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Adding It Up: The Costs and Benefits of Investing In Family Planning and Maternal and Newborn Health

Estimation Methodology

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I. INTRODUCTION

A. Objectives of the report

This report provides methodological details on the estimates presented in *Adding It Up: The Costs and Benefits of Investing in Family Planning and Maternal and Newborn Health* (*AIU-2008*)[1,*] and related publications.[2–11] We describe the analytic framework, sources and calculations behind each of the specific estimates. Our objective is to enable users to better understand the results, and the limitations, of the estimates presented in *Adding It Up* publications.

B. Other recent estimates

Adding It Up is one of a number of recent efforts to estimate the resources required to meet the need for sexual and reproductive health services in developing countries. These include projects by the United Nations Population Fund (UNFPA),[12] the Joint United Nations Programme on HIV/AIDS (UNAIDS),[13] Women Deliver,[14] the High Level Taskforce on Innovative International Financing for Health Systems[15] and Norway's Global Campaign for the Health MDGs,[16] as well as other cost and impact analyses.[17–19]

Differences between estimates from the various studies can be explained by differences in the following factors:

- the services covered;
- the countries included;
- whether estimates cover direct services costs alone or include the indirect costs that support service provision;
- whether estimates include total costs or only additional funding needs;
- the time frame covered;
- the costing methodology used; and
- the targeted level of services (i.e., the proportion of the population in need that is covered by the estimated costs).[20]

This report does not offer a comprehensive comparison and evaluation of the various estimates of the costs and benefits of sexual and reproductive health services. Others have begun to make such comparisons,[21] and, as new estimates become available, there is ongoing need for such analyses. However, we do make comparisons in this report to two estimates of the costs of improving family planning and maternal and newborn health from which we drew data and methodology.

C. Prior work contributing to this project

In an earlier study, Guttmacher Institute researchers estimated the 2003 costs of fully meeting needs for modern family planning methods in developing countries. UNFPA has produced revised estimates of the costs for achieving the International Conference on Population and Development (ICPD) Programme of Action by 2015 in developing countries (called "revised ICPD estimates" in this report). Both of these sources provided insights and data for the current project, which are discussed in detail throughout this report.

In comparing *AIU-2008* and the UNFPA's revised ICPD estimates, Population Action International authors remark on "convergence" of the AIU-2008 costs of meeting 100% of needs in 2008 with the average annual ICPD 2009–2015 costs.[21] Both estimate the annual cost of meeting family planning need at $6.7 billion and of meeting maternal and newborn health care need at roughly $23 billion. However, the apparent similarity in total

[*] For clarity, we refer to the most recent *Adding It Up* methodology and estimates as *AIU-2008* and refer to the earlier methodology and estimates as AIU-2003.

costs masks differences between the two sets of estimates, including differences in geographic coverage, care components and time frames (see summary, page 36).

1. ***Adding It Up* 2003 (AIU-2003)**
   The new *AIU-2008* estimates build on a methodology developed in an earlier project that estimated health and financial benefits of investing in contraceptive services in developing countries in 2003.[22,23] The current project expands on *AIU-2003* to estimate the costs and impacts of increasing maternal and newborn health care, in addition to family planning. While some of the information sources for the two projects are similar and allow for comparisons over time, costing data come from different types of sources and are not comparable; therefore, the newer report does not establish trends over time in family planning costs. Key similarities and differences between the two *AIU* projects are pointed out in this document.

2. **UNFPA's revised ICPD estimates**
   The new *AIU-2008* project took advantage of UNFPA's updated cost estimates for implementing the ICPD Programme of Action.[12,23–25] Since some of this work is crucial for understanding data and assumptions behind *AIU-2008* findings, information about the sources of the UNFPA data and assumptions used in the *AIU-2008* project are included in this report, along with a discussion of similarities and differences between the two sets of estimates. References to the revised ICPD estimates are specifically noted; otherwise, data sources and methodology discussed in this report refer to data sources and methodology unique to *AIU-2003 and AIU-2008*.

II. FRAMEWORK AND SCENARIOS

A. *AIU-2008* framework

Figure 1 (page 39) illustrates the topics covered in *AIU-2008*. Following the framework, Section III of this report describes the procedure for estimating the numbers of women in need of family planning, and Section IV presents the methodology used for calculating the numbers of pregnancies in developing countries under various contraceptive scenarios. In Section V, we then describe the approach used for estimating the need for and use of maternal and newborn health services. In Sections VI and VII, we describe the data sources and methods we used to estimate the costs of family planning and maternal and newborn health care services and possible health benefits (in terms of maternal and newborn mortality and morbidity and children who lose their mothers due to maternal deaths), according to scenarios based on different levels of needs met. Broader benefits to women and children, families, communities and society (shown on the right of Figure 1 and discussed in *AIU-2008*) were not estimated in this project but are based on the findings of other published and unpublished studies.[1]

B. Scenarios

In *AIU-2008*, estimates of costs and benefits are made for three scenarios:

1. **Current use**
   a. **Family planning**
      We based estimates of the costs and benefits of family planning on 2008 levels of women wanting to avoid pregnancy and their contraceptive method use.

   b. **Maternal and newborn health care**
      We based estimates of costs and benefits on the levels of maternal and newborn health care in 2008. These estimates take into account the proportions of women and newborns needing and receiving general care, as well as care for special conditions and complications.

2. No use

a. Family planning

We assumed that the women who are currently using modern methods would continue to want to avoid a pregnancy, but would use no contraceptive method. Traditional method users were assumed to continue with their current methods. We assumed there to be no change in factors that may affect the proportions of women wanting to avoid a pregnancy, such as marital status, sexual activity, fecundity and childbearing intention.

b. Maternal and newborn care

We assumed that pregnant women and newborns would receive no maternal or newborn health care, but that their needs for care would be unchanged.

3. 100% of needs met

a. Family planning

We assumed that women who currently want to avoid a pregnancy and are using traditional methods or no method would all become users of modern methods (and that those already using modern methods would continue to do so). We included women relying on traditional methods as needing modern contraceptives because the failure rates of traditional methods are typically much higher than those of modern methods.[26]

We assumed that the types of modern methods adopted by new users, and the percentage distribution of these methods, would reflect the method mix of current modern method users in their country with the same childbearing intentions and marital status. No change was assumed in the proportions of women wanting to avoid a pregnancy.

b. Maternal and newborn health care

We assumed that all women and newborns in need would receive the maternal and newborn health care services covered in this project, including general care and treatment for special conditions and complications.

C. Time period of estimates

1. *AIU-2008*

The estimates in the most recent *Adding It Up* analysis draw from the most recently available data, projected to 2008, and demonstrate the full gains from immediate attainment of meeting all unmet needs. Cost figures are expressed in 2008 U.S. dollars and all scenarios are calculated as of 2008.

2. Revised ICPD estimates: 2008–2015

The revised ICPD estimates start from a base year of 2008 and are projected forward each year from 2009 through 2015. Costs are in 2008 U.S. dollars. In these estimates, increasing proportions of 2008 unmet family planning and maternal and newborn health care needs are met each year until 2015, when need is fully met. The phase-in approach used in the revised ICPD estimates takes into account to some extent the time needed to improve infrastructure and address other service bottlenecks.

D. Geographic coverage

1. Countries included

a. The 2008 estimates include all countries classified as "developing" by the United Nations Statistics Division (Table 1, page 42).[27] Under this definition, developing countries include all countries in Africa, Asia (including countries in Central Asia, but excluding Japan), Latin America and the Caribbean, and Oceania (except Australia and New Zealand). The following countries and administrative regions are included in the *AIU-2008* estimates, but are excluded from the revised ICPD estimates: Brunei Darussalam, Guadeloupe, Hong Kong,

Israel, Macao, Martinique, Netherlands Antilles, Puerto Rico, Singapore, United Arab Emirates and the U.S. Virgin Islands.

b. Transition countries in Europe are included in the UNFPA's revised ICPD estimates, but not in *AIU-2008*. These countries are Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Malta, Poland, Republic of Moldova, Romania, Russian Federation, Serbia and Montenegro, Slovakia, Slovenia and Ukraine, and they comprise the Southern and Eastern Europe region in ICPD estimates.

2. Geographic groupings

a. In summary *AIU-2008* tabulations, countries are grouped by geographic region and subregion according to the United Nations Statistics Division classifications (Table 1). We combined Central Asia and South Asia into South Central Asia, as does UNFPA.[28] In regional summaries, Oceania was included in Asia.

b. The Arab countries grouping from the United Nations Development Programme Regional Aggregates was used for the *AIU-2008* Arab Countries fact sheet.[3] Arab countries are identified in Table 1.

3. Country income groupings

a. World Bank country income classifications, based on gross national income (GNI) per capita in 2007, were used to group countries into four income categories.[29] Countries with a per capita GNI of $935 or less were classified as low-income; those with a per capita GNI of $936–3,075 as lower-middle–income; those with a per capita GNI of $3,076–11,455 as upper-middle–income; and those with a per capita GNI of $11,456 and above as high-income.

b. In the *Adding It Up* publications, the upper-middle– and high-income groups were combined because they represented small proportions of all women aged 15–49 in developing countries (11% and 2%, respectively, in 2008). This category of upper-middle– and high-income countries also included some developing countries not covered by the World Bank classifications, namely Réunion and other small countries in Eastern Africa, Guadeloupe, Martinique, French Guiana and other small countries in South America.

c. As shown in Table 2 (page 45), regions and subregions differ widely in the proportions of women aged 15–49 in each country income grouping. Most women in low-income countries live in Sub-Saharan Africa (48%) or Asia (51%); 89% of those in middle-income countries live in Asia; and, 59% of women in upper-middle– and high-income countries live in Latin America and the Caribbean.

E. Population numbers

1. Total population and number of women aged 15–49

a. The total population and the number of women aged 15–49 for each country in 2008 used in the *AIU-2008* estimates were obtained from UN *Population Prospects*, 2008 revision, medium variant.[30] These figures were used for all scenarios of the *AIU-2008* estimates. In the UN *Population Prospects,* some small countries are included in the regional totals but not in the detailed country listing. To avoid omitting these countries and so that country estimates could be summed to subregional totals, we included the combined populations of these small countries in the calculations. We estimated their combined populations to be the difference between the subregional totals and the populations of the countries for which population was reported (Table 1).

b. Total population estimates and the number of women aged 15–49 for each country for 2008–2015 used in the revised ICPD calculations came from UN *Population Prospects*, 2006 revision, medium variant.[24] Variations in estimated

population and numbers of women between the 2006 and 2008 *Population Prospects* revisions are minor.

2. Women aged 15–49, by marital status:

a. Currently married women

The *AIU-2008* proportion of women aged 15–49 in 2008 in each country who were currently married was taken from the Reproductive Health Costing Tool, where they are sourced to the United Nations Population Division, Population Projections, medium variant, 2006 revision.[31]

1) The proportions were applied to the number of women aged 15–49 in 2008 in each country to estimate the number of currently married women in each country. As shown in Table 3 (page 46), 69% of women aged 15–49 in developing countries were currently married, ranging from 42% in Southern Africa to more than 70% in Middle and Western Africa, East Asia and South Central Asia. These 2008 estimates were used in all scenarios of the *AIU-2008* calculations.

2) The revised ICPD estimates assumed constant proportions of women aged 15–49 to be married for 2008–2015.

b. Formerly married and never-married women

1) In the AIU-2008 calculations, the number of unmarried women in each country in 2008 was estimated as the difference between total women aged 15–49 and the estimated number who were currently married. The distribution of unmarried women according to whether they were formerly married or never married was estimated from available data.

a) For countries with a recent DHS or similar survey available (Table 1), the percentage distribution of unmarried women aged 15–49 who were formerly vs. never married from the most recent survey was applied to the estimated number of unmarried women aged 15–49 in 2008 to estimate the numbers of formerly married and never-married women.

b) For countries with no recent DHS or similar survey available, the subregional weighted marital status distributions of unmarried women aged 15–49 from countries with survey data or the distribution from a similar nearby country were used to estimate the proportions of unmarried women who were formerly and never married. These proportions were then applied to the countries' estimated number of unmarried women aged 15–49 in 2008.

2) See below (Section III.C.2) for the methodology used for including unmarried women in the revised ICPD estimates.

III. NEED FOR AND USE OF FAMILY PLANNING

A. *AIU-2008* definitions

Women aged 15–49 in each country and marital status subgroup were classified as not at risk for unintended pregnancy or as at risk for unintended pregnancy and seeking to space or limit future births, also referred to as "wanting to avoid pregnancy" and "in need of modern family planning." Those not at risk include women who are not sexually active, are infecund or want to have a child in the next two years. Women at risk for unintended pregnancy include those who are sexually active, fecund and want to wait at least two years before having a child or want no more children at all.

1. Wanting to avoid pregnancy (risk for unintended pregnancy)

a. All currently married women were assumed to be sexually active. Women who were not married were classified as sexually active if they reported having had intercourse in the three months prior to the survey. Because of the stigma attached to nonmarital sex, the level of sexual activity—and therefore risk for unintended pregnancy—is likely to be underestimated among unmarried women, especially in Asian and Arab countries, where stigma is especially strong.

b. Sexually active women were classified as infecund if they declared when surveyed that they were infecund, had had a hysterectomy or were menopausal. Also considered infecund were women who were neither pregnant nor experiencing postpartum amenorrhea but who had not had a menstrual period for six or more months, as well as those who were married and not using a contraceptive method during the past five years, but had not had a birth and were not currently pregnant.

c. Sexually active women who were not infecund were considered to be wanting to avoid pregnancy if they did not want to have a child in the next two years. While this measure omits sexually active fecund women who wanted to avoid having a child for a shorter period of time, it is consistent with definitions widely used in the literature.[32]

1) Women not wanting a child in the next two years were categorized as "spacers" if they wanted to have a(nother) child, but not within the next two years or as "limiters" if they wanted to have no more children.

2) Women who were currently pregnant or experiencing postpartum amenorrhea were classified based on whether their current or recent pregnancy was wanted at that time or earlier, mistimed (too early) or unwanted.

2. Contraceptive use categories

Women at risk who were spacing or limiting births were further classified according to contraceptive use status, as follows:

a. Using modern methods

1) Limiters only: tubal ligation (among women) and vasectomy (among male partners).

2) Spacers and limiters: IUD, injectable/implant, pill, condom and other supply methods (diaphragm, female condom, spermicides). Injectable and implant users were grouped together because the methods are both long-acting hormonal contraceptives, but relatively few women in developing countries use implants.

b. Using traditional methods: periodic abstinence, withdrawal, lactational amenorrhea and other nonsupply methods.

c. At risk but not using any contraceptive method.

3. Unmet need for modern family planning

Women wanting to avoid a pregnancy for the next two years or longer who were using traditional methods or not using any contraceptive method at all were considered to have unmet need for modern family planning. Those using traditional methods are included because such methods have high use-failure rates.

B. *AIU-2008* data sources

1. Countries with recent DHS survey data files available

Percentage distributions of women were obtained by special tabulations of DHS survey data (Table 1).[33]

2. Countries with published DHS or other data available

In a number of other countries, some data were available from national surveys or reports. These sources are listed in Table 1. When the national survey or published source did not include all the data items needed for these analyses, we made estimates based on patterns in similar countries or used the weighted average for the entire subregion.

3. Countries with no recent DHS or comparable survey available or with no survey data on unmarried women

Other countries lacked recent DHS data and we found no other published data for use in this project; or, the available data and reports did not cover never-married women or omitted all unmarried women. For such countries, we assumed distributions of women by risk, future childbearing intention and/or contraceptive use were similar to other countries in their subregion or region or to other countries that are demographically or socioeconomically similar.

4. Data coverage in *AIU-2008* calculations

a. As shown in Table 4 (page 47), DHS or other country survey data on contraceptive use were available for 76% of women aged 15–49 in developing countries and for at least 74% of women aged 15–49 in all main regions. Coverage was higher in low and lower-middle income countries (77–80%) than in higher-income developing countries (59%).

b. The coverage level for married women was at least 81%, except in the higher-income countries. Coverage was low among formerly married and never-married women in Asia. Only 33–38% of unmarried women in Asia, and 54% and 66%, respectively, in Asia outside of China, were covered by available contraceptive use information. These lower coverage levels for unmarried women in Asia reflect the fact many country surveys in this region do not include unmarried women, especially never-married women, on the assumption that they are not sexually active and therefore that survey content does not apply to them. Our data on all women of reproductive age in developing countries include estimates for women in specific marital status groups in countries where such data was unavailable; caution should therefore be used in interpreting the results.

c. Of women estimated to have unmet need (i.e., those wanting to avoid pregnancy but using a traditional method or no method), 74% were covered by available survey data, ranging from 68% in Asia and the Caribbean to 91% in Sub-Saharan Africa. For low-income countries, 89% of women with unmet need were covered by available country data, as were 66% of those in lower-middle–income countries and 65% in higher-income countries.

Although actual data on unmet need are available from country surveys for fewer than 10% of unmarried women with unmet need in Asia, unmarried women account for low proportions of unmet need in this region. As a result, 68% of women in Asia with unmet need were represented in country data.

