

Implications for Evaluating the Impact of Family Planning Programs with a Reproductive Health Orientation

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In 1994, Jain and Bruce proposed an index—HARI, an acronym for Helping Individuals Achieve their Reproductive Intentions—to measure success or failure of family planning programs with a reproductive health orientation. HARI applies the principle of individual rights and well-being to the assessment of these programs. The index measures two components: the achievement of an individual's reproductive intentions and the avoidance of severe reproductive health problems associated with an individual's efforts to achieve her stated reproductive intentions. A family planning program can be deemed successful if an individual is able to avoid having an unintended pregnancy (or is able to have a wanted child) within the stipulated period and if she experiences no severe reproductive health problems in the process. If these conditions are not met, the program could be deemed a failure. The HARI index has not yet been applied in field conditions. This report illustrates the procedure for estimating HARI by using data from a panel survey conducted in Peru. It discusses the usefulness and limitations of the index in assessing the success or failure of a family planning program with a reproductive health orientation. (STUDIES IN FAMILY PLANNING 2001; 32[3]: 220–229)

Because most government funds allocated to the population sector traditionally have been spent on family planning programs and related activities, these programs have received a considerable degree of scrutiny since their inception in the mid 1960s. Although the establishment of these programs has been guided by multiple rationales, the overall intent of governments and donors has been to reduce fertility and population growth. Consequently, the success or failure of these programs has been judged in terms of their contributions to increases in contraceptive use or decreases in fertility and population growth (see, for example, Bongaarts et al. 1990). Two extreme views on this subject have been expressed: The view reiterated by Pritchett (1994) is that fertility is principally determined by the desire for children and that the family planning program in a country is not a major factor in determining fertility differences among countries. The other extreme, prevalent in the population field, is that these programs can reduce high fertility in almost all settings. Assuming that public or private services for mod-

ern contraceptive methods are required, the main difference between the two perspectives is the belief regarding the influence of program inputs on lowering desired family size.

Another dimension of the effort to evaluate the success or failure of these programs, following the goals set out at the 1994 International Conference on Population and Development (ICPD) in Cairo (United Nations 1994), is the desire of national governments and international donors to broaden the scope of family planning programs to incorporate reproductive health services. The focus of this study is to determine how to incorporate a reproductive health perspective in modifying the dependent variable used in judging programs' success or failure.

How reproductive health services are provided in a country depends upon the availability of financial and human resources and whether contraceptive services are offered as a component of health services or as part of a vertical family planning program. The addition of reproductive health services where contraceptive services are already integrated with health services may be easier to accomplish than where contraceptive services are offered within a vertical family planning program. Adding reproductive health services to a preexisting family planning program is challenging, especially when the

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existing services are weak and resources are scarce. For such an effort to succeed, consistency is required among three dimensions of the program—objective, design, and the criteria used to assess its success or failure. Program managers cannot be expected to change the design of their programs to encompass reproductive health services without modifying the main objective and the main assessment criteria. Accordingly, Jain and Bruce (1994: 199) suggested that instead of the traditional objective of reducing fertility and population growth, the primary goal of these expanded programs be “to help individuals achieve their reproductive intentions in a healthful manner.” In addition to a redefinition of the objective, Jain and Bruce also proposed an index—HARI, an acronym for Helping Individuals Achieve their Reproductive Intentions—to measure the success or failure of family planning programs with a reproductive health orientation.

HARI applies the principle of individual rights and well-being. For example, suppose a woman wants to have a child within two years and another woman does not want a child for two years. From the perspective of the first woman, the service-delivery program can be deemed successful if she is freely able to have the wanted child within the stipulated period of two years and if she does not experience any severe reproductive health problem in the process. Similarly, from the perspective of the second woman, the program can be deemed successful if she does not have a child for two years and does not experience any severe reproductive health problem during that period of time. Otherwise, the program could be deemed a failure (see Table 1).

This index has not yet been applied in field conditions. The challenge of field application is how to collect and aggregate the required information. This study illustrates the procedure for estimating HARI by using data from a panel survey¹ conducted in Peru. The usefulness and limitations of this index in assessing the success or failure of a family planning program with a reproductive health orientation are discussed.

