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ESTIMATING POTENTIAL CONTRACEPTIVE DEMAND: AN IMPROVED METHOD OF MEASUREMENT

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Abstract

Conventional measures of potential contraceptive demand have hitherto generally omitted pregnant and anovulatory women from consideration because in these states, women do not need to practice contraception to limit or space future pregnancies. A model is presented and applied to the findings of several Westinghouse Contraceptive Prevalence Surveys that measures potential contraceptive demand over an interval of time (one year) from the survey date. Recognizing that pregnancy and anovulation are temporary states, the model incorporates women in these conditions at the survey in its measure of potential contraceptive demand during the year following the survey. The findings suggest that women who reproduce in the year following the survey constitute a non-trivial proportion of all women with potential demand during at least part of the year. Among younger women (under age 30), the proportion is striking.

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Introduction

Like the managers of business and commercial enterprises, family planning program administrators must also assess the existing and potential demand for their services and products. The question of whether these programs create as well as satisfy demand that originates from stimuli other than the program need not concern us here. At issue is the assessment of the prevailing or short-term demand for contraceptive services and supplies, the extent to which the current demand is being satisfied through the public and private/commercial sectors, and the residual between these two measurements, lately called the KAP-GAP but now often referred to as the "unmet need" for contraception.

As is well known in family planning circles, the acronym KAP derives from the numerous household surveys undertaken in developing countries in the past quarter century to ascertain the contraceptive knowledge, attitude, and practice of couples of reproductive age.[1] Conducted in a new and sensitive field of inquiry by people with a vested interest in obtaining findings favorable to family planning program development, the early KAP surveys were often derided as lacking in scientific rigor and professional expertise. With the advent of the World Fertility Surveys in the mid-1970s, however, standards of research design, execution, and analysis are now considered of

sufficiently high caliber for recent surveys to yield useful findings for policy prescriptions.

A major policy question--one that influences the resources committed to family planning programs and their modes of operation--is to assess the potential demand for contraceptives. The term "unmet need" has come into vogue for this measurement, but potential demand is a more felicitous phrase. First, the latter embodies the relevant marketing concept, the measurement of which is meant to inform program administrators of the possible demand for their services and products. Second, "unmet need" connotes an active interest on the part of survey respondents in practicing contraception, whereas it is a prescription recommended by researchers to couples who want to avoid or space future pregnancies. In many areas of human behavior, the means to desired ends are readily apparent but for one reason or another, people often do not (whether they cannot or will not is debatable) avail themselves of these means. The word "potential" is thus apt to suggest the possible clientele size for contraceptives made available under an adequate and accessible delivery system.

Measurement of the potential demand for contraception is not only of practical importance for sound operational decisions, but it has also stimulated research into explaining the apparent discrepant behavior in developing countries between the high proportion of couples who say they want no more children and the relatively low proportion practicing contraception. The tendency was once to attribute this almost universal finding to the limitations of the KAP surveys, to their failure, for example, to probe for degrees of motivation to control fertility. While considerable scope for improving KAP surveys undoubtedly remains, recent micro-level research on the

determinants of fertility from a psychosocial and cultural perspective are discovering the numerous obstacles to and ambivalences toward contraceptive practice in traditional and transitional societies.[2] Operationally, policymakers and family planning program administrators are paying increased attention to the rational explanations for the apparent discrepancy between reproductive behavior and fertility desires. This new focus is helping to improve the delivery of services and to deal with the limitations of present contraceptive technology.[3]

Since KAP surveys to date have gererally treated the question of "future pregnancy desires" as a dichotomous variable calling merely for a yes or no response, the most direct measure of the potential demand is the difference between the number or proportion of respondents who want to prevent (or space) future births and the number or proportion currently practicing contraception at the time of the survey. Attempts to refine this measure have been limited thus far to the simple expedient of removing from consideration those couples who for one reason or another are deemed to have no need for contraception at the time of the survey despite the fact that they want to avoid (or space) a future birth.[4] Pegged to a point in time, these presumably refined measures are flawed by the fact that some people not in need of contraception this month will indeed be exposed to the risk of unwanted pregnancy next month. To adduce the argument in support of these measures that as one group moves out of the "not→currently→exposed" state another group will replace, it implies a constant ratio over time of currently exposed to non→exposed women, an implication that is not warranted if satisfaction of the "unmet need"→→the purpose of its measurement→→is under way.

The present model is conceptually superior to the technique of arbitrarily disregarding couples with no current need in that it measures contraceptive use (in terms of both couples of reproductive age and couple years of protection) required to meet the birth spacing and limiting desires of all couples over a specified interval of time. By incorporating time as a factor, the model takes cognizance of the fact that exposure status is not constant, that pregnancy is a temporary state, that breastfeeding is not a reliable contraceptive beyond the anovulatory postpartum period, and that a change in the contraceptive prevalence rate affects the ratio of women currently exposed to non-exposed to the risk of unwanted pregnancy. In other words, a time-oriented model overcomes the perplexing question of how to handle pregnant and breastfeeding women in measuring contraceptive demand. This macro deterministic model is not without limitations, an important one being that it calls for values of parameters which at best are aggregate rough orders of magnitude.

Data for application of the model are findings from recent Contraceptive Prevalence Surveys (CPS) conducted under the auspices of the Westinghouse Health Systems in Bangladesh, Colombia, Costa Rica, Republic of Korea, the rural and urban components of Mexico, and Thailand. Although geographic diversity and cultural variation guided the selection of countries, the choice of countries was secondary to the issue of developing a better technique for measuring the potential demand for contraception. New to the literature are the estimates provided of contraceptive need to space births, estimates made possible by the fact that the CPSs asked respondents wanting more children whether they were seeking their next pregnancy soon, within the next year (or as soon as possible after the next delivery if currently

pregnant). As a first attempt to measure potential contraceptive demand over time, a one-year interval from the survey data was selected, which also accorded with the time period of the birth spacing question in the CPSs.

The late Bernard Berelson once observed that if there were signals by which to identify women who want to avoid a pregnancy but who will nevertheless conceive, family planning programs could recruit and restrict their clientele to them with a considerable saving in time, effort, and funds.[5] The phrase "unmet need" for contraception had not as yet been coined, but Berelson's formulation of a cost-effective and efficient modus operandi for family planning programs was predicated on its concept. Theoretically the concept seems simple enough--women who do not want to but are likely to become pregnant--yet, from the same survey data, a variety of estimates can be inferred depending on the composition of women under scrutiny and the roster of methods recognized as offering contraceptive protection.

In their innovative and insightful analysis of the World Fertility Survey (WFS) findings, Westoff and Pebley showed the impact on the unmet need measurement of varying the composition of women considered currently in need of contraception (to limit but not to space births) and of adjusting the survey responses. The estimates ranged widely (median among 18 countries) from 7 to 40 percent of the married women of reproductive age (MWRA).[6] The latter figure was simply the proportion of MWRA who said they wanted no more children and were not using an effective method. The former figure was a

refined estimate obtained by (1) weeding out of consideration the infecund plus the currently pregnant or breastfeeding; (2) inflating the self-identified infecund with MWRA who declared themselves fecund but had not had a birth in the past five years; and (3) reducing the class of women who said they want no more children by subtracting those whose present family size was less than the number given in response to the hypothetical question in the WFS "If you could choose exactly the number of children to have in your whole life, how many would that be?" The effect of these adjustments was to leave a residue of MWRA comprising most of the current contraceptive users and relatively few non-users, with the resulting low estimate of unmet need among MWRA of 7.2 percent if all methods in use were recognized, or 10.6 percent if only effective methods were considered.

In commenting on their wide range of estimates, Westoff and Pebley observed "There is probably no 'best' estimate of unmet need."[7] They suggested that the nature of the program, its stage of maturity, and its level of funding be used as criteria for selecting the appropriate measure. Program administrators are not likely to be comfortable with this advice that begs the question. As pragmatists, they probably see potential demand as a reality to be measured by an appropriate yardstick. Moreover, regardless of nature, maturity, or level of funding, public sector providers tend to service any claimant, without investigating whether the prospective client meets an arbitrary set of criteria to establish unmet need. Administrators want a prescriptive answer to assess the potential market for contraceptive services and supplies if programs are established within certain communities or regions.

The major advantage of a time-oriented model is that it can deal with all fecund women, including the currently pregnant and breastfeeding. This is important because of the likelihood that a considerable proportion of these women are in these states precisely because they failed to practice (effective) contraception. On the other hand, identification of (1) the infecund, (2) the duration and degree of contraceptive protection afforded by breastfeeding, and (3) women who want to limit or space future pregnancies is as problematic in a time-oriented as in a snapshot measurement of potential demand. Different values for these parameters will of course produce different results, but the explicit consideration given in a time model to all rather than a sub-class of fecund women removes a major source of variation among likely estimates of potential demand.

Identifying the infecund

For two good reasons survey data tend to understate the proportion infecund among couples of reproductive age. First, except for surgical sterilization of one of the spouses (medical or contraceptive), a woman cannot know her fecundity status with certainty, even if she has not had a recent pregnancy. Second is the natural reluctance to acknowledge infecundity, especially in societies that place a high value on reproductive capacity. In the nine CPSs under review, reported infecundity ranged from 6 percent (Costa Rica) to 9 percent (South Korea) of MWRA. Findings in the WFS were generally of similar order of magnitude, although the proportion was 12 percent in Pakistan and as high as 15 percent in Thailand.[8] This statistic is influenced by the age composition of MWRA, since fecundity tends to diminish with increasing age.[9] Thus, in societies where females marry at an

early age, the proportion of MWRA naturally sterile will be lower, ceteris paribus, than in societies where women marry at a later age. In any case, on the basis of what is known from studies of natural fertility at various ages, the survey data considerably understate the proportion infecund.

For their estimates of unmet need, Westoff and Pebley compensated for the underreporting of natural sterility by adding a behavioral measure, namely women among the reported fecund who had not had a birth in the past five years. The effect of this adjustment was to double and in some cases (Dominican Republic and Jamaica, for example) to triple the reported proportion infecund. Westoff and Pebley recognize that induced abortion, contraception, and infrequent intercourse (illness, spouse separation) as well as infecundity account for the phenomenon of no live birth in the past five years, but lacking adequate information on the first three, they refined the response to infecundity by attributing the five-year absence of a live birth solely to infecundity. The refinement yielded a median proportion of MWRA infecund (among the 18 countries in their review) of 21 percent, ranging from 14 percent in several countries to 27 percent in Indonesia.[10] An indication of the extent of overestimate of this refined measure can be inferred from Henry's work on natural fertility. According to the average schedule he compiled from a study of European pre-industrial societies, not until age 36 are one-fifth of the women of reproductive age infecund; and at age 30, a rough estimate of the average age of MWRA, the proportion infecund is 10 percent.[11] On the other hand, Westoff and Pebley argue in defense of their infecundity assumption that although "the behavioral measure (no birth in the past five years) may be capturing influences other than pure infecundity.... this is irrelevant for present purposes, since all of those

factors (abortion, illness, etc.) would affect the magnitude of unmet need."[12]

A really refined estimate of the "true" proportion infecund would require reliable empirical longitudinal data on abortion, contraception, and coital frequency, information not readily available. In illustrating the present model, it was decided to take the reported infecund in the CPSs at face value. There is some justification for this, other than the paucity of data to improve upon the response. It can be argued that (1) infecund women who think themselves fecund are potential clients for family planning services: (2) the Westoff and Pebley behavioral measure is affected by the extent to which abortion accounts for no recent live birth; and (3) if it becomes fashionable to participate in subsidized programs, the infecund might prefer to share in the participation rather than risk publicizing their infecundity by not joining their neighbors in claiming services and supplies. However, the purpose here is not to defend any particular level of or technique for identifying the infecund. A researcher utilizing any model is at liberty to assign any values to its input parameters (s)he thinks appropriate.