C. *AIU-2008* estimates of contraceptive use and unmet need for modern methods

1. Contraceptive use and unmet need, 2008 (current-use scenario)

The distributions of women by risk status, childbearing intention and contraceptive use were applied to the estimated numbers of currently married, formerly married and never-married women in each country and summed to yield the total numbers of women in each risk, intention and method-use category.

a. By marital status, the proportions of women classified as at risk for unintended pregnancy were 75% of currently married women; 36% of formerly married; and 9% of never-married women (21% in Africa, 5% in Asia and 18% in Latin America and the Caribbean; data not shown).

b. As shown in Table 5 (page 48), in 2008, an estimated 630 million women aged 15–49 in developing countries were not currently in need of contraception because they were not sexually active, were infecund or wanted to have a child within the next two years. These women accounted for 44% of all women aged 15–49 (59% in Africa, 41% in Asia, and 39% in Latin America and the Caribbean).

c. An estimated 818 million women were in need of contraception because they wanted to avoid pregnancy, i.e. were sexually active, fecund, and not wanting to have a child in the next two years or not wanting any more children. The proportions of women in need of contraception were lowest in Africa (34–44% in all subregions except Southern Africa), reflecting relatively high desired numbers of children throughout the region. Higher proportions of women aged 15–49 wanting to avoid pregnancy in lower-middle– and higher-income developing countries (60–61%) than in low-income countries (43%) also reflect the move to smaller desired family size as income rises.

d. Some 603 million women (and/or their partners) were using a modern contraceptive in 2008. These women represent 74% of those in developing countries who want to avoid pregnancy. Use is low in Africa (47%) compared with Asia (78%) and Latin America and the Caribbean (76%).

e. A total of 215 million women were estimated to have unmet need for modern contraceptives in 2008. Although the proportion of women aged 15–49 who want to avoid pregnancy is relatively low across most regions in Africa, a relatively high proportion (53%) of those who do want to delay or stop childbearing have unmet need for modern methods (they are using traditional methods or no method), compared with 22% in Asia and 24% in Latin America and the Caribbean.

2. Comparison of *AIU-2003* and *AIU-2008* current-scenario levels of contraceptive use and unmet need (Table 6 and Figure 2, pages 49 and 40)

a. Between 2003 and 2008, the estimated number of women aged 15–49 in developing countries increased by 10%, from 1.3 billion to 1.4 billion. The rate of increase was greatest in Africa (18%), compared with 8% in Asia and 6% in Latin America and the Caribbean.

b. The number of women wanting to avoid pregnancy increased more steeply than did the overall population of women aged 15–49. Between 2003 and 2008, the number of women in developing countries wanting to avoid pregnancy rose by 16%, from 705 million to 818 million. Population growth accounted for 59% of the increase in the number of women wanting to avoid pregnancy; the remaining 41% resulted from rising proportions of women 15–49 wanting to avoid pregnancy (from 53% in 2003 to 56% in 2008; data not shown).

c. In Africa, the increase in the number of women wanting to avoid pregnancy was 22%, somewhat greater than the 18% growth in the number of women 15–49. The proportion of women wanting to avoid pregnancy increased by 1–5 percentage points in all regions of Africa, except Northern and Western Africa. In Asia, the number wanting to avoid pregnancy rose 15%, almost double the region's overall population increase, reflecting 4–8 percentage point increases in the proportion of women wanting to avoid pregnancy in the large regions of East and South Central Asia, counterbalanced by 3–4 percentage point decreases in Southeast and Western Asia and no change in Oceania. In Latin America and the Caribbean, the increase in the proportion wanting to avoid pregnancy was triple the increase in population growth—18% vs. 6%. The proportions of women

aged 15–49 wanting to avoid pregnancy rose by 5–10 percentage points across subregions of Latin America and the Caribbean.

d. The number of modern method users rose by 20%, from 504 million in 2003 to 603 million in 2004. However, the proportion of all women in developing countries wanting to avoid pregnancy who were using a modern method only rose from 71% to 74%.

Most of the increase in modern method users reflected the rising population of women aged 15–49 in developing countries, as well the smaller increase in the proportions of women wanting to avoid pregnancy. The number of women using modern contraceptives rose at a greater rate than the number wanting to avoid pregnancy in every subregion except Southern Africa, East Asia and the Caribbean.

The overall increase in modern contraceptive users by 99 million was accounted for by increases in Asia (74 million), Latin America and the Caribbean (15 million) and Africa (10 million), and reflect larger-than-average rates of increase in method use in Southern Africa, East Asia, the Caribbean and South America.

e. The *proportion* of women wanting to avoid pregnancy who had unmet need for modern methods decreased from 29% to 26% between 2003 and 2008, but the total *number* rose from 201 million to 215 million. The increased number of women with unmet need indicates that the rising proportion of women whose need for modern methods was met was not sufficient to make up for population growth and increasing proportions of women wanting to avoid pregnancy.

f. The number of women relying on traditional methods rose 17% from 64 million to 75 million, while the number at highest risk of unintended pregnancy because they used no method increased only 2%, from 137 million to 140 million.

3. Contraceptive use with 100% met need for modern family planning (100% of needs met scenario; Table 7, page 50)

In this scenario, women who currently want to avoid a pregnancy and are using traditional methods or no method would all become users of modern methods (in addition to those who are already using modern methods). We assumed that the contraceptive use distribution of new modern method users would be the same as the distribution among current modern method users in their country with their same childbearing intention and marital status characteristics. No change was assumed in the proportions of women not wanting to avoid a pregnancy, i.e. those not at risk for unintended pregnancy.

a. Overall the number of women who have been sterilized for contraceptive purposes (231 million) is more than 10 times the number of men who have had vasectomies (22 million). In addition, the numbers of women and their partners relying on sterilization is greater than the numbers using reversible modern contraceptives in South Central Asia and in all subregions of Latin America and the Caribbean.

b. The IUD is the next most common modern method after sterilization, with 180 million users in developing countries in 2008, followed by 65 million oral contraceptive users, 46 million injectable and implant users (relatively few are using implants), 56 million condom users and roughly two million using other supply methods.

c. Based on the assumption that the contraceptive method distribution of women with current unmet need for modern methods would be the same as women in the same country with the same marital and childbearing intention status, we estimated that 51 million women would move to sterilization (primarily female

sterilization), and more than three-quarters of these women would live in Asia. An estimated 47 million would move to condoms or (in small numbers) to other supply methods; 43–44 million each would use oral contraceptives and the IUD; and 30 million would take up the injectable.

D. UNFPA's revised ICPD cost estimate sources for contraceptive use and definition of unmet need

1. Contraceptive use

a. Estimates were based on all women, regardless of marital status, rather than for separate marital status groups.

b. Proportions of married women aged 15–49 using each method (pill, IUD, injectable, implant, male condom, female condom, female sterilization, male sterilization, other modern methods, traditional methods) were taken from the most recent available DHS, CDC and other country surveys. For countries with no available survey data, unweighted regional or subregional averages from the 2007 UN's "World Contraceptive Use" wall chart[34] were used. These proportions were applied to the numbers of married women aged 15–49 in 2008.

c. The proportion of married women in a country using any contraceptive method (contraceptive prevalence rate, or CPR) was adjusted upward to account for use among unmarried women, based on available national survey data with information on women of all marital statuses.[24] The adjusted CPR was then multiplied by the number of married women in the country in 2008 to obtain the total number of contraceptive users for that year. For countries lacking all needed data, the adjusted CPR was based on unweighted regional averages from countries with available data.

2. Unmet need estimates

a. In UNFPA's revised ICPD estimates, only those women wanting to avoid pregnancy who were using no method were defined as having unmet need.

b. The number of women wanting to avoid pregnancy who were using no method in 2008 was the proportion of married women in this category, adjusted by the inflation factor described above to account for unmarried women, times the number of married women in 2008.

3. Estimated levels of contraceptive use 2008–2015

a. The overall level of contraceptive use, and use of each specific method category, was estimated to increase from 2008 to a 2015 level at which all current (2008) need for contraceptives would be met.

b. We assumed that the estimated 2008 method mix distribution would remain unchanged through 2015. Traditional methods were considered to be a method-use category, rather that part of unmet need.

IV. *AIU-2008* ESTIMATION OF PREGNANCIES, BY INTENTION STATUS AND OUTCOME

A. Current scenario numbers of pregnancies by intention status and outcome

1. Births

a. The total numbers of births in each country in 2008 were taken from UN *Population Prospects,* 2008 revision.[35]

b. For births in countries for which survey data were available, the proportions of births that were unplanned (mistimed or too early, and unwanted or too many) or planned (including those for which the woman did not care about planning births)

were applied to the total numbers of births. Survey data on planning status was available for 86% of births in 2008.

c. We assumed that the distribution of births by intention status in countries without available data was similar to the distribution of births for countries with data in the same subregion.

2. Induced abortions

a. Survey reports on induced abortion are generally inaccurate, and national abortion statistics are often unavailable or suffer from underreporting, especially in developing countries with restrictive abortion laws.[36]

b. The number of induced abortions in each subregion in 2008 was calculated by projecting the trend in the abortion rate between 1995 and 2003 (based on data from *Abortion Worldwide*[37]), and applying the projected rate to the number of women in 2008.[38]

c. Induced abortions in each subregion were distributed across countries in the same way that unplanned births were distributed, i.e. it was assumed that the ratio of induced abortions to unplanned births was constant across all countries in each subregion.

3. Miscarriages

Pregnancies ending in miscarriage—i.e., pregnancies that end in spontaneous abortion or stillbirth after lasting long enough to be noted by the woman (6–7 weeks after the last menstrual period)[39]—were estimated to be equivalent in number to 20% of pregnancies ending in birth and 10% of those ending in induced abortion. These proportions are based on studies estimating that for every 100 pregnancies at six weeks since ovulation, roughly 8% will result in miscarriages in the next four weeks, another 8% will be end in miscarriage or stillbirth in the remaining weeks of pregnancy and 84% will result in live births. Thus the ratio of miscarriages to live births is 16%/84%, or roughly 20%. Since induced abortions typically end early in pregnancy, miscarriage estimation relative to those pregnancies is based on the ratio of miscarriages to pregnancies ending 10 weeks since ovulation is 8%/92%, or roughly 10%.

4. Intention status of pregnancies

a. Intended pregnancies include all planned births, plus the miscarriages resulting from planned pregnancies.

b. Unintended pregnancies include all unplanned births, all induced abortions and the miscarriages resulting from unintended pregnancies.

5. Comparison of unintended pregnancy estimates from *AIU-2008* and *Abortion Worldwide*

a. The *AIU-2008* estimates yield a total of 186.2 million pregnancies in developing countries in 2008, compared with 185.4 million published in *Abortion Worldwide*.[38] This slight difference stems from our use of births to all women in 2008, compared with use of births only to women aged 15–44 in 2008 in calculations for *Abortion Worldwide*.

b. Miscarriages were estimated in the same way for both projects.

6. Pregnancy estimates

a. Table 8 (page 51) shows the estimated annual number of pregnancies, by outcome and intention status by according to region, subregion and economic classification of countries.

b. Of the estimated 186 million pregnancies among women in developing countries in 2008, an estimated 75 million (40%) were to women who had not wanted to become pregnant at the time.

c. Some 30.1 million of these women gave birth, including 16.5 million who had not wanted to have a child for at least two years and 13.6 million who had not wanted to have a child (or another child) at all; 35.4 million women with unintended pregnancies had induced abortions and 9.6 million miscarried.

7. Unintended pregnancies by intention and outcome

a. Table 9 shows the unintended pregnancy rates for each subregion and country income category and the distributions of unintended pregnancies by intention and outcome.

b. Of every 1,000 women in developing countries wanting to avoid pregnancy in 2008, an estimated 92 became pregnant, ranging from fewer than 100 in East Asia, South Central Asia, Oceania and Central America to more than 200 per 1,000 in Eastern and Middle Africa.

c. While some 40% of all pregnancies in developing countries were unintended, the level reached 58% in Latin America and the Caribbean, including 62% in the Caribbean and 63% in South America.

d. Unintended births accounted for 25% of all births.

e. Some 19% of all pregnancies and 47% of unintended pregnancies ended in induced abortion. East and Southeast Asia had the highest proportions of unintended pregnancies ending in abortion (78% and 57%, respectively).

B. Unintended pregnancies and outcomes across contraceptive use scenarios

The unintended pregnancy levels described above were not linked to data on whether women had been using a contraceptive method, so further estimation was needed to estimate pregnancy rates according to contraceptive method. The most commonly used measure for assessing the risk of pregnancy among contraceptive users and sexually active nonusers reflects experience within the first year of a period of use among sexually active fertile women.[26] However, women wanting to avoid pregnancy include those who have used a method (or no method) for longer periods of time and may not be continually sexually active or fertile. In order to reconcile unintended pregnancy estimates based on method use among those wanting to avoid pregnancy with the external estimates described above, we used first-year pregnancy rates to establish relative rankings across methods and adjusted these rates, by country, to equal the number of unintended pregnancies estimated from external sources.

1. First-year pregnancy rates by method and nonuse

a. For each of the three contraceptive use scenarios, annual pregnancy rates among women using contraceptive methods and among women at risk for unintended pregnancy who were using no method were multiplied by the estimated number of women in each method-use category in their country to estimate the number of unintended pregnancies. The same method-specific and country-specific rates were used in each scenario.

b. For reversible contraceptive methods, we used the median values of 12-month contraceptive use-failure rates among married women in 18 countries.[40]

These average failure rates were as follows:

IUD: 1.6%
Injectable (used for injectable and implant users): 2.9%
Pill: 6.9%
Condom: 9.8%
Other supply methods (we assumed the same failure rate as condom): 9.8%
Withdrawal: 15.1%
Periodic abstinence, including lactational amenorrhea method: 21.6%

Other nonsupply methods (we assumed that the use-failure rate for these methods is equal to the average of the failure rates listed above for periodic abstinence and withdrawal): 18.35%

c. For tubal ligation and vasectomy, we used first-year typical-use pregnancy rate estimates from a review of multiple studies.[26]

Tubal ligation: 0.5%
Vasectomy: 0.2%

d. For women wanting to avoid pregnancy using no method, we used a pregnancy rate of 40%. The commonly used estimate of 85% represents the estimated pregnancy rate during the first 12 months of frequent sexual activity among fertile couples.[26] The 40% pregnancy rate is likely more realistic for a general population of couples who are at risk of unintended pregnancy but are not using a contraceptive method[41] because it reflects probable lower levels of sexual activity and fecundity among actual nonusers, many of whom have not become pregnant despite being sexually active and not using a method for more than 12 months. Ideally, estimates of the pregnancy rate among women who are not using any method and are at risk of unintended pregnancy would be available from actual studies; in the absence of such studies, the estimate of 40% is a conservative one and has the strong advantage of being roughly consistent with independently developed global estimates of unintended pregnancies.

2. Pregnancy rate adjustment

a. The number of pregnancies based on current contraceptive use among women at risk for unintended pregnancy and first-year method-specific use-failure rates differed in most countries from the number of unintended pregnancies estimated from external sources (Table 8).

b. The first-year use-failure rates for each method and for nonuse were therefore adjusted so that the total number of unintended pregnancies calculated in each country equaled the number estimated for 2008 from external sources. This adjustment multiplied the initial failure rates by the ratio for each country of the estimated 2008 number of unintended pregnancies to the number of unintended pregnancies calculated using the failure rates. Within each country, the adjustment ratio was applied to all method and nonuse failure and pregnancy rates, maintaining their relative ranking.

c. The adjustment ratios averaged 0.88. The proportions of women wanting to avoid pregnancy by country adjustment ratio levels are as follows:

Adjustment ratio	% of women wanting to avoid pregnancy
<0.50	2
0.50–0.74	43
0.75–1.25	47
0.126–1.49	5
≥1.50	3

The adjustment ratios ranged across countries from 0.06 to 2.72. Among regions, they varied between 0.83 for Asia (from 0.37 for Oceania to 1.12 for Southeastern Asia) to 0.95 for Africa (from 0.73 for Western Africa to 1.11 for Eastern Africa) and to 1.05 for Latin America and the Caribbean (from 0.87 for the Caribbean to 1.10 for South America).

d. Cleland, Ali and Shah, analyzing data from 34 DHS surveys across 18 countries, found estimated failure rates for reversible methods to be broadly similar for rural and urban users and for users with primary or no education vs. users with

secondary or higher education.[42] However, they found that women who did not want to have any (more) children who were relying on condoms, periodic abstinence and, to a lesser extent, withdrawal had much lower failure rates than users of these methods who wanted more children in the future. Method-specific failure rates according to women's childbearing intention and other characteristics are not available across a range of countries, however, and our estimates do not take into account the possibility of variation in failure rates or adjustment ratios by union status or intention for future childbearing, or women's other sociodemographic characteristics.

3. Outcomes of unintended pregnancies

a. Unintended pregnancies in each country for the three scenarios were distributed according to outcome (unplanned birth, induced abortion or miscarriage), based on the country's externally estimated distribution in 2008 of unintended pregnancies (Table 9, page 52).

b. As described above, the numbers of births are country-level estimates. The proportion of births that were unintended comes from country-level surveys for most countries, but for others it is based on estimates from countries with data. However, the levels of induced abortions are estimated from subregional data,[37] using the assumption that all countries within a subregion had similar distributions of unintended pregnancies into unplanned births, induced abortions and miscarriages. This is a tenuous assumption, since even within subregions, countries differ in access to abortion and other factors that may affect women's choice of outcome for unintended pregnancies. As a result, country-level estimates of the levels of unintended pregnancy and induced abortion, and unplanned births in some countries, are rough approximations. Thus, we have chosen to present them only at the regional and subregional level.

V. NEED FOR AND RECEIPT OF MATERNAL AND NEWBORN MEDICAL CARE

Estimates of the proportions and numbers of women and newborns needing and receiving care were calculated using average values within regions, subregions or countries, depending on data availability. It is likely that needs vary according to women's characteristics, such as parity, length of time since last pregnancy, age and access to health care, as well as newborns' gestation and birth weight. However, assessing such differentials and integrating them into our models were beyond the scope of this project.

A. Antenatal care

1. Women needing care

a. All women giving birth were assumed to need at least four antenatal care visits, as recommended by the World Health Organization (WHO).[43]

b. Some of these women were also assumed to need care specific to the conditions listed below. Except as noted below, the proportions of women needing such care were taken from the UNFPA's Reproductive Health Costing Tool (RHCT) and the sources listed here are those used the RHCT.[25] Although many of the sources used in the RHCT to estimate need for treatment of specific conditions are quite old, preliminary literature searches did not uncover more recent reports summarizing data across developing countries, and collection and analysis of more recent data were not feasible. Further, basing our estimates on the RHCT increases comparability with UNFPA's ICPD cost estimates.

