Part III.B
Family Planning and Fertility

- Family Planning Program Effort Index
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Program evaluation is more methodologically advanced for family planning than for any other area of reproductive health, thanks to 30+ years of dedicated effort and strong funding support for this work. Several factors spurred the development of evaluation methodologies. The demographic concern that underscored the early family planning programs translated to monitoring of results in quantitative terms: numbers of new acceptors and continuing users. The problem of the "unequal weight" of different methods (e.g., one condom acceptor versus one vasectomy acceptor) gave rise to the index of couple-years of protection (CYP).

Critics and skeptics of family planning unwittingly strengthened evaluation efforts. The hot debate originating during the 1970s on the relative contribution of family planning programs versus that of socio-economic development impelled researchers to develop methods of demonstrating the **independent** effect of family planning. The family planning program effort scores (Lapham and Mauldin, 1984) played a useful role in this research. Although this public debate has subsided, the challenge remains to demonstrate causality (i.e., the program interventions have impact) in family planning program evaluation.

The World Fertility Survey (conducted from 1972 to 1984) focused primarily on the determinants of fertility, with relatively little attention to family planning and related programmatic issues. The Contraceptive Prevalence Survey, first piloted in 1975 in El Salvador, was designed to produce more programmatically useful results with shorter turn-around time. This survey tool later evolved into the Demographic and Health Survey (DHS) and the Reproductive Health Survey (RHS), both national-level representative surveys of women (and increasingly of men) of reproductive age in developing countries (Robey et al., 1992). The DHS and RHS have become the most widely utilized sources of data for family planning program evaluation, because of the quality of the information, standardization of items in the core questionnaire, availability of repeat measurement over time, and possibility of cross-national comparisons. Both surveys extend beyond family planning to cover related issues of maternal health/safe pregnancy and child health. In addition to the core questionnaire, the DHS offers 12 optional modules, including several of particular relevance to reproductive health (e.g., women's status and empowerment, violence against women, female genital cutting, HIV/AIDS, and maternal mortality). The RHS has a young adult version, and more recently in Africa, modules on sexual behavior and HIV testing and counseling.

A number of factors facilitate the job of evaluating family planning programs. First, the "intermediate outcome" – the desired behavioral change at the population level – is a single measurable behavior: use of a contraceptive method (aggregated to a measure of contraceptive prevalence). Second, despite the sensitive nature of family planning in many countries (especially in the early years of programs), women are willing and able to report contraceptive use with a high degree of accuracy, assuming the interviewer creates good rapport and the question is clearly worded. Third, the intermediate outcome of contraceptive prevalence is strongly (inversely) correlated with a key long-term outcome: fertility (except in countries with high levels of abortion). In short, family planning evaluators are blessed with a single, measurable, and valid outcome variable. Other areas of reproductive health (with the possible exception of breastfeeding) present a greater methodological challenge. Nonetheless, family planning program evaluation does have a few problems of its own.

Methodological Challenges of Evaluating Family Planning Programs

- **Contraceptive methods vary in terms of their use-effectiveness, duration of action, and likelihood of continuation.**

Although all "program methods"[1] can protect against pregnancy, some do so better than others. Thus, the program with a higher percentage of users of long-term methods will generally be more effective in pregnancy prevention than those in which users opt for less effective methods will be. The measure "couple-years of protection" (CYP) was designed to address this issue, but it has certain problems of its own (discussed below).

- **Large-scale survey data yield the most reliable estimates of contraceptive use, but they have limitations.**

Valuable as DHS/RHS data are for tracking national trends, they have three major limitations. First, such surveys are conducted only once every three to five years (if that often). Second, they do not yield precise results for geographical sub-areas (e.g., district, provinces) in most countries, which is the level at which program managers generally need their information. Third, these large-scale surveys are very expensive to conduct and analyze, a fact that has caused some countries to question the feasibility of continuing to fund them, especially if donor funding is unavailable. Given these limitations, program statistics, such as number of acceptors and CYP, are widely used to monitor family planning programs on a routine basis.

- **Demonstrating the impact of family planning programs on contraceptive use requires more than the simple tracking of contraceptive prevalence over time in a given country.**

Many working in family planning would like to think that "if contraceptive prevalence increases, the program must be successful." However, factors other than the program may have contributed to these increases. Controlled field experiments to demonstrate what would have happened in the absence of the family planning program are not feasible in evaluating ongoing, national level programs. The single largest methodological challenge for evaluating family planning programs in the past decade has been the issue of establishing attribution. (For a full description of the issue and proposed methods of addressing it, see Bertrand, Magnani, and Rutenberg, 1996, Chapter IV). Evaluation methodology is far more advanced for family planning than for other areas of reproductive health, in part because a single, valid outcome indicator measurable through DHS-type studies is available. Yet, definitively establishing cause-and-effect is still relatively rare in the evaluation of family planning programs.

- **The long-term outcome variable for family planning programs is no longer clear-cut.**

Prior to the 1994 Cairo Conference, one of the primary goals of many family planning programs – especially in Asia – was to reduce fertility, an indicator that is reliable and relatively easy to measure. Whereas many governments worldwide continue to track fertility as a desired outcome of family planning programs, a number of programs are repositioning family planning within the larger context of reproductive health as a reproductive right or health intervention. To date, there is no standardized, widely accepted measure of these alternative outcomes. Moreover, these outcomes are highly influenced by other factors in addition to contraceptive use. The HARI index (**Helping Individuals Achieve their Reproductive Intentions**) has been proposed to fill this void (Jain, 1995; Jain, 2001), but is not yet in widespread use. In short, the field has moved away from a single-minded focus on fertility, but an alternative indicator that reflects the health and reproductive rights aspects has yet to surface.

Almost all of the indicators in this section were taken directly from the *Handbook of Indicators for Family Planning Program Evaluation* (Bertrand, Magnani, and Knowles, 1994), suggesting little change in the basic indicators for evaluating outputs and outcome in family planning programs since that time. However, we have reduced the total number of indicators of family planning/fertility from 35 to 14, retaining those which have proven most useful for program evaluation in field settings.

[1] Program methods include oral pills, IUDs, injections, condoms, NORPLANT implants, male sterilization, female sterilization, spermicides, and lactational amenorrhea method (LAM). Non-program methods include rhythm, withdrawal, abstinence, and folkloric methods. The lower effectiveness of certain methods is reflected in the way major surveys treat them. The DHS collects data on all the above-cited methods, but future reporting of contraceptive prevalence may exclude abstinence and folkloric methods. The RHS surveys omit LAM, abstinence, or folkloric methods in their calculation of contraceptive prevalence. Note: The distinction between program and non-program methods varies by country. For example, some programs directed at youth promote abstinence, which in this context is a program method.

Indicator

Family Planning Program Effort Index

Definition
This indicator is a score (ranging from 0-120) measuring the strength of the national family planning program of a given country on four dimensions (policy and stage setting activities, service and service-related activities, evaluation and record keeping, availability and accessibility of fertility control supplies and services). The score has a potential range of 0-120 points, based on 0-4 points for each of 30 items.

