

APPENDIX B. DEFINING AND MEASURING ACCESS

Defining and Measuring Access

Background paper for the World Health Organization–Management Sciences for Health consultative meeting on
Access to Essential Drugs, Vaccines, and Health Commodities
Ferney Voltaire, France, 11–13 December 2000

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Introduction

The lack of access to essential drugs, vaccines, and health commodities in developing countries has received international recognition as being of enormous significance, and various agencies and organizations, including the World Health Organization (WHO), have presented data to estimate the extent of the problem. Despite the widespread use of the term, “access” is rarely operationalized nor is the nature of the relationships between factors influencing access specified. In the absence of such a framework and of valid and reliable measures, there is little basis for planning for directed change to alleviate the specific problems that we typically associate with lack of access to essential drugs, vaccines, and health commodities. Therefore, the determination of any impact of planned interventions is limited.

In light of the many global initiatives aimed at improving access to drugs and related commodities, it is important to arrive at a consensus definition of access and to identify a set of testable indicators that can be used to measure it. WHO and Management Sciences for Health (MSH) have jointly undertaken to organize a consultative meeting with recognized experts to be held in December 2000 in order to identify an appropriate operational definition of access to drugs and related commodities, specify indicators to document problems with lack of access, and, subsequently, to track the impact of interventions to increase or improve access. This background paper reviews some major different approaches to defining and measuring access and presents a sample list of indicators that have been developed to measure access or some important aspect of access. This paper does not aim to present a comprehensive review of all definitions or approaches to understanding access. It provides a starting point for discussion.

Objectives

The specific objectives of this paper are to—

1. Identify how access to health care services and access to medicines have been defined in the literature.
2. Identify the variables/indicators that have been used or proposed to measure access.

Methodology

A literature search of both published and unpublished (gray) literature was conducted. For published literature, a search was conducted using key words and medical subject headings (MeSH) terms/key words on MEDLINE and POPLINE computerized databases. The gray literature reviewed included conference proceedings, many of which were identified through HealthSTAR, and Web sites. Finally, various key contributors were queried. Details of search terms and the names of key contributors are given in Annex 1. For the purposes of this paper, definitions and measures of access are explored in terms of access to health services and access to pharmaceuticals and pharmaceutical services as a subset of health services.

Defining Access

Merriam-Webster's Collegiate Dictionary Tenth Edition defines access as the “freedom or ability to obtain or make use of” something. In terms of public health policy, access (to some basic set of services) is generally considered to be an individual right and refers to the ability to obtain care when needed. The concern for access, however, extends beyond individuals having the ability to make use of services to the often unstated need for individuals to make use of services for the public good—for example to prevent the spread of communicable diseases. Furthermore, the health of a population is closely linked to important social and economic policies and goals, and access to health services is used as a political measure to reflect these relationships.

Access to care, broadly speaking, has been an important policy and research issue for at least the past three decades and, for the most part, has been focused on the context of developed countries. In contrast, the recent specific concern for the lack of access to essential drugs, vaccines, and other health commodities reflects the particularly critical role of these items in contemporary public health problems in an increasingly globalized social and economic context. The international call for solutions to lack of access demands conceptual clarity to understand access and the factors that influence access so that appropriate and cost-effective interventions may be identified and implemented. A logical place to start is to review what research on access to pharmaceuticals and pharmacy services has already been done. As much of this work is rooted in health services utilization research, this paper will begin with an overview of this research.

Correlates of Access and Health Services Utilization

Health services researchers are typically interested in access as it relates to utilization. Research in this area focuses on correlates of access and on important outcome measures, such as utilization or patient satisfaction. Commonly examined correlates include population characteristics (e.g., income, insurance, and attitudes) and characteristics of services (e.g., available human resources or commodities). Access is assumed when there is utilization. Conversely, when there is no utilization or when it is limited in the presence of need, various types of barriers may be presumed.

Some researchers (e.g., Aday and Andersen 1974, 1975; Andersen and Newman 1973) have classified determinants/correlates of access in terms of those that predispose an individual to use services (individual and population characteristics), those that enable use (individual and

health system characteristics), and those need-for-care variables, such as illness or perceived illness, that influence utilization. In this way, a dynamic model for understanding access and utilization emerges. Aday et al. (1980) further distinguish qualities of access: the *potential access* of a given population group to the health care system offered by the characteristics of the health care system and *actual access* that is determined by the characteristics of the population group. Utilization of services, in this sense, may be defined as the realization of potential access.

Finally, the quality of access has been described by Aday et al. (1993) in terms of health services utilization and the impact of access on health status, reflecting the prevailing concerns in health services utilization research about cost containment and quality. *Effective* access is established when utilization studies show that use improves health status or satisfaction with services, whereas *efficient* access is shown when the level of health status or satisfaction increases relative to the health care services consumed.

