Revising the Definition of Unmet Need for Family Planning

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Introduction

Unmet need for family planning, or the percentage of women who are not currently using a method of contraception and want to stop or delay childbearing, is a measure that is widely used for advocacy, the development of family planning policies, and the implementation and monitoring of family planning programs worldwide. Yet the calculation of unmet need remains complex and is not widely understood. Furthermore, the definition and calculation of unmet need has changed over time, and has been applied in different ways in different surveys, making comparisons across countries and interpretation of time trends difficult and potentially misleading.

As unmet need has been adopted as a Millennium Development Goal (MDG) indicator, ensuring that the indicator can be calculated in a consistent way over time and across countries has become crucial. To address this need, the USAID-funded MEASURE Demographic and Health Surveys (DHS) program has convened a Technical Expert Working Group (TEWG) on Unmet Need to review suggestions for the revision of the unmet need indicator.

The goals of this paper are threefold. One, to describe why a revision to the definition of unmet need is so urgently needed; two, to outline the changes to the definition of unmet need; and three, to explain and demonstrate the impact of the revision on levels of unmet need by analyzing 160 DHS surveys from 67 countries conducted over the last 20 years.

Changes over time in the definition of unmet need for family planning

The definition of unmet need has been in flux since the concept was first introduced in the 1960s, as noted by Robey, Ross, and Bhushan (1996). The gap between the proportion of women who said they didn't want any more children and the proportion of women who were using contraceptives became known as the "KAP-gap," after the knowledge, attitudes, and practice (KAP) surveys of that era (Bongaarts 1991). The term "unmet need for contraception" was first coined in the 1970s to describe the seemingly discrepant behavior of women who want to avoid pregnancy, but are not using family planning (Robey, Ross, and Bhushan 1996).

Early attempts to measure unmet need employed a relatively simple definition. In its simplest form, unmet need was defined as the percentage of currently married women who want no more children but are not using contraception (the numerator), out of all currently married women (the denominator) (Westoff 1978; Westoff and Pebley 1981).

Spacing and Limiting

From there, the definition of unmet need grew increasingly complex. In addition to women who wanted no more children, women who wanted to delay a pregnancy, or who weren't sure if or when they wanted to become pregnant, were added to the definition of unmet need. These women were considered to have "unmet need for spacing," while women who wanted to end childbearing had "unmet need for limiting," (Nortman 1982).

Infecundity

A new level of complexity was introduced by attempts to identify and exclude women who were not at risk of becoming pregnant. A primary reason for this exclusion was the goal of estimating the demographic impact of fulfilling all unmet need. To do so, analysts needed to exclude women for whom contraceptive use would have no demographic impact: women who could not give birth, or were infecund. Infecund women were considered to have no need for contraception and so were removed from the numerator of the unmet need calculation. Determining women's infecundity based solely on survey data proved to be complicated. In 1988, Westoff published revised estimates of unmet need that considered women to be infecund either if they had no birth in the last five years despite having been married for longer than five years and never having used contraception, or if they had not menstruated in the last six weeks but were not pregnant or amenorrheic (Westoff 1988). The cutoff date for last menstruation used in determining infecundity was later expanded to the last twelve weeks (Westoff and Ochoa 1991), then six months (Westoff and Bankole 1996). The definition of infecundity was later refined to include women who reported that they were menopausal, or who, when asked if they wanted a/another child, said they could not get pregnant (Westoff and Bankole 1995). Additionally, though we could not find this documentation in a paper, examination of the code used by the DHS to calculate unmet need shows that women who said they could not get pregnant, had a hysterectomy, or said they had never menstruated but were not postpartum amenorrheic, were also added to the infecund category in approximately 1990.

Pregnancy and postpartum amenorrhea

Pregnant and postpartum amenorrheic women have been treated differently in different definitions of unmet need. Early estimates treated these women as having no need because they are currently not at risk of becoming pregnant (Westoff 1978). This approach was criticized because these women may soon be in need of contraception, even if they were not at risk of pregnancy at the precise moment of survey. Nortman (1982) recommended treating pregnant and breastfeeding (used as a proxy for postpartum insusceptibility) women as potentially having an unmet need because they would return to an at-risk status within a one-year time horizon. Westoff and Ochoa (1991) argued that many pregnant and postpartum amenorrheic women may be in that state at the time of survey because their prior need for family planning was not met. They suggested that women who are pregnant or postpartum amenorrheic be assigned an unmet need status based on the wantedness of their last birth or current pregnancy. If the woman reported that she wanted to become pregnant at the time she became pregnant, she had no need for contraception; if she wanted to become pregnant later, she had an unmet need for spacing; if she did not want to become pregnant at all, she had an unmet need for limiting. Despite critiques of using retrospective fertility intentions for pregnant and postpartum amenorrheic women (e.g., Ross and Winfrey 2001), this treatment of pregnant and postpartum women

has been used by the DHS[1] in calculating unmet need from approximately 1990 through the present day.

Around 1995, an adjustment of the treatment of some pregnant and postpartum amenorrheic women was incorporated. If pregnant or postpartum amenorrheic women said they did not want their current pregnancy/last birth at all, but also all reported wanting another child in the future, they were shifted from having an unmet need for limiting to unmet need for spacing (Westoff and Bankole 1995). This adjustment affected levels of unmet need for spacing and limiting, but did not affect total unmet need.

In addition to changes in how postpartum amenorrheic women are handled in the definition of unmet need, the group of women defined as postpartum amenorrheic in DHS surveys has also changed over time. To determine whether or not a woman is postpartum amenorrheic, the DHS has consistently used the question from the maternity history, *"Has your period returned since the birth of (NAME OF YOUNGEST CHILD)?"* What has changed has been the group of women who are asked this question. In DHS surveys from rounds II, IV, and V, this question was asked of all women who gave birth in the 5 years prior to the survey. In DHS III, it was asked only of women who gave birth in the prior 3 years. The algorithm for determining whether a woman was postpartum amenorrheic does not limit the duration of postpartum amenorrhea. The maximum duration of postpartum amenorrhea was therefore different in different surveys: 35 months in surveys with 3-year maternity histories, and 59 months in surveys with 5-year maternity histories.[2]

Calendar data

Another change over time in the DHS questionnaires that affected the definition of unmet need is in the use a contraceptive calendar. The contraceptive calendar is a month-by-month retrospective history of births, pregnancies, terminations, and episodes of contraceptive use that each woman experienced for the 5 years prior to her interview. In addition, the full calendar includes columns to collect information on reasons for discontinuation of each contraceptive method, and on marital status in each month (see DHSIV Model A questionnaire, ORC Macro 2001). Several versions of the calendar have been used in DHS surveys across countries and over time. During DHS rounds II, III and IV,[3] the DHS core questionnaire was split into a Model A questionnaire for high contraceptive prevalence countries, and a Model B questionnaire for low contraceptive prevalence countries. The full contraceptive calendar was

[1] The "standard DHS definition" or the "DHS definition of unmet need" refers to the unmet need algorithm used to compute estimates of unmet need that are shown in DHS final reports, STATCompiler, and are included in the MDG database. This definition has varied over time.

[2] Although this does not affect a large number of women who were treated as postpartum amenorrheic for 3 years or longer, it introduces an additional inconsistency into the algorithm. This inconsistency particularly affects estimates for West African countries that have long durations of breastfeeding and postpartum amenorrhea.

[3] The DHS project is currently in its 6th round of data collection. The timelines for previous DHS rounds were I (1984-89), II (1989-93), III (1993-97), IV (1997-2003), and V (2003-2008).

included in the Model A questionnaires for high contraceptive prevalence countries in DHS rounds II, III and IV, from approximately 1990 to 2003. Model B questionnaires, used in countries with lower contraceptive prevalence, did not include the calendar. In DHS V, the standard questionnaire for all countries included a one-column calendar covering only births and contraceptive use.[4] The calendar was simplified as part of an effort to reduce the length and the complexity of the entire instrument and not with the explicit intention of revising the unmet need definition.

When the full calendar was implemented in a survey, the unmet need algorithm incorporated data from the calendar in two ways. One, if the marriage column (column 4 in the DHSIV Model A questionnaire, ORC Macro 2001) was collected, these data were used in the estimation of infecundity. Two, if the "reasons for discontinuation" column (column 3 in the DHSIV Model A questionnaire, ORC Macro 2001) was included, the data were used to estimate contraceptive failure.

Different definitions of infecundity were used depending on whether or not the survey included column 4 of the calendar on marital status. In surveys with calendar data on marriage, women were considered to be infecund if they had been continuously married for the last five years, had not used contraception in the last five years, and had no births in the last five years. In surveys without calendar data, women were considered infecund if they had no birth in the last five years, were first married more than five years before the survey and had never used contraception. Infecund women (by either definition) were removed from the numerator of the unmet need calculation.

In surveys that collected the "reasons for contraceptive discontinuation" in the calendar, pregnant and postpartum amenorrheic women are split into two groups. Women who were pregnant or postpartum amenorrheic, and who were not using contraception at the time they became pregnant, are given an unmet need status based on the wantedness of their pregnancy/last birth. Women who were pregnant or postpartum amenorrheic and whose pregnancy resulted from contraceptive failure, however, are not considered to have unmet need, because they were already users at the time they became pregnant[5] (Westoff and Ochoa 1991). By contrast, in surveys that did not include column 3 of the calendar, it is not possible to determine whether a pregnancy resulted from contraceptive failure, so all pregnant or postpartum amenorrheic women are assigned an unmet need status based on the wantedness of their pregnancy/last birth. This results in a higher estimate of unmet need. The magnitude of the difference depends on the contraceptive prevalence rate and the method mix of the country at the time of survey.

Even within high or low contraceptive prevalence countries, the inclusion or exclusion of the calendar has not been consistent, partly due to changes in the core questionnaire, and partly due to requests of the individual countries. Bolivia, Kenya, the Philippines, Malawi, Tanzania, and several other countries all

[4] Some countries (e.g., Indonesia, Egypt) that were interested in contraceptive use dynamics continued to implement the full calendar.

[5] Some consider these women to have a need for more effective contraception; this has never been implemented in the DHS definition of unmet need.

included a calendar in some of their surveys, but not in others. Even within surveys that included the calendar, implementation has been inconsistent: surveys included some parts of the calendar but not others. Some surveys (e.g., Azerbaijan 2006; Colombia 2010; Jordan 2007 and 2009; Ukraine 2007;) included the reasons for discontinuation column but not the marriage column, and so calendar data were used to determine failure but not infecundity.

Other questionnaire changes

Several other changes have been incorporated into the definition of unmet need for family planning due to changes in survey questions. From approximately 1993 to 1997, the DHS core questionnaires included the question *"If you became pregnant in the next few weeks, would you be happy, unhappy, or would it not matter very much?"* (Macro International 1995). This question was used to determine the unmet need status of fecund women who were not using contraception and said they were unsure if or when they wanted a/another child. If a woman who fit these criteria said she would be happy if she became pregnant soon, she was determined to have no unmet need; if she said she would be unhappy or it would not matter, she was classified as having unmet need for spacing (Macro International 1996).

