COMPARATIVE STUDIES 8

HIGH-RISK BIRTHS AND MATERNITY CARE

DHS Demographic and Health Surveys

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Demographic and Health Surveys
Comparative Studies No. 8

High-Risk Births And Maternity Care

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June 1993

Cover photos: PAHO/WHO/C. Gaggero
Central Bureau of Statistics (Indonesia)
Macro International/Kia I. Reinis

The recommended citation for this publication is:

Govindasamy, Pavalavalli, M. Kathryn Stewart, Shea O. Rutstein, J. Ties Boerma, and A. Elisabeth Sommerfelt. 1993. *High-Risk Births and Maternity Care*. DHS Comparative Studies No. 8. Columbia, Maryland: Macro International Inc.

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Preface

An important part of the DHS program is the comparative analysis and further analysis of data obtained from DHS surveys. Standard recode files have been prepared for most surveys and researchers worldwide are encouraged to use the datasets for further analysis.

Much of the comparative analysis of DHS data, particularly for major topics such as fertility, mortality, contraceptive use, and maternal and child health, is being carried out by DHS staff in Columbia, Maryland. The results of these analyses are published in the *DHS Comparative Studies* series. A total of 17 *Comparative Studies* are planned.

The studies in this series are based on the standard recode files which were available in early 1990. These include datasets for 25 standard DHS surveys carried out from 1985 to 1989. Data for El Salvador, Ondo State (Nigeria), and Sudan may not be included in all reports because some of the El Salvador and Ondo State data are not comparable with data from other DHS surveys and the Sudan survey was not completed until mid-1990.

Reports in the *DHS Comparative Studies* series provide detailed tables and graphs comparing the results of DHS surveys for countries in sub-Saharan Africa, the Near East/North Africa, Asia, and Latin America/Caribbean. The reports also discuss various issues such as questionnaire comparability, survey procedures, and data quality. Where appropriate, data from previous survey programs, primarily the World Fertility Survey (WFS) and the Contraceptive Prevalence Surveys (CPS), are used to evaluate trends over time.

The *DHS Comparative Studies* series is intended to provide analysts and policymakers with readily available comparisons of data from developing countries. The studies will also be useful to others in the fields of international population and health.

During the second phase of the DHS program (1988-1993), data were collected for 22 countries. An update of the information on knowledge and use of contraception (including data from DHS-II countries) will be published later in the program.

In the third phase of the DHS program (1992-1997), surveys will be carried out in at least 20 countries.

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Project Director

Acknowledgments

The authors wish to thank Guillermo Rojas and Trevor Croft for programming assistance.

1 Introduction

During the early 1980s, the average rate of infant mortality was almost six times greater in the developing world than in the developed (United Nations, 1988). The high risks associated with childbearing in developing countries are also reflected in high rates of maternal mortality: the risk of dying from pregnancy-related causes is more than 1 in 25 in parts of Africa as compared with less than 1 in 1,000 in developed countries (National Research Council, 1989). Studies in a variety of developing countries have confirmed these findings, documenting excessive levels of maternal, infant, and child mortality and identifying associated causes of death (Boerma, 1987; Boerma and Bicego, 1992; Fauveau et al., 1988; Fortney et al., 1988; Hobcraft, 1987; Hobcraft et al., 1985; Kwast, 1989; Kwast et al., 1985; Palloni and Millman, 1986). Socioeconomic, cultural, biological, and demographic factors interact in a complex manner in these settings, often to the detriment of maternal and infant and child survival. Behavioral determinants of the utilization of health and family planning services also play an important role, as do barriers limiting access to these services.

The first phase of the Demographic and Health Surveys (DHS-I) documented high levels of infant and child mortality in many of the 28 countries surveyed. These surveys were conducted from 1985 to 1989 and collected data from women aged 15-49 (with the exception of Brazil and Guatemala, where the women were aged 15-44) (see Table 1.1). Table 1.2 presents infant and child mortality rates for the countries surveyed, calculated by the direct method of estimation from birth history data (Rutstein, 1984). These rates were calculated for all births that occurred in the five years preceding each survey, excluding the month of interview.

Table 1.1 Summary of DHS surveys, 1985-1990

Date of fieldwork, number of women interviewed, and eligible respondents, Demographic and Health Surveys, 1985-1990

Country	Year of fieldwork	Number of women interviewed	Respondents
SUB-SAHARAN AFRICA			
Botswana (BT)	1988	4368	All women 15-49
Burundi (BU)	1987	3970	All women 15-49
Ghana (GH)	1988	4488	All women 15-49
Kenya (KE)	1988/89	7150	All women 15-49
Liberia (LB)	1986	5239	All women 15-49
Mali (ML)	1987	3200	All women 15-49
Ondo State (OS)	1986/87	4213	All women 15-49
Senegal (SN)	1986	4415	All women 15-49
Sudan (SD)	1989/90	5860	Ever-married women 15-49
Togo (TG)	1988	3360	All women 15-49
Uganda (UG)	1988/89	4730	All women 15-49
Zimbabwe (ZW)	1988/89	4201	All women 15-49
NORTH AFRICA			
Egypt (EG)	1988/89	8911	Ever-married women 15-49
Morocco (MA)	1987	5982	Ever-married women 15-49
Tunisia (TN)	1988	4184	Ever-married women 15-49
ASIA			
Indonesia (ID)	1987	11884	Ever-married women 15-49
Sri Lanka (LK)	1987	5865	Ever-married women 15-49
Thailand (TH)	1987	6775	Ever-married women 15-49
LATIN AMERICA/CARIBBEAN			
Bolivia (BO)	1989	7923	All women 15-49
Brazil (BR)	1986	5892	All women 15-44
Colombia (CO)	1986	5329	All women 15-49
Dominican Rep. (DR)	1986	7649	All women 15-49
Ecuador (EC)	1987	4713	All women 15-49
El Salvador (ES)	1985	5207	All women 15-49
Guatemala (GU)	1987	5160	All women 15-44
Mexico (MX)	1987	9310	All women 15-49
Peru (PE)	1986	4999	All women 15-49
Trinidad & Tob. (TT)	1987	3806	All women 15-49

Table 1.2 Infant and child mortality rates

Infant and child mortality rates for all births in the five years preceding the survey (month of interview excluded), Demographic and Health Surveys, 1985-1990

Country	Neonatal (<1 mo)	Post-neonatal (1-11 mos)	Infant (0-11 mos)	Child (1-4 yrs)	Under-five (0-4 yrs)
SUB-SAHARAN AFRICA					
Botswana	22.5	15.9	38.4	14.7	52.8
Burundi	35.2	38.5	73.7	84.9	152.3
Ghana	43.3	33.9	77.2	84.0	154.7
Kenya	27.7	33.0	60.7	30.9	89.7
Liberia	67.9	76.4	144.3	91.4	222.5
Mali	51.1	54.0	105.1	158.6	247.0
Ondo State	26.3	31.9	58.3	55.8	110.8
Senegal	45.8	42.0	87.8	117.0	194.6
Sudan	43.8	26.1	70.0	57.7	123.7
Togo	39.7	37.6	77.3	83.8	154.6
Uganda	43.0	55.3	98.3	87.1	176.8
Zimbabwe	26.6	22.4	49.1	22.7	70.6
NORTH AFRICA					
Egypt	38.3	34.9	73.2	30.9	101.8
Morocco	41.5	32.7	74.2	31.1	103.0
Tunisia	26.2	21.9	48.0	14.0	61.8
ASIA					
Indonesia	27.2	40.2	67.4	32.9	98.1
Sri Lanka	16.3	8.4	24.7	9.5	34.0
Thailand	20.2	15.0	35.2	9.1	44.0
LATIN AMERICA/CARIBBEAN					
Bolivia	35.6	47.3	82.9	49.5	128.3
Brazil	33.1	40.1	73.2	10.7	83.2
Colombia	18.9	13.4	32.3	9.2	41.2
Dominican Rep.	39.9	27.5	67.3	22.4	88.2
Ecuador	35.3	21.8	57.2	25.1	80.9
El Salvador	27.3	39.8	67.1	19.6	85.4
Guatemala	33.1	39.6	72.7	39.3	109.1
Mexico	26.9	20.5	47.4	14.7	61.4
Peru	34.6	40.4	75.1	38.0	110.2
Trinidad & Tob.	22.9	5.1	28.0	3.7	31.6

Source: Sullivan et al., 1993

Neonatal mortality accounted for more than half of all infant deaths in 61 percent of the countries surveyed. Complications of pregnancy, infections including neonatal tetanus, and low birth weight all contribute to this high risk of neonatal mortality. Birth weight and subsequent child survival are influenced to a large extent by maternal nutrition, which in turn is affected by a wide range of factors, including childhood undernutrition, poverty, lack of knowledge, the low status of women, heavy work loads, and early and frequent childbearing (Krasovec and Anderson, 1991; Merchant and Kurz, 1992).

The risk of dying before the first birthday is greatest in sub-Saharan Africa. (The countries surveyed have been divided into four regions: sub-Saharan Africa, North Africa, Asia, and Latin America and the Caribbean). In Liberia and Mali infant mortality rates exceed 100 deaths per 1000 live births. Only 8 of the 28 countries surveyed (Botswana, Colombia, Mexico, Sri Lanka, Thailand, Trinidad & Tobago, Tunisia, and Zimbabwe) had an infant mortality rate of less than 50 deaths per 1000 live births. On average, a higher percentage of under-five mortality is due to infant rather than child deaths.

The same regional pattern is observed for under-five mortality. On average, children in sub-Saharan Africa are more likely to die before their fifth birthday than children in other regions. Mali has the highest under-five mortality rate, 247 deaths per 1000 live births, followed by Liberia and Senegal, with 223 and 195 deaths per 1000 live births, respectively. Under-five mortality in sub-Saharan Af-

rica is lowest in Botswana where there are 53 deaths per 1000 live births. In two of the three North African countries surveyed, under-five mortality was more than 100 deaths per 1000 live births. Under-five mortality rates were also over 100 deaths per 1000 live births in three Latin American and Caribbean countries, Bolivia, Guatemala, and Peru. Among the 28 countries surveyed, the probability of dying before the fifth birthday was lowest in Trinidad and Tobago.

Three DHS-I surveys used the indirect sisterhood method to estimate maternal mortality. The maternal mortality ratios for Bolivia, Egypt, and Sudan were 373, 170, and 347 per 100,000 live births, respectively, all of which indicate the high risk associated with childbearing in these countries.

Higher rates of mortality have been observed among first births, higher order births, births to very young and older mothers, and births spaced too closely together (Burkhalter et al., 1991; Hobcraft, 1991; Hobcraft et al., 1983, 1985). First births pose an unavoidable risk, but family planning services can reduce the impact of the other risk factors associated with maternal, infant, and child survival by preventing high-risk births.

In addition, all pregnant women should have access to antenatal and delivery care and the preventive and curative services they provide (Ebrahim, 1982; Herz and Measham, 1987; Rosenfield and Maine, 1985). Research findings and historical lessons from developed countries make clear the preventable nature of most maternal and many perinatal and infant deaths associated with complications of pregnancy and childbirth.