Dimensions of Access and Health Services Utilization

Access is difficult to define concisely. When one asks, “When is a service accessible?” or, “When does one have access to needed services?” the tendency is to provide a list of responses that includes adjectives, such as “affordable,” or “available,” suggesting the need for a more comprehensive definition of access—and/or a more precise one. Penchansky (1977) and Penchansky and Thomas (1981) developed this observation and defined access in terms of the effects of the interaction between characteristics of the individual and relevant health services. Within this framework, access is a variable concept that represents the relative degree of fit between the patient or user and the system (Penchansky 1977; Penchansky and Thomas 1981). Access “exists” when various individual, social, and health system factors are optimally “aligned” for a particular context. Penchansky and Thomas (1981) defined five dimensions of access to health services that illustrate how these factors relate.¹

1. *Availability*—the relationship of the volume and type of existing services and resources to the users’ volume and types of needs
2. *Accessibility*—the relationship between the location of supply and the location of users, taking account of user transportation resources and travel time, distance, and cost
3. *Accommodation*—the relationship between the manner in which supply resources are organized to accept users in terms of appointment systems, hours of operation, walk-in facilities, and of existing patient/provider relationship to the users’ ability to accommodate to these factors and the users’ perception of their appropriateness
4. *Affordability*—the relationship of prices of services and providers’ insurance or deposit requirements to users’ income, ability to pay, eligibility for public support, and existing health insurance. Users’ perception of worth relative to price or total cost may be a relevant concern as well as their knowledge about existing prices, total cost, and possible credit arrangements.

¹ Penchansky and Thomas assume that the client and the patient are one and the same in their definition. However, in health care systems that incorporate third party payers, the client may be the payer and not the patient. Therefore for the purposes of this paper, we have used the term “user” in place of “client.”

5. *Acceptability*—the relationship of the users’ attitudes about personal and practice characteristics of providers to the actual characteristics of existing providers as well as to provider attitudes about acceptable personal characteristics of patients

The identification of these dimensions of access has been useful for researchers interested in explaining utilization and in applying research results aimed at improving access to services. Research indicates that any particular dimension, while important, is a relatively weak predictor of access, but taken together they can provide a road map for evaluating the extent to which access “exists” for an individual or population and what might be done about it.

These dimensions of access to health services are compatible with other approaches to understanding the nature of access. For example, a comparable construct is afforded by the WHO framework for access to health care in discussions on defining primary health care (1978). The dimensions identified in the framework are—

Geographical accessibility—distance, travel time, and means of transportation are acceptable

Financial accessibility—services are affordable whatever the method of payment

Cultural accessibility—using technical and managerial methods in keeping with cultural patterns of community

Functional accessibility—having the right kind of care available on a continuing basis for those who need it, when they need it

While there are other definitions and approaches to understanding access, more commonalities emerge than differences. For example, Penchansky and Thomas’s model and the WHO framework may be compared with the framework proposed by Khan and Bhardwaj (1994) that describes access in terms of spatial relationships. In this model, *spatial* aspects of access refer to “geographic or physical” barriers or facilitators to utilization, and *aspatial* access refers to “social” barriers or facilitators. Access is achieved when facilitators exceed barriers. Although the terms are different, the essential understanding of access as defined by these specific types of relationships between users and providers is comparable.

Penchansky (1977) & Penchansky & Thomas (1981)	WHO (1978)	Khan and Bhardwaj (1994)
Accessibility	Geographical	Spatial
Affordability	Financial	Aspatial
Acceptability	Cultural	Aspatial
Accommodation	Functional	Spatial
Availability	Functional	Spatial

Researchers who have studied access have frequently added to or adapted the five-dimension framework. Donabedian (1972) added a temporal dimension to the definition of access that refers more to a qualitative dimension of access by distinguishing between the *initiation* and *continuation* of access. This crosscutting dimension refers to concerns about the sustainability of access services. Soucat et al. (2000) further adapted the framework to assess the

performance of the health sector, identifying critical dimensions of quality of services, timing, and continuity to physical access and availability of resources. In addition, they add a dimension of service utilization in recognition of the possibility that even when the services are accessible, they may not be utilized when needed.

Some notable differences exist, however, between definitions or frameworks of access to health services that explain utilization patterns of populations and those that explain the utilization patterns of individuals. This observation is made by Campbell et al. (2000), who describe a conceptual framework for defining quality of care that incorporates two dimensions—access and effectiveness. Within this framework, the dimension of access for individuals and the dimension of access for populations differ: affordability is included as a dimension of access for individuals (a factor related to personal wealth) but not for populations; from a population perspective, affordability refers to the efficient use of services for the maximum desired outcomes within costs. Another important consideration in this framework is inclusion of the concept of equity (the extent to which all individuals in a population access the care that they need) as a quality of access. For this reason, the authors conclude that there is a potential conflict between population and individual concerns about quality of care, as measured by access and effectiveness, when, for example, scarce resources for particular health needs must be prioritized.

Defining Access to Pharmaceutical Products and Services

Models of health services utilization have been used to describe access to pharmaceutical products (e.g., Kloos et al. 1986, Miralles and Kimberlin 1998). Although medication use may be considered to be a subset of health services utilization, there is an important distinction in that medication use is impacted not only by the pharmaceutical service but also by the pharmaceutical product.² Accordingly, access needs to be considered in terms of the service as well as the goods that are delivered by the service. In addition, it is important to address the fact that many drugs are available to the general public in a relatively uncontrolled environment. Consumers are allowed greater leeway in personal decision making about drug use than are patients seeking care in treatment facilities (Kloos et al. 1986). Therefore, definitions of access to pharmaceutical commodities need to extend beyond explaining utilization by “entry use” through a prescription from a health care professional to incorporate utilization patterns in the informal sector and in self-medication.

A consideration of particular relevance to defining dimensions of access to pharmaceutical products and pharmaceutical services is the notion of acceptable or assured *quality*. This assurance includes concerns about the chemical/pharmaceutical integrity and bioequivalence of the product as well as the quality of the services that ensures the appropriate use of the product. Therefore, access to pharmaceuticals implies not only access to the product but also access to the *information* that is needed to make appropriate decisions concerning the availability and use of that product. Information, in this context, influences all components of the drug supply cycle (selection, procurement, distribution, and use) and, therefore, the various dimensions of access. Similarly, another multidimensional quality concern is the *continuity* or *sustainability* of access to pharmaceutical products and services, in particular for chronic use treatments or for the treatment of endemic conditions.

