

A New Perspective on the Definition And Measurement of Unmet Need for Contraception

By Deborah S. DeGraff and Victor de Silva

A new, health-based concept of unmet need for contraception identifies women for whom pregnancy would raise the mortality risk for themselves, their expected child or their previous child because of maternal age, short birth interval or high birth order. When applied to Demographic and Health Survey data for Sri Lanka, the method classifies 4–23% of currently married women as being in need of contraception, depending on whether women who are pregnant, abstaining or using traditional methods are considered as potentially in need. The usual concept of unmet need, based on women's stated fertility preferences, classifies 6–31% as in need. The preference-based approach identifies 50–90% of the women with health-based unmet need, performing better when women using traditional methods and those abstaining from sex are included as potentially in need and when pregnant women are not. The health-based approach identifies 43–65% of those with preference-based unmet need, performing better when pregnant women are included and women using traditional methods are not.

(International Family Planning Perspectives, 22:140–147, 1996)

With the data for determining unmet need for contraception readily available from the World Fertility Surveys (WFS), the Demographic and Health Surveys (DHS) and a variety of contraceptive prevalence surveys, the measure is increasingly being used as an indicator of family planning program effectiveness in developing countries. This trend has been accompanied by research that has refined the methodology for measuring unmet need so that the estimates obtained are more consistent with the underlying theoretical concept. For example,

Deborah S. DeGraff is assistant professor of economics at Bowdoin College, Brunswick, Maine, USA. Victor de Silva is evaluation and research consultant for, and former director of, the Family Planning Association of Sri Lanka, Colombo. This research was supported, in part, by National Institutes of Health grant #2-T32-HD07237-06 for postdoctoral work by the first author at the Carolina Population Center, University of North Carolina, Chapel Hill, N. C., USA. The authors are grateful to the Sri Lankan Department of Census and Statistics and to Macro International, Inc., which jointly administered the Demographic and Health Survey in Sri Lanka and prepared data tapes. Helpful comments on earlier versions of this paper were provided by Eric Jensen and Amy Tsui. The authors gratefully acknowledge the able research assistance of Joel Aberbach and John Canders and the computer support of Ruth Marinshaw.

issues such as how to classify currently pregnant or amenorrheic women, whether to incorporate the desire to space births as well as limit births, how to identify women who are infecund, how to define contraceptive use, and how to treat prolonged abstinence have all received serious attention in the literature.¹ Although there may be some debate about specific aspects of the methodology as it has evolved, this research has resulted in more meaningful estimates of unmet need for contraception, both for evaluating family planning program performance and for projecting future demand for contraception.²

Although there have been many refinements in the measurement of unmet need, the vast majority of research in this area is based on the same underlying concept of unmet need. Westoff succinctly summarizes it as follows: "The objective is to identify the pool of nonusers of contraceptives who are capable of conceiving, who are exposed to the risk of pregnancy and *who wish to avoid or postpone pregnancy.*"³

The aspect on which we focus here is the latter part of the concept, the respondent's preferences about future fertility. Stated fertility preferences determine

whether a woman at risk of pregnancy is categorized as experiencing unmet need. Specifically, women at risk of pregnancy who are not practicing contraception are considered to be in need if they want to delay or limit childbearing. This is a logical conceptualization of unmet need, the widespread application of which attests to its validity and value.

It has recently been argued, however, that the concept of unmet need should be expanded to include situations in which the contraceptive method is used improperly, the woman is dissatisfied with her method, or the particular method used is inappropriate given the woman's health status.⁴ Although these suggestions would entail significant revision of the standard measure of unmet need to acknowledge that one can be using contraceptives (even modern contraceptives) and still experience unmet need, the resulting methodology would share with previous measures the reliance on expressed fertility preferences to identify those in need among nonusers.

This article takes an entirely different approach to the identification of unmet need. Rather than relying on a preference-based concept of unmet need, we develop a health-based measure.* Our objective, to paraphrase Westoff, is to identify the pool of nonusers of contraceptives who are capable of conceiving, who are exposed to the risk of pregnancy and *who, if they were to become pregnant, would experience an elevated risk of mortality for their expected child, their living children or themselves.*

Such a measure could be used when evaluating family planning programs from a health policy perspective. Specific-

*Similar health-based measures of unmet need have recently, and independently, been developed in P. Govindasamy and S. O. Rutstein, 1993 (see reference 26), P. Govindasamy et al., 1993 (see reference 26), and World Bank, *New Directions in the Philippine Family Planning Program*, Report No. 9579-PH, Washington, D. C., 1991.

cally, its application would provide insights into the effectiveness of family planning efforts in identifying high-risk women and providing them with appropriate information and contraceptive services. As such, it complements the preference-based approach by focusing on additional benefits of contraceptive use.

These two approaches have a fundamental conceptual difference: The standard approach relies on the expressed fertility preferences of individual women, while the health-based approach, which is based on external, objective criteria, does not take individual preferences into account. This distinction is important. The wide application of the health-based approach, with disregard for individual preferences, is highly questionable from an ethical viewpoint. It is much more appropriate as a tool for enhancing preference-based evaluations and for fine-tuning the nature of family planning services provided.

In this article, we first develop a health-based measure of unmet need that can be widely and easily applied given available data. We then apply the methodology to Sri Lanka, using data from the 1987 Demographic and Health Survey. The levels of unmet need estimated using the health-based measure are compared to levels of unmet need based on the standard, preference-based measure. Finally, we determine the extent to which the standard approach and the health-based approach categorize the same women as having unmet need, and we derive revised estimates of unmet need based on an expanded concept that combines the preference-based and the health-based criteria.

Unmet Need as We Know It

Although the underlying concept of unmet need as expressed by Westoff is clear, its implementation is not so straightforward. The complexities inherent in the measurement of unmet need for contraception have resulted in an evolution of the methodology itself, as each of these complexities has been addressed.

The first issue one typically confronts in the application of the standard, preference-based methodology is whether traditional methods of contraception (e.g., withdrawal and rhythm) should be assumed to meet contraceptive demand. We have argued elsewhere that the decision should depend, in part, on whether traditional methods are more strongly associated with contraceptive failure than are modern methods in the population studied.⁵ In practice, researchers often derive two parallel measures—one that assumes that ei-

ther modern or traditional methods satisfy contraceptive need, and a second that assumes that only modern methods do so.