Data

Data used in the present analysis refer to information collected from 1,093 married women living in two regions of Peru, Nor-oriental del Meranon and Lima. These women were interviewed for both the 1991–92 Demographic and Health Survey (DHS) and for a 1994 follow-up survey (see the Appendix for the survey questions used in this analysis).² The 1991–92 DHS survey collected information about the reproductive intentions of the respondents. The 1994 follow-up survey collected

Table 1 Suggested classification of a family planning and reproductive health service-delivery program as a success (S) or a failure (F) from the perspective of an individual making use of the services, by the individual’s reproductive intention

Reported reproductive intention at time t_1	Reported pregnancy between time t_1 and t_2	Reported severe reproductive health problem associated with pregnancy or use of contraceptives between time t_1 and t_2	
		Yes	No
Wants next child soon	Yes	SF	SS
	No	? F	?S
Wants next child later	Yes	FF	FS
	No	SF	SS
Does not want another child	Yes	FF	FS
	No	SF	SS

Notes: The first letter indicating program success or failure is based on the occurrence of unplanned, unwanted, or intended pregnancy, and the second letter is based on the occurrence of a severe reproductive health problem associated with pregnancy or use of a contraceptive. The symbol ‘?’ includes women with potential infertility problems as well as those who might be practicing contraception. The classification of the program as S or F will depend upon the respondent’s fertility status and contraceptive behavior.

data concerning the women’s contraceptive use and fertility between the two surveys, and also on their reproductive intentions at the time of the survey. These data are used to estimate the occurrence of unplanned pregnancy, unwanted pregnancy, and not having an intended pregnancy. The 1994 follow-up survey also collected information about respondents’ health-seeking behavior, including any overnight stay in a hospital (hospitalization) and about their use of a health facility. This information is used to clarify women’s reports of their experiences of reproductive health problems.

Measurement

HARI measures two components: whether and to what extent women achieve their reproductive intentions and whether women avoid associated severe reproductive health problems.³

Achieving Reproductive Intentions

Within the component that measures whether reproductive intentions have been achieved are three subcomponents: avoiding unintended pregnancies, regret at having undergone sterilization, and having intended pregnancies. The extent of sterilization regret is estimated from women’s reports in the 1994 survey; the other two subcomponents are estimated by linking the reproductive preferences reported by the Peruvian women in 1991 to the occurrence of subsequent pregnancies as reported in 1994. A respondent’s reported fertility preferences concerning the near future are considered reasonably reliable⁴ and can be used to determine whether she met her

reproductive intentions subsequently. In the Peru sample, a cutoff date was established that provided equal exposure to the risk of becoming pregnant for all women. This period was set at 29 months—the minimum number of months between two surveys. All pregnancies that began within 29 months of the first survey are included in the computation; pregnancies that began after 29 months are censored.⁵ All pregnancies are included whether or not they ended in a live birth.

About 19 percent of all women in this sample had at least one live birth between the two surveys. Typically, family planning programs have focused on reducing this number. Nearly one-half of these births were wanted, however. A focus on reducing total fertility invariably implies an effort to reduce both wanted and unwanted fertility. Wanted fertility and desired family size clearly depend upon various societal and individual circumstances, such as female education, infant and child mortality, gender equity in education, health, and economic opportunities. Any substantial modification of these factors is beyond the scope of family planning programs.⁶ Moreover, a substantial level of unwanted childbearing already exists in almost all developing countries. Hence, the first priority for these family planning programs should continue to be to help individuals to avoid unwanted childbearing.

The failure rate of the family planning program based on the number of unwanted births reported decreases only to 10 percent. This proportion does not include mistimed births (4 percent), unwanted pregnancies with other outcomes (such as stillbirths, miscarriages, and abortion) (4 percent), or mistimed pregnancies with other outcomes (1 percent), however. Some of these events may lead to unsafe abortions and must be taken into account. For this reason, women were classified as being unable to meet their reproductive intentions if they had had an unintended pregnancy between the two surveys—that is, if they became pregnant even though they had reported in 1991 that they wanted no more children (unwanted pregnancy) or if they became pregnant at least three months earlier than they said they had wished to (mistimed). According to this definition, 20 percent of all women were found to have at least one unintended pregnancy (see Mensch et al. 1997 for further details). Therefore, the inclusion of mistimed births and unwanted and mistimed pregnancies with other outcomes almost doubles the program failure rate from 10 to 20 percent.

Conversely, nearly 80 percent of women did not have an unintended pregnancy during 29 months of exposure. This number includes those women who were sterilized or whose husbands were sterilized. A program with a heavy emphasis on sterilization will receive a high score on this indicator because sterilization is a perma-

nent method, and only a small fraction of sterilized women become pregnant. So that programs promoting sterilization do not receive an unduly high score, women's subsequent reports of regret at having undergone sterilization should be counted as instances of the program's failure.