1) Treatment of hypertensive disorders of pregnancy

a) We took regional and subregional proportions of pregnant women with hypertensive disorders of pregnancy from the RHCT. They were taken from estimates developed for Global Burden of Disease (GBD) 2000 project.[44] Disability-adjusted life-years (DALYs) calculations used in the current analyses were also based largely on the GBD 2000 project.[45,46]

b) Following the RHCT methodology, the estimated proportions of women needing care for hypertensive disorders of pregnancy was inflated by 1.05 to account for women needing care whose pregnancies do not end in live birth.[47] This adjustment is smaller than that needed to estimate total pregnancies, including all miscarriages and induced abortions, since many of the specific conditions included in these estimates typically occur later in gestation than do most miscarriages and induced abortions.

2) Malaria prevention and treatment

a) WHO standards for maternal and newborn care recommend that all pregnant women in areas with stable levels of malaria transmission receive intermittent preventive care and that women with malaria receive treatment.[43]

b) We took the proportion of pregnant women giving birth who need preventive prophylaxis for malaria or malaria treatment from RHCT, which sourced estimates to WHO.[47] Following the RHCT methodology, we inflated these proportions by 1.05 to account for women needing care whose pregnancies do not end in live birth**.**

3) Urinary tract infection

Based on the RHCT methodology, we assumed that 25% of pregnant women who give birth need treatment for urinary tract infection. This was also inflated by 1.05, to 26.25%, to account for women whose pregnancies do not end in live birth.

2. Women receiving care

a. Current scenario

1) Proportions, by country, of women giving birth who have at least four antenatal visits were taken from WHO[48] and UNICEF[49] sources, or from Guttmacher Institute tabulations of DHS or other country surveys, whichever source was most recent. For many countries, these estimates were from more recent sources than those available in the RHCT. Countries with no available data were assigned the level of a nearby similar country or the unweighted average of levels in countries with data in that subregion.

2) As shown in Table 10 (page 53), only 51% of women giving birth in 2008 are estimated to have received at least four antenatal visits, ranging from 35% in South Central Asia to 83% in South America. This proportion was half as high in low-income countries as in upper-middle– and high-income countries (38% vs. 76%, respectively).

3) Following the RHCT, we assumed that all women who received at least four antenatal visits and needed care for hypertensive disorders, malaria prevention or treatment, and urinary tract infection received care.[50]

b. 100% scenario: All needs met for maternal and newborn care

Under the scenario of full maternal and newborn care, we assumed that all women giving birth would receive routine antenatal care and management of the conditions specified above, when needed.

c. Adjustments for pregnancies not ending in birth.

We did not make additional estimates of antenatal care received by women experiencing miscarriages or having induced abortions, since the RHCT estimates included a 5% inflation to account for those receiving antenatal care whose pregnancies did not end in birth. As noted above, many of the specific conditions included in these estimates typically occur later in gestation than do most miscarriages and induced abortions.

B. Labor and delivery

1. Women needing care

a. Delivery care

All women giving birth were assumed to need basic delivery care.

b. Complications needing immediate care

The numbers of women estimated to need care for major complications are shown in Table 10. Data for the incidence of complications that might require immediate care were taken from the RHCT. Following the RHCT, we assumed that 20% of women with these complications would need treatment before referral to another site for treatment of the complication.

1) Premature rupture of membranes

Following the RHCT, we assumed that 10% of births, 11 million in 2008, involved premature rupture of membranes.[50]

2) Hemorrhage

We took proportions of women needing treatment for hemorrhage from RHCT, which sourced its estimates to WHO's 2000 GBD.[51] Estimates for WHO regions were applied to countries within each subregion. The RHCT assumed that 20% of hemorrhage cases occurred before giving birth and 80%, after giving birth. In 2008, an estimated 5.5 million women giving birth needed care for hemorrhage.

3) Sepsis

Subregional sepsis rates were taken from the RHCT, sourced to estimates for the 2000 GBD.[52] These were applied to countries within the WHO subregions. An estimated 7.2 million women in 2008 needed care for sepsis associated with delivery.

4) Pre-eclampsia and eclampsia

Following the RHCT, regional and subregional proportions of pregnant women with pre-eclampsia and eclampsia were taken from subregional estimates developed for the 2000 GBD.[44] An estimated 6.8 million women giving birth in 2008 needed care for pre-eclampsia and eclampsia.

5) Obstructed and prolonged labor

Subregional proportions of births in which women experienced obstructed labor were taken from the RHCT, sourced to estimates developed for the 2000 GBD.[53] Proportions ranged from 3% to 7% of births. It was assumed that women with obstructed labor needed cesarean deliveries. An estimated 7.6 million women who gave birth in 2008 needed care for obstructed labor.

In addition, following the RHCT, we assumed that the proportion of births with prolonged labor equaled 1.2 times the proportion with obstructed labor and that half of births with prolonged labor required forceps or vacuum-assisted delivery.

c. Other complications requiring treatment

1) Severe anemia

We used RHCT regional and subregional proportions of pregnant women needing management of anemia, which were taken from WHO estimates

based on a large number of studies that measured blood hemoglobin levels among pregnant women.[54] The surveys spanned 1970 to 1991, with more weight given to more recent surveys. A search of the literature uncovered no more recent synthesis for updating these estimates. National prevalence estimates were aggregated into regional percentages according to population distribution, assuming that the prevalence of anemia among pregnant women in countries with no available data was similar to that in countries in the same region or with similar development/health indicators.

2) Obstetric fistula

a) ICPD estimates include care and cost estimates for women living with obstetric fistula from pre-2008 deliveries. Prevalence of women living with fistula was assumed to be 184 per 100,000 women aged 15–49 in Sub-Saharan Africa, zero in other African countries and in South Korea, 14 per 100,000 in China, 76 per 100,000 in India, and 34 per 100,000 in the rest of Asia and in Latin America and the Caribbean.[31]

b) Following the RHCT, we assumed that the annual incidence of obstetric fistula was 10% of total prevalence in Sub-Saharan Africa, 39% of prevalence in India and 17% of prevalence in other countries. In all countries, we assumed no obstetric fistulas would occur under conditions of full maternal health care.

d. Cesarean section deliveries

1) We took current proportions of women delivering by cesarean section from special tabulations of DHS or other country surveys, or from WHO, depending on which source was most recent.[48] For countries with no available data, we used the unweighted average of countries with data in the same subregion (for Africa) or in the same region (for Asia and Latin America and the Caribbean; Table 10).

2) WHO estimates that 5–15% of women giving birth are likely to need cesarean section deliveries.[55] We assumed that at least 10% of women would need cesarean deliveries (the midpoint of the WHO range) in countries with proportions currently below 10%. However, we did not decrease the needed level of cesarean delivery in countries with levels above 10%.

e. Postpartum care

1) All women giving birth were assumed to need postpartum care.

2) Following RHCT, 15% of the women giving birth were estimated to need management of mastitis.[47]

2. Women receiving care

a. Current scenario

1) As shown in Table 10, the proportion of women delivering in a health facility in 2008 was only 55%, ranging from fewer than four in 10 women in Eastern and Western Africa to nine in 10 in South America. The range according to country income level was even wider than for antenatal care, from 38% to 93%.

2) We used the proportion of women delivering in a health facility (rather than delivery by a skilled attendant, which was used in the RHCT) as our measure of receipt of medical care for labor and delivery. While measures are fairly similar, those who deliver in a health facility are more likely to receive skilled assistance and needed interventions and care than those delivering at home, even with a skilled attendant. However, some health facilities in poor or remote areas may lack medically trained health professionals. Although the

quality and adequacy of care likely varies among facilities and across countries, national data on these dimensions of care are not available.

3) Lacking information, it was assumed that half of women delivering with a skilled attendant (RHCT) or in a health facility (*AIU-2008)* received postpartum care. Following RHCT estimates, we assumed that all women who received postpartum care who needed treatment for mastitis received that care.

4) We took country-specific proportions of women giving birth who had cesarean-section deliveries from the most recent sources (WHO or UNICEF sources, or Guttmacher Institute tabulations of DHS or other country surveys). Countries with no available data were assigned the level of a nearby similar country, or the unweighted average of levels in countries with data in their subregion.

5) We used the RHCT 2008 estimates for receipt for care for other conditions. These estimates assumed that the proportion of women needing care who received it was equivalent to the proportion of women giving birth who received emergency obstetric care. The proportion receiving emergency obstetric care was taken from available studies when possible; where data were not available, it was assumed that only half of the women who delivered with a skilled attendant (RHCT) or in a facility (*AIU-2008*) received care they needed for the complications and conditions detailed above.

b. 100% scenario: All needs met for maternal and newborn care

Under this scenario, we assumed that all women giving birth received basic labor and delivery and postpartum care, and that all needing care for the complications detailed above received that care.

c. No services scenario

We also estimated impacts of a scenario in which women's needs for general and specific pregnancy-related care remained the same, but no women received the relevant services.

C. Abortion complications

1. Safe vs. unsafe abortion

a. Subregional proportions of abortions that occurred under safe or unsafe conditions were taken from Sedgh et al.[36] These proportions were used for all countries in each subregion.

1) Unsafe abortion is defined by WHO as any procedure to terminate an unintended pregnancy done either by people lacking the necessary skills or in an environment that does not conform to minimum medical standards, or both. [56]

2) In these calculations, unsafe abortions include those performed in countries with restrictive abortion laws, as well as abortions that do not meet legal requirements in countries with less restrictive laws.[36] Safe abortions were defined for these estimates as those that meet legal requirements in countries in which abortion is legally permitted under a broad range of criteria.

3) Although there is not a perfect correlation between the legal status of abortion and its safety, there is substantial evidence that most abortions are safe in countries where the procedure is legally permitted under a broad range of criteria. In countries where the procedure is highly restricted by law, abortions are frequently performed by unqualified providers, are self-induced, or are carried out by medical professionals

under unhygienic conditions.[36] Even when done by a trained practitioner, the clandestine and illegal nature of abortion in these countries usually means that medical backup is not immediately available in an emergency, the woman might not receive appropriate postabortion care, and, if complications occur, the woman might delay seeking care.

b. The estimated total number of induced abortions in developing countries in 2008 was 35 million, of which 15 million were safe and 20 million were unsafe.

2. Complications of unsafe and safe abortions

a. We estimated that 42% of women having unsafe abortions have complications requiring medical treatment, including 26% currently receiving medical care for complications and 16% who need care, but do not receive it.[38] The same proportions were applied across all countries, because country-specific evidence is very limited (Table 10).

b. Lacking data on the rate of complications among women in developing countries who obtain induced abortions under safe circumstances, we estimated that 1% have complications requiring medical care and that all of these women obtain that care. In the United States, an estimated 0.3% of women obtaining abortions in 1995 have complications requiring hospitalization.[57] This rate was increased to 1% for developing countries based on the likelihood that resources and conditions under which abortion services are provided are poorer than in the United States.

3. UNFPA's revised ICPD estimates: treatment of abortion complications

a. RHCT estimates of the incidence of unsafe abortion were taken from WHO estimates for 2000.[58] Subregional estimates were applied to countries within the region.

b. We assumed that 20% unsafe abortions result in complications requiring hospital care.[47]

c. No complications needing medical care were estimated to result from safe abortions.

D. Newborns

1. Hospital care for all newborns

a. *AIU-2008* includes estimates of medical care needed by newborns in the immediate postpartum period.

b. Newborn care estimates include births that were intended, as well as those that were not intended, at time of conception.

2. Newborns needing care

Table 11 (page 54) shows the number of total births, the percentage of newborns delivered in a health facility, and the number estimated to need and receive care for major complications.

a. Routine care

All newborns are assumed to need routine care.

b. Sepsis and infections

We used the RHCT estimate that sepsis and infections occur currently in 10% of all newborns and that under conditions of full maternal and newborn health care, this level would be reduced to 5%.[59] A total of 12 million newborns were estimated to need care for sepsis or infection under conditions existing in 2008.

c. Low birth weight

We used RHCT data on the percentage of newborns with low birth weight estimated at the country level. These came primarily from UNICEF 2003 analyses of country survey data and other UNICEF reports.[25] Proportions ranged from 4% or less in China, South Korea, Samoa and Tonga to 30% in India, 31% in Sudan and Afghanistan, and 32% in Bangladesh.

Newborns needing management of low birth weight totaled an estimated 20 million in 2008.

d. Management of asphyxia and other breathing difficulties

We used the RHCT estimate that 3% of newborns experience asphyxia or other breathing difficulties. The RHCT sources this estimate to WHO.

As shown in Table 11, 4 million newborns are estimated to have needed management of asphyxia or other breathing difficulties in 2008.

3. Newborns receiving care

a. Current scenario

In the RHCT, it was assumed that all newborns delivered by a skilled attendant would receive routine care and that all those needing care for the complications listed above would receive care. As noted above, in *AIU-2008*, we used the alternate measure of delivery in a medical facility. As shown in Table 11, in 2008, only 55% of newborns in developing countries were delivered in a health facility. The numbers with unmet need for care of major complications only include those born outside a facility: five million needing care for sepsis/infection; 11 million for low birth weight; and one million for asphyxia/other breathing difficulties. These numbers are probably underestimates, since it is unlikely that all newborns delivered in a health facility received the care they needed for these complications.

b. 100% scenario: All need met for maternal and newborn health care

Under this scenario, it was assumed that all newborns would be delivered in a health facility and that all therefore would receive routine medical care and care for the listed complications.

c. No services scenario

We also estimated impacts of a scenario in which newborn's needs for general and specific care remained the same, but none received the relevant services.

VI. SERVICE COSTS

Cost estimates include estimates of direct and indirect costs. Direct costs include contraceptive commodities, clinical supplies and hospital fees (which, following the RHCT, were assumed to be the same across all developing countries) and labor (which was specific to each country). Indirect costs are program and systems costs needed to provide services. They were estimated at a regional level.

A. Direct costs

1. Estimation details

a. Costs of family planning and maternal and newborn health care services are based on the RHCT. Results from this tool were also used to generate revised estimates of the financial resources need to implement the ICPD Programme of Action.[12,24] Methodologies for the *AIU-2008* and ICPD estimates are similar, but not always identical; major differences are noted below. Although we took most cost information directly from RHCT, we discuss sources of and assumptions behind those data here since they are such a crucial part of our analysis.

b. All cost estimates in *AIU-2008* and in the ICPD revised estimates are presented in 2008 U.S. dollars.

c. The estimated costs are likely minimum estimates of the costs of these services. The estimates reflect the costs of providing services in the public sector. Private sector and social marketing services usually charge more for commodities and provider services than do public sector clinics. In addition, sometimes public-sector service users are required to pay additional fees to obtain care. Further, as described in more detail below, supply costs were taken from one source and may not reflect average costs across vendors. Finally, costs were based on inputs required to provide specific components of care and they may be reflect more optimistic assumptions about service efficiency than is actually the case.

2. Family planning

The RHCT database was used for estimates of the costs of each contraceptive commodity and the medical supplies and labor needed to provide it, amounts that were summed to arrive at an annual cost per user of protection against unintended pregnancy (Table 12, page 55). We assumed that traditional methods (periodic abstinence, withdrawal and other nonsupply methods) have no costs associated with their use.

a. Contraceptive commodities

1) We took unit costs of contraceptive commodities directly from the RHCT. These costs were from the November 2006 UNFPA price list, inflated to 2008 based on the U.S. Social Security Administration annual cost of living adjustments.[60] Commodity costs were adjusted upward in the RHCT to account for sea freight shipping and condom sampling and testing to generate total unit costs per method. The same method-specific commodity costs were applied across all countries.

2) We multiplied unit costs by method-specific couple-year of protection estimates to calculate annual costs for each short-term method, using the same method-specific factors as in the RHCT.

3) For long-acting methods, in *AIU-2008*, we assumed IUD use averages three years and that male and female sterilization both provide 10 couple-years of protection.[61,62] We allocated one-third and one-tenth, respectively, of the total costs for these methods to each current and new user, assuming average annual costs of a steady number of continuing and new users over time. Since much of the cost for these methods occurs at initiation, these annual costs are conservative estimates of service costs in times when the number of new users is increasing. However, in our analysis, we are comparing current costs with the counterfactual cost of a scenario in which all women wanting to avoid pregnancy use modern methods, not the year-by-year costs of ramping up to full use, as estimated in the ICPD costing.

4) The ICPD estimates reflect annual costs to increase contraceptive use to meet all unmet need in developing countries gradually by 2015. For long-acting methods (sterilization, IUDs and implants), method costs include the full costs for method initiation (and removal of IUD and implant) in the year the method is initiated or replaced.

b. Supplies

1) Some methods require additional supplies for beginning and/or ending use. For example, injectables require a needle, gloves and antiseptic solution; sterilization procedures require gloves, antiseptic, anesthesia, needles, sutures and sterile dressing.

2) Each item of necessary supplies was detailed in the RHCT, including the proportion of method users needing each supply and the cost of each item. RHCT costs were taken from the UNICEF Supply Catalog or the Management Sciences for Health International Drug Price Indicator.

c. Labor

1) Personnel time for the provision of each method of contraception was estimated in RHCT as the average number of minutes by type of staff. The same method-specific time allocations by type of staff were applied to each developing country.

2) Time allocations for each method included counseling on family planning and prevention of HIV and other STIs, as well as screening and counseling on gender-based violence, for users of nonpermanent methods and for both female and male partners in cases of sterilization. Other costs differed by method, including physical exams for users of oral contraceptives, injectables and IUDs; resupply visits for users of oral contraceptives and condoms; and injection visits for injectable users. For implant and IUD users, staff time estimates included initial insertion, a follow-up visit and a removal visit. For sterilization procedures, in addition to counseling, time was allocated for surgery and additional counseling by the surgeon, assistance during the procedure and follow-up.

3) RHCT estimates assumed that community health workers provide half of oral contraceptive and female condom services and 75% of male condom services. Nurses/midwives were assumed to provide half of oral contraceptive and female condom care; 25% of male condom–related care; all care needed for injectable, IUD and implant services; and all but the surgery and surgeon's counseling for sterilizations. It was assumed that obstetricians perform female sterilizations and general physicians perform male sterilizations.