A related issue is whether to include women who are practicing abstinence from sexual intercourse among those who may be experiencing unmet need. Although such women are clearly not currently at risk of pregnancy, their abstinence may be temporary and may be an undesirable method of birth prevention, even for relatively short periods of time, if they are otherwise interested in having sexual relations. Some societies have longstanding traditions regarding periods of abstinence, typically for a prescribed duration, so individual women do not necessarily choose abstinence explicitly as a form of contraception. For all of these reasons, women who have abstained from intercourse for at least one month are often included among the pool of those who may be experiencing unmet need.

A second major issue concerns the categorization of women who are currently pregnant or amenorrheic. Again, these women are not at risk of becoming pregnant in the immediate future. Accordingly, early studies of unmet need typically excluded such women from the group who might be experiencing unmet need. However, given that the pregnancy may have been unwanted or mistimed, and may have been the result of contraceptive failure, recent studies of unmet need often include pregnant women. This refinement in methodology arises from the view that these women may have been experiencing unmet need at the time they became pregnant, either because they were not practicing contraception at all or because they were in need of a more effective method.⁶ Consequently, estimates that do not allow for their inclusion among those with unmet need will be systematically biased downward.

Bongaarts argues, however, that their inclusion will yield an overestimate because some pregnant women who were experiencing an unmet need for means of spacing births at the time they became pregnant would have wanted to become pregnant by the time of the interview.⁷ This issue is further complicated by the possibility that pregnant women may be less likely to acknowledge that their pregnancy is unwanted or mistimed than nonpregnant women may be to acknowledge such feelings toward a future birth, thus resulting in an underestimate of unmet need.

Although this analysis presents results based on each view, we argue that it is preferable to include pregnant women as

candidates for unmet need, so as not to provide an inflated measure of family planning program success. In the case of Sri Lanka, fertility is relatively low and contraceptive use widespread; consequently, the results are less likely to be sensitive to assumptions about the categorization of pregnant women than would results in a high-fertility country.

The discussion thus far pertains to the identification of women who do not use contraceptives, are capable of conceiving and are exposed to the risk of pregnancy.* Once this pool is identified, the fertility preferences of each woman in the pool determine whether or not she is experiencing unmet need. Early studies typically considered only preferences about limiting births. Thus, if a woman wanted to have more children at any time, she was not included among those experiencing unmet need. Recent studies are much more likely to take into account both spacing and limiting desires. If a woman in the pool desires no further births, she is considered to have an unmet need for means of limiting births. Similarly, if a woman desires additional children, but not in the near future (usually within the next two years), she is categorized as having an unmet need for means of spacing births.

When pregnant women are included in the pool, they are considered to have an unmet need for means of limiting births if they report the pregnancy as unwanted, and to have an unmet need for spacing births if they report the pregnancy as mistimed. Total unmet need for contraception is simply the sum of the two categories of need, and is typically expressed as a percentage of the total sample of women of reproductive age.

A Health-Based Measure

The preceding discussion highlights the centrality of stated fertility preferences in the standard approach to measuring unmet need. To define our health-based concept of unmet need, we replace the preference criteria with indicators of increased health risks. Aside from this redefinition of what constitutes unmet need, the methodology is technically identical to the standard approach.

*Women are excluded from the pool if they are considered to be permanently infecund. In this analysis, all women who have an open birth interval of at least five years and have not practiced contraception during that interval are categorized as infecund. This is considered a more reliable indicator of infecundity than respondents' answers to direct questions about fecundity status. See: C. F. Westoff, "The Potential Demand for Family Planning: A New Measure of Unmet Need and Estimates for Five Latin American Countries" (reference 1).

We begin with a sample of currently married women of reproductive age.* The first step is to eliminate those who are using contraceptives. (If traditional methods are assumed not to satisfy need, women using such methods remain in the pool.) The second step is to determine which of the remaining women are capable of conceiving and are exposed to the risk of pregnancy. Again, decisions about the classification of pregnant women, the treatment of abstinence, and the determination of fecundity status must be made. We provide a range of estimates corresponding to differing assumptions regarding the inclusion of women using traditional methods, pregnant women and abstaining women to evaluate the sensitivity of results to these variations.

After identifying the pool of nonusers who are capable of conceiving and are exposed to the risk of pregnancy, we apply health-based criteria instead of preference-based criteria to determine the prevalence of unmet need. In other words, if according to the health-based criteria, a pregnancy of a woman in this pool would create an elevated risk of mortality for her expected child, her living children or herself, she is considered to have an unmet need for contraception.

Health Criteria

The health criteria selected to identify women with unmet need must possess several characteristics if they are to yield meaningful results and allow for wide application of the methodology. First, there should be a fairly well-established association in the literature between each criterion and increased mortality. Second, the information required to implement the methodology should be readily available in already-existing data sets and easily incorporated into future data collection. Third, the criteria should be characterized by some flexibility so that they can be modified in accordance with the specific demographic and health context of a given country. Finally, the criteria should be objective, not involving value judgments on the part of respondents, interviewers,

researchers or family planning program officers.†

We propose three health-based criteria—length of open birth interval, maternal age and birth order, characteristics that are among the most commonly examined explanatory variables in studies of infant and child mortality in developing countries.⁸ We focus primarily on infant and child mortality, rather than on maternal mortality, because there has been a much greater emphasis on the former in the literature. Several studies have found, however, that the same characteristics are associated with maternal mortality.⁹

• *Birth interval.* Length of birth interval is perhaps the most frequently examined determinant of infant and child mortality in developing countries, and the factor for which there are the most consistent findings. Notably, in two studies of WFS countries (using data from 26 and 39 countries, respectively), Hobcraft and colleagues found consistent evidence that a birth interval of less than two years, either preceding or following the birth of a child, resulted in an elevated risk of mortality for that child.¹⁰ Similarly, in a comparative study of 17 DHS countries, Boerma and Bicego found that a preceding birth interval of less than two years increased neonatal mortality risk by 98%.¹¹

Negative health effects of short birth intervals are hypothesized to arise through several channels, including maternal depletion, competition among closely spaced siblings for resources, greater risk of disease transmission and early cessation of breastfeeding.¹² Various approaches have been used to study the effects of birth spacing in an effort to distinguish between these channels. For example, some studies have attempted to disentangle the effects of duration of breastfeeding from the effects of length of birth interval per se. (A short birth interval may result in early cessation of breastfeeding for the previous child, while early cessation of breastfeeding contributes to short birth intervals.)