In this sample of Peruvian women, 150 women (or their husbands) were sterilized by 1994. About 14 percent of them (or 2 percent of all women) reported regret at having undergone the operation. Fifteen out of 21 women who expressed regret gave "want another child" as the reason for their regret. No one reported a child's death as her reason for sterilization regret. About 52 percent of sterilized women reported that they were not told about any other method, 51 percent were not told about the possible side effects of the procedure, 35 percent were not told about where to go in case they had any problems afterward, and 13 percent were not even told that they could not have any more children as a result of the operation. The proportion (33 percent) of women who expressed regret about having been sterilized among those who did not receive information concerning any of the four items mentioned is nearly five times higher than that among those who received information (7 percent) about all of the four items. About half of the women received information about three or four items, and the remaining women received information about none to two items. The proportion of women who expressed regret in these two groups of women were 8 percent and 21 percent, respectively.

Although the reasons for regretting sterilization may include changes in reproductive intentions and in family situations, such as divorce or a child's death, having no choice of contraceptive method and having no information about the permanent nature of the sterilization operation certainly contribute to feelings of regret. Providing women with adequate information prior to the operation and insuring that women do not subsequently regret the operation both fall within the scope of family planning programs oriented toward helping individuals meet their reproductive intentions. For this reason, the expressed feeling of sterilization regret can be included as a failure in the same way that the occurrence of an unintended pregnancy among those who used a reversible method or among those who did not use any method at all is counted as a failure.

Women who reported that they wanted to have another child but who failed to become pregnant for various reasons, including infertility problems, were treated as having met their reproductive intention in the earlier analysis (Mensch et al. 1997), because some of them could have become pregnant after the cutoff date. Using survey data for identifying women with infertility problems

is difficult. In this analysis, however, an attempt is made to identify such women by using a working definition of infertility that includes outcomes experienced by those women who reported wanting to have another child, who were not practicing contraception at the time of both surveys, and who did not become pregnant between the two surveys. The rationale for this definition is that these women may have been trying to become pregnant but failed to do so. Admittedly, some of them may have become pregnant and some may have changed their minds about having another child after the cutoff date, and others may not have been exposed to the risk of becoming pregnant because of a temporary separation or other circumstance. This definition may, therefore, provide an upper estimate of the proportion of women with infertility problems.

Forty out of 1,093 (or 4 percent) of Peruvian women in this sample were identified as possibly having an infertility problem according to the definition given above.⁷ This estimate of infertility is based on statistical inference from women's reports about wanting more children, not practicing contraception, and not becoming pregnant in the period between the two surveys. The estimate can be further refined by ascertaining directly from women whether they were trying to become pregnant and whether some reasons (for example, a temporary separation) existed for their not having become pregnant.

Combining the three subcomponents—unintended pregnancy, sterilization regret, and potential infertility—provides an estimate of the proportion of women who were unable to achieve their stated reproductive intentions. Thus the results from the Peruvian surveys indicate that about 25 percent of the women surveyed were unable to achieve their stated reproductive intentions, implying that the remaining 75 percent were able to do so during a period of 29 months of exposure.

Reproductive Health Problems

Although the methodology of data collection concerning reproductive intentions and behavior has been improved over the years, the same cannot be said of that for data required for estimating reproductive health problems. A great deal of experimentation is necessary to obtain the same level of accuracy for data concerning reproductive health problems as for data related to fertility.

The information required for estimating the HARI index is different from that required for accurately estimating the "true" prevalence of a particular reproductive morbidity at a given time. What is needed to estimate the HARI index is an identification of severe reproductive health problems that may be associated with women's efforts to achieve their reproductive intentions,

as well as the identification of those women who may have experienced these problems during the observation period. Recognizing the need for experimentation, the designers of the 1994 follow-up survey included a limited number of questions put to respondents about hospitalization (an overnight stay in a hospital) and reasons for hospitalization, about visiting a health facility or a health professional, and about what the attending professional might have told them. Not all hospitalizations are included in estimating the extent of severe reproductive health problems. The information collected about reasons for hospitalization is used in estimating the extent of severe reproductive health problems associated with pregnancy or contraceptive use that women experienced during the period of observation. Data concerning visits to a health facility are not used here because they refer to less severe problems and are more likely to reflect reporting errors than are responses concerning hospitalization. Furthermore, where access to care is limited, women may not seek it even though they are experiencing a reproductive health problem (see Jain et al. 1996 for further discussion of these issues).

About 28 percent of women reported having had an overnight stay in a hospital during the period covered by the two surveys. The reported reasons for hospitalization⁸ were: surgery (10 percent); heart conditions (less than 1 percent); childbirth (15 percent); stillbirth (less than 1 percent); abortion or miscarriage (3 percent); dilatation and curettage (2 percent); ectopic pregnancy (0.1 percent); and other reasons (6 percent). Those women who reported surgery or other reasons as a cause for hospitalization were asked to specify the reason. Reasons for surgery were divided into two groups: those related to reproduction, including cesarean section and tubal ligation, and those unrelated to reproduction. Other reasons were similarly subdivided: those related to reproduction and those unrelated to reproduction. Reasons related to reproduction were further classified as potentially related to pregnancy or to contraception and as other reasons. Those reasons that could be related to contraceptive use were then cross-classified according to use of hormonal methods or IUDs, in order to identify women who could have suffered a severe reproductive health problem associated with the use of a particular type of contraceptive.