In the next round of the DHS[6], from approximately 1997 through 2003, this "happy" question was removed from the core questionnaire and replaced with *"In the next few weeks, if you discovered that you were pregnant, would that be a big problem, a small problem, or no problem for you?"* (ORC Macro 2001). Similarly to the "happy" question, this "problem" question was used to categorize women who were not using a method of contraception, were determined to be fecund (as above), and were undecided whether or when they wanted a/another child. If a woman said it would be "no problem" if she became pregnant, she was treated as having no need; if she gave any other response she was treated as having unmet need for spacing (ORC Macro 2005). More recent DHS surveys have not included either question. Subsequently all fecund, non-using women who are undecided when or if they want (more) children are treated as having an unmet need for spacing (ICF Macro 2010).

Many of these changes to the unmet need definition resulted from a quite reasonable goal: to estimate, in the most precise way possible, the level of unmet need for family planning and the impact that fulfilling all demand would have on total fertility. Using all available data to achieve this goal, even if inconsistent, makes sense when producing estimates for one country at one time point. However, these varying definitions of unmet need have lead to estimates that are not comparable with each other, as demonstrated below, and therefore are unusable for tracking trends over time or comparing across countries.

Data and methods

[6] The DHS project is currently in its 6th round of data collection. The timelines for previous DHS rounds were I (1984-89), II (1989-93), III (1993-97), IV (1997-2003), and V (2003-2008).

We analyzed DHS data from all available surveys from DHS II onwards. Surveys from DHS I did not include enough of the needed survey questions to provide comparable estimates of unmet need. The earliest available surveys are from 1990; the latest surveys with data available were implemented in 2010. This gave us a sample of 160 DHS surveys from 67 countries.

First, we recalculated unmet need for every survey, using the definition that was applied at that time, including the "happy" and "problem" questions and calendar data, if collected, and correcting for errors, if found, in the original calculation. We refer to this as the **Original** definition of unmet need. Second, we calculated a **Basic** definition that excluded data from any questions that were not asked in every survey ("happy" and "problem" questions and calendar data), using a consistent definition of infecundity and consistent handling of pregnant and postpartum amenorrheic women. Results from this analysis are shown in the *Results from preliminary analyses* section. The purpose of this analysis is to highlight the consequences that changes in the Original definition over time have had on observed levels of unmet need.

In a third step, the authors proposed several types of changes and prepared multiple revised estimates, each of which were considered and discussed by the TEWG. After incorporating all feedback, a final **Revised** definition was approved[7] by the TEWG and corresponding set of estimates were produced. Details of this feedback and results are described in the section *Revising the definition of unmet need*, below. Estimates using the Revised definition of unmet need are compared with estimates using the Original definition in order to illustrate the overall impact of adopting the Revised definition on estimated levels of unmet need.

Limitations

This analysis is limited to currently married/in-union (living together as if married; referred to hereafter as married) women, excluding women who are unmarried (i.e., those who have never been married as well as those who are separated, divorced, or widowed). There are several reasons for this limitation: some DHSs excluded never-married women, complicating the interpretation of trends. Also, the denominator of unmarried women who are exposed to the risk of pregnancy is not well-defined (the DHS definition traditionally assumes that all married women are exposed to the risk of pregnancy, and unmarried women are exposed if they had sexual intercourse in the last 30 days). Finally, married women age 15-49 are the denominator for the MDG indicator. We plan to examine unmet need among never-married women in future work; we anticipate that results will be similar for to those for married women.

Results from preliminary analyses

[7] Some discussions on the criteria for infecundity are ongoing as of this writing; consensus has been reached on all other revisions.

The preliminary analysis compares unmet need levels according to the Original definition (the definition used at the time of each survey, which changed over time) with levels estimated according to the Basic definition (a consistent definition that does not change over time). This analysis illustrates how the changes in the Original definition summarized above impacts estimates of unmet need. The change in the Original definition that has had the largest effect on unmet need estimates is the incorporation of calendar data. Inclusion of contraceptive calendar data into the unmet need algorithm affects the level of unmet need in two ways, as described above. One, if women are pregnant or postpartum amenorrheic as the result of a contraceptive failure, they are not considered as having unmet need. Two, the definition of infecundity used when marriage data are collected in the calendar encompasses more women. When calendar data are collected, any woman who has been continuously married for 5+ years with no children and has not used contraception in those 5 years is considered infecund. Without calendar data, women who have been married 5+ years with no children and *never* used contraception are considered infecund. (Other data are also used to determine infecundity, and they are used the same way whether or not calendar data were collected). Because many more women did not use contraception in the last 5 years than never used contraception, the calendar definition of infecundity usually captures many more women. If a woman is categorized as infecund, she is considered as not having unmet need. Thus, the inclusion of calendar data generally decreases levels of unmet need, often substantially.

Inclusion of the "happy" and "problem" questions also slightly decreases levels of unmet need by placing more women into the "no need" category if becoming pregnant soon would be "no problem" or they would be "happy" if they discovered they were pregnant.

If including calendar data and the "happy" and "problem" questions tends to decrease unmet need, their exclusion from the Basic definition would result in higher levels of unmet need when comparing the Basic definition to the Original definition, particularly in surveys that collected calendar data. Several countries collected calendar data in some, but not all, surveys, and most countries included the "happy" or "problem" question inconsistently. The version of the Original definition that was used to calculate unmet need has therefore varied between surveys. Particularly in countries that included the calendar inconsistently, this makes trends in unmet need calculated with the Original definition potentially misleading. Examples are shown in figures 1 through 4.

<Figures 1-4 about here>

Each figure shows the Original levels of total unmet need – as used in DHS final reports, STATCompiler, and the MDG database – in blue with diamond markers. The new estimates of total unmet need produced by the consistent Basic definition are shown in red with square markers.

In the Philippines (figure 1), the apparent sharp increase in the Original definition of unmet need between 2003 and 2008 is attributable to the inclusion of a contraceptive calendar in the 1993, 1998, and 2003 surveys, which decreased the estimated level of unmet need, and the exclusion of the calendar in 2008. The 2008 final report states: "The level of unmet need has increased by more than

one-third since the 2003 NDHS[8] (17 percent)... The increase in unmet need appears to reflect the impact of the withdrawal of the USAID commodities supply and/or an increase in demand for family planning," (NSO 2009, p. 85). This "increase" is due solely to the removal of calendar data: if the same (Basic) definition of unmet need is consistently applied, it can be seen that there is no increase; unmet need remained at the same level between 2003 and 2008.

In Bolivia (figure 2), the Original estimates show an inverted v-shaped trend in unmet need, with an increase between 1994 and 1998, and a steady decrease thereafter. The spike in 1998, however, is due to calendar data having been included in the definition of unmet need in 1994 but not in later surveys. When a consistent definition is applied, it is clear that unmet need has decreased steadily over time, and there is no v-shaped trend.

Similar issues are seen in Kenya and Jordan, (figures 3 and 4): apparent increases in unmet need are simply artifacts of the changes in the version of the Original definition of unmet need that was applied in each survey. Calendar data were collected in the 1998 and 2003 surveys in Kenya, but not other rounds. The seeming increase in unmet need between 2003 and 2008-09 is due to a different definition, without calendar data, having been used to produce the 2008-09 estimate.

In Jordan, the calendar has been implemented in every survey, but in slightly different formats. In the first 3 surveys shown, a full calendar was used, including marriage (used to determine infecundity) and reasons for discontinuation (used to calculate failure). In the 2007 and 2009 surveys, the marriage column was not collected. Additionally, the 1997 survey included the "happy" question and the 2002 survey the "problem" question, while the 2007 and 2009 surveys included neither. This makes it appear as though the level of unmet need increased between 2002 and 2007, and remained flat between 2007 and 2009. Although the "increase" from 11.0 in 2002 to 11.9 in 2007 is small, it is considered programmatically significant in Jordan: "Total unmet need in the 2007 JPFHS is slightly higher than that recorded in 2002, when 11 percent of women had an unmet contraceptive need. This is a result of an increase in unmet need for limiting births." (Department of Statistics [Jordan] and Macro International Inc. 2008, p. 76). When the same definition is used at all time points, however, it is clear that unmet need has decreased consistently, albeit more slowly in recent years, in every survey.

Similar problems with trend interpretation due to the inconsistent inclusion of calendar data can be seen in several other countries, particularly Malawi, the Dominican Republic, Tanzania, Kazakhstan, Morocco, Nicaragua, and Colombia (data shown in table 2).

Conclusions from preliminary analyses

The variations in the Original definition of unmet need that have been applied in different surveys can substantially alter levels of unmet need and change the directionality of trends. Yet many publications, and even the MDG indicator database, treat unmet need as though the calculation has not changed over

[8] Refers to the National (Philippines) DHS

time, and assume that comparisons can be made over time and across countries. A revised unmet need indicator producing consistent estimates is clearly needed.

In calculating a consistent definition, the authors and TEWG found several other problematic issues with the Original definition. For example, the Original definition treats women as postpartum amenorrheic for up to five years after their most recent birth; assigns women with missing data to having unmet need for spacing; and is extremely complex and difficult to understand and calculate. The Original definition also cannot be replicated using data collected in Multiple Indicator Cluster Surveys (MICS) carried out by UNICEF. MICS uses a different algorithm from the DHS to estimate unmet need. As shown above, using different definitions can lead to invalid comparisons and incorrect conclusions about trends. The MDG database also includes unmet need estimates from the Reproductive Health Surveys (RHSs, implemented by the Centers for Disease Control and Prevention) and the surveys of the Pan Arab Project for Family Health (PAPFAM, funded by the Arab League).

In an attempt to address these concerns, the authors began to formulate alternatives to the Original definition of unmet need that could be consistently applied to all DHS surveys, were simpler to understand and implement than the Original definition, and could be calculated using data from MICS and other survey programs.

Revising the definition of unmet need

Particularly because unmet need is so widely used, any revision to the definition must be undertaken with care. Based on these preliminary analyses, MEASURE DHS convened a Technical Expert Working Group (TEWG) on unmet need for family planning to consider the details of a revision, beginning with a meeting in July 2010. Technical Experts included Charles Westoff, John Bongaarts, Amy Tsui, and John Casterline. USAID participants included Scott Radloff and Jacob Adetunji, and UNFPA was represented by Stan Bernstein and Edilberto Loaiza. In addition to the authors, Ann Way and Sunita Kishor from MEASURE DHS participated in the discussions. Additional inputs were received from several others within MEASURE DHS, notably Shea Rutstein.

A number of options for revising the definition of unmet need were considered. With an aim to reduce the complexity of the unmet need definition, the authors originally proposed a radical simplification using only current-status data, without consideration of pregnancy or postpartum amenorrhea. This proposal would have required only 4 questions vs. the 14 used by the Original algorithm. The proposed definition produced notably higher levels of unmet need than the Original definition and was thus deemed unsuitable, although it did produce comparable trends. Other suggestions, such as using only women's self-reported exposure to the risk of pregnancy in place of the behavioral infecundity measure currently used, and treating pregnant women as having no need to produce a more clearly current-status measure, were also rejected as too different from the Original definition.

Based on thoughtful discussions and examination of the impact of changes in 160 DHS surveys, the TEWG has agreed upon several changes to the definition of unmet need for family planning, described below.