Palloni and Millman found that after they controlled for duration of breastfeeding and for reverse causality between breastfeeding and birth interval, short subsequent birth intervals continued to be associated with higher infant and child mortality in six of nine Latin American countries.¹³ Their results for duration of preceding birth intervals were somewhat less consistent. Similarly, studies by Palloni and Tienda and by Pebley and Stupp also found significant effects of preceding and following birth intervals on infant and child mortality in Peru and Guatemala, re-

spectively, after taking duration of breastfeeding into account.¹⁴

Another issue in the birth interval literature is the degree to which failure to control for short gestational period biases the results for the effect of preceding birth interval on infant mortality. Premature birth leads to a shorter birth interval, by definition, but also results in a greater risk of mortality, thus creating a spurious correlation between birth interval and mortality.¹⁵ Studies that have controlled for this source of potential bias have found that the effects of birth spacing remained significant, although perhaps somewhat weaker, when gestational length was considered.¹⁶

There is also a more general debate in this literature as to whether the relationship between length of birth interval (or maternal age or parity) and infant and child mortality is causal or spurious.¹⁷ The underlying causes of infant and child mortality are poverty-related, according to arguments that consider the demographic characteristics focused on here to be intermediate or proximate determinants that are themselves the result of socioeconomic influences. Although most recent studies have included socioeconomic factors in their multivariate analysis, few studies treat the proximate demographic characteristics as endogenous. Although this issue is clearly of importance to our understanding of the determinants of infant and child mortality, it is less important for the purposes of this research. Our objective is to find strong indicators of high risk that are easily identifiable. It is not necessary to have a full understanding of structural determinants of mortality to accomplish this goal.

• *Maternal age.* The empirical evidence regarding the effects of maternal age and parity is somewhat less robust, although the majority of studies include these variables as potential determinants of infant and child mortality. Maternal age has been associated with higher infant and child mortality in many developing countries, including Bangladesh, Brazil, Guatemala, Mali, Senegal and Sri Lanka.¹⁸ The findings, however, differ as to whether young or old maternal age leads to higher risk, whether neonatal, postneonatal or child mortality is affected, and whether the effects are significant across subsamples defined on the basis of socioeconomic characteristics such as level of education of the mother. Thus, although many studies have not found significant effects of maternal age on infant and child mortality, the general pattern that emerges from the

*Dixon-Mueller and Germain (see reference 4) argue that the concept of unmet need should not be restricted to women who are currently married. While we agree in principle with this argument, it is not of practical relevance to this study because sexual activity among unmarried women is uncommon in Sri Lanka.

†This last characteristic is important not only to ensure high data quality, but also to prevent potential misuse of the methodology, for political or ideological reasons, to target subsets of the population (e.g., according to ethnicity or religion) as being in need, or not in need, of contraception.

literature is one of greater health risks associated with pregnancy among women younger than 20 or older than 34. There is also some evidence of increased risk of maternal mortality for adolescents.¹⁹

• *Birth order.* Because the desire to remain childless is extremely rare in developing countries, we focus on higher order births rather than first births. Studies have found that infants of high birth order have a higher mortality rate in Bangladesh, Brazil, the Philippines and Sri Lanka, and in several other countries where World Fertility Surveys were conducted.²⁰ Again, the findings differ on whether neonatal or postneonatal mortality is affected, on the cutoff point used to designate a "high-order" birth, and on whether high birth order is associated with a greater risk of mortality only if the birth is also closely spaced.

In sum, there is substantial evidence that a short birth interval, young or old maternal age and high birth order are indicators of an elevated mortality risk for infants and children,* even though the effects are not significant in all of the populations studied. The following application of these health-based criteria to the case of Sri Lanka uses as specific indica-

Table 1. Percentage distribution of currently married women aged 15–49 (N=5,442), by selected characteristics, Sri Lanka Demographic and Health Survey, 1987

Characteristic	%
Age	
15–19	2.4
20–24	12.8
25–29	19.7
30–34	21.1
35–39	19.2
40–44	15.1
45–49	9.8
Children ever born	
0	8.5
1	16.8
2	22.0
3	19.7
4	12.9
5	8.5
6	5.1
≥7	6.6
Contraceptive use	
No method	38.3
Traditional method	21.1
Modern reversible method	10.8
Sterilization	29.8
Open birth interval*	
0–12 months	16.7
13–24 months	14.0
25–36 months	10.0
37–48 months	8.2
≥49 months	51.1
Total	100.0

*Among women with at least one birth. For currently pregnant women with at least one previous birth, the interval is from birth to conception.

tors of high mortality risk: The woman is younger than 20 or older than 34; she has already had at least four births;[†] and the open birth interval (or the interval from the last birth to the time of conception if the woman is pregnant) is less than 13 months, which, on average, is equivalent to an interval of less than 22 months between births.[‡]

Data and Sample Characteristics

The data used in this analysis are taken from the 1987 Demographic and Health Survey of Sri Lanka, which included 5,865 ever-married and 5,449 currently married women of reproductive age. The sample is nationally representative but for two exceptions: Seven districts in the north and east of the country (constituting 14% of the total population) were inaccessible at the time of the survey because of civil disturbances, and the estate plantation sector was oversampled to ensure that women from the Indian Tamil population, which is concentrated in this sector, were adequately represented.²¹ Sample weights are used throughout the analysis to adjust for the oversampling of the estate population. The weighted sample for our analysis consists of 5,442 currently married women.

Table 1 presents selected characteristics of the sample that are relevant to the measurement of unmet need. Given that women marry relatively late in Sri Lanka, the percentage of the sample aged younger than 20 is very small. The unusually low level of fertility in Sri Lanka, in comparison to levels in other South Asian countries, is evident in the average number of children ever born (3.0) and in the relatively large proportion of women with three or fewer births (67%). Only 38% of the women were not practicing contraception at the time of the survey, and users relied heavily on traditional and permanent methods. The duration of the open birth interval is also suggestive of a relatively low fertility profile, as almost 70% of the women had an interval from last birth to time of interview (or conception) of at least two years. Almost 9% of the sample had abstained from sexual intercourse for at least one month and 7% were currently pregnant (not shown).

