dimensions of efficiency or processes related to quality assurance. For example, if health workers neglect their duties because of poor supervision or lack of incentives, low labor productivity may reflect technical inefficiency.

Alternatively, if inadequate complementary resources are available (e.g., ancillary personnel in the case of physicians, equipment, and supplies) or if facilities are overstaffed in relation to the demand for their services, low productivity may reflect economic inefficiency. It often happens in government health systems that health workers cluster in and about major cities with the result that facilities in those locations become seriously overstaffed and those located in less favored locations (remote rural areas) become understaffed. Large variations in labor productivity from one facility to another often result from such inefficient allocations of human resources. This is an example of extreme economic inefficiency.

One problem with labor productivity indicators which renders them invalid measures of efficiency (in some cases) is that labor productivity may be high because a health facility uses uneconomically high levels of complementary inputs (i.e., levels of inputs which do not minimize cost). This problem can only be addressed by using unit cost indicators, as discussed below. Finally, if the facility does not provide the kind or quality of services consumers want (allocative inefficiency), this will also be reflected in low labor productivity.

Although labor productivity is relatively easy to measure (as compared to unit cost, for example, which is discussed below), it presents certain measurement problems. First, visits are not uniform. Some facilities may see relatively complex cases or may have more initial visits than others. There may also be variation in the quality of care from one facility to another (i.e., the visits of one facility may require more personnel time and other inputs than those of another facility). In some cases, there may not be data on the number of hours worked, and it may be necessary to substitute the number of personnel for the number of hours worked as a measure of labor inputs. To the extent that the number of hours worked by day, week, or month vary from one facility to another, this will introduce a measurement error into the input measure.

In government health systems with poor allocation of human resources between facilities, high observed levels of labor productivity in understaffed facilities may be indicative of poor quality care rather than of relatively high efficiency. This is an example of where indicators of more than one dimension (e.g., efficiency and quality) need to be used in combination in order to obtain an accurate gauge of system performance.

When labor inputs apply to all medical personnel, it is usually desirable to weigh the different categories of personnel according to some measure of their relative productivities. In practice, relative wage rates are most often used for this purpose, so that the measure of labor inputs becomes personnel costs.¹ One problem in comparing such indicators across countries is that salaries differ substantially from country to country. One possible solution is to confine comparisons to comparable countries in terms of per capita income (e.g., the group of low-income countries).

- *Cost per outpatient visit (or Operating cost² per outpatient visit)*
- *Cost per hospital bed-day (or per hospital admission or per hospital discharge)*

These are measures of unit cost and are often used as indicators of efficiency. They differ in two respects from the labor productivity indicators of efficiency discussed above. First, they are input/output indicators, whereas labor productivity indicators are output/input indicators. This implies that low unit costs are associated with efficiency, whereas high levels of labor productivity are usually associated with efficiency. Second, the measure of inputs includes all inputs (or at least all variable inputs); the cost numerator is effectively the sum of all inputs used, weighted by their unit costs. Use of cost as a measure of inputs avoids problems noted above with labor productivity measures of efficiency—when high values of labor productivity may reflect uneconomic use of complementary inputs.

The principal drawback to using unit cost measures as indicators of efficiency is that they require cost estimates, in some cases broken down by function (e.g., cost of inpatient services versus

¹ If available, estimates of the relative marginal productivities of different categories of labor, which can be obtained from estimates of production functions, might be preferable to relative wage rates (which may also reflect market power or tradition).

² It is preferable to use full costs (i.e., including capital or fixed costs), rather than only operating or variable costs, so that variations in unit costs do not reflect greater or lesser use of complementary capital inputs. However, in practice, the fact that budget data are usually limited to operating costs leads many to construct input measures limited to variable inputs (e.g., personnel, supplies, medicines).

outpatient services in a hospital). Where good quality budget data are available, it may be reasonably simple to obtain estimates of operating costs.

Another problem with unit cost indicators of efficiency is that variations in unit costs between health facilities may reflect variations in quality and that this may not imply anything about relative efficiency. In some cases, they may also reflect variations in the unit cost of inputs (although it is easier to correct for such variation than to correct for variations in quality). In addition, when comparisons are made between countries, especially when foreign exchange rates are used to convert national currencies into dollars (or some other standard monetary unit), the observed variations may reflect errors of measurement in the price index.