Currently pregnant and breastfeeding women

Compared with the infecund, identification of women currently pregnant or breastfeeding seems uncomplicated; but a count of these two groups for the purpose of estimating their potential need for contraception is also problematic. With respect to the former, at an early gestation stage women do not know with certainty whether they are pregnant. Also, if spontaneous fetal wastage is high or a woman is contemplating an induced abortion, she

may not admit she is currently pregnant. On balance, it is likely that the currently pregnant are underreported, but for a snapshot estimate of potential contraceptive demand it is not important to correct for the undercount, since a woman who wants no more children and who thinks she is fecund but not pregnant is in the potential market for contraception. A time model for measuring potential demand must, however, take unrecognized pregnancies into consideration, because these become manifest with the passage of time. The technique by which the model does this is discussed below under its description.

It has long been known that by inhibiting ovulation and delaying menstruation, full breastfeeding greatly reduces the probability of conception. In general, the longer a woman nurses her child, especially if it gets little or no supplemental food, the longer she is protected from the risk of pregnancy. An empirical regression relationship indicates 1.3 months of postpartum amenorrhea with no breastfeeding, plus a half month prolongation of postpartum amenorrhea for every one month increase in the duration of breastfeeding.[13] Postpartum amenorrhea does not, however, guarantee protection from pregnancy because ovulation and the physiologic processes necessary to sustain a pregnancy (development of the endometrium, for example) can occur prior to the resumption of menstruation.[14]

To illustrate, among pregnant women in the nine-country WHO Collaborative Study on Breastfeeding, an average (median) of 7 percent said they had conceived during postpartum amenorrhea. (The range was from one percent in Chile and Guatemala to 11 percent in Nigeria and Sweden.)[15] Another study found that among groups of breastfeeding women (of varying degree of suckling intensity), 20 to 50 percent reported menstruating within

six months of delivery.[16] Even fully breastfeeding women are not fully protected from pregnancy risk. In Guatemala and Hungary, the WHO study found that among women suckling their infants at least 5 times a day, menstruation had returned to 23 percent in the former and 51 percent in the latter when the child was only 5 to 8 months old.[17]

Breastfeeding not only has a demonstrable contraceptive effect, but its physiological basis is well known. Indeed, in societies where contraception is not generally practiced, the intensity and duration of breastfeeding are major determinants of differentials in birth intervals. At the same time, it does not guarantee protection from conception. On the aggregate level, the degree of protection should be thought of in quantitative probabilistic terms, as a schedule of decreasing probability of protection over time. On an individual level, although likely to be protected if anovulatory, women who would abide by the criterion of statisticians of not taking a risk of failure of more than a few percent would not rely on lactational amenorrhea for contraceptive protection beyond the period of full breastfeeding, but would instead adopt a contraceptive method appropriate for lactating women. Westoff and Pebley showed that eliminating all breastfeeding women from estimates of contraceptive need produces low estimates of unmet need. The time model to be discussed takes account of breastfeeding women by providing as an input parameter an assigned period of postpartum protection from pregnancy.

Identifying potential birth spacers and limiters

The finding perhaps most responsible for the doubt cast on the validity of the early KAP surveys is the high proportion of respondents who said they

wanted no more children, yet were not doing anything to avoid conception. In the WFSs, samples were drawn with the guidance of astute statisticians, the sequencing and phrasing of questions were culturally oriented, and presumably well-trained interviewers worked under competent supervision; yet, as in the case of the earlier surveys, numerous respondents gave discrepant answers to the questions on current contraceptive behavior and their desire to limit births. In Mexico, for example, a country where fertility is thought to be falling rapidly [18], the WFS, conducted in 1976-77, found that 56 percent of the currently married, fecund, non-pregnant women wanted no more children, and of these "exposed" women, two-thirds were not practicing contraception.[19]

Variation in the degree of commitment to a goal is, of course, a plausible factor to explain why some people do, while others do not, pursue the obvious means to a desired end. To recognize that there are degrees of motivation, however, does not warrant the inference that people who do not act to implement their desires do not "really" entertain those desires. Research on the determinants of fertility is disclosing that in the matter of fertility control, as in other areas of life, women's roles and status in developing societies are not conducive to independent judgment, decision, and action. In these societies it is the exceptional woman, or the woman with the exceptional spouse--urban, educated, skilled--who can implement, with or without her husband's cooperation, her desire to space or limit births. Motivation to control fertility is not a force acting in a vacuum but is an intention vitiated by the corrosive influence of women's inferior status relative to men, fear of child mortality, uncertainties about other future events, fear of contraceptive side effects, and a host of psychosocial and economic factors that transcend the scope of this paper.

If potential contraceptive demand is taken as the maximum level that might be elicited in the near future under an optimal delivery system, then it is reasonable to accept the responses on future pregnancy desires at face value. For their conservative estimates of unmet need, Westoff and Pebley adjusted these responses to weed out of consideration respondents who said they wanted no more children but may not "really" have meant it. The device was to eliminate women whose concept of the desirable number of children to have exceeded their present family size. In rebuttal to this adjustment it can be argued that the time and place to deal with inconsistent responses to questions designed to be internally consistent are during the survey itself; and if the questions are independent, the logic of "correcting" the response to one by the response to the other is faulty. *

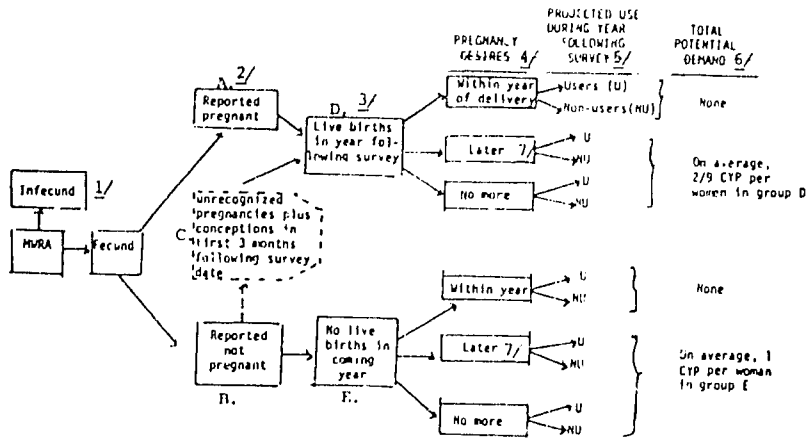
In the present illustrations of the time-oriented model, the CPS findings on future pregnancy desires with regard to birth spacing and limiting are utilized as input parameters without adjustment for response error.

Description of the Model

The time-oriented model can be most readily understood by reference to its schematic representation in Figure 1. The flow of MWRA is from left to right in a branching process, the terminal branches of which identify women

* Westoff and Pebley did not argue the merits of this adjustment but intended simply to show its effect on the unmet need estimate.

Figure 1. Schematic Diagram of Model to Calculate Potential Contraceptive Demand (and its likely to be fulfilled and unfulfilled components) to Achieve Pregnancy Desires During the Year Following a Survey



Note: CYP stands for couple year of protection. Since not all women require one full CYP to space or limit births, demand measured in CYsP is always less than demand measured in terms of couples. The likely to be fulfilled component of the total potential demand is based on the contraceptive use pattern found in the survey; the unfulfilled component is the residual between the total calculated from the model and the likely fulfilled component.

1/ Excludes respondents sterilized for contraceptive reasons. The implied assumption that all contraceptively sterilized couples remain fecund to the end of the reproductive age span is not likely to affect the results signficantly.

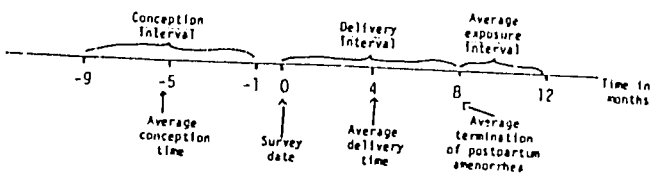
2/ Assumed in the exercise to be all pregnancies of 2 to 9 months gestation.

3/ Reported pregnancies (Group A) inflated by 12/7 to account for unrecognized pregnancies (less than two months gestation) plus yet-to-occur conceptions.

4/ For women with a live birth next year (Group D), based on responses of women currently pregnant (Group A); for Group E women, based on responses of women reported not pregnant at survey (Group B) technically adjusted to remove the Group C component (calculated as D-A) of Group B. The adjustment does not significantly affect the results.

5/ Based on responses per pregnancy desire category (1) by women with a live birth last year to project use among women with a live birth next year (Group D), and (2) by women in Group B to project use among women in Group E.

6/ To achieve spacing and limiting desires, women in Group E, being exposed to pregnancy risk all of next year, require one full couple year of protection (CYP) On the other hand, women in Group D, being exposed for only part of next year, require less than one full year of protection, calculated as follows to be 2/9 of a year on average.



As shown in the diagram, with a four month allowance for postpartum amenorrhea (ppa), women with a live birth next year who will have any contraceptive need to space or avoid a pregnancy after delivery are those whose conceptions occurred at -1 to -9 months of the survey date, or 2/3 of next year's mothers. For these women, taking t = -5 as the average conception date, t = +4 as the average delivery date, and t = +8 as the average date of termination of ppa leaves them exposed to pregnancy risk during the last four months, or 1/3, of next year. Thus, average contraceptive protection time per woman in Group D = (2/3)(1/3) = (2/9) CYP.

7/ Includes respondents uncertain whether they want no more.

with different degrees of potential and likely to be fulfilled contraceptive demand during the year following a contraceptive prevalence survey.

The first step, shown on the extreme left, is to dichotomize the MWRA interviewed in the survey into the infecund and the fecund. As shown, the infecund are then dispensed with insofar as contraception is concerned. It is immaterial to the model whether the infecund are the self-identified in the survey, or an estimate made by the investigator. The next step is to subdivide the fecund into reported pregnant (Box A) and reported not pregnant (Box B). Box C is a component of Box B and consists of women with unreported (assumed to be unrecognized) pregnancies at the time of the survey plus women who will conceive in the three-month interval following the survey, (an interval that leads to a birth in the year under review).