Health-Based Unmet Need

The first panel of Table 2 presents two sets of estimates of unmet need for contraception in Sri Lanka using the health-based approach. One set is based on the assumption that the use of traditional methods satisfies the need for contraception, and the other set is based on the as-

Table 2. Estimates of unmet need for contraception among currently married Sri Lankan women, by type of measure and addition of pregnant and abstaining women to baseline risk group, according to whether traditional methods are assumed to satisfy need

Measure and women added	Use of traditional methods	
	Satisfies need	Does not satisfy need
Health-based		
Baseline group	4.0	9.4
Abstaining added	8.3	14.8
Pregnant added	11.0	17.6
Both added	15.8	23.0
Preference-based		
Baseline group	6.0	19.3
Abstaining added	11.9	27.2
Pregnant added	9.3	23.2
Both added	15.4	31.1
Combined		
Baseline group	7.1	20.1
Abstaining added	13.7	28.6
Pregnant added	14.9	29.1
Both added	21.9	37.6

Note: For all three measures, the baseline group considered at risk of experiencing unmet need consists of fecund, currently married women who are not using a modern contraceptive method.

sumption that it does not. Within each set, estimates vary by whether pregnant women and women who have abstained from intercourse for at least one month are included among the candidates for unmet need. Although we believe that the most inclusive definition is appropriate for Sri Lanka, we present the alternatives in Table 2 to establish a range of estimates and to examine the sensitivity of the results. For the sake of brevity, we do not break the unmet need for contraception into its component parts of need for means of spacing

*Past infant or child mortality has been suggested as a fourth indicator of elevated health risk. We question this modification because past mortality may have resulted from conditions that no longer hold, such as young age of mother. In the case of Sri Lanka, infant and child mortality rates are so low that the results are unaffected by the use of this indicator. Obviously, this would not be the case in a high-mortality setting.

†The analysis that follows has also been conducted using parity cutoffs of four and six births, instead of five, because the parity criterion is more variable in its specification throughout the literature than are the other two criteria. The results are very similar across these alternative specifications and, therefore, only one set of results is presented. In countries where fertility rates are substantially higher than in Sri Lanka, the results might be more sensitive to this change in threshold. We have not conducted sensitivity analysis for the parity and age thresholds.

‡The methodology applied to DHS data from 28 countries in two studies (see reference 26) uses the same three criteria, but with slightly different cut-off points. The criteria used in the World Bank's 1991 study of the Philippines are also the same; a cut-off point of 24 months for birth spacing is the only difference (see: World Bank, *New Directions in the Philippine Family Planning Program*, Report No. 9579-PH, Washington, D. C., 1991).

Table 3. Percentage distribution of all currently married women, and of nonusers of modern contraceptive methods, by contraceptive need status and type of measure used

Sample, status and measure	%
All	
In need	37.6
Health-based only	6.5
Preference-based only	14.6
Both	16.5
Not in need	62.4
Nonusers	
In need	63.3
Health-based only	10.9
Preference-based only	24.6
Both	27.8
Not in need	36.7
Total	100.0

births and need for means of ending childbearing.*

The health-based estimates of unmet need range from 4% to 23%. As expected, the estimates in the second column, which include users of traditional methods in the pool of candidates for unmet need, are always substantially larger than their counterparts in the first column, and the estimates rise as the definition of unmet need becomes more inclusive. It is striking that the level of health-based unmet need using the most inclusive definition is as high as 23% in a country where the contraceptive prevalence rate is relatively high, and where attainment of secondary education and access to primary health care are widespread. This figure represents 39% of currently married women who are using no method or a traditional method (59%, see Table 1).

By making a series of pairwise comparisons of alternative estimates of the level of health-based unmet need, we can gauge

*For the health-based measure of unmet need, factors associated with temporary health risk, such as young age or short birth interval, lead to an unmet need for means of spacing. In contrast, factors associated with permanent health risk, such as older age or high parity, lead to an unmet need for means of ending childbearing. This distinction for the health-based measure of unmet need is discussed in P. Govindasamy and S. O. Rutstein, 1993 (see reference 26), P. Govindasamy et al., 1993 (see reference 26), and World Bank, *New Directions in the Philippines Family Planning Program*, Report No. 9579-PH, Washington, D. C., 1991.

†Details on the derivation and interpretation of these estimates can be found in D. S. DeGraff and V. de Silva, 1991 (see reference 5).

‡An examination of the degree of correlation between these same reproductive risk factors and stated intentions to limit births in six Sub-Saharan African countries found fairly strong positive correlations, particularly for high parity (see: S. R. Radloff et al., "Reproductive Risks and Intentions in Sub-Saharan Africa," *International Family Planning Perspectives*, 15:136-143, 1989). Such correlations contribute to a high degree of overlap between the two measures of unmet need presented here.

the relative sensitivity of the results to the alternative assumptions embedded in the definition of unmet need. The results are most sensitive to the inclusion of pregnant women and least sensitive to the inclusion of those practicing prolonged abstinence, with the classification of traditional methods having an intermediate effect. This pattern reflects both differences in the number of women in each of these groups as well as differences in the incidence of the health-based criteria within each group.

The second panel of the table provides comparable estimates of unmet need for contraception based on the standard preference-based measure.[†] These estimates range from 6% to 31%. The standard estimates are always larger than the corresponding health-based estimates if pregnant women are not included among the pool of candidates for unmet need. When pregnant women are included, the opposite result sometimes obtains, perhaps because pregnant women are reluctant to say that their pregnancy is unwanted, thus yielding an underestimate of unmet need. Overall, these results suggest that preference-based unmet need for contraception in Sri Lanka is somewhat more widespread than health-based unmet need.

In contrast to the health-based measure, the preference-based measure is most sensitive to the classification of traditional methods and least sensitive to the inclusion of pregnant women. This difference suggests that the incidence of health-based unmet need is much higher than the incidence of preference-based unmet need among pregnant women. Again, this is likely to be due, in part, to the reluctance of pregnant women to state that their pregnancy is unwanted or mistimed; the health-based approach is not subject to this problem because it is based on objective criteria.