Data Requirements
Responses to a detailed questionnaire from selected key informants (representatives of the Ministry of Health, IPPF affiliate or other NGO; international consultants familiar with that country; and other informed individuals)

Data Source(s)
A questionnaire designed explicitly for this purpose, completed by an average of four to six individuals per country (with extreme cases ranging from 1-12 respondents). The items have remained constant over the four rounds of data collection.

Purpose and Issues
The purpose of the Family Planning Program Effort Index is to assess the strength of family planning programs worldwide and to measure changes over time. It attempts to measure the effort (input) that goes into the family planning program, not the results achieved. These data have been collected in five different cycles over a 27-year period from 1972 to 1999. The questionnaire consists of some 125 different questions that relate to 30 different dimensions of program effort. Researchers convert the responses to these questions to individual scores (ranging from zero to four) for each of the 30 items, using an established set of rules.

The Family Planning Program Effort Index serves several important purposes:

1. It allows for cross-national comparisons of family planning programs at different points over the past 27 years;
2. It traces the evolution of the family planning program in a given country over time;
3. It measures family planning program input, independent of outcomes (such as contraceptive prevalence or fertility). As such, it has been used to analyze the relative importance of family planning program effort versus social and economic factors in the decline of fertility rates worldwide (Lapham and Mauldin, 1984; Mauldin and Ross, 1991; Ross and Mauldin, 1996; Ross and Stover, 2001).

This index is useful primarily to researchers, donor agency representatives, and those interested in understanding family planning programs in the international context. Although it indicates areas of strength and weakness for a national program, it has not been the tool of preference for program managers at the country level in identifying ways to improve programs. Indeed, in contrast to other widely used measures and tools (CYP, contraceptive prevalence, DHS and RHS surveys, situation analysis) which are widely known to family planning program managers throughout the developing world, the Family Planning Program Effort Index is used primarily for research purposes.

Two major criticisms have been leveled against this index. First, some critics argue that a sample of four to six key respondents per cycle of data collection is inadequate to accurately capture the complexity of national family planning programs. Some countries have been scored using data from as few as one or two respon-

dents. Second, many argue that the responses of the key informants are biased by their knowledge of key outcomes (contraceptive use and fertility decline). That is, if contraceptive prevalence is high, the respondents unconsciously give high scores to the availability of methods, assuming that the two go hand in hand. In short, although the index claims to measure inputs, the responses may be biased by a knowledge of outcomes.

Despite these limitations, the Family Planning Program Effort Index represents a valuable source of information to the international reproductive health community. It is the only source of data that purports to measure inputs using a standard set of questions across countries and over time. The results for the Family Planning Program Effort Index have generally coincided with qualitative assessments of "how good a family planning program is" in a given country. For example, the scores indicate that in 1972 a quarter of the world's population lived in countries with very weak or no family planning programs. As of 1999, no country in the world fell in this category. Conversely, the percentage of the world's population living in countries with strong family planning programs increased from 36 percent in 1972 to 68 percent in 1999 (Ross and Stover, 2001). Curiously, some of the strongest family planning programs in the world (e.g., in China and the Republic of Korea) actually dropped in the most recent cycle of data collection, presumably because the established norm for small families and contraceptive use no longer required the aggressive family planning program initiative of previous years.

Most of the indicators in this *Compendium* are included to encourage evaluators and researchers to collect the necessary data to use them. By contrast, the data collection for the Family Planning Program Effort Index is conducted by a small team of researchers based in the United States (which has included Bernard Berelson, Robert Lapham, Parker Mauldin, John Ross, and John Stover over different cycles), using a standardized instrument across countries. Further validation of the FP Program Effort Index is available from Mauldin and Ross, who demonstrated that the "judgmental" scores of key informants were relatively consistent with more direct measures of the different components in a case study that specifically investigated their comparability (Mauldin et al., 1995). The index is useful to the international reproductive health community because it offers data of this nature for secondary use, not as a type of information routinely collected by program managers for the purpose of program improvement.

Indicator

Helping Individuals Achieve Their Reproductive Intentions (HARI Index)

Definition
The effectiveness of family planning programs from the user perspective of successfully achieving reproductive intentions, rather than the more demographically oriented indicators of contraceptive prevalence or TFR

The index consists of two components: the achievement of an individual's reproductive intentions and the avoidance of severe reproductive health problems associated with an individual's effort to achieve her stated reproductive intentions (Jain, 2001).[2]

Data Requirements
Self-report of the following information by women of reproductive age:

- Reproductive intentions and contraceptive use at two time periods, and the occurrence of pregnancies and births during the interim period;
- Sterilization regret; and
- Experiences with severe reproductive health problems associated with pregnancy and contraception during the interim period.

Data Source(s)
A panel survey with two rounds of data collection among the same respondents (ideal for estimating the achievement of **individuals'** reproductive intentions); cross-sectional surveys (possible, but as yet untested in the literature)

Purpose and Issues
Consistent with the goals set at the 1994 ICPD in Cairo, this indicator broadens the scope of family planning programs to incorporate reproductive health services. Whereas family planning programs have traditionally been evaluated in terms of contraceptive use and fertility reduction, the objective of many current programs is to help individuals achieve their reproductive intentions in a healthful manner.

Jain proposed the HARI Index in 1994, but until his article in 2001, no one had published results of a field test of this indicator. Experience in the use of this indicator is limited to this single panel study in Peru, consisting of two rounds of data collection 29 months apart. The standard DHS questions were expanded slightly to allow for more in-depth information related to the experience of sterilization and potential infertility problems. Additional questions were also added in the second round to retrospectively collect information on reproductive health problems experienced by women during the interim period. Although this indicator is relatively new, we include it in the *Compendium* because it is one of the few indicators that attempts to capture the goals of reproductive choice expressed at the Cairo conference.

One could measure the two components of HARI separately. However, the potential advantage of using a combined indicator is to draw the attention of researchers, service providers, and program managers to both components. Although severe health problems associated with contraception and pregnancy in this application tend to contribute less to the HARI index than do mistimed pregnancies, such problems are extremely important from the individual's perspective. The HARI index has several strengths. First, it measures success and failure of a reproductive health program from the user's perspective of successfully achieving RH intentions, consistent with the Cairo agenda. Second, a program is considered successful if the woman has a wanted and intended pregnancy. Third, it is considered successful if a woman avoids an unwanted or mistimed pregnancy, regardless of her contraceptive use or her visits to facilities to avoid an unintended pregnancy. The index reflects the realization of a woman's reproductive intentions stated by those surveyed. As such, the index overcomes the problem created by clandestine or unreported use of contraceptives identified in some settings. Moreover, the index draws attention to the need to shift

[2] The description of this indicator draws heavily on the article by Anrudh Jain (2001).

attention from reducing wanted pregnancies to avoiding severe reproductive health problems when one designs family planning programs.

This current application of the index has several potential limitations. First, considerable overlap exists between the two components of HARI: the achievement of individual reproductive intentions and the avoidance of severe health problems associated with an individual's effort to achieve her stated RH intentions. Thus, the single figure does not fully reflect reasons women did not achieve their reproductive intentions in a healthful manner, although presentation of data by each subcomponent readily addresses this shortcoming.

