INDICATORS FOR REPRODUCTIVE HEALTH PROGRAM EVALUATION

NUTRITION • SAFE PREGNANCY • BREASTFEEDING• ADOLESCENT HEALTH • STD/HIV INFECTION

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The EVALUATION Project

Introduction

Indicators for Reproductive Health Program Evaluation

by

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The text of the reports was prepared almost entirely by members of the different subcommittees, without whose expertise and help this document would not exist. The members of the subcommittees are listed in Appendix D; their institutional affiliation is listed at the back of the relevant section; and the authors of each indicator are duly noted at the bottom of the indicator descriptions.

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Chapter I

Rationale for the Reproductive Health Indicators Working Group

- USAID Center for Population, Health and Nutrition's Strategic Plan
- Objectives of the RHIWG
- Subcommittee Process

Chapter I

RATIONALE FOR THE REPRODUCTIVE HEALTH INDICATORS WORKING GROUP

Over the past half century a number of shifts have occurred in global paradigms for organizing and justifying resource allocations to health-related interventions. These interventions have been aimed at improving the health of women, men and children in the developing world. From efforts aimed at the eradication of communicable and infectious diseases, to population growth stabilization, to food and malnutrition crises, to family planning, to child survival, and to toxic waste disposal, the international community has confronted and quickly responded to an expanding list of health needs that over time has led to remarkable reductions in worldwide levels of morbidity and mortality.

With the 1994 International Conference on Population and Development, occurring "at a defining moment in the history of International cooperation" (ICPD, 1994: Preamble), a new paradigm and challenge have been set before governments, nongovernmental organizations, and civic groups to address needs in reproductive health. The oft-quoted paragraph of the ICPD Programme of Action defines a new area for social investment:

> "Reproductive health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes." (ICPD, 1994: Chapter 7)

The challenge to the international community lies less in the acceptance of the human rights philosophy embedded in this definition than in the operationalization of the reproductive health concept through existing and new health and social programs.

USAID Center for Population, Health and Nutrition's Strategic Plan

The U.S. Agency for International Development's (USAID) strategy for sustainable development states that,

> "Certain factors play a critical role in keeping nations poor: a lack of resources; limited educational opportunities; a dearth of skills; and economic, social and political systems that impede broad-based growth. Rapid population growth and poor health and nutrition are inextricably linked, and they make every one of these conditions worse." (USAID, 1994: 23)

The Agency has long been a leader in establishing means and standards for evaluating the impact of its foreign assistance efforts in the area of population, health and nutrition. In its recently prepared Strategic Plan[1] the Agency identifies four sub-goals designed to contribute directly to the sector goal of stabilizing world population and protecting human health.

- Reduce unintended pregnancies
- Reduce maternal mortality
- Reduce infant and child mortality
- Reduce sexually-transmitted disease (STD) transmission with a focus on human immunodeficiency virus (HIV)

[1] This Plan was not finalized before the Reproductive Health Indicators Working Group completed its work. Hence the Working Group does not speak directly to the indicators needed to monitor the Plan.

Each sub-goal is supported by one strategic objective:

- Increased use of voluntary practices by women and men that contribute to reduced fertility;
- Increased use of reproductive health interventions with a focus on safe pregnancy and nutrition;
- Increased use of key child health interventions; and
- Increased use of technically sound interventions to reduce HIV/STD transmission and to mitigate the epidemic's impact.

The sub-goals and their corresponding strategic objectives are "directly concerned with the reproductive health of women, while also encompassing the roles and responsibilities of men." In the logical hierarchy that connects the Agency's sector goal and the PHN Center's subgoals and strategic objectives are also a number of program outcomes representing intermediate-level results to guide programs and activities and allow the Center to monitor its progress. For example, one program outcome in support of the first strategic objective is "new and improved contraceptive methods and delivery systems developed, tested and disseminated."

Progress along each of these levels of results, from goal to program outcome, is monitored by one or more indicators. The system of indicators, and the requisite assembly of data and measurement techniques that lie behind it, represent the evaluation challenge in population, health and nutrition for the next decade. As the design, development and implementation of reproductive health programs and intervention packages are launched over the next three to five years and expanded over the following five to ten years, the question that must be faced and answered now is "How will it be known that reproductive health has been improved and that programs and the invested resources have had the intended role in that achievement?"

Objectives of the Reproductive Health Indicators Working Group

The primary purpose of the Reproductive Health Indicators Working Group (RHIWG) was to assist USAID and the field of population, health and nutrition programs develop indicators for monitoring and evaluating reproductive health. Because indicators for a number of constituent areas of reproductive health existed (e.g., safe motherhood, infant mortality), the RHIWG's work was not to be redundant but supplemental to the work already underway or completed at other international agencies, such as the World Health Organization and the World Bank. The thematic organization of the RHIWG was to reflect USAID's specific areas of interest, and to focus on particular health intervention packages--family planning, safe pregnancy and safe motherhood, breastfeeding, maternal nutrition, and STD/AIDS -- likely to be implemented under the PHN Center's strategy. However the RHIWG was also directed to think broadly about indicators for the reproductive health areas and not focus on any one agency's strategy. Sensitivity was also encouraged in indicator development to cross-cutting issues in reproductive health, including gender equity, quality of services and care, and cultural practices with harmful health effects.

In terms of an RHIWG "product," USAID requested a report of indicators that defined and detailed each relevant indicator, organized by reproductive health topic. This report is the product of the RHIWG and represents a unique, collaborative effort.

Subcommittee Process

In early 1994 the USAID Office of Population and Office of Health and Nutrition requested The EVALUATION Project organize the Reproductive Health Indicators Working Group (RHIWG) according to the model of working groups used in the previous two years to develop the *Handbook of Indicators for Family Planning Program Evaluation*. In May of 1994, a steering committee met to define the objectives of this exercise, finalize the areas of reproductive health to be covered, suggest

participants for specific groups, identify cross-cutting issues to be addressed, and develop a timetable to complete this activity. The first meeting of the RHIWG was announced for June 1994, and invitations were sent to members of the international population and health communities (especially those in U.S.-based cooperating agencies) who might have interest in this activity. The invitations stipulated that participants would be expected to contribute to the activity by drafting 2-3 indicators (which in retrospect was a gross underestimation in most cases). This initial round of invitations obtained a positive response from over 100 individuals to be participants in the RHIWG.

The first meeting of the RHIWG was held on June 7, 1994, in Rosslyn, Virginia, and attended by some 90 individuals from USAID, its cooperating agencies, other donor agencies, private foundations, and other interested parties. After initial presentations by Drs. Duff Gillespie and Nils Daulaire regarding USAID policy on reproductive health interventions, the moderators explained how the RHIWG was to work. Participants were invited to join a specific subcommittee that would treat one of the RH topics. Originally there were six subcommittees, but two subcommittees were later merged.