Women who reported that they had suffered a severe reproductive health problem related to pregnancy included those who reported that they had been hospitalized: six women had had surgery related to pregnancy, 33 had had an abortion or a miscarriage, 26 had had dilatation and curettage, one had had ectopic pregnancy, and seven were hospitalized for other reasons related to pregnancy.⁹ Some women experienced multiple episodes of severe reproductive health problems related to

pregnancy. Forty-seven women reported at least one of the conditions listed above, the equivalent of about 4 percent of all women surveyed.

Women whose severe health problem may have been related to contraceptive use include those who used either hormonal methods or an IUD and reported hospitalization: Four of these women had surgery related to contraception and another four were hospitalized for other reasons related to contraception. Seven women suffered at least one episode of a severe reproductive health problem that may have been related to contraceptive use, the equivalent of about 0.6 percent of all women surveyed.¹⁰

Combining the two groups provides an estimate of severe reproductive health problems associated with pregnancy or contraception. In all, about 5 percent of women surveyed reported having suffered at least one episode of a severe reproductive health problem associated with pregnancy or the use of a contraceptive. This estimate is affected by the women's health-seeking behavior, including their access to a hospital and errors in their reports of the reasons for hospitalization. The validation of these reports may not be a serious problem for reasons including abortion or miscarriage, ectopic pregnancy, and dilatation and curettage. These reasons account for 36 cases of the 47 included in the category of reproductive health problems associated with pregnancy. The reasons reported by the remaining 11 women who are classified in this category and the seven who are classified as having a severe reproductive health problem associated with contraceptive practice certainly need to be validated. A review of hospital records comparing the diagnosis given with the diagnosis the women recalled could be undertaken to address the problem of recall bias and could assist in validating the diagnosis the women reported. A comparison of hospital records and women's reports may not resolve the problem of validity completely, however, because of the poor correlation between diagnoses based on clinical examination and those based on laboratory tests, especially in cases of gynecological morbidity (not included in this analysis). In addition to validating the reasons reported for hospitalization, future data-collection efforts should focus on those women who did not visit a hospital to determine their experiences with severe reproductive health problems.

The Composite HARI Index of Success

A considerable overlap exists between the two components of HARI (see Table 2). About 20 percent of all women surveyed who had at least one unintended pregnancy

are considered as having experienced a program failure; but 13 percent of these women (or nearly 3 percent of all women surveyed) also reported having a stay in the hospital as a result of problems related to pregnancy. Similarly, the 80 percent of all women with no unintended pregnancy are considered as having experienced a program success; but this number includes 2 percent who reported hospitalization as a result of problems related to pregnancy or contraception, 4 percent who may have a potential infertility problem, and another 2 percent who expressed sterilization regret.

Table 3 shows the estimated values of program failure rates using different criteria for failure. The proportions of women who had at least one live birth and of those who had at least one unwanted birth are also shown for comparison purposes. About 19 percent of all women had at least one live birth during 29 months of exposure, but only about 10 percent of all women had at least one unwanted birth. Inclusion of other reasons increases the program failure rate from about 10 to 28 percent as we move from unwanted births and add, successively, mistimed births and all other unwanted and unplanned pregnancies, potential infertility problems, expressed sterilization regret, and severe reproductive health problems associated with pregnancy or contraception.

Table 3 also shows the estimated value of the HARI index of program success in helping women to achieve their reproductive intentions and simultaneously avoid severe reproductive health problems associated with their efforts to do so. The value of this index is estimated by subtracting from 100 the proportion of women who had at least one unintended pregnancy or expressed sterilization regret, or have potential infertility problems, or suffered from a reproductive health problem associated with pregnancy or with the use of a contraceptive.¹¹ The value of the HARI index is estimated to be 72 in this sample of Peruvian women, that is, 72 percent of Peruvian women in this sample were able to achieve their reproductive intentions over a period of 29 months without suffering any severe reproductive health problem associated with their efforts to do so.