4) Labor costs were estimated in the RHCT from the WHO CHOICE database, assuming the equivalent of a 30-hour workweek for 40 weeks of the year (1,200 hours per year) would be spent delivering these services. Labor costs are specific to type of staff and country, so that the cost of delivering each method varies widely by country (Table 12). WHO did not provide salary estimates for community health workers, so their salaries were estimated as the average of the outreach nurse and attendant salaries.

a) Table 12 shows median staff costs by method type and according to geographic region and country income group. The highest median costs are in North Africa (excluding Sudan), Western Asia, and upper-middle– and high-income countries. The lowest median costs are in the rest of Asia. Differences between median staff costs in low- and lower-middle–income countries are small.

b) *AIU-2008* labor cost calculations used the RHCT-based 2008 country-specific estimates for all scenarios. UNFPA's revised ICPD estimates assumed that in all countries salaries will increase linearly to double their 2008 level by 2015 in order to improve staff motivation and retention.[24]

3. Differences between *AIU-2008* and UNFPA's revised ICPD family planning direct cost estimates

a. RHCT supplies for IUDs included the insertion and follow-up, but not removal supplies; *AIU-2008* costs were increased to also include IUD removal supplies. The impact of this adjustment on method and total costs was small. In the RHCT calculations, labor costs for male sterilization were calculated using general

physician and obstetrician salaries, rather than nurse/midwife and general physician costs. They were recomputed with the nurse/midwife and general physician staff salaries for the *AIU-2008* estimates, yielding lower staff costs for male sterilization than in the revised RHCT estimates.

b. In *AIU-2008*, RHCT costs for injectables were applied to implants as well, since relatively few women in developing countries use implants. Lacking specific information on the types of methods used by those reporting having used "other supply methods," we used male condom costs for this category, although it likely included a small number of female condom users. The revised ICPD estimates considered female condoms and implants as separate method categories, costing $132.05 for female condom commodities for one couple-year of protection and $28.97 for implant commodities and insertion supplies. Since these methods were not costed separately in *AIU-2008*, these costs are not included in Table 12.

c. The revised ICPD estimates, but not the *AIU-2008* estimates, also included commodity costs for 120 male condoms each year for half of oral contraceptive and injectable users to reflect the need for protection against STIs. They also included similar numbers of male condoms for IUD, implant and sterilization users in the year they initiated or renewed use of those methods. Including costs for these condoms in *AIU-2008* would have increased the costs of commodities and supplies under the 100% of needs met scenario from $1.6 billion to $2.7 billion and personnel costs from $0.8 billion to $1.3 billion.

d. UNFPA's revised ICPD estimates, but not *AIU-2008*, included costs to provide contraceptive services as part of humanitarian relief to people in refugee camps and spontaneous settlements. Humanitarian relief comprised 8% of total ICPD family planning direct costs in 2009, rising to 18% in 2015.[63] The ICPD costing uses 2008 as its base year, so 2009 already includes some assumed scaling up of coverage and corresponding costs.

4. Maternal and newborn health care

Table 13 shows average direct costs of maternal and newborn care per case currently receiving care, by type of care, region and country income group, according to current and full provision of care for complications among those who receive any care.

a. Data sources

Costs of maternal and newborn medical care were taken from the RHCT.

1) RHCT supply costs for maternal and newborn care were taken from the UNICEF Supply Catalog or the Management Sciences for Health International Drug Price Indicator. Costs for specific supplies were assumed to be constant across all countries.

2) For women needing hospitalization, only meals were included (at $.50 per day of hospitalization) in direct costs, since system-related hospitalization costs were reflected elsewhere.

3) Labor cost estimates were based on global estimates of the time, by category of provider, needed to provide routine care and care for complications. Labor costs were country-specific.

b. Care components

1) Costs were estimated for routine antenatal, facility delivery, newborn and postpartum care.

2) Costs were also estimated for the range of complications detailed above that women and newborns may experience, including complications from induced abortion.

3) While the unit costs for each item of care were the same across all scenarios, the average per-case costs of service provision shown in Table 13 (page 56) are different for the current scenario and the 100% of needs met scenario because of the differences in proportions of women needing care who are estimated to receive it.

4) The revised ICPD estimates, but not *AIU-2008*, included costs to provide maternal and newborn health services as part of humanitarian relief to people in refugee camps and spontaneous settlements, costs for screening and treatment for reproductive organ cancers, and costs for the repair of existing cases of obstetric fistula. Humanitarian relief costs made up 3% of maternal health direct costs in 2009, rising to 4% in 2015, and reproductive cancer care represented 16% and 48% of costs in 2009 and 2015, respectively.[63] Note that the ICPD costing used 2008 as the base year, so 2009 already includes some assumed scaling up of coverage and corresponding costs.

c. Antenatal care

1) Antenatal care includes care for pregnant women before termination of the pregnancy by birth, miscarriage or induced abortion.

2) Antenatal care supplies include, for all or some women, depending on the country, iron supplementation; hookworm treatment; tetanus vaccination; tests for blood sugar, Rh factor, anaemia, pregnancy and syphilis; urine tests; monitoring supplies and IV infusion for women with hypertension; oxytocin and related supplies to induce labor in women more than 37 weeks' gestation with hypertension; intermittent preventive malaria treatment and insecticide-treated nets; and drugs and supplies for treating women with malaria.

3) The average direct cost for a woman who receives antenatal care is $21.17 in the current scenario (Table 13). In the 100% needs met scenario, that cost is $21.34. Since we assumed that all women obtaining at least four antenatal visits would receive needed care for the complications listed above, these slight differences in average costs between the current and full needs met scenarios reflect variation across countries in levels of antenatal care, rather than actual differences in the cost components.

d. Labor and delivery

1) Components of care

a) Labor and delivery supplies included postpartum oxytocin and pain medication for all women, and supplies to provide episiotomy or manage vaginal tears and for cutting the umbilical cord for half of women.

b) Postpartum supplies included two months of iron supplementation.

c) Obstetric complication supplies included, depending on the complication, intravenous solutions, oxytocin, sedation and anesthesia, antibiotics, magnesium sulfate, drugs for pain management, transportation costs to the referral facility for the woman and accompanying medical staff, surgical supplies and blood transfusions.

2) Facility delivery costs include labor and delivery services, postpartum care for women and newborn care. The current average direct cost is $42.93 for care for a health facility birth, $28.52 for a birth with no cesarean section and $100.82 for a birth with cesarean section (Table 13). With full care for all

women giving birth, the average direct cost decreases to $39.02, reflecting a lower need for care for obstetric fistula and newborn sepsis, and increased proportions of births receiving care that occur in low- and lower-middle–income countries, where costs per case are lower, and in regions other than Latin America, where the proportion of births that occur by cesarean section, which is much more expensive per case than vaginal delivery, is higher than in other regions.

e. Newborn health care

1) Costs of newborn care are included with facility delivery costs in Table 13.

2) Newborn care includes routine provision of antibiotics to prevent ophthalmia; vaccination against tuberculosis, polio and hepatitis B; and breast-feeding counseling. When needed, supplies also include further hospitalization for newborns with complications; antibiotics against sepsis and infections such as skin, umbilical and eye infections, meningitis and congenital syphilis; medication for newborns with convulsions; intravenous glucose and convulsion medication for newborns with birth asphyxia and breathing difficulties; and intravenous glucose for those with low birth weight.

f. Induced abortion complications

1) We used RHCT estimates of direct costs for treating abortion complications: $24.63 per case for supplies, $3 per case for hospitalization and varying amounts for country-specific labor costs. Total costs averaged $34.87 for each woman receiving care.

2) These direct costs for postabortion care included supplies and personnel time to perform, for all or some women, manual vacuum aspiration, repair of lacerations and treatment of sepsis, as well as food during hospitalization.

B. Program- and systems-related costs

In addition to the direct costs of contraceptive commodities and supplies, other cost components are necessary for service delivery. These, often called indirect costs, are termed program- and system-related costs in the revised ICPD estimates.

1. Program- and systems-related cost components

Components a–h were adapted by UNFPA from WHO's estimation of the program and systems costs needed for scaling up interventions to attain universal coverage of maternal and newborn health services.[64,65] Components h–j were adjusted or added for the revised ICPD estimates.[24] Elements that were added to the WHO estimates include facility construction (and corresponding maintenance and operations), commodity supply system development and health management information systems. UNFPA notes that such elements can entail substantial health systems costs.

a. Program management—developing and assessing policy, regulations, and strategic and operational plans for programs

Staff supervision

b. Monitoring and evaluation—establishing or integrating services into monitoring and evaluation frameworks and designs, conducting community surveys (such as DHS) and conducting facility-based surveys

c. Human resources development—increasing training capacity and number of trained staff to scale up to target coverage levels, accounting for attrition; upgrading pre-service training; reviewing training materials; establishing refresher training courses; and establishing in-service training programs

d. **Transport and telecommunication**—acquiring, running and maintaining vehicles and telecommunications systems for transporting patients, supervising staff, and performing training and outreach services

e. **Health education**—mobilizing the community to raise awareness of family planning and maternal and newborn health–related issues using mass media (radio, TV) and printed material (posters, fliers)

f. **Advocacy**—developing advocacy strategy and materials, and implementing advocacy activities

g. **Infrastructure**—upgrading and maintaining existing facilities and building new ones

h. **Commodity supply systems**—establishing, upgrading and maintenance

i. **Health management information system improvements**.

2. **Estimation**

a. Since the WHO program and systems cost estimates included only 75 countries and were not as inclusive as UNFPA deemed appropriate for updating the ICPD family planning and maternal health costs, UNFPA adapted the WHO estimation methodology to calculate new regional program and system costs.[24] Variable timing schedules for program and system investments were developed based on per capita gross domestic product, with the assumption that the poorest countries would require more time to ramp up these resources. Country estimates were aggregated into regional estimates of the percentage of total costs associated with programs and systems.

b. The percentages of total sexual/reproductive health/family planning costs that were program and systems costs used in UNFPA's revised ICPD cost calculations are shown in Table 14 and in Figure 3 (pages 57 and 41), by region and year. Current (2008) spending on program- and systems-related costs was estimated at 35% of total sexual/reproductive health/family planning costs in Sub-Saharan Africa and 49–57% of total costs in the other developing regions. This reflects the fact that, in general, health infrastructure is less developed in Sub-Saharan Africa than in other parts of the developing world.

c. It was estimated that by 2015, program-and systems-related costs will fall to about one-quarter of total costs, except in Sub-Saharan Africa, where they will be at 50% of total costs. The shapes of the curves over time reflect timing of capital expenditures and associated recurrent costs following construction. However, projections of future program and systems costs are predicated on prior years' investments at the full needed levels, since much of the needed investment, especially in Sub-Saharan Africa, is needed for constructing, as opposed to maintaining, health infrastructure. As Figure 3 shows, these estimates adapted from WHO data with the adjustments described above assume that health infrastructure expenditure needs related to sexual and reproductive health services will rise quickly and much more steeply in Sub-Saharan Africa than in other regions.

d. The UNFPA estimates did not distinguish between program and systems costs specific to family planning vs. maternal health. In order to estimate total costs of each of these areas of care, in *AIU-2008*, we estimated the ratio of program and systems costs to total direct costs for family planning and for maternal health from the UNFPA estimates. We applied the same ratio to the direct cost estimates for family planning and for maternal and newborn health to estimate the program and systems costs, and the total costs, for each area of care.

e. *AIU-2008* estimates of the total costs of care actually provided in 2008 used the UNFPA 2008 program- and systems-related percentages for each region. For the scenarios in which 100% of service needs are met, we used the 2009 percentages from the revised ICPD estimates. While the 2009 percentages are higher than later years, we used them as the best representation of the near-term health infrastructure investment needs, given our scenario based on all service needs being met in the near term. While we considered using cumulative or average program and systems costs for 2009–2015 by region, these include both ongoing costs, such as staff supervision and health education activities, and one-time costs, such as construction of facilities and establishing commodity supply systems. We decided to use 2009, the year of the highest proportional program and systems costs as best representing the near-term challenge of ramping up services to fully meet family planning and maternal and newborn health care needs.

C. Comparison of family planning costs with earlier estimates

We estimated the costs of family planning care in 2003 in a prior version of *Adding It Up (AIU-2003)*.[22] Data sources and methodology used in the *AIU-2008* estimates are different from those used to estimate costs in *AIU-2003*. As a result, differences between the two sets of cost estimates should not be interpreted as actual differences over time (Table 15, page 57). In addition, we did not estimate costs of maternal and newborn health care in *AIU-2003*.

1. The *AIU-2003* estimates were based on the best information then available, which were summary figures from available studies. These had the advantage of providing on-the-ground estimates of costs, but were limited to the studies that were available, which varied according to methodology, coverage of countries, programs, contraceptive methods and types of costs included. The *AIU-2003* estimates used the same method costs per case for all countries due to the small number of studies available. Costs were split into method commodities and related supplies, labor, overhead and hospitalization (for female sterilization).

2. The *AIU-2008* estimates described here are based on UNFPA sources and methodology, so as to be consistent in approach to the revised ICPD estimates. As described above, these are "built up" from the various inputs needed to supply each type of contraceptive service rather than looking from a total cost-per-client perspective. The estimated supplies and labor for providing services that were used for the *AIU-2008* estimates may be lower than is the case in actual programs. Further, the contraceptive commodity and supply costs use low-cost public-sector options where available, but try to account for some of the wastage, etc. by using couple years of protection to calculate amount of product per user. These figures were assumed to be the same for all countries. Labor costs vary by country, based on WHO estimates. Program and systems costs (overhead) vary by region. No hospitalization costs were included for contraceptive users.

3. The estimated total cost for fulfilling all need for modern methods using the *AIU-2008* methodology is only 61% of the 2003 estimate, even though, as shown above, the number of women in need rose from an estimated 705 million in *AIU-2003* to 818 million in *AIU-2008*. The average cost per user was twice as high in *AIU-2003* ($16) as estimated for *AIU-2008* ($8). The difference between the totals stems from lower estimates for direct costs in the 2008 estimates. The overall percentages of total costs due to overhead and program and systems costs were similar—63% in the 2003 estimates vs. 64% in the new estimates.

4. As shown in Table 16 (page 58), average total cost per modern method user (in the 100% of needs met scenarios) was 6% higher for Africa in the *AIU-2008* estimates than in the 2003 estimates, reflecting a 13% increase in average personnel costs

and a 9% increase in estimated overhead/program and systems costs per user. However, estimated average costs per user were 62% lower in Asia in *AIU-2008* than in *AIU-2003*, and 51% lower in Latin America and the Caribbean. While all components of these costs were much lower in the *AIU-2008* than the *AIU-2003* estimates, differences were especially large for personnel cost estimates in Asia and in the overhead costs in both regions.

5. Further work is needed to determine the most realistic methodology and data sources for estimating service costs, as well as to elucidate the sources of differences between them in terms of assumptions and outcomes.

VII. *AIU-2008* ESTIMATES OF PREGNANCY-RELATED MORTALITY AND MORBIDITY

A. Maternal mortality

After publication of *Adding It Up*, two lower estimates of maternal mortality in 2008 were released. We used these to recalculate our estimates and published summaries incorporating the changes. Here, we first describe the original estimates, then those based on the more recent data.

1. Original estimates

a. Total number of maternal deaths

1) For each country, the ratio of maternal deaths per 100,000 live births was taken from WHO estimates for 2005.[66] For the few countries with no WHO estimate, the ratio for a similar country nearby was used.

2) The total number of maternal deaths in each country in 2008 was estimated as the product of the country's 2005 maternal mortality ratio and the total number of planned and unplanned births in 2008.

3) No adjustments for trends over time were made to the maternal mortality ratios.

b. Deaths from pregnancies ending in induced abortion

1) Mortality from safe and unsafe abortions

a) We assumed that the mortality rate was 2 deaths per 100,000 safe abortions. This is at least double the reported rates for women having safe abortions in developed countries,[57] and draws on the assumption that differences in health status and health care access would contribute to higher mortality in developing countries. We assumed this rate for all safe abortions.

b) We used 2003 subregional rates for unsafe abortion (deaths per 100,000 unsafe abortions), calculated from WHO estimates (the most recent available).[67] We assumed the subregional rates for unsafe abortions applied to all countries in each subregion.

c) An estimated 71,200 women died in 2008 from complications of induced abortion. Of these women, 300 had had abortions under safe conditions, and 70,900 did so under unsafe conditions. This number is slightly higher than the 66,400 deaths from unsafe abortion estimated by WHO for 2003 because there was a higher number of live births in 2008 than in 2003.[67]

2) Abortion mortality rate

An overall abortion mortality rate for 2008 was calculated as the total number of women dying from abortion in a country per 100,000 total

induced abortions in that country. The overall abortion mortality rate was estimated, for each subregion, by the following formula:

Total abortion deaths/100,000 induced abortions =

[(Number of safe abortions * 2/100,000) +

(Number of unsafe abortions * Subregional rate of mortality from unsafe abortions)] /

Total number of abortions.

c. Deaths from pregnancies ending in birth or miscarriage

1) Nonabortion maternal deaths in each country were estimated as the difference between total maternal deaths and those resulting from induced abortion.

2) Since the WHO estimates of maternal deaths include all pregnancy-related deaths, our calculations of nonabortion-related maternal deaths include those to women whose pregnancies ended in live births, stillbirths and miscarriages.

3) The nonabortion mortality ratio for 2008 was estimated as the number of nonabortion maternal deaths per 100,000 live births.

d. Maternal deaths under alternative contraceptive scenarios

1) The estimated numbers of nonabortion-related deaths per 100,000 births were multiplied by the number of births in each country under the various study scenarios to yield the numbers of nonabortion maternal deaths.

2) The estimated country rates of abortion-related deaths per 100,000 induced abortions were similarly applied to the number of abortions in each country under the various study scenarios.

3) The numbers of nonabortion-related and abortion-related maternal deaths were summed to yield total maternal deaths under each scenario.