- Safe pregnancy (including the treatment and prevention of unsafe abortion)
- STD/HIV
- Women's nutrition
- Breastfeeding
- Adolescent reproductive health services

Each subcommittee was to have two to three meetings between June and December 1994. The purpose of the meetings was to establish a conceptual framework for the RH topic, review existing indicators from work done by other groups (with the idea of retaining those relevant to the current task), identify new indicators, assign members of the group to draft descriptions of the indicators using a pre-established format, and eventually review the drafts of fellow subcommittee members. The work completed by mid-January 1995 was compiled into a series of draft reports that was circulated to relevant RHIWG subcommittee members prior to the second meeting of the full RHIWG, held on February 7, 1995, again in Rosslyn, Virginia.

The February meeting was attended by 80-some professionals from the reproductive health community, including some who had not participated in the individual subcommittee meetings. Elizabeth Maguire, Director of USAID's Office of Population, provided an update on reproductive health policy within the Agency and outlined future program directions in this area. This meeting provided the opportunity for RHIWG members to review the work of each subcommittee in summary form. In addition, each subcommittee met to draw up a list of "ten key indicators" for their topic area. The February meeting reflected an enormous amount of prior work that had gone into the development of indicators to that time. At the same time almost all groups felt compelled to make further changes in their draft report and/or list of short indicators. Three of the groups held at least one final subcommittee meeting between March and April 1995.

The second draft of each report was finalized between April-June 1995. Each subcommittee identified one key external reviewer for the report, as well as a list of other professionals in the area whose feedback would also be highly valuable. These drafts were sent out for review in May-June, and comments continued to flow into The EVALUATION Project through August. At that time, the drafts were revised for a final time to reflect the comments of reviewers (as deemed appropriate). This draft was then reviewed by USAID before publication.

Chapter II

Framework for Indicator Development

- Intended Audience and Use
- Conceptual Framework
- Intervention Scale
- Terminology

Chapter II

FRAMEWORK FOR INDICATOR DEVELOPMENT

The development of indicators for reproductive health program evaluation has been (a) informed by a conceptual framework, (b) targeted at nationally-scaled interventions, and (c) adapted to standard evaluation terminolo- gy. First a note is offered regarding the intended audience and use of the working group's indicator report.

Intended Audience and Use

Professionals working with international and national health and social development organizations may find these reproductive health indicators useful in executing their monitoring and evaluation responsibilities. Researchers of reproductive health intervention effects may also find some of the discussion of inherent technical issues associated with several indicators informative for their analytic tasks. Because these indicators build upon a base of existing indicators and represent the professional insights of a number of experts on selected reproductive health problems, they are also likely to be at the cutting edge.

Viewed as a whole, the prospects of applying these indicators will seem daunting to any health or development professional. This report is not intended to be a manual for implementing the indicators. Instead the indicators are described and offered more as a reference resource, to enable the individual user to select and adapt those applicable to the objectives of the project or program to be monitored and evaluated. Chapter IV provides additional guidance on the selection and prioritization of indicators.

Conceptual Framework

A conceptual framework can be thought of as a "theoretical" map that assists a user to find his or her way from one point in the geography of influences to another. Just as a map lays out roadways between cities and towns and guides the traveler to his or her destination, a conceptual framework links causal paths between key components and helps the user explain the occurrence of an outcome of interest.

The dynamics of reproductive health behaviors and the multiplicity of relevant interventions make it difficult to capture all the influential components in one framework. Perspectives will vary on which components to emphasize. Different aspects of reproductive health and its milieu of influences will be emphasized depending on the programmatic or analytic purpose of the framework. Often these perspectives are informed by the philosophy, professional training, and international experiences of the framework's developer(s).

An important objective of a conceptual framework for program evaluation is to depict clearly the desired program and population outcomes targeted by interventions and the main paths of influence that connect the pertinent actions of donors, programs, clients and populations to the achievement of those outcomes.

A conceptual framework for reproductive health is necessary to help those involved in program design, management, implementation and evaluation to understand how their package of interventions can reduce the incidence of sexually transmitted diseases (STDs), unwanted pregnancy, unsafe abortion, pregnancy-related nutritional deficiencies, gynecologic and obstetric morbidities, and maternal and perinatal mortality.

Although conceptual frameworks can be very elaborate and dense with hypothesized components, they can also be very simple, tying together only the broadest of concepts. Figure 1 illustrates two examples. Panel (a) captures the ecology of influences on reproductive health: socioeconomic welfare, violence prevention, women's empowerment, individual health, and human rights. Panel (b) offers a "supply-demand" perspective. The supply of health services and the demand for health care are seen to affect the use of those services jointly and in turn produce the desired improvements in health status. A conceptual framework that captures the causal process properly will link the **supply** of reproductive health services, the **demand** for reproductive health care, and the morbidity and mortality **outcomes**. These linkages allow one to suppose that increasing the availability, quality and acceptability of reproductive health services, in a context of popular and political support and demand for them, will lead to improvements in reproductive health status.

Figure 2 elaborates the supply-side of program effort by identifying the various stages of program implementation and has been used for locating indicators of program **inputs**, **process**, **outputs**, and **outcomes**. Indicators relating to national policy, resource allocations, and government commitment to reproductive health might be developed for the first input component. Other indicators relating to implementation might be developed to gauge program capacity for strategic planning, diverse service delivery channels, and well-functioning operating systems.

Not shown in Figure 2 is the significant role played by contextual factors of a biological, social, cultural, or political nature. Because these are not directly or usually manipulable by health programs, they have not been explicitly included in this evaluation framework.

Ultimately the value of a conceptual framework depends on how well it (a) captures causal processes at the level of the program, population or a combination of both and (b) serves its program planning or analytic purpose. "Any good system of indicators rests on some understanding of underlying dynamics. The better this understanding, the more focused and economical the indicator set can be, and the easier it is to interpret the indicators" (Bulatao, 1995). Figure 3 of the USAID Center for Population, Health and Nutrition's strategic plan is an example of a conceptual framework with a programmatic purpose (specifically a planning one).

Conceptual frameworks are then successful organizing tools when:

- their ultimate purpose is known and clear;
- they identify the levels of influences (program, population or both) consistent with the framework's purpose and underlying causal dynamics;
- they identify components that can be operationally defined and measured through indicators; and
- they represent a shared perspective among stakeholders.

