Health and Family Planning Indicators:

A Tool for Results Frameworks

Volume I

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Acronyms

AED	Academy for Educational Development
AFR/SD	Africa Bureau/Office of Sustainable Development
ARI	Acute respiratory infections
BASICS	Basic Support for Institutionalizing Child Survival
BSS	Behavior Surveillance Survey
BUCEN	U.S. Bureau of the Census
CDIE	Center for Development Information and Evaluation
CIWG	Common Indicators Working Group
CPR	Contraceptive prevalence rate
CSIWG	Child Survival Indicators Working Group
CSM	Contraceptive social marketing
CYP	Couple-years of Protection
DHS	Demographic and Health Survey
EPI	Expanded Program on Immunization
FHI	Family Health International
G/PHN	Global Bureau/Population, Health, and Nutrition Center
HHRAA	Health and Human Resources Analysis for Africa
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HPLC	High pressure liquid chromatography
ID	Infectious disease
IMCI	Integrated Management of Childhood Illness
IMR	Infant mortality rate
INACG	International Nutritional Anemia Consultative Group
INTRAH	International Training in Health
IPAS	International Projects Assistance Services
IPPF	International Planned Parenthood Federation
IR	Intermediate result
ITM	Insecticide treated materials
MACRO	Macro International
MEASURE	USAID-funded project focusing on research & evaluation in population and health
MMR	Maternal mortality rate

MOH	Ministry of Health
MOST	Micronutrient Project
MSH	Management Sciences for Health
NGO	Non-governmental organization
ORS	Oral Rehydration Salts
ORT	Oral Rehydration Therapy
PATH	Program for Appropriate Technology in Health
PHN	Population, Health, and Nutrition
PLWHA	People living with HIV/AIDS
PPC	USAID/Office of Program and Policy Coordination
RHIWG/SP	Reproductive Health Indicators Working Group/Safe Pregnancy
SANA	Sustainable Approaches to Nutrition in Africa
SARA	Support for Analysis and Research in Africa
SDP	Service delivery points
SO	Strategic objective
STD	Sexually transmitted disease
STI	Sexually transmitted infection
TB	Tuberculosis
TBAs	Traditional birth attendants
TFR	Total fertility rate
TT	Tetanus toxoid
U5MR	Under five mortality rate
UNAIDS	Joint United Nations Program on AIDS (Programme commun des Nations Unies sur le VIH/SIDA (ONUSIDA))
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USAID/G	USAID/Global Bureau
WHF	Weight-for-age
WHO	World Health Organization
WHO/AFRO	World Health Organization/Regional Office for Africa
WHO/CAH	World Health Organization/Child and Adolescent Health Development Division
WHO/GPA	World Health Organization/Global Program on AIDS

I. Introduction

The increased reliance on performance information for decision-making within USAID demands continued improvement and refinement of performance monitoring methods. This document presents an introduction to the hierarchy of family planning and health results suggested by results frameworks used by USAID missions in the sub-Saharan Africa region, key indicators of progress toward these results, guidance on the collection and interpretation of data, and suggestions for improved methods of performance monitoring in the future.

Three years ago, the Africa Bureau's Health and Human Resources Analysis for Africa (HHRAA) project produced a *Working Document on Health and Family Planning Indicators* that provided guidance to operating units in sub-Saharan Africa on the various performance indicators used through FY 1995. Building upon that guidance, Volume I of this series draws on further experience with performance monitoring through FY 1999, direct input from USAID missions, cooperating agencies, and private voluntary partners, and developments elsewhere in the Agency, particularly the Global Bureau's Population, Health, and Nutrition Center (G/PHN).

In 1998, USAID's Center for Development Information and Evaluation (CDIE) published *Performance Monitoring and Evaluation TIPS, No. 12: Guidelines for Indicator and Data Quality*, establishing clear criteria for quality performance monitoring throughout the Agency. Other important sources informing this edition include efforts by USAID's "Common Indicators Working Groups" (CIWG) to establish Agency-wide standards for performance monitoring in the health and family planning sector, collaboration by USAID with the World Health Organization (WHO) and other partners to develop indicators for programs in HIV/AIDS and Integrated Management of Childhood Illnesses (IMCI), ongoing work under G/PHN to refine indicators in the areas of maternal health and capacity building, and the development of indicators for infectious disease programs by the Africa Bureau's Office of Sustainable Development (AFR/SD), a new area of emphasis that is detailed in Appendix I. A full list of resource materials is provided in Section VII, "References."

Although many performance indicators already enjoy broad acceptance and are widely understood within USAID, new paradigms of sustainable development and related programmatic shifts, such as the move from narrow vertical programs to sector-wide systems strengthening, call for new types of indicators that are still being established and refined. Volume II of this series, *Health and Family Planning Indicators: Measuring Sustainability*, establishes guidelines for monitoring sustainability, an endeavor undertaken in direct response to demand from the field. The Africa Bureau welcomes and encourages feedback from operating units regarding the material presented in each of these two volumes.

II. The Results Framework and Performance Monitoring

A. The Results Framework

The *Results Framework* consists of the strategic objective, supporting intermediate results, and key performance indicators for which an operating unit is willing to be held accountable. The framework is dynamic and subject to change by an operating unit based on its experience. This flexibility facilitates refinements in the intermediate results and related activities over the life of the strategic objective. The results framework structure depicts the anticipated causal relationships from activities to intermediate results, from intermediate results to the strategic objectives, and, ultimately, from the strategic objective to the achievement of a broad program goal.

The *Strategic Objective* (SO) is the highest-level result that an operating unit can materially affect with its resources and for which it is willing to be held accountable. The SO should be: 1) clear, precise, and objectively measurable; 2) unidimensional, where possible; 3) linked to Agency objectives and goal.

Intermediate Results (IRs) are those key lower-level results that must occur in order for the SO to be achieved. The SO is not a summation of the intermediate results but rather a higher level result. In other words, a causal relationship exists between the IRs and SO and their relationship is direct and clear. IRs should include both key-partner and USAID-funded results.

Figure 1 provides a model of this hierarchy of results for the family planning and health sector. The various levels in this model are not identified as "SO-" or "IR-level" because it is for each operating unit to interpret what lies within its own manageable interest. For example, one mission may believe that it can affect fertility while another may feel that only a change in contraceptive prevalence or access is within its manageable interest. While the level chosen for the SO may differ, the hierarchy of results remains much the same.

The model presented in Figure 1 depicts a framework in which improvements in access, quality, demand, and sustainability all directly contribute to the specific family planning and health behaviors that are assumed to lead to improved health status and/or decreased fertility. Depending on particular program circumstances, an operating unit may conceive the essential elements of its framework quite differently, perhaps focusing primarily on improving access to and quality of services with the understanding that results in other areas have already been achieved or are being addressed by other partners. Nevertheless, it is important to consider all of the components at the time the results framework is being developed and to identify clearly those results which lie outside the unit's control.

The results framework approach to strategic planning and performance monitoring allows flexibility for sequencing of results over time (not shown in Figure 1) within the overall strategic planning timeframe of five to seven years. The results framework approach can also include essential intermediate results for which responsibility lies with other development partners, such as host country governments or other donors. Though performance monitoring efforts may focus on those results for which a unit is to be held accountable, missions and other operating units must also monitor critical assumptions upon which the entire results framework relies.

Clearly, the four major elements presented at the third level of the model in Figure 1 are not mutually exclusive but overlap considerably and lie open to interpretation by the individual operating

unit. For example, human resources—the trained personnel necessary to provide health and family planning services—are introduced here as an element of availability of services, but a mission's results framework may characterize human resources as more critical to service quality than access or availability. Performance of information or logistical systems is presented as an element of quality of services, but elsewhere may relate more to sustainability than to quality. Community support may likewise be thought to relate more to sustainability than to demand. Indeed, Volume II of this series, which focuses on sustainability, explores measuring systems strengthening, levels of community support, and changes in personal attitudes further than the discussions found here under the headings of "quality" and "demand." In fact, Volume II includes a more elaborate conceptual model (see Figure 2) of sustainability in terms of *sustainable systems* (financial, institutional, and sectoral) as well as *sustainable demand* at the community, household, and personal level. For details on the components of this model, please see Volume II.

B. Performance Monitoring

Performance monitoring is the on-going process of collecting and analyzing data to measure program performance. Performance monitoring focuses on the achievement of expected results. It involves the analysis of how changes in specific performance indicators compare with expected levels of change specified in performance targets. Performance monitoring alerts managers to problems or successes, for example, when targets are not being met, are being reached, or are being exceeded. If satisfactory explanations are lacking for shortcomings identified through performance monitoring, evaluation activities may then be required to determine why assistance is not achieving intended results.[1]

Performance monitoring relies on identifying indicators at each level of the results framework that can demonstrate movement towards the desired results. An implicit hierarchy among the indicators parallels the cause and effect hierarchy of the results framework. For example, in the domain of family planning programs, causal relationships exist among knowledge of family planning options, demand for family planning services, the contraceptive prevalence rate, and the total fertility rate. In theory, higher-level indicators (corresponding to the higher levels of the results framework) change in response to changes in the indicators at the next level down which, in turn, change in response to changes in those at the lower levels.

Indicators commonly used to monitor performance in the family planning and health sector are summarized in Figure 3, presented in the context of programs in family planning, child survival, maternal health, and prevention of HIV and other sexually-transmitted infections (STI). More detailed discussions of these indicators appear in sections III-VI of this document. For illustrative purposes, an additional row in Figure 3 gives examples of indicators for infectious disease (ID) programs, an area presented in more detail in Appendix 1, Figure A1.

C. Selection of Indicators

When choosing or formulating indicators for performance monitoring, missions and regional programs are urged to make sure that the chosen indicators are, to the greatest extent possible:

- Valid (the indicator measures the phenomenon it is intended to measure)
- Operational (measurable with developed and tested definitions and standards)
- Sensitive (changes in the indicator reflect changes in the phenomenon)
- Reliable (produces the same results when used to measure the same phenomenon)
- Unidimensional (measures only one phenomenon)
- Objective (unambiguous about what is being measured and how)
- Practical (measurable on a timely basis and at reasonable cost).

[1]USAID's Automated Directives System (ADS) discusses the purpose of evaluations in Sections 203.5.1b and 203.5.6. In addition to identifying why progress toward results is or is not occurring, evaluations may also serve to examine conditions for sustainability, the validity of hypotheses and assumptions embedded in strategic objectives and results frameworks, whether the needs of intended customers are being served, unintended consequences or impacts of assistance programs, lessons learned which may be useful elsewhere in the Agency, and the effectiveness of Agency strategies across countries and within sectors.

Considerations of practicality may force a mission to compromise in the selection of indicators at the expense of directness of measurement. Performance indicators should provide data to managers at a reasonable cost with respect to the utility of the data produced for management purposes. Indicators that are not sensitive enough to reflect significant change, for which high-quality data cannot be produced on a timely basis, or for which data are not generalizable to the entire target population are of little value. The indicators selected to measure progress toward a given result should be the minimum number and require the minimum effort necessary to ensure that progress toward a specific result is sufficiently captured. For more information on the selection or formulation of appropriate indicators for USAID performance monitoring, see CDIE's TIPS No. 12, *Guidelines for Indicator and Data Quality*.

Missions are expected to choose reporting intervals for individual indicators consistent with what experience dictates to be reasonable periods for measuring significant change. Where significant change is not expected to be directly measurable within a one-year period, or where annual reporting is otherwise not practical due to the constraints of data collection, data may be collected at several-year intervals. In such a case, reporting may be supplemented by annual data for proxy or indirect indicators to get an indication of progress toward the longer-term result being monitored. Thus it is not necessary to report on every indicator annually, but *some* performance data should be available frequently enough to inform program management decision-making.

In the family planning and health sector, definitions of the higher-level indicators—those measuring health status or fertility—are generally well-established, though in some cases methodologies for measuring these indicators are still being refined. Indicators at the second level—monitoring use of services—are also typically well-established and have been field-tested across various program and country settings. However, lower-level indicators, which tend to focus on the supply and demand of health and family planning services, are often more program-specific and may be best defined according to the special priorities and working conditions of a given mission's program.

D. A Hierarchy of Indicators

A hierarchy of family planning and health indicators is presented below (also see Figure 3 above). More detailed discussions of specific indicators appear in sections IV-VI, as well as in Appendix I on indicators for infectious disease programs.

Higher-level Indicators. Trends in health status and fertility reflect the explicit purpose for which family planning, child survival, and HIV/AIDS programs are undertaken. Although cases exist where marked changes in indicator values have been observed in time periods as short as five years, more often than not a longer time period is required to effect and measure substantial change. Where change in one or more of these indicators is deemed to be within a unit's manageable interest, these higher-level indicators are most appropriately placed at the strategic objective level of the results framework.

- Total fertility rate (TFR)
- Under-five mortality rate (U5MR)
- Infant mortality rate (IMR)
- Maternal mortality ratio (MMR)
- HIV/STI prevalence or incidence
- Nutritional status
- Prevalence of vitamin A deficiency

Second-level Indicators. These indicators track people-level impact in terms of use of services or other behavior. Like those at the higher-level, these indicators are best monitored through population-based surveys. The logic of the results framework implies that progress on each of these indicators will contribute to the higher-level results of improved health status and decreased fertility. Service use and other behavior indicators are frequently used to monitor program outcomes at the strategic objective level but may instead be placed at the intermediate result level. These indicators can be the most effective measures of program impact because the time period required to show significant change is typically shorter than that required for changes in health status or fertility.

Family Planning:

- Contraceptive prevalence rate (CPR)
- Couple-years of protection (CYP)

Child Survival:

- Immunization coverage
- Oral rehydration therapy (ORT) use rate
- Treatment of acute respiratory infections (ARI)
- Treatment of fever (presumptive malaria)
- Infant feeding practices
- Exclusive breastfeeding
- Complementary feeding
- Vitamin A supplementation

Maternal Health:

- Births attended by medical personnel
- Use of prenatal care services

HIV/STI Prevention:

- Reported condom use with non-regular partner
- Reported condom use with regular partner
- Reported non-regular sexual partners
- Treatment of STIs

Infectious Diseases:

- Use of insecticide-treated bednets
- Prevention of malaria among pregnant women

Family planning and HIV/AIDS programs tend to focus on personal behavior occurring outside the provider-patient interface but include measurements of service use as well. Maternal and child health programs routinely monitor the use of immunization, prenatal, and delivery services to measure program performance, but indicators of household and community practices are equally important. Indicators monitoring home management of childhood illnesses—the prevention, recognition, and treatment of childhood illnesses by mothers or other caretakers—are an essential element of measuring performance of programs emphasizing Integrated Management of Childhood Illnesses (IMCI). Along with indicators on nutrition and hygiene practices, these second-level indicators measure the full set of 12 key areas of behavior promoted by IMCI programs (*UNICEF, BASICS*).

Third-level Indicators. These indicators monitor progress in improving access to and quality of sustainable family planning and health services and the generation of demand for these services. While missions are requested to follow accepted reporting conventions wherever possible many of these indicators can be tailored to reflect individual program emphases more closely. They are usually reported at the intermediate result level and can be grouped in the following general categories (with a few examples for each grouping).

- *Access to Services*

Access to goods and services concerns the ability of the population to overcome obstacles to obtaining desired goods and services. Where possible, programs may employ indicators of access incorporating elements of time, distance, or economic means. (For example, the percentage of the population within one hour's traveling time to a specified service; the percentage with access to safe water and adequate sanitation, etc.) Information may be obtained through assessments of the location of services with respect to local census data or in some cases through population-based surveys.