- *Percent of outpatient visits obtained from the private sector*
- *Private hospital beds as a percent of total*

The above indicators are measures of the relative importance of the private sector in the provision of both outpatient and inpatient health care. There is a presumption by many (supported by limited empirical evidence) that private health providers are both technically and economically more efficient than government providers. Their assumed advantage in technical and economic efficiency depends not only on their greater use of monetary incentives but also on the degree of competition in private markets, which results in the relatively weak performers being driven out of the market over time. The same discipline does not necessarily occur with respect to government providers.

However, unless private providers are effectively regulated, either by the government or by their own professional organizations, their increased attention to the “bottom line” may make them allocatively less efficient in some cases than government providers. For example, private providers may have few incentives to promote preventive health care. They may also prescribe health services which their patients do not really need. Accordingly, under circumstances of weak regulation, indicators of the relative importance of the private health sector may not be valid indicators of efficiency.

- *Personnel expenditure as a percent of total recurrent health expenditure*
- *Expenditure on drugs and supplies as a percent of total recurrent health expenditure*

These indicators are often applied to government health systems to monitor the degree of economic efficiency. Under conditions of budgetary shortfalls, ministries of health typically protect jobs and allow other inputs (e.g., drugs and supplies) to diminish relatively, and in some cases, absolutely. When this happens, inputs are no longer combined in such a way as to minimize costs. In extreme cases, the quality of care declines below acceptable levels and the facilities are underutilized.

Although inefficiency is typically signaled by high shares of personnel expenditure and by a low share of expenditure on drugs and supplies, this is not always the case. For example, very low values of personnel expenditure may signify that salaries are too low relative to earnings in the private sector. This may lead government health workers to reduce the number of hours they work, using the balance of their time in private practice (which may itself lead to additional inefficiencies).

Similarly, high shares of drug expenditure may also signify inefficiency. For example, drug expenditure may be high because the logistic system is inefficient, because drugs are “leaked” to

private markets, or because branded drugs are used instead of generic drugs. A high value of the indicator may also suggest poor quality of care in the form of excessive use of drugs.

These indicators are simple to construct and track over time, as they are calculated using standard government budget and/or expenditure data.

- *Number of nurses per doctor*
- *Number of nurses per hospital bed*
- *Number of doctors per hospital bed*

These are indicators of economic efficiency (i.e., use of least cost input combinations). They are easy to measure and can be interpreted by comparing them to standard ranges obtained from international data. They are valid indicators of economic efficiency within the personnel area, but they need to be combined with other indicators (such as the preceding indicators) of the overall use of personnel. Either particularly high or low values of these indicators, compared to those of other countries of comparable income levels, may signify inefficiency.

In some cases, use of particularly high ratios of doctors to nurses may appear efficient, at least in the short run, given a relative surplus of doctors. However, the production of health manpower is usually heavily subsidized in developing countries, so that it is necessary to look beyond the supply conditions in an individual country.

- *Ratio of average salary of government health worker (e.g., doctor, nurse, technician) with a given level of experience, to the income of a comparable private sector health worker*
- *Salaries of government health workers are paid on time (yes/no)*
- *Adequate performance incentives exist for government health personnel (yes/no)*

These indicators are designed to measure whether government health workers are adequately compensated relative to private health workers and whether they have adequate incentives to perform their jobs well, which is directly related to technical efficiency.

In the case of the first indicator, data on private sector earnings of health workers can usually be obtained from private hospitals and private employers. It is often difficult to get such information from private practitioners or clinics. In the case of the third indicator (i.e., adequate performance incentives), it may be difficult to judge what is “adequate.” However, an adequate incentive system should have at least the following characteristics: 1) personnel are promoted (and are perceived to be promoted) on the basis of merit; 2) strong performance is rewarded; and 3) continued poor performance leads to dismissal from service.