2. New maternal mortality estimates

a. Institute for Health Metrics and Evaluation estimates

1) An April 2010 article by Hogan et al., from the Institute for Health Metrics and Evaluation (IHME), that was published in the *Lancet* estimated that there were 340,000 maternal deaths in developing countries in 2008, rather than 550,000 estimated in *AIU-2008* based on the 2005 WHO data.[68]

2) We recalculated *AIU-2008* estimates of maternal mortality using the mean numbers of maternal deaths from Hogan et al.[69]

a) We estimated deaths in small countries not included in the Hogan et al. data based on their estimate of maternal deaths in a nearby country and the proportional difference between that number and the number we had estimated based on the 2005 WHO number of deaths.

b) We assumed that the mortality rate from unsafe abortions in 2008 equaled the rate we originally estimated times the country-specific ratio of the number of maternal deaths in 2008 using Hogan et al.'s data to the number we had originally estimated from the 2005 WHO data. We assumed no change in the mortality rate for safe abortions. The resulting total number of abortion deaths in 2008 was 50,000.

c) We estimated the nonabortion-related maternal mortality ratio (nonabortion-related maternal deaths per 100,000 live births) as the difference between total maternal deaths and deaths related to abortion divided by total births, i.e. 290,000 deaths.

3) Using the 2008 country-specific maternal mortality estimates by Hogan et al. reduced the number of maternal deaths that would be averted compared with the original *AIU-2008* calculations.[70] The proportional impacts of improved care on maternal deaths would not change significantly because the proportional decreases primarily reflect the distributions of pregnant women needing and receiving care for sepsis, hemorrhage and other complications, and the estimated difference in mortality from these complications between women who receive needed care and those who do not. These data are from other sources, independent of the maternal mortality estimates.

b. WHO estimates

1) In September 2010, WHO released new maternal mortality estimates for 2008 and revised estimates for years 1990–2005.[71] The total number of maternal deaths in 2008 in countries classified in *AIU-2008* as developing was 356,100.[71,72]

2) We recalculated *AIU-2008* estimates of maternal mortality using the maternal deaths based on these estimates. The estimation methodology was the same as for the original calculations, except that we substituted the newer mortality estimates.

- **a)** For small countries not included in WHO estimates, we multiplied the maternal mortality ratio of a nearby country times the number of births in the small country. This added an estimated 300 maternal deaths, for a total in our calculations of 356,400.
- **b)** We assumed that the mortality rate from unsafe abortions in 2008 equaled the rate we had originally taken from the 2003 estimate by WHO,[67] times the country-specific ratio of the number of maternal deaths in 2008 from the number we had originally estimated from the 2005 WHO data. Country-specific mortality rates from unsafe abortion were all assumed to be the same as those estimated for their subregion.
- **c)** We assumed no change in the mortality rate for safe abortions. The resulting total number of abortion deaths in 2008 was 46,500 (46,200 deaths from unsafe abortion and 300 from safe procedures), compared with the original *AIU-2008* estimate of 71,000.
- **d)** WHO has more recently released estimates of unsafe abortion in 2008.[73] The total number of unsafe abortions in developing regions in 2008 estimated by WHO (21.2 million, with a range of 20.4 million to 22.0 million) is somewhat higher than the 20.4 million total used in the *AIU-2008* estimates. However, the total number of deaths from unsafe abortion is similar—47,000 in the new WHO estimate, compared with the estimate of 46,200 used in our revised calculations.
- **e)** We estimated the number of nonabortion-related maternal deaths as the difference between total maternal deaths and deaths related to abortion—310,000.

3) Using the WHO 2008 country-specific maternal mortality estimates reduced *the number* of maternal deaths that would be averted by the recommendations in *AIU-2008*.[2] The proportional impacts of improved care on maternal deaths would not change significantly because the proportional decreases primarily reflect the distributions of pregnant women needing and receiving care for sepsis, hemorrhage and other complications, and the estimated difference in mortality from these complications between women who receive needed care and those who do not. These data are from other sources, independent of the maternal mortality estimates.

B. Children who lose their mothers from pregnancy-related mortality

1. Average number of children per woman

From DHS country surveys, we tabulated the average number of children in the following subgroups of women of reproductive age separately according to marital status (currently married, formerly married and never married): all women, women not at risk of unintended pregnancy, women spacing births and using a modern contraceptive, women spacing births and using a traditional method, women spacing births and at risk but not using any contraceptive, women limiting births and using a modern contraceptive, women limiting births and using a traditional method, and women limiting births and at risk but not using any contraceptive.[74]

2. Number of children losing their mothers

a. These average numbers of children were multiplied by the numbers of women estimated to die from pregnancy-related causes under the various project scenarios, according to country, marital status, childbearing intentions and method used.

b. Estimates of children who lose their mothers through maternal mortality do not include newborns. As a result, they underestimate the number of children who lose their mothers because of maternal mortality.

3. Estimates based on revised maternal mortality data

We recalculated the numbers of children losing their mothers using the new WHO maternal mortality estimates.[2] The estimated number under the current scenario fell from 740,000 annually to 460,000.

C. Neonatal (newborn) mortality

After publication of *Adding It Up*, newer, lower estimates of neonatal mortality in 2008 were released. We used these to recalculate our estimates and published summaries incorporating the changes. Here, we first describe the original estimates, then those based on the more recent data.

1. Definitions

a. Neonatal or newborn deaths are those that occur within the first 28 days of life.

b. Infant deaths are those within the first year of life, including deaths during the neonatal period.

2. Original estimates

a. Neonatal mortality rates for 2004, by country, were taken from the WHO.[75,76]

b. For use in estimating 2008 neonatal mortality, infant mortality rates for 2004 and 2007, by country, were taken from an online database that contains estimates for infant mortality and under-five mortality generated by the Inter-agency Group for Child Mortality Estimation from UNICEF, WHO, the World Bank and United Nations Population Division.[77]

c. Neonatal mortality rates for 2007 were estimated as the ratio of neonatal to infant mortality rates in 2004 times the infant mortality rate in 2007. These neonatal mortality rates were assumed to also apply for 2008. These were multiplied by the number of births under each scenario, country and subgroup to estimate the numbers of neonatal deaths in 2008.

d. Lacking specific information, we applied the overall mortality rates without any adjustment for difference likely to exist according to characteristics of mother or newborn, including parity or birth interval, or adjustments for potential improvements in newborn health resulting from improved maternal health care.

3. Revised neonatal mortality estimates

We took the number of neonatal deaths in each country in 2008 from the Institute for IHME online dataset.[78,79] We estimated the neonatal mortality rate for each

country as the number of deaths per 1,000 live births, based on 2008 births from UN *Population Prospects,* 2008 revision.[30] For small countries not included in the IHME estimates, we used the neonatal mortality rate for the subregion or a similar nearby country.

D. Maternal DALYs

Disability-adjusted life-years (DALYs) estimate how many healthy years of life are lost to death and disability. We have not attempted to revise maternal DALY estimates for the recent revisions in maternal mortality. New DALY estimates are due to be released in early 2012.[80]

1. Total DALYs lost to maternal mortality and morbidity

a. We took the total DALYS related to maternal mortality and morbidity, by country, in 2004 from WHO.[81] These are the most recent country-level estimates.

b. We used the standard DALY estimates, with 3% time discounting and nonuniform age weights, consistent with earlier burden of disease estimates released by WHO.

c. To calculate the ratio of total DALYs lost to maternal mortality and morbidity per 1,000 births, we used the 2004 DALYs and births in 2004 for each country from UN World Population Prospects, 2002 revision.[82]

2. Nonabortion maternal DALYs

a. We assumed that the 2004 MDG-regional proportion of DALYs due to nonabortion vs. abortion causes applied to all countries in each region, including using data specific to Arab countries.[83]

b. The ratio of nonabortion-related maternal DALYs per 1,000 births was calculated as the ratio of total maternal DALYs per 1,000 births in each country times the MDG-regional proportion of maternal DALYs that were from nonabortion causes.

3. Abortion-related DALYs

a. The ratio of abortion-related DALYs per 1,000 induced abortions for each country was calculated from MDG-regional estimates for 2004, based on the number of abortion-related DALYs per region in 2004[83] and the estimated number of induced abortions in each region in 2004.

b. The number of abortions in 2004 was estimated by interpolation between the estimated number for 2003[84] and *AIU-2008*'s estimated number for 2008.

c. We assumed that the ratio of abortion-related DALYs per 1,000 abortions was the same for all countries in each MDG region.

E. Neonatal DALYs

We have not attempted to revise neonatal DALY estimates for the recent revisions in neonatal mortality. New DALY estimates are due to be released in early 2012.[80]

1. Neonatal DALYs definition

Neonatal DALYs are assumed in this project to be equivalent to the perinatal DALYs estimated by WHO. Perinatal DALYs are those due to "causes arising in the perinatal period" as defined in the International Classification of Diseases, principally low birth weight, prematurity, birth asphyxia and birth trauma; they do not include all disability or deaths occurring in the neonatal period (within 28 days after birth). For example, congenital anomalies and injuries may also occur in the neonatal period but are classified according to other cause categories.[81]

2. Ratios of neonatal DALYs per 1,000 births

a. Numbers of neonatal DALYs were taken from 2004 WHO country estimates.[83]

b. We calculated ratios of DALYs per 1,000 births, using the numbers of neonatal DALYs and 2004 births in each country. These ratios were assumed to apply to births in 2008.

F. Impact of maternal and newborn interventions

1. Estimation approach

a. To estimate the potential impact of improving maternal and newborn health care on mortality and DALYs, we first estimated the mortality and DALY ratios specific to maternal and neonatal causes of mortality or morbidity.

b. We obtained estimates of the effectiveness of receiving care, expressed as the proportional reduction in mortality or morbidity from a specific condition, on the likelihood of mortality and morbidity from each of the cause categories.

c. We used estimates described above of the numbers of women and newborns needing and receiving care for each cause or condition.

d. As described below, we estimated cause-specific deaths and DALYs for women and newborns for each country.

e. We used the following equation to calculate mortality and DALY ratios for women and newborns needing care for each cause and for those who do and do not receive needed care, using as the example maternal DALYs from hemorrhage:

DALYs from hemorrhage/Births with hemorrhage =
[(DALYs from hemorrhage/Births with hemorrhage care) *
(Births with hemorrhage care/Births with hemorrhage)]
+
[(DALYs from hemorrhage/Births not receiving needed hemorrhage care) *
(Births not receiving needed hemorrhage care/Births with hemorrhage)],

where

(DALYs from hemorrhage/Births with hemorrhage care) =
(DALYs from hemorrhage/Births not receiving needed hemorrhage care) *
(1 - effectiveness of hemorrhage care).

Therefore, if X equals the ratio of DALYs from hemorrhage to births not receiving needed hemorrhage care,

DALYs from hemorrhage/Births with hemorrhage =
[(X * (1 - effectiveness of hemorrhage care) *
(Births with hemorrhage care/Births with hemorrhage)]
+
[X *(Births not receiving needed hemorrhage care/Births with hemorrhage)],

For example, in a country in Sub-Saharan Africa, we estimated from the sources and methodology described above that in 2008 there were a total of 1,201,000 maternal DALYs (excluding those related to abortion) and 3,110,000 births. (For simplicity, this example uses rounded numbers; calculations were based on unrounded numbers.) As outlined below, we estimated that 17% of maternal DALYs in the Sub-Saharan region with known causes other than abortion were due to hemorrhage, for 204,000 DALYs in the country in 2008 from hemorrhage. From work described above, we had estimated that 5% of women giving birth in the country (156,000 women) needed care for hemorrhage. Thus, DALYs from

hemorrhage divided by births to women needing care for hemorrhage equaled 204,000/156,000, or 1.31.

We had previously estimated that only 3% of women giving birth who need hemorrhage management currently receive care and that 97% do not. (We were unable to adjust for differences according to the adequacy of care that was received.)

As discussed below, we assumed that the ratio of DALYs per birth among women needing care for hemorrhage who received care was an 85% reduction from the level among women needing care who did not receive care.

The estimation formula then becomes

1.31 = (X * (1-.85) * .03) + (X * .97)

X = 1.31/[(1-.85)*.03 + .97] = 1.31/.9745 = 1.34

The ratio of DALYs per birth for women needing hemorrhage care but not receiving it is 1.34. For those who do receive needed care, the ratio is 1.34 * (1-.85) = 0.20.

2. Cause-specific maternal and newborn deaths and DALYs

a. Maternal deaths by cause

1) Since country estimates of maternal deaths by cause were not available from WHO, we assumed the 2004 estimated distribution of maternal deaths by cause, according to MDG region (the most recent year for which these data were available), also applied to maternal deaths in 2008.[85]

2) Causes are grouped into the following categories: maternal hemorrhage, maternal sepsis, hypertensive disorders, obstructed labor, abortion and other maternal causes.

3) We assumed that the regional percentage distributions of deaths by cause also applied to countries in the region.

b. Maternal DALYs by cause

1) We took the distribution of maternal DALYs according to cause of death from the 2004 MDG-regional WHO estimates.[83]

2) Maternal causes are distributed into five categories: maternal hemorrhage, maternal sepsis, hypertensive disorders, obstructed labor, abortion and other causes.

c. Neonatal mortality by cause

1) Neonatal deaths, by cause, by country were taken from WHO country estimates for 2004.[81]

2) This source groups causes into the following categories: prematurity and low birth weight; birth asphyxia and birth trauma; and neonatal infections and other conditions, which includes severe neonatal infections and other noninfectious causes arising in the perinatal period (such as deaths resulting from maternal hypertension and surgery, umbilical and other neonatal haemorrhage, haemolytic disease, neonatal jaundice and hypothermia).[46]

3) The estimated number of neonatal deaths in 2008 in each country were distributed according to the regional distribution by cause of death in 2004 to estimate cause-specific neonatal deaths in 2008.

d. Neonatal DALYs by cause

1) The distribution of neonatal DALYs were taken from 2004 MDG-regional estimates.[83]

2) Causes of neonatal DALYs are grouped into the same four categories as are neonatal deaths.

3. Effectiveness of care

a. The impacts of obtaining care if a woman or newborn experienced a specific complication were based on expert estimates summarizing current literature in the field.[86] The impact estimates are shown in Table 17 (page 59).

b. Three estimates of the effectiveness of interventions are presented—low, high and best. We used the "best estimate" available for hemorrhage, sepsis, hypertensive disorders of pregnancy (including eclampsia), obstructed labor and unsafe abortion. For low birth weight, effectiveness estimates are also presented for contexts with and without nutritional supplements. We used the best estimate of impact in context without nutritional supplements for the *AIU-2008* current scenario calculations and impact in context with nutritional supplements for the 100% need met scenario. Effectiveness estimates for treatment of birth asphyxia, including birth trauma, are presented with and without an enhanced delivery care package. We used these best estimates of the impact of care for newborns with asphyxia and breathing difficulties, applying the impact estimate in context without enhanced delivery care package for the *AIU-2008* current scenario calculations and impact in context with enhanced delivery care package for the 100% needs met scenario calculations. For sepsis/infection, we averaged the best estimates available for infections (including tetanus) and newborn sepsis. Lacking other information, we assumed that care for other conditions reduced maternal mortality and DALYs by 50%, but did not change newborn mortality or DALYs from other conditions.

Summary comparison of *AIU-2008* and revised ICPD estimates

Because of the central roles of the *Adding It Up* and UNFPA's revised ICPD estimates in the field. And because of overlaps in some of the data and methods used for these calculations, this section outlines key similarities and differences between the two sets of estimates.

A. Content

1. Breadth of focus

a. Both projects cover family planning and maternal and newborn health care.

b. The revised ICPD estimates, but not *AIU-2008,* include the costs incurred over time to scale up the health systems to the desired coverage.

c. The revised ICPD estimates**,** but not *AIU-2008*, include HIV/AIDS services, including sexually transmitted infection diagnosis and treatment, and the ICPD category of basic research/data/policy analysis.

2. Costs of care

a. Costs of family planning and maternal and newborn health care are estimated in both projects.

b. ICPD estimates calculate program and systems costs for sexual and reproductive health and family planning as a whole. *AIU-2008* calculates the program and systems costs of family planning and maternal and newborn care separately.

c. The revised ICPD estimates for sexual and reproductive health and family planning include costs of care that are not included in *AIU-2008*, including

1) condoms for disease prevention for some users of oral contraception, injectable users, IUD and implant users during their first y*ear* of use or after replacement, and female and male sterilization users for the first year after initiating that method;

2) family planning services in humanitarian emergencies;

3) maternal and newborn health care in humanitarian emergencies;

4) screening and treatment for reproductive organ cancers, as part of maternal health care; and

5) repair of cases of obstetric fistula from pregnancies prior to 2008, as part of maternal health care.

3. Benefits of care

a. *AIU-2008,* but not the revised ICPD estimates, estimate maternal and newborn health care costs, mortality and morbidity (DALYs) at current and increased levels of need met for family planning and maternal and newborn health care.

b. *AIU-2008* includes estimates of the numbers of children whose mothers die from pregnancy- and delivery-related causes.

4. Pregnancies by intention status and outcomes

a. AIU-2008 estimates need, costs and impacts by pregnancy intention status and outcome (birth, miscarriage or induced abortion).

b. The revised ICPD estimates of need for maternal and newborn care do not separate intended and unintended pregnancies.

5. Countries included

a. *AIU-2008* estimates include all developing countries, i.e. all countries except Japan, Australia and New Zealand, and those in Europe and North America.

b. The revised ICPD estimates include almost all of the countries included in *AIU-2008*, as well as the following transition countries in Europe that are not included in *AIU-2008*: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Malta, Poland, Republic of Moldova, Romania, Russian Federation, Slovenia, Slovakia, Serbia and Montenegro, and Ukraine.

B. Time frame and scenarios

1. 2008 dollars

a. Both projects express findings in 2008 dollars.

b. Both projects use 2008 estimates for direct costs of commodities and supplies, hospital meals and labor.