² Pharmaceutical services for the purposes of this paper encompass both the product distribution function and the patient care/professional services, including providing the information required for optimal use of these products.

Dimensions of Access to Understand Utilization of Pharmaceuticals and Pharmaceutical Services

How well does the general framework of defining access by its various dimensions and components apply to access to pharmaceuticals and related services, and to what extent can it be used to guide the development of meaningful and relevant indicators? This section examines each dimension in detail in order to answer these questions.

Accessibility/Geographical Accessibility/Spatial Aspects

The relationship between the location of both pharmaceutical products and pharmaceutical services to the location of the individuals has been shown to be an important dimension of access to pharmaceutical services and products. Igun (1987) showed that one of the important reasons given for seeking treatment at retail pharmacies in preference to hospitals in Nigeria was, “It is the nearest source of treatment to my home.” The transportation resources, travel time, distance, and cost have been shown to be equally important. In Bangladesh, the price of the bus ticket was the major obstacle to access (Green 1986). Again, in Igun’s (1987) study, an explanation given for seeking treatment at retail pharmacies in preference to hospitals was, “Treatment is given without waste of time.”

Affordability/Financial Accessibility/Aspatial Aspects

The dimension of affordability as defined by Penchansky (1977) or financial accessibility (WHO 1978) is relevant for defining access to pharmaceutical services and products. In Igun’s (1987) study in Nigeria, explanations given for seeking treatment at retail pharmacies in preference to hospitals included, “the cost of treatment is often minimal.” This dimension brings together components of price, costs, and value directly related to the products and services received. They must be considered in conjunction with the financial resources disposable to populations and individuals. Indirect costs such as transportation are related to geographic access issues, not affordability.

Acceptability/Cultural Accessibility/Aspatial Aspects

Acceptability as defined by Penchansky (1977) or cultural accessibility (WHO 1978) again is relevant for defining access to pharmaceutical products and services. Numerous authors have described the influence of acceptability of health services on health-seeking behavior. Reasons given for seeking treatment in a retail pharmacy in preference to hospital treatment included, “They do not engage in preferential treatment of patients” and “anonymity in treatment” (Igun 1987).

Accommodation/Functional Accessibility/Spatial Aspects

Functional accessibility (WHO 1978) is defined as the right kind of care available on a continuing basis for those who need it, *when they need it*, and it therefore incorporates both availability and accommodation. As defined by Penchansky (1977), accommodation—as the relationship between the manner in which resources are organized, including times of appointment and walk-in facilities—may be relevant for access to pharmaceutical products and services where access is determined mainly by “entry use” through a prescription from a health care professional. In the context of the informal sector, accommodation is also relevant to treatment-seeking behavior—for example, obtaining drugs from vendors who will trade drugs without a prescription. Although relevant, the importance of this dimension in the overall impact of access may be country- or context-specific.

Availability/Functional Accessibility/Spatial Aspects

Penchansky (1977) defines availability as the relationship of the volume and type of existing services and resources to *the patients’/users’ volume and types of need*. As discussed above, functional accessibility (WHO 1978), defined as the right kind of care available on a continuing basis for those who need it when they need it, incorporates availability and accommodation. Although it is clear that availability is a key component in defining access to pharmaceutical services and products, this dimension may need to be further refined to incorporate the availability of a rational selection of drugs in rational quantities or courses and to define from whose perspective availability is seen to be rational. Informational needs would also need to be similarly incorporated. For example, two reasons stated for seeking health care at a retail pharmacy in preference to a hospital were that “here there is no restriction on the drugs that can be purchased,” implying the desired selection of drugs was available, and that drugs could be purchased in small (and affordable) quantities, implying that drugs such as antibiotics may not have been sold in complete courses (Igun 1987). It could be argued that meeting the patients’ volume and type of needs may not be in the patients’ interest if products that are readily available could be determined to be dangerous or useless.

In general, both Penchansky’s framework for defining access through dimensions that reflect specific relationships between the user and provider and the WHO framework appear to be useful for understanding factors influencing use of pharmaceuticals and are compatible with strategically important programming concerns for public health. Indeed, in a more recent publication, WHO (2000) specifically addresses access to essential drugs from a programmatic perspective that refines the basic health services utilization framework to focus on drugs and related services.

Defining Access for Monitoring and Evaluating Programs: The WHO Medicines Strategy

Increased access to health services in general—and drugs in particular—is a common goal for health-related development projects and programs. The relationship between the program activities and goal of increased access may or may not always be explicit, but it can often be inferred. The need for internal consistency between the various program goals, objectives, and expected outcomes should not be underestimated.

WHO addresses access (or lack thereof) to essential drugs from a programmatic perspective in the recently published *WHO Medicines Strategy: Framework for Action in Essential Drugs and Medicines Policy 2000–2003* (WHO 2000). In this document, WHO aims to guide pharmaceutical work at the country, regional, and global level and, toward this end, four key objectives are specified that relate to concerns about policy, access, quality and safety, and rational use.