Earlier comparative reports in this series have presented data from the DHS-I surveys on the knowledge and use of contraception (Rutenberg et al., 1991) and on the unmet need and demand for family planning (Westoff and Ochoa, 1991). This report uses DHS-I data to examine two other, service-related dimensions of unmet need: the use of maternity care and the use of contraception by women whose fertility characteristics place themselves and their children at high risk.

This report examines the potential mortality reductions which could be achieved through increased use of family planning and wider access to maternity care. First, differentials in the coverage and utilization of maternity care are examined. Next, the fertility-related factors that place women and their children at high risk are explored. Data on women who fall into high-risk categories are then used to calculate a new measure of unmet need for family planning with the goal of avoiding high-risk births. All analyses are presented in simple tabular form, without controlling for potentially confounding variables.

2 Maternal Health Care

DHS-I collected data on the utilization of maternity care services by women who had live births during the five years preceding the survey. Specifically, the women were asked:

- if they had received a tetanus toxoid immunization during pregnancy,
- who, if anyone, was seen for antenatal care, and
- who, if anyone, provided delivery care.

Fourteen surveys also included a country-specific question about the place of delivery. Though a standard format was followed for data collection in most surveys, there were several exceptions. Table 2.1 summarizes the information available for each country and indicates where questions or coding of responses departed from the standard format.

Antenatal care facilitates a variety of preventive interventions, including tetanus toxoid immunizations, nutrition education, and

Table 2.1 Summary of information on tetanus toxoid immunization, antenatal care and delivery care

Information on tetanus toxoid immunization, antenatal care, and delivery care for live births in the five years preceding the survey, Demographic and Health Surveys, 1985-1990

Country	Date of fieldwork	Tetanus toxoid	Antenatal care provider[a]	Delivery care provider[b]	Place of delivery
SUB-SAHARAN AFRICA					
Botswana	Aug-Dec 1988	yes	yes	yes	last birth
Burundi	Apr-Jun 1987	yes	yes[c]	yes	no
Ghana	Feb-May 1988	yes	yes	yes	no
Kenya	Dec-May 1988/89	yes	yes	yes	all births
Liberia	Feb-Jul 1986	last birth	last birth	last birth	last birth
Mali	Mar-Aug 1987	yes	yes[d]	yes[e]	no
Ondo State	Sep-Jan 1986/87	yes	yes	yes	no
Senegal	Apr-Jul 1986	yes	yes[d]	yes[e]	no
Sudan	Nov-May 1989/90	yes	yes	yes	no
Togo	Jun-Nov 1988	yes	yes[f]	yes[e]	no
Uganda	Sep-Feb 1988/89	yes	yes	yes	no
Zimbabwe	Sep-Jan 1988/89	yes	yes	yes	all births
NORTH AFRICA					
Egypt	Oct-Jan 1988/89	yes	yes	yes	all births
Morocco	May-Jul 1987	no	yes	yes[g]	all births
Tunisia	Jun-Oct 1988	yes	yes	yes[g]	all births
ASIA					
Indonesia	Sep-Dec 1987	no	no	yes	all births
Sri Lanka	Jan-Mar 1987	yes	yes[h]	yes	all births
Thailand	Mar-Jun 1987	yes	yes	yes	all births
LATIN AMERICA & CARIBBEAN					
Bolivia	Mar-Jun 1989	yes	yes	yes	all births
Brazil	May-Aug 1986	yes	yes[i]	yes[j]	all births[j]
Colombia	Oct-Dec 1986	yes	yes	yes	no
Domican Rep.	Sep-Dec 1986	yes	yes	yes	no
Ecuador	Jan-Mar 1987	yes	yes	yes	last birth
El Salvador	May-Jun 1985	yes	no	yes	no
Guatemala	Oct-Dec 1987	yes	yes	yes	no
Mexico	Feb-May 1987	no	yes	yes	no
Peru	Sep-Dec 1986	yes	yes	yes	no
Trinidad	May-Aug 1987	yes	yes	yes	all births

[a]Doctor, nurse, midwife, traditional birth attendant (TBA), and other, unless otherwise specified.
[b]Doctor, nurse, midwife, TBA, relative, and other, unless otherwise specified.
[c]Women were asked the place where ANC was received, instead of the provider.
[d]Women were asked who provided ANC during the first visit. Response categories included both persons and places.
[e]Response categories omitted "relative" category, and included both persons and places.
[f]Response categories included both persons and places.
[g]Response categories omitted "relative" category.
[h]Two separate questions were asked to determine whether a midwife or a doctor provided ANC.
[i]Women were asked where ANC was received for last birth and births prior to last birth in separate questions.
[j] Women were asked where DC was received for last birth and births prior to last birth in separate questions.

Source: Adapted from Stewart et al., 1993

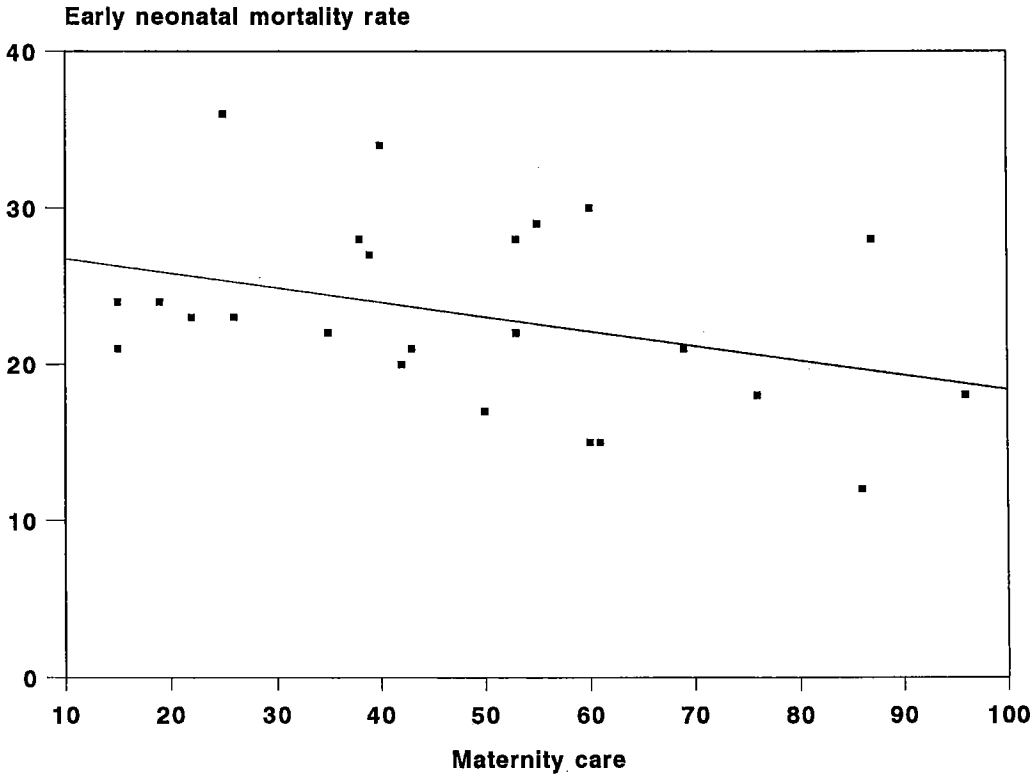
postpartum family planning. It also allows health care providers to identify and monitor women who meet known risk criteria and to detect and manage pre-existing and new problems. When a trained provider with adequate access to medical facilities attends women during labor and delivery, this care is extended into the period when complications are most likely to be fatal (Fauveau et al., 1988, 1991; Freedman and Maine, 1992; Kaunitz et al., 1984). Family planning services can prevent many unwanted and high-risk pregnancies. Together with safe abortion care, family planning also helps avoid abortion-related maternal deaths due to complications of sepsis and hemorrhage, a major contributor to maternal mortality in the developing world (Adetoro, 1989; Coeytaux et al., 1992; Fauveau and Blanchet, 1989; Kwast, 1989).

In spite of the clear importance of maternity care, poor access to and low utilization of such services continue to be important determinants of mortality and morbidity throughout the world (Bhandari et al., 1989; El Kady et al., 1989; Fortney et al., 1988; Holian, 1989; Paul, 1991; and Rossiter et al., 1985). Coverage of maternity services varies greatly between countries, differing in much the same way as rates of mortality and other indicators of health and nutritional status. Figure 2.1 illustrates a general trend of decreasing rates of early neonatal mortality (defined as mortality during the first week of life) with increasing coverage of maternity care for the countries surveyed in DHS-I.

2.1 WOMAN-BASED VERSUS BIRTH-BASED DATA ANALYSIS

DHS data can be viewed using either the woman or her births as the unit of analysis. These two methods have been referred to as the woman-based and birth-based approaches, respectively, and each has its specific advantages and disadvantages. Techniques using a birth-based data set may be appropriate when trying to determine the rate of service coverage for a sample of live births. Such information is helpful in quantifying the level of *protection*

Figure 2.1—Maternity care and early neonatal mortality, Demographic and Health Surveys, 1986-1990



Maternity care: Antenatal and delivery care
Early neonatal mortality rate: Deaths 0-6 days

which is currently being provided. However, using births as the unit of analysis assumes that separate births to the same woman may be treated as independent events. Where the main objective is to identify women to be targeted for care, this approach has clear limitations (Adekunle et al., 1990; Filippi et al., 1991). In such cases, the alternative, woman-based approach has been recommended.

Obermeyer has suggested that labeling women as users and nonusers of health care services, as health utilization studies typically do, "may not correspond to the more fluid reality of health care behavior." She cites preliminary results of research in Morocco where women were found to be "constantly shifting between traditional and modern services during pregnancy and at the time of birth," and concludes that the reasons for service use or nonuse appear to be "less the result of a commitment to one type of care or the other, and more the outcome of a pragmatic weighing of alternatives" (Obermeyer, 1992:13).

One might argue that many service- and user-related factors associated with the use of maternity services, such as education, access, status, and quality and availability of services, do not change a great deal between births when considering service use on a population basis. Other factors, particularly complications which are not predictable and occur less frequently, may explain some of the variation in individual service use detected in the qualitative study described by Obermeyer.

Whether women can be viewed as consistent *users* or *nonusers* of maternity care therefore emerges as an important question, from both programmatic and research perspectives. Though not without limitations, DHS-I data can be used to explore behavioral patterns of service usage. With a woman-based approach, it is possible to check the consistency with which women received tetanus toxoid immunizations, antenatal care, and delivery care in a series of live births.

2.2 COVERAGE AND USE OF MATERNAL HEALTH SERVICES

This section presents overall rates, differentials, and trends in tetanus toxoid immunization, antenatal care, and delivery care coverage for live births in the five years preceding the survey. Also examined are patterns of maternity care for individual women: the combination of maternity services a woman receives for each live birth and the consistency with which a woman uses maternity services from one birth to the next. Results include bivariate and stratified tabulations only. All countries are not included in some of the tables because relevant data were not available.