2. *AIU-2008* estimates fully meeting need in 2008

a. Estimates compare current (2008) needs, services, costs and benefits with the following counterfactual scenarios in which differing levels of need for would be met: no modern family planning and no maternal and newborn health care services; current levels of contraceptive use and maternal and newborn health care; and 100% of needs met for modern family planning, for maternal and newborn health care, and for both.

b. Estimates for current and no-service scenarios used 2008 program and systems costs; the scenarios of 100% of needs met used 2009 program and systems costs. The 100% needs-met scenarios are based on the 2008 population, with no adjustments for population change.

c. Unmet need for family planning is defined as unmet need for modern contraceptives, with both traditional method users and nonusers who want to avoid pregnancy considered to have unmet need.

d. Family planning service costs are annualized. Costs for short-term methods are estimated based on commodities and supplies for one couple-year of protection. Total costs for longer-term methods are divided by the average length of use.

3. Revised ICPD estimates fully meeting need by 2015

a. The revised ICPD estimates project costs of increasing contraceptive use and maternal and newborn health services on a yearly basis over the period 2009–2015, starting from a 2008 base.

b. Estimates are based on fulfilling unmet need among women using no method. Traditional method users are considered contraceptive users, and some women using no method are assumed to adopt traditional methods.

c. Projections to 2015 account for increases in population, as projected by the UN.

d. Costs for all years are in 2008 dollars, with no allowance for inflation.

e. Personnel salaries are assumed to double between 2008 and 2015.

f. Program and systems costs change each year.

g. Family planning service costs for short-term methods are annualized. Costs for the IUD and implant are counted only in the year they are inserted or replaced. Estimates of annual use take into account increasing proportions of women using contraceptives and adjust for population changes (mortality, immigration and population growth).

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Table 17. Estimated reduction in mortality and DALY ratios from receiving care, according to type of maternal and newborn complication

FIGURE 1. ***Adding It Up: The Costs and Benefits of Investing in Family Planning and Maternal and Newborn Health*—project framework**

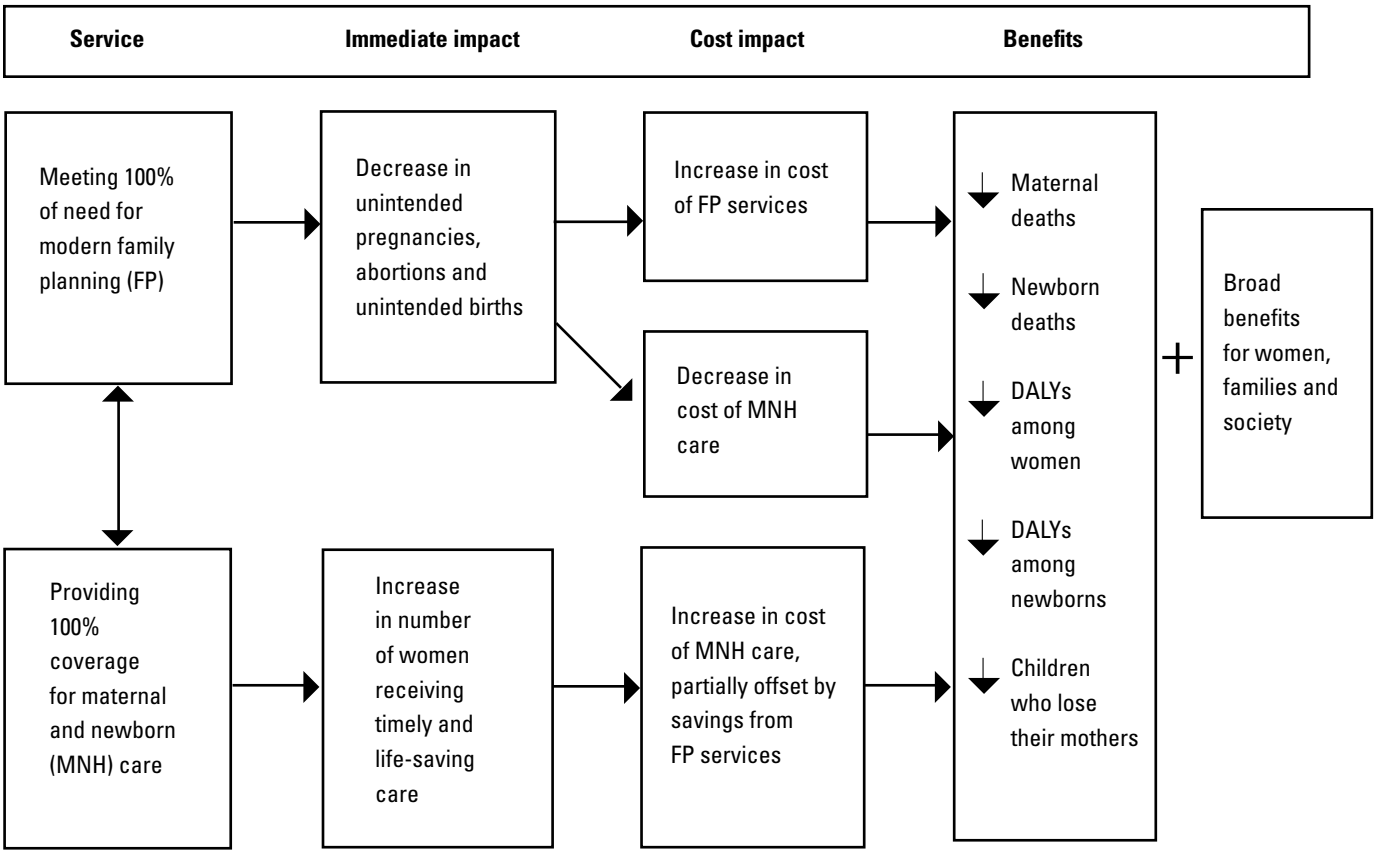
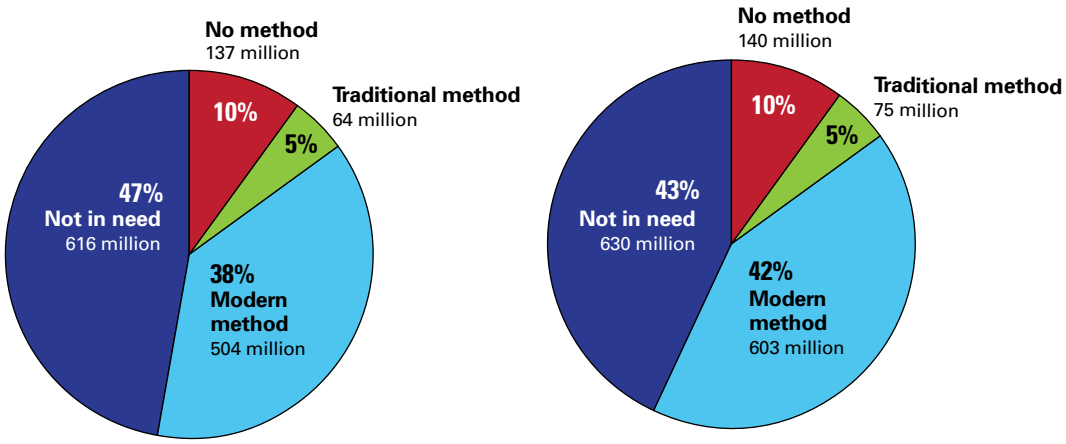


FIGURE 2. The increase in modern method users in 2003–2008 reflects rising population, more women wanting to avoid pregnancy and more of them using modern methods



Women 15–49, 2003 (1,321 million)

Women 15–49, 2008 (1,448 million)

FIGURE 3. Program- and systems-related costs as a percentage of total sexual and reproductive health and family planning costs, 2008–2015.

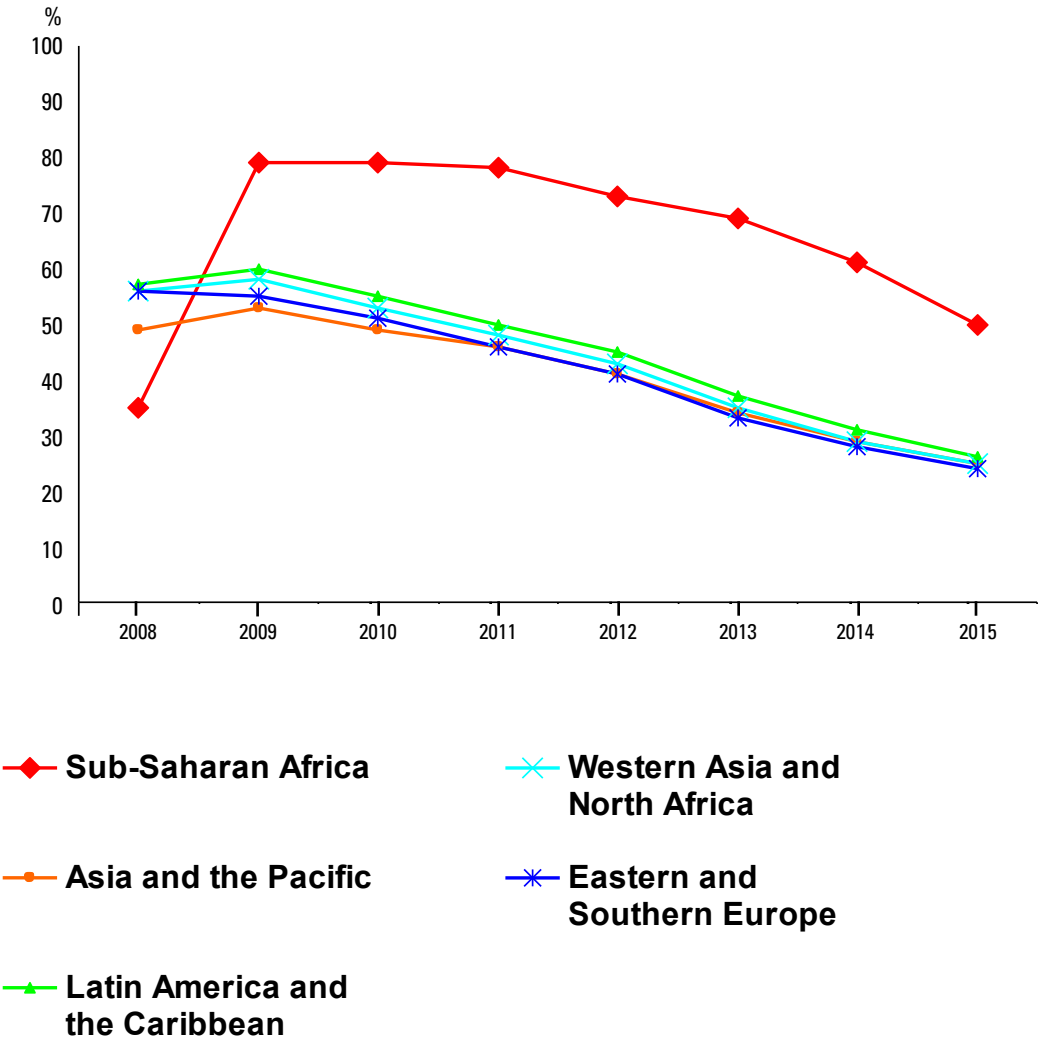


TABLE 1. Data sources for country distributions of women by risk for unintended pregnancy, future childbearing intention and contraceptive use

Region, subregion and country	Available data			Region, subregion and country	Available data	
	Data source	Data year			Data source	Data year
AFRICA				**ASIA**		
Sub-Saharan Africa				**Eastern Asia**		
Eastern Africa				China	Publication	2006
Burundi				China, Hong Kong		
Comoros	DHS tabs	1996		China, Macao		
Djibouti #				North Korea		
Eritrea	DHS report	2002		Mongolia		
Ethiopia	DHS tabs	2005		South Korea		
Kenya	DHS tabs	2003		**South Central Asia**		
Madagascar	DHS tabs	2004		Afghanistan		
Malawi	DHS tabs	2004		Bangladesh	DHS tabs	2004
Mauritius				Bhutan		
Mozambique	DHS tabs	2003		India	DHS tabs	2006
Réunion (a)				Iran		
Rwanda	DHS tabs	2005		Kazakhstan	DHS tabs	1999
Somalia #				Kyrgyzstan	DHS tabs	1997
Uganda	DHS tabs	2006		Maldives		
Tanzania	DHS tabs	2004		Nepal	DHS tabs	2006
Zambia	DHS tabs	2002		Pakistan	DHS tabs	2007
Zimbabwe	DHS tabs	2006		Sri Lanka		
Middle Africa				Tajikistan		
Angola				Turkmenistan	DHS report	2000
Cameroon	DHS tabs	2004		Uzbekistan	DHS tabs	1996
Central African Republic	DHS tabs	1995		**Southeast Asia**		
Chad	DHS tabs	2004		Brunei Darussalam		
Congo	DHS tabs	2005		Cambodia	DHS tabs	2005
Dem.Republic of the Congo	DHS tabs	2007		Timor-Leste		
Equatorial Guinea				Indonesia	DHS tabs	2003
Gabon	DHS tabs	2000		Laos		
Sao Tome and Principe				Malaysia		
Southern Africa				Myanmar		
Botswana				Philippines	DHS tabs	2003
Lesotho	DHS tabs	2004		Singapore		
Namibia	DHS tabs	2007		Thailand		
South Africa	DHS tabs	1998		Viet Nam	DHS tabs	2002
Swaziland+small states	DHS tabs	2006		**Western Asia**		
Western Africa				Armenia	DHS tabs	2005
Benin	DHS tabs	2006		Azerbaijan	DHS tabs	2006
Burkina Faso	DHS tabs	2003		Bahrain #		
Cape Verde (b)	DHS tabs	2005		Cyprus		
Côte d'Ivoire	DHS tabs	1999		Georgia	CDC report	2005
Gambia				Iraq #		
Ghana	DHS tabs	2003		Israel		
Guinea	DHS tabs	2005		Jordan #	DHS tabs	2007
Guinea-Bissau				Kuwait #		

continued

TABLE 1. (cont.) Data sources for country distributions of women by risk for unintended pregnancy, future childbearing intention and contraceptive use

	Available data				Available data	
Region, subregion and country	Data source	Data year		Region, subregion and country	Data source	Data year
Liberia	DHS tabs	2007		Lebanon #		
Mali	DHS tabs	2006		Palestinian Territory #		
Mauritania	DHS tabs	2001		Oman #		
Niger	DHS tabs	2006		Qatar #		
Nigeria	DHS tabs	2003		Saudi Arabia #		
Senegal	DHS tabs	2005		Syria #		
Sierra Leone				Turkey	DHS tabs	2003
Togo	DHS tabs	1998		United Arab Emirates #		
Northern Africa				Yemen #	DHS report	1997
Algeria #						
Egypt #	DHS tabs	2005		**OCEANIA**		
Libya #				**Melanesia**		
Morocco #	DHS tabs	2004		Fiji		
Sudan #				New Caledonia		
Tunisia #				Papua New Guinea		
Western Sahara				Solomon Islands		
				Vanuatu		
LATIN AMERICA AND THE CARIBBEAN				**Micronesia**		
Caribbean				Guam		
Bahamas				Fed. States of Micronesia (e)		
Barbados				**Polynesia**		
Cuba				French Polynesia		
Dominican Republic	DHS tabs	2007		Samoa		
Guadeloupe				Tonga (f)		
Haiti	DHS tabs	2006				
Jamaica						
Martinique						
Netherlands Antilles						
Puerto Rico	Publication	1996				
Saint Lucia						
Saint Vincent and the Grenadines						
Trinidad and Tobago						
United States Virgin Islands (c)						
Central America						
Belize	Publication	1998				
Costa Rica						
El Salvador	CDC report	2003				
Guatemala	CDC report	2002				
Honduras	DHS tabs	2005				
Mexico						
Nicaragua	DHS tabs	2007				
Panama						

continued

TABLE 1. (cont.) Data sources for country distributions of women by risk for unintended pregnancy, future childbearing intention and contraceptive use

	Available data				Available data	
Region, subregion and country	Data source	Data year		Region, subregion and country	Data source	Data year
South America						
Argentina						
Bolivia	DHS tabs	2003				
Brazil	DHS tabs	1996				
Chile						
Colombia	DHS tabs	2005				
Ecuador	CDC report	2004				
French Guiana (d)						
Guyana						
Paraguay	Publication	1998				
Peru	DHS tabs	2004				
Suriname						
Uruguay						
Venezuela						

Notes: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan. # denotes Arab countries. (a) Grouped with Mayotte and Seychelles for many calculations. (b) For many of the calculations, grouped with Saint Helena. (c) For many of the calculations, grouped with Anguilla, Antigua and Barbuda, Aruba, British Virgin Islands, Cayman Islands, Dominica, Grenada, Montserrat, Saint Barthélemy, Saint Kitts and Nevis, Saint Martin (French part), and Turks and Caicos Islands. (d) For many of the calculations, grouped with Falkland Islands. (e) For many of the calculations, grouped with Kirbati, Marshall Islands, Nauru, Northern Mariana Islands and Palau. (f) For many of the calculations, grouped with American Samoa, Cook Islands, Niue, Pitcairn, Tokelau, Tuvalu, and Wallis and Futuna Islands.