1) Inconsistently collected data: Calendar data will no longer be used in the calculation of unmet need, either to determine if a woman's current pregnancy or last live birth was due to contraceptive failure, or to determine her fecundity status. The "happy" (*"If you became pregnant in the next few weeks, would you be happy, unhappy, or would it not matter very much?"*) and "problem" (*"In the next few weeks, if you discovered that you were pregnant, would that be a big problem, a small problem, or no problem for you?")* questions will also be excluded from the algorithm. Only information that has been collected in all DHS surveys will be used to calculate unmet need.
2) The definition and treatment of postpartum amenorrheic women: The unmet need algorithm treats women who are fecund differently than women who are postpartum amenorrheic in assigning them to unmet need categories.
   a) In examining the Original algorithm, it was highlighted that the current definition of unmet need allows women to be considered postpartum amenorrheic for up to five years after a birth. This was determined to be excessive, and several analyses were undertaken considering shorter cutoffs for the duration of amenorrhea (i.e., 6, 12, 18, or 24 months). After much discussion, it was decided that women whose period has not returned since their last birth may be considered postpartum amenorrheic for up to 23 months after that birth. Women whose periods have not returned for 24-59 months after their last birth are considered fecund, unless they give other information indicating they are infecund.[9] All women whose last birth was 5 or more years ago and whose period has not returned are considered infecund.
   b) The TEWG also considered ways to make the determination of which women should be considered postpartum amenorrheic as consistent as possible across surveys. In recent DHS surveys, all women who had a birth in the past 5 years were asked *"Has your period returned since the birth of [NAME OF CHILD]?"*. Earlier surveys only asked this question to women who had a birth in the last 3 years, or in some surveys, in the last 4 years. MICS asks the same question to women who had a birth in the last 2 years. In order to determine which women are postpartum amenorrheic for up to 5 years, as required by the algorithm described above, the TEWG agreed to use information from a second question, *"When did your last menstrual period start?"* to determine postpartum amenorrhea status for women who had a birth in the last 5 years, but were not asked (or did not answer) the question on whether their period had returned since their last birth. This change ensures that the reference period for postpartum

[9] Women are considered to be infecund for the purposes of unmet need calculation if they fit any of the following criteria: 1) they were first married 5+ years ago, had no children in the past 5 years, and never used contraception; 2) when asked if they wanted to have a/another child, said they can't get pregnant; 3) said they were menopausal or had a hysterectomy when asked when their last period was or why they do not intend to use a contraceptive method in the future; 4) said they had never menstruated when asked when their last period was; or 5) said their last period was 6 or more months ago, and they are not currently postpartum amenorrheic. In order to avoid overestimating the percentage of infecund women, condition number 5 excludes women whose periods have not returned since the birth of their child in the last 5 years.

amenorrhea is the same – five years – for all women, and the reference period does not change over time or across surveys.

3) Unmet need for spacing vs. unmet need for limiting: As described above, an addition to the handling of women who were a) pregnant or postpartum amenorrheic, and b) did not want their current pregnancy/last birth at all, was introduced into the unmet need algorithm around 1995. Previously, women who fit both these criteria were all treated as having an unmet need for limiting. The new modification used more information to classify these women: if their last birth/current pregnancy was unwanted, but they want more children in the future, they were classified as having an unmet need for spacing rather than limiting. The TEWG agreed that this change was problematic for two reasons. One, it had not been implemented consistently in the past, and two, it required the use of both retrospective and prospective information to be used to determine unmet need for each woman who fit both criteria. Women who were postpartum amenorrheic or pregnant (criterion a) but did not say their last birth/current pregnancy was unwanted (criterion b) were classified solely on retrospective information. The TEWG decided this modification was inconsistent and unnecessarily complex, and removed the modification from the algorithm. This has no effect on total unmet need, but shifts some women who were classified as having unmet need for spacing in the Original algorithm to having unmet need for limiting.
4) The definition of infecundity: In an attempt to harmonize with other survey programs, the TEWG considered removing any information that was not collected in MICS from the calculation of unmet need. MICS4 surveys (round 4 is in the field as of this writing) do not collect information on ever-use of contraception, which is needed for the infecundity condition "first married 5+ years ago, had no children in the past 5 years, and never used contraception." After much consideration, the majority of the TEWG agreed that the DHS would keep this condition as there was not a sound scientific reason to remove it, and to request the MICS program to add the required question on ever use of contraception to their questionnaire. Calendar data, which had previously been used to calculate infecundity when data were available, will be excluded from all parts of the unmet need algorithm.
5) Handling missing data and inconsistencies:
    a) Missing data: In the Original definition of unmet need, if data are missing (because women did not respond to the question, or, in rare cases, due to data entry error) on key questions, assumptions are made to give women with missing data an unmet need status. Pregnant or postpartum amenorrheic women whose response on the wantedness of their current pregnancy/last birth was missing were categorized as having unmet need for spacing. Fecund women whose response on desire for future births was missing were also categorized as having an unmet need for spacing. Women without a recorded response on whether or not their period has returned since their last birth were treated as not postpartum amenorrheic. The TEWG agreed to changes to the handling of all three of these types of missing data. If responses to the wantedness of the last birth (for postpartum amenorrheic women), wantedness of current pregnancy (for pregnant women), or desires for a future birth (for fecund women) are missing, these women will not be categorized as having any unmet need status. For women with missing data about the return of their period after a birth, responses about the time since

their last menstrual period will be used. This is consistent with the new treatment of women who were not asked about the return of their menses due to a shortened maternity history.

b) Inconsistencies: In the process of analyzing 160 surveys, we came across several inconsistencies in the data. These may be due to women giving inconsistent responses, or possibly due to an error on the part of the interviewer or data entry staff. Regardless of the reason, we felt that some of these inconsistencies needed to be handled explicitly in the unmet need algorithm. The TEWG agreed to the following changes:

1. Women who said their last period was before their last birth but have never given birth: in the Original calculation, these women were treated as fecund unless classified as infecund elsewhere in the algorithm (see footnote 9. In the Revised definition of unmet need, these women are treated as infecund, assuming that the "before last birth" response was a recording error and should have been either "menopausal/hysterectomy" or "never menstruated" – response codes that are on either side of "before last birth" in the questionnaire.
2. Women who said they never menstruated, but also reported that their period returned after their last birth: the Original algorithm treated all these women as infecund. All of the women who were asked if their period returned since their last birth had given birth in the last 5 years, and in many cases more recently, implying that they are fecund. The TEWG agreed to treat these women as fecund (unless classified as infecund elsewhere in the algorithm, see footnote 9.
3. Women who reported never having menstruated, but had children: the Original definition treated these women as infecund because they never menstruated. But clearly since they had children, all of them were fecund at one time. The TEWG agreed to treat these women as fecund if they had given birth in the last 5 years (unless classified as infecund elsewhere in the algorithm, see footnote 9), and infecund if they had not (on the assumption that they are no longer menstruating).

Explicitly handling missing and inconsistent data in the unmet need algorithm will help ensure that the Revised definition of unmet need can be applied consistently to all DHS surveys, as well as MICS, RHS, and PAPFAM surveys.

The impact of revising the definition of unmet need

As shown in table 1, the impact of incorporating all of the changes above to the definition of unmet need increases the total level of unmet need among currently married women 15-49 from an unweighted average[10] across 160 surveys of 21.1 percent using the Original definition to 22.8 percent

[10] While sampling weights were used to calculate the percentage of unmet need within each survey, the results from each survey were not weighted by the size of the population of each country. Each survey therefore represents one observation when averages are calculated across multiple surveys.

using the Revised definition. The average change is 1.7 percentage points (range across all 160 countries is -1.4 to 6.2 percentage points, see table 2).

<Table 1 about here>

The majority of this change is due to the removal of calendar data. The impact of the removal of calendar data can be seen by comparing the impact of changes on calendar vs. non-calendar surveys. In calendar surveys, implementing all changes above increases unmet need by an average of 3.4 percentage points, from an average of 13.9 to 17.3 percent. By comparison, in non-calendar surveys, moving from the Original to the Revised definition increases total unmet need by only 0.6 percentage points, from 25.8 to 26.4 percent.

Predominantly due to the calendar having been implemented in high CPR countries (the calendar was part of the Model A questionnaire "for High Contraceptive Prevalence countries" but not the Model B questionnaire), the greatest differences in levels of unmet need between the Original and Revised definitions are in high CPR countries. Implementing all changes approved by the TEWG increases unmet need by an average of 2.6 percentage points in countries with the highest levels of contraceptive use; the increase is 0.5 percentage points on average in low CPR countries. Much of the variety in the impact of changes (e.g. by region or unmet need tercile) can be explained by the inconsistent collection of calendar data. For example, the impact of moving from the Original to the Revised definition is largest in the Middle East/North Africa and East Asia/Pacific regions. In these regions, over 70 percent of surveys collected calendar data (data not shown). In West and Central Africa, where the impact is 1 percent, no surveys included the calendar.

<Table 2 about here>

Table 2 shows the impact of the revised definition in each survey. Though the impact of the definitional revision varies by survey, trends in the impact can be seen in three broad groups: 1) countries that implemented the calendar in every survey, highlighted in figures 5 through 8; 2) countries that did not collect calendar data in any survey, highlighted in figures 9 through 12; and 3) countries that collected calendar data in some surveys but not others, shown in figures 13 through 16. In figures 5 through 16, the total level of unmet need among currently married women 15-49 is represented with the line in blue with diamond markers, and the level of total unmet need using the Revised definition is shown by the green line with round markers.

<Figures 5-8 about here>

Egypt, Zimbabwe, Indonesia, and Peru, shown in figures 5 through 8, have all collected calendar data in every survey. Removing calendar data, along with the other changes approved by the TEWG, consistently increases the level of unmet need. In Egypt, Zimbabwe, and Indonesia, the difference between the two estimates is largest in surveys conducted between 1995 and 2002, all of which included either the "happy" or "problem" question, which decreased the level of unmet need. Later

surveys in these countries did not include either question, and the difference between levels of unmet need using these Original vs. Revised definitions are smaller. In Peru, the largest difference is in the 1991-92 survey, where the estimated level of unmet need is 6.1 percentage points lower using the Revised vs. the Original definition. In this survey, the difference is due to a particularly high level of contraceptive failure. In the 1991-92 Peru survey, 6.4 percent of married women were pregnant or postpartum amenorrheic due to contraceptive failure and so could not have an unmet need, according to the Original definition. The Revised definition does not include contraceptive failure is not used in, so women who were treated as having failed (and thus having no need) in the Original definition may be treated as having unmet need in the Revised definition. In later surveys in Peru, as modern contraceptive use increased, failure rates decreased, and the gap between the two definitions of unmet need narrowed.

<Figures 9-12 about here>

Figures 9 through 12 show trends in both definitions of unmet need in four countries that did not include calendar data in any survey: Haiti, Madagascar, Nepal, and Niger. In these surveys, there is almost no difference in the levels of unmet need calculated using the Original and the Revised definition. Slight differences are introduced with use of the "happy" question in some surveys (e.g., Madagascar 1997, Nepal 1996, Niger 1998) and missing data. In these four countries, the definitional changes approved by the TEWG had little or no effect on the total unmet need estimates.

<Figures 13-16 about here>

Figures 13 through 16 show trends in total unmet need using each definition in four countries that included the calendar inconsistently: Kenya, Bangladesh, the Dominican Republic, and Colombia. Kenya collected calendar data in the 1998 and 2003 surveys but not in the 1993 or 2008 surveys. Including the calendar in the 1998 and 2003 surveys seemed to decrease unmet need, but that was only an artifact of the change in definitions. Inclusion of the "happy" question in the 1998 survey also decreased unmet need compared to the other Kenya surveys, none of which included that question. When the consistent Revised definition is used, it can be seen clearly that unmet need decreased sharply with the uptake of contraception between 1993 and 1998, remained stable between 1998 and 2003, and decreased between 2003 and 2008-9, mirroring changes in contraceptive use. The Revised definition gives a very different – and much more interpretable – picture of trends in unmet need than the inconsistent Original definition.