SERVICE COVERAGE

Tables 2.2-2.4 show the percentage of live births for which women received tetanus toxoid immunizations, antenatal care, and delivery care, according to residence, education, age, parity, and birth interval. The proportion of births for which women recalled having received at least one tetanus toxoid injection ranged from over 85 percent in Botswana, the Dominican Republic, Kenya, and Sri Lanka to less than 20 percent in Egypt, Guatemala, Mali, and Peru (Table 2.2). In almost all countries, coverage was higher for antenatal care than for either tetanus toxoid or delivery care, but it still varied widely. The proportion of births for which women received antenatal care ranged from over 90 percent in Botswana, the Dominican Republic, Sri Lanka, Trinidad and Tobago, and Zimbabwe to less than 50 percent in Bolivia, Guatemala, Mali, and Morocco (Table 2.3). As for delivery care, coverage ranged from above 85 percent in the Dominican Republic, Sri Lanka, and Trinidad and Tobago to less than 33 percent in Burundi, Guatemala, Mali, and Morocco (Table 2.4).

In general, coverage for all three services was lower among births to women living in rural areas and/or having no education. Less consistent differences in coverage were seen by mother's age, parity, and birth interval.

MISSED OPPORTUNITIES

The World Health Organization recommends that all women receive two tetanus toxoid injections during their first pregnancy, a third dose six to twelve months later or during the next pregnancy, a fourth dose at least a year later or during the subsequent pregnancy, and a fifth dose at least one year later or during the subsequent pregnancy. The fifth dose is thought to provide lifelong protection (World Health Organization, 1987). Thus, tetanus toxoid immunizations should be a fundamental component of effective antenatal care. According to the DHS data, however, many women who saw a doctor, nurse, or midwife during pregnancy reported that they did not receive a tetanus toxoid injection.

While this could be due to underreporting of tetanus toxoid injections, it seems unlikely that women would selectively underreport tetanus toxoid in this manner. Another explanation could be that these represent true missed opportunities for immunization. Table 2.5 shows tetanus toxoid coverage among women who received antenatal care and gives some indication of the probable magnitude of the problem. In a number of surveys, more than 40 percent of the relevant births fall into this category. The problem is seen particularly in Egypt, and in the Latin America/Caribbean region, where more than 45 percent of births to mothers who received antenatal care represented missed opportunities for TT immunization in all countries surveyed, with the exception of the Dominican Republic.

Table 2.2 Differentials in tetanus toxoid coverage

Percentage of live births in five years preceding the survey for which women received tetanus toxoid during pregnancy, by residence, level of education, age, parity, and birth interval, Demographic and Health Surveys, 1985-1990

Country	Percent of births for which woman received tetanus toxoid	Residence		Level of education			Age			Parity			Birth interval		Number of births
		Urban	Rural	No educ.	Pri-mary	Second-ary+	<18	18-34	35+	0	1-3	4+	<24	≥24	
SUB-SAHARAN AFRICA															
Botswana	84.5	85.0	84.3	76.3	87.0	90.8	81.0	84.8	85.2	83.4	85.5	83.8	83.7	84.6	3177
Burundi	59.2	91.4	58.1	56.9	67.3	84.2	(79.9)	59.9	54.7	63.7	59.1	57.4	59.7	59.1	3841
Ghana	69.6	81.3	65.3	59.8	76.9	84.0	62.0	71.0	65.1	71.2	70.8	67.2	64.8	70.7	4089
Kenya	88.7	92.2	88.2	84.8	89.4	92.7	84.7	89.7	85.5	89.1	89.2	88.2	88.9	88.7	7049
Liberia	71.2	76.7	67.5	66.8	75.3	83.8	72.9	72.6	63.4	73.2	74.1	66.2	69.4	71.9	3080
Mali	18.2	52.4	7.3	14.0	41.4	81.5	19.1	18.9	14.6	20.3	18.4	17.3	17.8	18.4	3390
Ondo State, Nigeria	71.2	80.4	64.6	61.8	73.7	87.6	56.3	73.4	66.2	73.7	73.9	68.2	71.7	71.1	3249
Senegal	31.0	53.8	18.9	26.7	47.9	61.8	24.3	32.3	27.8	30.4	32.7	29.3	33.8	30.2	4253
Sudan	44.9	58.5	37.8	35.2	54.7	64.2	45.4	46.2	37.0	52.6	46.2	40.2	44.5	45.0	6536
Togo	70.4	88.2	64.1	64.0	82.2	87.0	66.7	72.2	63.3	74.4	70.9	67.9	65.0	71.5	3098
Uganda	55.6	74.9	53.5	49.7	57.7	72.4	52.6	56.0	55.3	55.9	57.7	53.3	53.9	56.3	5004
Zimbabwe	78.7	80.7	78.0	74.4	79.6	80.2	75.8	80.0	73.1	82.0	79.9	75.4	73.9	79.9	3334
NORTH AFRICA															
Egypt	11.4	12.6	10.6	9.3	12.9	15.4	10.4	11.6	10.8	14.0	11.2	10.0	10.4	12.0	8633
Tunisia	33.1	35.3	30.8	28.0	40.5	35.0	(32.5)	34.2	26.6	40.2	34.1	26.7	30.8	34.5	4439
ASIA[a]															
Thailand	65.3	62.8	65.8	47.2	66.5	71.5	59.0	67.4	50.3	72.2	64.7	44.6	57.8	67.7	3631
Sri Lanka	86.3	87.0	86.1	76.4	84.5	88.7	81.3	86.1	88.2	93.7	83.5	81.2	78.9	89.6	3965
LATIN AMERICA & CARIBBEAN															
Bolivia	20.1	25.6	15.0	9.5	19.1	30.2	19.0	20.9	16.7	21.5	20.5	18.7	19.2	20.5	5731
Brazil	40.5	42.7	36.2	33.4	41.2	43.3	44.0	39.8	44.1	43.7	38.7	40.4	40.1	40.8	3463
Colombia	38.8	37.8	40.5	40.4	36.9	41.8	42.6	39.7	29.2	42.1	38.7	34.8	37.2	39.8	2671
Dominican Republi	87.2	88.4	85.6	76.0	86.5	92.1	87.2	87.6	82.8	89.2	88.7	81.1	86.6	87.7	4401
Ecuador	38.3	42.8	33.9	22.1	36.9	46.6	41.5	39.6	28.1	40.1	40.3	33.0	40.1	37.3	3031
El Salvador	47.8	56.7	40.5	28.7	53.3	65.6	52.0	49.0	33.8	57.1	48.9	36.7	47.6	47.9	3448
Guatemala	13.7	15.7	12.9	10.1	18.2	12.4	14.8	13.8	12.3	14.3	13.9	13.2	14.3	13.4	4581
Peru	15.4	22.1	8.1	6.8	13.4	22.2	16.0	16.3	11.1	17.9	17.4	11.0	14.3	16.0	3106
Trinidad/Tobago	30.8	28.9	32.3	b	32.0	29.3	29.5	31.3	26.9	26.7	31.6	35.6	32.4	29.9	1929

Note: Figures in parentheses are based on fewer than 50 cases.
[a]Data not available for Indonesia
[b]Fewer than 20 cases

Table 2.3 Differentials in antenatal care

Percentage of live births in five years preceding the survey for which women received antenatal care from a health professional, by residence, level of education, age, parity, and birth interval, Demographic and Health Surveys, 1986-1990

Country	Percent of births for which woman received antenatal care	Residence		Level of education			Age			Parity			Birth interval		Number of births
		Urban	Rural	No educ.	Pri-mary	Second-ary+	<18	18-34	35+	0	1-3	4+	<24	≥24	
SUB-SAHARAN AFRICA															
Botswana	92.2	96.6	90.7	82.2	96.0	98.1	91.9	92.3	92.1	93.2	92.2	91.4	88.5	92.8	3177
Burundi	79.5	97.0	78.9	77.2	88.7	94.8	89.9	80.3	74.9	82.6	79.7	77.9	77.3	80.1	3841
Ghana	82.3	93.7	78.1	72.5	89.7	97.0	82.9	83.4	77.1	86.2	84.0	78.1	80.2	82.8	4089
Kenya	77.2	81.6	76.5	72.3	77.7	82.9	77.2	78.4	70.6	77.4	79.4	75.1	76.6	77.4	7049
Liberia	82.6	91.3	76.6	77.3	88.9	96.3	91.3	83.0	74.5	87.9	84.3	77.2	82.4	82.7	3080
Mali	31.4	70.0	19.1	26.6	58.8	(94.9)	36.0	32.2	25.2	35.0	32.6	28.8	29.1	32.3	3390
Ondo State, Nigeria	80.0	88.9	73.6	72.5	82.5	92.3	68.8	81.8	75.8	81.6	82.1	77.7	81.4	79.7	3249
Senegal	62.4	94.4	45.4	56.4	89.6	97.6	53.8	64.2	57.3	65.6	63.1	60.1	64.7	61.8	4253
Sudan	70.7	87.5	61.9	57.2	85.9	94.4	68.2	71.6	66.2	74.9	71.1	68.4	72.7	69.8	6536
Togo	80.7	96.5	75.1	74.2	92.8	96.7	81.9	81.9	74.6	86.5	82.0	76.3	76.0	81.6	3098
Uganda	86.7	95.3	85.8	81.1	89.9	95.2	90.6	86.3	85.9	89.2	86.7	85.6	84.7	87.5	5004
Zimbabwe	91.3	96.2	89.5	86.1	91.1	97.2	88.9	92.4	86.4	92.6	92.9	88.6	86.2	92.5	3334
NORTH AFRICA															
Egypt	52.8	68.9	41.8	41.8	57.0	80.7	44.8	53.2	53.4	65.8	51.8	46.2	50.9	54.0	8633
Morocco	24.7	48.3	12.6	18.3	53.4	73.4	18.5	25.4	22.8	31.0	26.7	19.9	22.5	25.7	6060
Tunisia	57.5	71.8	42.9	44.0	69.5	91.2	(70.0)	59.6	44.0	73.4	60.9	41.4	54.8	59.2	4439
ASIA[a]															
Sri Lanka	96.6	97.2	96.5	86.7	96.4	98.3	92.2	96.8	95.7	97.1	96.9	93.7	96.1	96.8	3965
Thailand	77.0	94.1	73.5	47.8	77.5	96.2	70.6	78.8	65.0	84.9	76.7	51.5	69.9	79.3	3631
LATIN AMERICA & CARIBBEAN[b]															
Bolivia	45.0	62.3	28.8	15.6	37.8	80.5	49.1	46.6	35.6	59.0	47.5	32.9	42.5	46.0	5731
Brazil	58.2	64.7	45.4	42.4	62.4	53.5	59.4	59.1	51.1	65.7	57.1	51.5	56.3	59.4	3463
Colombia	72.6	82.2	57.4	44.6	65.9	91.3	71.6	73.5	65.6	82.8	74.9	53.8	68.0	75.4	2671
Dominican Republic	94.8	95.9	93.4	83.6	94.3	99.2	94.7	95.2	90.8	97.2	94.8	91.8	93.3	95.9	4401
Ecuador	68.9	81.4	56.7	44.2	62.6	89.4	64.2	70.2	62.0	79.1	70.0	57.6	66.4	70.2	3031
Guatemala	34.2	57.4	25.6	18.4	44.7	86.0	34.6	35.3	26.7	45.6	35.9	26.0	36.3	33.3	4581
Mexico	70.9	66.7	78.5	38.0	69.7	94.3	60.1	72.9	63.1	81.1	74.5	56.1	68.9	72.0	5583
Peru	54.7	79.1	28.2	19.4	45.9	83.9	45.7	57.4	45.6	67.5	60.4	39.3	53.8	55.3	3106
Trinidad/Tobago	97.6	96.6	98.4	c	97.9	97.3	93.7	98.0	95.6	97.9	98.0	95.9	96.4	98.4	1929