Second, the HARI Index is best applied in the context of a panel survey (i.e., with the same respondents on two rounds of data). Panel surveys provide a more accurate estimation of the achievement of an individual's reproductive intentions component of the index, but they are rarely conducted in developing countries. The items concerning reproductive intentions and the wantedness of recent pregnancies or births are standard content in demographic surveys. However, questions regarding serious health consequences related to pregnancy and contraception are not standard to the existing RH surveys (i.e., DHS, RHS). Including such questions on these RH surveys would allow evaluators to estimate this indicator from cross-sectional surveys on a large scale.

Third, each item in the HARI index receives equal weight. For example, having an unwanted birth counts the same as experiencing a reproductive health problem or having a mistimed pregnancy. Moreover, a woman who fails to achieve her reproductive health intentions on both components of the score (e.g., having both an unwanted pregnancy and a hospitalization due to abortion-related complications) may have the same score on the HARI as one who fails on only one of the components. Also, the index is not adjusted for changes in reproductive health intentions or inappropriate provisions or inappropriate use of reversible methods. HARI can be adjusted by using differential weights for women with different problems and by counting inappropriate provision or use of contraception as failure, provided such information is collected.

Finally, the current application of HARI cannot assess the relative importance of a larger set of reproductive health problems outlined in the ICPD Programme of Action. We gain little by incorporating well-established indicators of infant, child, and maternal mortality in the HARI index. Breast and cervical cancers are too rare to be captured in a survey of this kind. Progress on preventive actions can be monitored through such process indicators as the percentage of women visiting a clinic who are informed about breast examination, or who have a mammogram or a Pap smear test on schedule. HARI does incorporate a smaller but important set of reproductive health problems associated with pregnancy and the practice of contraception. HARI can incorporate other important reproductive morbidities (e.g., reproductive tract infections and STIs) as progress is made toward identifying them in the absence of lab tests.

Indicator

Number of Acceptors New to Modern Contraception

Definition
The number of persons who accept for the first time in their lives any (program) method of contraception; to be reported for a defined reference period (e.g., one year)

Data Requirements
Counts of persons accepting any (program) method for the first time in their lives during a one-year period

Data Source(s)
Service statistics; surveys (possible but uncommon)

Purpose and Issues
This indicator measures the ability of the program to attract new clients from an untapped segment of the population to its services. The measure eliminates the problem of counting as "new" those clients who switch from one source to another for reasons of convenience or cost. As an indicator, it may also reflect the success of special communication programs or other interventions (e.g., social marketing projects) aimed at increasing service utilization among those previously missed by the program. However, in this latter case, one must be mindful that some of the new acceptors might have obtained the same or another method from an alternate source (e.g., the unsubsidized pharmacy sector) if the special intervention had not taken place.

"Program method" refers to methods made available through established family planning programs: pill, IUD, the NORPLANT implant, injection, condom, spermicides, diaphragm, tubal ligation, vasectomy, and lactational amenorrhea method (LAM), if used under program supervision. Thus, a young woman who formerly obtained condoms from the pharmacy is not a new acceptor. By contrast, a client who to date has depended on withdrawal is a new acceptor, because withdrawal is not a program method.

The **Number of Acceptors New to Modern Contraception**, defined as first-time use in the life of the individual, reduces the ambiguity associated with the more general term "new acceptor" and avoids a duplication of cases that may result when substitution occurs.

Evaluators can obtain this indicator from survey data as well (e.g., from the "calendar" used in the DHS or other data collection tools for obtaining contraceptive histories retrospectively). Moreover, surveys allow one to include non-program methods. However, surveys are rarely used to produce data on acceptors, and total current use rather than "new use" is likely to be of greater interest to those interpreting the data.

Program personnel (including evaluation staff) can disaggregate service statistics by key variables (age, sex, parity, place of residence, ethnicity, or other factors judged relevant in the country context) to obtain a sociodemographic profile of the client population. This information is useful in tracking changes in the composition of the client population over time and in determining whether programs intended to reach certain subgroups are effectively doing so.

Indicator

Couple-Years of Protection (CYP)

Definition
The estimated protection provided by family planning services during a one-year period, based upon the volume of all contraceptives sold or distributed free of charge to clients during that period

The CYP is calculated by multiplying the quantity of each method distributed to clients by a conversion factor, to yield an estimate of the duration of contraceptive protection provided per unit of that method (Wishik and Chen, 1973; Stover, Bertrand, and Shelton, 2000). The CYPs for each method are then summed over all methods to obtain a total CYP figure.

The EVALUATION Project undertook an extensive review of the literature and empirical data on a number of the variables that form the underlying assumptions for the calculation of CYP. Based on this analysis, the researchers recommended a modified set of conversion factors for CYP (described in Stover, Bertrand, and Shelton, 2000). USAID accepted this set of recommended factors but "harmonized" them with the previous set of conversion factors (i.e., they retained the old factors when they were close to the new ones to minimize disruption to data collection systems worldwide). USAID then issued a slightly modified set of conversion factors, which the USAID system has used since 1997. The CYP conversion factors endorsed by USAID are as follows:

Method	***CYP Per Unit***
Oral Contraceptives	*15 cycles per CYP*
Condoms	*120 units per CYP*
Vaginal foaming tablets	*120 units per CYP*
DepoProvera (injectable)	*4 doses (ml) per CYP*
Noristerat (injectable)	*6 doses per CYP*
Cu "T" 380–A IUD	*3.5 CYP per IUD inserted*
NORPLANT implant	*3.5 CYP per implant*
Sterilization(male or female)	*9 CYP per procedure (global default value)**
Natural Family Planning:	*2 years per trained, confirmed adopter*
Lactational Amenorrhea Method (LAM)	*4 active users per CYP*

* Note: Because of marked differences in CYP for sterilization by country and by region (based on differences in median age at sterilization), countries should use the median value for their region (assuming their data on age at sterilization conform to those of the region). The regional values for one sterilization are:

- Asia 10 CYP
- Latin America 10 CYP
- Africa 8 CYP
- Near East/North Africa 8 CYP

Programs wishing to use country-specific statistics are referred to the Stover, Bertrand, and Shelton (2000) report for the appropriate CYP.

An illustrative computation of this indicator is provided at the end of the discussion of the indicator.

Data Requirements
Quantities of pills, condoms, and spermicides distributed to clients; numbers of IUDs and NORPLANT implants inserted; number of injections administered; number of sterilization operations performed; number of trained, confirmed clients of NFP; number of LAM clients during the reference period

Data Source(s)
Service statistics or logistics management information system

Purpose and Issues
CYP measures the volume of program activity. Program managers and donor agencies use it to monitor progress in the delivery of contraceptive services at the program and project levels. Because USAID and IPPF generally require the organizations they support to report CYP, this measure is currently one of the most widely used indicators of output in international family planning programs.

This indicator has several advantages:

- It can be calculated from data routinely collected through programs or projects, and thus minimizes the data collection burden;
- These data can be obtained from all the different service delivery mechanisms (clinics, CBD, social/commercial marketing); and
- The CYP calculation is relatively simple to do.