In Bangladesh (figure 14), trends in unmet need also vary with the definition used. Bangladesh collected calendar data in the four surveys between 1993 and 2004, but did not collect calendar data in the 2007 survey. When calendar data are included in the unmet need definition, unmet need appears to increase by 5 percentage points between 2004 and 2007, jumping to a higher level than has been seen in Bangladesh since 1994. This dramatic increase does not fit with trends in other indicators in Bangladesh, notably contraceptive use, which increased by 13 percentage points between 1994 and 2004 (NIPORT, Mitra and Associates, and Macro International 2009). The trend shown using the Revised definition is

much more in line with the pattern seen in contraceptive use, which increased steadily between 1991 and 2004, then decreased by two percentage points between 2004 and 2007 (ibid.).

The Dominican Republic (figure 15) and Colombia (figure 16) both included calendar data in the first four surveys shown in these figures, between 1990 and 2005. In the Dominican Republic, no calendar data were collected in 2007. Colombia used a modified calendar in 2010, collecting information on reasons for discontinuation (used to collect failure data), but excluding the marriage column (used to calculate infecundity). In both countries, the outcome is the same: what appears to be an increase in unmet need between the last two surveys is actually a slight decrease, which can be seen once the consistent, Revised definition is used.

<Table 3 about here>

The impact of changing the definition of unmet need has a similar impact on unmet need for spacing and limiting as the revision has on total unmet need. On average across surveys, implementing all revisions described above increases unmet need for spacing from 11.9 to 12.2 percent, and unmet need for limiting from 9.1 to 10.5 percent. The increase in limiting is greater than the increase in spacing, primarily because the Revised definition removes the modification added to the treatment of pregnant and postpartum amenorrheic women who wanted no more children which had shifted some women from having an unmet need for limiting to spacing based on their intentions for future births.

<Figures 17-19 about here>

Figures 17 through 19 show trends in unmet need for spacing and limiting, comparing the Original and Revised definitions, in Bolivia, the Dominican Republic, and the Philippines. In Bolivia (Figures 17a and 17b), unmet need for spacing decreases consistently (or remains stable) using the Revised definition, while the Original definition shows an increase between 1994 and 1998. The increase is even sharper in unmet need for limiting using the Original definition, which shows an inverted v-shaped pattern. The Revised definition, however, shows a steady decrease in unmet need for limiting with each survey.

In the Dominican Republic (Figures 18a and 18b) and the Philippines (Figures 19a and 19b), unmet need appears to increase in the last survey, but this is an artifact of the changes in the Original definition over time. Using the Revised definition, unmet need for limiting decreases steadily with each survey, and unmet need for spacing decreases or does not change.

As seen with trends in total unmet need, the trends in unmet need for spacing and limiting are clearer and more easily interpretable when using the consistent Revised definition vs. the Original definition.

Conclusions

Though the concept of unmet need has been around for decades, the measure is now gaining an unprecedented level of attention from donors as the family planning movement is revitalized. Policymakers and program planners are monitoring unmet need as never before, in part, due to its

inclusion as an MDG indicator. There has never been a more crucial time to ensure that unmet need is measured consistently.

Despite the acknowledgement that the definition of unmet need has been in flux for several decades, and that levels of unmet need can vary widely with changes in definitions (Govindasamy and Boadi 2000; Westoff and Pebley 1981) many publications, including the MDG database, assume that the definition of unmet need has remained constant and estimates can be tracked and compared over time and across countries. As shown above, this assumption is clearly untrue.

This research demonstrates that varying definitions of unmet need that have been used over time have lead to estimates that are not comparable with each other, and have lead to the incorrect interpretation of trends in several countries. Previously calculated levels of unmet need also cannot be compared across countries or survey programs, as variations in definitions make estimates unusable for tracking trends over time or comparing across countries – two of the primary uses of MDG indicators.

In this paper, we present a simplified, standard definition of unmet need that can be consistently applied over time and across countries. This revision results in a small increase in estimated levels of unmet need. In the majority of surveys, the impact is quite minimal. In some countries that have high levels of contraceptive use, and have collected calendar data, the impact is larger. The authors understand that the changes in estimated levels in unmet need with this revision is problematic in some countries, but we hope that the benefits of being able to produce more reliable estimates and comparable trends over time outweigh the costs of these changes.

We hope this simplification and standardization of the unmet need definition will help ensure the quality and comparability of a key MDG indicator and will inform advocacy efforts for family planning and maternal and child health policies and programs across the globe.

REFERENCES

Bongaarts, J. 1991. The KAP-gap and the unmet need for contraception. Population and Development Review 17(2): 293-313.

Department of Statistics [Jordan] and Macro International Inc. 2008. *Jordan Population and Family Health Survey 2007.* Calverton, Maryland, USA: Department of Statistics and Macro International Inc.

Govindasamy P. and Boadi E. 2000. A decade of unmet need for contraception in Ghana: Programmatic and Policy Implications. Calverton, Maryland: Macro International Inc. and National Population Council Secretariat [Ghana].

ICF Macro. 2010. RECODE5.APP. Computer program written in CSPro for creation of DHS recode dated 2/10/2010)"

Macro International Inc. 1995. Model "A" Questionnaire with Commentary for High Contraceptive Prevalence Countries. DHS-III Basic Documentation Number 1. Calverton, Maryland: Macro International Inc.

Macro international Inc. 1996. RECODE3.APP. Computer program written in ISSA for creation of DHS recode dated 11/1/1996.

National Institute of Population Research and Training (NIPORT), Mitra and Associates, and Macro International. 2009. *Bangladesh Demographic and Health Survey 2007.* Dhaka, Bangladesh and Calverton, Maryland, USA: National Institute of Population Research and Training, Mitra and Associates, and Macro International.

Nortman, D.L. 1982. Measuring the unmet need for contraception to space and limit births. International Family Planning Perspectives. 8(4): 125-134.

National Statistics Office (NSO) [Philippines], and ICF Macro. 2009. *National Demographic and Health Survey 2008.* Calverton, Maryland: National Statistics Office and ICF Macro.

ORC Macro. 2001. Model "A" Questionnaire with Commentary for High Contraceptive Prevalence Countries. MEASURE DHS+ Basic Documentation Number 1. Calverton, Maryland: ORC Macro.

ORC Macro. 2005. RECODE4.APP. Computer program written in CSPro for creation of DHS recode dated 11/18/2005.

Robey, B., Ross, J., and Bhushan, I. 1996. Meeting unmet need: New strategies. Population Reports, Series J, No. 43. Baltimore, Johns Hopkins School of Public Health, Population Information Program

Ross, J.A., and Winfrey, W.L. 2001. Contraceptive Use, Intention to Use and Unmet Need During the Extended Postpartum Period. International Family Planning Perspectives. 27(1):20–27

Westoff C.F. 1978. The unmet need for birth control in five Asian countries. Family Planning Perspectives. 10(3):173-81.

Westoff, C.F., and Bankole, A. 1995. Unmet need: 1990-1994. DHS Comparative Studies No. 16. Calverton, Maryland: Macro International Inc.

Westoff, C.F., and Bankole, A. 1996. The potential demographic significance of unmet need. International Family Planning Perspectives 22(1): 16-20.

Westoff, C.F., and Ochoa, L.H. 1991. Unmet need and the demand for family planning. Demographic and Health Surveys Comparative Studies No. 5. Columbia, Maryland: Institute for Resource Development.

Westoff C.F., and Pebley, A.R. 1981. Alternative measures of unmet need for family planning in developing countries. International Family Planning Perspectives 7(4): 126-136.

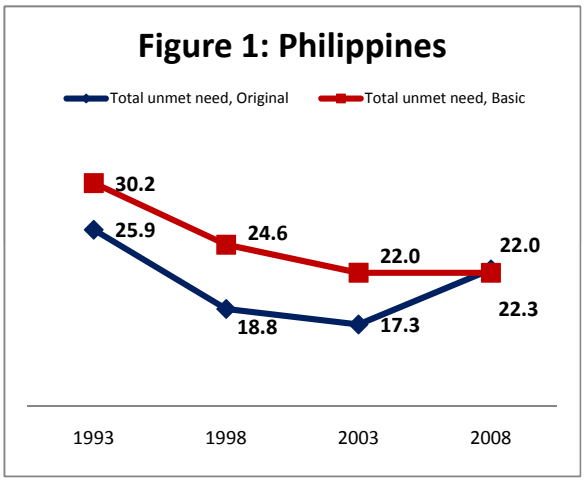
Figure 1: Philippines
Total unmet need, Original
Total unmet need, Basic
30.2
25.9
24.6
22.0
22.0
18.8
17.3
22.3
1993
1998
2003
2008

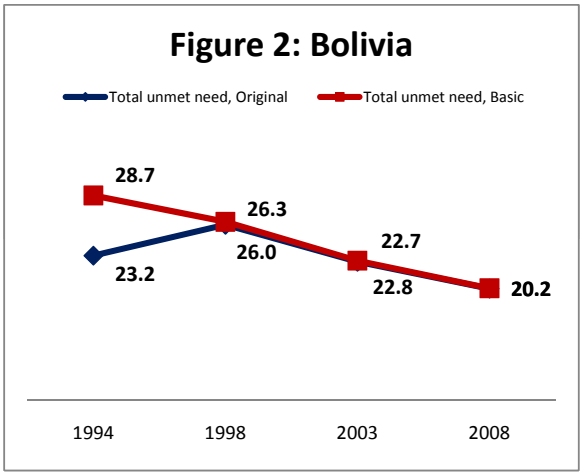
Figure 2: Bolivia
Total unmet need, Original
Total unmet need, Basic
28.7
26.3
23.2
26.0
22.7
22.8
20.2
1994
1998
2003
2008

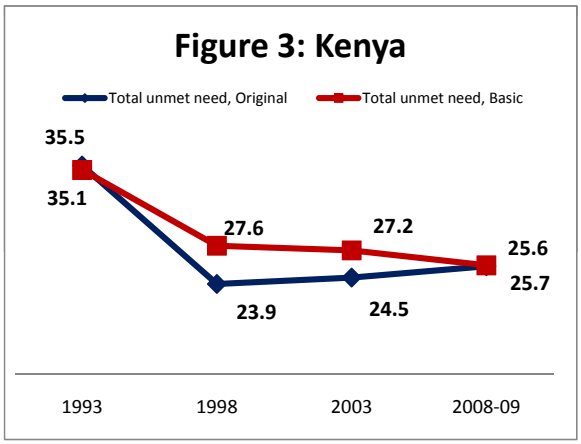
Figure 3: Kenya
Total unmet need, Original
Total unmet need, Basic
35.5
35.1
27.6
27.2
25.6
25.7
23.9
24.5
1993
1998
2003
2008-09

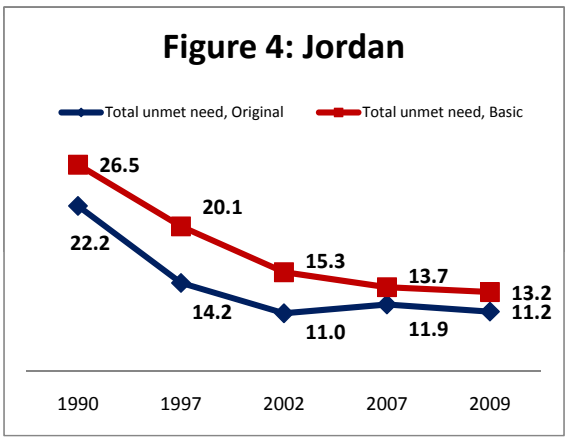
Figure 4: Jordan
Total unmet need, Original
Total unmet need, Basic
26.5
20.1
22.2
15.3
13.7
13.2
14.2
11.0
11.9
11.2
1990
1997
2002
2007
2009