> **Access** is the ability to overcome barriers (social, economic, time, or distance) to the use of goods and services.
> *- Child Survival Indicators Working Group*

Access depends to a large extent on the *availability* of goods and services. The most basic indicators of access are thus raw tallies of commodities, services, or service providers supplied to the population (for example: number of contraceptives or oral rehydration salts (ORS) packets distributed; number of service delivery points meeting certain criteria; number of health workers trained in IMCI, etc.) Tallies are often the most practical indicators in terms of data collection but may be inadequate to measure whether supply is increasing relative to the needs of targeted population groups. It is thus preferable to report the ratio of such tallies to the targeted population (for example, condoms per adult of reproductive age) where the targeted population can be precisely defined and quantified.

> **Availability** is the level of supply of a particular service and/or commodity as measured with respect to the number of intended beneficiaries.
> *- Child Survival Indicators Working Group*

Another key contributing element to access is the fair distribution of goods and services with respect to targeted population groups, or *equity*. In fact, equity is a broader, cross-cutting issue that can be measured through comparisons of disparate health outcomes and behavior as well as different degrees of access and availability for various population groups. However, because the critical differences accounting for lack of equity tend to occur at the level of access and availability, the most basic performance indicators of equity would be found there as well.

> **Equity** is the degree to which interventions or desired outcomes are distributed according to demonstrable need among geographic areas and various population groups (for example, rural and urban, gender groups, etc.).
> *- Child Survival Indicators Working Group*

- *Quality of Services*

Quality of family planning and health care services refers to their delivery according to accepted protocols or standards. The elements of the health care system examined to monitor quality are (1) provider performance and (2) support systems (training, supervision, logistics, information systems).
- Child Survival Indicators Working Group

Related to supply of services are facility-based and system-wide indicators of the quality of family planning and health interventions. These may assess *provider performance* (for example, correct case management, missed opportunities for immunization, appropriate counseling, appropriate application of IMCI) or *systems performance* (for example, indicators assessing implementation of training, supervision, management of drugs or other commodities, health information systems). Elements of service quality are also commonly incorporated as criteria in indicators of access or availability (for example, percentage of population within one hour's traveling time to a facility with trained personnel, number of facilities receiving regular visits from a supervisor).

- *Demand*

Demand is the desire for a particular outcome, service or commodity, or for practicing a particular behavior.
-Child Survival Indicators Working Group

These indicators are specifically designed to monitor demand independently of other variables. Demand may be measured in terms of knowledge, attitudes, or practices, but the clearest indicators of demand are generally those dealing with attitudes. Knowledge of a service or behavior is a necessary but an insufficient prerequisite for demand; only in some cases can demand—the desire to use the given service or behavior—be inferred from knowledge of it. Data on practices (i.e., service use and other health-related behavior), on the other hand, may provide an indication of "effective" demand, but fail to capture the amount of demand that remains unmet, typically due to access or quality problems. Where poor access or service quality do not fully account for the gap between knowledge and use, information on the population's attitudes toward particular results or interventions may help identify the role of insufficient demand.

Demand indicators can target various levels of the strategic framework. For example, measurement of "mean desired family size" assesses people's desire for reduced fertility. Monitoring desire to use contraceptives, on the other hand, addresses a slightly lower level in the framework by illustrating demand for services. In all cases, however, generating demand is an intermediate step toward higher-level results and is not an end in and of itself. Indicators of demand may go beyond individual attitudes to assess levels of community support; some related indicators, such as levels of cost recovery, are considered here under "sustainability." For further discussion of indicators of demand, please consult Endnote 1 (nature and role of demand indicators) and Volume II's "Sustainability of Demand" section (sustained changes in attitudes and community participation).

- *Sustainability*

Sustainability is the ability of host country entities (community, public and/or private) to assume responsibility for programs and/or outcomes without adversely affecting the ability to maintain or continue program objectives or outcomes.

- Child Survival Indicators Working Group

Sustainability is a broad, cross-cutting issue that can be applied to all levels of a results framework. Here, it is intended to refer to the establishment of sustainable family planning and health programs and services as measured through developments in public policy-making, capacity-building, and the generation of resources and other support for family planning and health activities. Commonly-used indicators of sustainability monitor policy development, public resource allocation, mobilization of the private sector, levels of cost recovery, and trends in community participation. Indicators dealing with decentralization processes should also ultimately be examining the degree to which local programs are becoming sustainable. Though indicators of sustainability discussed in this document tend to focus on the *supply* of services, equally critical is the establishment of sustainable *demand* for services. For a more detailed treatment of sustainability indicators, see Volume II, *Health and Family Planning Indicators: Measuring Sustainability*.

III. Higher-level Indicators

This section presents recommended indicators of health or fertility status, each with definition, discussion, suggested data sources, and a word about the general range of expected change in values for the indicator.

A. Total Fertility Rate (TFR)

Definition: Number of children that would be born per woman if she were to pass through the childbearing years bearing children according to a current schedule of age-specific fertility rates *(Evaluation Project).*

Unit: Children per woman.

Data Source: Demographic and Health Surveys (DHSs) are the best source. A number of organizations (United Nations Population Division, World Bank, U.S. Census Bureau) make indirect estimates of fertility using mathematical modeling supplemented by subjective evaluation of available empirical data. These indirect estimates are **not** appropriate for measuring program impact. They are typically generated in the form of a time series trend, not single estimates for individual points in time; when new empirical data become available in the form of a new survey, census, or report from a vital statistics registration system, the entire time series trend is reevaluated.

Setting Targets: The ideal TFR value is 2.2 children, at which point population growth in developing nations would be stabilized. This is of course far from reality in Africa. Country-specific estimates by the U.S. Bureau of the Census in 1998 imply that TFR in sub-Saharan Africa declined from roughly 6.5 births per woman in 1985 to 6.0 in 1995. Trends calculated for USAID subregions over the same time period are 6.7 to 6.2 in East Africa, 5.8 to 4.9 in southern Africa, and 6.7 to 6.3 in West Africa *(calculated from BUCEN)*.

Discussion: USAID's Common Indicators Working Group (CIWG) selected TFR as a key common indicator for USAID program performance monitoring. In developing countries, calculations of TFR usually result from survey data and do not refer to a single year but to a group of several years preceding the survey. DHS estimates are usually for three-year periods. Most missions have become accustomed to attributing DHS findings to the year of the survey, which is actually the end-year of the period. In such cases, an additional note should indicate the full time period reflected in the data.

B. Under Five Mortality Rate (U5MR)

Definition: Number of deaths among children under age five in a given year per 1,000 live births in that same year *(Report to Congress).*

Unit: Deaths per 1,000 live births.

Data Source: DHS. As with TFR above, indirect estimates and projections are **not** appropriate for measuring program impact.

Setting Targets: Unlike TFR, U5MR is not a very precise measure of program impact because of the strong influence of other contributing factors such as economic conditions or food supply. Generally speaking, the higher a country's U5MR, the more one can hope to reduce it. Targets should be set with consideration for the size of the program and the types of interventions to be supported. Of 37 sub-Saharan DHSs published by 1986 to 1998, the U5MR averaged a decline of just under 20 (19.7) deaths per 1,000 live births over the two most recent five-year periods. Eleven DHSs indicated declines of over 30, including three with declines of over 50. Four DHSs, however, showed slight increases in U5MR over the two five-year periods and two (Zambia in 1992 and 1996) found the rate to have risen by over 10 deaths per 1,000 live births.

Discussion: U5MR was selected by the CIWG as a common indicator for USAID child survival programs. U5MR may indicate program impact more comprehensively than infant mortality rate (IMR) because it reflects results of child survival interventions focused on reducing mortality among infants as well as those that have the highest impact during the second and third year of life.

Although figures for U5MR are typically reported for a specific year, calculations are usually based on a longer time period of three to five years. DHS surveys tend to estimate U5MR for the five-year period preceding the survey. As with TFR, missions may attribute data to the survey year as long as the full time period is indicated as well.

Some confusion exists between the terms "under five mortality" and "child mortality." Whereas U5MR refers to deaths by age five per thousand live births, child mortality refers to deaths by age five per thousand children who survived the first year of life (i.e., mortality among children ages one through four).

C. Infant Mortality Rate (IMR)

Definition: Number of deaths in infants (children under age one) in a given year per 1,000 live births in that same year *(Report to Congress).*

Unit: Deaths per 1,000 live births.

Data Source: The best source of direct estimates is the DHS. Indirect methods of calculating IMR are not appropriate for performance monitoring.

Setting Targets: As with U5MR, IMR is not a very precise measure of direct program impact because of the strong influence of other contributing factors. One can generally hope for higher reductions in IMR in higher-mortality areas. Of 37 sub-Saharan African DHSs published from 1986 to 1998, infant mortality averaged a decline of 13.3 deaths per 1,000 live births over the two most recent five-year periods. Nine of these DHSs indicated a decline of over 20, but four showed increases in IMR.

Discussion: As with U5MR, missions may attribute DHS findings on IMR to the survey year as long as the full time period reflected in the data (typically five years) is indicated as well. Where DHS data are cited directly, it is appropriate to consider both IMR and U5MR as key indicators of underlying mortality and morbidity patterns.

D. Maternal Mortality Ratio (MMR)

Definition: Number of maternal deaths per 100,000 live births, where a maternal death is one which occurs when a woman is pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy or its management *(Report to Congress).*

Unit: Maternal deaths per 100,000 live births.

Data Source: DHS is the ideal source. MMR can also be derived from vital registration systems (usually underestimated), community studies and surveys (requiring very large sample sizes) or hospital registration (usually overestimated).

Setting Targets: Because MMR has been so difficult to measure in the past, there is little data that convincingly quantifies reduction in MMR. In light of this, recommending amounts of change does not seem advisable.

Discussion: The Africa Bureau and G/PHN do **not** recommend that Missions track MMR to monitor program performance. Instead, Missions pursuing programs in maternal health are encouraged to monitor indicators of service use, particularly the percentage of births attended by medically-trained personnel (see "Second-Level Indicators").

MMR may be an important indicator to monitor in order to understand maternal health status, but it remains very difficult to determine in a reliable and timely manner. Current methods for calculating MMR, such as the sisterhood

method, continue to rely on relatively small samples, producing estimates with very wide confidence intervals. Estimates typically refer to a time period of at least a decade, rendering the data of little value to monitor program performance *(G/PHN(b))*.

E. HIV/STI Prevalence or Incidence .

1. HIV Seroprevalence

Definition: Percentage of a specified population whose blood tests positive for HIV.

Unit: Percent.

Data Source: U.S. Bureau of the Census HIV/AIDS Surveillance Database, National AIDS Control Programs, other local sources of test results.

Setting Targets: Setting a target for reducing HIV seroprevalence is a daunting task. USAID/Uganda has shown reductions in HIV seroprevalence among target populations, particularly young pregnant women, at selected sites for several years. Some missions have chosen stable prevalence as their target.

Discussion: Since the ultimate measure of success of an HIV prevention program would be a decline in new HIV infections, G/PHN and the CIWG recommend HIV incidence as the most appropriate indicator of program impact at the highest level. Unfortunately, adequate methodologies to measure incidence are still lacking. Recent joint guidance by UNAIDS, USAID, and WHO recommends monitoring HIV seroprevalence trends among women ages 15-19 and 20-24, as an effective proxy for incidence *(UNAIDS)*. Missions may also wish to continue tracking HIV seroprevalence to monitor progress among other targeted population groups, such as higher-risk groups, under the rationale that serial data on HIV prevalence may provide evidence of declining incidence of HIV infection.

Preventive programs are thought to require a very long time to affect measurable change in HIV prevalence in the general population. Trends in HIV prevalence should be reported only with the understanding that diverse factors determining prevalence lie outside the purview of USAID's preventive interventions. A major confounding factor is that HIV seroprevalence data respond inversely to the rate at which those infected perish from full-blown AIDS. G/PHN recommends that missions use HIV/AIDS priority prevention indicators developed by WHO and USAID as a basis for developing or refining their indicators. These indicators measure key components of USAID's strategies for reducing HIV/AIDS transmission: improved knowledge, lower-risk sexual behavior, and improved case management *(G/PHN)*. (See second- and third-level indicators below.)

2. STI Prevalence among Women

Definition: Number of pregnant women age 15-24 with positive serology for syphilis divided by the population of pregnant women of that age attending antenatal clinics whose blood has been screened.

Unit: Percent. (or infections per 100,000)

Data Source: Local testing or survey results.

Setting Targets: Projecting reduction in STI prevalence or incidence is subject to many of the difficulties outlined for HIV above. Projections require analysis of the current STI situation and the possible efficacy of programmed interventions. This indicator is not very responsive because syphilis antibodies may be detected up to two years after treatment and cure; the focus on younger women may serve to mitigate this problem somewhat.

Discussion: This indicator was chosen as a common indicator for USAID HIV/STI prevention programs. Data on syphilis prevalence provide valuable information on the susceptibility of the population to HIV/AIDS and other STIs. Data are relatively easy to collect as pregnant women are routinely screened to prevent congenital syphilis. Where samples are drawn

from newly sexually-active populations of adolescents, prevalence data can closely approximate incidence of syphilis. G/PHN also recommends collecting data on other STIs among men and women but concedes that this will remain very difficult until practical means to do so are developed *(CIWG, G/PHN)*.

F. Nutritional Status among Children

Definition: Percentage of children age 12-23 months whose weight is more than two standard deviations below the median weight achieved by children of that age *(CIWG)*.

Unit: Percent.

Discussion: Weight-for-age (WFA) is generally accepted to be one of the best general indicators of the health status of a population. It is responsive to a number of factors, including the economy, food availability, and the quality and quantity of health service provision. It is generally the most commonly available indicator for national and international comparisons of nutritional status. The median weight and the distribution of weights around that median in a healthy population are taken from a standard established by the U.S. National Center for Health Statistics and endorsed by WHO.

Although WFA is recommended as a common indicator for USAID child survival programs, missions in the Africa region may choose to consider other anthropometric measures:

W*asting*, or acute malnutrition, is defined in terms of a child's weight with respect to height (weight-for-height). Data on wasting will respond dramatically to short-term phenomena, such as temporary disruption of food supply or a disease outbreak, and therefore are not necessarily appropriate to demonstrate long-term program performance.

S*tunting*, or chronic malnutrition, is defined in terms of a child's height with respect to age (height-for-age). Monitoring indicators of stunting over time may be useful for tracking long-term trends in nutrition and health.

Missions may also consider age groups other than "12 to 23 months of age," but the trends for all children under 60 months of age are almost always identical to the trends for this more limited group.

G. Prevalence of Vitamin A Deficiency

Definition: An estimate of the proportion of children, 12 to 59 months of age, with serum values of vitamin A less than or equal to 0.70 µmol/l.

Unit: Percent.

Data Source: National or sub-national surveys in which blood samples are taken and analyzed for serum retinol content.

Setting Targets: Vitamin A deficiency can be virtually eliminated in a few short years by the proper combination of supplementation, fortification and other food-based interventions. A prevalence level above 20 percent is considered to represent a serious public health problem. Successful programs should be able to reduce the observed deficiency in children to below 10 percent.

Discussion: The level of retinol in the blood is regulated in the body over a broad range of body stores but, when levels are very high or very low, the body is unable to maintain constant levels. Thus, measurement of the level of retinol in the blood is not a reliable approach to detecting the vitamin A status of an individual. Within a population, however, the proportion of individuals with low serum retinol is a good indicator of the level of vitamin A deficiency in that population.

Retinol levels can be determined in serum by high pressure liquid chromatography (HPLC),

or by fluoresence or UV spectrophometry. HPLC is the method of choice because of its high specificity and sensitivity, but cost and local laboratory capacity may mediate against its use in some situations.