The principal disadvantages of the indicator are that:

- It is not intuitively easy to understand by those outside the field;
- One cannot ascertain the number of individuals represented by CYP. For example, if a program administers 10,000 injections of DepoProvera, this amount is equivalent to 2,500 CYP. Theoretically, this figure represents 2,500 women protected for 12 months each; however, in fact it may refer to 5,000 women covered for 6 months each or 10,000 women covered for 3 months each; and
- The validity of the assumptions underlying the choice of conversion factors is open to debate.

Regarding the calculation of CYP for long-term methods, most programs "credit" the entire amount to the calendar year in which the client accepted the method. For example, if a family planning program performed 100 voluntary surgical contraception (VSC) procedures in a given year, it would credit all 1000 CYP (100 procedures x 9 years/each) to that calendar year, even though the protection from those procedures would in fact be realized over that and the next nine years. An alternative approach is to "annualize" this projection, allocating it over a nine-year period. The same principle applies to IUDs and the NORPLANT implant. Although the first approach (of crediting the full amount of CYP in the calendar year of acceptance) has been harshly criticized, it represents current practice in most programs that report CYP, probably because it is easier to apply.

Ideally, CYP should be based on the volume of contraceptives delivered to clients who will presumably use them, not on those delivered to facilities where they may remain unused in cartons or on shelves. However, in some projects such as social marketing, it may be impossible to monitor the exact numbers reaching the hands of clients. Rather, the only means of calculating CYP is to base it on the volume of contraceptives delivered to the retailers in question. Given that retailers are unlikely to stock products that move slowly, it is probable that (after an initial shipment) most contraceptives sold to retailers will make their way into consumers' hands. However, in those instances where the calculation of CYP is based on the volume of products delivered to retailers, not directly to the clients or customers themselves, those preparing the CYP report should clarify this detail to the users of the information.

Illustrative Computation
CYP, based upon conversion factors given in text

Method	Quantity	CYP
Oral contraceptives	5,022	334.8
IUDs	87	304.5
Condoms	62,810	523.4
Vaginal tablets	3,900	32.5
Tubal ligations	13	117.0
DepoProvera	1,277	319.3
TOTAL		1631.5

Indicator

Method Mix

Definition
The percent distribution of contraceptive users (or alternatively, of acceptors) by method

Data Requirements
Number of users (or acceptors) by method

Data Source(s)
Service statistics (program-based) or DHS-type surveys (population-based)

Purpose and Issues
The method mix provides a profile of the relative level of use of different contraceptive methods. A broad method mix suggests that the population has access to a range of different contraceptive methods. Conversely, method mix can signal: (1) provider bias in the system, if one method is strongly favored to the exclusion of others; (2) user preferences; or (3) both.

Method mix often changes in response to the introduction of a new method in-country (e.g., the injection), to non-availability of methods due to stockout, to increased need for a method that also protects against STIs (i.e., condoms), and to user preferences. Data on method mix can signal these changes, but do not provide insight into the reasons for the change. Evaluators can use qualitative methods to better understand the clients' motivations for switching methods.

Because of the problems of monitoring the number of current users based on service statistics, method mix is generally based on acceptors, not on current users, when measured at the program level. The two yield different distributions, since user data reflects the accumulation of long-acting methods from previous years.

Similarly, one expects some discrepancy on method mix calculated from program statistics versus surveys, even in programs with reliable data. (The reason is that program-based statistics reflect activity in the calendar year under study, whereas the survey results include continuing users of long-acting methods who adopted them in previous years and have not needed or chosen to return to the clinic in the calendar year under study). In addition, survey data may include folk methods, non-program methods (e.g., withdrawal), and program methods also available from non-program sources (e.g., pills from pharmacies).

In the case of method mix, the question is not which source of data is better: program- versus population-based. Both are used in forecasting the future contraceptive needs of a country. Many evaluators consider survey data more reliable for assessing preferences for specific methods, because they include clients from both the public and private sector, in addition to those using a non-program method such as withdrawal. However, one must be mindful that in survey data (e.g., the DHS or RHS) the coefficient of variation may be large, and thus affect the stability of the estimate, especially where the percentage using a specific method is very low. Finally, survey data and service statistics sometimes differ, a situation that can arise from inflated service statistics, wastage in the system, or the sale of products outside the intended area for the program (e.g., across borders).

Despite considerable discussion of method mix, there has been relatively little published research on what constitutes a desirable method mix, exceptions being Hutchings, Perkin, and Saunders (1987) and Potter (1999). Practitioners generally feel that a program should respond to the changing needs of the population at different stages in the reproductive life cycle, and offer reversible methods for those who desire to space pregnancies and permanent methods for those who have completed their desired family size. Thus, programs offering no permanent methods or overemphasizing permanent methods are subject to criticism. Yet within the category of reversible methods, the distribution of acceptors by type of contraceptive will vary by availability of specific methods, costs, local preferences, and other factors, and thus make it difficult to generalize regarding desirable method mix.

Gender Implications of this Indicator

Contraceptive method mix can be one indication of gender balance in contraceptive responsibility within a country or program. Globally, vasectomy, though safer and less costly, is much less widely available and used than female sterilization is. Nearly a third of all contraceptors rely on female sterilization, while only seven percent rely on vasectomy. In India, the ratio of 35 female sterilizations to 1 vasectomy suggests that the program is heavily biased towards female responsibility for contraception. In many parts of sub-Saharan Africa, vasectomy remains virtually unknown. The condom, rhythm, and withdrawal also require male participation or responsibility. Encouraging greater gender equity in contraceptive practice is one goal of the efforts to involve men as partners in family planning and reproductive health.

Indicator

Contraceptive Prevalence Rate (CPR)

Definition
The percent of women of reproductive age who are using (or whose partner is using) a contraceptive method at a particular point in time, almost always reported for women married or in sexual union

Generally, the measure includes all contraceptive methods (modern and traditional), but it may include modern methods only.

The indicator is calculated as follows:

$$\frac{\text{\# of women ages of reproductive age (married or in union) using a contraceptive method}}{\text{Total \# of women of reproductive age (married or in union)}} \times 100$$

Illustrative Computation
For example, the DHS for Peru (2000) yielded the following data on CPR, among women 15-45 years of age:

All women	**Women currently married or in union:**
CPR= 12,240/27,843	CPR = 10,764/15,628
=0.440 x 109	= 0.689 x 100
=44.0	= 68

Source of data: Peru Demographic and Health Survey, 2000

Data Requirements
The total number of women of reproductive age, by marital status; and of these, the number that are currently using a contraceptive method

Data Source(s)
Population-based surveys

Purpose and Issues
The CPR provides a measure of population coverage of contraceptive use, taking into account all sources of supply and all contraceptive methods; it is the most widely reported measure of outcome for family planning programs at the population level.

Technically speaking, CPR is a ratio, not a rate. Prevalence is measured by a ratio and incidence by a rate. For a given year, contraceptive prevalence measures the percentage of women of childbearing age in union who use a form of contraception. To obtain a true contraceptive use rate, the denominator should reflect the population at risk (of pregnancy), i.e., sexually active women who are not infecund, pregnant, or amenhorreic. The numerator should reflect the number of contraceptive users from that population. Note: We include this point for informational purposes only. The international population community uses the term "contraceptive prevalence rate" as defined above; thus, this *Compendium* endorses this practice to assure consistency.