Intervention Scale

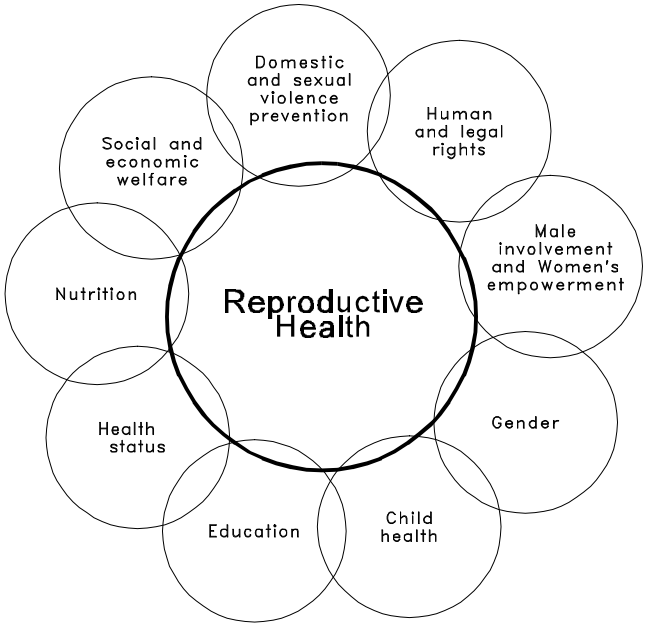
Figure 2 is the conceptual framework that has been used in this report to organize the development of reproductive health indicators for program evaluation. Several points of explanation should be made regarding the level of program activity that this framework addresses.

- The framework has been developed with a nationally-scaled program in mind.
- The framework can be applied at a lower scale, such as projects operating in local areas, but the scale of expected impacts (and indicator measurement effort) should be adjusted accordingly.

Figure 1

Panel (a)

Ecology of Influences on Reproductive Health



Panel (b)

A Simplified Framework for Reproductive Health

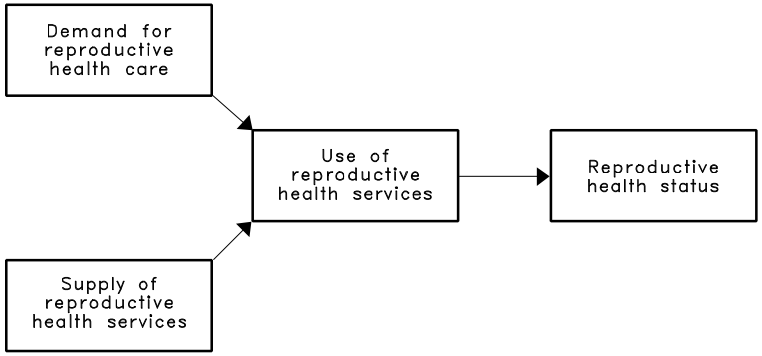


Figure 2.
A Conceptual Model for Evaluating Reproductive Health Program Components

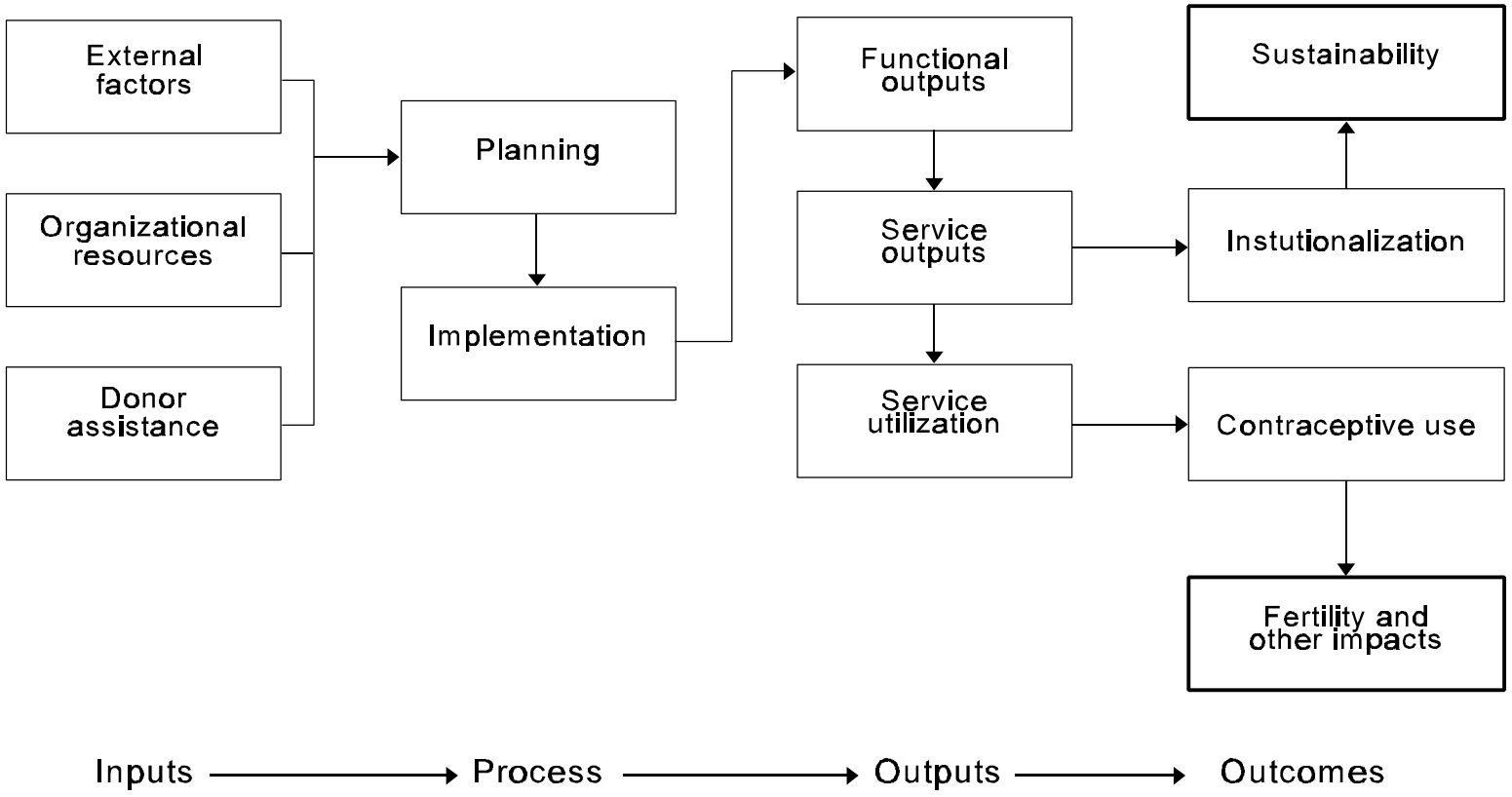
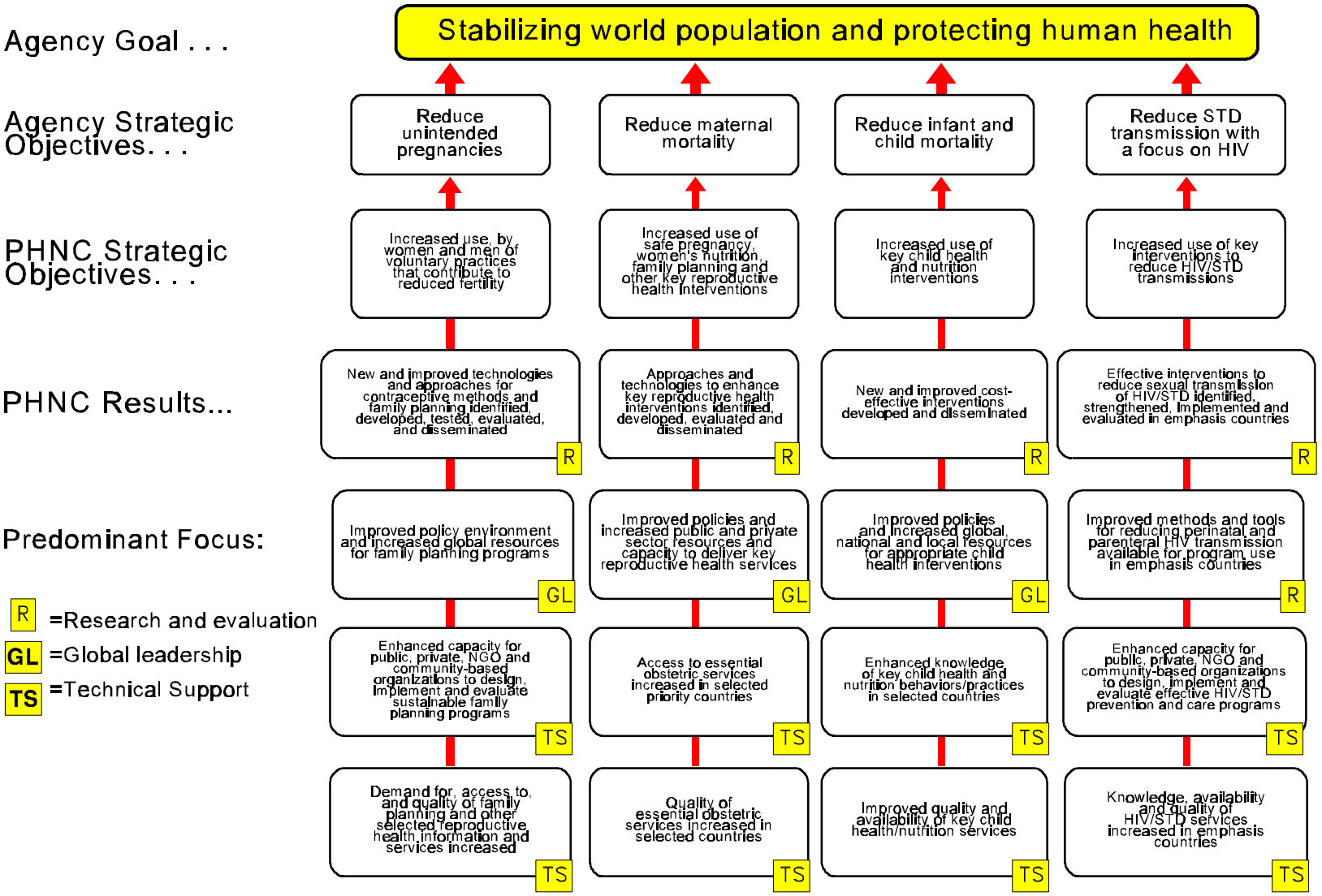