Table 1. Total unmet need for family planning among currently married women 15-49, summary

Total unmet need using the Original and Revised definition, unweighted averages by survey characteristics, DHS surveys 1990-2009

	Total unmet need, Original definition	Total unmet need, Revised definition	Percentage point difference	Number of surveys
Survey type				
Calendar	13.9	17.3	3.4	63
Non-calendar	25.8	26.4	0.6	97
Region				
West and Central Africa	25.5	26.5	1.0	38
East and Southern Africa	26.5	27.6	1.1	41
Middle East/North Africa	13.5	16.7	3.2	13
Eastern Europe/NIS	11.3	13.8	2.4	13
South Asia	21.0	22.2	1.2	14
East Asia/Pacific	16.6	19.6	3.0	14
Latin America and Caribbean	17.4	19.7	2.3	27
CPR tercile				
CPR - lower tercile (<24)	27.9	28.8	1.0	54
CPR - mid tercile (24-53)	23.6	25.3	1.6	53
CPR - upper tercile (>53)	11.7	14.2	2.6	53
Unmet need tercile				
Unmet need - upper tercile (>26)	31.7	32.3	0.5	56
Unmet need - mid tercile (16-26)	21.4	23.1	1.6	50
Unmet need - lower tercile (<16)	11.5	14.3	2.8	54
Total				
Average, 160 surveys	**21.1**	**22.8**	**1.7**	**160**

Note: while sampling weights were used to calculate the percentage of unmet need within each survey, the results from each survey were not weighted by the population of each country. Each survey therefore represents one observation; all averages are simple arethmatic means.