In the third panel of the table, a woman is categorized as experiencing unmet need if she meets either the standard, preference-based criteria or the health-based criteria. The combined estimate of unmet need ranges from 7% to 38%. The estimate based on the most inclusive combined measure is substantially higher than either of the previous corresponding measures (31% and 23%), and represents 63% of women not using modern contraceptives. This expanded concept of unmet need indicates that nearly two-thirds of women using no method or using a traditional method are in need of contraception either because they do not want additional children soon or at all, because they are in a high health-risk category, or for both reasons.

The magnitude and composition of the

combined measure of unmet need, calculated using the most inclusive combined measure, are further illustrated in Table 3. The top panel shows the percentage breakdown of all women in the sample by whether or not they are in need and by category of need (preference-based only, health-based only or both). The bottom panel of the table gives the distribution of the subset of women who are not using modern contraceptives. As the two panels show, substantial unmet need remains in Sri Lanka, despite the country's high contraceptive prevalence rate. The same conclusion would be reached using the standard, preference-based criteria alone, but the use of the health-based criteria strengthens this finding, both by increasing the estimate of unmet need and by emphasizing that a subset of nonusers are exposed both to the risk of unwanted pregnancy and to an elevated health risk if they become pregnant. While their stated fertility preferences may reflect, at least in part, a recognition of the health risk involved should they become pregnant, their recognition of this risk may not have been translated into the use of an effective form of contraception.

In addition to comparing the magnitude and pattern of the parallel results shown in the three panels of Table 1, we determine if the two methodologies identify the same subset of women as experiencing unmet need. If the preference-based measure includes almost all of the women identified as having health-based unmet need, there is less to be gained by applying the health-based approach than if the two approaches identify different subsets of women. Similarly, it is useful to determine to what extent the health-based measure captures women with preference-based need.[‡]

In Figure 1, the vertical bars represent the proportion of women with health-based unmet need who have also been identified using the standard approach, according to various definitions of unmet need. For example, in the first set of results on the left, neither women who are pregnant nor those who are practicing prolonged abstinence are included in the pool of women who could have unmet need. Within this set, the first bar shows that if women using traditional methods are assumed not to be in need, then 75% of health-based need is identified, while the second bar shows that if women using traditional methods are assumed to be in need, then 87% of health-based need is identified.

The most obvious conclusion to be drawn from Figure 1 is that the effectiveness of the standard approach in measuring health-based unmet need is highly

sensitive to the precise definition used. The proportion of women with health-based unmet need who are also identified by the standard approach ranges from 50% to 90%. Despite this wide range, there are some clear patterns in the results. First, the standard approach always performs better (from the perspective of measuring health-based unmet need) when pregnant women are not included in the pool of potential candidates. This is undoubtedly due to the downward bias in the standard estimate of unmet need among pregnant women that was discussed previously.

Second, the standard approach performs better when women who practice prolonged abstinence are considered to have an unmet need for contraception. This pattern is consistent with the more widespread practice of abstinence among older women of high parity (terminal abstinence) and among younger women who have recently given birth (temporary abstinence), as these women are probably the ones most likely to fit both the health-based criteria and the preference-based criteria.

The final pattern that emerges in Figure 1 is that the standard approach performs better when users of traditional methods are included among those potentially in need, implying that the preference-based measure performs better at identifying those with health-based unmet need among users of traditional methods than among women using no method. This is not surprising, given that the act of using

a traditional method indicates the existence of a need for contraception, even if traditional methods do not effectively meet that need. In this subset of women, those with health-risk characteristics are more likely to have articulated a desire to limit childbearing.

Figure 2 represents the proportion of women with preference-based unmet need who have also been identified as having health-based unmet need. This proportion ranges from 43% to 65%. Thus, not only is the health-based measure generally less effective in identifying those with preference-based unmet need than vice versa, its effectiveness is also less sensitive to change in definition. In six of the eight cases shown in each figure, the preference-based measure performs better than the health-based measure in terms of degree of overlap. The two exceptions, in which the health-based measure performs better, are the cases in which pregnant women are included in the pool of those potentially in need.

Figure 1. Percentage of health-based unmet need identified by preference-based measure, by risk group, according to whether traditional methods are assumed to satisfy need

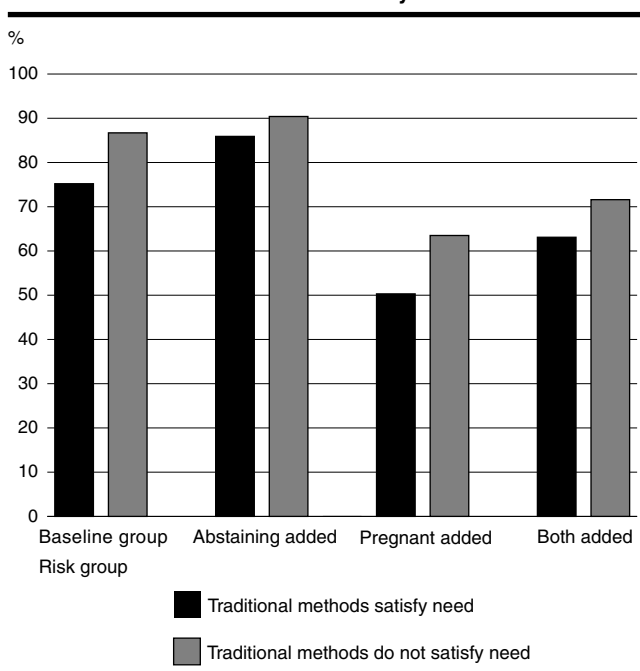
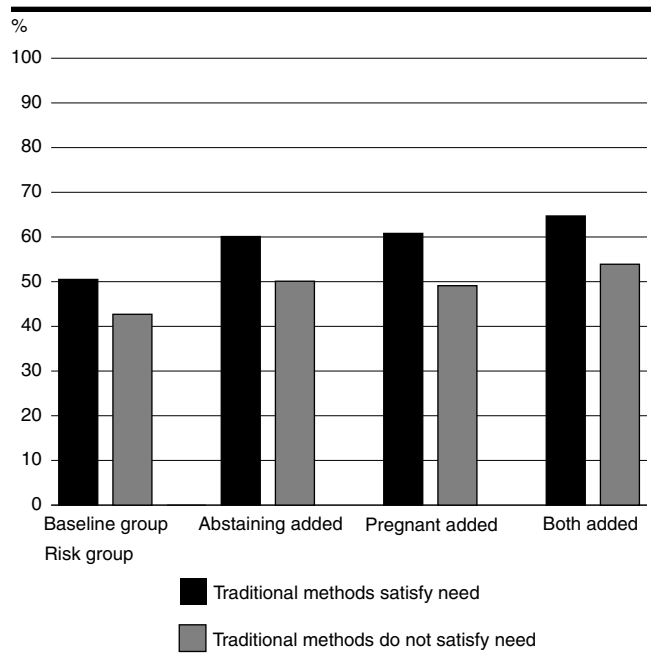