The “access” objective is to “ensure equitable availability and affordability of essential drugs with an emphasis on diseases of poverty.” Consumers are said to have access to essential drugs when “such drugs can be obtained within reasonable traveling distance (i.e., are geographically accessible), they are readily available in health facilities (i.e., are physically available), and affordable (i.e., are financially available).” These dimensions of access are comparable to four of the five dimensions of access offered by Penchansky and Thomas—accessibility (geographically accessible), availability and accommodation (physically available), and affordability (financially available). In addition the dimension of acceptability is discussed under a component of the “rational use” objective, “Rational Use by Consumers,” where utilization is stated to be influenced “by knowledge, culture, drug promotion and personal finances.”

Each of the four objectives contains between two and four specific components and each component includes indicators to provide quantitative measures. The “access” objective incorporates three main components:

1. *Access strategy and monitoring for essential drugs*—help countries to ensure and monitor access to essential drugs, focusing on diseases of poverty
2. *Financing mechanisms and affordability of essential drugs*—ensure the implementation of national strategies to finance the supply and increase the affordability of essential drugs, in both the public and private sectors.
3. *National and local public sector drug supply systems and supply capacity*—support countries to run efficient public sector drug supply systems, ensuring the availability of essential drugs at all levels of the distribution chain

The WHO Medicines Strategy takes a step to operationalizing access by identifying four factors that are “critical for securing and increasing access.” These are—

1. *Rational selection of essential drugs and drug development*
2. *Affordable prices for governments and consumers*
3. *Sustainable financing, through general government revenues and social health insurance*
4. *Reliable supply systems, with a mix of public and private services*

These factors correspond to a framework for collective action that is identical to the four-part strategy to guide and coordinate action on access to HIV-related drugs adopted by the UN Interagency Task Team on Access to HIV-Related Drugs (2000). The four elements of this

framework are accompanied by some specific qualifications or suggested strategy for achieving access. These are—

1. *Rational selection and use* based on development of a national essential drugs list, so that health facilities focus drug purchasing and prescribing on drugs that represent the best balance of quality, safety, efficacy, and cost
2. *Affordable prices* to ensure that the drug expenditure of governments, other health care providers, and consumers is cost-effective and represents best value for money
3. *Sustainable financing* through equitable funding mechanisms such as government revenues, social health insurance, and transitional methods
4. *Reliable supply systems* incorporating a mix of public and private supply services to ensure regular supply of essential drugs of assured quality and sufficient research and development of new drugs

Do these four key elements of the WHO/UN framework relate to the dimensions of access as described previously? If so, in what way?

Rational selection and use based on development of a national essential drugs list is an approach to modify the dimension of *availability* as defined by Penchansky (1977) and Penchansky and Thomas (1981), where rational selection and use refer to the type of medication that should be available and the manner in which it is used. Within the WHO Medicines Strategy, rational selection and use are considered under the “rational use” objective. The recommended strategy for rational selection and use is the development of a national essential drugs list.

Affordable prices to ensure cost-effective expenditure and best value for money for governments and consumers. This element has a goal of ensuring *affordability* of essential drugs by modifying drug prices. Not specifically mentioned are opportunity and other costs associated with access, such as time and transportation. There may be significant difference in what is considered best value for money by governments in comparison with best value for money by individuals.

Sustainable financing through equitable funding mechanisms such as government revenues and social health insurance includes a strategy for achieving drug *affordability*, but only as it relates to the consumer’s ability to pay for the products or services. Access for the individual would depend on the extent to which the individual benefits from these financial resources. Sustainability of financing can be considered a component of continuity of access.

Reliable supply systems incorporating a mix of public and private supply services to ensure regular supply of essential drugs of assured quality in health care facilities is presented as a strategy to improve the *availability* of essential drugs of assured quality through achieving an “optimal mix” of private and public sector supply systems. WHO suggests that where the public sector clearly fails, the private sector may support the public sector. It may contribute to improving the availability of essential drugs by reducing drug stock-outs and reducing drugs costs. The mix of systems may vary with respect to the roles of the government, the private sector, and also with the incentives for efficiency. Regular supply implies sustainability or continuity of supply. In addition, the public/private mix of supply systems to ensure regular supply may incorporate an approach to modify the dimension of *accommodation*.

The following table serves to highlight how definitions of access relate to programmatic objectives. The nature of the relationship between the suggested interventions and expected outcomes is clear. In the next section, the question of operationalizing the access and obtaining objective, valid, and reliable measures is discussed.

Key Elements WHO (2000) Framework for Collective Action	Dimensions of Access		
	Penchansky (1977), Penchansky & Thomas (1981)	WHO (1978)	Khan and Bhardwaj (1994)
	Accessibility	Geographical	Spatial
Affordable prices Sustainable financing	Affordability	Financial	Aspatial
	Acceptability	Cultural	Aspatial
Reliable supply systems	Accommodation	Functional	Spatial
Rational selection & use Reliable supply systems	Availability	Functional	Spatial

Measuring Access

Measures of access to health or pharmaceutical services or goods are typically used to compare groups or to compare against a given standard or target. Individuals or populations are said to have or not to have access, or they may have a relative degree of access. Increased access may refer to increased coverage in population terms or increased numbers of services relative to a previous time period. Development projects with a drug management focus should aim to demonstrate increased access to pharmaceutical services and products by comparisons between and with relevant groups over the time of the project.

Many of the studies reviewed for this paper use the measure of utilization of services as a proxy measure of access and, it might be argued, as a proxy measure for health impact or outcome. As mentioned earlier, the assumption with this model is that a barrier to access is indicated when, in the presence of need, utilization does not occur. Identifying important dimensions of access can help determine the type of barriers that are rate-limiting for a given population or context. Moreover, the extent to which some dimensions are necessary and which are sufficient for achieving access may be investigated.