Women producing a live birth during the year after the survey (Box D) come from groups A and C. The model requires an estimate of this number. This is highly conjectural, and the limitations of current pregnancy status as a basis for this estimate have been extensively documented in the literature.[20] Nevertheless, the technique for estimating the value of this parameter in the illustration of the model was to make use of the reported pregnant (Box A) by assuming these consisted of all pregnancies of 2 to 9 months gestation, and therefore, by inflating this number by the factor 12/7 (for five additional months of conceptions), to yield the estimate required for Box D. Alternative techniques would be to ascertain gestation age more precisely by asking its question in the survey; by taking account of seasonal variation in monthly conceptions; or by simply estimating the expected number of births by extrapolating an observed trend. Whatever number is assigned to women in Box D, the number of women with no live birth next year (Box E) is

simply the residual of the total fecund.

Once the fecund women are dichotomized into two groups, those who do and those who do not produce a live birth next year, the exercise is reduced to the question of the number of couples per group who, in order to achieve their desire not to become pregnant next year, constitute a potential market for contraceptive demand. Since the CPSs queried all fecund MWRA about their pregnancy desires, data are available to distribute pregnancy desires among women who give birth next year (Box D) in accordance with the responses of women reported pregnant at the survey (Box A); and among women who do not give birth next year (Box E), in accordance with the responses of the fecund non-pregnant at the survey (Box B). *

For each pregnancy desire group, the proportion of women likely to use a contraceptive method next year is (1) in accordance with the current users at the survey among women who had a live birth last year, for the women expected to have a live birth next year (Box D); and (2) in accordance with the current users reported not pregnant at the survey (Box B), for women who will not have a birth next year (Box E). Since projected use is an input parameter, investigators are not bound by the survey findings on current use but are at liberty to allow for an increasing trend.

The final point is to calculate the contraceptive use (in terms of couples or couple-years) required next year to meet current birth spacing or

* Technically, the latter distribution should be adjusted to remove the group C component (D → A) of group B. However, since E is not appreciably smaller than B, bypassing this correction does not sufficiently affect the results.

limiting desires. It is apparent that spacers or limiters susceptible to the risk of pregnancy all through the year (Box E) require a full year of contraceptive protection. That is, one couple equals one required year of protection (CYP). On the other hand, women who will have a birth during the year (Box D), will be exposed to the risk of a new pregnancy for only part of the year and therefore will require less than one CYP to fulfill their spacing or limiting desires. On average, with an allowance of 4 months for postpartum protection, a calculation more fully explained in footnote 6 of Figure 1, yields 2/9 of a CYP required next year among women with a live birth next year who wish to prevent or space the next pregnancy.

CPS Findings

Attention is focused on the CPS findings of relevance in applying the time model to estimate the potential demand for contraceptive services and supplies in the year following the survey. Table 1 summarizes the CPS results in seven national entities (5 countries plus the urban and rural components of Mexico). Calculations derived from the model are presented in Table 2.

Tables 3 and 4 are the counterparts of Tables 1 and 2 respectively, giving the data by two age groups, under 30 and 30 and over. The age breakdown has important implications regarding births averted because of the higher potential fertility of younger women.

Five groups of women are identified in Tables 1 and 3, the number in each group serving as the denominator of the percent per listed item: A. all

TABLE 1. Contraceptive Prevalence Survey (CPS) Findings on Fecundity and Pregnancy Status, Contraceptive Use, and Future Pregnancy Desires among Married Women of Reproductive Age (MWRA): 7 national entities

Item	BANGLADESH	COLOMBIA	COSTA RICA	SOUTH KOREA	MEXICO RURAL	MEXICO URBAN	THAILAND
A. MWRA (N)	12834.0	1950.0	1849.0	11997.0	1149.0	1449.0	2481.0
% Infecund (self-identified)	4.9	7.8	5.8	8.7	5.7	7.0	6.3
% Fecund 1/	95.1	92.2	94.2	91.3	94.3	93.0	93.7
% Using a method	11.7	43.7	61.3	50.3	22.3	50.4	50.6
% Not using a method	88.3	56.3	38.7	49.7	77.7	49.6	49.4
Currently pregnant/1000	143.9	149.5	122.2	80.7	164.5	128.4	95.1
Live births in coming year/1000 2/	246.7	255.9	209.8	138.3	282.0	220.2	163.2
Live births last year/1000	257.4	234.9	243.9	132.3	327.2	253.3	185.4
B. Fecund MWRA: (N) 3/	12205.0	1714.0	1742.0	10953.0	1084.0	1347.0	2325.0
% Using a method	12.3	47.4	65.0	55.1	23.6	54.2	54.0
% Not using a method	87.7	52.6	35.0	44.9	76.4	45.8	46.0
Currently pregnant/1000	151.3	162.2	129.7	88.4	174.4	138.1	101.5
Live births in coming year/1000 2/	259.4	277.7	222.7	151.5	298.9	236.8	174.2
Live births last year/1000	270.6	255.0	258.9	144.9	346.9	272.5	197.8
% Want no more children	42.6	69.7	52.5	75.2	49.9	58.8	63.7
and using a method	9.2	36.5	39.2	51.2	14.7	35.9	40.4
and not using a method	33.4	33.1	13.3	24.0	35.2	22.9	23.3
% Want later 4/	43.0	21.7	37.4	9.9	29.0	30.5	26.9
and using a method	2.6	8.1	20.9	2.3	7.5	14.7	11.7
and not using a method	40.4	13.7	16.5	7.6	31.5	15.8	15.2
% Want soon (next year)	14.4	8.6	10.1	14.9	11.1	10.7	9.3
and using a method	0.5	2.8	4.9	1.7	1.5	3.6	1.9
and not using a method	13.9	5.8	5.2	13.3	9.6	7.1	7.4
C. Fecund not pregnant (N)	10358.0	1436.0	1516.0	9985.0	895.0	1161.0	2089.0
% Want no more children	43.9	70.8	54.6	77.9	50.9	59.7	65.5
and using a method	10.9	43.6	45.1	56.1	17.8	41.7	45.0
and not using a method	33.0	27.2	9.6	21.8	33.2	18.0	20.5
% Want later 4/	40.6	19.4	34.8	7.9	38.7	28.9	25.8
and using a method	3.1	9.6	24.0	2.5	9.1	17.1	13.0
and not using a method	37.5	9.7	10.8	5.4	29.6	11.9	12.8
% Want soon	15.5	9.8	10.6	14.2	10.4	11.4	8.7
and using a method	0.5	3.3	5.7	1.8	1.3	4.1	2.1
and not using a method	15.0	6.5	4.9	12.3	8.6	7.2	6.6
% Using a method	14.5	56.5	74.7	60.4	29.6	62.9	60.1
% Not using a method	85.5	43.5	25.3	39.6	71.4	37.1	39.9
D. Reported pregnant at survey (N)	1847.0	278.0	226.0	968.0	189.0	186.0	236.0
% Want no more children	35.4	63.7	38.5	47.3	45.0	53.2	47.9
% Want later 4/	56.7	33.8	54.4	30.0	40.7	40.3	36.9
% Want soon as possible	7.9	2.5	7.1	22.7	14.3	6.5	15.3
E. Women with live birth last year (N)	3303.0	437.0	451.0	1587.0	376.0	365.0	460.0
% Want no more children	39.8	69.6	48.6	49.3	47.3	54.8	54.6
and using a method	4.9	22.4	29.0	12.4	9.0	30.4	22.4
and not using a method	34.9	47.1	19.5	36.9	38.3	24.4	32.2
% Want later	55.0	26.5	47.7	29.7	48.4	40.0	39.3
and using a method	2.4	10.1	24.8	4.6	8.8	14.2	14.1
and not using a method	52.6	16.5	22.8	24.1	39.6	25.8	25.2
% Want soon	5.1	3.9	3.8	22.1	4.3	5.2	6.1
and using a method	0.2	1.1	2.4	1.8	0.5	1.6	1.3
and not using a method	5.0	2.7	1.3	20.2	3.7	3.6	4.8
% Using a method	7.5	33.6	56.3	18.8	18.4	46.3	37.8
% Not using a method	92.5	66.4	43.7	81.2	81.6	53.7	62.2

1/ Includes contraceptively sterilized women (or women whose husbands had vasectomies).
2/ Currently pregnant inflated by 12/7. For rationale, see Figure 1, footnotes 2 and 3.
3/ Excludes self-identified infecund.
4/ Includes respondents uncertain about wanting more children and those who failed to answer. The proportion of these two groups was a median average of 6% among the countries considered.

TABLE 2. Model Findings on Potential Contraceptive Demand per 1000 Fecund MWRA during Year following Survey: 7 national entities
(Derived from model illustrated in Figure 1)

Item	BANGLADESH	COLOMBIA	COSTA RICA	SOUTH KOREA	MEXICO RURAL	MEXICO URBAN	THAILAND
I. Fecund MWRA	1000	1000	1000	1000	1000	1000	1000
A. With live birth next year 1/	259.4	277.7	222.7	151.5	298.9	236.8	174.2
Pregnancy desire after delivery 2/							
1. No more	91.9	176.8	85.7	71.7	134.4	126.1	83.4
2. Postpone	147.0	93.9	121.2	45.4	121.8	95.5	64.2
3. Soon as possible	20.5	7.0	15.8	34.4	42.7	15.3	26.6
B. With no live birth next year	740.6	722.3	777.3	848.5	701.1	763.2	825.8
Pregnancy desire after delivery 3/							
1. No more	325.0	511.5	424.5	661.1	357.2	455.5	541.2
2. Postpone	300.5	139.8	270.7	67.2	271.0	220.9	213.1
3. Soon as possible	115.0	70.9	82.0	120.2	72.9	86.8	71.6
II. Potential demand: couples 4/	784.8	831.8	833.2	806.3	799.1	824.1	852.7
Group A1 (Limiters: L)	61.2	117.9	57.2	47.8	89.6	84.0	55.6
A2 (Spacers: S)	98.0	62.6	80.8	30.3	81.2	63.7	42.8
A3 (Seekers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B1 (L)	325.0	511.5	424.5	661.1	357.2	455.5	541.2
B2 (S)	300.5	139.8	270.7	67.2	271.0	220.9	213.1
B3 (Seekers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Limiters	386.3	629.4	481.7	708.8	446.8	539.6	596.8
Spacers	398.5	202.4	351.5	97.5	352.2	284.5	255.9
III. Likely demand: couples 5/	115.1	446.0	613.1	514.3	219.8	517.6	517.2
Group A1 (L)	7.5	38.0	34.2	12.0	17.1	46.6	22.8
A2 (S)	4.3	23.7	42.1	4.9	14.7	22.7	15.4
B1 (L)	80.4	314.9	350.2	476.2	124.6	318.2	371.6
B2 (S)	22.8	69.4	186.6	21.2	63.5	130.2	107.5
Limiters	88.0	352.9	384.4	488.3	141.7	361.8	394.4
Spacers	27.1	93.2	228.7	26.0	78.2	152.8	122.9
IV. % Unfulfilled potential: couples 6/	85.3	46.4	26.4	36.2	72.5	37.2	39.3
Group A1 (L)	87.7	67.8	40.2	74.8	80.9	44.5	59.0
A2 (S)	95.6	62.1	47.9	84.0	81.9	64.4	64.1
B1 (L)	75.3	38.4	17.5	28.0	65.1	30.2	31.3
B2 (S)	92.4	50.4	31.1	68.5	76.6	41.1	49.5
Limiters	77.2	43.9	20.2	31.1	68.3	32.4	33.9
Spacers	93.2	54.0	34.9	73.3	77.8	46.3	52.0
Group A	92.6	65.8	44.7	78.4	81.4	53.1	61.2
Group B	83.5	41.0	22.8	31.7	70.1	33.7	36.5
V. Potential demand: CYsP 7/	678.6	711.5	741.2	754.3	685.2	725.6	787.1
Group A1	20.4	39.3	19.1	15.9	29.9	28.0	18.5
A2	32.7	20.9	26.9	10.1	27.1	21.2	14.3
B1	325.0	511.5	424.5	661.1	357.2	455.5	541.2
B2	300.5	139.8	270.7	67.2	271.0	220.9	213.1
Limiters	345.5	550.8	443.6	677.0	387.1	483.6	559.7
Spacers	333.2	160.7	297.6	77.3	298.1	242.1	227.3
VI. Likely demand: CYsP	107.2	404.9	562.2	503.0	198.6	471.4	491.8
Group A1	2.5	12.7	11.4	4.0	5.7	15.5	7.6
A2	1.4	7.9	14.0	1.6	4.9	7.6	5.1
B1	80.4	314.9	350.2	476.2	124.6	318.2	371.6
B2	22.8	69.4	186.6	21.2	63.5	130.2	107.5
Limiters	83.0	327.5	361.6	480.2	130.3	333.7	379.2
Spacers	24.2	77.3	200.7	22.8	68.4	137.7	112.6
VII. % Unfulfilled potential: CYsP	84.2	43.1	24.1	33.3	71.0	35.0	37.5
Group A1	87.7	67.8	40.2	74.8	80.9	44.5	59.0
A2	95.6	62.1	47.9	84.0	81.9	64.4	64.1
B1	75.3	38.4	17.5	28.0	65.1	30.2	31.3
B2	92.4	50.4	31.1	68.5	76.6	41.1	49.5
Limiters	76.0	40.5	18.5	29.1	66.3	31.0	32.3
Spacers	92.7	51.9	32.6	70.5	77.1	43.1	50.4
Group A	92.6	65.8	44.7	78.4	81.4	53.1	61.2
Group B	83.5	41.0	22.8	31.7	70.1	33.7	36.5