Currently, tests are underway of new and, potentially, less expensive and less challenging methods of measuring vitamin A levels in the blood. One method, the RPB Elisa test developed by the Program for Appropriate Technology in Health (PATH), may well reduce the cost of measuring vitamin A status to less than one dollar per test as compared to the $15 - $20 dollars per test in using HPLC. It is in anticipation of the successful field-testing and validation of this these lower cost methods that this indicator is included in this document. In the same way that the HemoCue test of anemia has been added to the core questionnaire of the DHS survey, it can be anticipated that the test for vitamin A status will also be technically and financially feasible within the next year or two.

Note that the “mol” in the unit defining the cut-point of 0.70 µmol/l is the molecular weight of retinol and the l stands for a liter. Serum levels were traditionally expressed in the unit µg/dl (micrograms per deciliter). 28.57µg/dl = 1 µmol/l. At one time, “international units” were considered the preferred unit of measurement. It is essential that close attention be paid to the unit selected.

IV. Second-level Indicators

This section presents recommended indicators tracking people-level impact in terms of behavior change, including levels of service use as well as improved practices at home and in the community. Only population-based data represent a true, direct measurement of behavior. Facility- or commodity-based measures, such as tallies of clients served, consultations, or products provided may serve either as proxies for utilization or as lower-level indicators of service supply.

A. Contraceptive Prevalence

Two indicators are commonly used to track the use of family planning services. The first, the contraceptive prevalence rate (CPR), is preferred primarily because it is a population-based measure. Since CPR is derived from survey data, it is generally not available on an annual basis. The second indicator, couple-years of protection (CYP), is based on service statistics and may serve as a lower-level proxy indicator to track progress when data on CPR are not available.

1. Contraceptive Prevalence Rate (CPR) for modern methods

Definition: Percentage of women of reproductive age (15-49) who are currently using (or whose partner is currently using) a modern method of contraception *(Evaluation Project)*.

Unit: Percent.

Data Source: DHS, other contraceptive prevalence surveys.

Setting Targets: Developing nations are far from the "replacement level" of 65 percent associated with stabilizing population size. Most sub-Saharan nations report CPRs well under 25 percent. For use of modern methods among all women of reproductive age, East African nations with DHS surveys since 1994 average around 10 percent, southern African nations over 20 percent, and West African nations just over 5 percent.

Generally, an annual increase of 1-2 percentage points indicates significant progress. Where family planning programs are established in countries with very low contraceptive prevalence, many USAID missions have been able to report doubling of the CPR within a five-year span:

Ghana:	5.2% in 1988	10.1% in 1993
Kenya:	9.7% in 1984	27.3% in 1998
Malawi:	7.4% in 1992	14.4% in 1996
Mali:	1.4% in 1987	4.5% in 1995-6
Niger:	2.3% in 1992	4.6% in 1998
Tanzania:	6.7% in 1991	13.3% in 1996
Uganda:	2.5% in 1988	7.8% in 1995

(use of modern methods among women in union; Source: Demographic and Health Surveys)

Discussion: CPR is recommended as the core common indicator for USAID family planning programs *(CIWG)* and is the single indicator most commonly tracked by missions in the Africa region. It is important to specify which methods and population groups (marital status and age) are being reported. The Africa Bureau recommends that a rate be reported for modern methods (defined in DHSs to include pills, intra-uterine devices (IUD), injections, diaphragm, foam or jelly, condoms, and voluntary surgical contraception (VSC)). In addition, missions may report CPR for all methods (including traditional) if this is thought to enhance the reflection of program performance.

The Africa Bureau recommends that rates be reported for "all women," not just those in union, though sometimes historical data are available only for the latter group. If the indicator is to be monitored over time, it is important that the value be reported for the same marital status group and the same age group (usually woman ages 15-49, sometimes 15-44) in all time periods, and that the same definition of modern methods be applied.

2. Couple-years of Protection (CYP)

Definition: An estimate of the protection against pregnancy provided by family planning services during a period of one year, based upon the volume of all contraceptives sold or distributed free of charge to clients during that year.

Unit: Couple-years of protection.

Data Source: Service statistics, logistics management information systems.

Discussion: CYP may serve as a lower-level proxy indicator to track progress when CPR is not available. Missions are cautioned not to convert CYP data to contraceptive prevalence rates. See endnote #2 if Mission plans to report on CYP. The value of the indicator is calculated by multiplying the quantity of each method distributed to clients by a conversion factor, which yields an estimate of the duration of contraceptive protection provided per unit of that method. The CYPs for each method are then summed over all methods to obtain a total CYP figure. The following conversion factors are currently in use in the USAID system:[2]

Condoms	120 condoms per CYP
Vaginal Foaming Tablets	120 tablets per CYP
Oral Contraceptives	15 cycles per CYP
Depo-Provera (injectable)	4 “doses” (1 ml) per CYP
Noristerat (injectable)	6 “doses” per CYP
Diaghram	1 CYP per diaghram
IUD	3.5 CYP per IUD
Norplant implant	3.5 CYP per device
VSC	8 CYP per procedure
Natural Family Planning	2 CYP per trained adopter
Lactational amenorrhea	4 active users per CYP

(Evaluation Project(a))

B. Immunization Coverage among Children

Definition: Percentage of children under one year of age who have received each vaccination at the recommended age and interval, as stated in the national immunization policy.

Unit: Percent.

Data Source: DHS, standard WHO or UNICEF cluster coverage surveys; administrative reporting.

Discussion: Coverage rates can be tracked for each specific recommended vaccine—BCG, DPT, Measles, Polio, and in some countries Yellow Fever and/or Hepatitis B—or for complete coverage with all the recommended vaccines. Coverage for each of the individual antigens requires that the proper number of doses have been administered: three doses in the case of polio (not including dose at birth), DPT, and Hepatitis B; and one dose for BCG, Yellow Fever, and Measles. For antigens requiring multiple doses, the intervals between doses must be at least four weeks apart. Hepatitis B vaccine is provided in two common schedules depending on the pattern of age-specific transmission during early childhood in the country. The first, second, and third doses are often provided, respectively, at birth, with DPT 1, and with DPT 3; alternatively, the doses are provided at the same time as each of the three DPT doses. Yellow fever and measles vaccines are typically recommended at nine months of age.

Complete vaccination coverage refers to the proportion of children who have received all of the nationally-recommended childhood vaccinations before their first birthday. In the absence of data on complete coverage, the recommended

[2] These conversion factors recommended by the Evaluation Project in 1997 were adopted by the CIWG in 1998 for Agency-wide use. Note that factors recommended in the first edition of this document have changed for condoms and vaginal foaming tablets (formerly 150 per CYP), IUDs (formerly 3.8 CYP each), and VSC (formerly 10 CYP per procedure). In the case of VSC, the current factor of 8 applies to the AFR and Near East regions only while the factor of 10 remains valid for the LAC region and Asia.

indicator is coverage with three doses of DPT before the first birthday.

Administrative estimates of vaccination coverage can be made by dividing the number of doses of each antigen administered to children under one year of age during a given time period (typically one year) by an estimate of the pool of children eligible for vaccination (the number of newborns for calculating BCG coverage and number of newborns surviving their first year for all other antigens). The administrative method is commonly used to obtain national-level data, but resulting estimates may be skewed by various shortcomings, including inaccurate estimates of the target population, unreliable grouping of children by age categories in routine vaccination reports, and incomplete or otherwise inaccurate aggregation of tallies of children vaccinated at each level of reporting.

Survey estimates give immunization coverage among the age cohort surveyed; the recommended cohort is children 12–23 months of age because they are the ones expected to have used immunization services during the preceding year. Survey estimates should calculate children vaccinated before their first birthday as a proportion of all children 12–23 months of age. It is necessary to define in advance what documentation of vaccination is acceptable—card alone or card plus caretaker's recall—and what constitutes correct vaccination.

Missions should try to be consistent in their choice of sources. Administrative estimates from routine data may differ greatly from survey-based estimates. It is recommended that missions monitor and report on immunization coverage calculated from routine data and evaluate trends from these estimates. Estimates from surveys should also be reported when available, but missions should clearly note the source of data and should not attempt to compare figures from different types of sources directly. Missions should also note when using survey data if the responses are only from cards or from cards and history, and if the information is corrected for age and/or interval between doses (*BASICS (a), WHO/AFRO*).

C. Oral Rehydration Therapy (ORT) Use Rate

Definition: Percentage of cases of diarrhea in children under age five treated with oral rehydration salts (ORS), an appropriate home-based solution and/or increased fluids *(CIWG)*.

Unit: Percent.

Data Source: DHS, other population-based surveys.

Discussion: This definition of ORT including increased fluids of any kind has been recommended as an Agency-wide common indicator and is based on the definition used by WHO since 1991. The more restrictive definition used in the past (ORS or a recommended home fluid only) is thought to inappropriately discount the efficacy of household case management through increased fluids but may be a more appropriate indicator of direct program impact where programs specifically promote the use of ORS and home solutions. The debate within the international public health community continues; WHO no longer publishes values using the older definition and data availability may thus be limited to DHSs or comparable surveys.

Missions that stress the use of pre-packaged ORS as the cornerstone of the diarrheal disease program may also wish to report on "ORS Use Rate" as an appropriate measure of program performance. The survey methodology is the best method of estimating the rate; administrative estimates based on ORS packets distributed are also possible but are highly sensitive to estimates of diarrhea incidence.

ORT use rates are best estimated by surveying mothers whose children have had diarrhea within the last two weeks. Experience suggests that recall beyond two weeks is poor. Since the number of children with diarrhea in any two-week period is small in most countries, the sample size required to generate a statistically valid estimate—the number of mothers to be interviewed in order to find enough cases of diarrhea—is quite large.

D. Treatment of Acute Respiratory Infections (ARIs)

Definition: Percentage of children under age five with cough and rapid or difficult breathing taken to a health facility.

Unit: Percent.

Data Source: DHS or other population-based survey.

Discussion: G/PHN proposes to track this indicator at the global level with the inclusion of treatment of ARIs by trained community health workers and private medical providers as well as health facilities (*G/PHN*). Precise wording of the indicator at the country level may vary according to program focus or survey wording. Recent DHS surveys, for example, typically provide information on the percentage of children with ARI taken to a health facility or a doctor.

E. Prevention and Treatment of Malaria

For a complete listing of indicators relating to prevention and treatment of malaria and other infectious diseases, see Appendix 1.

1. Treatment of Fever (presumptive malaria) among Children

Definition: Percentage of children under five years of age with fever who are treated at home with an antimalarial drug (according to national policy) or brought to a health facility within 48 hours after fever began *(AFR/SD)*.

Unit: Percent.

Data Source: Household or facility-based survey.

Discussion: Definition of appropriate treatment may depend on national policy or program emphasis. USAID/Malawi, for example, is tracking the percentage of children with fever receiving the first-line drug within 48 hours of the onset of fever.

Data from standardized household surveys such as the DHS reflect treatment of fever among the general population. Some DHS reports provide information only on prevalence and not treatment of fever, though some do indicate the percentage of children with fever in the previous two weeks receiving treatment at a health facility. The new DHS malaria module, however, collects information on promptness and appropriateness of treatment of fever in children. Data obtained through facility-based surveys focus on promptness of treatment only among those children seen in facilities and are thus not directly comparable to data obtained through household surveys.

2. Prevention of Malaria among Pregnant Women

Definition: Percentage of women in their first or second pregnancies who report that they have followed the nationally-recommended course of prophylaxis/intermittent therapy for prevention of malaria during their pregnancy *(AFR/SD)*.

Unit: Percent.

Data Source: Facility-based survey of mothers after delivery; review of antenatal care cards and facility records.

Discussion: This indicator proposed by AFR/SD monitors pregnant women's compliance with the recommended course of malaria prevention during pregnancy. Women's behavior may be recorded on their antenatal clinic cards. Clinic records may be reviewed to confirm history.

3. Use of Bednets and other Insecticide-Treated Materials (ITM)

Definition: Percentage of households that own at least one treated bednet (or other appropriate ITM) *(AFR/SD)*.

Unit: Percent.

Data Source: Record review of social marketing project by district; interviews with net sellers or household cluster survey.

Discussion: ITM marketing/distribution programs may already collect this data. Actual use of ITM is presumptive based on ownership. AFR/SD has proposed two indicators that focus on the proper use of ITMs in households that have them:

- Use of treated bednet: Percentage of (a) children under five years of age, (b) pregnant women, or (c) other target group living in a household with treated mosquito net who state that they slept under the net the previous night.
- Re-treatment of bednet: Percentage of families with a bednet who state that they have re-treated it during the last 6 months (or in accordance with national guidelines) (AFR/SD).

These two indicators can be calculated using the new DHS core questionnaire along with the DHS malaria module.

F. Infant Feeding Practices

1. Exclusive Breastfeeding

Definition: Percentage of infants less than four months of age who are being exclusively breastfed.

Unit: Percent.

Data Source: DHS, other population-based surveys.

Discussion: An infant is considered to be exclusively breastfed if he/she receives only breast milk with no other liquids or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicine. It is recommended that surveyors use 24-hour recall data of all liquids and solids consumed by living infants 0–3 months of age. If retrospective data are collected to capture this information, the results are not directly comparable to 24-hour recall data *(WellStart).*

Because USAID, UNICEF, and WHO endorse six months as the recommended period for exclusive breastfeeding, a variation of this indicator that monitors the full six-month period is recommended as a common indicator for USAID programs in both child survival and family planning (*CIWG*). Monitoring use of exclusive breastfeeding through four months (0–3 months), however, is far more sensitive to program impact as rates among children 4–6 months tend to remain very low, even in countries with very active promotion of breastfeeding. Missions supporting breastfeeding promotion programs may also wish to monitor the proportion of children exclusively breastfed at different age periods (e.g., 0–1 month, 2–3 months, 4–6 months) (*SARA*).

2. Complementary Feeding

Definition: Percentage of infants six to nine months of age (181 days to 299 days) still breastfeeding and also receiving complementary weaning foods *(WHO/CDD)*.

Unit: Percent.

Data Source: DHS, other population-based surveys.

Discussion: A companion indicator to exclusive breastfeeding, the indicator of complementary feeding completes the picture of the weaning process. Both indicators are best measured through surveys where the current feeding practices for children in the appropriate age brackets can be ascertained.

Unfortunately, feeding practices depend on many factors beyond the influence of programs promoting appropriate breastfeeding and complementary feeding, including availability of food, incidence of childhood diseases, and HIV infection among mothers. An alternative to these indicators may examine a lower-level program result, mothers' knowledge of appropriate feeding practices:

- Knowledge of key child feeding practices: percentage of care givers who can state the appropriate feeding practices (according to

local protocols) for children less than six, 6–12, and 12–24 months of age (*SARA*).

G. Vitamin A Supplementation

Definition: Percentage of children 6–60 months of age receiving vitamin A supplementation in the previous 6 months (*G/PHN(a)*)

Unit: Percent.

Data Source: Household survey or administrative estimate (doses distributed to children ages 6–60 months divided by an estimate of all children ages 6–60 months).

Discussion: This indicator measures vitamin A preventive supplementation coverage. To more fully reflect vitamin A coverage, this indicator may be used in conjunction with facility-based indicators relating to IMCI vitamin A protocols (e.g., proportion of children presenting at health facility with measles, prolonged diarrhea, etc. who receive vitamin A). The CIWG recommended that USAID missions track the proportion of children receiving vitamin A supplements "at appropriate intervals according to established protocols," but data for this indicator may be difficult to collect in a reliable fashion.

H. Births Attended by Trained Medical Personnel

Definition: Percentage of births attended by trained health personnel, excluding traditional birth attendants *(G/PHN(a))*.

Unit: Percent.

Data Source: DHS, other population-based surveys. This indicator is best calculated from a survey, since vital registration systems are lacking in most developing nations. Where health information systems are comprehensive, administrative estimates are also possible based on reported deliveries divided by estimated births.