Figure 3.
Results Framework: PHN Center



- The program components are seen to comprise a range of diverse and multiple health interventions that can be clinical or non-clinical in nature. They may be "packaged" or "bundled," as is likely to be necessary for a broad area such as reproductive health. The WHO "Mother-Baby" Package is one example of a bundled set of interventions to address needs in the sub-area of safe pregnancy.

There are no "feedback loops" shown in the model, because it depicts the causal process in a "freeze frame," that is, at one point in time. However, social engineering is by definition a dynamic strategy, and health is an evolving and changing state for individuals and societies. Hence, there is every expectation that certain intermediate-outcome indicators, such as "contraceptive use" or "immunization rates," would influence subsequent program planning and resource allocations.

Terminology

Throughout the RHIWG report, a generic evaluation terminology has been used to organize and develop the indicators. Figure 2 also diagrams the stream of action among the program components of inputs, processes, outputs and outcomes, which are defined as follows:

- **Input** refers to the resources invested in a program and include financial, technological, and human manpower.

- **Process** refers to activities carried out to achieve the program's objectives; they show what is done and how well it is done.

- **Output** refers to the results achieved at the **program level.** There are three types of output:

  - *Functional output*: which measures the number of activities conducted in each functional area such as training or IEC;

  - *Service output*: which measures the adequacy of the service delivery system in terms of access, quality of care, and program image; and

  - *Service utilization*: which measures the extent to which the services are used.

- **Outcome** refers to changes observed at the **population level** among members of the target population as a result of a given program or intervention. There are two types of outcome:

  - *Effects*: changes in the short- to medium-range (e.g., 2-5 years) in a behavior promoted by the program (e.g., use of condoms, birth delivery in a supervised setting).

  - *Impact*: changes that occur over the long-term in fertility, morbidity, or mortality rates (e.g., age-specific fertility rates for young adults, prevalence of STDs, maternal mortality rate).

Throughout the different chapters of this document, the term "service delivery point" (SDP) is used to refer to any location where program services are provided. The type of locations will differ by type of reproductive health service, but may include clinics, health posts, community centers, kiosks, community-based distribution points, youth clubs, and home-visiting service providers. It should not be interpreted as limited to a clinical setting.

USAID evaluation terminology. The Agency has begun recently to use a terminology that, while not identical to the one adopted for this Report, is technically related. Most simply rendered, the correspondence is as follows:[2]

[2]For a more detailed discussion of parallels between these two lexicons, see Tsui and Gorbach (forthcoming).

USAID		EVALUATION
Goal	=	Outcome (long-term)
Sub-goals	=	Outcome (short-term)
Strategic objectives	=	Effects
Results (Program outcome)	=	Outputs

The lexicon of input/process/output/outcome terms used in this report originates with the broader field of program evaluation (see Rossi and Freeman, 1993; Reynolds, 1990) and was retained.