This percentage may appear high at a first glance, especially because 70 percent of the Peruvian women reported practicing contraception in both surveys, including about 40 percent who reported using a modern method in 1991, compared with 44 percent who did so in 1994. The value of HARI is likely to decrease with an increase in the women's exposure to the risk of becoming pregnant, because with the increase in time, more women are likely to experience an unintended pregnancy or a reproductive health problem. The basis for the high number for the HARI index of success is the safety of

Table 2 Relationship among different reasons for program failure: unintended pregnancy, hospitalization, potential infertility, and sterilization regret, Peru 1991–94

Reported reproductive preference (1991 DHS)	Percentage of women with at least one unintended pregnancy between 1991 and 1994										
	Yes			No						All women	
	Hospitalization related to pregnancy			Hospitalization related to		Potential infertility	Expressed sterilization regret	Neither hospitalization nor infertility nor regret	Total	Percent	(N)
	Yes	No	Total	Pregnancy	Contraception						
Wants next child within two years	0.3	1.0	1.3	0.5	0.1	1.0	0.0	9.2	10.8	12.1	(132)
Wants next child in two or more years	0.8	3.7	4.5	0.3	0.2	2.6	0.4	11.9	15.4	19.8	(217)
Does not want another child	1.4	12.4	13.8	1.0	0.4	0.0	1.5	51.3	54.2	68.1	(744)
All women (percent)	2.5	17.1	19.6	1.8	0.6	3.7	1.9	72.4	80.4	100.0	
(N)	(27)	(187)	(214)	(20)	(7)	(40)	(21)	(791)	(879)		(1,093)

Note: Percents may not sum to total because of rounding.

modern contraceptives and the level of infertility in the population, which is low. The level of sterilization regret in this Peruvian sample is also low. Moreover, the definition of program success concerning the achievement of reproductive intentions includes those women who at the interview in 1991 said that they wanted additional children and in fact had a child between the two surveys. It also includes those women who at the first survey in 1991 said that they wanted to space their childbearing for at least two years or wanted no more children and who did not have a pregnancy during the stipulated period between the two surveys (reckoned without regard to their contraceptive-use history). By this reckoning, the program is considered successful regardless of the respondent's contraceptive use or her visits to facilities to avoid an unintended pregnancy. The index reflects reality according to the reproductive intentions stated by the women surveyed. By this means, the index overcomes the problem created by clandestine or unreported use of contraceptives identified in some settings.

Table 3 Percentage of women surveyed whose reports indicate that they were unable to achieve their reproductive intentions or to avoid severe reproductive health problems, Peru, 1994

Reports	Percent
Had at least one live birth	19.3
Had at least one unwanted birth	10.2
Had at least one mistimed birth	4.4
Had at least one unwanted pregnancy with other outcomes	3.6
Had at least one mistimed pregnancy with other outcomes	1.4
Had at least one unintended pregnancy	19.6
Had potential infertility problem	3.7
Experienced sterilization regret	1.9
Unable to achieve reproductive intention	25.2
Had severe reproductive health problem related to pregnancy or contraception	4.9
Unable to achieve reproductive intention or suffered severe reproductive health problem associated with pregnancy or contraception	27.6
HARI index of success in achieving reproductive intentions and avoiding severe reproductive health problems	72.4

Discussion and Conclusion

Interest is growing in improving the reproductive health of women in developing countries. Since this interest was articulated and endorsed unanimously by the governments participating in the 1994 ICPD in Cairo, efforts to do so have begun with the existing family planning program of each country. Although reproductive health is a broad concept and improvements in reproductive health require involvement not only of the health sector but also of other sectors of development, incremental changes can be made by enlarging the scope of services and information currently provided through family planning programs.

Because factors affecting wanted fertility are beyond the scope of family planning programs and because a substantial proportion of the population in most developing countries seeks to regulate fertility, the first priority for these programs should continue to be to help individuals and couples avoid unwanted childbearing. This help should be provided in such a way that women do not suffer associated severe reproductive health problems in their attempts to regulate their fertility.

Jain and Bruce (1994) proposed the HARI index in order to assess the success of family planning programs with a reproductive health orientation. In the illustration provided here, the calculation of HARI based on Peruvian data incorporated unwanted and unplanned childbearing (births and pregnancies), sterilization regret, potential infertility, and women's experiences with severe reproductive health problems associated with pregnancy and contraception, extending beyond the traditional indicators such as total fertility and unwanted fertility. No one indicator can serve all purposes. HARI is no exception. It is not a substitute for other indicators of input, process, outcome, and mortality. HARI provides a way, however, to incorporate a client's perspec-

tive as well as some reproductive health problems in assessing the effect of family planning programs.