The convention in reporting contraceptive prevalence is to base this calculation on women married or in sexual union (even though most DHS-type surveys ask questions of contraceptive use to women of reproductive age, regardless of their marital status). In countries with relatively little sexual activity outside marriage for women, basing prevalence estimates on women in sexual union captures the population at risk of pregnancy. However, in countries with the widespread practice of sexual activity outside of marriage or stable sexual unions, a prevalence estimate based on women in union only would ignore a considerable percentage of current users. Thus, researchers and program evaluators generally report percentage of sexually active unmarried women using contraception, if appropriate, in addition to contraceptive prevalence, because method mix is very different for those married versus unmarried (in/not in a stable union).

Whereas evaluators may theoretically derive the CPR from service statistics on numbers of current users and estimates of the population at risk, current practice is to rely upon population-based sample surveys in order to minimize the problems associated with maintaining a running count of current users and with obtaining accurate population estimates. (The problems include incomplete data, double-counting of users who enter the service delivery system at more than one point, purposeful inflation of service statistics, and poor quality of data due to other activities competing for the attention of those recording the information, to name the primary ones.)

The DHS and RHS are currently the main sources for obtaining national level estimates of prevalence. As mentioned in Part I, "DHS" is used in this *Compendium* to mean "DHS-type surveys:" the actual DHS, the RHS surveys conducted with technical support from CDC, and other large-scale national surveys conducted by the countries themselves under other auspices (e.g., in Algeria, Bangladesh, China, Costa Rica, Cuba, Hong Kong, India, Singapore, South Africa, South Korea, Taiwan, Turkey, and Vietnam). Evaluators may also use smaller scale and/or more focused surveys to estimate the CPR as long as they use probability sampling methods, the essential ingredient for obtaining scientifically-sound estimates. Evaluators may also obtain CPR by adding relevant questions to surveys on other topics (e.g., health program prevalence or coverage surveys), assuming appropriate sampling methods and sample sizes.

Indicator

Source of Supply (by Method)

Definition
The percent distribution of the types of service-delivery points cited by users as the source of their current contraceptive method (if more than one source, then the most recent one)

Data Requirements
Number of respondents currently using contraception, the type of method used, and the source of supply of their method (most recently)

Data Source(s)
Population-based surveys

Purpose and Issues
This indicator is useful to family planning program officials because it shows where contraceptive users obtain their supplies and thus allows programs to evaluate their effectiveness and to forecast procurement needs. It is particularly appropriate to countries trying to shift the burden for family planning services from the public to the private sector. For example, the DHS-type surveys yield information on the percentage of modern-method prevalence accounted for by the private sector.

In most countries, the source of supply will vary substantially by type of method. VSCs, IUDs, and the NORPLANT implants require a clinic-based facility (including mobile clinics). Pills are available through clinics in addition to commercial and CBD outlets. DepoProvera, once a clinic-based method, has been introduced into CBD programs and is available in pharmacies in some countries. Condoms and spermicides can be dispensed from any type of facility. Thus, data on source of supply are particularly useful when classified by method.

"Source of supply" yields two types of information: type of facility and type of sector (public/private). Type of facility generally includes hospital, health center, family planning clinic, mobile clinic, pharmacy, field worker, private doctor, and shop, among others. Sector distinguishes between governmental programs and those in the private sector (including the local family planning association, commercial retailers, private physicians, and other private providers). Ideally, data on source of supply should yield the percentage of contraceptive use attributable to the government program, the private family planning association, the private sector (pharmacies, private doctors), and other relevant sources.

However, the distinction between public and private is often difficult to make, especially in countries with multiple sources of contraception. The respondent may incorrectly identify a given clinic as a government clinic, when in fact it is private (or she simply may not know if it is public or private). A private physician may in fact be participating in a subsidized program to offer low-cost services to specific groups. In response to this problem, the DHS questionnaire now provides a line for entering the actual name of the facility. Subsequent to the interview, a member of the research team codes the place mentioned according to the correct classification, based on master lists of SDPs. To classify those SDPs not on the list, researchers can later contact key informants from the area.

Indicator

CONTINUATION RATES

Definition

The cumulative probability that acceptors of a contraceptive method will still be using any contraceptive method offered by the program after a specified period of time (e.g., one year)

This is also known as the "all-method" continuation rate.

When using cross-sectional population data, evaluators calculate the continuation rate for each unit-interval of use (e.g., first, second, third month of use, and so forth) as the complement of the ratio of acceptors who discontinue use of a program method of contraception at that duration to the number of women still using at the beginning of the month (i.e., 1 minus the discontinuation rate). Evaluators then cumulate these continuation rates to obtain the probability that acceptors of a contraceptive method will still be using any program method after the specified period of time.

The indicator (CR_x) is calculated as:

$$CR_x = \frac{x\ (1-q_x)}{\Pi}$$

Where:

x = 1

$\mathbf{q_x} = \mathbf{T_x}/\mathbf{N_x}$ = conditional probability of discontinuing use during a given interval (e.g., one month, one quarter);

$\mathbf{T_x}$ = the number of women discontinuing use during the interval; and

$\mathbf{N_x}$ = number of women using at the beginning of the interval.

Note: Π signifies that $(1-q_x)$ is multiplied over all intervals from 1 to x.

Illustrative Computation

Continuation rates for reversible methods for durations from 1-12 months, Bangladesh, 1992-97

x	T_x	N_x	q_x	CR_x
1	291.3	4422.5	.0659	93.4
2	160.1	4025.9	.0398	89.7
3	205.9	3803.1	.0541	84.8
4	89.9	3502.6	.0257	82.7
5	61.2	3322.9	.0184	81.1
6	107.5	3173.7	.0339	78.4
7	68.7	2998.3	.0229	76.6
8	57.2	2868.5	.0199	75.1
9	74.6	2757.4	.0271	73.0
10	59.8	2579.8	.0232	71.3
11	55.8	2458.0	.0227	69.7
12	109.5	2350.8	.0466	66.5

Source of data: Bangladesh Demographic and Health Survey, 1996/97

Data Requirements

Information on contraceptive initiation, duration of use (including method switching), and discontinuation during a given reference period (e.g., the 3-5 years prior to a survey). Based on this information, one can calculate the percentage who have continuously used for a specific duration (e.g., 12 months, 18 months), as well as the median duration of use.

Data Source(s)

Population-based: surveys with retrospective contraceptive use histories or calendars

Program-based: client records accompanied by a follow-up study of program dropouts. This source is rarely used.

Purpose and Issues

Contraceptive continuation rates provide a useful summary measure of the overall effectiveness of program

services in enabling clients to sustain contraceptive use even though they may switch from one method to another. However, the calculation of continuation rates from surveys requires knowledge of life table (survival) analysis by those subregions of the country (much less individual facilities), making this indicator more useful at the national than regional or local level.

Although evaluators can calculate continuation rates from either facility-based or population-based data, facility-based data have a number of limitations; thus, researchers tend to use large-scale surveys to provide more valid measurements of continuation among the intended population (e.g., Blanc, Curtis, and Croft, 1999).