Types of Measures

From a programmatic perspective, it is useful to distinguish measures of access that reflect discrete factors, which can be manipulated or changed, from those measures that are too broad to be useful to determine impact of an intervention. If we are to influence any important dimension of access, how can we know that it was our intervention that made an impact? Is there a framework that can be used to identify those measures?

If we can conceive of drug and health commodity management as a systems application, then we can define efforts to enhance access to these products (and related services) in terms of either system strengthening or creating. Systems can be characterized by specific structures and processes that, when functioning optimally, lead to an appropriate and desired outcome.

As such, we can adapt an approach developed originally by Donabedian (1980) to define three types of measures to assess the performance of health care systems and organizations, a pharmaceutical sector, and pharmaceutical service providers. The three areas of measures follow.

Structure

Structural measures focus on the context or the environment within which pharmaceutical services and commodities are provided and are intuitively relevant to ensuring access. The structure within which these services are provided indicates the extent to which providers, facilities, organizations, and systems have adequate capability to provide the services they offer but not the way in which the services themselves (processes) are provided. Structural measures also indicate the extent to which organizations and individuals meet certain accepted criteria for participation in the health care marketplace, such as licensure and insurance status. Structural inadequacies represent a failure to meet these minimal standards, for example, with regard to minimum training requirements for providers (e.g., prescribers and dispensers), the adequacy of facilities, and so forth.

Process

Process measures link structural elements with actual outcomes. Examples include utilization reviews, which medications are prescribed, and which lab tests are performed, as well as the specific content of physician/patient interactions. Process measures are often evaluated against some established criteria or standards and therefore may be used to evaluate the appropriateness of procedures. For example, clinical guidelines or protocols outline analytically the specific recommended procedures to be followed, explicitly relating processes to outcomes.

Outcomes

Outcome (or impact) measures address both the midpoints and end results of the system. Traditionally, the end points include such measures as infection rates, morbidity and mortality, and patient satisfaction. Important midpoints may reflect the outcomes of those structures and processes that directly relate to an important dimension of access. In many ways, outcome measures are the most important and the most intuitive indicators, and although they should relate to structure and processes, this is often difficult to assert. For example, many factors can influence a clinical outcome that are not directly attributable to the treatment given or care received, including nonadherence to recommended treatment or the natural course of illness.

Illustrative Indicators

Annex 2 provides a list of various measures to describe or explain utilization or other aspect of access to health services, categorized by the dimension of access that is most directly addressed. Some of these measures, or indicators, have been applied for research purposes only, whereas other have been developed for programmatic purposes, and still others appear to be most suitable for planning purposes. Few have been developed and used specifically for measuring access to pharmaceuticals or pharmaceutical services.

Indicators have been developed by WHO for the purposes of assessing the implementation of the *WHO Medicines Strategy 2000–2003*, with target values set for 2003. Eight indicators are presented that correspond to the three components for the objective of improving access to essential drugs. Two of the eight are identified as indicators that provide information about outcomes. (See the following discussion of types of indicators.) Seven have numbers of countries as the denominator, as is appropriate for the purposes of global measures of progress of the Strategy. The indicators also clearly reflect the specific strategies promoted by WHO, such as public health insurance to cover drug costs and competitive tenders.

WHO Medicines Strategy 2000–2003 Indicators

Component/Indicator	Indicator Type
Access strategy and monitoring for essential drugs	
Countries where less than 50% of the population has access to essential drugs	Outcome
Percentage of key drugs available in health facilities (measured in countries with comprehensive programs)	Outcome
Financing mechanism and affordability of essential drugs	
Countries with public drug expenditure per capita of less than US\$2	Process
Countries with generic substitution allowed in private pharmacies	Process
Countries with public health insurance covering drug costs	Structure and Process
National and local public sector drug supply systems and supply capacity	
Countries with public sector procurement based on a national list of essential drugs	Process
Countries with at least 75% of public sector procurement carried out by competitive tender	Process
Countries implementing the 1999 interagency guidelines on drug donations	Process

By contrast, Soucat et al. (2000) have been developing a set of core indicators for monitoring the implementation of interventions as well as evaluating their impact in combating communicable diseases at the country level. The indicators address specific diseases and interventions (such as IMCI, Roll Back Malaria, etc.) although no target measures are suggested. Many of the indicators directly address access to pharmaceutical products, vaccines, or other health commodities.

Soucat et al. (2000) Draft Illustrative Indicators

Problem Area/Indicator	Indicator Type
Childhood infectious diseases	
Under five and infant mortality reduction	Outcome/impact
Percentage of children under five with access to correct case management (IMCI)	Process
Percentage of children with illness correctly managed at home	Process
Percentage of infants exclusively breastfed to six months of age	Process
Vaccine-preventable diseases in childhood	
Reduction in vaccine-preventable deaths	Outcome
Percentage of children under 12 months immunized for measles	Process
Percentage of children under 12 months fully immunized for diphtheria, pertussis, and tetanus	Process
Malaria (in malaria endemic areas)	
Reduction in malaria death rate (in under fives and other age groups)	Outcome
Percentage of high risk persons with attack getting correct Rx in 24 hours	Process
Percentage of pregnant women on intermittent antimalaria treatment	Process
Percentage of facilities with first- and second-line antimalarials available	Process
Tuberculosis	
Reduction in TB mortality and prevalence rates	Outcome
TB incidence rate: number of new tuberculosis cases per 100,000	Outcome
Percentage of reported TB cases detected under DOTS	Process
Percentage of detected TB cases cured	Process
HIV/AIDS	
HIV seroprevalence among adults ages 15–24 reduced	Outcome
Percentage with access to condoms	Process
Percentage of STD cases correctly treated	Process
Percentage of safe, donated blood	Process
Percentage with access to drugs for HIV/AIDS opportunistic infections	Process

Also proposed are indicators to assess the performance of the health sector by the various dimensions discussed earlier—that is, accessibility, availability, quality, service utilization, and timing and continuity, applied to the type of intervention. These distinctions would allow for specific identification of the target population and would allow appreciable differences between indicators measuring the same dimensions for different population groups. Examples are provided in the following table.