Sources: **Country classifications**—United Nations Statistics Division, Composition of macro geographical (continential) regions, geographical subregions, and selected economic and other groupings, 2011, <http://unstats.un.org/unsd/methods/m49/m49regin.htm#developed>, accessed Nov. 7, 2009; and United Nations Population Fund (UNFPA), State of the World Population 2008, 2008, <http://www.unfpa.org/swp/2008/presskit/docs/en-swop08-report.pdf>, accessed Nov. 7, 2009. **China**—National Population and Family Planning Commission of China, *China Population and Family Planning Yearbook 2006,* Beijing: China Population and Family Planning Yearbook Publisher, 2006. **Ecuador**—Centro de Estudios de Poblacion y Desarrollo Social, *ENDEMAIN 2004: Encuesta Demografica y de Salue Materna e Infantil, Informe Final,* 2005, <http://www.cepar.org.ec/endemain_04/nuevo05/indice.htm>, accessed Feb. 23, 2009. **El Salvador and Guatemala**—Division of Reproductive Health, Centers for Disease Control and Prevention and United States Agency for International Development (USAID), *Reproductive, Maternal, and Child Health in Central America: Trends and Challenges Facing Women and Children El Salvador, Guatemala, Honduras and Nicaragua,* 2005, <http://www.cdc.gov/reproductivehealth/Surveys/CentralAmerica/CA%20report.pdf>, accessed Nov. 8, 2009. **Eritrea**—National Statistics and Evaluation Office (NSEO) and ORC Macro, *Eritrea Demographic and Health Survey 2002,* Calverton, MD, USA: NSEO and ORC Macro, 2003. **Georgia**—Sebanescu F et al., *Reproductive Health Survey Georgia 2005: Preliminary Report,* Atlanta, GA, USA: CDC, 2005. **Mexico**—Juarez F and Valencia JA, special tabulations of data from ENADID (Encuesta Nacional de la dinámica demográfica) 2006 survey. **Puerto Rico, Belize and Paraguay**—Zlidar VM et al., New survey findings: the reproductive revolution continues, *Population Reports,* Series M, No. 17, Baltimore: Johns Hopkins Bloomberg School of Public Health, 2003, <http://pdf.usaid.gov/pdf_docs/PNADD025.pdf>, accessed Nov. 8, 2009; and INFO Project, Additional survey data online, 2009, <http://info.k4health.org/pr/m17/additional.html>, accessed Nov. 8, 2009. **Turkmenistan**—Gurbansoltan Eje Clinical Research Center for Maternal and Child Health (GECRCMCH), Ministry of Health and Medical Industry and ORC Macro, *Turkmenistan Demographic and Health Survey 2000,* Calverton, MD, USA: GECRCMCH and ORC Macro, 2001; and CDC and ORC Macro, *Reproductive, Maternal and Child Health in Eastern Europe and Eurasia: A Comparative Report*, 2003, <http://www.measuredhs.com/pubs/pub_details.cfm?ID=410>, accessed Nov. 8, 2009. **Yemen**—Central Statistical Organization and Macro International, *Yemen Demographic and Maternal and Child Health Survey 1997,* 1998, <http://www.measuredhs.com/pubs/pub_details.cfm?ID=136&ctry_id=46&SrchTp=ctry&flag=sur&cn=Yemen>, accessed Nov. 8, 2009.

TABLE 2. Numbers of women aged 15–49 and percentage distribution, by region and subregion, according to country income category, 2008

Region	No. of women 15–49, 2008 (000s)	Percentage distribution by country income category			
		Total	Low	Lower-middle	Upper-middle, high and other
All developing countries	**1,447,580**	**1,447,580**	**330,390**	**925,120**	**192,060**
Africa	**240,230**	**17%**	**48%**	**7%**	**9%**
Sub-Saharan Africa	**194,940**	**13%**	**48%**	**2%**	**8%**
Eastern Africa	72,630	5%	22%	0%	0%
Middle Africa	28,090	2%	5%	1%	0%
Southern Africa	15,380	1%	0%	0%	7%
Western Africa	68,750	5%	21%	0%	0%
Northern Africa	55,370	4%	0%	6%	1%
Asia	**1,052,110**	**73%**	**51%**	**89%**	**32%**
East Asia, incl. China	388,060	27%	2%	40%	8%
South Central Asia	445,170	31%	34%	36%	2%
Southeast Asia	158,680	11%	13%	11%	4%
Oceania	2,420	0%	1%	0%	0%
Western Asia	57,770	4%	2%	2%	17%
Latin America and the Caribbean	**155,240**	**11%**	**1%**	**4%**	**59%**
Caribbean	10,970	1%	1%	0%	3%
Central America	40,480	3%	0%	1%	17%
South America	103,800	7%	0%	3%	40%
Total		100%	100%	100%	100%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa. *Sources:* **Women 15–49, 2008**—Department of Economic and Social Affairs, Population Division, United Nations (UN), *World Population Prospects: The 2008 Revision,* CD-ROM New York: UN, 2009. **Projected change in numbers of women 15–49, 2008–2015**—RH COSTING MODEL Version 3.0, UNFPA 2008, developed by Eva Weissman, Janneke Saltner and Howard Friedman.

TABLE 3. Number of women aged 15–49 and percentage distributions by marital status, according to region and subregion, 2008

Region	No. of women aged 15–49, 2008 (000s)	Percentage distribution by marital status			
		Total	Currently married	Formerly married	Never married
All developing countries	**1,447,580**	**100%**	**69%**	**7%**	**24%**
Africa	**240,230**	**100%**	**65%**	**9%**	**25%**
Sub-Saharan Africa	**194,940**	**100%**	**67%**	**9%**	**24%**
Eastern Africa	72,630	100%	64%	12%	24%
Middle Africa	28,090	100%	72%	8%	20%
Southern Africa	15,380	100%	42%	9%	49%
Western Africa	68,750	100%	76%	5%	20%
Northern Africa	55,370	100%	58%	13%	29%
Asia	**1,052,110**	**100%**	**71%**	**6%**	**22%**
East Asia, incl. China	388,060	100%	71%	9%	20%
South Central Asia	445,170	100%	76%	5%	20%
Southeast Asia	158,680	100%	63%	5%	32%
Oceania	2,420	100%	69%	4%	27%
Western Asia	57,770	100%	63%	6%	31%
Latin America and the Caribbean	**155,240**	**100%**	**61%**	**9%**	**30%**
Caribbean	10,970	100%	61%	16%	23%
Central America	40,480	100%	59%	8%	33%
South America	103,800	100%	62%	9%	29%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 4. Proportion of women aged 15–49 in countries with available data on contraceptive use and proportion with unmet need for modern contraceptives, by marital status, according to region and country income category, 2008

	Total	Currently married	Formerly married	Never married
Contraceptive use information available				
All developing countries	76%	88%	44%	48%
Region				
Africa	80%	86%	69%	68%
Sub-Saharan Africa	89%	90%	85%	87%
Asia	74%	89%	33%	38%
Asia excluding China	76%	84%	66%	54%
Latin America and the Caribbean	77%	81%	58%	75%
Country income category				
Low	80%	90%	80%	50%
Lower-middle	77%	92%	35%	46%
Upper-middle, high and other	59%	65%	36%	54%
Unmet need for modern contraceptives information available				
All developing countries	74%	78%	31%	50%
Region				
Africa	89%	89%	91%	84%
Sub-Saharan Africa	91%	91%	92%	91%
Asia	68%	74%	5%	6%
Asia excluding China	80%	81%	27%	38%
Latin America and the Caribbean	76%	78%	63%	73%
Country income category				
Low	89%	89%	87%	90%
Lower-middle	66%	73%	13%	21%
Upper-middle, high and other	65%	66%	39%	66%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 5. Number and percentage distribution of women aged 15–49 by need for contraception, use of modern methods and unmet need (using a traditional method or no method), by region, subregion and country income category, 2008

Region and country income category	Women aged 15–49 (000s)			Woment wanting to avoid pregnancy (000s)				Percentage distribution				
					Women with unmet need for modern contraceptives					Wanting to avoid pregnancy		
	Total	Not in need of contraception	Wanting to avoid pregnancy	Using modern methods	Total	Using traditional methods	Using no method	Total	Not in need of contraception	Total	Using modern methods	Unmet need
Region												
All developing countries	**1,447,580**	**630,040**	**817,540**	**603,090**	**214,450**	**74,600**	**139,850**	**100%**	**44%**	**56%**	**74%**	**26%**
Africa	**240,230**	**142,410**	**97,820**	**46,060**	**51,770**	**12,490**	**39,270**	**100%**	**59%**	**41%**	**47%**	**53%**
Sub-Saharan Africa	**194,940**	**117,360**	**77,580**	**30,610**	**46,970**	**11,100**	**35,880**	**100%**	**60%**	**40%**	**39%**	**61%**
Eastern Africa	72,630	42,690	29,940	11,560	18,380	3,210	15,170	100%	59%	41%	39%	61%
Middle Africa	28,090	17,400	10,690	2,130	8,560	3,580	4,980	100%	62%	38%	20%	80%
Southern Africa	15,380	5,900	9,490	7,380	2,110	130	1,980	100%	38%	62%	78%	22%
Western Africa	68,750	45,610	23,140	6,250	16,890	3,880	13,020	100%	66%	34%	27%	73%
Northern Africa	55,370	30,810	24,570	18,740	5,820	1,700	4,130	100%	56%	44%	76%	24%
Asia	**1,052,110**	**427,290**	**624,820**	**484,880**	**139,940**	**53,430**	**86,510**	**100%**	**41%**	**59%**	**78%**	**22%**
East Asia, incl. China	388,060	102,760	285,300	261,740	23,560	3,300	20,260	100%	26%	74%	92%	8%
South Central Asia	445,170	207,860	237,310	158,750	78,550	30,420	48,140	100%	47%	53%	67%	33%
Southeast Asia	158,680	85,890	72,790	50,590	22,200	10,090	12,110	86%	40%	46%	70%	30%
Oceania	2,420	1,250	1,180	760	420	170	250	100%	51%	49%	64%	36%
Western Asia	57,770	29,530	28,240	13,040	15,200	9,460	5,740	100%	51%	49%	46%	54%
Latin America and the Caribbean	**155,240**	**60,340**	**94,900**	**72,160**	**22,740**	**8,680**	**14,070**	**100%**	**39%**	**61%**	**76%**	**24%**
Caribbean	10,970	4,050	6,910	4,780	2,130	460	1,670	100%	37%	63%	69%	31%
Central America	40,480	18,980	21,500	16,590	4,900	1,370	3,530	100%	47%	53%	77%	23%
South America	103,800	37,310	66,490	50,780	15,710	6,850	8,860	100%	36%	64%	76%	24%
Country income category												
Low	330,390	189,080	141,310	64,820	76,490	22,470	54,020	100%	57%	43%	46%	54%
Lower-middle	925,120	364,410	560,710	450,620	110,090	40,140	69,950	100%	39%	61%	80%	20%
Upper-middle, high and other	192,060	76,550	115,520	87,650	27,860	11,980	15,880	100%	40%	60%	76%	24%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 6. Number and percentage distribution of women aged 15–49, by need for and use of modern contraception and with unmet need (using a traditional or no method), according to region and subregion, 2003, and percentage change 2003–2008

	2003							Percentage change 2003–2008						
	Women aged 15–49 (000s)			Using modern methods	Women with unmet need for modern contraceptives (000s)			Women aged (15–49 (000s)			Using modern methods	Women with unmet need for modern contraceptives		
Region and country income category	Total	Not in need of contraception	Wanting to avoid pregnancy		Total unmet need	Using traditional methods	Using no method	Total	Not in need of contraception	Wanting to avoid pregnancy		Total unmet need	Using traditional methods	Using no method
Region														
All developing countries	**1,321,070**	**616,260**	**704,810**	**503,870**	**200,940**	**63,660**	**137,280**	**10%**	**2%**	**16%**	**20%**	**7%**	**17%**	**2%**
Africa	**203,900**	**123,610**	**80,290**	**35,650**	**44,640**	**11,010**	**33,630**	**18%**	**15%**	**22%**	**29%**	**16%**	**13%**	**17%**
Sub-Saharan Africa	**163,780**	**101,280**	**62,500**	**23,410**	**39,080**	**9,970**	**29,110**	**19%**	**16%**	**24%**	**31%**	**20%**	**11%**	**23%**
Eastern Africa	62,770	39,010	23,760	8,090	15,670	2,820	12,850	16%	9%	26%	43%	17%	14%	18%
Middle Africa	22,670	15,110	7,560	1,410	6,150	2,800	3,350	24%	15%	41%	50%	39%	28%	49%
Southern Africa	14,010	5,520	8,480	6,630	1,850	170	1,680	10%	7%	12%	11%	14%	-21%	17%
Western Africa	56,160	37,410	18,750	4,700	14,040	3,930	10,110	22%	22%	23%	33%	20%	-2%	29%
Northern Africa	48,290	26,560	21,730	14,800	6,930	1,290	5,640	15%	16%	13%	27%	-16%	31%	-27%
Asia	**970,470**	**426,280**	**544,190**	**411,370**	**132,820**	**43,660**	**89,160**	**8%**	**0%**	**15%**	**18%**	**5%**	**22%**	**-3%**
East Asia, incl. China	379,900	130,800	249,090	229,920	19,180	2,780	16,390	2%	-21%	15%	14%	23%	18%	24%
South Central Asia	388,890	195,370	193,510	120,630	72,890	20,390	52,500	14%	6%	23%	32%	8%	49%	-8%
Southeast Asia	148,000	74,180	73,820	48,890	24,930	10,470	14,460	7%	16%	-1%	3%	-11%	-4%	-16%
Oceania	2,120	1,090	1,030	620	410	170	240	14%	15%	14%	21%	2%	1%	3%
Western Asia	51,580	24,840	26,730	11,310	15,420	9,860	5,560	12%	19%	6%	15%	-1%	-4%	3%
Latin America and the Caribbean	**146,700**	**66,370**	**80,330**	**56,850**	**23,480**	**8,990**	**14,490**	**6%**	**-9%**	**18%**	**27%**	**-3%**	**-3%**	**-3%**
Caribbean	10,220	4,700	5,520	3,920	1,600	380	1,220	7%	-14%	25%	22%	33%	20%	37%
Central America	38,250	21,650	16,600	10,660	5,940	1,240	4,700	6%	-12%	29%	56%	-17%	11%	-25%
South America	98,230	40,010	58,210	42,270	15,940	7,370	8,570	6%	-7%	14%	20%	-1%	-7%	3%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 7. Estimates of the number of women currently using modern contraceptives and the number who would move to modern methods under the scenario in which 100% of need for modern contraception is met, by method, according to region, subregion and country income category, 2008

Region and country income category	Women currently using modern contraceptives (000s)							Additional users under the 100% of needs met scenario (000s)						
	Total	Female sterilization	Vasectomy	IUD	Injectable*	Oral contracep-tives	Condoms and other supply methods	Total	Female sterilization	Vasectomy	IUD	Injectable*	Oral contracep-tives	Condoms and other supply methods
Region														
All developing countries	**603,090**	**231,020**	**22,440**	**180,480**	**46,490**	**65,150**	**57,530**	**214,450**	**49,290**	**2,410**	**42,670**	**29,910**	**43,610**	**46,560**
Africa	**46,060**	**3,400**	**140**	**10,150**	**13,450**	**12,820**	**6,090**	**51,770**	**2,650**	**50**	**4,200**	**16,200**	**13,400**	**15,270**
Sub-Saharan Africa	**30,610**	**2,870**	**140**	**2,480**	**11,730**	**7,870**	**5,520**	**46,970**	**2,500**	**50**	**2,050**	**15,750**	**11,580**	**15,050**
Eastern Africa	11,560	1,030	10	260	5,520	3,420	1,320	18,380	1,120	10	370	9,640	4,720	2,510
Middle Africa	2,130	170	-	50	170	270	1,470	8,560	500	-	150	660	1,140	6,110
Southern Africa	7,380	1,220	120	180	3,990	1,390	470	2,110	330	30	60	1,130	410	150
Western Africa	6,250	340	10	370	1,690	1,720	2,120	16,890	520	10	970	4,210	4,960	6,230
Northern Africa	18,740	650	-	9,300	2,080	6,010	710	5,820	180	-	2,650	550	2,170	270
Asia	**484,880**	**190,580**	**20,570**	**164,890**	**28,110**	**36,650**	**44,090**	**139,940**	**39,030**	**2,010**	**36,170**	**10,900**	**24,070**	**27,760**
East Asia, incl. China	261,740	83,700	17,050	133,590	2,950	3,950	20,490	23,560	4,910	920	13,830	450	660	2,790
South Central Asia	158,750	99,070	3,100	13,350	5,850	18,910	18,480	78,550	29,350	940	9,500	4,080	14,390	20,290
Southeast Asia	50,590	6,090	410	11,270	18,840	11,900	2,070	22,200	3,140	130	5,170	5,870	6,620	1,270
Oceania	760	120	-	90	300	220	20	420	60	-	50	170	130	10
Western Asia	13,040	1,590	10	6,590	180	1,660	3,010	15,200	1,560	20	7,630	330	2,260	3,400
Latin America and the Caribbean	**72,160**	**37,040**	**1,720**	**5,440**	**4,930**	**15,680**	**7,350**	**22,740**	**7,610**	**340**	**2,290**	**2,820**	**6,150**	**3,530**
Caribbean	4,780	2,770	10	120	540	810	530	2,130	440	10	60	610	510	510
Central America	16,590	9,280	300	2,450	1,680	1,300	1,590	4,900	1,980	60	870	740	540	700
South America	50,780	24,990	1,410	2,870	2,720	13,570	5,220	15,710	5,180	280	1,360	1,470	5,100	2,320
Country income category														
Low	64,820	9,870	750	11,610	13,830	18,720	10,050	76,490	8,400	380	8,330	19,590	20,060	19,730
Lower-middle	450,620	184,430	19,310	153,580	24,870	29,730	38,700	110,090	33,600	1,650	27,650	7,860	17,060	22,280
Upper-middle, high and other	87,650	36,720	2,380	15,290	7,790	16,700	8,780	27,860	7,290	370	6,690	2,460	6,490	4,550

*Injectable category also includes implant users. *Notes:* Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa. - = <0.5 million.