1/ Proportion of fecund women reported pregnant (D/B in Table 1 inflated by 12/7 (x 1000).
2/ Based on distribution in panel D, Table 1.
3/ Based on distribution in panel C, Table 1.
4/ Calculations discussed in text (final paragraph, description of model).
5/ For women in Groups A1 and A2, based on the corresponding use pattern of women in panel E, Table 1; for women in Groups B1 and B2, based on the corresponding use pattern of women in panel C, Table 1.
6/ For corresponding items, (1 - category III/II) x 100.
7/ A1 = (2/9)(I A 1 above); A2 = (2/9) (I A 2 above); B1 = I B 1 above; B2 = I B 2 above.

TABLE 3. Contraceptive Prevalence Survey (CPS) Findings on Fecundity and Pregnancy Status, Contraceptive Use, and Future Pregnancy Desires among Married Women of Reproductive Age (MWRA): two age groups for 7 National entities

Item	BANGLADESH		COLOMBIA		COSTA RICA		SOUTH KOREA		MEXICO RURAL		MEXICO URBAN		THAILAND	
	<30	30+	<30	30+	<30	30+	<30	30+	<30	30+	<30	30+	<30	30+
A. MWRA (N)	8223.0	4611.0	911.0	949.0	954.0	895.0	3920.0	8077.0	615.0	534.0	781.0	668.0	1134.0	1347.0
% Infecund (self-identified)	0.4	12.9	5.2	10.4	4.1	7.6	0.4	12.8	1.6	10.3	3.1	11.7	1.1	10.7
% Fecund 1/	99.6	87.1	94.8	89.6	95.9	92.4	99.6	87.2	98.4	89.7	96.9	88.3	98.9	89.3
% Using a method	9.4	15.7	40.4	46.8	57.2	65.6	31.3	59.5	21.6	23.0	48.3	52.8	44.7	55.6
% Not using a method	90.6	84.3	59.6	53.2	42.8	34.4	68.7	40.5	78.4	77.0	51.7	47.2	55.3	44.4
Currently pregnant/1000	173.7	90.9	233.8	68.5	177.1	63.7	197.7	23.9	230.9	88.0	184.4	62.9	151.7	47.5
Live births in coming year/1000 2/	297.7	155.7	400.7	117.0	304.0	109.5	338.8	41.0	395.1	151.7	316.3	107.8	260.1	81.7
Live births last year/1000	291.3	193.2	344.7	129.6	158.5	121.8	302.3	49.8	414.6	226.6	343.1	148.2	278.7	106.9
B. Fecund MWRA: (N) 3/	8191.0	4014.0	864.0	850.0	915.0	827.0	3906.0	7047.0	605.0	479.0	757.0	590.0	1122.0	1203.0
% Using a method	9.5	18.0	42.6	52.2	59.7	71.0	31.4	68.2	22.0	25.7	49.8	59.8	45.2	62.3
% Not using a method	90.5	82.0	57.4	47.8	40.3	29.0	68.6	31.8	78.0	74.3	50.2	40.2	54.8	37.7
Currently pregnant/1000	174.3	104.4	246.5	76.5	184.7	68.9	198.4	27.4	234.7	98.1	190.2	71.2	153.3	53.2
Live births in coming year/1000 2/	298.9	178.9	422.5	130.6	316.9	118.5	340.0	47.0	401.7	169.1	326.3	122.0	262.9	91.4
Live births last year/1000	294.5	222.0	363.4	144.7	373.8	131.8	303.4	57.0	421.5	252.6	354.0	167.8	281.6	119.7
% Want no more children	26.3	75.9	56.4	83.2	33.7	73.4	45.0	92.0	35.7	67.8	41.1	81.5	42.1	84.0
and using a method	5.3	17.2	25.6	47.6	23.2	57.0	22.5	67.0	9.9	20.7	22.3	53.4	22.9	56.8
and not using a method	21.0	58.7	30.8	35.5	10.5	16.4	22.5	24.9	25.8	47.2	18.8	28.1	19.2	27.2
% Want later 4/	55.2	18.2	37.4	9.8	51.9	21.3	24.2	1.9	49.4	25.9	44.5	12.5	44.6	10.5
and using a method	3.6	0.7	13.4	2.6	29.8	11.0	5.4	0.5	10.1	4.2	22.5	4.7	19.3	4.7
and not using a method	51.6	17.5	20.0	7.2	22.1	10.3	18.7	1.4	39.3	21.7	22.1	7.8	25.3	5.8
% Want soon (next year)	18.5	5.9	10.2	7.1	14.4	5.3	30.8	6.1	14.9	6.3	14.4	5.9	13.4	5.6
and using a method	0.6	0.1	3.6	2.0	6.7	3.0	3.5	0.7	2.0	0.8	5.0	1.7	3.0	0.8
and not using a method	17.9	5.8	6.6	5.1	7.8	2.3	27.4	5.4	12.9	5.4	9.4	4.2	10.3	4.7
C. Fecund not pregnant (N)	6763.0	3595.0	651.0	785.0	746.0	770.0	3131.0	6854.0	463.0	432.0	613.0	548.0	950.0	1139.0
% Want no more children	26.4	76.8	55.9	83.2	34.6	74.0	46.2	92.4	34.8	68.3	38.8	83.0	42.6	84.6
and using a method	6.4	19.2	33.9	51.6	28.4	61.2	28.1	68.9	13.0	22.9	27.6	57.5	27.1	60.0
and not using a method	20.0	57.6	22.0	31.6	6.2	12.9	18.1	23.4	21.8	45.4	11.3	25.5	15.6	24.7
% Want later 4/	53.1	17.0	31.5	9.3	49.6	20.5	21.5	1.7	49.9	26.6	45.0	10.9	44.2	10.4
and using a method	4.3	0.8	17.8	2.8	36.6	11.8	6.8	0.5	13.2	4.6	27.7	5.1	22.7	4.9
and not using a method	48.8	16.2	13.7	6.5	13.0	8.7	14.7	1.2	36.7	22.0	17.3	5.8	21.5	5.5
% Want soon	20.5	6.3	12.6	7.5	15.8	5.5	32.3	5.9	15.3	5.1	16.2	6.0	13.2	4.9
and using a method	0.7	0.1	4.8	2.2	8.2	3.2	4.3	0.7	2.6	0.9	6.2	1.8	3.6	0.9
and not using a method	19.7	6.1	7.8	5.4	7.6	2.2	27.9	5.2	12.7	4.2	10.0	4.2	9.6	4.0
% Using a method	11.5	20.1	56.5	56.6	73.2	76.2	39.2	70.2	28.7	28.5	61.5	64.4	53.4	65.8
% Not using a method	88.5	79.9	43.5	43.4	26.8	23.8	60.8	29.8	71.3	71.5	38.5	35.6	46.6	34.2
D. Reported pregnant at survey (N)	1428.0	419.0	213.0	65.0	169.0	57.0	775.0	193.0	142.0	47.0	144.0	42.0	172.0	64.0
% Want no more children	25.6	68.7	57.7	83.1	29.6	64.9	39.9	77.2	38.7	63.8	50.7	61.9	39.0	71.9
% Want later 4/	64.9	28.6	39.4	15.4	62.1	31.6	35.0	9.8	47.9	19.1	42.4	33.3	46.5	10.9
% Want soon as possible	9.5	2.6	2.8	1.5	8.3	3.5	25.2	13.0	13.4	17.0	6.9	4.8	14.5	17.2
E. Women with live birth last year (N)	2412.0	891.0	314.0	123.0	342.0	109.0	1185.0	402.0	255.0	121.0	266.0	99.0	316.0	144.0
% Want no more children	28.4	70.8	62.4	87.8	43.6	64.2	39.8	77.1	41.6	59.5	47.4	74.7	42.7	80.6
and using a method	4.0	7.4	20.4	27.6	24.6	43.1	9.8	20.1	8.6	9.9	24.1	37.5	16.5	35.4
and not using a method	24.4	63.4	42.0	60.2	19.0	21.1	30.0	57.0	32.9	49.6	23.3	27.3	26.3	45.1
% Want later	65.2	27.4	34.1	7.3	51.8	34.9	35.0	10.0	53.7	37.2	47.4	20.2	49.7	16.7
and using a method	2.9	1.2	13.4	1.6	27.5	16.5	5.9	0.7	11.0	4.1	18.4	3.0	16.1	9.7
and not using a method	62.4	26.2	20.7	5.7	24.3	18.3	29.1	9.2	42.7	33.1	28.9	17.2	33.5	6.9
% Want soon	6.4	1.8	3.5	4.9	4.7	0.9	25.1	12.9	4.7	3.3	5.3	5.1	7.6	2.8
and using a method	0.2	0.1	1.3	0.8	2.9	0.9	2.4	0.0	0.4	0.8	1.9	1.0	1.9	0.0
and not using a method	6.2	1.7	2.2	4.1	1.8	0.0	22.7	12.9	4.3	2.5	3.4	4.0	5.7	2.8
% Using a method	7.0	8.8	35.0	30.1	55.0	60.6	18.1	20.9	20.0	14.9	44.4	51.5	34.5	45.1
% Not using a method	93.0	91.2	65.0	69.9	45.0	39.4	81.9	79.1	80.0	85.1	55.6	48.5	65.5	54.9

1/ Includes contraceptively sterilized women (or women whose husbands had vasectomies).