Note: Figures in parentheses are based on fewer than 50 cases.
[a]Data not available for Indonesia
[b]Data not available for El Salvador
[c]Fewer than 20 cases

Table 2.4 Differentials in delivery care

Percentage of live births in five years preceding the survey for which women received delivery care from a health professional, by residence, level of education, age, parity, and birth interval, Demographic and Health Surveys, 1985-1990

Country	Percent of births for which woman received delivery care	Residence		Level of education			Age			Parity			Birth interval		Number of births
		Urban	Rural	No educ.	Pri-mary	Second-ary+	<18	18-34	35+	0	1-3	4+	<24	≥24	
SUB-SAHARAN AFRICA															
Botswana	77.4	93.5	71.7	53.6	84.5	96.6	82.7	78.6	66.5	87.0	77.8	68.0	75.9	77.7	3177
Burundi	19.1	85.3	16.8	15.7	28.5	75.7	39.9	19.8	14.6	32.1	17.6	15.2	22.3	18.2	3841
Ghana	40.2	70.3	28.9	25.9	49.1	79.0	45.4	40.4	37.5	48.7	39.8	35.7	38.2	40.6	4089
Kenya	50.1	77.5	45.6	33.4	49.0	78.2	54.4	51.5	40.2	64.7	53.7	40.7	51.9	49.3	7049
Liberia	58.0	76.8	44.9	49.2	61.6	86.7	62.7	59.7	45.9	63.9	59.0	52.9	59.1	57.6	3080
Mali	31.9	76.8	17.6	26.5	62.2	(98.3)	36.6	32.8	24.8	38.5	32.7	28.5	27.5	33.4	3390
Ondo State, Nigeria	58.7	68.0	52.0	46.4	61.1	81.5	37.5	60.7	54.8	64.2	61.8	54.3	64.1	57.4	3249
Senegal	41.4	82.2	19.8	34.2	70.7	91.5	35.5	43.1	35.3	47.3	42.6	37.3	45.7	40.3	4253
Sudan	68.5	86.0	59.3	52.4	87.3	95.5	65.8	69.4	63.9	73.6	68.1	66.6	68.8	68.3	6536
Togo	54.3	89.0	41.9	42.4	73.8	92.3	54.9	55.9	46.4	66.1	55.2	47.4	45.6	56.0	3098
Uganda	38.3	79.9	33.9	23.2	44.2	78.0	47.8	37.9	33.4	49.0	38.8	33.0	38.7	38.2	5004
Zimbabwe	69.6	90.5	62.1	46.4	70.0	91.2	63.6	72.0	59.3	78.0	72.8	61.0	64.7	70.8	3334
NORTH AFRICA															
Egypt	34.6	57.1	19.1	20.1	37.5	76.1	27.3	34.6	37.3	50.9	35.3	23.4	31.7	36.3	8633
Morocco	26.0	56.1	10.5	18.4	59.1	84.3	27.0	27.1	20.7	44.1	27.1	16.8	25.4	26.3	6060
Tunisia	68.9	87.3	50.1	54.1	84.5	97.1	(75.0)	71.8	51.0	87.4	73.0	49.9	70.4	68.0	4439
ASIA															
Indonesia	36.3	69.0	24.2	11.8	31.7	77.2	21.5	37.8	31.3	42.6	35.7	31.2	40.9	34.8	8174
Sri Lanka	87.2	94.7	86.0	67.8	83.6	92.2	82.1	87.1	88.7	89.8	86.9	82.3	85.9	87.8	3965
Thailand	65.9	95.6	59.8	43.3	63.7	95.9	63.6	67.4	54.2	76.8	63.8	38.9	57.3	68.6	3631
LATIN AMERICA & CARIBBEAN															
Bolivia	42.1	62.7	23.0	11.1	33.9	81.1	45.9	43.8	32.7	57.1	44.8	29.3	40.7	42.7	5731
Brazil	73.0	75.6	67.6	77.3	75.0	60.7	79.9	72.2	75.1	75.2	69.7	76.9	74.6	72.0	3463
Colombia	71.0	84.2	50.0	48.0	63.4	90.2	69.4	72.5	59.7	83.9	72.5	50.5	67.4	73.2	2671
Dominican Republic	89.8	95.0	82.9	73.4	88.4	97.9	89.6	90.7	81.1	94.7	91.1	80.4	90.2	89.4	4401
Ecuador	61.4	84.6	39.1	31.3	52.9	88.3	55.7	63.6	49.7	77.0	64.7	41.7	57.7	63.5	3031
El Salvador	51.1	72.3	33.7	31.6	53.0	93.5	48.8	52.8	39.3	63.8	53.9	33.5	48.2	52.7	3448
Guatemala	29.3	59.6	18.0	12.8	39.4	87.3	32.1	30.5	19.3	45.4	31.4	18.0	31.2	28.4	4581
Mexico	69.5	64.1	79.4	29.8	69.1	95.4	63.1	71.0	63.2	80.4	73.7	53.3	67.4	70.7	5583
Peru	49.1	80.0	15.5	11.7	35.9	85.0	45.1	52.0	37.3	66.6	55.7	29.4	46.8	50.4	3106
Trinidad/Tobago	97.7	98.3	97.2	a	97.3	98.1	97.9	97.6	98.7	98.4	97.6	96.5	96.9	98.1	1929

Note: Figures in parentheses are based on fewer than 50 cases.
[a]Fewer than 20 cases

Table 2.5 Tetanus toxoid immunization

Percent distribution of tetanus toxoid (TT) immunization among women who received antenatal care (ANC) for live births in the five years preceding the survey, Demographic and Health Surveys, 1986-1990

Country	Among births for which ANC was received: Percent with TT	Among births for which ANC was received: Percent without TT	No. of births for which ANC was received
SUB-SAHARAN AFRICA			
Botswana	89.6	10.5	2930
Burundi	73.6	26.4	3054
Ghana	81.7	18.3	3367
Kenya	95.2	4.8	5443
Liberia	82.7	17.3	2545
Mali	53.9	46.1	1065
Ondo State, Nigeria	86.7	13.3	2599
Senegal	48.1	51.9	2655
Sudan	54.0	46.0	4621
Togo	84.7	15.4	2046
Uganda	61.9	38.1	4339
Zimbabwe	86.1	13.9	3044
NORTH AFRICA			
Egypt	14.9	85.1	4561
Tunisia	47.7	52.4	2554
ASIA[a]			
Sri Lanka	88.4	11.7	3829
Thailand	80.8	19.2	2796
LATIN AMERICA & CARIBBEAN[b]			
Bolivia	31.8	68.2	2577
Brazil	52.0	48.0	2017
Colombia	46.6	53.4	1940
Dominican Republic	90.2	9.9	4172
Ecuador	50.1	49.9	2087
Guatemala	28.2	71.8	1568
Peru	24.9	75.1	1700
Trinidad/Tobago	31.1	68.9	1883

[a]Data not available for Indonesia
[b]Data not available for El Salvador

TRENDS IN SERVICE COVERAGE

Tables 2.6-2.8 and Figures 2.2-2.4 show the level of service coverage during each of the five years preceding the survey and the extent to which it changed over that time period. The greatest change has occurred in tetanus toxoid immunizations; coverage increased by more than 10 percent in Bolivia, Burundi, Colombia, Guatemala, Sudan, Thailand, Tunisia, and Uganda during the five-year period preceding the survey (Figure 2.2). Improvements in antenatal and delivery care have been less striking: coverage increased by 10 percent or more for antenatal care only in Egypt and for delivery care only in Thailand (Figures 2.3 and 2.4). Liberia experienced a 7 percent decline in the coverage of antenatal care during the five years preceding the survey, while delivery care fell by more than 5 percent in Liberia, Ondo State (Nigeria), and Togo.

Table 2.6 Trends in tetanus toxoid coverage

Percentage of births one to five years preceding the survey for which women received tetanus toxoid and the percentage of change during that period, Demographic and Health Surveys, 1986-1990

Country	Years preceding survey: 1	2	3	4	5	Percent of change
SUB-SAHARAN AFRICA						
Botswana	86	85	84	84	82	+4
Burundi	68	66	59	51	51	+17
Ghana	73	70	70	69	66	+7
Kenya	89	90	89	88	87	+2
Liberia	71	72	68	69	79	-8
Mali	18	20	17	19	18	0
Ondo State	70	71	72	72	72	-2
Senegal	31	33	32	28	31	0
Sudan	58	56	46	36	30	+28
Togo	72	74	69	69	67	+5
Uganda	68	64	51	49	44	+24
Zimbabwe	80	82	80	77	76	+4
NORTH AFRICA						
Egypt	16	14	10	9	9	+7
Tunisia	46	39	32	27	23	+23
ASIA						
Sri Lanka	82	86	86	87	90	-8
Thailand	70	69	67	64	58	+12
LATIN AMERICA/CARIBBEAN						
Bolivia	31	21	18	16	14	+17
Brazil	38	40	44	38	42	-4
Colombia	48	46	36	37	27	+21
Dom. Republic	85	88	87	86	90	-5
Ecuador	39	43	40	36	34	+5
Guatemala	22	14	14	10	9	+13
Peru	20	16	16	13	13	+7
Trinidad/Tobago	28	31	31	31	33	-5

Source: Adapted from Boerma et al., 1990

Table 2.7 Trends in antenatal care

Percentage of births one to five years preceding the survey for which women received antenatal care and the percentage of change during that period, Demographic and Health Surveys, 1986-1990

Country	Years preceding survey 1	2	3	4	5	Percent of change
SUB-SAHARAN AFRICA						
Botswana	92	91	94	93	91	+1
Burundi	82	82	81	77	76	+6
Ghana	84	83	82	82	80	+4
Kenya	76	79	77	79	76	0
Liberia	80	85	83	84	87	-7
Mali	30	34	31	33	28	+2
Ondo State	79	78	80	82	82	-3
Senegal	64	64	64	58	62	+2
Sudan	71	73	71	70	68	+3
Togo	80	83	81	80	79	+1
Uganda	88	89	86	86	85	+3
Zimbabwe	90	93	91	91	91	-1
NORTH AFRICA						
Egypt	57	58	54	50	47	+10
Morocco	28	25	27	23	21	+7
Tunisia	61	61	57	56	53	+8
ASIA[a]						
Sri Lanka	98	97	97	95	97	+1
Thailand	81	80	80	71	74	+7
LATIN AMERICA/CARIBBEAN[b]						
Bolivia	48	46	45	44	41	+7
Colombia	75	77	71	72	68	+7
Dom. Republic	96	95	93	95	95	+1
Ecuador	71	73	68	65	67	+4
Guatemala	36	34	36	33	32	+4
Mexico	76	72	69	69	68	+8
Peru	56	56	56	52	55	+1
Trinidad/Tobago	99	97	99	98	96	+3