WAITING FOR IMPACT

Mature programs with far-reaching coverage (e.g., family planning in many countries) are expected to have an impact at the population level (e.g., on fertility rates). By contrast, programs or projects that are just beginning and/or target a relatively small segment of the population would not be expected to have a population-level impact, at least in their launch phase. This distinction is important, since it may do a disservice to programs with limited reach to evaluate them at the population level too soon, when there is likely to be little or no evidence of broad-based impact.

For example, the long-term objectives of many adolescent reproductive health programs include lowering unwanted fertility rates and STD rates among young adults. However, if one were to evaluate a program that reaches only a fraction of in-school youth (who in turn represent only a fraction of that age group) based on all young people in the age group in the catchment population (e.g., "at the population level"), it is unlikely that one would detect changes attributable to the program. Those without a technical understanding of the intervention scale and lagged impact issues could easily conclude from the findings that adolescent programs "don't produce results."

In the case of this type of intervention targeted to a limited segment of the population, it is more productive to evaluate (a) whether the intervention was carried out according to plan and how well it was carried out, and/or (b) whether it resulted in changes in knowledge, skills, and behaviors among the clients or participants in these programs. Such measures constitute indicators of output, because they focus on the program or project's productivity, rather than population-wide results. While evaluations of progress toward achieving desired outcomes are appropriate at most times, interpretations of non-achievement should be made judiciously. Assuming a program has been implemented according to plan, sufficient lag time should be allowed and adequate population exposure to the program's "treatments" must be established to detect population-wide impact.

Chapter III

Issues of Measurement and Data Sources

- Types of Data Sources
- Levels of Measurement and Sample Size Considerations
- Validity and Reliability
- Experimental Versus Tested Indicators

Chapter III

ISSUES OF MEASUREMENT AND DATA SOURCES

Measuring progress in reproductive health constitutes a major challenge, not just because the area broadly encompasses so many health needs and behaviors but also because it requires significant clinical resources and technical skills to obtain accurate values for indicators that are biomarkers. While the fieldwork logistics for various physical measurements for women and children (e.g., height, weight, head and arm circumference) have been gradually integrated into national population-based surveys, it is not yet clear how easily STD diagnostic tests or physical examinations can be. Moreover, the costs of these field efforts are likely to be prohibitive, at least at first. In some cases, STD diagnostics may require laboratory-testing facilities that do not exist in developing countries.

Nonetheless, data from such tests and from physical examinations may be necessary to obtain valid measures of the prevalence and incidence of gynecologic and obstetric morbidities, many of which have been suggested to serve as indicators.

Without clinically valid measures for outcome indicators, it is questionable how well the achievement of reproductive health improvements can be known. For example, what is the present prevalence of severe obstetric complications among births? If the recognition and reporting of symptoms of obstetric complications rise with increasing awareness among women, there will appear to be an increase in obstetric morbidity. Valid measures of major reproductive health problems with a physiologic basis are then likely to be needed.

Given the long history of effort in the field of social and health development programs, conventional wisdom suggests that a baseline on the primary indicators should be established now in order for follow-up measures to reveal how much change has taken place. Evaluation of the impact of reproductive health programs requires nothing less.

Types of Data Sources

Indicators relevant to reproductive health, whether drawn from the set in these reports or those of other agencies, require data from a wide variety of sources. At least seven types of data sources should be considered.

(1) Population surveys

These are primarily surveys using a probability sample of households wherein individuals meeting certain eligibility criteria are selected for interviewing, such as in the Demographic and Health Surveys (DHS).

(2) Population censuses and vital registration systems

Data from decennial censuses and vital registration systems can provide values for most demographic rates, such as fertility and mortality. However, their drawbacks are, in the case of census data, infrequency and, in the case of vital registration, usually a high level of incomplete coverage. In some countries, sample registration systems have overcome some of the coverage problems.

(3) Facility surveys

These are surveys of health facilities, which should be drawn using probability sampling procedures. Facilities are usually

visited to assess the actual provision of different health services, staffing, and the on-site availability of necessary drugs, medical equipment, supplies, and the like. Well-known efforts of this type are the Situation Analysis of the Population Council and the Service Availability Module of the DHS.

(4) Surveys of program clients and providers

Program beneficiaries (clients) can be interviewed in follow-up surveys to provide information on indicators related to quality of care, such as client satisfaction, outreach and counseling experiences. Staff providers and managers are another program subpopulation that can be surveyed to provide data relevant to a number of indicators in this report.

(5) Program service statistics

These client record and reporting procedures are generally maintained (at the field to the central levels) by programs offering services. Where these records are kept at SDPs, they can be examined on a full or sample basis. For example, delivery room records, operating theater records or hospital maternity registers can be examined to calculate indicators based on caseload statistics.

Records of services are sometimes kept on cards held by clients (e.g., antenatal cards or child health/immunization cards) and can be examined during a survey interview. Those belong to or for those clients returning for services during a specified period of time can also be examined.

(6) Administrative records

This source of data can be of a financial, material or human resource (personnel) nature and is usually maintained manually or electronically in a management information system (MIS). Financial data, when well maintained and detailed, are essential for tracking costs and expenditures for key reproductive health interventions to improve cost-efficiency and cost-effectiveness. Data from commodity inventories and logistics records are often helpful for indicators relating to supply availability at SDPs. Also, personnel data can provide information for indicators on staff training (human resource development) and deployment.

(7) Record keeping by special programs

Several large programs, such as the expanded immunization program (EPI) or the malaria prophylaxis program, routinely keep their own records of service activity. These are potential sources of data for certain types of indicators.

Because several types of data sources are likely to be involved in any set of indicators chosen to monitor and evaluate program progress, it is necessary to consider their compilation and linkages early in a project evaluation design. One obvious linkage is that between facility, staff, client and household surveys using an area probability sample. This has occurred in Peru with the fieldwork "marriage" of the Situation Analysis and the DHS.

Levels of Measurement and Sample Size Considerations

Two levels of measurement are distinguished in the indicators for this report:

Program-based - refers to information obtained from program sources (client records, service statistics, administrative records) and from interviews with clients or other program participants (the rationale being that the program data "define the sample" respondents are not necessarily representative of the larger target population but rather are "self-selected" by their participation in the program).

Population-based - refers to information obtained from a probability sample of the target population in the catchment area for the program (e.g., the country, region, city, neighborhood). The data are generally collected from surveys, such as the DHS or the Young Adult Reproductive Health Surveys

(YARHS).