2/ Currently pregnant inflated by 12/7. For rationale, see Figure 1, footnoes 2 and 3.

3/ Excludes self-identified infecund.

4/ Includes respondents uncertain about wanting more children and those who failed to answer. The proportion of these two groups was a median average of 6 percent among the countries considered.

TABLE 4. Model Findings on Potential Contraceptive Demand per 1000 MWRA during Year following Survey: Two age groups for 7 national entities (Derived from model illustrated in Figure 1)

Item	BANGLADESH		COLOMBIA		COSTA RICA		SOUTH KOREA		MEXICO RURAL		MEXICO URBAN		THAILAND	
	<30	30+	<30	30+	<30	30+	<30	30+	<30	30+	<30	30+	<30	30+
I. Fecund MWRA	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
A. With live birth next year 1/	298.9	178.9	422.5	130.6	316.9	118.5	340.0	47.0	401.7	169.1	326.3	122.0	262.9	91.4
Pregnancy desire after delivery 2/														
1. No more	76.6	122.9	244.0	108.5	93.8	76.9	135.6	36.3	155.6	107.9	165.4	75.5	102.4	65.7
2. Postpone	194.0	51.2	166.6	20.1	196.9	37.4	118.9	4.5	192.3	32.4	138.2	40.7	122.3	10.0
3. Soon as possible	28.3	4.7	11.9	2.0	26.3	4.2	85.5	6.1	53.7	28.8	22.7	5.8	38.2	15.7
B. With no live birth next year	701.1	821.1	577.5	869.4	683.1	881.5	660.0	953.0	598.3	830.9	673.7	878.0	737.1	908.6
Pregnancy desire after delivery 3/														
1. No more	185.2	630.4	322.9	723.2	236.2	652.5	305.2	880.3	208.1	567.4	261.6	729.0	314.2	769.0
2. Postpone	372.5	139.3	181.9	80.0	338.8	180.9	141.9	16.4	298.5	221.2	303.3	96.1	325.9	94.9
3. Soon as possible	143.5	51.4	72.7	65.3	108.0	48.1	212.9	56.3	91.8	42.3	108.8	52.9	97.0	44.7
II. Potential demand: couples 4/	738.1	885.9	778.5	889.8	768.8	909.6	616.7	924.0	738.5	882.1	767.3	902.6	789.9	914.4
Group A1 (Limiters: L)	51.1	62.0	162.6	72.3	62.5	51.3	90.4	24.2	103.7	72.0	110.3	50.4	68.3	43.8
A2 (Spacers: S)	139.3	34.2	111.1	13.4	131.3	24.9	79.3	3.1	128.2	21.6	92.1	27.1	81.5	6.7
A3 (Seekers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B1 (L)	185.2	630.4	322.9	723.2	236.2	652.5	305.2	880.3	208.1	567.4	261.6	729.0	314.2	769.0
B2 (S)	172.5	139.3	181.9	80.8	338.8	180.9	141.9	16.4	298.5	221.2	303.3	96.1	325.9	94.9
B3 (Seekers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Limiters	236.2	712.4	485.6	795.5	298.7	703.8	395.6	904.5	311.8	639.4	371.8	779.3	382.5	812.8
Spacers	501.8	173.5	292.9	94.2	470.1	205.8	221.1	19.5	426.8	242.8	395.5	123.2	407.4	101.6
III. Likely demand: couples 5/	48.1	124.1	345.7	498.7	549.0	689.6	265.8	668.6	204.1	243.3	464.4	585.6	419.8	612.6
Group A1 (L)	7.2	8.6	53.1	22.8	35.2	34.4	22.2	6.3	21.5	12.0	56.0	32.0	26.3	19.3
A2 (S)	5.7	1.5	43.6	3.0	69.7	11.8	13.4	0.2	26.2	2.4	35.8	4.1	26.5	3.9
B1 (L)	45.1	157.6	196.1	448.6	194.1	539.2	185.5	656.9	77.5	190.4	185.7	504.7	199.4	544.8
B2 (S)	10.2	6.4	102.9	24.4	250.0	104.2	44.7	5.1	78.8	38.5	186.8	44.9	167.6	44.7
Limiters	52.3	166.2	249.2	471.3	229.4	573.6	207.7	663.2	99.1	202.4	241.7	536.7	225.7	564.1
Spacers	35.8	7.9	146.5	27.3	319.7	116.0	58.1	5.4	105.0	40.9	222.7	48.9	194.1	48.6
IV. % Unfulfilled potential: couples 6/	88.1	80.3	49.2	44.0	28.6	24.2	56.9	27.6	71.4	72.4	39.5	35.1	46.9	33.0
Group A1 (L)	86.0	89.5	67.3	68.5	43.6	32.9	75.4	73.9	79.2	83.3	49.2	36.5	61.5	56.0
A2 (S)	95.6	95.5	60.7	77.8	46.9	52.6	83.1	92.5	79.6	88.9	61.1	85.0	67.5	41.7
B1 (L)	75.6	75.0	39.3	38.0	17.8	17.4	39.2	25.4	62.7	66.4	29.0	30.8	36.5	29.1
B2 (S)	91.9	95.4	43.4	69.9	26.2	42.4	68.5	68.6	73.6	82.6	38.4	53.3	48.6	52.9
Limiters	77.9	76.7	48.7	40.8	23.2	18.5	47.5	26.7	68.2	68.3	35.0	31.2	41.0	30.6
Spacers	92.9	95.4	50.0	71.0	32.0	43.6	71.7	72.4	75.4	83.2	43.7	60.3	52.4	52.2
Group A	92.9	91.3	64.7	70.0	45.8	39.3	79.0	76.0	79.4	84.6	54.6	53.5	64.8	54.1
Group B	86.5	78.7	40.8	41.2	22.8	22.8	48.5	26.2	69.1	71.0	34.0	33.4	42.7	31.8
V. Potential demand: CYsP 7/	617.8	809.4	596.0	832.6	639.6	858.8	503.6	905.8	583.9	819.8	632.4	850.9	690.0	880.7
Group A1	17.0	27.3	54.2	24.1	20.8	17.1	30.1	8.1	34.6	24.0	36.8	16.8	22.8	14.6
A2	43.1	11.4	37.0	4.5	43.8	8.3	26.4	1.0	42.7	7.2	30.7	9.0	27.2	2.2
B1	185.2	630.4	322.9	723.2	236.2	652.5	305.2	880.3	208.1	567.4	261.6	729.0	314.2	769.0
B2	372.5	139.3	181.9	80.8	338.8	180.9	141.9	16.4	298.5	221.2	303.3	96.1	325.9	94.9
Limiters	202.2	657.7	377.1	747.3	257.1	669.6	335.4	888.4	242.6	591.4	298.3	745.8	337.0	783.6
Spacers	415.6	150.7	218.9	85.3	382.5	189.2	168.3	17.4	341.3	228.4	334.1	105.2	353.0	97.1
VI. Likely demand: CYsP	79.5	167.4	331.2	481.5	479.1	658.8	242.1	664.2	172.3	233.7	403.2	561.5	384.6	597.2
Group A1	2.4	2.9	17.7	7.6	11.7	11.5	7.4	2.1	7.2	4.0	18.7	10.7	8.8	6.4
A2	1.9	0.5	14.5	1.0	23.2	3.9	4.5	0.7	8.7	0.8	11.9	1.4	8.8	1.3
B1	45.1	157.6	196.1	448.6	194.1	539.2	185.5	656.9	77.5	190.4	185.7	504.7	199.4	544.8
B2	30.2	6.4	102.9	24.4	250.0	104.2	44.7	5.1	78.8	38.5	186.8	44.9	167.6	44.7
Limiters	47.5	160.5	213.8	456.1	205.9	550.7	192.9	659.0	84.7	194.4	204.4	515.3	208.2	551.2
Spacers	32.1	6.9	117.4	25.4	273.2	108.1	49.1	5.2	87.6	39.3	198.8	46.2	176.4	46.0
VII. % Unfulfilled potential: CYsP	87.1	79.3	44.4	42.2	25.1	23.3	51.9	26.7	70.5	71.5	36.2	34.0	44.3	32.2
Group A1	86.0	89.5	67.3	68.5	43.6	32.9	75.4	73.9	79.2	83.3	49.2	36.5	61.5	56.0
A2	95.6	95.5	60.7	77.8	46.9	52.6	83.1	92.5	79.6	88.9	61.1	85.0	67.5	41.7
B1	75.6	75.0	39.3	38.0	17.8	17.4	39.2	25.4	62.7	66.4	29.0	30.8	36.5	29.1
B2	91.9	95.4	43.4	69.9	26.2	42.4	68.5	68.6	73.6	82.6	38.4	53.3	48.6	52.9
Limiters	76.5	75.6	43.3	39.0	19.9	17.8	42.5	25.8	65.1	67.1	31.5	30.9	38.2	29.7
Spacers	92.3	95.4	46.3	70.3	28.6	42.9	70.8	70.1	74.3	82.8	40.5	56.1	50.0	52.7
Group A	92.9	91.3	64.7	70.0	45.8	39.3	79.0	76.0	79.4	84.6	54.6	53.5	64.8	54.1
Group B	86.5	78.7	40.8	41.2	22.8	22.8	48.5	26.2	69.1	71.0	34.0	33.4	42.7	31.8

1/ Proportion of fecund women reported pregnant (D/B in Table 1 inflated by 12/7 (x 1000).
2/ Based on distribution in panel D, Table 1.
3/ Based on distribution in panel C, Table 1.
4/ Calculations discussed in text (final paragraph, description of model).
5/ For women in Groups A1 and A2, based on the corresponding use pattern of women in panel E, Table 1; for women in Groups B1 and B2, based on the corresponding use pattern of women in panel C, Table 1.

MWRA; B. fecund MWRA; C. fecund not pregnant MWRA; D. reported pregnant at the survey (and therefore unquestionably fecund); and E. MWRA who reported having a live birth "precisely" within the last year of the survey date.