Undoubtedly, both components of HARI will have to be measured separately. What is to be gained by combining them in one index? One potential advantage of using a combined indicator is that both components thereby receive appropriate attention from researchers, service providers, and program managers. An important issue for changing the design of services is the composition of the evaluation index. The proportion of women who had a live birth (wanted or unwanted), for example, is the same as that of those who had an unintended pregnancy, but the composition of the two groups is different. The index's first indicator implies a focus on reducing both wanted and unwanted births, whereas the second implies a focus on reducing unwanted and mistimed pregnancies. This shift in focus could mean an increase in efforts to enhance the use-effectiveness of contraceptive methods by helping individuals to select a method appropriate to their circumstances and by encouraging them to switch methods if they judge that the method selected initially has proved unsuitable. This shift would require that the information, education, and communication (IEC) efforts be modified together with the programs for training providers who interact directly with clients. The focus of IEC and provider-training efforts would shift from motivating individuals to have small families to offering them accurate information about how and where to obtain contraceptive services and supplies and about the kind of care to expect at a service facility. Such a shift in the focus of IEC and provider-training efforts might result in a decreasing need for induced abortions.

The application of HARI in this example incorporated severe reproductive health problems associated with contraception and pregnancy, because these problems are directly associated with women's efforts to achieve their reproductive intentions. The net contribution (about 2.4 percentage points) of this second component is small because of the overlap of about 2.5 percentage points with the first component (see Table 2). Despite the magnitude of this second component, severe health problems associated with the management of pregnancy and the practice of contraception are important from the individual's perspective. These health problems are likely to receive greater attention in the information and services components of programs if they are also incorporated in the evaluation index. For example, a number of safety issues associated with the use of contraceptives can and should be addressed by providing women with accurate information at the time of method selection. They should receive information about potential medical and social contraindications, potential adverse effects,

and means of getting help early, including switching methods if they experience problems. To help reduce sterilization regret, providers can insure that women are clear about not wanting another child, that they understand the permanent nature of the operation, and that they know of or have used other methods. The safe management of intended and unintended pregnancies is likely to remain a major problem requiring continuous attention, however.

The current application of HARI cannot be used to assess the relative importance of a larger set of reproductive health problems as implied by the ICPD Programme of Action. In response to ICPD, however, it incorporates a smaller set of reproductive health problems associated with pregnancy and the practice of contraception. The incorporation of these problems in the index is not intended to suggest that prevention and treatment of other reproductive health problems are not important. Little consensus exists on the types of services needed to improve reproductive health, a broad and inclusive concept (for example, see Pachauri 1996 for a comprehensive definition for India). In the effort to extend traditional family planning programs to include reproductive health programs, thinking in terms of four goals of reproductive health services may be useful: (1) to make the practice of contraception safe and voluntary; (2) to manage unintended pregnancies safely and to insure the safe outcome of intended pregnancies; (3) to treat gynecological problems, including reproductive tract infections, sexually transmitted infections, breast and cervical cancers, and infertility; and (4) to address broader issues of gender inequality and sexuality (for example, sexual coercion, domestic violence, neglect of female children, and sex-selected abortions). In moving from the first to the fourth goal, the role of the traditional family planning program increasingly becomes less important, whereas the role of health and other aspects of development clearly becomes more important.

Which aspects of reproductive health should be addressed by existing family planning programs traditionally aimed at reducing fertility and population growth? The answer depends upon which reproductive health services are already available in a country and whether anything would be gained by integrating those services with the family planning program. Most developing countries have, at best, a family planning program focused on reducing total fertility, a program to reduce infant and child mortality through immunization alone or integrated with other efforts such as growth monitoring and breastfeeding, and an effort in place to reduce maternal mortality by promoting antenatal care and institutional delivery. Most of these services are weak and require additional resources. In this context,

delivering appropriate services to alleviate reproductive health problems is not a simple proposition. Expanding and strengthening existing reproductive health services and adding new services, whether offered as a vertical program or as a part of existing family planning or health programs, require more than changing the evaluation criterion for assessing the success or failure of family planning programs. Services required to prevent, screen, and treat women for many reproductive morbidities require political will, additional financial resources, and development and implementation of effective programs. Services to provide safe abortions, moreover, require changes in legal systems and religious beliefs in many countries.

Little can be gained by including infant, child, and maternal mortality and breast and cervical cancers in the HARI index. Some of these events have well-established and tested indicators and others are too rare to be captured in a survey of this kind. Moreover, indicators of preventive measures such as breast examinations and pap-smear tests could be included in process indicators. Other important reproductive morbidities such as reproductive tract infections (RTIs) and sexually transmitted infections (STIs) can be incorporated in HARI as service programs begin to address these morbidities and as progress is made toward identifying them in the absence of lab tests. Although efforts are being made on many fronts, family planning programs can make important contributions to the improvement of reproductive health by making the use of contraceptives voluntary and safe and by modifying the content of information exchange with clients. For example, in the absence of services to screen and treat STIs, family planning programs should offer women information about the degree of protection provided by a contraceptive method against transmission of such infections. Information about the medical and social contraindications of a method can also help women to reject methods not appropriate to their circumstances (see Lazcano Ponce et al. 2000). These programs can also refer women to other facilities that provide services for the treatment of STIs.