[a]Data not available for Indonesia
[b]Data not available for El Salvador

Table 2.8 Trends in delivery care

Percentage of births one to five years preceding the survey for which women received delivery care and the percentage of change during that period, Demographic and Health Surveys, 1986-1990

Country	Years preceding survey 1	2	3	4	5	Percent of change
SUB-SAHARAN AFRICA						
Botswana	79	79	77	79	72	+7
Burundi	18	18	21	19	19	-1
Ghana	41	41	41	39	38	+3
Kenya	50	54	48	50	49	+1
Liberia	55	61	55	64	67	-12
Mali	31	33	33	33	28	+3
Ondo State	54	56	61	61	61	-7
Senegal	41	43	42	38	43	-2
Sudan	69	70	69	67	68	+1
Togo	51	55	55	53	57	-6
Uganda	38	41	36	38	39	-1
Zimbabwe	70	72	68	69	69	+1
NORTH AFRICA						
Egypt	37	37	33	33	33	+4
Morocco	28	28	27	25	22	+6
Tunisia	71	72	69	70	65	+6
ASIA						
Indonesia	39	39	35	35	34	+5
Sri Lanka	90	87	85	87	89	+1
Thailand	74	70	64	64	59	+15
LATIN AMERICA/CARIBBEAN[a]						
Bolivia	44	43	42	43	38	+6
Colombia	73	73	69	72	68	+5
Dom.Republic	90	91	89	90	89	+1
Ecuador	65	64	62	54	59	+6
Guatemala	29	31	29	30	27	+2
Mexico	70	72	70	68	67	+3
Peru	50	50	48	48	49	+1
Trinidad/Tobago	99	99	97	97	96	+3

[a]Data not available for El Salvador

Figure 2.2—Percentage of births in the five years preceding the survey for which women received tetanus toxoid during pregnancy, by region, Demographic and Health Surveys, 1986-1990

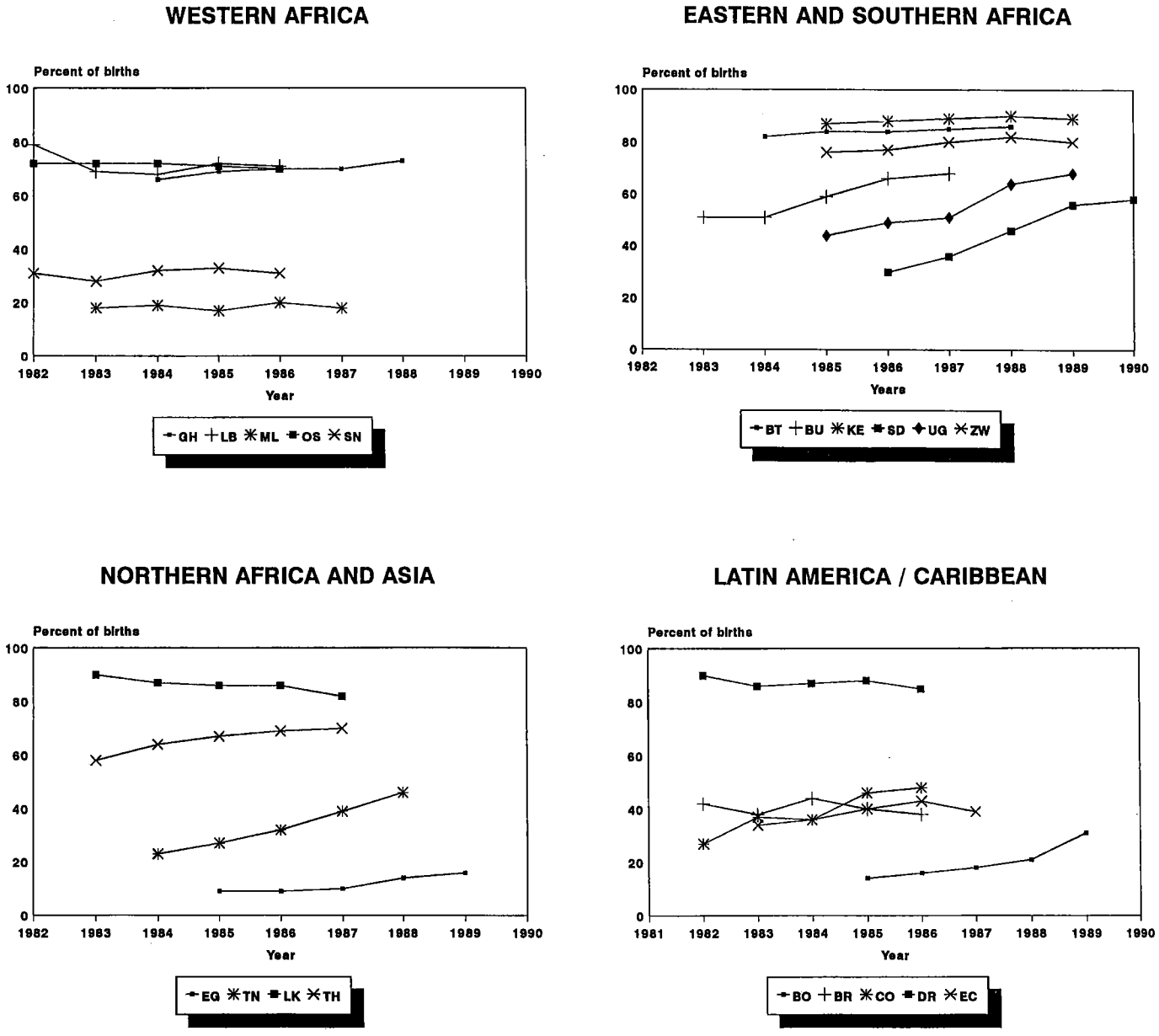


Figure 2.3—Percentage of births in the five years preceding the survey for which women received antenatal care, by region, Demographic and Health Surveys, 1986-1990

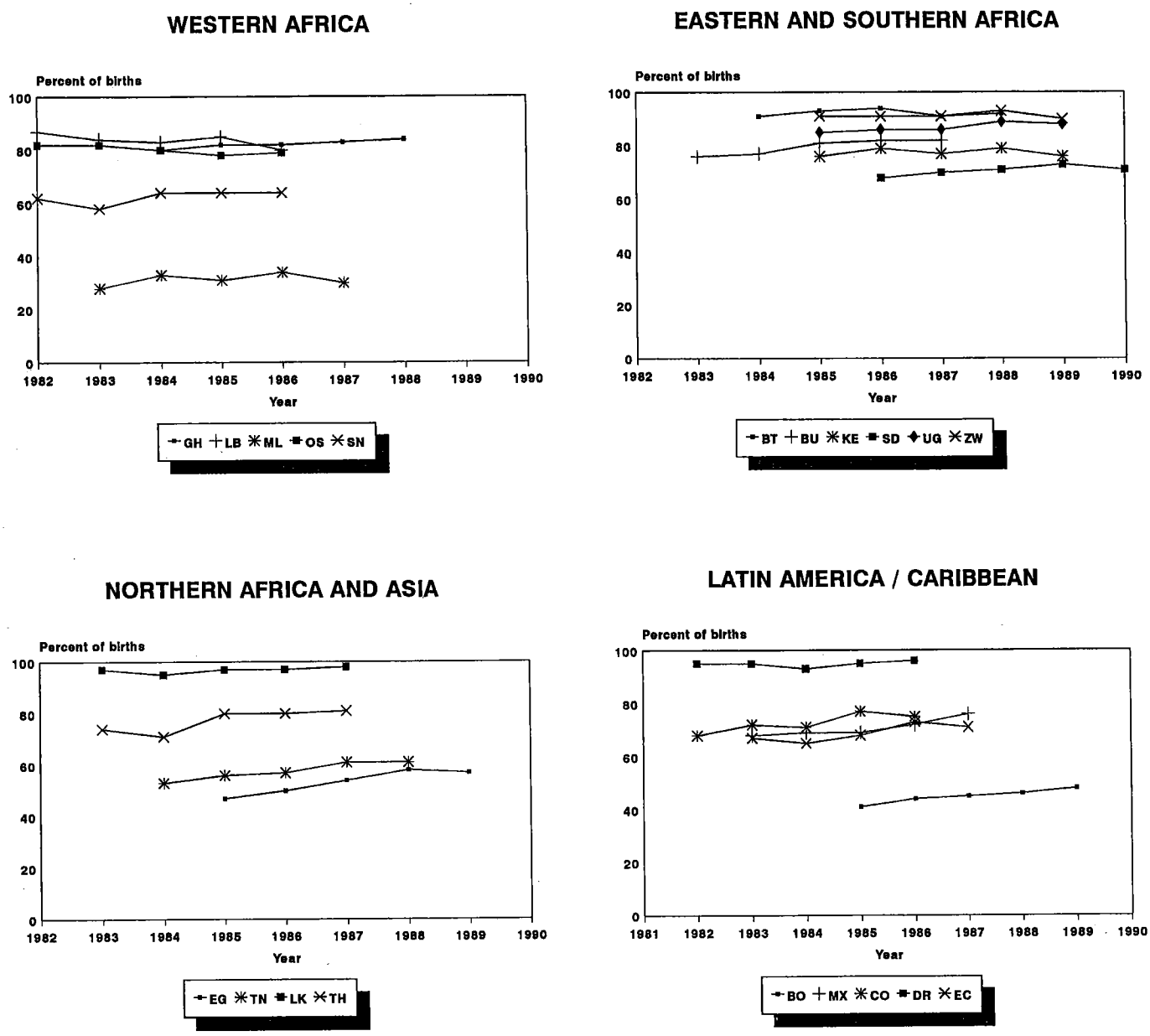
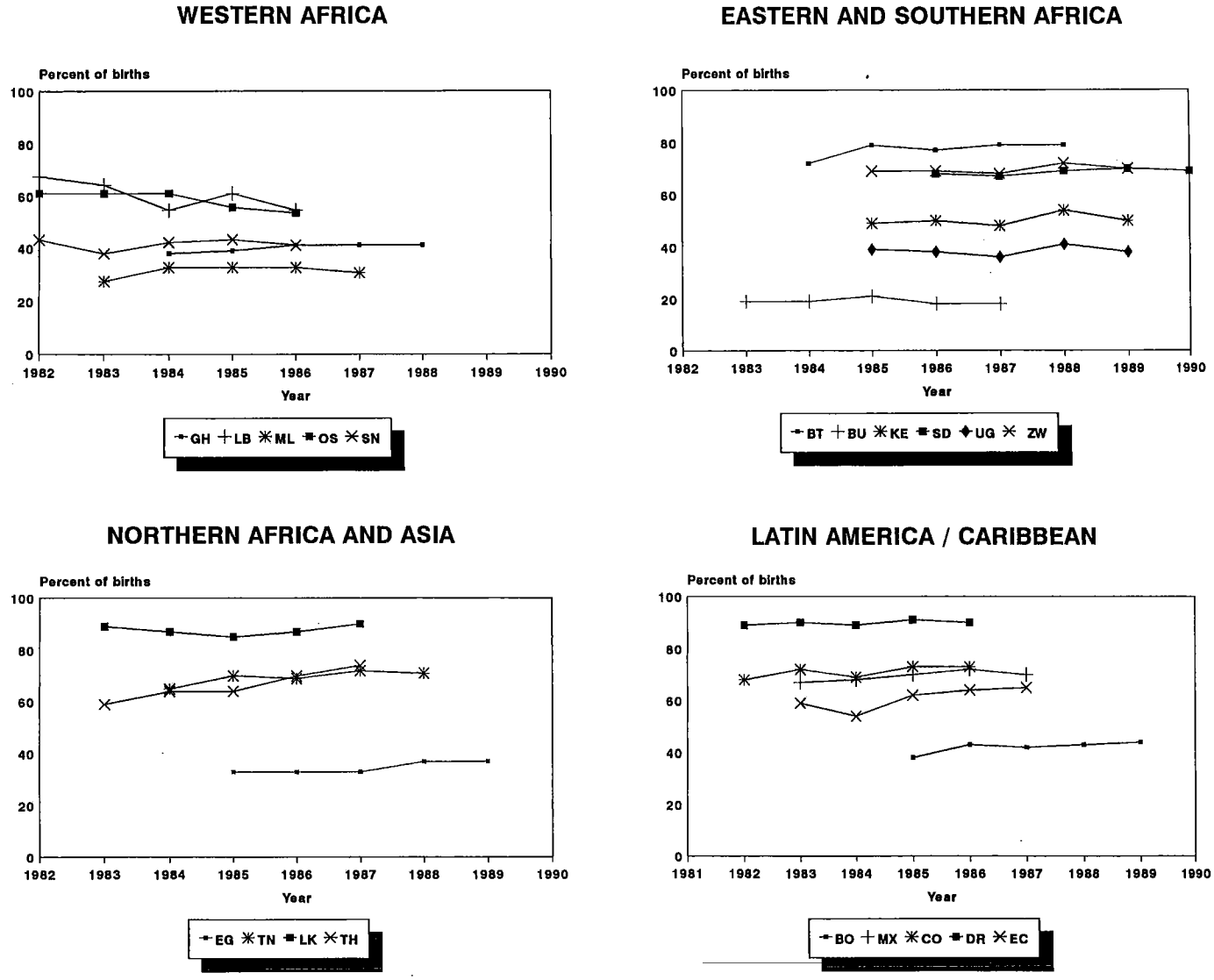