Sample size requirements for indicator values will vary considerably depending on a number of factors. It is advisable to consult a sampling statistician before attempting to collect data to measure an indicator because the design of the sample, desired level of precision and confidence, quality of fieldwork, and cost will affect the size of the sample needed to estimate the indicator's value. Indicators for which precise estimates (smaller error) are needed will require larger sample sizes and hence can be more costly.

The accompanying table (taken from Aday, 1991) illustrates the eleven steps to estimating sample size. The example used is for the maternal mortality *rate*. Because its incidence is small (0.001 or 100 deaths per 100,000) relative to other rates, such as fertility or infant mortality, the maternal mortality rate requires a large sample size of nearly 616,000 cases. DHS surveys average 8,000-10,000 sample size at present. Note that if the maternal mortality *ratio* was used, where the denominator is live births, then a smaller sample of women could be required to obtain a sufficient number of annual births in the denominator to estimate the maternal mortality ratio.

Criteria for Estimating the Sample Size (n)

Criteria	Example
1. Select the indicator	Maternal mortality rate
2. Determine its metric	Maternal deaths in a given period per 100,000 women aged 15 to 49 years
3. Determine the population of interest	Women aged 15 to 49 years
4. Identify the relevant standard error formula	Standard error of percentage: SQRT[p x (1.00-p)/n]
5. Estimate the indicator's value	100 deaths per 100,000 women 15 to 49 years or p=.001
6. Decide on a tolerable range to error in the estimate	Tolerable range = +/- .0001 (+/- 10 deaths per 100,000)
7. Decide on a desired level of confidence in the estimate	95% level of confidence 1.96 x standard error where, therefore $n = 1.96^2[p \times (1.00-p) / .0001^2$ $= 3.841[.002 \times .998]/ 1.0 \times 10^{-8}$ = 383,716
8. Adjust for the estimated sample design effect (DEFF)	DEFF=1.3 (assuming a cluster sample) therefore n = 383,716 x 1.3 = 498,831
9. Adjust for the expected response rate	Response rate = 90% therefore n = 498,831 / .90 = 554,256
10. Adjust for expected proportion of eligibles	% eligible = .90 therefore n = 554,256 / .90 = 615,840
11. Compute survey costs	Cost/case = $5 therefore total cost = 615,840 x $5 = $3,079,203

Source: Adapted from Aday (1991), Table 10.

Validity and Reliability

The validity of an indicator depends on whether it measures what it is supposed to. Obstetric complications indicators are intended to measure the prevalence of such conditions. If self-reported data are used, the validity of the indicators based on reported complications may be in doubt since experience with and recall of severe symptoms can be fairly subjective. There are three types of validity issues of concern for indicators: content validity, criterion validity, and construct validity. According to Aday (1991), these are defined as follows and illustrated with reproductive health measures:

Type of validity	Definition	Example
Content validity	Extent to which indicator adequately represents the concept	Algorithms that adequately capture symptoms of a particular sexually transmitted disease
Criterion validity	Extent to which indicator predicts or agrees with criterion indicator of concept; criterion validity usually involves comparison against a "gold standard".	STD prevalence measured using individually reported symptoms compare well with clinically diagnosed infection levels.
Construct validity	Extent to which relationships between indicators agree with relationships predicted by theories or hypotheses	Pregnancy complications predict perinatal loss. If indicators of complications are strongly correlated with perinatal mortality rates, then both have construct validity.

Adapted from Aday (1991)

Sensitivity and specificity analyses are used to establish the criterion validity of indicators. For example, indication of the prevalence of a particular sexually transmitted infection might be based on respondent reports of having the set of symptoms. If compared against clinical diagnoses, the indicator will have high sensitivity if few false negatives occur, that is, few respondents report a condition clinically known not to exist. The same comparison will establish the specificity of the report-based indicator if few false positives occur. That is, the indicator will be highly specific if few respondents report a condition not detected clinically.

It is important for evaluators to have a good understanding of the validity of the indicators they select to monitor reproductive health programs. It is equally important that they use reliable indicators, that is, those that give consistent measurements over time with the same instruments or with different instruments applied at the same point in time. Again there are three types of reliability: test-retest reliability, inter-rater reliability, and internal consistency reliability.

Type of reliability	Definition	Example
Test-retest reliability	Correlation between answers to same questions at different points in time	Questions about pregnancy complications asked of the same respondents a month later yield the same measured levels.
Inter-rater reliability	Correlation between answers to the same questions obtained by different data gatherers	A team of physicians examining adults detect and diagnose an STD identically.
Internal consistency reliability	Correlation between answers to different questions about same concept	Items measuring a woman's locus of control may be highly correlated to suggest high internal consistency between the items and locus of control.

Adapted from Aday (1991)

Although an indicator with low reliability will also have low validity, the reverse is not always the case. An indicator with high reliability may have low validity by having a

consistency bias built into its measurement.

Experimental Versus Tested Indicators

It is helpful to review measurement issues related to reliability and validity of indicators. A number of indicators in this report are of unknown validity and reliability because their construction is coincident with the rising interest in reproductive health programming and its evaluation. The indicators are, however, often drawn from those used in related fields, in particular, family planning.

Caution is therefore suggested in adapting or applying some of the indicators. In many cases the indicator author(s) have noted when the measure is experimental. Other indicators, such as the maternal or perinatal mortality rate, have been tested and repeatedly used.

Chapter IV

Prioritizing and Selecting Indicators

- Defining “Good” Indicators
- Prioritizing Indicators
- Guide to Using Indicators
- Monitoring with Indicators

Chapter IV

PRIORITIZING AND SELECTING INDICATORS

Perhaps above all, one should be clear on what purpose a given indicator is to serve. Once this is established, effort should be made to ensure the indicator is well defined, measurable, responsive to intervention inputs, and estimated at regular intervals.

Defining "Good" Indicators

Indicators are operational measures of the components in a conceptual framework. For example, in Figure 2 the service utilization component for safe pregnancy might be monitored through an indicator such as "average annual caseload for emergency obstetric patients in facility type x." Once a baseline value has been fixed for the indicator, it can be monitored over time to see how well program services are being supplied and used and whether the targeted change in pregnancy morbidity levels is being achieved.

There are a number of desirable features of a good indicator (WHO, 1994); specifically it should:

- actually measure the phenomenon it is intended to measure (valid);
- produce the same results when used more than once to measure precisely the same phenomenon (reliable);
- measure only the phenomenon it is intended to measure (specific);
- reflect changes in the state of the phenomenon under study (sensitive); and
- be measurable or quantifiable with developed and tested definitions and reference standards (operational).

It is important to keep the above criteria in mind when constructing or selecting indicators for different aspects of reproductive health services or outcomes. Otherwise, there is a risk of identifying an inappropriate set of indicators. Also, indicators should be readily available from existing data sources or obtained on a regular basis at low cost. Indicators become problematic when they are unreasonably difficult to measure, unmanageable to compile, irrelevant to the main health issues at hand, or measured too infrequently to be helpful.