Obtaining continuation rates at the program level is theoretically possible if evaluators use follow-up studies of new acceptors at a specified period of time after adoption of the method (e.g., 12 months). However, this technique is rarely used (except in clinical trials), given the difficulty and expense of locating these acceptors a year later.

The preferred source of data is the "calendar," a data collection format used in cross-sectional surveys such as the DHS. However, such surveys have limitations of their own. They (a) depend upon the accuracy of respondent recall, (b) do not allow linking of respondents to specific SDPs, and (c) may not capture the full contraceptive history (e.g., when five-year calendar is used).

It is important to note the distinction between discontinuation and failure of a contraceptive method. Discontinuation of contraception may occur because the individual chooses to stop using a selected method or because accidental pregnancy intervenes. As such, method failure is a subset of discontinuation. Method failure necessarily results in discontinuation. However, not all discontinuation is attributable to method failure.

Indicator

Unmet Need for Family Planning

Definition
The number or percent of women currently married or in union who are fecund and who desire to either terminate or postpone childbearing, but who are not currently using a contraceptive method

The total number of women with an unmet need for family planning consists of two groups of women: (a) those with an unmet need for limiting, and (b) those with an unmet need for spacing.

Women with an unmet need for limiting are those who desire no additional children and who do not currently use a contraceptive method. Women with an unmet need for spacing are those who desire to postpone their next birth by a specified length of time (for example, for at least two years from the date of a survey) and who do not currently use a contraceptive method.

The indicator is calculated as follows:

$$U_L + U_S = U$$

Where:

U = the number or percent of women with unmet need for family planning;

$\mathbf{U_L}$ = the number or percent of women with an unmet need for limiting; and

$\mathbf{U_S}$ = the number or percent of women with an unmet need for spacing.

Note: The actual calculation of unmet need is fairly complex, as described in detail in Appendix H.

Illustrative Computation
Estimate of unmet need for family planning, Peru, 2000 (expressed as the percentage of women currently married or in union).

$\mathbf{U = U_L + U_S}$
$= 6.7 + 3.5$
$= 10.2$

Source of data: Peru Demographic and Health Survey, 2000

Data Requirements
Responses to survey questions on:

- Desire for additional children and, if so, the desired length of birth interval;
- Current contraceptive use status;
- Current fecundity, pregnancy, and amenorrhea status for women not currently using a contraceptive method;
- The planning status (with respect to number and/or timing) of the current/last pregnancy for women currently pregnant or amenorrheic; and
- Use (or not) of a contraceptive method at the time of the current/last pregnancy.

Note: The use of the information in the final two items in the computation of the indicator is explained below.

Data Source(s)
Population-based survey

Purposes and Issues
This indicator provides information on the size of an extremely important population sub-group for family planning program management: women at risk of pregnancy with an apparent need for family planning services based upon their expressed desire to limit or space future births, but who do not use contraception. Such women have an "unmet demand" or "unmet need" for family planning and are the logical primary audience of program efforts.

The indicator may also be interpreted as the number of additional clients who would be using contraception (over and above the number of current users) if all women at risk of pregnancy and desiring to either terminate or postpone childbearing were to adopt contraception.

The indicator follows from the breakdown of total demand for family planning services into two components: "met demand" and "unmet demand" (or "unmet need"). Met demand consists of women with demand for family planning who are using a contraceptive method to achieve their reproductive goals; unmet need, or unmet demand, consists of women with an apparent demand for family planning who are not using contraception.

Following the procedure proposed by Westoff and Ochoa (1991), women are considered to be at risk of pregnancy in the present indicator if they are:

- Of reproductive age and currently married or in union;
- Fecund;
- Not using a contraceptive method; and
- Not currently pregnant or amenorrheic.

However, the following categories of women are not considered to have an unmet need for family planning, and thus, when computing the indicator, evaluators should exclude:

- Currently pregnant or amenorrheic women who were using contraception at the time they became pregnant with the current/last birth (these women are viewed as not in need because prior need was met through contraceptive use, although they do appear to need a more effective method);
- Currently pregnant or amenorrheic women whose pregnancy was reported as intentional; and
- Fecund women who want their next child within the next two years.

Bongaarts (1991) has proposed two modifications to the measurement procedure described in Appendix H: (1) an adjustment to account for the fact that the satisfaction of need for spacing through contraceptive use will reduce the need for limiting to the extent that it postpones the date at which women reach their desired family size; and (2) an adjustment for a perceived overestimate of the need for spacing in the procedure described above. Bongaarts proposes that evaluators use the estimates produced by the procedure described above as a starting point and introduce these two adjustments to compensate for the perceived problems. A comparison of the estimates from the two methods suggests that the Westoff procedure tends to produce estimates of the level of unmet need that are higher than those of Bongaarts by, on average, about five percent (Bongaarts, 1991; Westoff and Ochoa, 1991). The reader is referred to these references for further details on the two methods of computing the indicator.

Another refinement consists of reporting unmet need for married women, unmarried women, and all women of reproductive age. This refinement is particularly relevant for countries in which a significant share of childbearing occurs outside of recognized marriages/unions.

Some researchers have argued that the definition of "unmet need" should be broadened to include women using: (1) traditional contraceptive methods (on the grounds of high failure rates for such methods); (2) a theoretically effective method incorrectly or sporadically; and (3) a method that is unsafe or unsuitable for them (Foreit, 1992; Dixon-Mueller and Germain, 1992). The RHS has modified the calculation of unmet need to include traditional contraceptive methods in countries where they are in widespread use (e.g., Eastern Europe, Turkey, Mauritius). The adoption of these alternative definitions would raise significantly the estimated numbers of women with unmet need for family planning in many developing country settings.

A related indicator, the satisfaction of demand for family planning services, consists of the percentage of total demand for family planning at any time that is being satisfied by current contraceptive use. Thus:

Satisfaction of demand for FP = 1 – unmet need

Gender Implications of this Indicator

A gender-sensitive approach to unmet need would examine which factors lead to unmet need, distinguish between the unmet need of women and men, and include gender-sensitive service-delivery strategies.

1. Factors that lead to unmet need:
   - Do women and men have different access to the knowledge and household resources that would enable them to use family planning effectively?
   - Do women and men have different levels of decision-making autonomy and freedom of movement that would enable them to use family planning effectively?
   - Do women and men have the communication skills to discuss their fertility and contraceptive preferences with their partners?
   - Is family planning use a factor in gender-based violence, actual or feared?

2. Unmet need of women and men:
   - To what extent are fertility preferences shared between women and men?
   - Are cultural norms regarding extramarital sexual relations different for women and men, and the expectations of bearing children with different sexual partners?
   - In societies with polygamous unions, how do women and men view childbearing?
   - Is son preference a dominant issue in different fertility preferences between women and men?

3. Service-delivery issues:
   - Are providers trained to recognize gender-based obstacles to effective use of family planning (e.g., women clients may find it difficult to ask questions)?
   - Are providers trained to screen for domestic violence?
   - Do providers' own gender-based cultural norms and biases contribute to unmet need, (e.g., unmarried women or widows should not be having sex but it is OK for young men and widowers)?
   - Does the service-delivery system include strategies to mitigate gender-based financial or access constraints? Are services available at times and places convenient to female and male clients?