Figure 5: Egypt

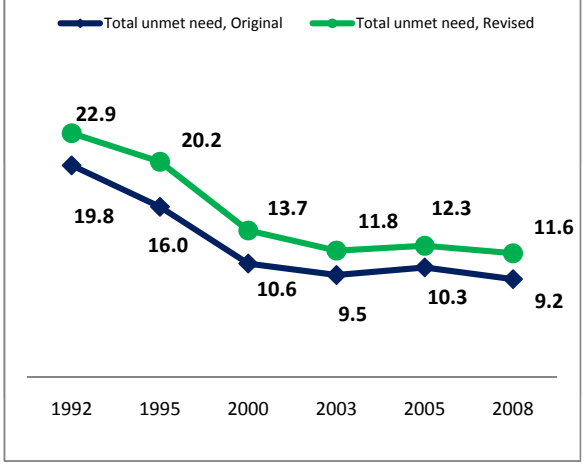

Figure 6: Zimbabwe

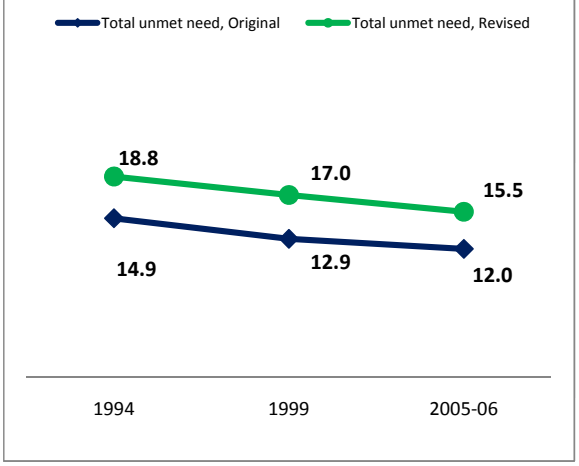

Figure 7: Indonesia

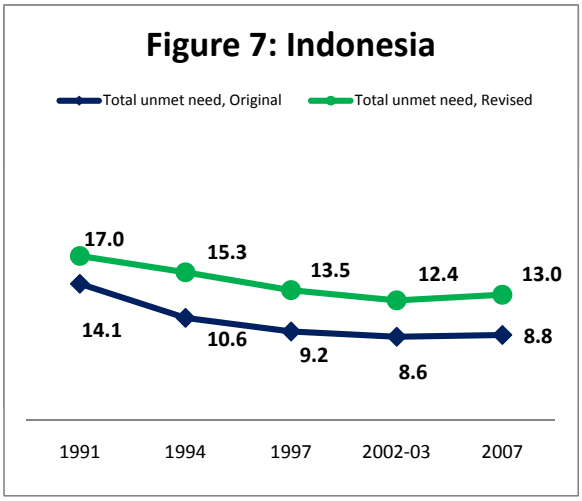

Figure 8: Peru

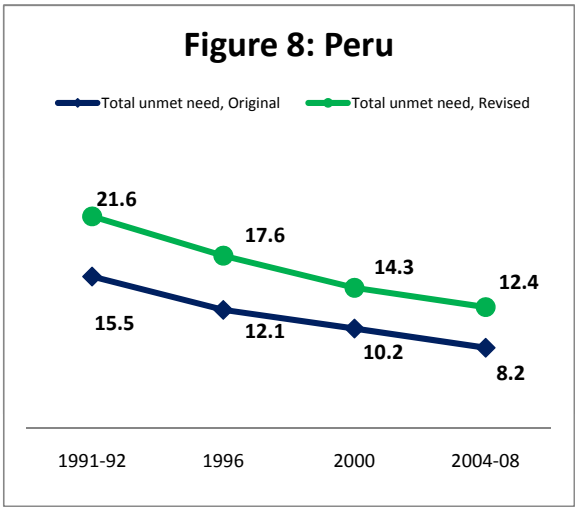

Figure 9: Haiti

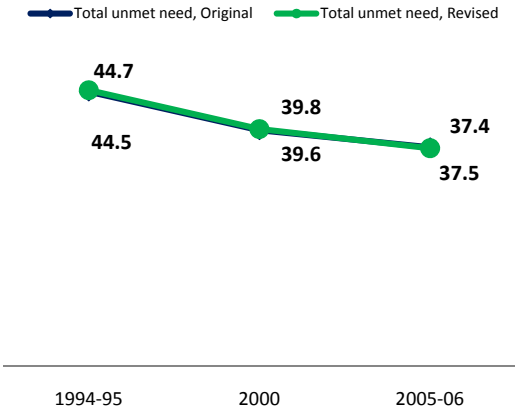

Figure 10: Madagascar

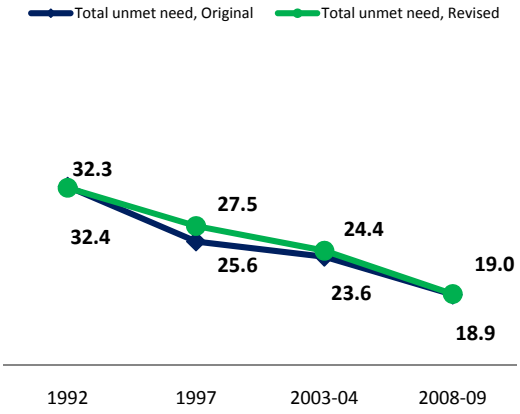

Figure 11: Nepal

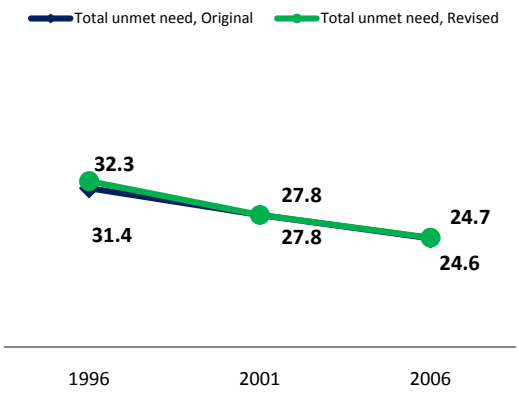

Figure 12: Niger

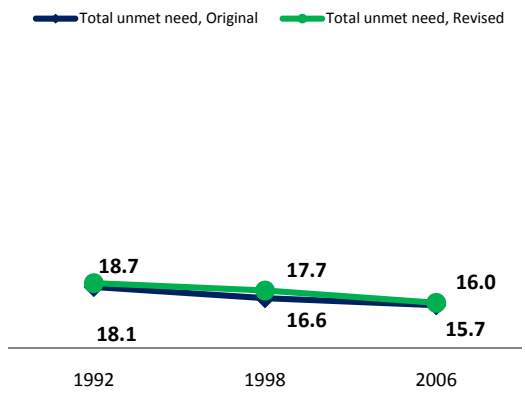

Figure 13: Kenya

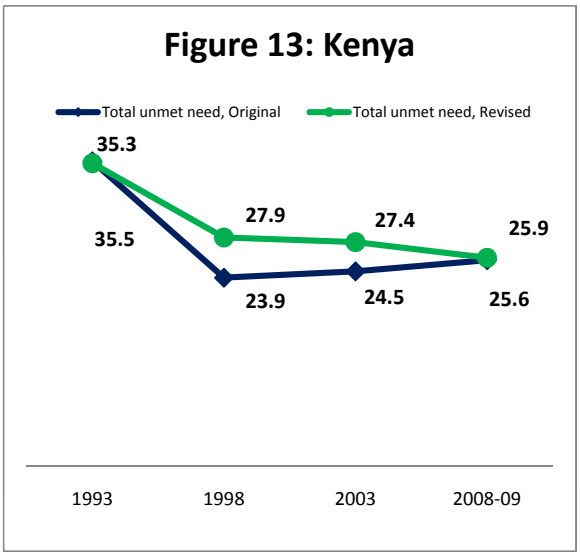

Figure 14: Bangladesh

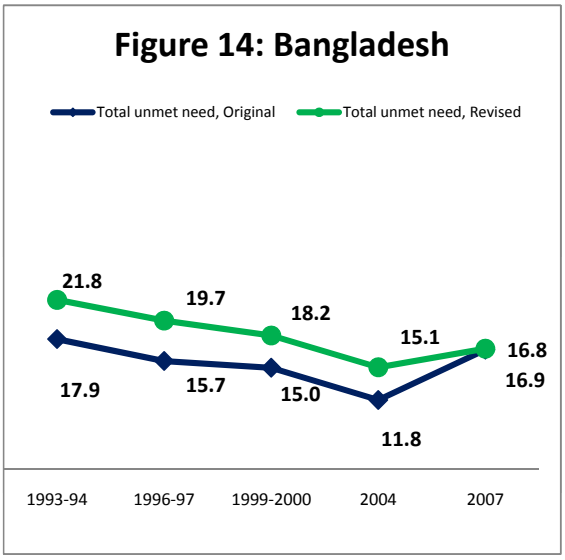

Figure 15: Dominican Republic

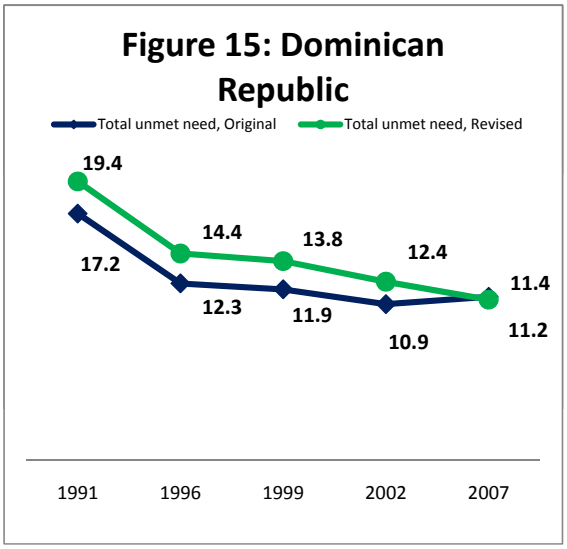

Figure 16: Colombia

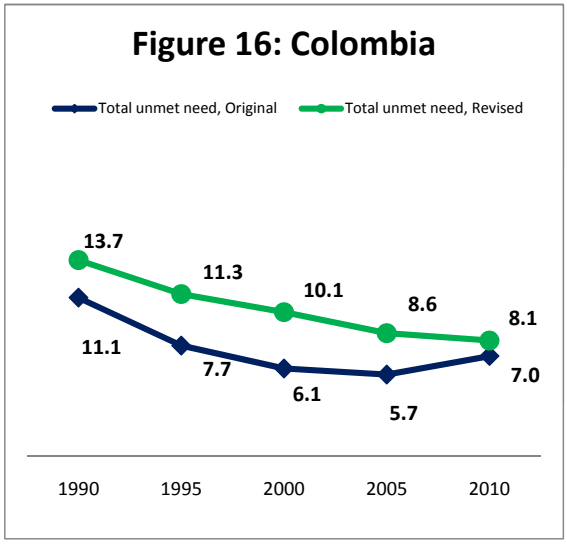

Table 2. Total unmet need for family planning among currently married women 15-49

Total unmet need using the Original definition and Revised definition, DHS surveys 1990-2009

Survey	Total unmet need, Original definition	Total unmet need, Revised definition	Percentage point difference	Number of married women 15-49
Albania, 2008-09	12.8	12.9	0.1	5,001
Armenia, 2000	11.8	18.0	6.2	4,125
Armenia, 2005	13.3	19.1	5.9	4,044
Azerbaijan, 2006	15.1	15.4	0.3	5,269
Bangladesh, 1993-94	17.9	21.8	3.9	8,840
Bangladesh, 1996-97	15.7	19.7	4.0	8,307
Bangladesh, 1999-2000	15.0	18.2	3.2	9,540
Bangladesh, 2004	11.8	15.1	3.3	10,436
Bangladesh, 2007	16.8	16.9	0.1	10,192
Benin, 1996	25.7	27.6	1.9	4,198
Benin, 2001	27.2	28.0	0.7	4,563
Benin, 2006	26.4	27.3	0.9	13,403
Bolivia, 1994	23.2	28.8	5.6	5,334
Bolivia, 1998	26.0	26.3	0.3	6,649
Bolivia, 2003	22.7	22.6	-0.1	10,569
Bolivia, 2008	20.2	20.2	-0.1	10,162
Brazil, 1996	7.3	10.8	3.5	7,584
Burkina Faso, 1993	24.5	24.6	0.1	5,326
Burkina Faso, 1998-99	25.8	30.2	4.4	5,181
Burkina Faso, 2003	28.8	29.9	1.0	9,655
Cambodia, 2000	29.7	33.0	3.3	9,071
Cambodia, 2005	25.1	25.2	0.1	10,087
Cameroon, 1991	21.7	22.4	0.6	2,868
Cameroon, 1998	19.7	20.6	0.9	3,676
Cameroon, 2004	20.2	20.3	0.1	7,166
CAR, 1994-95	16.2	19.0	2.8	4,083
Chad, 1996-97	15.1	17.4	2.2	5,832
Chad, 2004	19.1	20.6	1.5	4,663
Colombia, 1990	11.1	13.7	2.6	4,450
Colombia, 1995	7.7	11.3	3.6	6,097
Colombia, 2000	6.1	10.1	3.9	5,935
Colombia, 2005	5.7	8.6	2.9	19,762
Colombia, 2010	7.0	8.1	1.1	26,247
Comoros, 1996	34.6	35.6	0.9	1,634
Congo (Brazzaville), 2005	19.3	19.5	0.2	3,979
Congo Democratic Republic, 2007	26.2	27.1	0.9	6,622
Cote D'Ivoire, 1994	27.1	27.1	-0.1	5,271
Cote D'Ivoire, 1998-99	27.7	28.8	1.2	1,863
Dominican Republic, 1991	17.2	19.4	2.2	4,083
Dominican Republic, 1996	12.3	14.4	2.1	4,983
Dominican Republic, 1999	11.9	13.8	2.0	728
Dominican Republic, 2002	10.9	12.4	1.6	13,996
Dominican Republic, 2007	11.4	11.2	-0.2	15,417
Egypt, 1992	19.8	22.9	3.0	9,153
Egypt, 1995	16.0	20.2	4.2	13,710
Egypt, 2000	10.6	13.7	3.1	14,382
Egypt, 2003	9.5	11.8	2.3	8,445
Egypt, 2005	10.3	12.3	2.0	18,187
Egypt, 2008	9.2	11.6	2.4	15,396
Ethiopia, 2000	35.2	36.6	1.4	9,789
Ethiopia, 2005	33.8	36.2	2.4	9,066
Gabon, 2000	28.0	27.9	-0.1	3,348
Ghana, 1993	36.5	36.9	0.3	3,204
Ghana, 1998	33.5	34.7	1.2	3,131
Ghana, 2003	34.0	34.4	0.4	3,549
Ghana, 2008	35.3	35.7	0.3	2,876

Survey	Total unmet need, Original definition	Total unmet need, Revised definition	Percentage point difference	Number of married women 15-49
Guatemala, 1995	24.3	28.1	3.8	7,984
Guatemala, 1998-99	23.1	26.6	3.5	3,964
Guinea, 1999	24.2	24.7	0.6	5,561
Guinea, 2005	21.2	22.1	0.8	6,292
Haiti, 1994-95	44.5	44.7	0.2	3,113
Haiti, 2000	39.6	39.8	0.1	5,958
Haiti, 2005-06	37.5	37.4	-0.1	6,323
Honduras, 2005-06	16.9	16.8	-0.1	11,613
India, 1992-93	19.4	19.5	0.2	84,328
India, 1998-99	15.8	16.1	0.2	84,682
India, 2005-06	12.6	13.9	1.3	93,089
Indonesia, 1991	14.1	17.0	2.9	21,109
Indonesia, 1994	10.6	15.3	4.7	26,186
Indonesia, 1997	9.2	13.5	4.3	26,886
Indonesia, 2002-03	8.6	12.4	3.8	27,857
Indonesia, 2007	8.8	13.0	4.2	30,931
Jordan, 1990	22.2	26.5	4.3	6,168
Jordan, 1997	14.2	20.0	5.9	5,337
Jordan, 2002	11.0	15.3	4.3	5,706
Jordan, 2007	11.9	13.7	1.8	10,354
Jordan, 2009	11.2	13.2	2.0	9,651
Kazakhstan, 1995	15.7	16.5	0.8	2,507
Kazakhstan, 1999	8.7	11.7	3.0	3,018
Kenya, 1993	35.5	35.3	-0.2	4,629
Kenya, 1998	23.9	27.9	4.0	4,834
Kenya, 2003	24.5	27.4	2.9	4,919
Kenya, 2008-09	25.6	25.9	0.2	4,928
Kyrgyz Republic, 1997	11.6	11.9	0.3	2,675
Lesotho, 2004	31.0	31.1	0.2	3,709
Liberia, 2007	35.6	35.7	0.1	4,540
Madagascar, 1992	32.4	32.3	-0.1	3,736
Madagascar, 1997	25.6	27.5	1.9	4,435
Madagascar, 2003-04	23.6	24.4	0.8	5,140
Madagascar, 2008-09	18.9	19.0	0.1	12,039
Malawi, 1992	35.7	36.5	0.8	3,492
Malawi, 2000	29.7	30.0	0.3	9,452
Malawi, 2004	27.6	30.4	2.8	8,312
Maldives, 2009	28.1	28.6	0.5	6,500
Mali, 1995-96	25.7	27.4	1.7	8,222
Mali, 2001	28.5	29.7	1.1	10,723
Mali, 2006	26.7	27.5	0.9	12,365
Mauritania, 2000-01	31.6	32.2	0.6	4,541
Moldova, 2005	6.7	11.3	4.6	4,937
Morocco, 1992	19.7	23.5	3.8	5,118
Morocco, 2003-04	10.0	11.9	1.9	8,782
Mozambique, 1997	22.5	24.9	2.4	6,530
Mozambique, 2003	18.4	18.9	0.5	8,736
Namibia, 1992	21.9	21.8	-0.1	2,259
Namibia, 2000	22.1	24.0	1.8	2,610
Namibia, 2006-07	20.6	20.7	0.2	3,451
Nepal, 1996	31.4	32.3	1.0	7,982
Nepal, 2001	27.8	27.8	0.0	8,342
Nepal, 2006	24.6	24.7	0.1	8,257
Nicaragua, 1998	14.7	17.8	3.1	8,045
Nicaragua, 2001	14.6	14.7	0.1	7,424
Niger, 1992	18.1	18.7	0.5	5,561
Niger, 1998	16.6	17.7	1.0	6,382
Niger, 2006	15.7	16.0	0.3	7,941
Nigeria, 1990	20.5	21.5	1.0	6,880
Nigeria, 1999	17.5	20.0	2.5	5,757
Nigeria, 2003	16.9	17.6	0.6	5,336
Nigeria, 2008	20.2	20.2	0.0	23,578

Survey	Total unmet need, Original definition	Total unmet need, Revised definition	Percentage point difference	Number of married women 15-49
Pakistan, 1990-91	31.8	30.5	-1.3	6,364
Pakistan, 2006-07	24.9	25.2	0.3	9,556
Paraguay, 1990	15.0	17.4	2.4	3,574
Peru, 1991-92	15.5	21.6	6.1	8,741
Peru, 1996	12.1	17.6	5.5	16,885
Peru, 2000	10.2	14.3	4.2	15,628
Peru, 2004-08	8.2	12.4	4.1	22,564
Philippines, 1993	25.9	30.2	4.2	8,961
Philippines, 1998	18.8	24.6	5.8	8,336
Philippines, 2003	17.3	22.2	4.8	8,671
Philippines, 2008	22.3	22.0	-0.3	8,418
Rwanda, 1992	38.8	38.2	-0.5	3,785
Rwanda, 2000	35.6	36.2	0.6	5,052
Rwanda, 2005	37.9	38.4	0.5	5,510
Sao Tome and Principe, 2008-09	37.1	37.8	0.7	1,718
Senegal, 1992-93	29.3	28.8	-0.4	4,450
Senegal, 2005	31.6	31.9	0.3	9,866
Sierra Leone, 2008	27.6	28.4	0.8	5,525
South Africa, 1998	15.0	16.5	1.5	5,077
Swaziland, 2006-07	23.8	24.9	1.0	2,062
Tanzania, 1991-92	27.9	27.8	-0.1	6,038
Tanzania, 1996	23.9	25.7	1.8	5,411
Tanzania, 1999	21.8	22.6	0.8	2,653
Tanzania, 2003-04	21.8	24.0	2.2	6,950
Timor-Leste, 2009	30.8	31.5	0.8	7,906
Togo, 1998	32.3	34.9	2.6	5,819
Turkey, 1993	11.2	14.6	3.3	6,271
Turkey, 1998	10.1	14.0	3.8	5,921
Turkey, 2003	6.3	9.5	3.2	3,902
Uganda, 1995	29.0	30.0	0.9	5,136
Uganda, 2000-01	34.6	35.0	0.4	4,881
Uganda, 2006	37.8	38.0	0.3	5,337
Ukraine, 2007	10.3	10.2	0.0	4,116
Uzbekistan, 1996	13.7	13.6	0.0	3,102
Vietnam, 1997	6.9	8.4	1.4	5,340
Vietnam, 2002	4.8	6.6	1.8	5,338
Zambia, 1992	30.7	30.0	-0.7	4,457
Zambia, 1996	26.5	25.1	-1.4	4,902
Zambia, 2001-02	27.4	27.6	0.2	4,694
Zambia, 2007	26.5	26.6	0.2	4,402
Zimbabwe, 1994	14.9	18.8	3.9	3,788
Zimbabwe, 1999	12.9	17.0	4.1	3,609
Zimbabwe, 2005-06	12.0	15.5	3.5	5,143
Unweighted Average	**21.1**	**22.8**	1.7	
Range of differences:				
Minimum difference			-1.4	
Maximum difference			6.2	