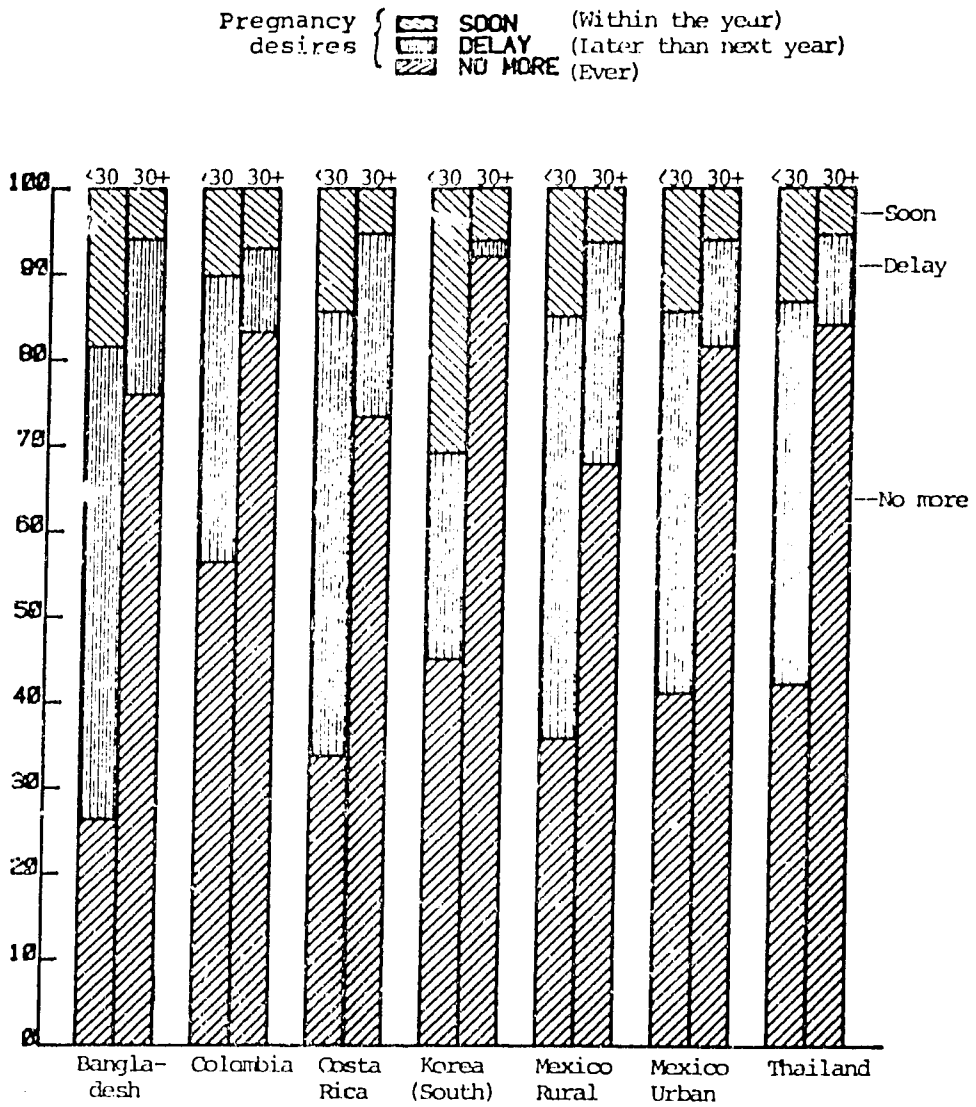
Items of interest are the distribution by future pregnancy desires (no more, later, soon, corresponding to avoid, delay, or seeking, respectively), and the proportion using a contraceptive method within pregnancy desire groups. Because the chief virtue of the time model is its inclusion of pregnant women in its estimate of potential contraceptive demand, a comparison of the births projected for the year following the survey with the number reported last year is also of interest. Both of these, not merely the former, are subject to wide margins of error. The ratio of projected to last year's reported births ranges from .86 to 1.09 among the seven national entities (median .98) in Table 1; from .85 to 1.16 (median .95) among the seven under 30 age groups, and from .67 to .90 (median .81) for the seven 30 and over age groups in Table 3. With fertility falling rapidly in some of these countries, it may be that the older women are producing notably fewer births each year, but to improve upon the projection, it might be advisable during the survey to ask pregnant women the gestation age. *

Future pregnancy desires

In asking women whether they wanted more children, an unusual feature of the CPSs was to inquire of those who said "yes" whether they wanted the next pregnancy soon (within a year) or later. This makes it possible to add child

* As noted in the discussion of the model, the projection of live births need not be based on survey findings regarding the currently pregnant.

Figure 2. CPS findings: Percent distribution of fecund women by future pregnancy desires: two age groups, under 30 and 30 and over



Source: Table 3, panel B.

spacing to limiting considerations in estimating next year's potential contraceptive demand. The findings are striking. If women are taken at their word, very few want a (new) pregnancy next year: among fecund women age 30 and over, a mere 5 to 7 percent, as shown in Figure 2; and among younger women, an average (median) of 14 percent, ranging from 10 percent in Colombia to 31 percent in Korea).

If spacers are added to limiters, not only are the age differentials dissipated in the proportion of women desirous of avoiding a pregnancy in the near future, but country differentials virtually vanish, despite wide differences in culture and/or stage of socioeconomic development. It is striking that on average (median), 86 percent of the fecund women under age 30 and 94 percent of the 30 and over age group say they do not want to conceive in the near future. As expected, however, differentials by country and age persist in the breakdown with the reason--to limit or space--for not wanting a pregnancy next year. In Korea, the relatively low proportion under age 30 who want to delay the next pregnancy (24 percent compared with a median of 44 percent) can probably be explained by the relatively high age at marriage, and it is counterbalanced in Korea by the high proportion after age 30 who want no more children (92 percent compared with a median of 81 percent among the seven national entities).

If taken literally, the CPS findings indicate that the vast majority of fecund MWRA are potential claimants for contraceptive services and supplies. On average (median), 59 percent of the fecund MWRA said they want no more children (Table 1), and of the 41 percent who do want more, only one-fourth want the next child soon.

Contraceptive use patterns

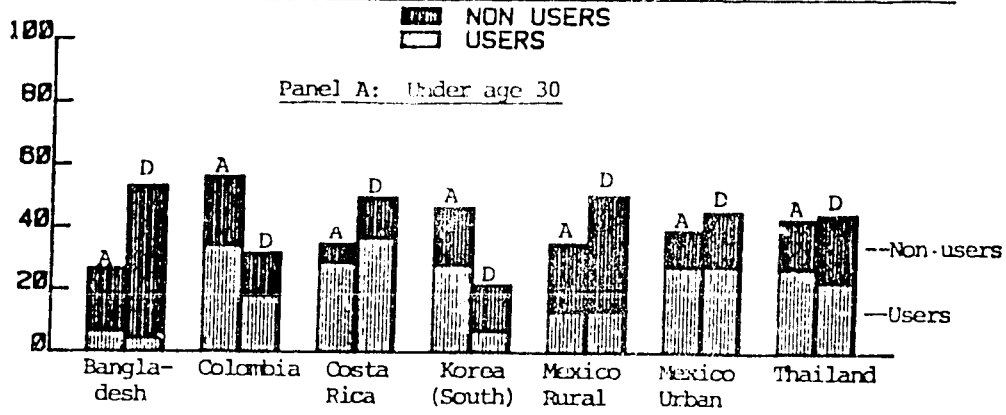
Contraceptive prevalence rates are confounded by the currently pregnant (also lactating) women. Excluding them from the denominator exaggerates the rate; including a group in the denominator that has no participation in the numerator deflates the rate. This is the dilemma of snapshot estimates of potential contraceptive demand. For the time model estimate, the use proportions found in the CPS (panels C and E, Tables 1 and 3) are utilized to project the likely contraceptive use among women who do and those who do not have a live birth next year.

Figure 3 depicts the contraceptive use patterns of three groups of non-pregnant women: 2 age groups and those (all ages) who said they had a live birth last year. Interest centers on the latter group because those women of proven fecundity provide the basis for the model projection of the likely contraceptive use of the currently pregnant at the survey.

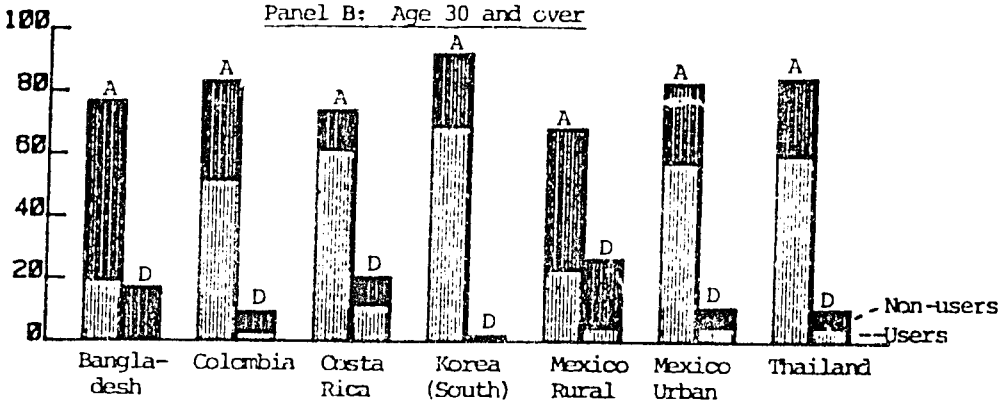
The proportions using contraception to implement their pregnancy desires are not directly shown in Figure 3 but are easily inferred from the height of the user shading relative to the total length of each bar. If all women acted to fulfill their pregnancy desires, the total bar would be shaded as contraceptive users. In some countries, the use proportion is substantial--Colombia, Costa Rica, Korea, and urban Mexico--particularly among pregnancy avoiders and older women. It is no surprise that birth avoiders are more likely to use contraception than birth spacers but among younger women, the difference per country betwen use by spacers and limiters is less pronounced than might have been expected. * A further point of

* Birth limiters probably use more efficient methods.

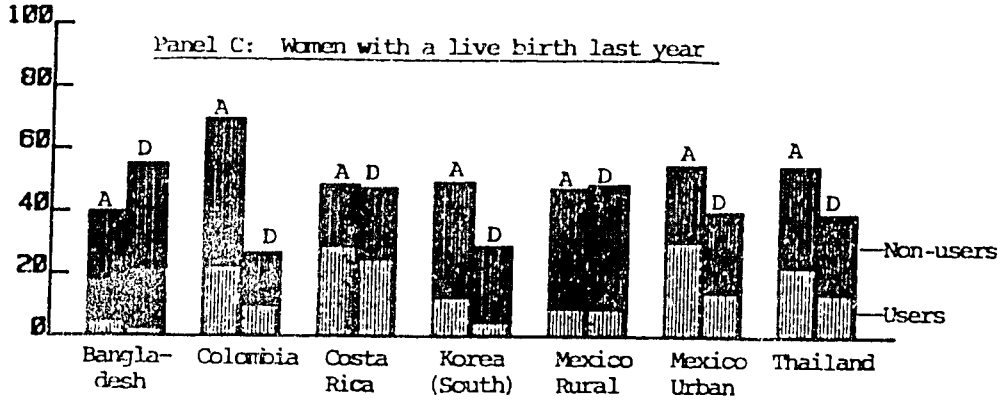
Figure 3. CPS findings: Percent of fecund, non-pregnant MWRA who want to avoid (A) or delay (D) a future pregnancy, subdivided into contraceptive users and non-users: three groups of women



Source: Table 3, panel C.