Prioritizing Indicators

USAID's Center for Development Information and Evaluation (CDIE) and others have suggested several criteria to consider in choosing among performance indicators at the program level:

- Is the indicator oriented toward the targeted results (objective) and is it at the right level?

  It is important to include at least one indicator relating to the desired results, appropriate to the scale of the intervention. That is, if a desired outcome is to lower STD infection rates in a program that provides care to clients engaging in risky sex behaviors, an indicator of the STD prevalence rate should be selected and a value obtained for the catchment population if this is not too costly. If the program is largely confined to achieving results among clients of a specific facility (e.g., a STD clinic), then an area-based rate for STD prevalence is not an appropriate result indicator.

- How available is the information, at what frequency and from what sources? And what is the quality of the data?

  As is described below, effort should be given to indicators of high priority and involving less difficulty in measurement. Naturally, priority should be given to indicators based on measures of known quality, i.e., strong reliability and validity.

- How comparable are the results from the indicator?

  Because of the need to monitor the performance of reproductive health interventions across a number of programs simultaneously and given the nascency of this global initiative, priority should be given to those indicators that offer comparable results. Selection of more esoteric, circumstance-specific indicators should be avoided since their validity and reliability can be difficult to determine without repeated applications.

- How responsive to change is the indicator?

  This presumes the important first step of obtaining a baseline value on the indicator such that subsequent values can be compared to determine if change or improvement has occurred. Indicators that are responsive to underlying intervention efforts in a short period of time (3-5 years) are to be preferred over, but should not displace, those requiring a longer lag time (e.g., the maternal mortality rate).

Guide to Using Indicators

Some readers will be more familiar than others with the use of indicators to evaluate RH interventions. Thus, we conclude this overview section with a short description of one approach to the task of identifying indicators for a specific program or inter- vention. Those with limited research experi- ence will still find it useful to consult a more experienced researcher or evaluator, but this set of steps is intended to demystify the process.

1. Identify a limited number of indicators that are consistent with program objective(s)

It would be very unusual for a given program to use all the indicators for a given topic to evaluate its program. Rather, it is important to choose a limited number that best "fit" with the program/project objectives. Here are some steps for identifying a "short list":

- Write down the objective(s) of the program/project (that is, what results do you expect in the short term, such as 1 year; or in the medium term: 2-5 years?).

- Specify the main activities to be conducted in an effort to obtain the objectives.

- Clarify whether the program is (a) a large scale effort to reach all members of the target population (e.g., all pregnant women in the catchment ares) or (b) a smaller, more limited intervention that will "reach" only those who participate in specific services or educational programs. If "b," then select only from the indicators listed in the policy and output categories; the outcome indicators generally will not be feasible to measure and apply as defined.

- Define the main purpose of the evaluation: to improve the program (e.g., through mid-course corrections), to track and document results, or both.

- Review the summary list of indicators and identify all indicators that correspond to the objectives of the program and the purpose(s) of the evaluation.

2. Identify the types of data/data collection needed for each indicator

- For each indicator selected in step #1, specify the source(s) of data needed.

- Determine in each case if the data exist (in service statistics, surveys, program records) or if it would be necessary to collect new data (interviews with staff, client, focus groups, household surveys).

3. Construct and complete a large matrix (table) that has 3 columns (see below figure):

- possible indicators (identified in step #1)
- importance of the indicator (based on stakeholder judgments, such as staff)
- ease in obtaining the data[3] (based on information from step #2)

Illustrative Table for Classifying Indicators in terms of Importance and Ease of Data Collection

Importance of indicator to the program	Data Collection: Easy	Feasible/ requires effort	Difficult
High	A High priority	B Worth collecting if possible	C Worth collecting if possible
Low	D Worth collecting only if part of instrument for "important" indicator	E Worth collecting only if part of instrument for "important" indicator	F Low priority

4. Prioritize the indicators by importance and ease of obtaining data

- Give high priority to those that are important and can be (relatively) easily measured (see cell "A" of table).
- Give lower priority to those that are judged to be less important and difficult to measure (see cell "F" of table).
- Discuss the advantages/disadvantages as well as the practicality of the remaining indicators (cells B,C,D, and E).
- Consider the "questionable" indicators (in cells B and C versus D and E) are worth the investment. Because those in cells B and C are of high priority to the program, every reasonable effort should be made to measure them including investing in efforts that will institutionalize over the longterm those difficult to collect at present.

  If those in cells D and E can be obtained from the same data collection exercise as the "high priority" ones (cell A), this may favor including them. If, to the contrary, it would mean a new data collection exercise (e.g., conducting focus groups to get a single indicator), it may not be worth it.

5. Group these indicators by source of data to determine the number of different linkages that would be required if all were retained.

[3] Data that are routinely collected by the program and available for analysis would be considered "easy" to obtain. A second category is "feasible but requires effort;" this would describe new data collection that is nonetheless within the technical capability of the institution, if resources are available for this purpose. A third category is "difficult," for the reasons that (1) technically qualified staff are not available, (2) the type of information needed is difficult to obtain, even under ideal conditions (e.g., drug use, abortion, etc.), and/or (3) the study population is geographically inaccessible or located in a politically unstable area.

- service statistics
- program administrative records
- survey of target group in the general population
- survey of clients
- survey of providers
- observation
- other

Each source of data that is required for a given, or set of given, indicators will mean a separate data collection activity. Early planning is necessary in assembling indicator values to ensure that the various data sources generate the values when needed, including at baseline. Usually indicator systems are information system which forge the linkage across data collection activities.

6. Decide what your organization is able to do, given:

- staff resources/expertise;
- logistical requirements (transport, printing, computers);
- time; and
- budget.

In sum, it is important to establish the objectives of the program, to define the main purpose(s) of the evaluation (to improve the program, to document results, or both), and to select indicators that are relevant and practical. Some evaluation (e.g., those designed to identify ways to improve the program) may use program-based measurements only. Others may combine program- and population-based data, or rely on population-based measures only. The technical decisions will depend on the resources available and purpose of the evaluation.

Monitoring with Indicators

It should be stressed that indicators, and the monitoring of their values over time, do not give full proof that the service interventions were responsible for any observed improvement in reproductive health. All that indicator values over time can show is that trends in program effort and population outcomes were moving together in the expected fashion. To establish the independent impact of reproductive health interventions or programs requires formal modeling and use of multi variate analysis techniques, if not randomized controlled experiments.