Soucat et al. (2000) Draft Proposed Indicators

Evaluation Criteria	Child Health	Reproductive Health	Transmissible Disease
	Examples	Vaccination	ANC
Target population	Children 0–11 months	Pregnant women	General population
Availability of personnel	Percentage of nurses (actual/plan)	Percentage of midwives (actual/plan)	Percentage of nurses and doctors (actual/plan)
Availability of medicines and vaccines	Percentage of time when all vaccines are available	Percentage of time iron is available	Percentage of time chloroquine is available
Geographical access (defined by kms. between home and service)	Percentage with access to vaccination services	Percentage with access to MCH facilities	Percentage with access to primary care facility
Use of services	Percentage use of BCG	Percentage of pregnant women with at least one prenatal visit	Number of visits for malaria per capita
Continuity and adherence to quality	Percentage use of DPT3 Percentage of time with functional cold chain	Percentage of pregnant women with at least four prenatal visits Percentage of women receiving iron supplements	Percentage receiving adequate quality treatments

These three sets of indicators illustrate different types of indicators, developed for different purposes, but they address similar concerns about access to pharmaceuticals and related products. They also provide an example of the presentation of indicators, although the specific indicator definitions are not provided. The WHO indicators address the implementation and monitoring of essential drugs programs and have a country-level focus. The Soucat et al. indicators address the monitoring and evaluation of interventions aimed to treat key diseases and have a population focus. Indicators have been developed for other purposes can similarly address various dimensions of access to pharmaceuticals and pharmaceutical services, some of which are presented in Annex 2. The task before us is to use these measures to guide the discussion of identifying relevant indicators of access.

The Task at Hand

By holding this consultative meeting with recognized international experts, we hope to meet an important criterion for indicator development and selection: face validity. Validity in general refers to the extent to which useful inferences can be drawn from a measure for a given purpose under a given circumstance. Face validity is construed as the extent to which items appear to measure a construct that is meaningful to relevant reviewers. Reliability refers to the consistency or reproducibility of measures.

Other important criteria include reliability (especially in avoiding both incorrect or missing data and variations in indicator terms and definitions) and feasibility (data availability, data collection method, difficulty or ease of data collection, cost, and time involved). Specific questions for indicator review and selection follow.

1. Does the indicator have a clear and valid relationship to a dimension of access?
2. What are the key components and relationships addressed by the indicator?
3. If an outcome measure, does the indicator vary primarily because of structures or processes of a drug supply system or is it primarily vulnerable to other factors?
4. Is the indicator quantitative and can the data be collected?
5. Does the indicator have a clear, operational definition?
6. Is the data available, reliable, and accurate?
7. Is there a specified method of interpretation of the indicator?
8. Does the indicator allow for measuring change (e.g., improvement)?

Annex 1. Search Strategy and Key Contributors

1. Search terms for MEDLINE, POPLINE, and HealthSTAR

MEDLINE was searched from 1966–2000, POPLINE from 1970–2000, and HealthSTAR from 1975–2000, using the National Library of Medicine Internet Grateful Med Search V2.6.3.

- “Essential drugs” or “drugs, essential” and “access” (title or subject) all documents—MEDLINE/POPLINE/HealthSTAR
- “Essential drugs” or “drugs, essential” and “access*” (title or subject) all documents—MEDLINE
- “Essential drugs” or “drugs, essential” and “accessibility” (title or subject) all documents— POPLINE/HealthSTAR
- “Essential drugs” or “drugs, essential” and “supply and distribution” all documents—MEDLINE/POPLINE/HealthSTAR
- “Pharmaceutical preparations” and “supply and distribution” review documents—MEDLINE/ HealthSTAR; all documents—POPLINE
- “Pharmaceutical preparations” and “access*” (title or subject) review documents—MEDLINE
- “Pharmaceutical preparations” and “access*” (title) all documents—MEDLINE
- “Pharmaceutical preparations” and “access” (title or subject) all documents—POPLINE/HealthSTAR
- “Pharmaceutical preparations” and “accessibility” (title or subject) all documents—POPLINE/HealthSTAR
- “Pharmaceutical preparations” and “access*” (title or subject) and “supply and distribution” all documents—MEDLINE
- “Pharmaceutical preparations” and “access” (title or subject) and “supply and distribution” all documents—POPLINE/HealthSTAR
- “Pharmaceutical preparations” and “accessibility” (title or subject) and “supply and distribution” all documents—POPLINE/HealthSTAR
- “Pharmaceutical preparations” or “drug therapy” and “access” (title or subject) and “supply & distribution”—all documents MEDLINE/POPLINE/HealthSTAR (1993–2000)
- “Pharmaceutical preparations” or “drug therapy” and “access*” (title or subject) and “supply & distribution” —all documents MEDLINE
- “Pharmaceutical preparations” or “drug therapy” and “accessibility” (title or subject) and “supply & distribution”—all documents POPLINE/HealthSTAR (1993–2000)
- “Anti-HIV agents” or “HIV infections/therapy” and “access” (title or subject) review documents— MEDLINE; all documents—POPLINE/HealthSTAR
- “Anti-HIV agents” or “HIV infections/therapy” and “access*” (title) review documents—MEDLINE
- “Anti-HIV agents” or “HIV infections/therapy” and “accessibility” (title) all documents— POPLINE/HealthSTAR
- “Anti-HIV agents” or “HIV infections/therapy” and “supply and distribution” review documents— MEDLINE; all documents—POPLINE/HealthSTAR
- “Health services accessibility” and “supply & distribution” review documents—MEDLINE/HealthSTAR
- “Health services accessibility” and “supply & distribution” and “access” (title or subject) all documents—MEDLINE/HealthSTAR
- “Health services accessibility” and “supply & distribution” and “access” (subject) or “accessibility” (subject) all documents—POPLINE