Figure 2. Percentage of preference-based unmet need identified by health-based measure, by risk group, according to whether traditional methods are assumed to satisfy need



Discussion

This study develops and applies a health-based approach to the measurement of unmet need for contraception. This approach is not intended to substitute for the standard, preference-based methodology, and it may be most usefully applied in conjunction with that approach. The analysis indicates that the health-based methodology captures only 43–65% of preference-based unmet need in Sri Lanka. Thus, the use of the health-based methodology alone would fail to adequately represent unmet need for contraception. Furthermore, relying heavily on externally driven criteria, while minimizing the role of stated fertility preferences, constitutes an extremely heavy-handed approach to family planning.

The results of the application of the health-based methodology to Sri Lanka indicate that although the standard approach identifies some of the women with health-based need, it does not fully capture this subset. Furthermore, the degree of overlap of the two groups is highly sensitive to the precise specification of unmet need. Using the most inclusive definition of unmet need, the standard approach successfully identifies 72% of women who are in need of contraception for health reasons. In other words, more than one in four women with health-based unmet need have not been identified by this measure. The failure to identify such a sizable number of women has implications for both the magnitude and the nature of unmet need

in Sri Lanka. Thus, if one is evaluating family planning efforts in Sri Lanka from a health perspective, as well as from the perspective of enabling women to attain desired fertility levels and timing of births, there is further room for improvement in the provision of services.

This conclusion assumes that there are health benefits to be gained from the use of contraceptives. Not long ago, a debate emerged as to whether family planning can, in fact, reduce infant mortality. Bongaarts argued that while the potential exists for family planning to reduce infant mortality rates by reducing the number of high-risk births, this potential health benefit might not materialize because of offsetting changes in family formation that occur along with a decline in fertility (specifically, an increase in the percentage of births that are first births and a shortening of the birth interval).²² Trussell countered this by arguing that the aggregate infant mortality rate is a misleading measure in this context.²³ The fact that a first birth is a necessary condition for births of higher order, and that first births are subject to a higher risk of mortality than are second births, results in a compositional shift in the infant mortality rate that obfuscates the beneficial effects of contraception. Birth-order-specific infant (and perhaps child) mortality rates might be more meaningful indicators because they would eliminate the compositional effect of birth order.

Trussell also argued that the shortening of birth intervals as fertility declines is a result of the effects of modernization, most notably a reduction in the length of breastfeeding, rather than a result of increased contraceptive use. Birth intervals might be even shorter if not for family planning. He concluded by stating that "the mortality-reducing effect of family planning will be important among women who use contraception to space their births or to eliminate unwanted high-order births."²⁴ Potter added that increased use of family planning might have indirect health benefits, beyond those arising through the reduction in high-risk births, such as improvements in prenatal and maternal care.²⁵ Given these arguments, we conclude that although aggregate infant mortality rates could rise (or at least not decline) as contraceptive use becomes more widespread, there are health benefits to be gained at the individual level from the reduction of unmet need.

Our results suggest that family planning performance might be improved by taking into account differences in the cat-

egories of unmet need, because the type of family planning service needed by women in those categories may be quite different. For example, women who do not have a preference-based need for contraception, but are in need according to health criteria, may benefit from information regarding the health risks associated with closely spaced births, births of high order, and births to younger and older women. For any given woman in this category, however, other characteristics may mitigate these risks. Indeed, two studies have found that in roughly half of 28 DHS countries examined, the mortality rate among children younger than five born to mothers aged 35 or older or with three or more previous live births was lower than average if the mothers had none of the other designated health risks.²⁶ In contrast, under-five mortality was consistently higher than average among children of mothers younger than 18 or for those born after a birth interval of less than 24 months.

In any case, it is important to ensure that individual women in this category are able to make an informed assessment about whether to take steps to avoid pregnancy, and to be informed about and provided with appropriate prenatal care if pregnancy does occur. In contrast, women who already desire to space or limit births, but are not currently subject to an elevated health risk, can perhaps be better served by the provision of information about the availability and appropriate use of various contraceptive methods and by follow-up care to support the use of contraceptives.

As we have indicated, concerns have arisen that an overemphasis on risk assessment in targeting family planning services could have substantial negative repercussions. Such problems include undermining the autonomy of individuals to make voluntary reproductive decisions; discouraging women from becoming pregnant when, in some cases, the increase in health risk may be very small; and diverting scarce family planning resources away from those who desire to space or limit births but are not in a high health-risk category.²⁷ Focusing greater attention on high-risk women should occur only as the result of an increase in family planning resources, or after careful examination of whether a reallocation of given resources is warranted. Furthermore, any such shift in focus must be guided by the fundamental principle that contraceptive use is voluntary. Specifically, as suggested above, the unmet need of some high-risk women may not be a need for contrac-

tive services, but rather for better information and for support services associated with high-risk pregnancy.

Finally, the results derived here are specific to Sri Lanka, a country characterized by relatively low fertility and mortality rates, widespread use of contraceptives, and late entry into marriage and parenthood, particularly in comparison to other South Asian and low-income countries. Differences across countries in the reliance on traditional methods, the practice of abstinence, the timing of marriage, the duration of breastfeeding, and in average fertility and mortality levels, all influence the level of health-based unmet need, the effectiveness of the standard approach in identifying women with health-based unmet need, and the sensitivity of these results to variations in the definition of the standard measure of unmet need.