- *Generic drug expenditure as a percent of total drug expenditure*
- *Government health system uses basic drug list for procurement (yes/no)*

These indicators are measures of the “value for money” which a health system is likely to obtain from its expenditure on drugs. Socialist governments have traditionally been very hard on the international drug manufacturers. But many developing countries (particularly francophone countries) have spent high shares of limited government drug budgets on branded drugs. In many countries consumers treat themselves with drugs purchased at pharmacies, and pharmacists often

prescribe more expensive branded drugs. Accordingly, the first of the two indicators listed should, if possible, be applied to both public and private purchases of drugs.

- *Percent of government recurrent health budget spent on public health services*

This is an indicator of allocative efficiency which has both public health and economic rationale. Public health services, as distinct from private health services, are defined as those health services which are either of a public good nature (i.e., services such as vector control for which it is not possible to charge a user fee) and services which involve “externalities” (i.e., services such as immunization or control of infectious diseases which affect the health of others).

A strong case can also be made to include expenditure on health education, or “information, education, and communication” (IEC), on the grounds that some types of information are a public good (i.e., it is difficult to charge a fee for certain forms of health education) and that in the absence of government intervention, private markets would provide too little health education. A similar argument can be made for many types of research.

Economists recognize that markets do not function efficiently with public health services and therefore support the use of government subsidy (though not necessarily government provision) of these services. Public health advocates believe that such services are generally more cost effective than private health services (although there are notable exceptions, such as safe motherhood services, which are private in nature but still cost effective).

- *Primary health care expenditure as a percent of recurrent costs*
- *Percent of total government drug expenditures allocated to primary care facilities*

The first of these two indicators is a widely used indicator of allocative efficiency. However, it can be misleading. For example, primary health care includes both curative and preventive services; and the allocation of resources may be inefficient *within* primary health.

Generally, the indicator ‘primary health care expenditure as a percent of recurrent costs’ is favored somewhat more by public health advocates than by economists. Public health advocates believe that primary health services are more cost effective than either secondary or tertiary health services. Economists support the use of this indicator because many primary health services merit subsidies both on efficiency and equity grounds. Where insurance coverage is low, however, economists recognize that government funding (which implies direct provision, in the absence of insurance) of hospital services can also be an efficient allocation of resources (“efficient” in the sense of increasing consumer welfare, but not necessarily efficient in its effects on overall population health status indicators).

The second indicator also attempts to measure allocative efficiency but focuses more on the allocation of the most important non-personnel input, which may be a more valid indicator of a government health system’s priorities.

- *Fees are charged in all facilities (yes/no)*
- *Fee levels promote efficiency (yes/no)*
- *Referral system functions effectively (yes/no)*

On efficiency grounds, fees should be charged in all government facilities for all services. Also as a general rule (with exceptions as noted below), fees should be equal to the marginal social costs of producing a service (which in competitive markets implies that in the long run they will also be equal to average, or unit costs). Charging consumers cost-based fees promotes efficient consumption of health services by consumers, because, for example, it can avoid excessive consumption of health services and also can encourage them to pursue health-promoting behavior in general, including use of preventive health services. When consumers pay fees, an important link is created between the provider and the consumer which promotes efficiency in service delivery as well (i.e., fees promote supply-side efficiency as well as demand-side efficiency).

Although fees should be equal to marginal costs in general, there are some important exceptions to this rule. First, there are some types of health services, such as “public goods” for which it is impractical to charge fees at all (examples are vector control or clean air). Second, where either marginal social benefits diverge from marginal private benefits (e.g., immunizations, treatment of communicable diseases) or where marginal social costs diverge from private social costs (e.g., salaries of government health providers are below market levels), fees should be adjusted to levels which bring about a socially optimal level of output (i.e., where marginal social benefits are equal to marginal social cost).

Third, in the absence of insurance, fees for some types of services (e.g., catastrophic hospital care, care of chronic illnesses) may be subsidized for social financing purposes. In general, there will be an optimal subsidy for such services which balances the welfare gains from social financing (i.e., the benefits of risk pooling) against the welfare costs of excessive consumption (i.e., “moral hazard”). The optimal level of social financing (and overall welfare gains) can be increased when an effective referral system is in place which limits moral hazard (i.e., subsidized fees are only available to consumers who are admitted to hospitals on referral). This is the reason for the last of the three indicators listed above.