- “Health services accessibility” and “quality indicators” all documents—MEDLINE/HealthSTAR
- “Health services accessibility” and “quality indicators” and “access” (subject) all documents— POPLINE
- “Health services accessibility” and “process assessment” all documents—MEDLINE/HealthSTAR
- “Health services accessibility” and “process assessment” and “access” (subject) all documents— POPLINE
- “Health services accessibility” and “pharmacies/utilization” all documents—MEDLINE/HealthSTAR/POPLINE
- “Health services accessibility” and “drug utilization” all documents—MEDLINE/HealthSTAR/POPLINE
- “Health services accessibility” and “access” (title) review documents—MEDLINE/POPLINE; all documents—HealthSTAR
- “Health care quality, access and evaluation” and “supply & distribution” all documents—MEDLINE
- “Health care quality, access and evaluation” and “quality indicators” all documents—MEDLINE
- “Health care quality, access and evaluation” and “process assessment” all documents—MEDLINE

2. Web sites searched

- World Health Organization (WHO) www.who.int
- Joint United Nations Program on HIV/AIDS (UNAIDS) www.unaids.org
- World Bank www.worldbank.org

3. Key contributors

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Annex 2. Measures of Access

This annex contains illustrative indicators that have been identified through a review of the literature into the dimensions. The search strategies are detailed in Annex 1.

Measures of Access

Indicators of Affordability	Source	Discussion
Household expenditure on drugs as a % of total health expenditure	WHO (2000)	<p><i>Affordability</i></p> <ul style="list-style-type: none"> • Not identified as a WHO critical indicator but mentioned in the text. • Household expenditure may increase if drugs are made more accessible/available. • May be wide variation between different population groups. • May also be a measure of a health system overly oriented towards drugs versus other health interventions, or of the insufficient availability of other forms of services.
Percentage of population with private/public health insurance that covers drugs	WHO (2000)	<p><i>Affordability</i></p> <ul style="list-style-type: none"> • Not identified as a WHO critical indicator but mentioned in the text. • Drugs may still be inaccessible for some groups if copayments are high. • Can look at different population subgroups, e.g., children under five.
Number of working hours to pay for a full course of treatment (average worldwide price) for TB/shigellosis/gonorrhoea	WHO (1999)	<p><i>Affordability</i></p> <ul style="list-style-type: none"> • Not identified by WHO as a critical indicator but mentioned in the text. • Local price may be preferable to average worldwide price. • Needs a reference standard or could be used to compare variation between different population groups.
Cost of one month's supply of contraceptives (or other supply, such as chronic care) as a % of monthly wages	Bertrand et al. (1994)	<p><i>Affordability</i></p> <ul style="list-style-type: none"> • May need another measure for population groups that do not have a monthly wage. • May be a measure of continuous affordability compared with the indicator above that measures affordability of acute care.
Percentage of total health insurance costs spent on drugs	WHO (2000)	<p><i>Sustained affordability</i></p> <ul style="list-style-type: none"> • Not identified as a WHO critical indicator but mentioned in the text. • Measure of sustainability of health insurance scheme. • Can be improved by rationalizing the selection of drugs reimbursed. • Needs a reference measure for an appropriate percentage for a sustainable health insurance scheme. • Impact would depend on number of people covered by health insurance scheme.

Measures of Access

Indicators of Accessibility	Source	Discussion
Rural:urban ratio of number of distribution points needed per number (e.g., 100,000) of population for people to obtain drugs within 2km of home	Foster (1991)	<p><i>Accessibility</i></p> <ul style="list-style-type: none"> • Partial measure as other factors may affect accessibility, e.g., availability of transportation/condition of roads. However, transportation/state of roads is probably not significant for 2km distance (1.25 miles).
Number of facilities (e.g. pharmacies) located within a fixed distance or travel time of a given location	Bertrand et al. (1994)	<p><i>Accessibility (service density)</i></p> <ul style="list-style-type: none"> • Needs a reference standard or could be used to compare variation between different population groups.
Percentage of facilities (e.g., pharmacies) that are accessible from local markets or shops	Kloos et al. (1986)	<p><i>Accessibility</i></p> <ul style="list-style-type: none"> • Partial measure of accessibility. Highlights the fact that the point of origin may be other than home. • Needs a reference standard or could be used to compare variation between different population groups. • Not operationalized.
Rural:urban ratio of private drug distributors (capital city vs. rural areas)	WHO (1999)	<p><i>Accessibility</i></p> <ul style="list-style-type: none"> • Not identified by WHO as a critical indicator but mentioned in the text.
Indicators of Accommodation	Source	Discussion
Regular presence of health care provider (e.g., prescriber, pharmacy technician/pharmacist)	Bertrand et al. (1994)	<p><i>Sustained accommodation</i></p> <ul style="list-style-type: none"> • Adapted from contraceptive indicators. • Measure of quality