Indeed, the application of a similar health-based methodology to 28 DHS countries suggests that the prevalence of health-based unmet need is lower in Sri Lanka than in any of the other countries studied, with the exceptions of Colombia and Thailand.²⁸ The results of that analysis, combined with the results of the present study, suggest that future research efforts should focus on a cross-country comparison of the sensitivity of the level of health-based unmet need and the degree of overlap of the health-based and preference-based measures to the assumptions embedded in each approach and to the thresholds used to define the health-based criteria.

References

1. J. Bongaarts, "The Measurement of Wanted Fertility," *Population and Development Review*, 16:487-506, 1990; —, "The KAP-Gap and the Unmet Need for Contraception," *Population and Development Review*, 17:293-313, 1991; D. L. Nortman, "Measuring the Unmet Need for Contraception to Space and Limit Births," *International Family Planning Perspectives*, 8:125-134, 1982; D. L. Nortman and G. L. Lewis, "A Time Model to Measure Contraceptive Demand," in J. A. Ross and R. McNamara, eds., *Survey Analysis for the Guidance of Family Planning Programs*, Ordina Editions, Liege, Belgium, 1984; C. F. Westoff, "The Unmet Need for Birth Control in Five Asian Countries," *International Family Planning Perspectives*, 4:9-18, 1978; —, "Is the KAP-Gap Real?" *Population and Development Review*, 14:225-232, 1988; —, "The Potential Demand for Family Planning: A New Measure of Unmet Need and Estimates for Five Latin American Countries," *International Family Planning Perspectives*, 14:45-53, 1988; C. F. Westoff and L. Ochoa, *Unmet Need and Demand for Family Planning*, DHS Comparative Studies No. 5, Institute for Resource Development/Macro Systems, Columbia, Md., USA, 1991; and C. F. Westoff and A. R. Pebley, "Alternative Measures of Unmet Need for Family Planning in Developing Countries," *International Family Planning Perspectives*, 7:126-136, 1981.
2. J. Bongaarts, 1991, op. cit. (see reference 1); —, "Measuring the Unmet Need for Contraception: Reply to Westoff," *Population and Development Review*, 18:126-127, 1992; and C. F. Westoff, "Measuring the Unmet Need for Con-

trapection: Comment on Bongaarts," *Population and Development Review*, 18:123–125, 1992.

3. C. F. Westoff, "The Potential Demand for Family Planning: A New Measure of Unmet Need and Estimates for Five Latin American Countries" (see reference 1), p. 46.

4. R. Dixon-Mueller and A. Germain, "Stalking the Elusive 'Unmet Need' for Family Planning," *Studies in Family Planning*, 23:330–335, 1992; and K. Foreit and P. Mas-tajo, "Prevalence Is Not Enough: The Importance of Appropriateness of Contraceptive Method in Evaluating Unmet Need for Contraception," paper presented at the annual meeting of the Population Association of America, Cincinnati, Ohio, USA, Apr. 1–3, 1993.

5. D. S. DeGraff and V. de Silva, "Unmet Need for Contraception in Sri Lanka," *International Family Planning Perspectives*, 17:123–130, 1991.

6. C. F. Westoff and L. Ochoa, 1991, op. cit. (see reference 1).

7. J. Bongaarts, 1991, op. cit. (see reference 1); and —, 1992, op. cit. (see reference 2).

8. J. Trussell and A. R. Pebley, "The Potential Impact of Changes in Fertility on Infant, Child, and Maternal Mortality," *Studies in Family Planning*, 15:267–280, 1984.

9. J. McCarthy and D. Maine, "A Framework for Analyzing the Determinants of Maternal Mortality," *Studies in Family Planning*, 23:23–33, 1992; and B. Winikoff, "The Effects of Birth Spacing on Child and Maternal Health," *Studies in Family Planning*, 14:231–245, 1983.

10. J. N. Hobcraft, J. W. McDonald and S. O. Rutstein, "Child-Spacing Effects on Infant and Early Child Mortality," *Population Index*, 49:585–618, 1983; and —, "Demographic Determinants of Infant and Early Child Mortality: A Comparative Analysis," *Population Studies*, 39:363–385, 1985.

11. J. T. Boerma and G. T. Bicego, "Preceding Birth Intervals and Child Survival: Searching for Pathways of Influence," *Studies in Family Planning*, 23:243–256, 1992.

12. M. A. Koenig et al., "Birth Intervals and Childhood Mortality in Rural Bangladesh," *Demography*, 27:251–266, 1990; S. Millman and E. Cooksey, "Birth Weight and the Effects of Birth Spacing and Breast Feeding on Infant Mortality," *Studies in Family Planning*, 18:202–212, 1987; and A. Palloni and M. Tienda, "The Effects of Breastfeeding and Pace of Childbearing on Mortality at Early Ages," *Demography*, 23:31–52, 1986.

13. A. Palloni and S. Millman, "Effects of Inter-Birth Intervals and Breastfeeding on Infant and Early Childhood Mortality," *Population Studies*, 40:215–236, 1986.

14. A. Palloni and M. Tienda, 1986, op. cit. (see reference 12); and A. R. Pebley and P. W. Stupp, "Reproductive Patterns and Child Mortality in Guatemala," *Demography*, 24:43–60, 1987.

15. B. Winikoff, 1983, op. cit. (see reference 9).

16. M. A. Koenig et al., 1990, op. cit. (see reference 12); J. E. Miller et al., "Birth Spacing and Child Mortality in Bangladesh and the Philippines," *Demography*, 29:305–318, 1992; A. R. Pebley and P. W. Stupp, 1987, op. cit. (see reference 14); and D. Wolfers and S. Scrimshaw, "Child Survival and Intervals Between Pregnancies in Guayaquil, Ecuador," *Population Studies*, 29:479–496, 1975.