Figure 2.4—Percentage of births in the five years preceding the survey for which women received delivery care, by region, Demographic and Health Surveys, 1986-1990



PATTERNS OF SERVICE USE

One major function of antenatal care is to screen and monitor women during pregnancy. Women with high-risk pregnancies, whether because of bio-demographic, medical, or social factors, can be identified during antenatal care and subsequently referred for delivery care. Antenatal care also serves to establish rapport between women and providers in the health care system. This contact facilitates women's efforts to seek timely assistance during labor and delivery and may be life-saving when emergencies occur.

Table 2.9 presents the distribution of births according to whether women received both antenatal and delivery care, only one of these services, or neither. DHS does not provide any data on the process by which the care is received, so the scenarios involved can only be postulated. The cases where both antenatal and delivery care were received may include births to women who are low risk but routinely use health services as well as births to women who were referred for delivery care because of their high-risk status. Antenatal care only may include women who were screened and found to have low or no risk as well as women who, for any number of reasons, have no access to delivery care. Women who received only delivery care may have had no problems until the onset of labor when they then sought help because of complications.

Table 2.9 Levels of antenatal care and/or delivery care

Percent distribution of births in the five years preceding the survey for which women received antenatal care (ANC) from a health professional during pregnancy and/or delivery care (DC), Demographic and Health Surveys, 1986-1990

Country	ANC and DC	ANC only	DC only	No ANC or DC	Total	No. of births
SUB-SAHARAN AFRICA						
Botswana	75.7	16.5	1.8	6.0	100.0	3177
Burundi[a]	18.7	60.8	0.5	20.1	100.0	3841
Ghana	39.5	42.9	0.7	17.0	100.0	4089
Kenya	41.7	35.6	8.4	14.4	100.0	7049
Liberia	54.5	28.1	3.4	13.9	100.0	3080
Mali	25.0	6.4	6.8	61.8	100.0	3390
Ondo State, Nigeria	57.5	22.5	1.1	18.9	100.0	3249
Senegal	38.6	23.8	2.8	34.8	100.0	4253
Sudan	60.3	10.4	8.2	21.1	100.0	6536
Togo	53.3	27.4	1.0	18.3	100.0	3098
Uganda	37.7	49.1	0.7	12.6	100.0	5004
Zimbabwe	68.8	22.5	0.8	7.9	100.0	3334
NORTH AFRICA						
Egypt	25.8	27.1	8.8	38.4	100.0	8633
Morocco	14.5	10.2	11.5	63.8	100.0	6060
Tunisia	49.5	8.0	19.4	23.1	100.0	4439
ASIA[b]						
Sri Lanka	85.7	10.9	1.5	1.9	100.0	3965
Thailand	60.4	16.6	5.5	17.5	100.0	3631
LATIN AMERICA/CARIBBEAN[c]						
Bolivia	34.5	10.5	7.6	47.4	100.0	5731
Brazil[a]	15.0	38.9	11.9	34.2	100.0	3463
Colombia	60.6	12.0	10.5	16.9	100.0	2671
Dominican Republic	86.5	8.3	3.3	1.9	100.0	4401
Ecuador	52.5	16.4	9.0	22.2	100.0	3031
Guatemala	21.8	12.4	7.4	58.3	100.0	4581
Mexico	62.6	8.3	7.0	22.1	100.0	5583
Peru	42.7	12.0	6.4	38.9	100.0	3106
Trinidad/Tobago	96.3	1.4	1.4	1.0	100.0	1929

[a]Women were asked where care was received instead of who provided care.
[b]Data not available for Indonesia
[c]Data not available for El Salvador

In general, in countries where the overall coverage of delivery care is high (Table 2.4), the percentage of births receiving both antenatal and delivery care is also high (Table 2.9), because most women receiving delivery care also get antenatal care. The only countries where more than 10 percent of births receive only delivery care are Brazil, Colombia, Morocco, and Tunisia.

Table 2.10 presents early neonatal mortality (ENNM) rates, which include infant deaths during the first week of life, according to whether antenatal and/or delivery care were received. There is no consistent pattern across the surveys. While higher mortality might be expected among those births receiving only delivery care or no care at all, this relationship is not constant for all surveys in the bivariate analysis. This is not surprising, however, since there are many other determinants both of health care use and of early neonatal mortality which are not included in this analysis. In addition, DHS data on dead children are less complete than data on surviving children (Stewart et al., 1993).

The use of health services at the time of delivery appears to be influenced by whether or not a woman received antenatal care during that pregnancy (Table 2.9). A related issue is whether the

Table 2.10 Early neonatal mortality and receipt of antenatal care and/or delivery care

Early neonatal mortality (ENNM) rates for births in the five years preceding the survey, according to whether or not antenatal care (ANC) and/or delivery care (DC) was received, Demographic and Health Surveys, 1986-1990

Country	Overall ENNM rate	ENNM rate: ANC and DC	ENNM rate: ANC only	ENNM rate: DC only	ENNM rate: No ANC or DC	No. of births
SUB-SAHARAN AFRICA						
Botswana	18	14	26	27	45	3177
Burundi[a]	24	34	15	67	42	3841
Ghana	34	34	24	172	54	4089
Kenya	20	20	13	17	26	7049
Liberia	29	23	37	17	36	3080
Mali	36	20	45	16	43	3390
Ondo State, Nigeria	17	17	21	--	15	3249
Senegal	27	23	21	25	36	4253
Sudan	30	27	29	34	37	6536
Togo	28	33	18	33	30	3098
Uganda	28	23	28	24	38	5004
Zimbabwe	21	15	22	36	74	3334
NORTH AFRICA						
Egypt	23	28	13	45	22	8633
Morocco	21	16	23	28	20	6060
Tunisia	17	16	12	22	17	4439
ASIA[b]						
Sri Lanka	12	10	10	16	128	3965
Thailand	15	10	10	2	39	3631
LATIN AMERICA/CARIBBEAN[c]						
Bolivia	22	12	15	29	28	5731
Brazil[a]	24	23	22	30	20	3463
Colombia	15	12	30	8	17	2671
Dominican Republic	28	25	30	67	84	4401
Ecuador	22	15	14	49	33	3031
Guatemala	23	19	27	39	21	4581
Peru	21	13	28	31	27	3106
Trinidad/Tobago	18	14	--	111	316	1929

-- = <0.05 percent
[a]Women were asked where care was received instead of who provided care.
[b]Data not available for Indonesia
[c]Data not available for El Salvador

use of maternity services is consistent for a given woman from one birth to the next. This question is particularly relevant for studies of the determinants of health care utilization.

In DHS-I, questions on the use of maternity care were asked only in relation to live births occurring in the five years preceding the survey. Therefore, patterns in the consistency of use can only be studied for women who had more than one birth during the five-year time period under study. Of those women who gave birth during that time, from 24 to 56 percent had more than one live birth during the period (data not shown). Tables 2.11-2.13 show these women's patterns of use for tetanus toxoid injections, antenatal care, and delivery care.