Measures of Access

Indicators of Availability	Source	Discussion
Percentage of population who know at least one source of drugs/commodities of assured quality	Bertrand et al. (1994)	<i>Availability</i> <ul style="list-style-type: none"> Adapted from contraceptive indicators. Assured quality would need to be defined in order to question the population.
Average % of a set of unexpired indicator drugs in stock in private/public pharmacies	MSH (1995)	<u>Availability</u> <ul style="list-style-type: none"> Indicator tested and used extensively in MOH facilities. <u>Adapted from MOH facilities to public/private pharmacies.</u>
Average % time out of stock for a set of indicator drugs in private/public pharmacies	MSH (1995)	<i>Sustained availability</i> <ul style="list-style-type: none"> Adapted from MOH facilities to public/private pharmacies.

Indicators of More Than One Dimension of Access or Quality	Source	Discussion
Value placed on obtaining a prescription/filling a prescription in terms of time/travel costs	Foster (1991)	<i>Affordability/Accessibility</i> <ul style="list-style-type: none"> Would identify costs other than price to the consumer. Not clear how this would be measured or what the reference value would be.
Percentage of prescribed drugs presented for dispensing that are actually dispensed in MOH health facilities	MSH (1995)	Availability, affordability, or need <ul style="list-style-type: none"> This indicator may measure too many dimensions of access to be useful. Tested and used extensively.
Use of WHO Certification scheme	MSH (1995)	<i>Quality</i> <ul style="list-style-type: none"> Enabling characteristic of quality of access. Many developed countries do not use the WHO Certification scheme.

Measures of Access to Antimalarials

Indicators for Specific Categories of Drugs/Commodities	Source	Discussion
Av. % of a set of unexpired antimalarials in stock in private/public pharmacies	Clark (2000)	<p><i>Availability</i></p> <ul style="list-style-type: none"> • Structure/process indicator. • Adapted from MOH facilities to public/private pharmacies.
Average % time out of stock for a set of indicator drugs in stock in private/public pharmacies	Clark (2000)	<p><i>Sustainable availability</i></p> <ul style="list-style-type: none"> • Structure/process indicator. • Adapted from MOH facilities to public/private pharmacies.
Percentage of encounters with patients diagnosed with uncomplicated malaria at public/private pharmacies and who are prescribed/sold an antimalarial consistent with treatment guidelines	Clark (2000)	<p><i>Affordability/Availability/Quality of pharmacy services</i></p> <ul style="list-style-type: none"> • Outcome/impact indicator. • Adapted from MOH facilities to public/private pharmacies.
Percentage of encounters with patients diagnosed with uncomplicated malaria at public/private pharmacies who are prescribed/sold quantities of appropriate antimalarials sufficient to complete a full course of treatment	Clark (2000)	<p><i>Affordability/Availability/Quality of pharmacy services</i></p> <ul style="list-style-type: none"> • Outcome/impact indicator. • Adapted from MOH facilities to public/private pharmacies.
Percentage of patients/caregivers who could correctly describe how to give the prescribed antimalarial medication	Clark (2000)	<p><i>Availability of pharmacy services (information)/Quality of pharmacy services</i></p> <ul style="list-style-type: none"> ▪ Process indicator

Measures of Access to Tuberculosis Drugs

Indicators for Specific Categories of Drugs/Commodities	Source	Discussion
Av. % of a set of unexpired TB drugs in stock in private/public pharmacies	Zagorski (2000)	<i>Availability</i> <ul style="list-style-type: none"> • Structure/process indicator. • Adapted from MOH facilities to public/private pharmacies.
Average % time out of stock for a set of indicator drugs in stock in private/public pharmacies	Zagorski (2000)	<i>Sustainable availability</i> <ul style="list-style-type: none"> • Structure/process indicator. • Adapted from MOH facilities to public/private pharmacies.
Percentage of patients/caregivers who could correctly describe how to give the prescribed TB medication	Zagorski (2000)	<i>Availability of pharmacy services (information)/Quality of pharmacy services</i> <ul style="list-style-type: none"> ▪ Process indicator.
Percentage of prescribed TB drugs actually dispensed/sold	Zagorski (2000)	<i>Affordability/Availability/Need/Quality of pharmacy services</i> <ul style="list-style-type: none"> • Outcome/impact indicator.
Percentage of drug retail outlets where rifampicin and streptomycin were available without prescription	Zagorski (2000)	<i>Quality of pharmacy services/Rational use</i> <ul style="list-style-type: none"> • Outcome/impact indicator.

Measures of Access to Immunizations

Indicators for Specific Categories of Drugs/Commodities	Source	Discussion
<p>Percentage of children <1 year vaccinated against diphtheria, whooping cough, and tetanus</p> <p>Percentage of children <1 year vaccinated against measles</p> <p>Percentage of children <1 year vaccinated against poliomyelitis (OPV3)</p> <p>Percentage of children <1 year vaccinated against TB</p> <p><i>Tetanus toxoid vaccination among women of childbearing age (12–49) living in high-risk areas</i></p>	<p>PAHO (current guidelines 2000)</p>	<p><i>Measures all dimensions of access</i></p> <ul style="list-style-type: none"> • Outcome/impact measure. • These indicators may measure too many dimensions of access to be useful. • WHO/EPI program measures access as the % of children receiving first dose of DPT.

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