Fourth, subsidies may be needed to promote distributional objectives (e.g., equity, poverty reduction). For example, health services may be subsidized or even provided free to the poor. In some locations services may be subsidized for all because the cost of targeting (e.g., means testing) may exceed the benefits. Alternatively, fees may be subsidized for persons residing more than a certain distance (e.g., 5 kilometers) from a health facility because of the additional time and transportation costs they incur in consuming health services.

- *Average length of hospital inpatient stay*
- *Hospital bed occupancy rate*

These are widely used indicators of hospital sector efficiency. High average length of stay (and unusually high occupancy rates) may be due to inefficient budgeting or reimbursement systems. In some countries, for example, hospital budgets are linked to occupancy rates. Low occupancy rates may signify that hospitals are larger than they need to be in some areas (i.e., that hospitals are overbuilt). Low occupancy rates may also indicate poor quality of care within a particular class of

hospitals (e.g., low occupancy rates in district hospitals compared to provincial hospital may signify that care is of poor quality in the former).

“Average length of hospital inpatient stay” is a widely used indicator of hospital efficiency, like “hospital bed occupancy rate.” But cross-country comparisons of this indicator need to include the different definitions used by each country, e.g., whether the measure refers only to acute care facilities (Bossert, Berman, and Costello, 1995).

- *Percent of insured enrolled in plans which use copayments and deductibles, managed care plans, or plans subject to global budgeting*

This indicator is designed to measure the extent of cost containment in various social and private insurance plans. Cost containment is important to control costs in connection with health insurance coverage (i.e., reduce the effects of moral hazard).

Indicators of Sustainability

Financial Sustainability

- *Percent of total health system financed by tax revenue*
- *Percent of government health system financed by tax revenue*
- *Government health expenditure as percent of total government budget*
- *Government health expenditure as percent of GDP*
- *Percent of total health spending financed by donors*
- *Percent of government health spending financed by donors*
- *Percent of government recurrent health spending financed by donors*
- *Percent of government health expenditure directed to primary care*
- *Percent of government health expenditure directed to preventive care*
- *Percent of government health expenditure directed to MCH services*

Institutional Sustainability

- *Foreign doctors as a percent of all doctors*
- *Number of months of foreign technical assistance funded by donors*
- *Donor expenditures on technical assistance as a percent of all donor health expenditures*

2.5 Indicators of Sustainability

2.5.1 Definition of Sustainability

At the level of a health system, “sustainability” refers to the capacity of the system to continue its normal activities successfully in the future, should foreign assistance be withdrawn. Most definitions of sustainability also include the additional requirement that the system be able to expand its activities as needed to keep up with increases in demand due to economic and population growth. Sustainability includes both financial and institutional dimensions. Financial sustainability refers to the capacity of the health system to replace withdrawn donor funds with funds from other, usually domestic, sources. Institutional sustainability refers to the capacity of the system, if suitably financed, to assemble and manage the necessary non-financial resources to successfully carry on its normal activities.

2.5.2 Discussion of Sustainability

The concept of sustainability can also be applied to a project—where the concept originated—and to institutions within a health system (e.g., a ministry of health, an NGO). In the case of a project, sustainability refers to the capacity of the grantee to mobilize the resources to fund the recurrent costs of a project once it has terminated (i.e., once the investment phase has ended) and to mobilize the technical expertise to continue the activity supported by the program.

In the case of an institution related to a project, the concept of sustainability refers to the capacity of the institution to survive and to continue providing the services it has provided in the past (and possibly also to expand its operations as needed to keep up with growth in demand) following the termination of foreign assistance. The concept of institutional sustainability is rarely applied to commercial institutions since it is accepted that the normal operations of markets and competition lead to a certain percentage of them failing in a given year.

Donor investments are often concentrated on primary health care, particularly on interventions targeted to the health of women and children. It is widely believed that governments tend to cut back on these types of services, in favor of hospital services, when budgets are squeezed. For donors, therefore, sustainability of the health system often translates into the sustainability of those programs in which they have invested; i.e., the operational concept of system sustainability for donors lies somewhere between concern with the viability of the overall health system and the sustainability of particularly vulnerable programs.

2.5.3 Indicators of Sustainability

To date, most health sector reforms aimed at health system performance (as distinct from a project or single institution) have concentrated on financial sustainability. But in some cases (e.g., very poor countries, transitional economies) the institutions comprising the health system may not be sustainable in the absence of continuing technical assistance from donors.