Discussion: This indicator has been proposed as a global performance indicator by G/PHN and as a core common indicator for all Agency units with activities addressing maternal health. It is important to specify a clear and consistent definition of "medically-trained." G/PHN and the Safe Pregnancy Indicators Subcommittee both exclude traditional birth attendants (TBAs), trained or untrained. The Common Indicators Working Group (CIWG) for maternal health indicators defined trained health personnel to include all persons with midwifery skills, including trained auxiliary health personnel/birth attendants, who can manage normal deliveries and diagnose and refer obstetric complications. Programs promoting delivery by trained TBAs may choose to include them; in such a case it would be helpful to report two figures (with and without TBAs).

I. Prenatal Consultation

Definition: Percentage of women seen at least once during their pregnancy by a doctor or other persons trained with midwifery skills for reasons related to the pregnancy *(G/PHN(a))*.

Unit: Percent.

Data Source: DHS, other population-based surveys. Administrative estimates are also possible, but it is important to keep in mind that ongoing information systems typically report on the number of prenatal visits at a clinic in a specific time period, not the number of women seen in that time period.

Discussion: This indicator has been proposed as an Agency-wide common performance indicator and as an indicator for G/PHN to track at the global level. Variations of it have been included in the most recent strategic plans of four missions in sub-Saharan Africa. The minimum number of consultations may be increased where a program finds this appropriate and where data are available. A variation that has

been proposed for maternal health programs is the proportion of pregnant women with at least three prenatal visits with the first visit occurring before the seventh month *(G/PHN(b))*.

It is important to specify a clear and consistent definition of "medically-trained," one that expressly identifies whether or not midwives or other country-specific categories of health worker qualify as "medically trained." The CIWG defined trained health personnel to include persons with midwifery skills, including trained auxiliary health personnel/birth attendants, who can manage normal deliveries and diagnose and refer obstetric complications. Definition of the service providers to be included may ultimately depend on areas of program emphasis or availability of data.

J. Immunization Coverage among Women of Reproductive Age

Definition: Percentage of women age 15–49 receiving two or more tetanus toxoid (TT) doses during or before their pregnancies (*CIWG)*.

Unit: Percent.

Data Source: DHS, standard WHO cluster coverage surveys, administrative estimates.

Discussion: Past reporting on this indicator has been restricted to women receiving two doses during their pregnancies (TT2). The revised indicator (TT2+) also includes women who have received the appropriate number of properly-spaced boosters in the years preceding the pregnancy in question. TT2+ is far more difficult to accurately measure and cannot be calculated through administrative methods. Five doses of TT, following the schedule outlined below, protect a woman from tetanus and all her newborns from neonatal tetanus during her childbearing years:

TT1: At first contact or as early as possible during pregnancy.

TT2: Four weeks after TT1, no later than 2 weeks before delivery.

TT3: Six months after TT2, or during next pregnancy.

TT4: One year after TT3, or during next pregnancy.

TT5: One year after TT4, or during next pregnancy.

(WHO/EPI)

DHS surveys typically underestimate coverage by focusing only on doses given during the last 1 or 2 pregnancies. Administrative and survey estimates often correlate poorly with each other and both generally underestimate the true level of protection, which can only be known through serological surveys.

K. Iron Supplementation during Pregnancy

Definition: Percentage of pregnant women who receive any iron supplements *(CIWG)*.

Unit: Percent.

Data Source: DHS or other surveys of pregnant women or women who have delivered in the last six months.

Discussion: This indicator only measures whether women have received *any* iron-containing supplements in the form of a pill, without reference to adequate dosage. Future DHS surveys will provide information on whether women purchased or were given any iron supplements during pregnancy as well as the number of days they took iron supplements (*MACRO*). Possible indicators encompassing adequate dosage include the proportion of pregnant women who take iron supplements (1) for at least 90 days during their pregnancy, (2) according to locally established protocols, or (3) according to protocols published in 1998 by the International Nutritional Anemia Consultative Group (INACG), WHO, and UNICEF *(MOST)*.

L. Met Need for Essential Obstetric Care

Definition: Percentage of women estimated to have serious obstetric complications that are seen in essential obstetric care facilities *(CIWG)*.

Unit: Percent.

Data Source: Project or facility reporting; population-based survey or census for estimating number of births.

Discussion: This indicator has been recommended as a common indicator. Measuring this indicator requires tallies of serious cases (hemorrhage, prolonged/obstructed labor, sepsis, complications of abortion, pre-eclampsia/eclampsia, ectopic pregnancy, or ruptured uterus) treated in facilities divided by an estimate of all serious obstetric complications among women (generally accepted to account for 15 percentof all births)*(CIWG)*. A community-based survey would be more costly but could provide a far more reliable estimate.

M. Practice of Lower-risk Sexual Behavior

1. Reported Non-regular Sex Partners

Definition: Percentage of target group reporting sexual intercourse with at least one non-regular partner during the previous 12 months *(G/PHN)*.

Unit: Percent.

Data Source: DHS HIV/STD module, Behavior Surveillance Survey (BSS), or other population-based surveys.

Discussion: This indicator is based on WHO's Prevention Indicator 4. The terms "non-regular" and "regular" partner are country and culture-specific and difficult to define, but the distinction is important for measuring risky sexual behavior. WHO has defined a "non-regular partnership" as a temporary, occasional, or commercial relationship and a "regular partnership" as one that has lasted for 12 months or more *(WHO/GPA)*. These definitions are particularly problematic when applied to youth, among whom "serial monogamy" characterized by "regular" partnerships of less than one year is common. Though the term "non-regular" may not seem appropriate in such cases, the higher element of risk inherent to serial monogamous relationships would still apply *(G/PHN)*. New joint guidance by WHO, UNAIDS, and USAID suggests that programs monitor relationships with "non-marital, non-cohabiting" partners (*UNAIDS*).

2. Reported Condom Use with Non-Regular Sex Partner

Definition: Percentage of target group reporting barrier method use during the most recent act of sexual intercourse with a non-regular partner *(G/PHN)*.

Unit: Percent.

Data Source: DHS HIV/STD module, BSS, or other population-based surveys.

Discussion: This indicator has been proposed as a common indicator for USAID programs in HIV/STI prevention (see previous indicator for discussion of regular v. non-regular partners). In areas of high HIV prevalence, a similar indicator can be applied to assess safe sexual behavior among regular partners as well, based on WHO's Prevention Indicator 5. These indicators were originally proposed by WHO for use at the national level but may be effectively applied to show impact among specific targeted groups as well *(G/PHN)*.

The following composite indicator under development by the FHI/Impact Project is designed to monitor the overall prevalence of higher-risk sexual behavior among target groups: "Percentage of target group reporting unprotected sex with a non-regular partner during the previous twelve months"*(G/PHN)*.

N. Treatment of STIs

Definition: Among men and women surveyed who report at least one symptom of an STI in the past 12 months, the proportion who sought appropriate medical care or treatment *(G/PHN)*.

Unit: Percent.

Data Source: DHS HIV/STD module, BSS, or other population-based surveys.

Discussion: This indicator only reflects care-seeking behavior among symptomatic individuals. Appropriate treatment is defined as diagnosis and treatment at a health center, clinic, or hospital. G/PHN also recommends a similar indicator monitoring the proportion obtaining medication(s) for STI symptoms from an appropriate source (for example, pharmacy or health facility) *(G/PHN)*.

O. Care and Support of People living with HIV/AIDS (PLWHAs)

Definition: Percentage of PLWHAs and survivors receiving appropriate care and support *(G/PHN).*

Unit: Percent.

Data Source: Household survey of target population.

Discussion: This is an indicator under development by G/PHN's Division of HIV/AIDS. "Appropriate care and support" refers to non-medical care and includes (1) education and counseling on self-care, reduction of risk of HIV transmission, nutrition and sanitation, and rehabilitation, and (2) psycho-social support. Care and support may be provided by health personnel or trained community members. Appropriate care may differ by gender as women with HIV/AIDS may be more concerned about vertical transmission of HIV and care for children while they are sick and especially after they have died. The indicator is also intended to encompass care for AIDS orphans *(G/PHN)*. New joint guidance by WHO, UNAIDS, and USAID recommends the use of the following "Care and Support" indicators:

1) The percentage of households caring for orphans that receives help with care from an institution or group outside the family

2) The percentage of households caring for children or young adults with long-term illness in the past year that received help with care from an institution or group outside the family *(UNAIDS)*.

V. Third-level Indicators

These indicators measure progress toward various program results related to supply, quality, demand, and sustainability of services. Missions are encouraged to specify precisely the service or services to be monitored in evaluating performance. This does not suggest that efforts should be limited to a vertical program but rather that results must be specific in order to be measurable.

A. Access to Services

1. Population-based Access Indicators

Indicators of "access" are typically defined in terms of the percentage of the population living within a reasonable distance to a specified health service. "Reasonable distance" is defined locally and can be measured in terms of travel time (typically one hour by local means of travel) or geographic distance (typically 5 or 10 kilometers). Data may be gathered through population-based surveys or through geographic information systems which include local population estimates. Indicators may also focus on other forms of access, such as economic access or equitable access by gender.

By adding qualifiers to the specified service, missions can measure access to services of a particular quality. For example, one may specify access to facilities with a sufficient supply of vaccines, drugs, commodities, and/or equipment during a specified time period, or facilities with staff adequately trained to provide a specified service. These qualifying conditions require precise definitions for valid performance monitoring.

Calculating geographic access based on location of services requires good census data sufficiently disaggregated to the local level. Survey-based measures of access may overcome this problem but are strongly influenced by other variables such as respondents' knowledge of services. Several examples of possible access indicators follow. Precise definitions for reasonable access and qualifying conditions are generally left open for missions to determine locally. Access data should be disaggregated by gender groups and/or rural and urban locations to measure equity.

a. Access to Adequate Case Management Services

Definition: Percentage of the population living within a reasonable distance of a health facility that has a regular supply of drugs sufficient to treat all patients appropriately and staff adequately trained to provide proper treatment.

Unit: Percent.

Data Source: Local information systems, project-based reporting.

Discussion: This generic example of an access indicator can be modified to match criteria being pursued by a given program. For effective performance monitoring, one must precisely define "a regular supply of drugs sufficient to treat all patients appropriately" as well as "staff adequately trained to provide proper treatment."

b. Access to Family Planning Services

Definition: Percent age of the population who live within a reasonable distance from a family planning service delivery point *(CIWG)*.

Unit: Percent.

Data Source: Geographic information systems, project-based reporting; surveys are a possibility but less accurate.

Unit: Percent.

Data Source: DHS and other population-based surveys; geographic information systems may also provide these data at the local level.

Discussion: Definitions vary greatly. The two provided above are those recommended as

Agency-wide common indicators. Some missions have cited data from WHO or the WHO/UNICEF Joint Monitoring Program, but it is unclear whether such estimates are reliable for performance monitoring because methodologies and definitions are determined locally and may change over time.

Discussion: The CIWG for family planning recommends this as an Agency-wide common indicator, leaving the definition of a reasonable distance in terms of a fixed distance or travel time to be determined locally. A family planning service delivery point is defined as "any provider of contraceptive services and distribution point." *(CIWG)*

c. Access to Immunization Services

Definition: Percentage of the population living within a reasonable distance of a health facility that routinely has vaccines available and staff trained to give immunizations.

Unit: Percent.

Data Source: Geographic information systems, facility assessments, project-based reporting; population based surveys.

Discussion: Trained staff may be defined as staff who were trained or retrained to give immunizations in the last three years. The Africa Bureau uses the coverage rate for DPT1 as a proxy indicator for access to immunization services and clinical child health services in general.

d. Access to Safe Water and Adequate Sanitation

i. Adequate access to water for domestic use

Definition: Percentage of households with a direct water connection to the home or compound or a public fountain or other source within 200 meters of the home *(CIWG)*.

Unit: Percent.

ii. Access to adequate sanitation

Definition: Percentage of households with excreta disposal facility, typically a toilet or latrine, private or shared with others within the building or compound *(CIWG).*

e. Access to STI services

Definition: Percentage of adults with physical, logistical, and economic access to STI services *(G/PHN)*.

Unit: Percent.

Data Sources: Population-based survey, geographic and local price information, SDP operations information.

Discussion: Though still under development, this indicator is recommended by G/PHN in an effort to broaden the notion of access to include economic, administrative, cognitive, and psychosocial accessibility. Measurement may require various instruments, each focusing on a different element of access, encompassing issues such as hours of operation of service delivery points, stigma experienced by women seeking STI services, and availability of services to non-married clientele *(G/PHN)*.

f. Access to Condoms

Definition: Percentage of population age 15–49 who can acquire a condom.

Unit: Percent.

Data Source: DHS HIV/STD module, BSS, or other population-based surveys.

Discussion: WHO and G/PHN have both recommended this indicator to monitor effectiveness of HIV/AIDS/STI prevention programs. The denominator may be limited to a more specific target group. Similar indicators may be designed for other contraceptive methods. The scope of this indicator goes beyond physical or economic

access since lack of knowledge may also limit a survey respondent's ability to acquire a condom or other method.

2. Availability of Supplies and Services

The most basic indicators dealing with access are absolute tallies of facilities, service providers, or commodity supply and the ratio of such tallies to a given population, typically referred to as *availability* (for example, condoms per adult of reproductive age). Data for these indicators can frequently be collected relatively easily through routine reporting mechanisms. Gross tallies, and the calculation of availability per capita, however, fail to specify whether targeted population groups really have access to the services or commodities being counted.

In the case of Couple-years of Protection (CYP), discussed on p. 20, the contraceptive effects of diverse contraceptive supplies are aggregated together to provide an overall accounting of the potential impact of services supplied. The following list provides a few other examples of basic supply and availability indicators used for performance monitoring:

a. Contraceptive Supply

Definition: Number of contraceptives distributed (free or for sale).

Unit: Number.

Data Source: Service statistics, logistics information systems, contraceptive social marketing (CSM) programs.

Discussion: Data on the sale and/or distribution of contraceptives are good process indicators, though they do not necessarily show outcome or impact. This information may form the basis for estimates of CYP. Reporting on units sold through social marketing programs is also discussed in Section IV, "Sustainability."

b. Condom Availability

Definition: The total number of condoms distributed to the population in a one-year period divided by the population age 15–49.

Unit: Condoms per adult of reproductive age.

Data Source: Service statistics (for example, from MOH, CSM program, National AIDS Control Program) and census data or estimates by UN or BUCEN for population.

Discussion: This is one of two "condom availability" indicators prescribed by WHO and endorsed by G/PHN (the other is the population-based measure of access to condoms, indicator (1.f.) above). Similar indicators may be designed to measure availability of other contraceptive methods. G/PHN has also proposed monitoring the number of condoms imported into the country per adult, a more pure measure of access since sales and other distribution data also respond to demand *(G/PHN)*.

c. Availability of Other Commodities

Definition: The number of units of a given commodity supplied nationwide.

Unit: Number.

Data Source: MOH data, logistics information systems, local project reporting.

Discussion: Missions may choose to report on supply of other commodities with or without a reference to the target population, such as units per capita. In addition to condoms and other contraceptives, typical commodities monitored for health programs include oral rehydration salts (ORS) packets, supplies of essential drugs (including drugs for STIs), or micronutrient supplements. Supply may be monitored in terms of units imported, produced locally, in stock, and/or distributed to the population.

d. Service Delivery Points (SDPs)

i. Number of service delivery points

Definition: Number of points where a specified service is offered.

Unit: Number.

Data Source: National or local health information systems. Data on private SDPs may be available from the Ministry of Health or from an association of private providers.

Discussion: Raw tallies of SDPs meeting certain criteria are frequently used indicators of program performance. In most cases, data can be fairly easily collected. The specification of SDPs can be refined to various levels in order to count services meeting a particular standard of quality (measuring these criteria, however, may add considerably to the burden of data collection).