Table 3. Unmet need for spacing and limiting among currently married women 15-49

Unmet need for spacing and unmet need for limiting using the Original definition and Revised definition, DHS surveys 1990-2009

	Original definition		Revised definition			
Survey	Unmet need for Spacing	Unmet need for Limiting	Unmet need for Spacing	Unmet need for Limiting	Difference in Spacing	Difference in Limiting
Albania, 2008-09	3.4	9.4	3.5	9.4	0.1	0.0
Armenia, 2000	2.6	9.3	3.5	14.5	0.9	5.2
Armenia, 2005	3.6	9.7	3.8	15.3	0.2	5.7
Azerbaijan, 2006	2.9	12.2	3.0	12.4	0.0	0.3
Bangladesh, 1993-94	8.8	9.0	10.8	11.0	1.9	2.0
Bangladesh, 1996-97	7.7	8.0	9.8	10.0	2.1	1.9
Bangladesh, 1999-2000	7.6	7.4	8.5	9.7	0.9	2.3
Bangladesh, 2004	5.6	6.3	6.7	8.4	1.1	2.1
Bangladesh, 2007	6.6	10.2	6.7	10.3	0.0	0.1
Benin, 1996	17.2	8.6	18.7	9.0	1.5	0.4
Benin, 2001	17.5	9.7	18.1	9.8	0.6	0.1
Benin, 2006	17.0	9.4	17.4	9.9	0.4	0.5
Bolivia, 1994	5.5	17.7	7.5	21.3	1.9	3.6
Bolivia, 1998	6.8	19.3	6.7	19.6	-0.1	0.3
Bolivia, 2003	6.1	16.6	6.0	16.6	-0.1	0.1
Bolivia, 2008	6.4	13.8	6.2	14.0	-0.2	0.2
Brazil, 1996	2.6	4.7	4.0	6.8	1.4	2.1
Burkina Faso, 1993	18.3	6.2	18.0	6.6	-0.3	0.4
Burkina Faso, 1998-99	19.0	6.8	22.8	7.4	3.8	0.6
Burkina Faso, 2003	21.8	7.0	22.3	7.6	0.5	0.5
Cambodia, 2000	14.4	15.2	17.2	15.9	2.7	0.6
Cambodia, 2005	8.9	16.2	8.5	16.7	-0.4	0.5
Cameroon, 1991	17.1	4.6	17.4	4.9	0.3	0.3
Cameroon, 1998	13.3	6.4	13.9	6.8	0.6	0.4
Cameroon, 2004	14.2	6.0	14.0	6.3	-0.2	0.3
CAR, 1994-95	11.6	4.6	13.7	5.3	2.1	0.7
Chad, 1996-97	12.1	3.1	13.9	3.5	1.8	0.5
Chad, 2004	16.6	2.5	17.9	2.7	1.3	0.2
Colombia, 1990	4.2	6.9	4.8	9.0	0.6	2.0
Colombia, 1995	3.2	4.6	4.8	6.6	1.6	2.0
Colombia, 2000	2.6	3.5	4.4	5.7	1.8	2.2
Colombia, 2005	3.0	4.0	3.7	4.9	0.7	0.9
Colombia, 2010	2.5	3.2	3.6	4.5	1.1	1.3
Comoros, 1996	21.8	12.9	22.0	13.5	0.2	0.7
Congo (Brazzaville), 2005	14.3	5.0	14.0	5.5	-0.3	0.5
Congo Democratic Republic, 2007	20.1	6.1	19.9	7.2	-0.2	1.1
Cote D'Ivoire, 1994	20.0	7.1	19.2	7.8	-0.8	0.7
Cote D'Ivoire, 1998-99	20.0	7.6	21.0	7.8	1.0	0.2
Dominican Republic, 1991	8.8	8.3	9.1	10.3	0.3	2.0
Dominican Republic, 1996	7.1	5.2	8.2	6.2	1.1	1.0
Dominican Republic, 1999	7.4	4.5	8.2	5.7	0.8	1.2
Dominican Republic, 2002	6.7	4.2	6.9	5.5	0.3	1.3
Dominican Republic, 2007	7.0	4.4	6.7	4.5	-0.3	0.1
Egypt, 1992	6.9	12.9	7.1	15.8	0.2	2.9
Egypt, 1995	5.3	10.7	6.4	13.8	1.1	3.1
Egypt, 2000	3.1	7.6	3.8	10.0	0.7	2.4
Egypt, 2003	3.5	6.0	3.7	8.1	0.2	2.1
Egypt, 2005	3.6	6.7	3.5	8.8	-0.1	2.1
Egypt, 2008	3.4	5.8	3.4	8.2	0.0	2.4
Ethiopia, 2000	21.3	13.8	20.9	15.7	-0.4	1.8
Ethiopia, 2005	20.1	13.7	19.5	16.6	-0.6	2.9
Gabon, 2000	19.9	8.0	19.7	8.2	-0.2	0.1
Ghana, 1993	25.2	11.4	24.8	12.1	-0.4	0.7
Ghana, 1998	21.7	11.8	22.5	12.2	0.7	0.5
Ghana, 2003	21.7	12.3	20.7	13.7	-1.0	1.4
Ghana, 2008	22.5	12.9	21.5	14.1	-0.9	1.3

	Original definition		Revised definition			
Survey	Unmet need for Spacing	Unmet need for Limiting	Unmet need for Spacing	Unmet need for Limiting	Difference in Spacing	Difference in Limiting
Guatemala, 1995	12.4	12.0	14.4	13.7	2.0	1.7
Guatemala, 1998-99	11.8	11.3	13.8	12.8	1.9	1.5
Guinea, 1999	16.0	8.2	16.1	8.6	0.1	0.5
Guinea, 2005	13.1	8.1	13.4	8.7	0.3	0.6
Haiti, 1994-95	18.4	26.1	17.0	27.7	-1.4	1.6
Haiti, 2000	15.8	23.8	15.6	24.2	-0.3	0.4
Haiti, 2005-06	17.0	20.4	16.5	20.8	-0.5	0.4
Honduras, 2005-06	8.4	8.4	8.0	8.8	-0.5	0.4
India, 1992-93	12.0	7.3	12.0	7.5	-0.1	0.2
India, 1998-99	8.3	7.5	8.3	7.8	0.0	0.3
India, 2005-06	6.0	6.5	6.1	7.8	0.0	1.3
Indonesia, 1991	7.9	6.2	8.6	8.4	0.8	2.2
Indonesia, 1994	4.8	5.8	6.6	8.7	1.8	2.9
Indonesia, 1997	4.2	4.9	5.9	7.6	1.6	2.7
Indonesia, 2002-03	4.0	4.6	4.7	7.8	0.6	3.2
Indonesia, 2007	4.1	4.7	4.8	8.2	0.7	3.5
Jordan, 1990	9.4	12.8	9.7	16.8	0.3	4.0
Jordan, 1997	7.4	6.8	9.9	10.1	2.5	3.3
Jordan, 2002	5.6	5.5	7.1	8.2	1.5	2.7
Jordan, 2007	4.9	7.0	5.7	8.1	0.7	1.0
Jordan, 2009	4.7	6.5	6.0	7.2	1.3	0.7
Kazakhstan, 1995	4.0	11.8	4.6	11.9	0.7	0.1
Kazakhstan, 1999	3.6	5.1	4.1	7.7	0.5	2.6
Kenya, 1993	22.0	13.5	20.7	14.6	-1.3	1.1
Kenya, 1998	14.0	9.9	16.1	11.8	2.1	1.9
Kenya, 2003	14.4	10.1	15.2	12.3	0.8	2.2
Kenya, 2008-09	12.9	12.8	12.5	13.4	-0.4	0.6
Kyrgyz Republic, 1997	4.5	7.2	4.7	7.2	0.2	0.0
Lesotho, 2004	11.0	20.0	9.6	21.5	-1.3	1.5
Liberia, 2007	24.6	11.0	24.2	11.4	-0.3	0.4
Madagascar, 1992	17.5	14.9	16.2	16.2	-1.4	1.2
Madagascar, 1997	14.1	11.4	14.7	12.8	0.6	1.3
Madagascar, 2003-04	11.3	12.3	11.7	12.7	0.4	0.3
Madagascar, 2008-09	10.4	8.5	10.2	8.8	-0.2	0.3
Malawi, 1992	25.8	9.9	24.3	12.2	-1.6	2.4
Malawi, 2000	17.2	12.5	15.0	15.0	-2.2	2.5
Malawi, 2004	17.2	10.4	16.2	14.2	-1.1	3.9
Maldives, 2009	14.9	13.2	15.0	13.6	0.1	0.4
Mali, 1995-96	20.1	5.7	21.0	6.4	0.9	0.8
Mali, 2001	20.9	7.6	21.5	8.2	0.6	0.5
Mali, 2006	20.0	6.7	20.3	7.2	0.3	0.5
Mauritania, 2000-01	22.9	8.6	23.2	9.0	0.3	0.4
Moldova, 2005	2.5	4.2	3.1	8.1	0.6	4.0
Morocco, 1992	8.6	11.1	9.6	13.9	1.0	2.8
Morocco, 2003-04	3.5	6.6	4.4	7.4	1.0	0.9
Mozambique, 1997	16.9	5.6	18.7	6.3	1.8	0.6
Mozambique, 2003	10.8	7.5	10.9	8.0	0.1	0.5
Namibia, 1992	15.1	6.8	14.6	7.1	-0.4	0.3
Namibia, 2000	9.3	12.8	9.8	14.2	0.5	1.4
Namibia, 2006-07	9.1	11.5	8.6	12.2	-0.5	0.7
Nepal, 1996	14.3	17.1	14.8	17.5	0.6	0.4
Nepal, 2001	11.4	16.4	11.1	16.7	-0.3	0.3
Nepal, 2006	9.4	15.2	9.3	15.4	0.0	0.1
Nicaragua, 1998	6.3	8.4	7.4	10.5	1.0	2.1
Nicaragua, 2001	5.9	8.7	5.6	9.1	-0.2	0.3
Niger, 1992	15.8	2.3	15.6	3.1	-0.2	0.7
Niger, 1998	14.0	2.7	14.7	2.9	0.7	0.3
Niger, 2006	13.2	2.5	13.4	2.6	0.2	0.2
Nigeria, 1990	15.8	4.8	16.5	5.1	0.7	0.3
Nigeria, 1999	12.9	4.6	15.1	4.9	2.2	0.3
Nigeria, 2003	11.8	5.1	12.0	5.6	0.2	0.5
Nigeria, 2008	15.0	5.2	14.5	5.7	-0.5	0.5
Pakistan, 1990-91	16.6	15.2	15.0	15.4	-1.5	0.2
Pakistan, 2006-07	10.9	14.0	10.8	14.4	-0.1	0.4