Source: Table 3, panel C.



Source: Table 1, panel C.

interest is that age does not influence the extent of use among birth avoiders, but among women who want to delay the next pregnancy, younger women are more likely to practice contraception than older women.

As shown in panel C, except in Costa Rica and urban Mexico, fewer than half the women with a live birth last year were using contraception at the time of the survey. Whether these women want to space or limit births, on average (median), one-third reported they were using a contraceptive method (ranging from 12 percent in Bangladesh to 60 percent in Costa Rica among limiters, and among spacers, from 4 percent in Bangladesh to 52 percent in Costa Rica). If four months are allowed for postpartum contraceptive protection, then two-thirds of these women were exposed to the risk of an unwanted pregnancy, or twice the one-third, on average, practicing contraception. This finding underscores the importance of not discounting currently pregnant women in the estimate of "unmet need" for contraception.

Model Findings

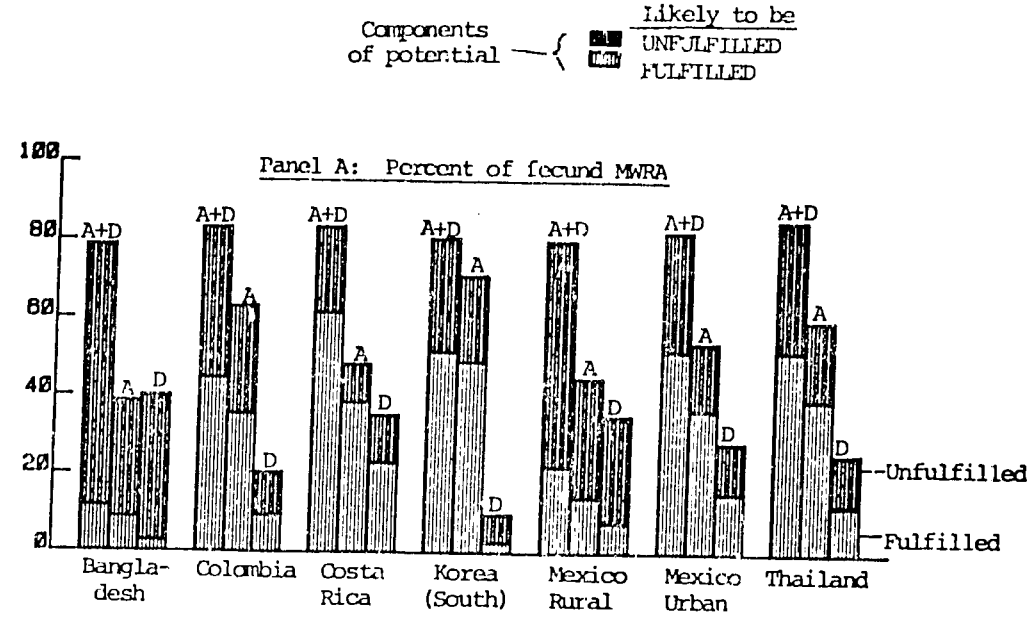
The model yields the potential contraceptive demand during the year after the survey from women desirous of avoiding or delaying a pregnancy, the likely portion of that demand being fulfilled on the basis of survey contraceptive use patterns, and as a residual, the likely unfulfilled portion. Based on 1000 fecund MWRA as the source of demand, two measures are considered which have an important conceptual distinction: one is in terms of number of fecund MWRA (relevant for potential family planning program clients); the other is in terms of couple years of exposure to pregnancy risk

(relevant for family planning program inventories and supplies). The latter differs from the former in that it takes into account the fact that not all fecund women are exposed to the risk of an unwanted pregnancy for the full year. For pregnant or recently delivered women to practice contraception would be redundant. Thus the model assigns only one-third of a CYP as the average potential demand among women with a live birth in the year following the survey who want to delay or avoid the next pregnancy.

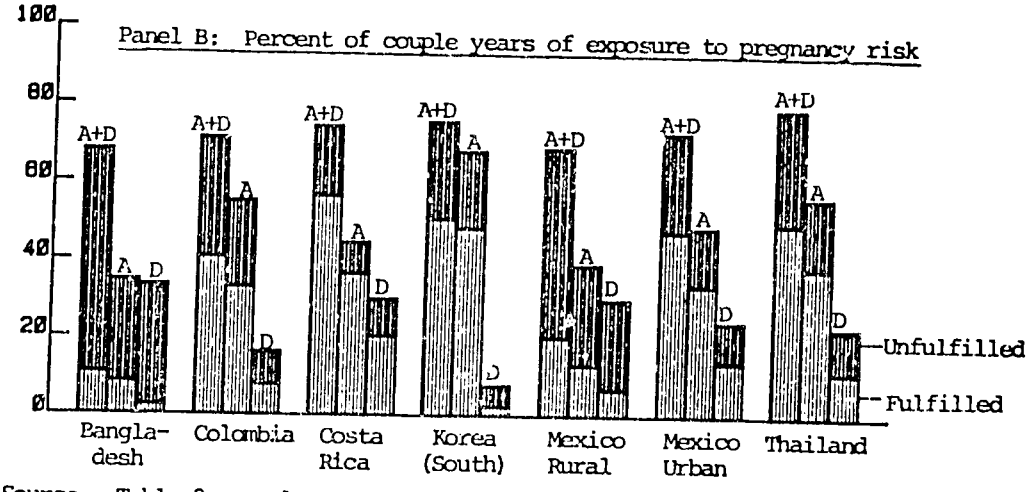
Figure 4 depicts the two measures of demand (couples and CYsP) for birth avoiders and/or delayers, with a subdivision of the total demand into its likely fulfilled and unfulfilled components. Figure 5 presents the two measures of potential demand (combined for spacers + limiters) for two age groups. The information in Figure 6 is at the heart of the model because it shows the extent to which the women pregnant at the survey, this obviously fecund group usually ignored in estimating contraceptive demand, contribute to potential demand measured over time rather than at a point in time. Finally, Figures 7 and 8 show how much of the potential demand is likely to remain unfulfilled without improvement in contraceptive use patterns, the former in terms of the percent of the total demand, the latter as a percent of MWRA.

It is clear in Figure 4 that potential demand is greater among avoiders than delayers but the former do not uniformly have a higher probability of fulfilling their potential. The combination of spacers and limiters (first bar of each country) reduces the variance among countries in the total potential but not in the probability of fulfillment. A factor in the relationship between the two measures in Figure 4 is the number of women who reproduce during the year. The fewer such women, the closer are the two

Figure 4. Model findings: Potential contraceptive demand in year following survey by women wanting to avoid (A) or delay (D) a (new) pregnancy: two measures (percent of fecund MWRA, percent of couple years of exposure to pregnancy risk)



Source: Table 2, panels II and III.



Source: Table 2, panels V and VI.

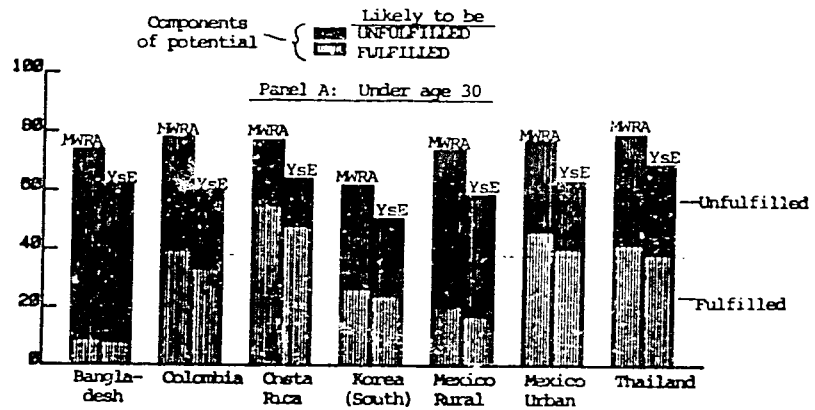
measures (ceteris paribus), since it is women with a live birth during the year who have less than one year's exposure to the risk of pregnancy. The difference between the two measures is a shortfall in the exposure estimate (panel B) of 6 (Korea) to 14 percent (Bangladesh) of the corresponding estimate based on couples (panel A).

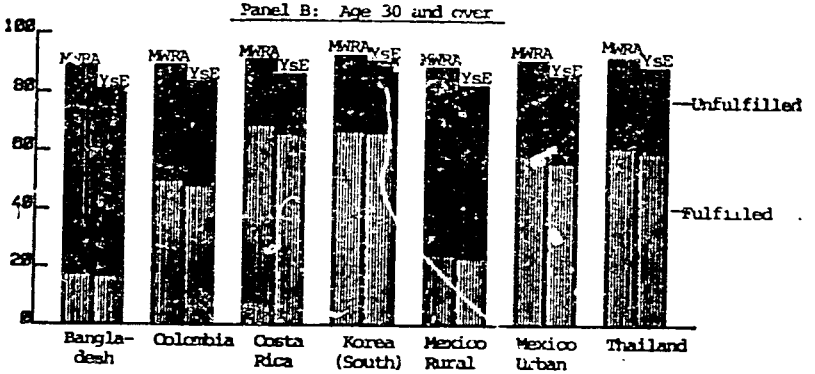
Figure 5 underscores the importance for fertility decline of satisfying the potential demand of younger women. In three countries--Bangladesh, Korea, and rural Mexico--less than half the younger MWRA will implement their potential desire to control their fertility if present contraceptive use patterns persist. Even among older women the unfulfilled poroportions are notable, but given the superiority in fecundity, and often in numbers, of the younger women, fulfillment of their desires to space and limit births would have a major impact on fertility.

Figure 6 depicts the crux of the difference between a time-oriented and a snap-shot measure of potential contraceptive demand. It indicates how much of the potential demand is missed when currently pregnant women are ignored in estimates of "unmet need" for contraception. The representation in Figure 6 is in terms of women, not couple years of protection. In terms of the latter, the bars would be 1/3 as high on the premise that on average, each woman with a live birth next year will require 1/3 of a year's contraceptive use before the end of the year in order to fulfill pregnancy spacing or limiting desires. (See figure 1, footnote 6).