The following example of such an indicator has been proposed as an Agency-wide common indicator for programs pursuing HIV/AIDS impact mitigation:

- Service delivery points for people living with HIV/AIDS (PLWHA), family members, and survivors (*CIWG*).

In this case, defining precise criteria for services being delivered is critical for effective performance monitoring.

ii. Service delivery points per population

Definition: Number of points where a specified service is offered divided by the total or target population.

Unit: Number per population.

Data Source: National or local health service information systems.

Discussion: Similar to the SDP indicator above but with reference to client population. The following example was recommended as an Agency-wide common indicator for maternal health programs:

- Number of facilities providing basic essential obstetric care 24 hours/day per 500,000 population *(CIWG).*

Minimal standards for essential obstetric functions at the health center level are identified as: provision of parenteral antibiotics, parenteral oxytocic drugs, parenteral sedatives for eclampsia, manual removal of placenta, manual removal of retained products. At the district hospital level, services should also include anesthesia, surgery, and blood transfusion *(RHIWG/SP)*. The denominator may be adjusted as appropriate to the specific program.

iii. Percentage of service delivery points meeting criteria

Definition: Percentage of service delivery points meeting specified criteria.

Unit: Percent.

Data Source: National or local health information systems, project-based reporting.

Discussion: Criteria that best reflect desired program results may be determined. The following examples focusing on availability of drugs, equipment, and supplies are recommended for child survival programs supporting IMCI:

- Percentage of health facilities with all essential equipment and material for IMCI.
- Percentage of health facilities with all essential IMCI drugs available.
- Percentage of health facilities with equipment and supplies to provide full vaccination services *(WHO/CAH).*

Indicators assessing service delivery points may also focus on the availability of trained personnel. The following examples include one specifically recommended for IMCI programs

and a more general indicator that could be applied to various program settings:

- Percentage of health facilities with at least 80 percentage of health workers managing children trained in IMCI *(WHO/CAH).*
- Percentage of health facilities with at least one health worker who was trained or retrained in the previous three years.

Indicators focusing on other criteria may have an increased emphasis on service quality. The following example has been proposed as a common indicator for maternal health programs:

- Percentage of facilities offering basic obstetric care that have current standards and protocols for essential obstetric care which are used by providers *(CIWG).*

e. Human Resources

Discussion: A critical facet of access to family planning and health services is the availability of personnel qualified to provide services. As with service delivery points, indicators of human resources may be gross tallies of service providers, measures of the number of providers per a given population, or an assessment of the percentage of all service providers who meet a certain qualification.

The following examples are typical indicators of program outputs that reflect the availability of trained service providers:

- Number of trained HIV outreach workers.
- Number of trained community health workers.

Other indicators measuring human resources may be more concerned with the levels of skill and knowledge among service providers:

- Percentage of service providers knowledgeable of referral facilities.
- Percentage of health workers who have received training in IMCI.
- Percentage of health workers who can correctly state and describe the danger signs of severe febrile illness *(AFR/SD).*

Indicators assessing the actual performance of service providers are considered under the next section on quality of care.

B. Quality of Care

These service quality indicators, unlike access and availability indicators presented above, measure actual performance of service providers and systems.

1. Provider Performance

a. Adequate Family Planning Counseling

Definition: Percentage of family planning clients who receive adequate counseling on contraceptive choices.

Unit: Percent.

Data Source: Observations and interviews in health facilities.

Discussion: Adequacy of counseling is measured against national protocol as it applies to the client receiving services. The following variation also requires reference to protocol as it applies to a given client: "Percentage of counseling sessions with new acceptors in which provider discusses all methods" *(Evaluation Project).*

b. Integrated Management of Childhood Illnesses

Definition: Percentage of health workers who manage cases of illness among children under five years of age in accordance with the national policy (regarding diarrhea, malaria, and/or acute respiratory infections [ARIs]).

Unit: Percent.

Data Source: Observations and interviews in health facilities.

Discussion: Integrated case management for diarrhea, malaria, and ARI has become recognized as an effective child survival strategy. Though quality of care indicators tend to focus on correct treatment of illnesses (see malaria indicator below), other elements of correct management to consider include correct diagnosis of patients and correct counseling of caretakers. The CIWG for child survival proposed that diagnosis, treatment, and counseling be monitored separately to assess provider performance in managing cases of pneumonia, diarrhea, malaria, and malnutrition *(CIWG).* For additional guidance on monitoring provider performance for child survival programs, particularly those supporting IMCI, see *BASICS* and *WHO/CAH*.

c. Treatment of Malaria in Health Facilities

Definition: Percentage of children under five with a diagnosis of malaria who are prescribed correct antimalarial treatment according to national guidelines *(AFR/SD).*

Unit: Percent.

Data Source: Supervisory visits or observation of health worker/sick child encounters.

Discussion: This indicator is designed to measure the quality of treatment for cases of malaria diagnosed in health facilities. In countries implementing IMCI, monitoring treatment of malaria may be conducted in conjunction with monitoring treatment of diarrheal diseases, ARI, and/or malnutrition. In each case, correct treatment must be defined based on protocols in a given country.

d. Quality of Immunization Services

These indicators measure provider performance with respect to providing immunizations in accordance with the national immunization policy. For countries that follow the WHO-recommended immunization policy, two indicators are recommended:

i. Targeting infants for immunizations

Definition: Percentage of infants who are immunized with measles after the earliest recommended age of nine months who are also immunized before the recommended age of one year.

ii. Missed opportunities for measles immunization

Definition: Percentage of infants who attended a clinic and were eligible to be immunized against measles, but who were not immunized against measles at that visit.

Unit: Percent.

Data Source: These indicators are most frequently calculated from immunization coverage survey data or from clinic-based assessments conducted as a component of routine clinic supervision.

e. Prompt Treatment of Women Admitted with Obstetrical Complications

Definition: Percentage of women admitted with hemorrhage, eclampsia, infection or sepsis, or obstructed labor who are treated within two hours of arrival.

Unit: Percent.

Data Source: Observation in health facilities.

Discussion: This indicator is recommended by the CIWG for maternal health indicators but is extremely difficult to accurately measure, requiring time-consuming, facility-based observation.

f. HIV/STI Case Management

i. Appropriate diagnosis and treatment

Definition: Number of individuals presenting with an STI in health facilities who are managed

in an appropriate way (for example, according to national standards) divided by the total number of individuals presenting with an STI in health facilities *(G/PHN)*.

Discussion: This indicator focuses on proper treatment of diagnosed STIs. Programs emphasizing the syndromic management of sexually-transmitted diseases may wish to monitor the validity of diagnoses based on observation of symptoms (genital ulceration, vaginal discharge, or urethral discharge) through laboratory confirmation *(G/PHN)*.

ii. Counseling on condom use and partner notification

Definition: Number of individuals seeking STI care in health facilities who received appropriate advice on condom use and on partner notification divided by the number of individuals seeking STI care in health facilities *(G/PHN)*.

Unit: Percent.

Data Source: Facility-based observation, exit surveys.

Discussion: This indicator is based on WHO/GPA's Prevention Indicator 7. A comprehensive methodology for data collection may include enumeration of facilities providing STI services, facility-based observation, and interviews with clients *(see G/PHN)*.

iii. Counseling to prevent vertical transmission of HIV

Definition: Percentage of women who were counseled and offered HIV testing during antenatal care for their most recent pregnancy *(UNAIDS)*.

Unit: Percent.

Data Source: Household survey.

Discussion: This indicator is recommended in joint guidance by USAID, UNAIDS, and WHO for countries with generalized HIV/AIDS epidemics and strategies to reduce mother to child transmission of HIV. It focuses on whether service providers counsel women during antenatal care. For an indication of total coverage of pregnant women, data for this indicator may be presented in conjunction with data on the percentage of women receiving antenatal care *(UNAIDS)*.

2. Systems Performance

These indicators monitor the performance of systems for providing training, supervision, collection and use of information, and logistics. Also considered here are quantitative assessments of inputs intended to strengthen these systems. Data necessary to calculate many of these indicators are typically collected through routine monitoring of program outputs, though some rely on clinic or community assessments or client surveys. Specific indicators are best designed at the country level.

a. Training

- Number of people attending training sessions.
- Percentage of trainees who apply the skills to their subsequent work.

b. Supervision

- Percentage of facilities with personnel who report one or more visits by their supervisor in the past three months.

c. Health Information Systems

- The proportion of reports (facility to district, district to national) received within the required period of time.

d. Logistics

- Percentage of storage capacity available to the program that meets acceptable standards with respect to temperature, humidity, ventilation, etc.

- Percentage of service delivery points that encountered a stock-out of any item during the past 12 months *(Evaluation Project).*

Discussion: The second indicator under logistics provides a measure of the extent to which SDPs have been unable to serve clients with the full range of health services during the past year due to inadequate supplies. For contraceptives, a stock-out is deemed to occur when a service delivery point has no supplies of a particular brand, even though supplies of other brands for the same method may be available.

A similar (but converse) indicator proposed as a common indicator for family planning programs assesses the performance of supply systems as well as providers distributing services from the clients' perspective:

- Percentage of target group receiving method of choice.

This indicator reflects whether a program has a diverse range of contraceptive methods available, whether it is properly promoting the full range, and whether providers are properly assessing clients' individual needs in order to prescribe a method which is both medically appropriate and appropriate for a given client's lifestyle *(CIWG)*.

C. Demand

These indicators measure the level of demand for family planning and health services, focusing on the population's attitudes toward and knowledge of desirable outcomes (for example, lower fertility), the need for family planning and health services, healthy practices, and how to access services.

The decision to assess demand independently of service use or other outcomes will undoubtedly vary across programs. Program managers in family planning, where knowledge of and attitudes toward family planning are key intermediate results toward increased contraceptive prevalence and reduced fertility, have tended to put more effort into monitoring levels of demand than have those in the health sector.

Assuming most people desire good health, measuring demand for good health would not provide much variation in response, but measuring people's demand for specific health services or commodities may be highly informative for program decision-making. Because desire for good health is typically more easily inferable than desire for family planning, demand indicators for health are primarily limited to those dealing with knowledge.

For more detailed discussion of indicators of demand, and particularly the *sustainability* of demand, see Endnote 1 and Volume II.

1. Attitudes

a. Mean Desired Family Size

Definition: The average number of children that women (or couples) of reproductive age would choose to have if they could have exactly the number of children desired (*Evaluation Project)*.

Unit: Children per woman (or couple).

Data source: DHS and other population-based surveys.

Discussion: This indicator, which is comparable to the "desired total fertility rate," is subject to various biases related to respondents' inability or unwillingness to accurately specify their desired family size.

b. Desire to Space or Limit Births

Definition: Percentage of women currently married or in union who are fecund and who desire not to have additional children or to delay the birth of their next child *(Evaluation Project)*.

Unit: Percent.

Discussion: This indicator is similar to "Desired family size" but reflects a more immediate desire to limit family size. It may be effectively used to show results of family planning information, education, and communications activities.

Data source: DHS and other population-based surveys.

c. Unmet Need for Family Planning

Definition: Percentage of women currently married or in union who are fecund and who desire either to terminate or postpone child-bearing, but who are not currently using a contraceptive method *(Evaluation Project)*.

Unit: Percent.

Data source: DHS and other population-based surveys.

Discussion: This indicator reflects both use and demand for family planning. It is useful for understanding the current level of opportunity for family planning programs but is **not** useful in monitoring overall program performance over time because programs typically aim to increase both use and demand at the same time. While increased use of contraceptives will reduce unmet need, increased demand to limit fertility will act to increase unmet need.

d. Approval of Family Planning

Definition: Percentage of men and women who approve of couples using contraception to avoid pregnancy *(CIWG)*.

Unit: Percent.

Data source: DHS and other population-based surveys.

Discussion: While the previous indicators are concerned with individuals' attitudes toward family planning as their own personal choice, this indicator reflects attitudes toward the use of family planning in general. As such, it could be more accurately be characterized as an indicator of the enabling environment for family planning programs; for further discussion of similar indicators, see section on "Sustainability of Demand" in Volume II.

e. Attitudes toward HIV/AIDS and HIV/AIDS Prevention

Definition: Percentage of target group that has ever discussed HIV/STIs with a regular partner

Discussion: This indicator has been proposed by G/PHN to monitor the social acceptability of STI prevention measures. G/PHN is also working with UNAIDS to develop methods to measure attitudes leading to stigmatization and discrimination against people living with HIV/AIDS *(G/PHN)*.

2. Knowledge

a. Knowledge of Modern Methods of Family Planning

Definition: Percentage of the target population who can name, without prompting, at least 3 or more modern methods of contraception *(CIWG)*.

Unit: Percent.

Data source: Population-based surveys.

Discussion: This indicator has been recommended as an Agency-wide common indicator for family planning programs. Data should be disaggregated for men and women.

b. Knowledge of Maternal Complications of Pregnancy and Childbirth

Definition: Percentage of women who can name (unprompted) a warning sign of maternal complication of pregnancy and childbirth *(Mothercare)*.

Unit: Percent.

Data source: Population-based surveys.

Discussion: This replaces a previous version of this indicator requiring that women name four of the seven signs. The seven warning signs are: antenatal vaginal bleeding, high fever, abdominal pain, swelling of hands and face, active labor for more than 12 hours, placenta retained for more than one hour, and seizures *(Mothercare, CIWG)*.

c. Knowledge of Key Child Health Practices

Definition: Percentage of caretakers who can state signs and symptoms of childhood illnesses requiring treatment and who can state rules for home case management.

Unit: Percent.

Data source: DHS and other population-based surveys.

Discussion: This indicator can be designed to measure mothers' knowledge of warning signs and recommended treatment for common childhood illnesses (for example, diarrheal diseases, malaria, and ARIs). The following example has been recommended as an Agency-wide common indicator for child survival programs:

- Percentage of mothers/caretakers of children under five years of age who mention at least one sign that a child with cough should be taken to a health worker.

Under this example for ARI, acceptable warning signs include fast breathing, difficult breathing, or a local term for fast or difficult breathing or pneumonia *(CIWG)*.

This indicator can also be adopted to monitor knowledge of any of the other 12 key practices promoted by IMCI programs (*UNICEF*); an example for knowledge of infant feeding practices is proposed above under discussion of exclusive breastfeeding and complementary feeding indicators.

d. Knowledge of STI/HIV Preventive Practices

Definition: Percentage of men/women surveyed who can identify two or more correct methods of reducing risk of HIV infection *(G/PHN)*.

Unit: Percent.

Data source: DHS, BSS, other population-based surveys.

Discussion: Acceptable responses include condom use, partner reduction (especially of high-risk partners), mutual monogamy, no "casual" sex, abstinence from sex, and avoiding injection with contaminated needles. To be considered as having cited two correct methods, G/PHN recommends that respondents be required to mention condom use and some form of partner limiting or avoiding injection with contaminated needles. Although surveys developed by WHO have used a prompted form of the question, G/PHN recommends soliciting both unprompted and prompted responses. For performance monitoring purposes, it is critical that form of acceptable response be clearly defined and maintained over time *(G/PHN)*.

e. Knowledge of STI Symptoms

Definition: Percentage of men/women surveyed who are able to describe, unprompted, two or more STI symptoms for their own gender *(G/PHN)*.

Unit: Percent.

Data source: DHS, BSS, other population-based surveys.

Discussion: G/PHN proposes that survey questioners listen for locally appropriate terminology to gain insight on which symptoms respondents consider to be indicative of illnesses that require treatment *(G/PHN)*.

f. Knowledge of Location of Services

Definition: Percentage of target population who know where specified services (for example, immunization services, emergency obstetric care, etc.) can be obtained.

Unit: Percent.

Data source: DHS and other population-based surveys.