TABLE 8. Estimated annual number of pregnancies, by outcome and intention status, according to region, subregion and country income category, 2008

Region and country income category	All pregnancies (000s)				Intended pregnancies (000s)			Unintended pregnancies (000s)					
	Total	Births	Induced abortions	Miscarriages	Total	Intended births	Miscarriages of intended pregnancies	Total	Unplanned births	Mistimed births	Unwanted births	Induced abortions	Miscarriages of unintended pregnancies
Region													
All developing countries	**186,230**	**122,720**	**35,430**	**28,090**	**111,160**	**92,640**	**18,530**	**75,060**	**30,080**	**16,480**	**13,600**	**35,430**	**9,560**
Africa	**49,490**	**35,490**	**6,270**	**7,730**	**30,390**	**25,330**	**5,070**	**19,100**	**10,170**	**6,410**	**3,750**	**6,270**	**2,660**
Sub-Saharan Africa	**43,990**	**31,790**	**5,310**	**6,890**	**26,950**	**22,460**	**4,490**	**17,040**	**9,330**	**6,050**	**3,280**	**5,310**	**2,400**
Eastern Africa	17,580	12,330	2,520	2,720	9,540	7,950	1,590	8,040	4,380	2,700	1,690	2,520	1,130
Middle Africa	6,920	5,240	580	1,110	4,450	3,710	740	2,470	1,530	1,120	410	580	360
Southern Africa	1,970	1,290	390	300	800	670	130	1,170	620	310	310	390	160
Western Africa	15,580	11,640	1,470	2,470	10,970	9,140	1,830	4,610	2,490	1,790	700	1,470	650
Northern Africa	7,440	5,000	1,310	1,130	4,630	3,860	770	2,810	1,140	490	650	1,310	360
Asia	**119,580**	**76,430**	**25,330**	**17,820**	**73,570**	**61,310**	**12,260**	**46,010**	**15,120**	**7,570**	**7,550**	**25,330**	**5,560**
East Asia, incl. China	31,780	19,090	8,070	4,620	21,400	17,830	3,570	10,380	1,260	630	630	8,070	1,060
South Central Asia	60,600	40,660	10,740	9,200	37,900	31,580	6,320	22,700	9,070	4,510	4,560	10,740	2,890
Southeast Asia	19,260	11,090	5,410	2,760	9,790	8,160	1,630	9,470	2,930	1,580	1,340	5,410	1,130
Oceania	360	280	20	60	300	250	50	60	30	20	10	20	10
Western Asia	7,590	5,320	1,100	1,170	4,180	3,490	700	3,400	1,830	830	1,000	1,100	480
Latin America and the Caribbean	**17,150**	**10,790**	**3,820**	**2,540**	**7,200**	**6,000**	**1,200**	**9,950**	**4,790**	**2,490**	**2,300**	**3,820**	**1,340**
Caribbean	1,240	780	280	180	460	390	80	770	390	220	160	280	110
Central America	4,610	3,110	800	700	2,610	2,170	430	2,000	930	500	440	800	270
South America	11,300	6,910	2,740	1,660	4,130	3,440	690	7,180	3,470	1,770	1,700	2,740	970
Country income category													
Low	63,650	43,840	10,040	9,770	37,880	31,560	6,310	25,770	12,280	7,560	4,710	10,040	3,460
Lower-middle	103,200	66,540	21,220	15,430	64,160	53,460	10,690	39,040	13,080	6,500	6,580	21,220	4,740
Upper-middle, high and other	19,380	12,330	4,170	2,880	9,130	7,610	1,520	10,250	4,720	2,420	2,300	4,170	1,360

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 9. Unintended pregnancy rate and proportion of pregnancies and births that are unintended, of unintended births that were mistimed and unwanted and the percentages of all pregnancies and unintended pregnancies that end in abortion, according to region and subregion and country income category, 2008

Region and country income category	Unintended pregnancies per 1,000 women wanting to avoid pregnancy	% of all pregnancies that are unintended	% of all births that are unintended	Percentage distribution of outcomes of unintended pregnancies				
				Total	Mistimed births	Unwanted births	Induced abortions	Miscarriages
Region								
All developing countries	**92**	**40%**	**25%**	**100%**	**22%**	**18%**	**47%**	**13%**
Africa	**195**	**39%**	**29%**	**100%**	**34%**	**20%**	**33%**	**14%**
Sub-Saharan Africa	**220**	**39%**	**29%**	**100%**	**36%**	**19%**	**31%**	**14%**
Eastern Africa	268	46%	36%	100%	34%	21%	31%	14%
Middle Africa	231	36%	29%	100%	45%	17%	23%	15%
Southern Africa	123	59%	48%	100%	26%	26%	33%	14%
Western Africa	199	30%	21%	100%	39%	15%	32%	14%
Northern Africa	115	38%	23%	100%	17%	23%	47%	13%
Asia	**74**	**38%**	**20%**	**100%**	**16%**	**16%**	**55%**	**12%**
East Asia, incl. China	36	33%	7%	100%	6%	6%	78%	10%
South Central Asia	96	37%	22%	100%	20%	20%	47%	13%
Southeast Asia	130	49%	26%	100%	17%	14%	57%	12%
Oceania	49	16%	10%	100%	33%	17%	33%	17%
Western Asia	121	45%	34%	100%	24%	29%	32%	14%
Latin America and the Caribbean	**105**	**58%**	**44%**	**100%**	**25%**	**23%**	**38%**	**13%**
Caribbean	112	62%	50%	100%	29%	21%	36%	14%
Central America	93	43%	30%	101%	25%	22%	40%	14%
South America	108	63%	50%	100%	25%	24%	38%	14%
Country income category								
Low	182	40%	28%	100%	29%	18%	39%	13%
Lower-middle	70	38%	20%	100%	17%	17%	54%	12%
Upper-middle, high and other	274	53%	38%	100%	24%	22%	41%	13%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 10. Number of births; proportion of women who received antenatal care, had a facility delivery and had a cesarean delivery; the number needing care for complications; and the number with unmet need for care—all according to region, subregion and country income category, 2008

Region and country income category	Total births (000s)	% currently receiving care			No. (000s) of women needing care for:					No. (000s) of women with unmet need for care of:				
					Obstetric complications				Complications of unsafe abortion	Obstetric complications				Complications of unsafe abortion
		At least 4 antenatal visits	Facility delivery	Cesarean delivery	Hemorrhage	Sepsis	Pre-eclampsia and eclampsia	Obstructed labor		Hemorrhage	Sepsis	Pre-eclampsia and eclampsia	Obstructed labor	
Region														
All developing countries	**122,710**	**51%**	**55%**	**11%**	**5,510**	**7,170**	**6,840**	**7,570**	**8,500**	**4,130**	**5,430**	**5,230**	**5,760**	**3,200**
Africa	**35,490**	**45%**	**46%**	**5%**	**1,790**	**2,320**	**2,280**	**2,290**	**2,600**	**1,380**	**1,780**	**1,750**	**1,770**	**1,000**
Sub-Saharan Africa	**31,790**	**44%**	**43%**	**3%**	**1,590**	**2,050**	**2,020**	**2,080**	**2,200**	**1,260**	**1,620**	**1,600**	**1,650**	**800**
Eastern Africa	12,330	42%	36%	3%	630	800	790	810	1,100	520	670	660	670	400
Middle Africa	5,240	45%	61%	3%	260	330	330	350	200	190	240	240	250	100
Southern Africa	1,280	74%	82%	15%	70	80	80	80	100	40	50	50	50	-
Western Africa	11,640	45%	39%	2%	570	720	710	770	600	460	580	580	620	200
Northern Africa	5,000	46%	67%	13%	270	380	360	290	500	170	240	230	180	200
Asia	**76,430**	**49%**	**55%**	**11%**	**3,330**	**4,250**	**4,050**	**4,690**	**4,400**	**2,540**	**3,320**	**3,190**	**3,650**	**1,700**
East Asia, incl. China	19,090	68%	84%	19%	790	760	800	1,010	0	460	440	460	590	-
South Central Asia	40,660	35%	41%	9%	1,730	2,560	2,440	2,650	2,900	1,480	2,200	2,110	2,300	1,100
Southeast Asia	11,090	68%	51%	7%	540	560	540	740	1,300	420	440	420	580	500
Oceania	280	77%	46%	8%	10	10	10	10	-	10	10	10	10	-
Western Asia	5,320	51%	72%	12%	260	360	260	280	200	170	230	180	180	100
Latin America and the Caribbean	**10,790**	**79%**	**87%**	**31%**	**390**	**600**	**510**	**590**	**1,500**	**220**	**330**	**290**	**330**	**600**
Caribbean	780	79%	73%	23%	30	40	40	40	-	20	30	30	30	-
Central America	3,110	71%	81%	32%	110	170	150	170	300	60	90	80	90	100
South America	6,910	83%	91%	32%	250	390	320	370	1,100	140	210	180	210	400
Country income category														
Low	43,840	38%	38%	4%	2,140	2,790	2,730	2,750	3,200	1,740	2,260	2,230	2,240	1,200
Lower-middle	66,540	54%	60%	13%	2,890	3,670	3,570	4,160	4,100	2,140	2,790	2,720	3,170	1,500
Upper-middle, high and other	12,330	76%	93%	26%	480	710	530	660	1,200	260	380	280	350	500

Notes: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa. na = not applicable. - = fewer than 50,000.

TABLE 11. Number of births; proportion of newborns delivered in a health facility; number of newborns needing care for complications; and the numbers with unmet need for care—all according to region, subregion and country income category, 2008

Region and country income category	Total births (000s)	% delivered in a health facility delivery	N0. (000s) of newborns needing care for:			No. (000s) of newborns with unmet need for care of:		
			Sepsis/infection	Low birth weight	Asphyxia/ breathing difficulties	Sepsis/infection	Low birth weight	Asphyxia/ breathing difficulties
Region								
All developing countries	**122,710**	**55%**	**12,270**	**20,280**	**3,680**	**5,470**	**11,080**	**1,640**
Africa	**35,490**	**46%**	**3,550**	**5,090**	**1,060**	**1,900**	**2,790**	**570**
Sub-Saharan Africa	**31,790**	**43%**	**3,180**	**4,710**	**950**	**1,800**	**2,670**	**540**
Eastern Africa	12,330	36%	1,230	1,680	370	790	1,100	240
Middle Africa	5,240	61%	520	620	160	210	240	60
Southern Africa	1,280	82%	130	190	40	20	30	10
Western Africa	11,640	39%	1,160	1,820	350	710	1,100	210
Northern Africa	5,000	67%	500	790	150	170	320	50
Asia	**76,430**	**55%**	**7,640**	**14,130**	**2,290**	**3,420**	**8,120**	**1,030**
East Asia, incl. China	19,090	84%	1,910	720	570	310	120	90
South Central Asia	40,660	41%	4,070	11,230	1,220	2,400	6,960	720
Southeast Asia	11,090	51%	1,110	1,330	330	550	710	160
Oceania	280	46%	30	30	10	10	20	-
Western Asia	5,320	72%	530	820	160	150	320	50
Latin America and the Caribbean	**10,790**	**87%**	**1,080**	**1,050**	**320**	**140**	**170**	**40**
Caribbean	780	73%	80	110	20	20	40	10
Central America	3,110	81%	310	280	90	60	60	20
South America	6,910	91%	690	670	210	60	60	20
Country income category								
Low	43,840	38%	4,380	7,490	1,320	2,720	5,040	820
Lower-middle	66,540	60%	6,650	11,530	2,000	2,660	5,930	800
Upper-middle, high and other	12,330	93%	1,230	1,250	370	90	100	30

Notes: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa. In Table 4.2 of Adding It Up, the numbers of newborns needing care for asphyxia/breathing difficulties who received and did not receive care are transposed. na = not applicable. - = fewer than 50,000.

TABLE 12. One-year commodity and supply costs; average staff minutes, by type of staff; and median average staff costs, by region and country income category–all according to method, 2008

Method	Units costed	Average years of use	Commodity and supply costs for one year of use			Average staff minutes for units costed		Median average staff costs						
								Region				Country income category		
			Total	Commodities	Supplies	Nurse/ midwives; community health workers	Physicians	Sub-Saharan Africa	North Africa and Western Asia	Rest of Asia	Latin America and the Caribbean	Low	Lower-middle	Upper-middle, high and other
Short-term methods														
Oral contraceptives	15 cycles	1	$4.92	$4.92	$0.00	45	-	$1.76	$3.11	$1.18	$2.06	$1.84	$1.80	$3.16
Injectable	4 injections	1	$5.24	$3.82	$1.42	50	-	$2.11	$3.74	$1.42	$2.49	$2.21	$2.16	$3.81
Male condoms	120	1	$3.18	$3.18	$0.00	40	-	$1.50	$2.65	$1.00	$1.75	$1.57	$1.53	$2.68
Long-acting methods														
IUD	Insertion, follow-up, removal	3	$0.37	$0.13	$0.25	18	-	$2.32	$3.33	$1.56	$2.73	$2.43	$2.23	$4.06
Female sterilization	Procedure, follow-up	10	$0.81	$0.00	$0.81	75	30	$9.02	$12.78	$5.99	$10.42	$9.41	$8.73	$15.59
Male sterilization	Procedure, follow-up	10	$0.31	$0.00	$0.31	65	30	$6.11	$10.75	$4.06	$7.08	$9.37	$6.39	$11.03

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 13. Average direct costs* of maternal and newborn care per case receiving care, by type of care, under current conditions and a scenario with 100% of needs met, according to region and country income group, 2008

	Current scenario					100% of needs mets scenario				
	Antenatal care	Facility delivery			Post-abortion care	Antenatal care	Facility delivery			Post-abortion care
Type of care		Total	No cesarean section	With caesarean section			Total	No cesarean section	With caesarean section	
All developing countries	$21.17	$42.93	$28.52	$100.82	$34.87	$21.34	$39.02	$29.18	$101.35	$34.87
Region										
Sub-Saharan Africa	$26.50	$38.24	$31.61	$116.84	$36.61	$27.06	$40.90	$32.90	$111.16	$36.61
North Africa and Western Asia	$24.20	$59.81	$42.21	$131.91	$39.47	$23.97	$51.84	$38.34	$128.55	$39.47
Rest of Asia	$18.14	$38.33	$24.69	$90.64	$33.30	$18.21	$34.05	$26.13	$90.42	$33.30
Latin America and the Caribbean	$23.20	$59.95	$32.41	$109.62	$35.26	$22.91	$55.47	$31.05	$109.45	$35.26
Country Income Group										
Low	$23.90	$38.03	$29.52	$104.28	$35.07	$24.11	$40.06	$32.76	$105.78	$35.07
Lower-middle	$18.78	$39.55	$25.42	$92.46	$33.95	$18.81	$34.35	$25.30	$91.92	$33.95
Upper-middle, high and other	$25.47	$61.84	$38.65	$120.57	$37.39	$25.15	$60.52	$38.32	$121.33	$37.39

*Direct costs comprise the costs of supplies, food during hospitalization and staff to provide services. *Note:* Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa.

TABLE 14. Program- and systems-related costs as a percentage of total sexual and reproductive health and family planning costs, according to region, 2008–2015

Region	2008	2009	2010	2011	2012	2013	2014	2015
Sub-Saharan Africa	35%	79%	79%	78%	73%	69%	61%	50%
Asia and the Pacific	49%	53%	49%	46%	41%	34%	29%	25%
Latin America and the Caribbean	57%	60%	55%	50%	45%	37%	31%	26%
Western Asia and North Africa	56%	58%	53%	48%	43%	35%	29%	25%
Eastern and Southern Europe	56%	55%	51%	46%	41%	33%	28%	24%

Note: Sub-Saharan Africa includes all countries in Eastern, Middle, Southern and Western Africa, as well as Sudan, which is in Northern Africa. *Sources:* Friedman H, special tabulations of data used for UNFPA revised ICPD cost estimates, 2009; and UN Economic and Social Council, Flow of Financial Resources for Assisting in the Implementation of the Programme of Action of the International Conference on Population and Development, 2009, <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N09/215/67/PDF/N0921567.pdf?OpenElement >, accessed Feb. 15, 2010.

TABLE 15. Estimated costs to meet the total need for modern contraception, according to type of cost, 2003 and 2008

	Costs to meet total need ($000)			Percent distributions	
	2003	2008	Difference	2003	2008
Total cost	$10,965,800	$6,674,000	-$4,291,900	**100%**	**100%**
Direct costs	*$4,019,900*	*$2,426,300*	*-$1,593,600*	*37%*	*36%*
Supplies	$2,005,200	$1,584,300	-$421,000	18%	24%
Labor	$1,490,400	$842,100	-$648,300	14%	13%
Hospitalization	$524,300	$0	-$524,300	5%	0%
Overhead	*$6,945,900*	*$4,247,600*	*-$2,698,300*	*63%*	*64%*

TABLE 16. Average costs per user of modern contraceptives in a scenario in which 100% of needs are met, 2003 and 2008, and percentage difference, by cost

Cost item and region	2003	2008	Percentage difference
Total cost	$15.54	$8.16	-47%
Africa	$24.94	$26.46	6%
Asia	$13.66	$5.13	-62%
LAC	$18.89	$9.28	-51%
Drugs/supplies			
Africa	$4.04	$3.71	-8%
Asia	$2.61	$1.60	-39%
LAC	$3.21	$2.34	-27%
Personnel			
Africa	$1.99	$2.24	13%
Asia	$2.10	$0.78	-63%
LAC	$2.32	$1.41	-39%
Overhead			
Africa	$18.76	$20.51	9%
Asia	$8.14	$2.75	-66%
LAC	$12.45	$5.52	-56%
Hospitalization			
Africa	$0.15	$0.00	na
Asia	$0.81	$0.00	na
LAC	$0.92	$0.00	na

Note: na=not applicable

TABLE 17. Estimated reduction in mortality and DALY ratios from receiving care, according to type of maternal and newborn complication

Complication	Estimated reduction with receving care	
	Current scenario	100% needs met scenario
Maternal conditions		
Obstetric complications		
Hemorrhage	85%	85%
Sepsis	75%	75%
Pre-eclampsia and eclampsia	76%	76%
Obstructed labor	80%	80%
Other*	50%	50%
Abortion complications	75%	75%
Newborn conditions		
Sepsis/infection**	50%	50%
Low birth weight	8%	28%
Asphyxia/breathing difficulties	40%	70%
Other*	0%	0%

*No data available **Average of Infections, including tetanus, and newborn sepsis. *Source* (except for "other" conditions): Graham WJ et al., Maternal and perinatal conditions, in: Jamison DT et al., eds., *Disease Control Priorities in Developing Countries,* second ed., Washington, DC: World Bank; and New York: Oxford University Press, 2006, pp. 499–529.

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