The impact of reproductive health interventions on intended outcomes will require the collection of longitudinal data on reproductive health services and the population(s) exposed to such risks. The key question is "did the reproductive health outcome change in the intended direction given the presence of the program?" To establish change and attribute it to the cause requires measurements of the same units be taken over time (see Bertrand et al., forthcoming).

Chapter V

Organization of Remainder of RHIWG Report

The remaining chapters of this report, separately printed, describe indicators for evaluating reproductive health interventions in five areas:

- Safe pregnancy (including the treatment and prevention of unsafe abortion)
- STD/HIV
- Women's nutrition
- Breastfeeding
- Adolescent reproductive health services

Each chapter includes a short introduction to the topic, including issues of concern or aspects of evaluation that are particularly problematic for the specific topic. The sections list the "key indicators" identified for that specific area (which are also listed in summary form in Appendix A of this section). There is a description of the process used to develop the list of indicators and the meetings held to accomplish this end. Participants and their institutional affiliations are listed in the appendix of each section.

This set has been prepared so that readers may use an individual section at a particular time. Although each report is written to be self-contained, this present chapter is intended as an overview to the remaining sections; the material herein is NOT repeated for each individual topic. Thus, we recommend keeping this overview with the specific section of interest for consultation during a given task.

Within each chapter the indicators are generally organized in terms of:

Inputs

- Policy environment

Outputs (program-level)

- Functional outputs
- Service outputs
- Service utilization

Outcomes (population-level)

- Intermediate
- Long-term

References and Appenices

- References
- Appendix A: Short List of Indicators by Subcommittee
- Appendix B: Steering Committee of the RHIWG
- Appendix C: Members of the Subcommittees of the RHIWG

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Appendix A

SHORT LIST OF INDICATORS BY SUBCOMMITTEE

- Safe Pregnancy
- STD/HIV
- Women's Nutrition
- Breastfeeding
- Adolescent Reproductive Health Services

Each of the Reproductive Health Indicators Working Group (RHIWG) subcommittees was asked to draw up a short list of "key indicators" that potentially would be the most important and useful in monitoring interventions in their area. It was recommended the list contain both policy or output (program-based) indicators and outcome (population-level) indicators. The list includes the following indicators:

SAFE PREGNANCY

Maternal and Neonatal Health

- Met need for emergency obstetric care (EmOC)
- Perinatal mortality rate
- Percentage of perinatal deaths contributed by stillbirth and early neonatal death
- Case fatality rate (CFR) -- all complications
- Percentage of all adults knowledgeable about maternal complications of pregnancy and childbirth
- Percentage of all adults knowledgeable about neonatal complications
- Percentage of pregnant women with at least 2 doses of tetanus toxoid immunization
- Proportion of women attended at least once during pregnancy by medically trained personnel for reasons related to the pregnancy
- Number of facilities providing essential obstetric functions (EOF) per 500,00 population
- Admission-to-treatment time interval: percentage of women with obstetrical complications treated within 2 hours at a health facility
- Existence and implementation of a safe pregnancy strategic or operational plan
- Maternal mortality ratio and rate

Post-Abortion Care

- Existence of service and administrative policy on the elements of post-abortion care
- Percentage of post-abortion care clients who receive counseling and referral or accept a family planning method at time of service
- Number, type and geographic distribution of SDPs that have commodities, equipment and transport for post-abortion care
- Knowledge of and willingness to use services within the service area

SAFE PREGNANCY CONT'D

- Facility case fatality rate (CFR) -- post-abortion complications
- Total number of admissions for abortion-related complications
- Compliance with provisions for protecting against coercion
- Compliance with provisions for maintaining confidentiality

STD/HIV

- Percentage of SDPs stocked with condoms and educational materials
- Percentage of clients correctly managed for STDs
- Percentage of clients screened appropriately for RTIs before IUD insertion
- Number of condoms distributed
- Percentage of family planning clients who accept condoms
- Percentage of adults practicing care-seeking behaviors that reduce STD/RTI infection
- Percentage of adults practicing low risk behavior for STD/HIV
- Percentage of target population with an unmet need for protection
- Female empowerment for condom use: composite indicator
- STD prevalence in a defined target population

WOMEN'S NUTRITION

- Existence of women's nutrition as a policy priority
- Percentage of service delivery points (SDP) with adequate supplies of mineral/vitamin supplements
- Percentage of women who consume vitamin A-rich foods
- Percentage of pregnant clients receiving treatment for hookworm
- Percentage of program participants who practice key nutrition behaviors promoted by the program

WOMEN'S NUTRITION CONT'D

- Percentage of malnourished women based on body mass index (BMI)
- Percentage of households using iodized salt
- Percentage of women with anemia
- Percentage of women with low breastmilk vitamin A level
- Percentage of women of low weight

BREASTFEEDING

- National breastfeeding policy and plan
- Percentage of RH/FP service providers trained to use family planning service delivery protocols for breastfeeding women
- Percentage of RH/FP service providers who ascertain whether or not a woman is breastfeeding prior to providing her with contraceptive advice or methods
- Percentage of RH/FP service providers trained in breastfeeding counseling
- Community-based counseling
- Percentage of target audience exposed to IEC messages on breastfeeding
- Continued breastfeeding at 24 months
- Timely complementary feeding rate
- Contraception among nursing mothers

ADOLESCENT REPRODUCTIVE HEALTH SERVICES

- Existence of government policies, programs or laws favorable to adolescent reproductive health
- Number/percentage of providers who successfully complete training programs on adolescent reproductive health services
- Number of SDPs serving adolescents that are located within a fixed distance or travel time of a given location
- Total number of contacts with adolescents

ADOLESCENT REPRODUCTIVE HEALTH SERVICES CONT'D

- Percentage of participants (peers, parents, teachers) competent in communication with adolescents in reproductive health issues
- Percentage of adolescents who know of at least one source of information and/or services for sexual and reproductive health
- Adolescent's knowledge of reproductive health: Composite indicator
- Percentage of adolescents who used protection at first/most recent intercourse
- (Adolescent) contraceptive user and/or non-user characteristics
- Proportion of births to adolescent women that are wanted

Appendix B

STEERING COMMITTEE OF THE RHIWG

Jane Bertrand	The EVALUATION Project/Tulane University
Patricia Coffey	USAID
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Paul Delay	USAID
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Katie McLaurin	IPAS
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Mary Ellen Stanton	USAID
Krista Stewart	USAID
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Appendix C

MEMBERS OF THE SUBCOMMITTEES OF THE RHIWG

- Safe Pregnancy
- STD/HIV
- Women's Nutrition
- Breastfeeding
- Adolescent Reproductive Health Services

SUBCOMMITTEE ON SAFE PREGNANCY

Safe Pregnancy

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