Discussion: This indicator can be designed to fit specific program needs. For example, G/PHN proposes that HIV/STI prevention programs monitor the following indicator:

- Percentage of adults correctly citing at least one service delivery point for care of STIs *(G/PHN)*.

3. Community Support

The following are examples of measurements of attitudes and demand for better health or health services as manifested at the broader community level:

- Number of communities with health committees.
- Number of community-based programs supporting primary health care.
- Percentage of constructed water supply facilities maintained by the community *(CIWG)*.

Indicators of community support relate closely to the enabling environment for family planning and health programs and are discussed in greater detail in Volume II (see section on "Sustainability of Demand").

D. Sustainability

These indicators monitor performance of activities to mobilize resources, increase institutional capacity, and develop public policy. They are basic measures of the sustainability of systems supporting health and family planning programs. Volume II of this series discusses a wider range of indicators of sustainability, including discussion of measures of the sustainability of demand.

1. Financial Sustainability

a. Resource Mobilization

These indicators examine the generation of public and private funds and other support for health and family planning programs. For further details on indicators of resource mobilization, see Volume II.

i. Mobilization of public resources

Indicators in this area typically examine absolute or proportional spending on the health sector through public funding. The following indicators of trends in health care financing through the public sector have been recommended as Agency-wide common indicators:

- Percentage of routine vaccines paid for by the national government *(CIWG).*
- Percentage of national health budget allocated to HIV/AIDS/STI programs *(CIWG).*

Data Source: Health ministry, government finance reporting. Actual expenditure information is preferable to budget data but is often not available in a usable format in a timely manner.

Discussion: The relationship between mission activities and government spending trends is not a direct one, but these indicators can be very useful to monitor whether a critical assumption of government commitment is being met. UNICEF is monitoring the first indicator at the international level to assess host countries' commitment to self-financing of immunization programs. For HIV/AIDS/STI programs, G/PHN also recommends monitoring resource allocation at the local government level where appropriate *(G/PHN)*. More recent joint guidance by UNAIDS, USAID,

and WHO recommends that programs monitor expenditure from national sources on HIV prevention programs per HIV-infected person *(UNAIDS)*.

ii. Mobilization of private resources

Private resources may be mobilized in the form of user fees for health service cost recovery, sales of health commodities, and the engagement of private sector organizations and firms in the provision of health services.

Cost Recovery

A few examples of possible indicators of the development of cost recovery at the facility or institutional level:

- Number (or percentage) of facilities with cost recovery mechanisms in place.
- Percentage of recurrent costs recovered through cost recovery.

Data Source: Facility or project reporting, management information systems.

Social Marketing Sales

Sales of family planning and health commodities through social marketing are indicative of supply and use of services, demand for services, and the financial sustainability of commodity distribution. The following example for family planning programs can also be adapted to reflect sales of health commodities such as ORS packets or bednets:

- Number of contraceptives sold through social marketing.

Data Source: Facility or project reporting; logistics information systems.

Discussion: Contraceptive sales figures may form the basis for CYP estimates, a common proxy indicator for use of family planning services. Condom sales figures can also demonstrate results of HIV/STI prevention programs and, in the absence of higher-level indicators, may be an appropriate proxy indicator for service utilization.

Mobilization of Private Sector

The following indicators examining the degree to which the private sector is supporting family planning and health programs have been recommended as Agency-wide common indicators:

- Number of HIV/AIDS service delivery points operated by non-governmental entities *(CIWG).*

Data Source: Facility assessments, ministry of health, private associations.

- Percentage of family planning clients who are receiving services through private sector channels *(CIWG).*

Data Source: DHS, other population-based surveys.

Discussion: For HIV/AIDS prevention and control programs, G/PHN also recommends that missions monitor the percentage of commercial firms providing HIV/AIDS information and services to their employees *(G/PHN)*.

b. Efficient Allocation and Use of Resources

These indicators examine allocation (or retention) of funds for specific program areas, such as primary health care, as well as the distribution of other resources within the health system, such as pharmaceuticals supplied to non-hospital facilities.

- Percentage of government health budget allocated to primary health care.
- Percentage of government expenditure allocated to primary health care.
- Personnel expenditure as a percentage of total recurrent health expenditure.
- Percentage of recovered costs available for primary health care.

Data Source: Ministry of health, facility reporting. Actual expenditure information is preferable to budget data.

Discussion: As with resource mobilization indicators, the relationship between mission activities and government spending trends is not a direct one. These indicators may demonstrate program impact but can also serve to monitor critical assumptions of government commitment. For more information on indicators of allocation and use of resources, see Volume II.

2. Institutional Capacity

Institutional capacity can be monitored by examining of the state of systems for planning and management, human resources, information, and logistics in target institutions. Performance of these various systems is discussed above under "Quality." An example of a broad measurement of institutional capacity proposed by G/PHN is:

- Percentage of NGOs supported for HIV/AIDS prevention with increased technical and managerial skills *(G/PHN).*

Definition: Number of NGOs supported for HIV/AIDS prevention whose technical and managerial skills have increased during the lifetime of the project divided by the total number of NGOs supported for HIV/AIDS prevention *(G/PHN)*.

This indicator may be difficult to monitor as it requires simultaneous assessment of a variety of skills. The following examples drawn from Volume II reflect the level of institutional capacity in more specific areas and may be more easily measured and interpreted because they are more "unidimensional."

a. Planning and Management

- Existence of a strategic plan.
- Presence of a system for preparing annual operational plans.
- Presence of a manager whose job description includes responsibility for developing, revising, and assessing implementation of strategic and operational plans.

b. Systems for Human Resources

- Presence of detailed, accurate, and up-to-date job descriptions.
- Presence of a system for regular staff performance assessment.
- Presence of a system for assessing the effectiveness of staff training.

c. Information Systems

- Presence of an accounting system that regularly provides income/revenue data and cash flow analysis based on specific service cost categories.
- Presence of an information system that provides reliable information on clients and services.

d. Logistics Systems

- Presence of a system for periodically reviewing the logistical needs and resources of the institution.
- Presence of a manager whose job description includes resource management tasks.

Discussion: G/PHN is currently supporting efforts to better define indicators and guidelines for monitoring and evaluating USAID's capacity-building efforts in the health sector (*MEASURE*). For a more detailed discussion of methods to monitor development of institutional capacity, see Volume II.

3. Enabling Environment

These indicators monitor the development of public policy, sector-wide approaches, and community empowerment to sustain family planning and health results. They tend to rely

on qualitative assessments of progress according to specified criteria; some employ a rating scale to produce a quantitative measure based on these assessments. For more detailed discussion of methods to monitor enabling environment, see Volume II.

a. Policy Process

These indicators may measure the achievement of very specific benchmarks or a composite of various developments in public policy. The following examples of indicators in the area of policy development are recommended as Agency-wide common indicators:

- National maternal health strategy operationalized.

Definition: Percentage of the government's administrative units that have operationalized the national maternal health strategy *(CIWG)*.

- AIDS Policy Environment Score.

Definition: The degree to which the policy environment in a given country supports efforts to prevent the spread of HIV/STIs, provide quality care for people with AIDS, ensure the rights of people with AIDS, and ameliorate the negative impact of AIDS on individuals, families, communities, and society *(CIWG).*

Discussion: A variation of this indicator is presented in joint guidance by UNAIDS, USAID, and WHO as the "AIDS Program Effort Index" *(UNAIDS)*. Exploration into the use of multi-dimensional policy indices as a means to quantify results of a primarily qualitative nature is still in an early stage. The use of indices requires very detailed definition and careful interpretation of data. More field testing is necessary before their value as performance monitoring tools at the mission level can be fully established.

b. Sector-Wide Approaches

Sector-wide approaches promote sustainability through the empowerment of host governments to coordinate and manage the variety of donor and other inputs in a given sector. Indicators considered here measure the extent to which cross-sectoral approaches are working to maximize achievements of results in the family planning and health sector. The following examples are treated in greater detail in Volume II:

- Existence of a sector investment program, sector-wide approach, or similar program.
- Presence of a cross-sectoral strategy for diarrheal disease control that includes water and sanitation components.

c. Community Empowerment

Indicators of community empowerment examine levels of participation and authority enjoyed by community members in decision-making processes affecting the health sector. The community in question could be local residents, members of a professional group, or any other groups whose participation is thought to be critical. A few examples of community empowerment indicators discussed in greater detail in Volume II include:

- Number of regions in which community decision-making structures operate to discuss health concerns or decide program management issues, or both.
- Policy dialogues and formulation involves NGOs, community leaders, and representatives of the private sector and special interest groups (*component of AIDS Policy Environment Score*).

VI. References

This document is the product of consultation with technical staff of USAID, its Cooperating Agencies, and other multilateral agencies as well as technical review of performance monitoring by USAID missions. The following specific sources are cited in the text:

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End Notes

1. Demand: The most basic definition of demand is the desire to possess or obtain something. There are two basic aspects of demand to consider in strategic planning and performance monitoring: (1) Prevalence, the proportion of a population that has a desire for something, and (2) Magnitude, the intensity of individuals' desires or how much people are willing to give to get that something.

Demand can be addressed hierarchically. For example, the family planning sector is concerned at the highest level of results with promoting the demand for smaller, healthier families, and at a lower level with stimulating demand for family planning services. The highest level of demand for the health sector would be for the general health of individuals and families and the next level down would be the demand for services and commodities provided through health and nutrition interventions.

Where does demand fit into family planning and health strategies and monitoring? Family planning and health strategies are concerned with both the *creation* and *satisfaction* of demand. However, problems in the creation of demand are generally more complex in the family planning sector than in the health sector because desire for smaller families is more variable than desire for better health. Consequently, family planning has tended to put more energy into monitoring different levels of demand than has the health sector. Family planning, for example, measures people's conception of ideal family size, desire to space births at least 24 months apart, and reasons for using or not using family planning. Each of these represents an attempt to measure demand at a different level. In the health sector, on the other hand, measuring demand for good health would not provide much variation in response (assuming most people desire good health) but measuring people's demand for specific services and commodities may be highly informative for program decision-making. While mothers would generally agree that it is desirable to prevent children's illnesses, their disposition to bring children to health services for complete immunization may vary considerably. Survey questions on attitudes toward health services are more likely to yield useful information about demand in the health sector than are questions about desired health status.

When demand is incorporated into a performance monitoring scheme as a distinct concept, it is best operationalized as an *attitudinal* variable. To measure demand directly, one collects data about what people do and do not want, how badly they want it, and what their reasons are for wanting or not wanting it. It is also important to note that demand should always be regarded as an intermediate variable; there are preceding causes for demand (or the lack thereof) and behavioral effects that follow demand.

Some analysts have argued that *knowledge* is an adequate proxy for demand, using the logic that if people know of the benefits of an intervention and know how to avail themselves of that intervention, they will logically demand it. While knowledge is clearly an important prerequisite of demand, it is insufficient grounds to infer demand: we often know what we *should* do, but choose to do something different for a variety of reasons. For example, mothers may know the proper procedure for ORT as a treatment for diarrhea, but their desire to administer it may vary considerably, particularly when weighed against a host of other beliefs and priorities, and may or may not be strong enough to result in actual use of ORT.

Use of commodities and services has also been posited as a proxy for demand, but use only measures "effective demand," that portion of demand that is currently being met. Measuring use does not tell us what proportion of total demand is not being met, or anything else to suggest why part of the population is not utilizing the services or commodities.

This does not mean that measurements of knowledge and use are not relevant to demand. In fact, a comparison of the difference between levels of *knowledge* (a preceding cause to demand) and *use* (a behavioral effect of demand) can yield important information about the nature of demand in a given situation. For example, if knowledge of an intervention is at 80% and use stands at 75%, we could infer that demand is high relative to knowledge and that the demand is essentially being met. On the other hand, if use is only 45%, the large difference between knowledge and use alerts us that something is wrong in the program: either knowledge is not sufficiently creating demand or demand is not being adequately met due to some other factor, such as poor access to or quality of services or commodities. We can, of course, measure access and quality, and if either or both of these are judged to be poor, we can speculate that they are the cause of low use.

Without asking the population directly, however, we cannot be certain how much of the knowledge-use gap is due to poor access and how much to poor quality, nor can we ascertain which aspects of access and quality are most to blame for the gap. We could determine that 60 percent of the population live more than one hour traveling distance from a service delivery point, but we still do not know what percentage wants the service badly enough to overcome the time/distance obstacle. We could measure certain aspects of quality that *we* think are important, but our priorities may not be the same as those of the target population. Without measuring attitudes, we also lack knowledge about cultural factors which may affect demand and in turn produce the discrepancy between knowledge and use.

Including the concept of *demand* into strategic plans and measuring attitudes related to demand for program outputs and outcomes can be very useful. The pivotal question is whether the value of information about demand is worth the cost of collecting it. This decision will undoubtedly vary across programs. Family planning program managers have found it important to monitor demand attitudes at various levels, as is evidenced by the content of many DHS questions. Programmers in the health sector may also need to consider the efficacy of including attitudinal questions that help to pinpoint the weak links in the intervention chains. If examination of the access-quality-knowledge-use data shows signs of weak linkages among program dimensions, then attitudinal surveys may be deemed the most efficacious way to identify the critical areas needing improvement.

2. CYP: Estimates of couple years of protection (CYP) based on family planning commodities distributed and/or services provided can typically be calculated on an annual basis at low cost, providing useful trend information for the years between population-based surveys. However, CYP data are less reliable than contraceptive prevalence rates obtained through surveys because the amount of contraceptives distributed in a given time period does not necessarily correspond to the quantity actually used by clients during the same time period. Often contraceptives are distributed nationwide or through sales networks well in advance of their actual use by consumers. Furthermore, supplies may be damaged or destroyed in transit or storage or may be diverted to markets outside of the area where the target population resides. CYP figures derived from service delivery or consumer sales data are more timely and relevant to current use by the target population than are figures based on national importation or distribution of contraceptives. In either case, CYP cannot substitute for CPR as an overall measure of program performance and should not be converted to or reported as CPR. Missions considering the use of CYP data should review the source, quality, and completeness of the program data used to calculate CYP. Missions should also ensure that the conversion factors used to calculate CYP are those recommended by G/PHN (see p. 20).

Appendix 1

Selected Indicators for Monitoring and Evaluating Infectious Disease Programs

July 1999

Office of Sustainable Development, USAID Africa Bureau (AFR/SD)

Appendix 1
Selected Indicators for Monitoring and Evaluating Infectious Disease Programs

I. Indicators for Tuberculosis (TB) Control Programs A-2
- A. Impact-level Indicators A-2
- B. Outcome-level Indicators A-2
- C. Process-level Indicators A-3

II. Indicators for Anti-Microbial Resistance (AMR) Programs A-5
- A. Impact-level Indicators A-5
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- C. Process-level Indicators A-5

III. Indicators for Surveillance Programs A-8
- A. Impact-level Indicators A-8
- B. Outcome-level Indicators A-8
- C. Process-level Indicators A-8

IV. Indicators for Malaria Programs A-11
- A. Impact-level Indicators A-12
- B. Outcome-level Indicators A-14
  1. Case Management in Health Facilities A-14
  2. Case Management at Home and Community A-14
  3. Prevention of Malaria in Pregnancy A-15
  4. Insecticide Treated Materials (ITMs) A-15
  5. Prevention and Containment of Malaria Epidemics A-16
- C. Process-level Indicators A-16
  1. Case Management in Health Facilities A-16
  2. Case Management at Home and Community A-18
  3. Prevention of Malaria in Pregnancy A-19
  4. Insecticide Treated Materials (ITMs) A-19
  5. Prevention and Containment of Malaria Epidemics A-20

Figure A-1: Performance Monitoring Indicators Matrix for Infectious Disease Programs A-22

Over the past year, USAID/AFR/SD facilitated a process of identifying appropriate indicators for monitoring and evaluating infectious diseases (ID) programs in sub-Saharan Africa. The guidance provided in the following sections on tuberculosis (TB), anti-microbial resistance (AMR), surveillance, and malaria was developed through examining current monitoring and evaluation tools recommended and/or used by the World Health Organization or other organizations as specified. A summary table of all the indicators suggested for ID programs appears at the end of this appendix in Figure A-1.