17. J. Bongaarts, "Does Family Planning Reduce Infant Mortality Rates?" *Population and Development Review*, 13:323–334, 1987; —, "Does Family Planning Reduce Infant Mortality?" *Population and Development Review*, 14:188–190, 1988; A. R. Pebley and P. W. Stupp, 1987, op. cit. (see reference 14); J. E. Potter, "Does Family Planning Reduce Infant Mortality?" *Population and Development Review*, 14:179–187, 1988; —, "Birth Spacing and Child Survival: A Cautionary Note Regarding the Evidence from the WFS," *Population Studies*, 42:443–450, 1988; J. Rooks

and B. Winikoff, *A Reassessment of the Concept of Reproductive Risk in Maternity Care and Family Planning Services*, The Population Council, New York, 1990; J. Trussell, "Does Family Planning Reduce Infant Mortality? An Exchange," *Population and Development Review*, 14:171–178, 1988; and B. Winikoff, 1983, op. cit. (see reference 9).

18. M. A. Koenig et al., 1990, op. cit. (see reference 12); A. K. Majumder, "Breast-feeding, Birth Interval and Child Mortality in Bangladesh," *Journal of Biosocial Science*, 23:297–312, 1991; S. L. Curtis and J. W. McDonald, "Birth Spacing and Infant Mortality in Brazil," *Journal of Biosocial Science*, 23:343–352, 1991; A. R. Pebley and P. W. Stupp, 1987, op. cit. (see reference 14); T. K. LeGrand and C. S. M. Mbacke, "Teenage Pregnancy and Child Health in the Urban Sahel," *Studies in Family Planning*, 24:137–150, 1993; J. Trussell and C. Hammerslough, "A Hazards Model Analysis of the Covariates of Infant and Child Mortality in Sri Lanka," *Demography*, 20:1–26, 1983; and J. N. Hobcraft, J. W. McDonald and S. O. Rutstein, 1985, op. cit. (see reference 10).

19. F. E. Okonofua, A. Abejide and R. A. Makanjuola, "Maternal Mortality in Ile-Ife, Nigeria: A Study of Risk Factors," *Studies in Family Planning*, 23:319–325, 1992.

20. A. K. Majumder, 1991, op. cit. (see reference 18); J. E. Miller et al., 1992, op. cit. (see reference 16); S. L. Curtis and J. W. McDonald, 1991, op. cit. (see reference 18); J. Trussell and C. Hammerslough, 1983, op. cit. (see reference 18); and J. N. Hobcraft, J. W. McDonald and S. O. Rutstein, 1985, op. cit. (see reference 10).

21. Sri Lanka Department of Census and Statistics, *Sri Lanka Demographic and Health Survey 1987*, Ministry of Plan Implementation, Colombo, Sri Lanka, 1988.

22. J. Bongaarts, 1987, op. cit. (see reference 17); and —, 1988, op. cit. (see reference 17).

23. J. Trussell, 1988, op. cit. (see reference 17).

24. *Ibid.*, p. 176.

25. J. E. Potter, "Does Family Planning Reduce Infant Mortality?" (see reference 17).

26. P. Govindasamy and S. O. Rutstein, "High-Risk Birth and the Unmet Need for Family Planning," paper presented at the 22nd General Population Conference of the International Union for the Scientific Study of Population, Montreal, Canada, 1993; and P. Govindasamy et al., *High-Risk Births and Maternity Care*, Demographic and Health Survey Comparative Studies No. 8, Macro International Inc., Columbia, Md., USA, 1993.

27. J. Rooks and B. Winikoff, 1990, op. cit. (see reference 17).

28. P. Govindasamy and S. O. Rutstein, 1993, op. cit. (see reference 26); and P. Govindasamy et al., 1993, op. cit. (see reference 26).

Resumen

Un nuevo concepto de la necesidad insatisfecha de anticonceptivos basado en la salud identifica a las mujeres para quienes el embarazo significaría un aumento de su riesgo de vida, el de su futuro hijo o de su hijo anterior, debido a la edad de la madre, a intervalos intergenésicos breves o a una alta secuencia de partos. Cuando se aplica el concepto a los datos de la Encuesta Demográfica y de Salud para Sri Lanka, el método clasifica el 4–23% de las mujeres actualmente casadas como personas que tienen necesidad de servicios anticonceptivos, dependiendo de quiénes se consideran como candidatas potenciales—i.e., si incluyen a las embarazadas, a las no activas sexualmente y a

las que usan métodos tradicionales. El concepto corriente de necesidad insatisfecha basada en las preferencias de fecundidad indicadas por las mujeres, determina que el 6–31% tienen una necesidad insatisfecha. El método de evaluar la preferencia identifica al 50–90% de las mujeres con una necesidad insatisfecha en base a la salud, y el índice funciona mejor cuando se toman en cuenta las usuarias de métodos tradicionales y aquellas que se abstienen de mantener relaciones sexuales, y no se incluyen a las mujeres embarazadas. El método basado en cuestiones de salud identifica al 43–65% de aquellas con necesidad insatisfecha basado en preferencias de fecundidad, y da un mejor resultado cuando se incluyen a las mujeres embarazadas, y no se incluyen a las usuarias de métodos tradicionales.

Résumé

Un nouvel concept, basé sur la santé, du besoin non satisfait de contraception identifie les femmes pour lesquelles une grossesse présenterait un risque de mortalité accru pour elles-mêmes, pour l'enfant attendu ou pour le précédent, en raison de l'âge maternel, de la brièveté de l'intervalle entre les naissances ou du haut rang de naissance. Appliquée aux données de l'Enquête démographique et de santé du Sri Lanka, la méthode classifie 4% à 23% des femmes mariées au moment de l'enquête comme présentant un besoin non satisfait de contraception, suivant que les femmes enceintes, pratiquant l'abstinence ou ayant recours aux méthodes traditionnelles sont considérées comme présentant un besoin de contraception. Selon le concept habituel de besoin non satisfait, fondé sur les préférences de fécondité déclarées des femmes, 6% à 31% des femmes présenteraient un besoin de contraception. L'approche fondée sur les préférences identifie 50% à 90% des femmes qui présentent un besoin non satisfait basé sur des raisons de santé; elle produit de meilleurs résultats lorsque les femmes qui pratiquent les méthodes traditionnelles et celles qui pratiquent l'abstinence sont considérées comme présentant un besoin non satisfait et que les femmes enceintes ne le sont pas. L'approche basée sur la santé identifie 43% à 65% des femmes dont le besoin, basé sur les préférences, n'est pas satisfait, et elle produit de meilleurs résultats lorsque les femmes enceintes sont incluses et que celles qui pratiquent les méthodes traditionnelles ne le sont pas.