	Original definition		Revised definition			
Survey	Unmet need for Spacing	Unmet need for Limiting	Unmet need for Spacing	Unmet need for Limiting	Difference in Spacing	Difference in Limiting
Paraguay, 1990	8.9	6.1	10.3	7.1	1.4	1.0
Peru, 1991-92	4.3	11.2	6.2	15.4	1.9	4.2
Peru, 1996	3.5	8.6	5.5	12.1	2.0	3.6
Peru, 2000	3.5	6.7	4.9	9.4	1.4	2.8
Peru, 2004-08	3.1	5.1	5.0	7.4	1.9	2.2
Philippines, 1993	12.5	13.4	13.5	16.7	1.0	3.3
Philippines, 1998	8.2	10.6	10.2	14.3	2.1	3.8
Philippines, 2003	7.9	9.4	9.0	13.1	1.1	3.7
Philippines, 2008	9.0	13.4	8.5	13.5	-0.4	0.1
Rwanda, 1992	25.0	13.8	20.2	18.0	-4.8	4.2
Rwanda, 2000	24.0	11.6	22.7	13.5	-1.2	1.9
Rwanda, 2005	24.5	13.4	23.4	14.9	-1.0	1.5
Sao Tome and Principe, 2008-09	19.1	18.0	18.0	19.8	-1.1	1.7
Senegal, 1992-93	22.6	6.7	21.7	7.1	-0.9	0.4
Senegal, 2005	24.2	7.3	24.3	7.6	0.1	0.3
Sierra Leone, 2008	16.4	11.2	16.1	12.3	-0.3	1.1
South Africa, 1998	4.7	10.3	5.7	10.8	1.0	0.5
Swaziland, 2006-07	7.3	16.5	6.7	18.2	-0.6	1.7
Tanzania, 1991-92	19.9	7.9	18.4	9.4	-1.5	1.4
Tanzania, 1996	15.4	8.5	15.8	9.9	0.4	1.4
Tanzania, 1999	13.8	8.0	13.3	9.3	-0.5	1.2
Tanzania, 2003-04	15.1	6.7	16.1	8.0	0.9	1.2
Timor-Leste, 2009	20.5	10.2	20.9	10.7	0.3	0.4
Togo, 1998	21.4	10.9	23.6	11.3	2.2	0.3
Turkey, 1993	3.8	7.5	4.4	10.2	0.7	2.7
Turkey, 1998	3.8	6.3	5.0	9.0	1.1	2.7
Turkey, 2003	2.4	3.9	3.1	6.4	0.6	2.6
Uganda, 1995	18.3	10.7	18.9	11.0	0.6	0.3
Uganda, 2000-01	20.7	13.9	20.3	14.7	-0.4	0.8
Uganda, 2006	24.1	13.7	23.7	14.3	-0.4	0.6
Ukraine, 2007	3.8	6.4	3.7	6.5	-0.1	0.1
Uzbekistan, 1996	6.6	7.0	6.5	7.1	-0.1	0.1
Vietnam, 1997	3.5	3.5	3.6	4.8	0.1	1.3
Vietnam, 2002	2.0	2.8	2.3	4.4	0.3	1.5
Zambia, 1992	22.9	7.8	20.8	9.2	-2.1	1.4
Zambia, 1996	18.7	7.8	16.9	8.2	-1.7	0.3
Zambia, 2001-02	16.8	10.6	15.0	12.6	-1.8	2.0
Zambia, 2007	17.1	9.4	15.9	10.7	-1.1	1.3
Zimbabwe, 1994	9.2	5.6	10.6	8.2	1.4	2.5
Zimbabwe, 1999	7.3	5.6	8.5	8.5	1.2	2.9
Zimbabwe, 2005-06	7.0	5.0	7.2	8.2	0.2	3.3
Unweighted Averages	**11.9**	**9.1**	**12.2**	**10.5**	**0.3**	**1.4**
Range of differences:						
Minimum difference					-4.8	0.0
Maximum difference					3.8	5.7

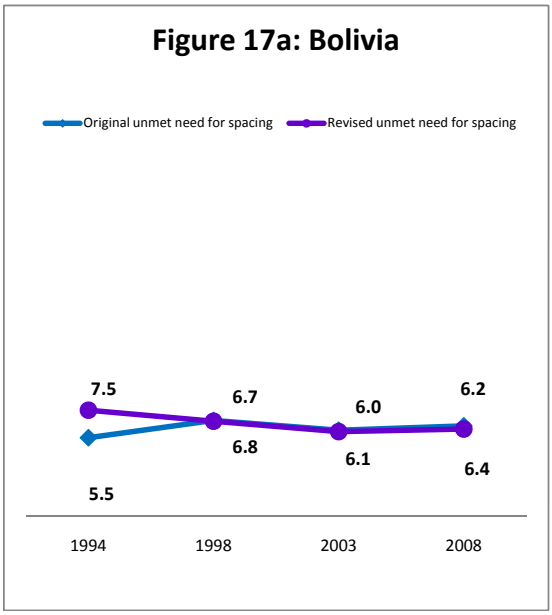
Figure 17a: Bolivia
Original unmet need for spacing
Revised unmet need for spacing
7.5
6.7
6.0
6.2
6.8
6.1
6.4
5.5
1994
1998
2003
2008

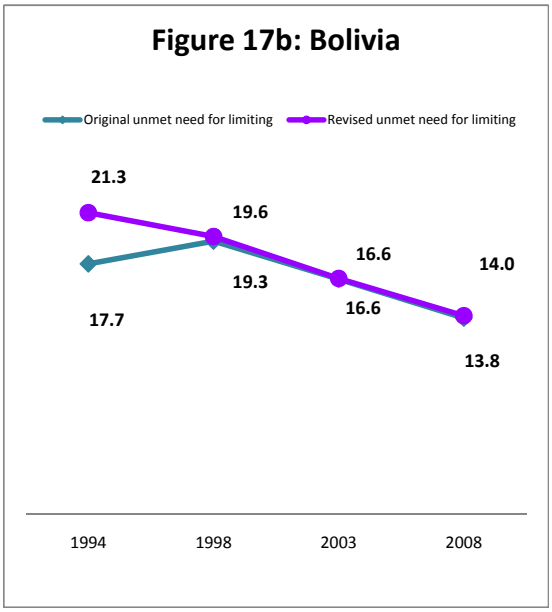
Figure 17b: Bolivia
Original unmet need for limiting
Revised unmet need for limiting
21.3
19.6
16.6
14.0
19.3
16.6
17.7
13.8
1994
1998
2003
2008

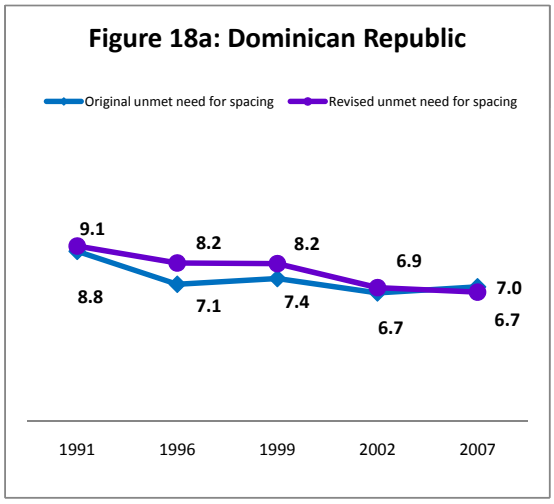
Figure 18a: Dominican Republic
Original unmet need for spacing
Revised unmet need for spacing
9.1
8.2
8.2
6.9
7.0
8.8
7.1
7.4
6.7
6.7
1991
1996
1999
2002
2007

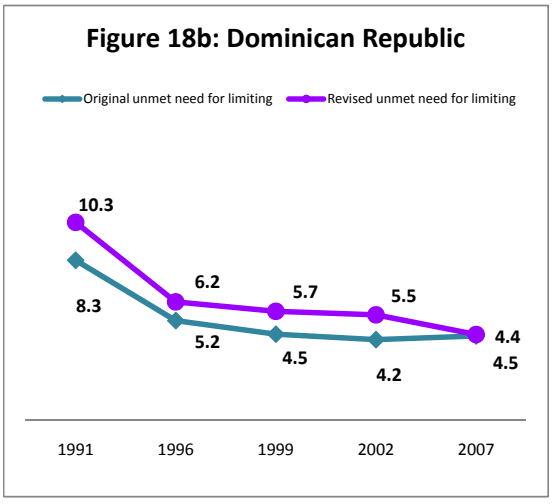
Figure 18b: Dominican Republic
Original unmet need for limiting
Revised unmet need for limiting
10.3
6.2
5.7
5.5
4.4
8.3
5.2
4.5
4.2
4.5
1991
1996
1999
2002
2007

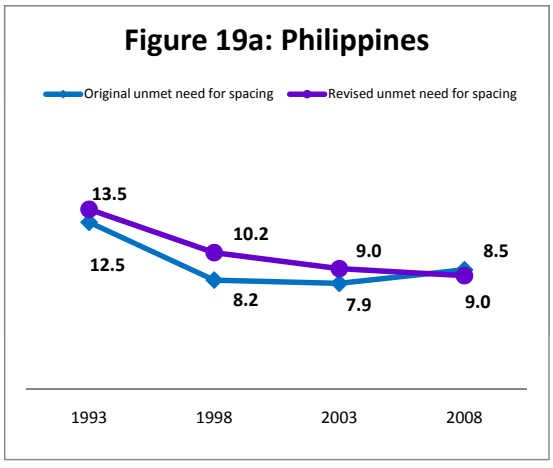
Figure 19a: Philippines
Original unmet need for spacing
Revised unmet need for spacing
13.5
10.2
9.0
8.5
12.5
8.2
7.9
9.0
1993
1998
2003
2008

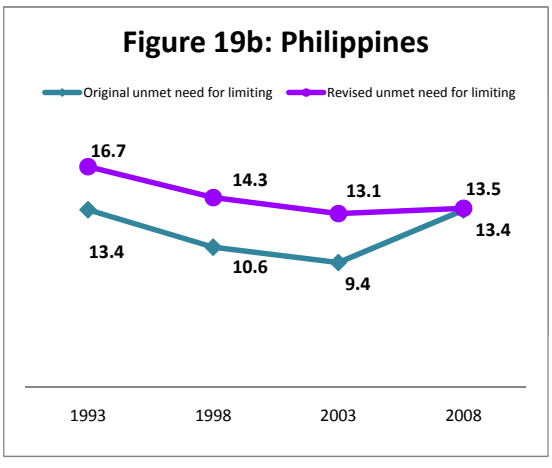
Figure 19b: Philippines
Original unmet need for limiting
Revised unmet need for limiting
16.7
14.3
13.1
13.5
13.4
13.4
10.6
9.4
1993
1998
2003
2008