Financial Sustainability

- *Percent of total health system financed by tax revenue*
- *Percent of government health system financed by tax revenue*

Government financing, whether from central budgets or provincial/local government budgets, has shown itself to be a vulnerable source of financing for several reasons. First, it is difficult for many developing countries to mobilize sufficient revenues from their tax system to keep pace with growing demand for health services (i.e., their tax capacity is weak). Second, government financing through general taxes (as well as household financing in very poor countries) may be difficult to sustain during economic downturns. Third, government financing is subject to political influences. Alternative sources of financing may be more sustainable, e.g., employment taxes (social insurance), private health insurance, employer financing (or direct provision of health services by employers) and user fees.

Although these indicators are proposed as measures of sustainability, they also have an efficiency dimension. Recent studies in the United States and other countries indicate that the extra burden (“distortionary costs” or “deadweight loss”) of raising a dollar of government revenue are substantial. In the United States, for example, the extra burden imposed on the economy from raising one dollar of additional revenue has been estimated to be in the range of \$0.17 to \$0.57.

In calculating this indicator, donor financing could be treated as part of government financing.

- *Government health expenditure as percent of total government budget*
- *Government health expenditure as percent of GDP*

Government financing, as noted above, is a particularly vulnerable part of a health system’s financing. It is common to look at recent trends in government health spending as a basis for gauging the system’s future sustainability.

- *Percent of total health spending financed by donors*
- *Percent of government health spending financed by donors*
- *Percent of government recurrent health spending financed by donors*

These are commonly used measures of the degree to which a health system has achieved financial sustainability. In calculating the indicators, donor funding should be limited to grants (i.e., only that portion of loans which represents subsidies should be included). A major disadvantage of these indicators is that they are affected by fluctuations in the exchange rate (or by inflation, if the exchange rate is fixed).

- *Percent of government health expenditure directed to primary care*
- *Percent of government health expenditure directed to preventive care*
- *Percent of government health expenditure directed to MCH services*

As noted above, these are the areas that governments tend to cut back when their budgets are severely constrained, and these are also sources of funding for many of the programs which have been developed by donor investments. Although these indicators can be used effectively to monitor system-wide sustainability, it is important to recognize that cross-country comparisons can

be highly misleading. Health systems differ significantly in how they define primary care, preventive care, and MCH services for accounting purposes and in how they allocate costs across the various categories.

Institutional Sustainability

- *Foreign doctors as a percent of all doctors*
- *Number of months of foreign technical assistance funded by donors*
- *Donor expenditures on technical assistance as a percent of all donor health expenditures*

These indicators can be tracked over time to show the degree of dependency of a health system on foreign human resources. The first indicator may not necessarily signify a lack of sustainability in some countries (e.g., many of the Gulf states have traditionally maintained high percentages of foreign doctors). The second indicator is a more direct measure of dependency on foreign technical assistance. However, it is an absolute indicator and accordingly cannot meaningfully be used to make comparisons between countries. The third indicator is a relative indicator but may be misleading since some donors prefer higher technical assistance components than others (and the relative importance of individual donors varies considerably between countries).

3.0 Developing a Short List of Indicators

3.1 Introduction

The number of indicators discussed in the preceding section is much too large for practical use. A smaller list of 10–20 indicators should be adequate to provide a valid characterization of a given health system’s performance. There are a number of alternative approaches to reducing the full list of indicators to a short list. The most commonly used procedure is to convene a meeting at which the full list is discussed and an effort is made to arrive at a short list through group discussion. Although well-run meetings have been known to arrive at such a conclusion, the decisions made risk reflecting a high degree of subjectivity. An alternative process, which is more quantitatively oriented, but which is also a group exercise, would proceed as follows:

- Convene a meeting of experts to discuss and agree on the following three decisions: 1) the ideal number of indicators to comprise a short list; 2) the criteria to be used in evaluating individual indicators; and 3) the weighting given to each of these criteria. (A draft list of criteria should be prepared in advance of the meeting, together with suggestions about how to score an indicator’s performance relative to each criterion. The purpose of the meeting would be to finalize this handout.)
- Following the first meeting, a list of the indicators would be circulated to the experts who would be asked to evaluate each of the indicators with respect to the criteria agreed upon at the first meeting. The experts’ scores would then be tabulated and presented to the same group at a second meeting. Discussion at the second meeting would focus on fine-tuning the short list of indicators which emerged from this process, as well as on cases where there was a lack of agreement on individual indicators (as reflected in the variance of the scores assigned). The second meeting would attempt to converge to an agreement on a workable short list.