Of all the women with any potential demand during the year, a surprisingly high proportion are women who have a live birth during the year, especially among the younger women. Even in terms of CYsP, namely 1/3 the length of the bars shown in Figure 6, the women who reproduce during the

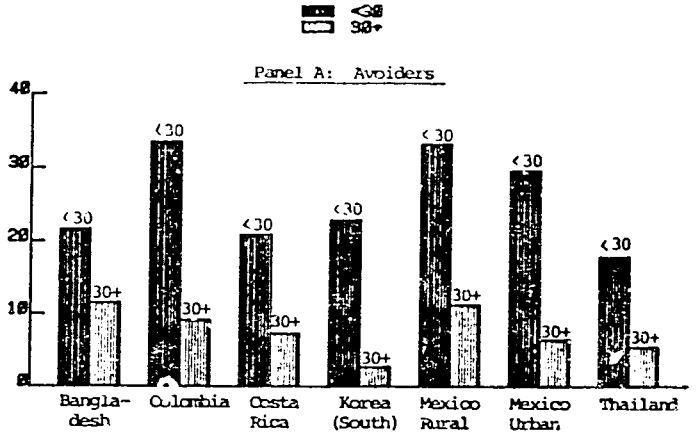
Figure 5. Model findings: Two measures of potential contraceptive demand in year following survey: (1) as percent of MWRA, (2) as percent of couple years of exposure (YsE)

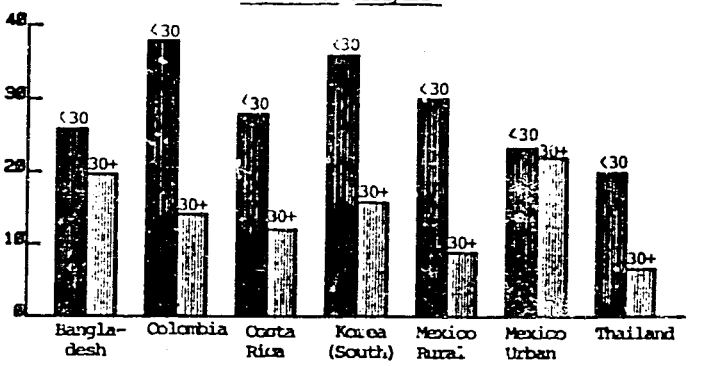




Source: Table 4, panels II and III for MWRA; panels V and VI for YsE.

Figure 6. Model findings: Women with a live birth next year as a percent of all women with potential contraceptive demand during at least part of the year: avoiders and spacers by two age groups





Source: Table 4, panel II.

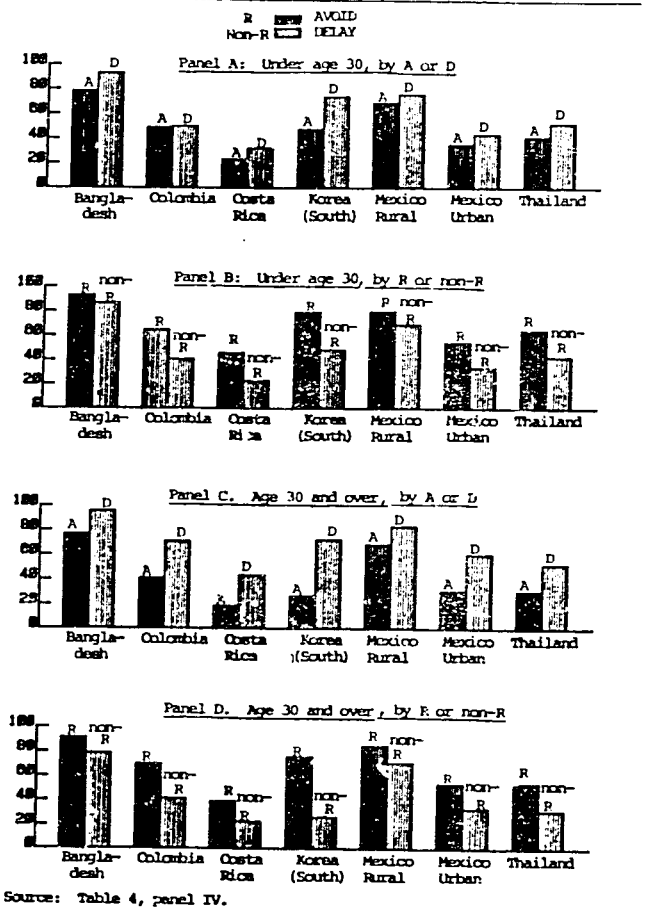
year account for a non-trivial proportion of the total potential demand. The major reason for this is the high fertility rate (per 1000) imputed to the younger fecund MWRA, namely 299, 422, 317, 340, 402, 326, and 263 for the seven national entitites listed from left to right respectively in Figure 6. With childbearing rates at these levels, the need to consider currently pregnant women in estimating future potential contraceptive demand is self-evident. The data warrant the inference that many women who become mothers during the year were not seeking to become pregnant but conceived because of failure to practice (effective) contraception.

Figures 7 and 8 present the bottom line of the findings generated by the model. The former shows the extent to which the potential demand--- whatever its level---is not likely to be satisfied; the latter depicts the absolute level of unfulfilled demand per 100 MWRA.

In examining Figure 7, it should be noted that the findings are given for two age groups, under 30 in panels A and B, 30 and over in panels C and D. Panels A and C relate to avoiders or delayers; panels B and D, to women reproducing (R) or not reproducing (non-R) during the year. Major highlights are as follows: considerable country variation but substantial proportions of unfulfilled potential in all countries; * greater unfulfilled demand among

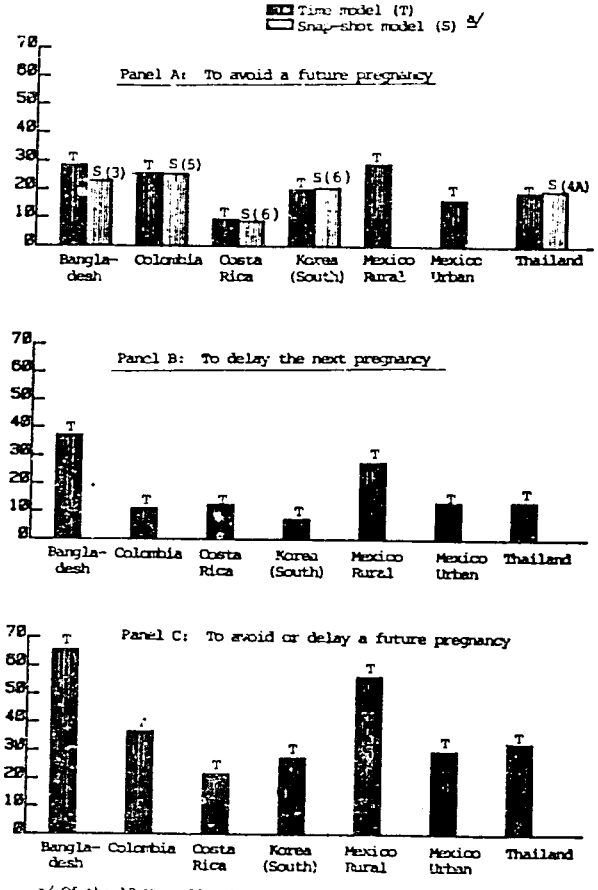
* Even in Costa Rica with the best record one-fourth of potential demand from avoiders and one-third from delayers under age 30 remain unsatisfied on the basis of current contraceptive use patterns.

Figure 7. Model findings : Percent unfulfilled of potential demand among two age groups of fecund MWRA: (1) by pregnancy desires, i.e., avoid (A) or delay (D) a (new) pregnancy; (2) by reproductive status during year (R for live birth, non-R for no live birth)



Source: Table 4, panel IV.

Figure 8. Model Findings: Percent of MWRA with unfulfilled potential contraceptive demand



a/ Of the 12 Westoff and Pebley measures, the one that comes closest (identified by the number in parentheses) to the time model finding.

Source: For T model, TAble 2, panel II - panel III (adjusted in panel A to a denominator of all MWRA); for S model, Westoff and Pebley, p. 128.

D than A women (panels A and C), but among younger women, less differential than one might have expected; and important differences by reproductive status (panels B and D), with R women consistently fulfilling less of their potential demand than non-R women. The latter finding yields the same inference drawn from Figure 6, that postpartum women should not be discounted in evaluating potential contraceptive demand; that their dependence on breastfeeding, if that is what many of them rely on to fulfill their pregnancy desires, conducive to unwanted fertility. Age differentials are somewhat difficult to observe in Figure 7 because they appear in different panels. Older women seem understandably more determined to avoid a future pregnancy than younger women (the A bars in panels A and C) but the younger women are more inclined to act to delay the next pregnancy (the D bars in panels A and C). Within reproductive status, the age differentials are minor. As usual, no matter how subdivided, country variation is wide, Costa Rica usually showing the best record, Bangladesh the poorest, for fertility control.

Figure 8 shows the familiar measure of "unmet need," percent of MWRA in need of contraception to avoid or space pregnancies whose behavior is inconsistent with their expressed pregnancy desires. Here comparison with the Westoff and Pebley findings would be valid, if the input parameters common to the two models (time versus snap-shot) were of approximately the same value. Substantial differences in the estimate of the proportion infecund (Westoff and Pebley assuming levels two to four times greater than used in the time model) destroy the validity of the comparison. This is nevertheless shown in Figure 8, panel A, by selecting from among the 12 Westoff and Pebley measures (which, it will be recalled, ranged on average

from 7 to 40 percent of MWRA with unmet need) the one closest (identified by its number) to the time model finding.

Of interest in the comparison is that a point-in-time measure of unmet need that excludes the currently pregnant but about triples the reported proportion infecund yields approximately the same level of unfulfilled potential contraceptive demand (measured in terms of MWRA, not CYsP) as a model that explicitly takes the currently pregnant into account and relies on the respondent's judgment of her fecundity. The currently pregnant and the infecund being two distinct, independent groups, there is no logical trade-off between the two and the possible compensation of one by the other suggested by the comparison is merely a statistical artifact.

By overcoming the arbitrariness of the snap-shot model regarding the composition of women to consider, the time model yields insight into the "best" measure of unfulfilled potential demand for contraception.

Limitations of the Model

Some of the limitations of the model have already been alluded to in its description. As a macro-deterministic model, not only are its input parameters aggregate population averages, but many are rough orders of magnitude. The advantage of the model is that it investigates the contraceptive need not only of women currently exposed to the risk of pregnancy but also of currently pregnant women once they terminate this state. To do this, however, requires a projection of the number of women who will produce a live birth during the time interval under review, limited in

the present analysis to one-year, which itself is a limitation. The possibility is envisioned for extending the analysis to cover a five year period, an exercise that requires projections of likely contraceptive prevalence rates as well as birth expectations and involves detailed age component considerations. From a marketing point of view, a five year period may be more useful than a one year time horizon, but an alternative to a more complex five year model is a projection of the one year output from two or more prevalence surveys spaced a year or more apart.

Other limitations of the model are that it does not allow for fetal wastage; it requires estimates of gestation age if the number of women reporting they are currently pregnant is used to project next year's live births; it requires an arbitrarily assigned average period of postpartum amenorrheic protection from the risk of pregnancy; and it deals with the women who reproduce during its time interval as a simple entity in order to ascribe an average time interval of exposure to pregnancy risk.

Identification of the infecund, the currently pregnant, women who mean what they say when they report they want no more children or want to delay the next pregnancy, the effectiveness of the methods currently or likely to be used, and so on, are empirical questions in no way resolved by the model. On the contrary, predicated on these questions, the validity of the findings from the model is a function of the reliability of its input data.

To extend the present analysis to a quantification of the fertility impact of satisfying the potential demand for contraception is left as an exercise for a future paper.

Notes

1. Mauldin, W. P., Watson, W.B., and Noe, L. F. KAP Surveys and Evaluation of Family Planning Programs. The Population Council. April 1970. (mimeo.)

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