The menus presented here are by no means exhaustive. Indicators were chosen primarily for their applicability to mission settings and their relative utility in monitoring and evaluating progress. Several indicators are new, particularly those for surveillance, and have not been field tested. USAID missions are encouraged to choose at least one appropriate indicator at the impact, outcome, and process levels that are congruent with and perhaps already collected by their respective ministries of health.

In each of the four areas, missions are encouraged to collect baseline data (or ensure that such data is collected by the MOH) on at least one appropriate impact and one outcome indicator in order to monitor longer-term (5 years or more) program impacts. All countries in sub-Saharan Africa are likely to collect malaria, tuberculosis, surveillance, and antimicrobial resistance data in some form. Technical assistance is available from AFR/SD and from Global Bureau projects to aid missions in developing monitoring and evaluation plans.

This is a work in progress. Your comments and suggestions on the selected indicators and their use will be warmly welcomed. Please send all comments to USAID AFR/SD/HRD, 1325 G Street, NW Washington, DC 20005. Comments can also be sent via e-mail to smehdi@afr-sd.org or mettling@afr-sd.org.

I. Indicators for Tuberculosis (TB) Control Programs

The menu of selected indicators presented here is based on International Union Against Tuberculosis and Lung Disease (IUATLD) and World Health Organization (WHO) TB guidelines. USAID missions with TB investments are encouraged to monitor at least one indicator at the impact, outcome, and process levels. Missions beginning new TB initiatives are encouraged to compile and report baseline data (or ensure that such data is collected by the MOH) on at least one appropriate indicator in order to monitor longer-term program impacts. It is likely that all of the following indicators will be collected by the national TB program (NTP).[1]

A. Impact-level Indicators

- **TB cure rate**

Definition: Number of cured cases (verified by appropriate l tests) of sputum smear-positive TB divided by total number of identified sputum smear-positive TB cases.

Unit: Percent.

Data Source: Directly Observed Therapy, Short Course (DOTS) program log book and surveillance data collected on an on-going basis and reviewed through a quarterly cohort analysis.

Discussion: DOTS program targets are to cure 85 percent of detected new cases of sputum smear-positive TB.

B. Outcome-level Indicators

- **TB detection rate**

Definition: Number of new cases (verified by appropriate laboratory tests) of sputum smear-positive TB cases divided by the estimated number of new smear-positive cases in a given year.

Unit: Percent.

Data Source: DOTS program log book and surveillance data collected on an on-going basis.

Discussion: DOTS program targets are to detect 70 percent of existing cases of sputum smear-positive TB cases. Case finding is expanded from 70 percent only when the national TB program has achieved a high cure rate throughout the country.

[1]The following is an indispensable reference on TB and provided the basis for most of the indicators contained herein: World Health Organization (1997). ***Treatment of Tuberculosis: Guidelines for National Programmes***, Second Edition. Geneva: World Health Organization. The booklet is available from the WHO Global TB Programme, located at: 20 Avenue Appia CH-1211 Geneva 27, Switzerland. Fax (41-22) 791-4199; Phone (41-22) 791-2963.

C. Process-level Indicators

- **Implementation of the DOTS strategy**

Definition: Proportion of administrative units (e.g. districts, regions) implementing the DOTS strategy.

Unit: Percent.

Data Source: MOH National TB Control Program (NTP) records.

Discussion: This is an appropriate indicator of progress in national coverage (improved access).

- **Adoption of a national TB control policy package**

Definition: Adoption of a national TB control policy package consisting of 1) government commitment to a National Tuberculosis Program; 2) case detection by sputum smear microscopy examination of suspected TB cases in general health facilities; 3) standardized short-course therapy to, at least, all smear-positive TB cases under proper case management conditions; 4) a regular, uninterrupted supply of all essential anti-TB drugs; 5) monitoring system for program supervision and evaluation.

Unit: Yes/no based on five criteria.

Data Source: Ministry of Health documents and TB control plan(s).

Discussion: A country is considered to have a functional national TB control policy only when all five of these conditions are met. Process indicators presented below monitor progress towards each of the five elements of the policy.

- **NTP manual**

Definition: The National Tuberculosis Control Program (NTP) has developed an program manual.

Unit: Yes/no.

Data Source: MOH records, NTP reports.

- **Presence of an NTP coordinating unit**

Definition: NTP has a central coordinating unit to initiate, monitor, and coordinate TB activities.

Unit: Yes/no.

Data Source: MOH records, NTP reports, organogram.

- **Microscopy services network**

Definition: Nation-wide network of microscopy services developed and subject to regular quality control, as per NTP guidelines.

Unit: Yes/no.

Data Source: MOH records, NTP reports and guidelines.

- **Standardized treatment regimens**

Definition: Approved, standardized short-course treatment regimens are administered through the primary health care system in districts implementing the DOTS strategy.

Unit: Yes/no.

Data Source: MOH records, NTP reports.

- **Adequate anti-TB drug supply**

Definition: Regular (on-going, routine, and consistent) and adequate supply of drugs and diagnostic materials to monitor and treat all detected cases.

Unit: Yes/no.

Data Source: MOH records, NTP reports.

- **DOTS reporting system established**

Definition: A DOTS recording and reporting system is present and uses IUATLD/WHO-standardized registers.

Unit: Yes/no.

Data Source: MOH records, NTP reports, national surveillance system.

II. Indicators for Anti-Microbial Resistance (AMR) Programs

USAID missions with AMR investments are encouraged to monitor at least one indicator at the outcome and process levels that are congruent with and perhaps already collected by their respective national programs. Missions beginning new AMR investments are also encouraged to collect baseline data (or ensure that such data is collected by the MOH) on at least one appropriate outcome indicator to monitor longer-term program outcomes.

A. Impact-level Indicators

Impact-level indicators for AMR are currently under development.

B. Outcome-level Indicators

- **Overall antibiotic use**

Definition: Percentage of patient encounters during which an antibiotic is prescribed.

Unit: Percent.

Data Source: Surveys of prescriber behavior, review of IMCI records. Prior to data collection, a list must be made available of all the drug products which are to be counted as antibiotics.

Discussion: This indicator measure is a proxy for overall use of antibiotics. It does not, however, distinguish between appropriate and inappropriate use.

C. Process-level Indicators

- **Correct instruction on use of antimicrobial tracer drugs**

Definition: Proportion of surveyed health providers that correctly instruct the care giver with respect to dose and duration of treatment for a selected antimicrobial tracer drug.

Unit: Percent.

Data Source: Data to be collected on a quarterly basis through specialized project area/local survey/studies. In countries that have adopted IMCI, data may be available through IMCI supervisory records.

Discussion: Tracer drugs refers to a pre-defined set of essential antimicrobial drugs. The set could be composed of first-line antimalarial drugs, antibiotics used for treating cholera or pneumonia in children, or others.

- **Health providers' knowledge of appropriate antimicrobial drug use**

Definition: Proportion of surveyed health providers that 1) do not prescribe antibiotics for cough or cold; and 2) do not prescribe antibiotics for non-bloody (non-cholera) diarrhea.

Unit: Percent.

Data Source: Data to be collected through specialized project area/local survey/studies. Data may also come from periodic reports of USAID supported partners such as the RPM Project or through IMCI programs. In countries with IMCI, these data can be collected through records of IMCI supervisory visits.

- **Use of AMR data for decision-making**

Definition: Proportion of surveyed health managers/supervisors who report having used both (a) data on antimicrobial resistance for making decisions with respect to disease management policies and guidelines; and (b) antimicrobial drug use data for decisions with respect to antimicrobial drug policies, guidelines, management or use.

Unit: Percent.

Data Source: Annual (baseline, midterm, end of project) surveys of high-level health managers, project reports, MOH records.

Discussion: This indicator assumes that the health managers surveyed are at the appropriate level to be le to make policy changes/decisions. An example is the proportion of malaria program managers who know levels of antimalarial resistance and who recommend changes in national policy to a second-line antimalarial drug.

- **Laboratory staff trained in standard practices for detecting AMR**

Definition: Percent of participating laboratories with staff trained in standard laboratory practices for detecting antimicrobial resistance

Unit: Percent.

Data Source: Training records, survey of random sample of participating laboratories.

Discussion: "Participating laboratories" refers to laboratories that are part of the national AMR surveillance system.

- **Laboratory capacity**

Definition: Percent of laboratories that pass standardized assessment of basic minimum capacity levels.

Unit: Percent.

Data Source: Laboratory surveys.

Discussion: Standardized protocol to include: building facilities and utility services, l equipment, staff, reagents, laboratory management, and quality control procedures (see surveillance indicator).

- **Accurate stock records of antimicrobial tracer drugs at health facilities**

Definition: Percent of stock records that correspond with physical counts for a set of antimicrobial tracer drugs (defined locally) at surveyed health centers or health posts.

Unit: Percent.

Data Source: Special studies/surveys. These may come from reports by USAID projects and partners.

Discussion: This is primarily an indicator of the performance of the logistics system. It could be linked to or may already be collected by quality assurance programs.

- **Stockouts of antimicrobial tracer drugs at heath centers**

Definition: Average number of days surveyed health centers are out of stock of a set of antimicrobial tracer drugs.

Unit: Number of days.

Data Source: MOH records, special studies/surveys, reports by USAID projects and partners.

Discussion: Depending on which drugs are included in the definition, this indicator can be linked to malaria indicators and/or to IMCI.

III. Indicators for Surveillance Programs

USAID missions with investments in surveillance are encouraged to monitor at least one indicator at the impact, outcome and process levels that are congruent with and perhaps already collected by their respective national surveillance programs. Missions beginning new initiatives are also encouraged to collect baseline data (or ensure that such data is collected by the MOH) on at least one appropriate indicator in order to monitor longer-term program impacts.

A. Impact-level Indicators

- **Mortality rates attributed to epidemics**

Definition: Mortality rates attributed to specific diseases (e.g. epidemic malaria, cholera, meningitis, etc.) in health facilities in epidemic-affected districts during epidemic months.

Unit: Deaths per X population.

Data Source: MOH, facility records, WHO/AFRO.

Discussion: As the surveillance system is improved, it is likely to detect more cases and deaths as compared to a period that did not have adequate surveillance. For this reason, the case rates are likely to rise at first then decline as response improves.

B. Outcome-level Indicators

- **Duration of epidemics**

Definition: Duration of epidemics in weeks

Unit: Number of weeks.

Data Source: On-going collection of data from MOH, facility records, WHO/AFRO.

Discussion: The duration of certain epidemics can be expected to be reduced as surveillance and response improves over time.

C. Process-level Indicators

- **Prompt response to epidemics**

Definition: Proportion of identified epidemics that are reported, investigated, and responded to within 48 hours.

Unit: Percent.

Data Source: MOH, WHO/AFRO.

- **Laboratory capacity**

Definition: Percent of laboratories that pass standardized assessment of basic minimum capacity levels.

Unit: Percent.

Data Source: Laboratory surveys, WHO/AFRO.

Discussion: Standardized protocol to include: building facilities and utility services, equipment, staff, reagents, tests performed, management, and quality control procedures.

- **Percentage of district surveillance reports received per reporting period (week or month)**

Definitions: a) Weekly reports: Number of weekly district reports received in past 3 months, divided by the number of reports expected during that period of time (total number of districts multiplied by 12); or b) Monthly reports: Number of monthly district reports received during the past 3 months, divided by the number of reports expected (number of districts multiplied by 3).

Unit: Percent.

Data Source: Review of MOH surveillance unit records.

Discussion: This is a measure of the completeness of surveillance data collection.

- **Percentage of district surveillance reports received on time per reporting period**

Definitions: a) Weekly reports: Number of weekly district reports received ON TIME in past 3 months, divided by the number of reports expected during that period of time (total number of districts multiplied by 12); or b) Monthly reports: Number of monthly district reports received ON TIME during the past 3 months, divided by the number of reports expected (number of district multiplied by 3).

Unit: Percent.

Data Source: Review of MOH surveillance unit records.

Discussion: This is a measure of the timeliness of surveillance data collection.

- **District health teams in epidemic-prone districts with a copy of the district's epidemic preparedness plan**

Definition: Proportion of district health teams in epidemic-prone districts that can produce a copy of the district's epidemic preparedness plan.

Unit: Percent.

Data Source: Review of health facility training records.

Discussion: This indicator also appears below under malaria indicators.

- **Budget line for surveillance**

Definition: Budget line for surveillance present in the MOH budget.

Unit: Yes/no.

Data Source: MOH Budget.

Discussion: Contributes to objective of improved resource mobilization/sustainability. Once budget line is established, the indicator can change to "Percent of budget allocated to surveillance."

- **Assessment of surveillance system using standard protocols**

Definition: Surveillance system assessed using standard protocols.

Unit: Yes/no.

Data Source: MOH records.

Discussion: Standard protocol refers to the *WHO Assessment Protocol for National Communicable Disease Surveillance Systems and Epidemic Preparedness and Response*, or a similar standardized protocol.

- **National plan of action for strengthening surveillance**

Definition: National plan of action for strengthening surveillance developed.

Unit: Yes/no.

Data Source: MOH records.

Discussion: National plan of action should include: (1) elaboration of the country's priority diseases, (2) action thresholds for priority (epidemic) diseases, (3) standardized case definitions for priority diseases, (4) indicators for progress, (5) links to health system strengthening for response.

- **Central coordinating unit for surveillance at the MOH/Central level**

Definition: Central coordinating office/unit for surveillance established at the MOH/Central level.

Unit: Yes/no.

Data Source: MOH records/organogram.

- **District teams with training in early detection, prevention, and containment of epidemics**

Definition: Proportion of district teams in epidemic-affected districts (localities) that have received training in early detection, prevention, and containment of epidemics.

Unit: Percent.

Data Source: Review of training records.

Discussion: Denominator is the total number of district teams in epidemic-affected districts. An example of this indicator for malaria appears under malaria indicators.

IV. Indicators for Malaria Control Programs

Over the past six years, USAID/AFR/SD facilitated a process of identifying appropriate indicators for monitoring and evaluating malaria control programs in Africa. The following list was selected from a longer list of indicators developed and field tested by WHO's Africa Regional Office (WHO/AFRO) and Division of Control of Tropical Diseases (WHO/CTD/MAL) in collaboration with USAID and the U.S. Centers for Diseases Control and Prevention (CDC). This process includes indicators developed at the WHO inter-country workshop in Bujumbura in 1993 and the series of inter-country workshops on monitoring and evaluation of malaria control programs for managers and health information staff in late 1995. The complete list is available through WHO/AFRO or USAID/AFR/SD.

USAID missions are encouraged to monitor at least one indicator at the impact, outcome and process levels that are congruent with and perhaps already collected by their respective national malaria control programs. Missions beginning new malaria initiatives are also encouraged to collect baseline data (or ensure that such data is collected by the national malaria control program) on at least one appropriate indicator in order to monitor longer-term program impacts. The new DHS Malaria Module may be considered a useful aid in collecting baseline data and monitoring progress. All malaria endemic countries in the region are likely to have a national plan of action for malaria control. Technical assistance is available from AFR/SD to aid Missions in developing monitoring and evaluation plans.

This presentation of malaria indicators is organized as follows:

A. Impact indicators for all malaria programs

B. Outcome indicators grouped according to major categories of malaria interventions:

1. Case management in health facilities
2. Case management in the home and community
3. Prevention of malaria in pregnancy
4. Use of insecticide treated materials (ITM), and
5. Prevention and control of malaria epidemics.