The remainder of this section discusses possible criteria for use in evaluating indicators and provides an example of the quantitative scoring methodology proposed above.

3.2 Criteria for Evaluating Individual Indicators

The evaluation literature (e.g., Bertrand, Magnani, and Rutenberg, 1996) suggests that indicators should be selected according to the following criteria:

- **Validity.** Does it measure what it is supposed to measure? Much of the discussion of alternative indicators in Section 2.0 (above) concerned whether the indicator was a valid indicator of a particular dimension of health system performance.

- **Precision.** Is the indicator clearly and unambiguously defined? For example, if the indicator refers to government expenditures, should it be based on recurrent expenditures, capital expenditures, or total expenditures?
- **Reliability.** Will two measurements of the indicator for the same health system produce the same result? This is particularly a problem when the indicator relies on subjective assessments or when sampling errors are large, as in household surveys.
- **Timeliness.** Is the indicator available on an annual basis and without undue delay? This is a problem with indicators which require household surveys or which depend on government statistics which are published after a delay of several years.
- **Comparability.** Can the indicator be used to compare health systems meaningfully across countries? More or less weight may be given to this criterion depending on the primary purpose to be served by the indicator.
- **Additivity.** Can the indicator be readily and meaningfully applied to sub-regions and to population sub-groups (e.g., gender, income)?
- **Interpretability.** Does a higher (or lower) value of the indicator consistently imply that a health system performs better? Some indicators are difficult to interpret because either relatively high or low values of the indicator may imply poor performance (e.g., the proportion of recurrent costs absorbed by drugs).
- **Cost.** Is the cost manageable? There is often an unavoidable tradeoff between cost, on the one hand, and validity, reliability, and timeliness, on the other hand.

In addition to the above considerations, it is desirable that all indicators be expressed in relative, rather than absolute terms (i.e., percentages or ratios instead of raw numbers) to facilitate comparability and that the total number of indicators be as small as possible to reflect adequately the various dimensions of performance. Indicators are never directional (e.g., “increase in fee revenue”); this is the role of targets.

3.3 An Example of Scoring Indicators

Table 3.1 (see page 47) lists the indicators of health system efficiency (discussed in section 2.4.3) which provides a *hypothetical* scoring of each indicator according to the criteria listed in the preceding section (5 is the highest score given and 1 is the lowest).³ For example, the indicator “Outpatient visits per hour of physician labor” is given a relatively low score for Validity (it does not reflect the use of other inputs, such as non-physician labor and capital) but high scores for the other criteria (it is clearly defined and yields consistent results; it provides a basis for making

³ In a realistic application in which each member of a group of experts scored the indicators, the raw scores would be presented as means and standard deviations, with the former serving as the score and the latter serving as an indicator of the degree of consensus among the experts.

comparisons between facilities, geographical areas, and even countries; it is easy to interpret and can be calculated at low cost with readily available health system data).

“Cost per outpatient visit” is a more valid measure of efficiency (it reflects the use of other inputs) but is expensive to compute (it requires cost data), can be unreliable (if different assumptions are used to estimate costs), and is not well suited to international comparisons (because of the problem of comparing costs across different currencies).

Table 3.2 (see page 49) again lists the indicators (column 1) and presents the unweighted sum of their raw scores from Table 3.1 (column 2; the maximum value is 40), as well as their ordinal ranking on the basis of this unweighted sum (column 3). Table 3.2 also lists a (purely hypothetical) weighted⁴ sum of the raw scores (column 4; the maximum value is again 40) and their ranking according to this weighted sum (column 5). Weighting may be used if some of the criteria are considered to be more important than others (i.e., Validity and Cost in this hypothetical example).⁵ Table 3.2 illustrates how the methodology can be used to identify a short list of indicators, as well as the potential sensitivity of the procedure to the weighting scheme used (i.e., not very sensitive in this hypothetical example).