Indicator

Desire for Additional Children

Definition
The number or percent of women (or men) of reproductive age who want to have a (another) child or, conversely, who do not want to have additional children

Data Requirements
Numbers or percent of respondents reporting that additional children are/are not desired

Data Source(s)
Population-based surveys or facility-based data

Purposes and Issues
This indicator is widely used in surveys to identify both: (1) women (or men) with a demand for additional children and (2) those who do not desire additional children and thus have an apparent need/demand for fertility limitation. In the DHS, non-pregnant women married or in union are asked, "Would you like to have a (another) child or would you prefer not to have any (more) children?" Women who are pregnant (or uncertain of their status) at the time of the survey are asked, "After the child you are expecting, would you like to have another child or would you prefer not to have any more children?" On the basis of responses to these questions, evaluators may divide respondents into two categories: those desiring additional children and those desiring to terminate childbearing, with women in the latter category considered as having a "demand for family planning."

Evaluators may also combine responses to this type of question with information on current fecundity and contraceptive use to assess the level of unmet need for family planning (see Appendix H). Comparable information may sometimes be available from service statistics of clinic-based family planning programs. Questions similar to those included in the DHS are often asked of (at minimum) new clients in order to determine the appropriateness of different contraceptive methods in relation to reproductive intentions: that is, methods appropriate for limiting versus spacing.

Despite earlier concerns as to the validity of survey questions of this type in predicting actual fertility behavior, recent studies have provided rather convincing evidence of strong aggregate-level associations between expressed desires for additional children on the one hand and patterns of current contraceptive use and current and future fertility on the other (Bongaarts, 1990; Westoff, 1991). The indicator is currently viewed as relatively unbiased, because respondents have no obvious reasons to over- or under-report preferences to continue childbearing.

Indicator

Wanted Total Fertility Rate (WTFR)

Definition
The number of children who would be born per woman (or per 1,000 women) if she/they were to pass through the reproductive years bearing children according to a current schedule of age-specific fertility rates if only "desired" or "wanted" births occurred

For this indicator, "wanted" births are defined taking into account both desired family size and the number of surviving children. All births during a specified reference period (usually the two to five years prior to a survey) that do not exceed the respondent's stated "desired number of surviving children" are classified as wanted. Births raising the number of surviving children above the desired family size are considered unwanted.

The indicator is calculated as follows:

$$\text{WTFR} = 5 \sum_{a} \left(\frac{WB_a}{E_a} \right)$$

Where:

$\mathbf{WB_a}$ = the number of births to women in age group *a* in a given year or reference period that are "wanted;" and

$\mathbf{E_a}$ = the number of person-years of exposure in age group *a* during the reference period.

Data Requirements
Responses to survey questions on:

- Numbers and dates of births during a recent period (typically the two to five years prior to a survey);
- Desired number of children or family size; and
- Number of children ever born and number surviving.

Data Source(s)
Population-based surveys

Purposes and Issues
The WTFR is a measure of "wanted" fertility, a hypothetical measure of what the total fertility rate (TFR) would be given age-specific fertility rates for a recent past period under the condition that all women's fertility preferences were perfectly realized; that is, if only "wanted" births occurred. The measure represents an attempt to avoid the suspected bias in the wanted status of recent births indicator by defining wanted or desired status on the basis of the consistency (or lack thereof) between the reported desired family size and the number of surviving children, instead of on the basis of retrospective reports of fertility intentions at the time of becoming pregnant.

Evaluators calculate the indicator as the sum of age-specific fertility rates, or the total fertility rate, after they delete births occurring during a specified reference period that raise the number of surviving children of sample respondents above their stated desired number of children.

In the DHS, numbers of births during the specified reference period are derived from the birth history portion of the survey interview, the numbers of surviving children are derived from questions on lifetime fertility and survival status, and the information on desired family size are derived from survey questions.

The above definition of the WTFR is based upon the work of Lightbourne (1985, 1987) and Westoff (1991) (who labels the measure the "desired total fertility rate" or DTFR). Bongaarts (1990) proposed a modified definition of the WTFR in which wanted births are defined on the basis of whether survey respondents desired additional births at the time of a survey instead of on the basis of the comparison of the desired number of children and the number of surviving children. Under this definition, births within a specified reference period are

classified as wanted if the respondent reported wanting additional children at the time of a survey.

The argument for the alternative definition is that it is based upon responses to questions on preferences for additional children, an indicator of demand thought to be less affected by reporting biases than the desired family size indicators (Bongaarts, 1990). Comparison of estimates of the two versions of the WTFR for 48 DHS countries indicates that the two measures are reasonably close for most countries, with an average difference between the measures of about 9 percent – 4.09 versus 3.76 (Bongaarts, 1990). On the basis of available evidence, either version of the WTFR is preferable to using the wanted status of previous births in defining wanted fertility.

The comparison of the WTFR with the TFR indicates the extent to which observed fertility exceeds desired or wanted fertility. This type of comparison provides program managers and policy-makers with some insight into the potential short- to medium-term demand for family planning services and the potential for fertility decline in the future (Westoff, 1991). In the case of Burkina Faso, for example, the comparison of the TFR (6.4) with the WTFR (5.7) suggests that a considerable share of current fertility is unwanted and that sufficient latent demand exists in this population; thus an increase in contraceptive prevalence and a decline in fertility might be reasonably expected, if family planning services are available to the population (Institut National de la Statistique et de la Demographie and Macro International Inc., 2000).

Indicator

Age Specific Fertility Rates (ASFR)

Definition
The number of births occurring during a given year or reference period per 1,000 women of reproductive age classified in single-or five-year age groups

The ASFR is calculated as:

$$ASFR_a = \frac{B_a}{E_a} \times 1000$$

Where:

$\mathbf{B_a}$ = number of births to women in age group *a* in a given year or reference period; and

$\mathbf{E_a}$ = number of person-years of exposure in age group *a* during the specified reference period.

Illustrative Computation
Estimates of average annual ASFRs for all women 15-49, Egypt, 1997-2000

Age Group	Births B_a	Person-Years of Exposure E_a	Rate/ Woman	Rate/1,000 Person-Years
15-19	764	14893.2	.051	51
20-24	2304	11747.2	.196	196
25-29	1994	9602.3	.208	208
30-34	1295	8805.5	.147	147
35-39	564	7549.5	.075	75
40-44	161	6643.2	.024	24
45-49	19	4498.8	.004	4

Source of data: Egypt Demographic and Health Survey, 2000

Data Requirements
The number of births in a given year or reference period classified by age of mother and the number of women of reproductive age (i.e., 15-44 or 15-49 years), in 1-or 5-year age groups

Data Source(s)
Vital statistics (numerator only), population censuses or population-based surveys

Purposes and Issues
The ASFR has two primary uses: (1) as a measure of the age pattern of fertility, that is of the relative frequency of childbearing among women of different ages within the reproductive years, and (2) as an intermediate computation in the derivation of the **Total Fertility Rate (TFR)**, discussed next in this section.