C. Process indicators grouped according to major categories of malaria interventions:

1. Case management in health facilities
2. Case management in the home and community
3. Prevention of malaria in pregnancy
4. Use of insecticide treated materials (ITM), and
5. Prevention and control of malaria epidemics.

For any indicator definition including subsections (a) and (b) such as "case fatality rate for malaria among: (a) children under five or (b) other target groups admitted to hospitals," consider each subsection as an individual indicator. For example, a program should collect data on case fatality rates of children under five years of age separately from case fatality rates for other target groups. Data from the two groups should not be combined. These options allow a program to customize indicators to their own specifications.

A. Impact-level Indicators for all Malaria Interventions

- **Case fatality rate for malaria**

Definition: Case fatality rate for malaria among (a) children under five years of age or (b) other target groups admitted to hospitals and health centers with inpatient facilities.

Unit: Percent.

Data Source: Review of records: inpatient monitor, logbook of admissions and inpatient deaths.

Discussion: Number of deaths attributed to malaria in target group divided by number of patients with malaria in target group admitted to health facility during same time period. Moderately expensive to collect.

- **Case fatality rate for severe malaria**

Definition: Case fatality rate for severe malaria among (a) children under five years of age or (b) other target groups admitted to hospitals and health centers with inpatient facilities.

Unit: Percent.

Data Source: Interviews and follow-up visits with caretakers, examination of vaccination records.

Discussion: Number of deaths attributed to severe malaria in target group divided by number of patients in target group admitted to health facility with severe malaria during the same period. Expensive to collect.

- **Proportionate mortality due to malaria**

Definition: Proportionate mortality attributed to malaria among (a) children under five years of age or (b) other target groups admitted to hospitals and health centers with inpatient facilities.

Unit: Percent.

Data Source: Quarterly review of records, inpatient monitor, logbook of admissions, inpatient deaths.

Discussion: Number of deaths attributed to malaria in target group divided by total number of deaths among all hospital admissions in target group during same time period. Moderately expensive to collect. Proportionate mortality is not a rate but a ratio. It can only indicate trends in major causes of death, but does not provide information on the risk of dying from any particular disease. For example, the number of deaths due to malaria in children under five admitted to hospitals could fall because of better case management in those hospitals. If we only measured the proportionate mortality ratio for malaria, the positive effects of better case management could be counteracted by a major increase in the number of children referred to hospitals for severe febrile illness over the same period of time. In this example, the proportionate mortality ratio could conceivably remain the same or even worsen even though the malaria case fatality rate for children under 5 might be improving (falling). Proportionate mortality ratios are also subject to wide variation in diagnostic and reporting practices and can be heavily skewed by trends beyond the scope of an intervention (e.g., a deadly epidemic of any other disease could serve to lower the proportionate mortality ratio for malaria). It is therefore important to interpret proportionate mortality ratios carefully.

- **Proportionate mortality due to severe anemia**

Definition: Proportionate mortality due to severe anemia (Hemoglobin < 5.0 g/dl) in children under five years of age admitted to hospitals and health centers that have inpatient facilities.

Unit: Percent.

Data Source: Quarterly review of records: inpatient monitor, logbook of admissions and inpatient deaths.

Discussion: Moderately expensive to collect. See note on proportionate mortality ratios under previous indicator.

- **Prevalence of anemia among children under five years of age**

Definition: Proportion of children under five years of age surveyed with moderate to severe anemia.

Unit: Percent.

Data Source: Special surveys, DHS surveys.

Discussion: With the perfection of the hemocue (pin prick for measuring Hemoglobin) it is possible to measure anemia fairly easily. The DHS has included the measurement of anemia in its core survey under its latest contract. In countries implementing IMCI, anemia prevalence may also be determined by reviewing clinic records.

- **All-cause (under-five) mortality rate**

Definition: All-cause mortality rate among children under five years of age living in a given district.

Unit: Deaths per thousand.

Data Source: Quarterly data collection through visits to all households in selected communities to interview caretakers.

Discussion: Most convincing measure of impact since malaria-specific deaths in the community are unlikely to be accurately measured. Very expensive to collect. The all-cause mortality rate for under-fives is the number of deaths of children under five years of age from all causes in one year within a specified geographic area divided by a mid-year estimate of the total number of children under five in the same geographic area, multiplied by 1,000.

- **Epidemic malaria mortality rate**

Definition: Number of malaria deaths during epidemic months in a given district, divided by the total population at risk in the district during epidemic.

Unit: Deaths per X population.

Data Source: Monthly data collection through epidemic investigations, health information/surveillance systems. Usually deaths are recorded in health facilities.

- **Epidemic malaria morbidity rate**

Definition: Number of malaria cases during epidemic months in a given district, divided by the total population at risk in the district during epidemic.

Unit: Cases per X population.

Data Source: Monthly data collection through epidemic investigations, health information/surveillance systems. Means of diagnosing malaria should be specified: i.e. by slide microscopy, clinical diagnosis, or IMCI classification.

B. Outcome Indicators

1. Case Management in Health Facilities

- **Completion of recommended antimalarial treatment among children under five**

Definition: Proportion of caretakers of children under five years of age diagnosed with malaria seen in health facilities in the last two weeks who can provide a convincing history that the child completed the recommended course of antimalarial treatment.

Unit: Percent.

Data Source: Household cluster survey: interviews with mothers/caretakers.

Discussion: Moderate cost. Necessary question(s) can be added to other on-going household surveys.

2. Case Management at Home and Community

- **Prompt treatment of fever (facility-based measure)**

Definition: Proportion of (a) caretakers of children under 5 or (b) other target groups seeking treatment at an outpatient clinic who report that within 48 hours after fever began the patient received the recommended first-line antimalarial drug or was brought to a health facility.

Unit: Percent.

Data Source: Review of supervisory records or facility-based survey.

Discussion: Expensive if not done as part of regular supervisory visits to outpatient clinics.

- **Prompt treatment of fever (population-based measure)**

Definition: Proportion of children under five years of age with fever who are treated at home with an effective antimalarial drug (according to national policy) or who are brought to a health facility within 48 hours after fever began.

Unit: Percent.

Data Source: Household cluster surveys. The new DHS malaria module will collect data on this indicator.

Discussion: It is expensive to collect data for this indicator because it requires a community survey, but it is a good measure of overall improvements in care-seeking behavior. Costs could be lowered by adding to on-going household surveys.

3. Prevention of Malaria in Pregnancy

- **Prevention of malaria among pregnant women**

Definition: Proportion of women in their first or second pregnancies delivering in health facilities who have recorded on their antenatal clinic cards that they have followed the nationally recommended course of prophylaxis/intermittent therapy for prevention of malaria during their pregnancy.

Unit: Percent.

Data Source: Interview with mothers after delivery and review of antenatal clinic records.

Discussion: Clinic records should be reviewed to confirm history. Moderate cost.

4. Insecticide Treated Materials (ITMs)

- **Use of treated bednet**

Definition: Proportion of (a) children under five years of age, (b) pregnant women, or (c) other target group living in a household with treated mosquito net who state that they slept under the net the previous night.

Unit: Percent.

Data Source: Household cluster survey. The new DHS will collect data on this indicator.

Discussion: Cost can be reduced by including this question in a larger household survey. ITM social marketing programs may already collect this data.

- **Households with treated bednet**

Definition: Proportion of households that own at least one treated bednet (or other appropriate ITM).

Unit: Percent.

Data Source: Record review of social marketing project by district; interviews with net sellers or household cluster survey. The new DHS will collect data on this indicator.

Discussion: ITM marketing/distribution programs may already collect this data.

- **Re-treatment of bednet**

Definition: Proportion of families with a bednet who state that they have re-treated it during the last 6 months (or in accordance with national guidelines).

Unit: Percent.

Data Source: Household cluster survey. The new DHS malaria module will collect data on this indicator.

Discussion: Cost can be reduced by including this question in a larger household survey. ITM social marketing programs may already collect this data.

5. Prevention and Containment of Malaria Epidemics

- **Duration of malaria epidemics**

Definition: Duration of malaria epidemics in weeks

Unit: Number of weeks.

Data Source: On-going collection of data from MOH, facility records, WHO/AFRO.

Discussion: The duration of malaria epidemics can be expected to be reduced as surveillance and response improves over time. Epidemics are defined according to locally-defined thresholds.

C. Process-level Indicators

1. Case Management in Health Facilities

- **Prescription of correct antimalarial treatment**

Definition: Proportion of (a) children under five years of age or (b) other target groups with a diagnosis of malaria who are prescribed correct antimalarial treatment according to national guidelines.

Unit: Percent.

Data Source: Observation of health worker/sick child encounters: Monthly data collection through supervisory visits (or review of records of such visits).

Discussion: The total cost of supervision is high but the cost per indicator is considered moderate since several indicators can be measured during each supervisory visit. This process will be facilitated in countries implementing IMCI. Means of diagnosing malaria should be specified: i.e. by slide microscopy, clinical diagnosis, or IMCI classification.

- **Facilities without stockouts of antimalarial drugs**

Definition: Proportion of (a) hospitals or (b) other selected health facilities with no stockouts of nationally recommended first- and second-line antimalarial drugs in the last 3 months.

Unit: Percent.

Data Source: Monthly data collection through review of supervisory records.

Discussion: Data collection requires regular monitoring of stock outs which may be part of quality assurance activities. Low cost.

- **Health workers' knowledge of danger signs of febrile illness**

Definition: Proportion of health workers who can correctly state and describe the danger signs of severe febrile illness.

Unit: Percent.

Data Source: Sample survey: interviews with health care workers.

Discussion: Danger signs include any one of the following: (1) History of convulsions, (2) sleepiness, lethargy or unconsciousness, (3) inability to take medicines by mouth, (4) inability to eat or drink, (5) repeated vomiting, (6) high fever, and (7) failure to respond to antimalarial treatment within two days.

- **National antimalarial treatment guidelines**

Definition: National antimalarial treatment guidelines on case management of uncomplicated and severe malaria exist.

Unit: Yes/no.

Data Source: Review of Ministry of Health policy.

Discussion: Very low cost.

- **Health workers with training in case management of malaria**

Definition: Proportion of health workers involved in patient care who have received training in case management of malaria appropriate to their level of responsibility.

Unit: Percent.

Data Source: Quarterly review of training records.

Discussion: Low cost.

- **Health facilities receiving supervisory visits every quarter**

Definition: Proportion of health facilities receiving at least one supervisory visit every quarter during the last 12 months that involves observation of health care worker-patient interaction and re-examination of patient to ensure that case management is in line with national policy/treatment guidelines.

Unit: Percent.

Data Source: Review of supervisory records (every 6 months).

Discussion: Low cost.

2. Case Management at Home and Community

- **Caretakers' knowledge of danger signs for severe febrile disease**

Definition: Proportion of mother/caretakers of children under five years of age who know the danger signs for severe febrile disease in a child under five.

Unit: Percent.

Data Source: Household cluster surveys.

Discussion: Expensive because it will require a community survey. Costs could be lowered by adding to on-going household surveys. Danger signs include any one of the following: (1) History of convulsions, (2) sleepiness, lethargy or unconsciousness, (3) inability to take medicines by mouth, (4) inability to eat or drink, (5) repeated vomiting, (6) high fever, and (7) failure to respond to antimalarial treatment within two days.

- **Community health workers' knowledge of correct drug and dosage for treatment of malaria**

Definition: Proportion of community health workers (CHWs) who know the correct drug and dosage according to national policy for the treatment of uncomplicated malaria in (a) children under five years of age or (b) other target groups.

Unit: Percent.

Data Source: Survey of CHWs.

Discussion: Moderate cost.

- **Community health workers with national malaria treatment guidelines**

Definition: Proportion of CHWs with a copy of the national malaria treatment guidelines.

Unit: Percent.

Data Source: Quarterly review of health facility training records.

Discussion: Low cost.

- **Correct counseling on case management of febrile illness at home**

Definition: Proportion of mothers/caretakers bringing children under five years of age to health facilities for treatment of febrile illnesses who receive instruction according to national guidelines on case management of febrile illness at home.

Unit: Percent.

Data Source: Review of supervisory records or exit interviews.

Discussion: Moderate cost.

3. Prevention of Malaria in Pregnancy

- **Health workers' knowledge of malaria prevention during pregnancy**

Definition: Proportion of health workers involved in antenatal care who can correctly describe 1) the nationally recommended drug and dosage for chemoprophylaxis/intermittent treatment of malaria during pregnancy and 2) the benefits of malaria prevention during pregnancy.

Unit: Percent.

Data Source: ANC survey: interviews with health workers in ANCs; could be done as part of routine supervisory visits.

Discussion: Moderate cost.

- **National policy for prevention of malaria during pregnancy**

Definition: National policy on chemoprophylaxis /intermittent treatment for prevention of malaria during pregnancy exists in country.

Unit: Yes/no.

Data Source: Review of MOH policies

Discussion: Very low cost.

- **Facilities with staff trained in prevention of malaria during pregnancy**

Definition: Proportion of facilities with at least one health worker involved in antenatal care who has been trained in the use of chemoprophylaxis/intermittent treatment for prevention of malaria during pregnancy.

Unit: Percent.

Data Source: Quarterly review of training records or health facility surveys.

Discussion: Review of training records – low cost. Health facility survey - moderate cost, but could be combined with other health facility surveys.

4. Insecticide Treated Materials (ITMs)

- **Access to ITM services**

Definition: Proportion of households that have access to ITM services.

Unit: Percent.

Data Source: Review of maps of districts noting distribution sites.

Discussion: Access is defined here as a bednet distribution program/vendor and an insecticide re-

impregnation site within 10 km. of their home; definition of access may have to be adapted to local conditions.

- **National policy of tax exemption for ITMs**

Definition: Existence of a national policy which incorporates a tax exemption for 1) ITMs and 2) insecticide supportive of ITMs.

Unit: Yes/no.

Data Source: Review MOH, Ministry of Trade/Commerce trade policies.

Discussion: Very low cost.

- **Monitoring of vector resistance to insecticides**

Definition: Level of resistance of mosquito vector to synthetic pyrethroid insecticides used to impregnate nets is regularly monitored (according to national guidelines).

Unit: Yes/no.

Data Source: National malaria control unit.

Discussion: Implementation of entomological surveys will require a specially-trained entomology unit within the national malaria control program.

5. Prevention and Containment of Malaria Epidemics

- **Districts with adequate stocks of antimalarial drugs and other supplies**

Definition: Proportion of epidemic-prone districts (localities) that have 1) adequate stocks of antimalarial drugs for epidemics and 2) other supplies, including insecticides and spraying equipment in place and accessible.

Unit: Percent.

Data Source: Data collected quarterly through surveys and/or record review.

- **District health teams with district epidemic preparedness plan**

Definition: Proportion of district health teams in epidemic-prone districts that can produce a copy of the district's epidemic preparedness plan.
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Unit: Percent.

Data Source: Quarterly review of health facility training records.

Discussion: Low cost.

- **National plan for malaria epidemic preparedness and containment including district plans**

Definition: National plan for malaria epidemic preparedness and containment exists that includes district-level plans of action.

Unit: Percent.

Data Source: Review of national epidemic control plans.

Discussion: Very low cost.

- **District teams with training in early detection, prevention, and containment of malaria epidemics**

Definition: Proportion of district teams in epidemic-prone districts (localities) that have received training in early detection, prevention, and containment of malaria epidemics.

Unit: Percent.

Data Source: Quarterly review of training records.

Discussion: Denominator = total number of district teams in epidemic-prone districts.

- **Early warning system for detecting potential malaria epidemics**

Definition: Early warning system for detecting potential malaria epidemics exists in all epidemic-prone areas of the country.

Unit: Yes/no.

Data Source: Review of national epidemic control plans.

Discussion: Low cost.