Various methodological problems remain to be addressed in using this approach. For example, each event in this application has received equal weight, that is, having an unwanted birth is treated the same as experiencing a reproductive health problem or having a mistimed pregnancy. Moreover, each woman, regardless of the number of events she has experienced, has received equal weight. Women experiencing an unwanted birth are treated the same in the index as those having an unwanted pregnancy and hospitalization associated with abortion. Also, the index is not adjusted for changes in reproductive intentions and inappropriate provision or inappropriate use of reversible methods. In the absence

of information on cause of death, eight women who died between the two surveys in the Peruvian sample are not included in the HARI index. Because women may die from unsafe abortions and unsafe childbirth practices before they have a chance to reach a hospital, this omission could be serious. A larger sample would be needed to capture these deaths, however. Addressing all these methodological issues at the initial stage of development of this index may not be feasible. Nevertheless, incorporating individuals' perspectives and experiences in an indicator used to assess the success or failure of a program with a reproductive health orientation is important.

The application of HARI described here used data from a panel survey, a type of survey that is not usually conducted in developing countries, a factor limiting the usefulness of this index. HARI can be used in experimental projects designed to assess the effectiveness of an intervention intended to improve specific components of services and information, however. It can also be used at the local level to evaluate the performance of service providers or clinics. Service providers routinely collect information annually from women at the beginning of each year using surveys that could be designed to include questions about their future reproductive intentions and reproductive health needs. This information could be linked with the subsequent behavior of the women surveyed to calculate HARI for each provider and clinic. Problems arise with aggregating this sort of information at a state or a country level through a management information system. For such cases, panel survey data are not essential for calculating the HARI index. The information from the Peruvian panel survey was used here to estimate achievement of reproductive intentions and level of infertility, but not for estimating sterilization regret or severe reproductive health problems associated with pregnancy and contraceptive use. The data on all four items required to calculate HARI can also be collected from cross-sectional surveys, albeit with some loss of accuracy in estimating the first two components.

Items concerning reproductive intentions and the wantedness of recent pregnancies or births are standard content in demographic surveys, presented in well-tested, concise formats. The estimates of unwanted and mistimed fertility based on panel surveys would be more accurate, however, than those based on cross-sectional surveys. Although an unbiased estimate of unwanted fertility based on cross-sectional surveys at the aggregate level can be obtained (Bongaarts 1990), the individual responses cannot be adjusted. In the present example, 211 women gave birth between two surveys. Forty-seven percent of them would be classified as having an unwanted birth on the basis of retrospective reports, compared with 53 percent if classified on the basis of pro-

spective reports. At the aggregate level, at least in this sample, the use of cross-sectional data would not have made much difference; it would have slightly overestimated the value of HARI. The magnitude of this bias in other settings may be smaller or larger than that observed in this sample. At the individual level, moreover, the reports would be inconsistent for about 27 percent of these women.

The data required for estimating the gross level of infertility can also be collected retrospectively in a cross-sectional survey, perhaps without much loss of accuracy, by asking additional questions of women who did not become pregnant within a reference period of, for example, three years prior to the survey. They could be asked whether they had wanted to become pregnant, whether their partners had wanted them to become pregnant, whether they were trying to become pregnant, whether they had practiced any method of modern or traditional contraception during this period, and whether any long period of separation between partners had occurred.

The data required for estimating sterilization regret and severe reproductive health problems in Peru were collected retrospectively. In order for the survey methodology to provide useful information about severe reproductive health problems, however, the data-collection method should be streamlined by standardizing the recall period. Moreover, the recall period for this purpose must be consistent with the reference period used to estimate the achievement of reproductive intentions and infertility. Some experimentation is required to fix the reference period. Although a short recall period will reduce errors in reporting reproductive health problems, it may not be adequate for experiencing a wanted or unwanted pregnancy. A balance between the two might be achieved by considering a reference period of two to three years.

The methodology should be further strengthened by collecting information on such topics as: (1) respondents' experience with morbidities associated with childbirth at home or in the hospital and (2) respondents' reasons for not visiting a hospital. The collection of information about experience with reproductive health problems among those who did not visit a hospital would require experimentation and probing, which can be facilitated by collecting information about the sequence of contraceptive use, pregnancy, health-related events, and hospitalization, possibly by means of a calendar. The focus of the index is not on estimating any disease-specific prevalence rate but on obtaining rough estimates of severe reproductive health problems that women experience in their efforts to achieve their reproductive intentions.