As indicated above, evaluators may derive ASFRs from several sources. When evaluators estimate ASFR from vital statistics, they use population projections or estimates of the number of women in each age group 15-49 for the denominator in the rate. When using population censuses or surveys, evaluators obtain both the numerator and denominator of the rate from the census or survey. Estimates from censuses are derived from questions on births during a specified period preceding the census (usually 12 months), while survey estimates may be derived either from questions on births within a specified prior period or from partial or complete birth histories.

A simpler, although less precise, procedure for computing the denominator of the rate is to take the average of the number of women in each age group during the reference period covered by the measure (i.e., the average of the numbers of women in each age group at the beginning and end of the reference period).

Reference periods of more than one year are frequently used to compute ASFRs from survey data, the rationale being to decrease sampling variability associated with relatively small numbers of annual births occurring to women in single or five-year age groups and the distorting effects of reference period reporting errors. Various analyses of DHS fertility data, for example, alternately use the three- or five-year period prior to the survey in calculating ASFRs (Arnold and Blanc, 1989; Lutz, 1990). When multiple years are used for computational purposes, average annual rates are normally presented.

Unlike the crude birth rate, the ASFR is unaffected by differences or changes in population age composition, and thus is more useful in comparing different populations or sub-groups and in measuring changes over time. The ASFR is, however, affected by differences or changes in the number or percent of women exposed to the risk of pregnancy. Thus, changes in ASFRs may provide misleading information regarding the impact of family planning programs on fertility when other factors affecting risk of pregnancy are changing (for example, for the 15-19 and 20-24 age groups when age at marriage is rising quickly).

To address this problem, evaluators may calculate ASFRs only for women who were continuously married or in union during the reference period of the measure. The resulting measure is known as the Marital Age-Specific Fertility Rate (MASFR). However, to calculate this measure, evaluators require data on duration of marriage or marriage histories. In actual practice, MASFRs are more often approximated by calculating ASFRs for women married or in union at the time of a survey, although evaluators should recognize that this figure only approximates the MASFR because women who are married or in union at the time of a given survey may not have been continuously married or in union over the entire reference period of the measure (e.g., for the three to five years prior to the survey).

ASFRs are sometimes presented for different groups of women; for example, ASFRs are for women currently married or in union and for all women of reproductive age in DHS country reports. In societies where fertility is largely confined to marriage, ASFRs for women currently married or in union will provide more or less complete coverage of recent fertility. Where a large share of fertility occurs outside of recognized unions, however, the restriction of the ASFR to currently married women will result in an under estimate of the level of current fertility.

The ASFR is of particular interest in countries, cities, or districts with adolescent RH interventions designed to reduce unintended pregnancy. Although the ASFR is rarely used as an outcome measure in evaluating such programs (due to the human, financial, and logistic resources needed to collect the data), it is a variable that program administrators and policy makers track over time as a macro-level indicator of program effectiveness combined with non-program influences.

Indicator

Total Fertility Rate (TFR)

Definition
The number of children who would be born per woman (or per 1,000 women) if she/they were to pass through the childbearing years bearing children according to a current schedule of age-specific fertility rates

The TFR is calculated as:

$$TFR = \Sigma ASFR_a \text{ (for single year age groups)}$$

or

$$TFR = 5 \Sigma ASFR_a \text{ (for 5-year age groups)}$$

Where:

$ASFR_a$ = age-specific fertility rate for women in age group *a* (expressed as a rate per woman).

Illustrative Computation
Estimate of the average annual TFR for all women aged 15-49, Egypt, 1997-2000.

TFR= 5 (.051 + .196 + .208 + .147 + .075 + .024 +.004)
= 3.53
Where: the figures in parentheses are age-specific rates for the 15-19, 20-24, ... , 45-49 age categories, respectively.

Source of data: Egypt Demographic and Health Survey, 2000.

Data Requirements
A current schedule of age-specific fertility rates (ASFRs), for one- or five-year age groups

Data Source(s)
Vital statistics (numerator only), population censuses or population-based surveys

Purposes and Issues
The TFR is the most widely used fertility measure in program impact evaluations for two main reasons: (1) it is unaffected by differences or changes in age-sex composition, and (2) it provides an easily understandable measure of hypothetical completed fertility.

Although derived from the ASFR, a period fertility rate, the TFR is a measure of the anticipated level of completed fertility per woman (or per 1,000 women) if she/they were to pass through the reproductive years bearing children according to the current schedule of ASFRs. We emphasize that the TFR is only a hypothetical measure of completed fertility, and thus women of reproductive age at any given point in time could have completed family sizes considerably different from that implied by a current TFR, should age-specific fertility rates rise or fall in the future.

Because the TFR is derived from a schedule of ASFRs, the comments and caveats regarding the ASFR also apply to the TFR (i.e., method of computation from different sources of data, effects of changing exposure to pregnancy, and implications of computation for currently married versus all women of reproductive age). As was also the case for the ASFR, the TFR may be computed for women who were continuously married or in union during the reference period of the measure in order to decrease the potentially confounding effects of differences in exposure to the risk of pregnancy (to the extent that differences are associated with marital status). This measure is known as the Total Marital Fertility Rate (TMFR).

Note also that whereas the standard age range for the TFR is ages 15-49, TFRs for other age ranges (e.g., 15-34) are sometimes used for analytic purposes, for example, in order to decrease the influences of truncation when examining cohort trends from birth history data.

Indicator

Unwanted Total Fertility Rate (UTFR)

Definition
The number of unwanted children who would be born per woman (or per 1,000 women) if she/they were to pass through the reproductive years bearing children according to current rates of unwanted fertility

One can derive the unwanted total fertility rate by subtracting the "wanted" component from the total fertility rate.

The indicator is calculated in one of two ways:

(1)

$$UTFR = 5 \frac{(B_{a,u})}{(E_a)}$$

or (2)

$$UTFR = TFR - WTFR$$

Where:

$\mathbf{B_{a,u}}$ = the number of births to women in age group *a* during a given year or reference period that are unwanted;

$\mathbf{E_a}$ = the number of person-years lived by women in age group *a* during the reference period;

TFR = the total fertility rate for a given year or reference period; and

WTFR = the wanted total fertility rate.

Illustrative Computation
Estimate of the UTFR for all women aged 15-49, Egypt, 1997-2000.

UTFR = TFR – WTFR
= 3.53 – 2.85
= 0.68

Source of data: Egypt Demographic and Health Survey, 2000.

Data Requirements
Responses to survey questions, by age of woman, on:

- Numbers and dates of births during a recent period (typically the two to five years prior to a survey);
- Desired number of children or family size;
- Number of surviving children; and
- Desire for additional children.

Data Source(s)
Population-based surveys

Purposes and Issues
The UTFR provides a hypothetical measure of the average number of "unwanted" births a woman or cohort of women would have during her/their reproductive career(s) if they were to follow current schedules of unwanted fertility. As the wanted status of births is based upon reproductive preferences or demand for children, the indicator provides a conceptually direct measure of family planning program impact in enabling women and couples to achieve their reproductive goals (i.e., to avoid unwanted pregnancies).

In the illustrative computation for Egypt, for example, the estimate of .68 indicates that women in Egypt would have on average .68 unwanted births over the course of their reproductive years if current levels of age-specific fertility and demand for children were to prevail throughout the reproductive years of women of reproductive age at the time of the 2000 DHS.