Examining the rankings in Table 3.2, it is clear that similar indicators are often ranked together. For example, the two top-ranked indicators (unweighted) are “Outpatient visits per hour of physician labor” and “Outpatient visits per hour of nurse labor.” Since these indicators are both measures of labor productivity, it would not be useful to include both in a short list. In the absence of weighting the criteria differently, the results in Table 3.2 suggest that an appropriate short list of indicators of efficiency might include:

- Outpatient visits per hour of physician labor
- Personnel expenditure as a percent of total recurrent health expenditure
- Number of nurses per doctor
- Fees charged in all facilities (yes/no)
- Government health system uses basic drug list for procurement (yes/no)
- *Average length of hospital stay*⁶
- *Hospital bed occupancy rate*

In the weighted case, the results in Table 3.2 suggest that the following indicators might constitute a short list of efficiency:

- Personnel expenditure as a percent of recurrent health expenditure
- *Ratio of outpatient visits to personnel costs*⁷
- Fees charged in all facilities (yes/no)
- Number of nurses per doctor

⁴ The hypothetical weights are as follows: Validity (3.0); Precision, Reliability, Timeliness, Comparability, Additivity, and Interpretability (0.5); and Cost (2.0).

⁵ Alternatively, if the indicators are to be used primarily to compare the performance of health systems between countries, it would be important to weight the Comparability criterion more heavily.

⁶ Indicators in italics are those which are unique to the unweighted short list.

⁷ Indicators in italics are those which are unique to the weighted short list.

- Outpatient visits per hour of physician labor
- Government health system uses basic drug list for procurement (yes/no)
- *Fee levels promote efficiency* (yes/no)

Table 3-1 Individual Scores by Criterion for Indicators of Health System Efficiency (5= High, 1 = Low)

	Validity	Precision	Reliability	Timeliness	Comparability	Additivity	Interpretability	Cost
Outpatient visits per hour of physician labor	3	5	5	5	5	5	5	5
Outpatient visits per physician	2	5	5	5	5	5	5	5
Outpatient visits per hour of nurse labor	3	5	5	5	5	5	5	5
Outpatient visits per nurse	2	5	5	5	5	5	5	5
Ratio of outpatient visits to personnel costs	4	5	5	5	3	5	5	5
Cost per outpatient visit	5	4	3	4	3	5	5	3
Operating cost per outpatient visit	4	4	3	4	3	5	5	3
Cost per hospital bed-day	4	4	3	4	3	5	4	3
Cost per hospital admission	4	4	3	4	3	5	4	3
Percent of outpatient visits obtained from the private sector	3	4	3	3	4	4	4	3
Private hospital beds as percent of total	3	4	3	5	5	5	4	5
Personnel expenditure as a percent of total recurrent health expenditure	5	5	5	4	5	5	3	5
Expenditure on drugs and supplies as a percent of total recurrent health expenditure	5	5	5	4	5	5	3	5
Number of nurses per doctor	4	5	5	5	5	5	3	5
Number of nurses per hospital bed	4	5	3	5	3	5	3	5
Number of doctors per hospital bed	4	5	3	5	3	5	3	5
Ratio of average salary of government health worker of given experience to the income of a comparable private health worker	4	4	3	4	4	4	4	3
Salaries of government health workers are paid on time (yes/no)	3	2	2	4	3	2	5	4
Adequate performance incentives exist for government health personnel (yes/no)	4	3	3	4	3	2	5	4

Table 3-1 Individual Scores by Criterion for Indicators of Health System Efficiency (5= High, 1 = Low)