Table 2.11 Patterns of tetanus toxoid immunization

Tetanus toxoid (TT) immunization among women with more than one live birth in the five years preceding the survey, according to consistency of TT immunization between the last pregnancy and previous pregnancies, Demographic and Health Surveys, 1986-1990

Country	Number of women with a live birth in the five years preceding the survey	Number of women with more than one live birth in the five years preceding the survey	Percent of women consistently receiving TT for last and at least one previous birth	Percent of women consistently failing to receive TT for both their last and all previous births	Percent of women with inconsistent TT immunization for the last and previous births
SUB-SAHARAN AFRICA					
Botswana	2,354	760	77.3	10.6	12.0
Burundi	2,351	1,306	46.3	27.6	26.1
Ghana	2,716	1,176	59.9	23.2	16.9
Kenya	4,237	2,248	83.5	5.9	10.6
Mali	2,108	1,073	13.9	76.6	9.5
Ondo State	2,153	954	63.7	20.5	15.7
Senegal	2,661	1,387	25.4	61.1	13.6
Sudan	4,021	2,093	28.7	41.0	30.3
Togo	2,058	895	57.3	20.4	22.2
Uganda	2,915	1,638	41.3	29.7	28.9
Zimbabwe	2,253	920	70.3	14.2	15.4
NORTH AFRICA[a]					
Egypt	5,329	2,582	6.7	84.4	9.0
Tunisia	2,677	1,382	20.5	56.9	22.6
ASIA[b]					
Sri Lanka	2,843	977	68.7	5.6	25.7
Thailand	2,872	682	49.0	32.5	18.5
LATIN AMERICA & CARIBBEAN[c]					
Bolivia	3,694	1,689	10.5	70.2	19.3
Brazil	2,357	841	27.5	48.0	24.5
Colombia	1,858	673	26.3	49.7	24.0
Dominican Republic	2,839	1,211	80.7	7.0	12.3
Ecuador	2,018	802	30.2	52.1	17.7
Guatemala	2,782	1,469	7.2	80.1	12.7
Peru	2,021	864	8.9	80.7	10.4
Trinidad/Tobago	1,338	479	24.0	58.2	17.8

[a]Data not available for Morocco
[b]Data not available for Indonesia
[c]Data not available for El Salvador

Table 2.12 Patterns of antenatal care

Antenatal care (ANC) received from a health professional by women with more than one live birth in the five years preceding the survey, according to consistency of receipt of ANC between the last pregnancy and previous pregnancies, Demographic and Health Surveys, 1986-1990

Country	Number of women with a live birth in the five years preceding the survey	Number of women with more than one live birth in the five years preceding the survey	Percent of women consistently receiving ANC for last and any previous birth	Percent of women consistently failing to receive ANC for both their last and previous births	Percent of women with inconsistent record of receipt of ANC for the last and previous births
SUB-SAHARAN AFRICA					
Botswana	2,354	760	87.4	6.7	5.5
Burundi	2,351	1,306	73.1	12.7	14.2
Ghana	2,716	1,176	75.3	11.8	12.9
Kenya	4,237	2,248	72.6	19.5	7.9
Mali	2,108	1,073	23.7	60.9	15.4
Ondo State	2,153	954	76.8	14.3	8.9
Senegal	2,661	1,387	55.4	31.1	13.5
Sudan	4,021	2,093	65.6	25.8	8.6
Togo	2,058	895	71.2	15.1	13.7
Uganda	2,915	1,638	81.7	8.3	10.1
Zimbabwe	2,253	920	85.0	6.3	8.7
NORTH AFRICA					
Egypt	5,329	2,582	38.5	40.1	21.4
Morocco	3,754	1,849	13.5	72.6	13.9
Tunisia	2,677	1,382	44.9	37.3	17.8
ASIA[a]					
Sri Lanka	2,843	977	94.2	2.1	3.7
Thailand	2,872	682	62.3	25.4	12.1
LATIN AMERICA & CARIBBEAN[b]					
Bolivia	3,694	1,689	31.7	54.5	13.8
Brazil	2,357	841	43.8	26.9	29.3
Colombia	1,858	673	58.3	25.5	16.2
Dominican Republic	2,839	1,211	91.8	3.6	4.6
Ecuador	2,018	802	56.9	30.3	12.9
Guatemala	2,782	1,469	23.9	63.9	12.3
Mexico	3,743	1,492	58.5	28.7	12.7
Peru	2,021	864	42.2	44.3	13.4
Trinidad/Tobago	1,338	479	96.0	0.6	3.4

[a]Data not available for Indonesia
[b]Data not available for El Salvador

Table 2.13 Patterns of delivery care

Delivery care (DC) received from a health professional by women with more than one live birth in the five years preceding the survey, according to consistency of receipt of DC between the last pregnancy and previous pregnancies, Demographic and Health Surveys, 1986-1990

Country	Number of women with a live birth in the five years preceding the survey	Number of women with more than one live birth in the five years preceding the survey	Percent of women consistently receiving DC for last and any previous deliveries	Percent of women consistently failing to receive DC for both their last and previous deliveries	Percent of women with inconsistent record of receipt of DC for last and previous deliveries
SUB-SAHARAN AFRICA					
Botswana	2,354	684	65.4	17.1	17.4
Burundi	2,351	1,080	11.2	74.0	14.7
Ghana	2,716	1,014	27.8	56.0	16.2
Kenya	4,237	1,720	34.9	42.3	22.8
Mali	2,108	861	25.1	62.1	12.7
Ondo State	2,153	832	49.8	34.0	16.2
Senegal	2,661	1,177	33.6	53.3	13.1
Sudan	4,021	1,644	64.1	28.6	7.3
Togo	2,058	781	40.9	41.8	17.3
Uganda	2,915	1,248	27.6	53.8	18.5
Zimbabwe	2,253	798	54.7	24.8	20.5
NORTH AFRICA					
Egypt	5,329	1,919	22.4	64.3	13.3
Morocco	3,754	1,436	15.0	71.7	13.4
Tunisia	2,677	1,048	58.0	26.2	15.8
ASIA					
Indonesia	5,975	1,639	31.1	59.7	9.2
Sri Lanka	2,843	850	79.5	9.7	10.7
Thailand	2,872	612	49.1	36.7	14.2
LATIN AMERICA & CARIBBEAN[c]					
Bolivia	3,694	1,308	30.7	58.9	10.5
Brazil	2,357	841	55.2	3.6	41.1
Colombia	1,858	539	56.5	26.0	17.4
Dominican Republi	2,839	914	83.2	6.6	10.3
Ecuador	2,018	612	49.0	41.3	9.7
Guatemala	2,782	1,115	19.2	71.1	9.7
Mexico	3,743	1,118	56.8	32.3	10.8
Peru	2,021	651	36.2	54.1	9.7
Trinidad/Tobago	1,338	365	95.0	0.2	4.8

[a]Data not available for El Salvador

For each woman, usage during the most recent birth is compared to usage during previous births in the five-year period preceding the survey. Thus women who used a service both in the most recent birth and in any previous births are viewed as *consistent users*. Women who did not use a service either in the last birth or in all previous births are viewed as *consistent nonusers*. The remaining women, the *inconsistent users*, either used a service for the first time during the most recent birth or failed to use a service that they had used before. The size of each group is calculated as a percentage of the total number of women who had more than one live birth in the five years preceding the survey.

In general, the percentage of inconsistent users is relatively low, particularly for antenatal care: there are only two countries in which more than 20 percent of women inconsistently used antenatal care (Table 2.12). Not surprisingly, those countries with higher overall coverage for antenatal and delivery care have more consistent users, while those with lower coverage have more consistent nonusers.

The tabulation of user groups by residence and education (not shown) is problematic because of small numbers in the inconsistent user cells, but, in general, there are higher percentages of consistent nonusers who are rural and/or uneducated. These factors can to some extent be controlled in multivariate analyses. However, a woman's previous maternity care experience cannot be controlled when each birth is treated independently, because maternity care information was collected for only the live births in the past five years. While past experience may influence future use, issues of physical and socioeconomic access clearly also have an explanatory role.

INSUFFICIENT COVERAGE

In summary, it is clear that the proportion of women with access to and/or utilizing maternity care services in the majority of countries surveyed is insufficient to assure a healthy pregnancy outcome for women and their children. These data indicate no trends of increased coverage for maternity services other than tetanus toxoid during the five years prior to the survey. Many women experienced missed opportunities for immunization during antenatal care visits. Comparisons of women according to their place of residence and educational levels reveal expected differentials in service use. Examination of patterns of use for individual women show high consistency from one pregnancy to the next and also for use of antenatal care among those women who were attended during delivery.

3 High-Risk Births

Targeting family planning services to prevent high-risk and unwanted pregnancies has the potential to significantly reduce both maternal and infant mortality (Koenig et al., 1988; Trussell and Pebley, 1984; Winikoff and Sullivan, 1987). Increased access to information about family planning and improved contraceptive services for women at risk could facilitate improvements in coverage, quality, and effectiveness of maternity care services. This chapter describes the fertility-related risk factors and their relationship with infant and child and maternal mortality, while the next chapter measures the need for targeted family planning services to prevent high-risk births.

For the purposes of this report a birth is defined as a fertility-related high-risk birth if one or more of the following conditions apply:

- the mother is below 18 years of age or more than 34 years at the time of the birth;
- the woman has already had three or more live births; or
- the birth occurs within 24 months of a previous live birth (Burkhalter et al., 1991).

For simplicity, births in these groups are referred to here as high-risk births, although we recognize that this excludes other high-risk births linked to different types of risk factors.

3.1 INFANT AND CHILD MORTALITY

BIRTH SPACING

A number of studies conducted over the years have concluded that birth spacing influences child survival. Studies have shown that there is a negative association between short birth intervals and child survival (Boerma and Bicego, 1992; Cantrelle and Leridon, 1971; Cleland and Sathar, 1984; Hobcraft et al., 1983, 1985; Palloni and Millman, 1986; Trussell and Hammerslough, 1983; Wolfers and Scrimshaw, 1975). This is especially true in the case of the length of the preceding birth interval. There are several mechanisms through which short birth intervals may influence a child's chances of survival, but the relative importance of each of these mechanisms may vary in different settings and populations.

One of the most impressive results was obtained by Hobcraft, McDonald, and Rutstein (1983) in an analysis of infant and early child mortality in 26 developing countries that participated in the World Fertility Survey (WFS). They found dramatic excess mortality for closely spaced births and concluded that "the risk of dying is generally considerably increased for a child who has a sibling born within the preceding two years, and that the risk of dying, particularly during the second year of life, was higher if the mother had an additional birth within a short period" (Hobcraft et al., 1983: 363). In an effort to overcome the confounding effects of socioeconomic differentials, the authors updated and expanded their earlier study to include the influence of bio-demographic birth determinants on infant and early child mortality for 39 WFS countries (Hobcraft et al., 1985). This follow-up study reaffirmed their earlier conclusion that closely spaced births are less likely to survive. They concluded that any birth that occurred within two years of the index birth was "linked with considerable excess mortality for the index child" even when controlling for birth order, age of mother, other spacing effects, and education (Hobcraft et al., 1985: 370).

In a more recent study using DHS data from 17 countries, Boerma and Bicego (1992) found that short preceding birth intervals of less than 24 months increased the neonatal mortality risk by 98 percent, when controlling for twin births, sex, mother's age, birth order, mother's education, and economic status of the household and residence. This percentage dropped to 88 percent when the survival status of the previous birth was also taken into account.

In-depth studies of WFS data from Sri Lanka and Pakistan give further credence to the conclusion that birth spacing influences child survival (Cleland and Sathar, 1984; Trussell and Hammerslough, 1983). In order to overcome the confounding effect of child death on the length of a subsequent interval, Cleland and Sathar controlled for the survival status of the preceding birth and arrived at the same conclusion.

One possible mechanism linking birth spacing to child survival is competition from other older or male siblings, but the evidence is mixed. Some researchers have found that a child may be weaned early, with deleterious effects on its survival, when another birth closely follows its own. In Senegal, for example, Cantrelle and Leridon (1971) found that the probability of a child dying within one year increased from 50 to 150 percent when the child was weaned during the succeeding pregnancy. Palloni and Millman (1986), however, measured the mediating role of breastfeeding on the preceding birth interval and concluded that birth spacing did not appear to influence survival through breastfeeding. They found that breastfeeding influenced survival only during the first six months of life and that its effect declined with the age of the index child. They also found that the effects both of breastfeeding and of the length of the following birth interval are strongest among those socioeconomically disadvantaged groups in which mortality is highest.