Appendix

Questions from the Peru 1994 survey used in this analysis

Sterilization regret

1. Do you regret that (you/your husband) had the operation not to have any (more) children?
 - 1a. If yes, why do you regret the operation?
 - Respondent wants another child
 - Partner wants another child
 - Side effects
 - Child died
 - Other (specify) _____
2. Now I would like to ask you about the sterilization services you/your husband received. Did the provider tell you/him:
 - a. About any other method?
 - b. About possible side effects of the operation?
 - c. Where to go if there is a problem
 - d. That you cannot have any more children after sterilization?

Health conditions

We would like to ask you some questions about your health since January 1, 1991.

1. Have you been hospitalized since January 1, 1991? (had an overnight stay in a hospital)
 - 1a. If yes, why were you hospitalized?
 - Surgery
 - Heart condition, stroke, heart attack
 - Childbirth
 - Stillbirth
 - Abortion / miscarriage
 - Dilatation and curettage
 - Ectopic pregnancy
 - Other (specify) _____

(If one of the responses is "surgery," ask about the type of surgery [operation] that the respondent had and write it down.)

Notes: Questions regarding reproductive preference, use of contraceptives, occurrence of pregnancy, and pregnancy outcome are the standard DHS questions. Additional probing is required to assess potential infertility problems. Additional questions are needed to assess reproductive health problems experienced by those who were not hospitalized and to obtain respondents' reasons for not visiting a hospital. Additional probing is also required to assess morbidities associated with childbirth at home or in the hospital. Data should be collected about the cause of death for women who died during the reference period. (This requirement does not apply to cross-sectional surveys of women.)

Notes

- 1 The panel-survey requirement can be relaxed, as discussed in the conclusion.

- 2 The original DHS sample from these two regions included 1,850 women, and interviewers conducting the follow-up survey were able to locate 1,370 women (74 percent of the original sample), of whom 63 were excluded because of counting errors. Of the remaining 1,307 women, 1,093 were believed to have been interviewed in the 1991–92 DHS. (See Mensch et al. 1997 for further details about the follow-up survey and the creation of the matched sample.)
- 3 HARI as initially proposed (Jain 1992) did not include the second component related to severe reproductive health problems associated with efforts to achieve reproductive intentions. The index, in the absence of the reproductive health component, is a modification of the concept of extended use-effectiveness proposed by Tietze and Lewit (1968) with one major difference: Among those seeking to space their children, the extended use-effectiveness concept attributes pregnancies that occur after the initiation of a contraceptive method to program failure, whereas HARI does not. Moreover, the extended use-effectiveness concept does not include women who do not initiate contraceptive use, whereas HARI can include nonusers through a population-based panel study.
- 4 The issue of reliability has been discussed widely in the demographic literature and by Mensch et al. (1995) for the Peruvian sample. The fertility preferences reported at the two surveys are found to be consistent for 72 percent of all women and for the move from wanting more to wanting no more for another 15 percent, shifting predictably in the expected direction. Prospective and retrospective reports concerning the wantedness of 74 percent of the 218 babies born between the two surveys were consistent. Fertility preference stated in the 1991 survey was a good predictor of subsequent fertility: 28 percent of those who wanted an additional child in 1991 had a child subsequently, compared with 15 percent who had a child among those who had wanted no more children.
- 5 This restriction can be relaxed by using a life-table approach.
- 6 These programs have sought to reduce desired family size through motivational and propaganda messages included in the IEC component. The evidence regarding the effectiveness of these efforts in reducing desired family size is weak and debatable (see Freedman 1997 for a recent review of the literature).
- 7 The pattern of infertility by age and parity (data not shown) looks reasonable. The proportion of women with potential infertility problems is highest among those of first parity (8 percent). The overall proportion of women with such problems increases with age (from 0 among those aged 15–19 to 9 percent among those aged 40–49), a finding that may reflect secondary sterility. Surprisingly, 9 percent of women aged 40–49 with at least five births are classified as infertile according to this definition because they reported wanting an additional child at both surveys. Whether this finding is an anomaly or a real preference is not clear. This group of women has been included in the overall estimate of those failing to meet their reproductive intentions, however, as a result of applying the respondent's perspective.
- 8 The percentages for each category do not add up to the total of 28 percent because some women reported more than one reason.
- 9 Women who were hospitalized as a result of cesarean section or childbirth are not included here among those with severe reproductive health problems associated with pregnancy.
- 10 Women who were hospitalized for tubal ligation are not included among those with severe reproductive health problems associated with contraception.
- 11 In estimating the overall HARI index of success, women who experienced multiple problems were counted only once.

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