	Validity	Precision	Reliability	Timeliness	Comparability	Additivity	Interpretability	Cost
Government health workers are permitted to engage in private practice (yes/no)	2	4	4	4	4	2	3	5
Generic drug expenditure as a percent of total drug expenditure	4	4	4	3	4	2	4	4
Government health system uses basic drug list for procurement (yes/no)	4	5	5	5	5	2	5	5
Percent of government recurrent health budget spent on public health services	4	3	3	3	4	3	5	5
Primary health care expenditure as a percent of recurrent costs	3	3	4	3	4	3	2	5
Fees are charged in all facilities (yes/no)	4	5	5	5	5	3	5	5
Fee levels promote efficiency (yes/no)	5	3	3	5	5	3	5	4
Referral system functions effectively (yes/no)	5	3	3	5	5	3	5	4
Average length of hospital inpatient stay	3	5	5	5	3	5	3	5
Hospital bed occupancy rate	3	5	5	5	3	5	3	5
Percent of insured enrolled in plans which use copayments and deductibles, managed care plans, or plans subject to global budgeting	4	4	4	4	4	2	5	4

Table 3-2

Unweighted and Weighted¹ Sums and Rankings of Individual Criterion Scores from Table 3-1

	Unweighted Sum	Rank of Unweighted Sum	Weighted Sum ¹	Rank of Weighted Sum
Outpatient visits per hour of physician labor	38.0	1	34.0	3
Outpatient visits per physician	37.0	2	31.0	10
Outpatient visits per hour of nurse labor	38.0	1	34.0	3
Outpatient visits per nurse	37.0	2	31.0	10
Ratio of outpatient visits to personnel costs	37.0	2	36.0	2
Cost per outpatient visit	32.0	6	33.0	6
Operating cost per outpatient visit	31.0	7	30.0	12
Cost per hospital bed-day	30.0	8	29.5	13
Cost per hospital admission	30.0	8	29.5	13
Percent of outpatient visits obtained from the private sector	28.0	10	26.0	16
Private hospital beds as percent of total	34.0	4	32.0	8
Personnel expenditure as a percent of total recurrent health expenditure	37.0	2	38.5	1
Expenditure on drugs and supplies as a percent of total recurrent health expenditure	37.0	2	38.5	1
Number of nurses per doctor	37.0	4	36.0	2
Number of nurses per hospital bed	33.0	5	34.0	5

¹ The weights are as follows: Validity (3.0), Precision (0.5), Reliability (0.5), Timeliness (0.5), Comparability (0.5), Additivity (0.5), Interpretability (0.5), and Cost (2.0).

Table 3-2 (continued)

Unweighted and Weighted¹ Sums and Rankings of Individual Criterion Scores from Table 3-1

	Unweighted Sum	Rank of Unweighted Sum	Weighted Sum ¹	Rank of Weighted Sum
Number of doctors per hospital bed	33.0	5	34.0	5
Ratio of average salary of government health worker of given experience to the income of a comparable private health worker	30.0	8	29.5	13
Salaries of government health workers are paid on time (yes/no)	25.0	12	26.0	16
Adequate performance incentives exist for government health personnel (yes/no)	28.0	10	30.0	
Government health workers are permitted to engage in private practice (yes/no)	28.0	10	26.5	15
Generic drug expenditure as a percent of total drug expenditure	29.0	9	30.5	11
Government health system uses basic drug list for procurement (yes/no)	36.0	3	35.5	3
Percent of government recurrent health budget spent on public health services	30.0	8	32.5	7
Primary health care expenditure as a percent of recurrent costs	27.0	11	28.5	14
Fees are charged in all facilities (yes/no)	37.0	2	36.0	2
Fee levels promote efficiency (yes/no)	33.0	5	35.0	4

¹ The weights are as follows: Validity (2.0), Precision (0.5), Reliability (0.5), Timeliness (0.5), Comparability (0.5), Additivity (0.5), Interpretability (0.5), Cost (0.5).

Table 3-2 (continued)

Unweighted and Weighted¹ Sums and Rankings of Individual Criterion Scores from Table 3-1

	Unweighted Sum	Rank of Unweighted Sum	Weighted Sum¹	Rank of Weighted Sum
Referral system functions effectively (yes/no)	33.0	5	35.0	4
Average length of hospital inpatient stay	34.0	4	32.0	8
Hospital bed occupancy rate	34.0	4	32.0	8
Percent of insured enrolled in plans which use copayments and deductibles, managed care plans, or plans subject to global budgeting	31.0	7	31.5	9

¹ The weights are as follows: Validity (3.0), Precision (0.5), Reliability (0.5), Timeliness (0.5), Comparability (0.5), Additivity (0.5), Interpretability (0.5), and Cost (2.0).

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