Excess mortality resulting from closely spaced births has also been attributed to the drain on a woman's nutritional resources. Studies have found that repeated pregnancies, especially with short birth intervals, result in *maternal depletion syndrome* in which the mother does not have sufficient time to recover, both physically and nutritionally, from the birth of each child; she is therefore more likely to have pregnancy losses and low birth weight babies (Merchant

and Martorell, 1988; Winikoff, 1983). Low birth weight, premature, and small-for-date babies have poorer survival chances (Hobcraft et al., 1983). However, other studies have failed to find convincing evidence linking maternal health to birth spacing and child survival (DaVanzo et al., 1984). Maternal depletion may also increase the likelihood of deaths to mothers, thereby jeopardizing the survival chances of their children.

Yet another possible mechanism is an indirect link with the socioeconomic status of parents. For instance, financially disadvantaged families may not have enough money to buy sufficient and/or nutritious food to feed the whole family. Moreover, low levels of education are linked to poor child-care practices because poorly educated parents are less likely to use maternal and child health services (Boerma et al., 1990). In a more recent examination of DHS-I data, Bicego and Boerma (1991) addressed a series of questions regarding the statistical association between maternal education and child health and survival. They concluded that while there is a significantly elevated risk of dying throughout the first two years of life associated with low levels of education, this risk is more pronounced during the post-neonatal period. This relationship with education in the post-neonatal period also tends to be more significant in urban than in rural areas. However, in 12 of the 17 countries examined, the education effect lost its statistical significance when controlling for economic conditions of the household.

Finally, the effects of close spacing may, in part, reflect the need to replace a dead child soon afterwards, resulting in a poorly spaced birth that is exposed to the same factors that might have caused the death of the previous child. In all these cases, the magnitude of the risk associated with rapid childbearing may increase with the number of children so conceived.

PARITY

The relationship between infant mortality and parity typically is a J-shaped curve, with substantial risks associated with both first- and high-order births when there is no control for maternal age. Compared with second- and third-order births, the first-born may experience acute excess mortality soon after birth, but after age one this disadvantage may wane. In contrast, mortality for high birth order children may remain elevated at all ages. This lack of decline with age could be due to a combination of factors: competition from siblings, being cared for by someone other than the mother (perhaps an older sibling), and the unwantedness of the birth (Galway et al., 1987).

Nortman (1974) contends that there is a basic curvilinear relationship between infant mortality and birth order that results from underlying biological factors. According to this argument, high-order births may be at greater risk because a woman's reproductive resources are exhausted. However, this relationship may be exaggerated due to the confounding effects of socioeconomic status, short birth intervals, or older age (Trussell and Pebley, 1984). In an analysis of 34 WFS countries that controlled for child spacing, survival, sex of the index child, and mother's educational level, Hobcraft et al. (1985) found that first births are at an exceptionally high risk especially during the first year of life. Generally, first births experience an excess risk of about 30 percent compared with second or third births, although the excess risk is 60 percent in countries in the Middle East and North Africa. There is also strong evidence for higher mortality, in excess of 20 percent, for births of order seven and over. However, this study concludes that births of order four to six show only a small excess risk of just over 5 percent.

AGE OF MOTHER

Children born to very young or to older women may also experience excess mortality. Two possible explanations linking young maternal age and elevated risks of child mortality have been forwarded, although the evidence available is fraught with methodological, statistical, and theoretical problems (Hobcraft, 1987; Potter, 1988). First, pregnancies that occur before mothers have attained full maternal growth or physical maturation may result in a greater risk of complications during pregnancy or childbirth (Aitken and Walls, 1986). Second, young women who become pregnant are less likely to receive early and adequate prenatal care, they are more likely to be from a socioeconomically disadvantaged environment, and they are less likely to be able to care for their children because they themselves are psychologically immature (Geronimus, 1987). Moreover, there is also the possibility that the child is not wanted.

There are fewer studies biologically linking older maternal age with excess child mortality. Older maternal age, however, is associated with congenital abnormalities such as Down's syndrome (Hansen, 1986).

3.2 MATERNAL MORTALITY

BIRTH SPACING

Although a number of researchers have hypothesized that short birth intervals would increase the risk of maternal mortality due to the so-called maternal depletion effect (Omran and Standley, 1981; Winikoff, 1983), evidence is lacking. There are no studies specifically addressing the impact of birth spacing on maternal mortality in developing countries, because data associating reproductive patterns and maternal health are generally not available in these countries. Moreover, unlike research on infant and child mortality, few of the available studies on maternal health use multivariate statistical techniques to control for potentially confounding variables.

PARITY AND AGE

Births to younger women are also often primiparous births. Because age and parity are so strongly associated, they must be controlled for simultaneously in order to study the independent effects

of each of them on maternal health. However, there are few such studies, and their results are conflicting. Some find elevated risks of maternal mortality for younger and primigravid women (Chen et al., 1975; Chi et al., 1981), while others show no increased risk (Koenig et al., 1988). One problem with these studies is that all births to women under age 20 are lumped together. In a hospital-based study in Nigeria that further subdivided young mothers by age, the increased risk of maternal mortality was most important for young women under age 17 and was even more marked for those under 15 (Harrison and Rossiter (1985). However, since younger women may only be brought to hospital if they have complications, there may be a selection bias in this sample.

Studies have also found that pregnancy-induced hypertension, obstructed labor due to the smallness of the pelvis, and malarial infection are the most common causes of morbidity and mortality among younger and primigravid women (Aitken and Walls, 1986; World Health Organization, 1988). However, these increased risks may reflect socioeconomic status and access to maternal care.

The confounding effects of age and parity are also present in studies investigating the relationship between maternal health, older maternal age, and/or high parity. Population-based studies have found a pattern of increasing risk of maternal death for each successive birth after the second or third birth (Chi et al., 1981; Koenig et al., 1988). These researchers have found that older women, especially those above age 35, generally tend to experience a greater risk of death at all parities due to problems associated with malpresentation and placental abnormalities, which may result in uterine rupture or hemorrhage associated with rupture.

3.3 HIGH-RISK BIRTHS: THE EXTENT OF THE PROBLEM

WOMEN AT RISK

For the purpose of this report, all women interviewed were classified into single- or multiple-risk categories. A woman has a possibility of having a high-risk birth if at the time of interview she was less than 17 years and three months, more than 34 years and three months, had a birth less than 15 months ago, and has had three or more children (this assumes a nine-month gestation period). Women who were classified as having a single risk factor had only one of the above-mentioned characteristics. For women pregnant at the time of the interview, the criteria stated is adjusted according to the duration of the pregnancy.

As shown in Table 3.1, the majority of women in all but five countries (Brazil, Colombia, the Dominican Republic, El Salvador, and Thailand) fell into one or more of the high-risk groups. Overall, 76 percent of women in North Africa and 72 percent of women in sub-Saharan Africa were classified as being in a high-risk group; this compares with 57 percent in Asia and 53 percent in Latin America and the Caribbean. The largest category in all four regions was the combination of high parity and older maternal age, which ranged from 8 percent in Brazil to 34 percent in Egypt. Most of the women with a single risk factor in sub-Saharan Africa, North Africa, and Asia fell into the high parity risk group; this ranged from 5 percent in Brazil to 16 percent in the Sudan. Young maternal age is relatively more important in sub-Saharan Africa and in Latin America and the Caribbean; it ranged from just 0.1 percent in Tunisia to 15 percent in Ondo State (Nigeria).

The existence of these demographic characteristics does not, by themselves, pose a risk to the mother and/or her children. It is only when a woman with one or more high-risk characteristic gives birth that they potentially become dangerous.

INCIDENCE OF HIGH-RISK BIRTHS

Table 3.2 shows what proportion of all live births in the ten years preceding the survey were high-risk births, that is, what proportion were born to women who, at the time of the birth, fell into one or more of the bio-demographic risk categories.

The incidence of high-risk births ranged from 45 percent in Thailand to 72 percent in Mali and Sudan. Depending on the country, between 30 and 44 percent of all births were exposed to a single risk factor, while between 15 and 32 percent of all births were exposed to two or more risk factors. Of all the risk factors considered, high-order births occurred most frequently, ranging from 11 percent in Thailand and Trinidad and Tobago to 31 percent in Ondo State (Nigeria). Short birth intervals were also a common problem. Of the multiple-risk categories, the most frequent were high parity in combination either with older maternal age or short birth intervals.

RELATIVE RISK OF INFANT AND CHILD MORTALITY

Table 3.3 examines the relative risk of infant and child mortality associated with the various bio-demographic risk factors. Two of the single risk factors are associated with excess infant and child mortality: mortality is increased by 64 percent for children born to young mothers and by 50 percent for those with short birth intervals. The excess mortality associated with births to young mothers is greatest in Latin America and the Caribbean, especially in Brazil, El Salvador, Peru, and Trinidad and Tobago where it exceeds 100 percent. Egypt is another country where the excess mortality associated with births to young mothers exceeds 100 percent. The excess mortality associated with births of order four or higher ranges from 1 percent in Senegal to 59 percent in El Salvador.

Births to mothers in multiple-risk categories carry greater risks than births to mothers in a single-risk category. This is especially true when mothers are young and have closely spaced births. On average there is a 130 percent excess in infant and child mortality when mothers are below age 18 and have births within a 24 month interval. The combination of older maternal age, short birth intervals, and high parity carries an average 140 percent excess mortality, while births that are too closely spaced and too high a birth order face excess mortality of 108 percent.

Table 3.1 Demographic risk factors for all women interviewed

Percentage of women interviewed, by demographic risk factors, Demographic and Heath Surveys, 1985-1990

Country	Single risk factor					Multiple risk factor[a]						Total		No. of women interviewed
	Too young	Too old	Too soon	Too many	Total	Too young and too soon	Too old and too soon	Too old and too many	Too old, too soon, and too many	Too soon and too many	Total	At risk	Not at risk	
SUB-SAHARAN AFRICA														
Botswana	8.6	3.8	9.6	13.2	35.2	0.7	0.0	16.1	3.3	7.5	27.6	62.8	37.2	4368
Burundi	8.1	2.2	8.7	11.5	30.5	0.0	0.0	18.5	6.4	12.7	37.6	68.1	31.9	3970
Ghana	8.4	2.6	8.2	13.3	32.5	0.4	0.0	20.9	5.2	9.9	36.4	68.9	31.1	4488
Kenya	9.4	2.1	7.9	15.1	34.5	0.3	0.1	19.9	4.8	12.5	37.6	72.1	27.9	7150
Liberia	8.1	4.2	10.4	13.0	35.7	1.2	0.3	15.9	5.1	13.9	36.4	72.1	27.9	5239
Mali	5.3	3.9	9.2	14.9	33.3	0.6	0.2	22.0	7.6	15.9	46.3	79.6	20.4	3200
Ondo State	15.0	1.4	6.2	9.7	32.3	0.3	0.1	27.4	6.4	7.9	42.0	74.3	25.7	4213
Senegal	9.1	2.9	7.4	15.2	34.6	0.8	0.0	17.5	4.6	13.2	36.1	70.7	29.3	4415
Sudan	1.0	3.6	10.2	16.0	30.8	0.3	0.2	28.6	5.9	13.9	48.9	79.7	20.3	5860
Togo	9.5	2.2	7.7	13.7	33.1	0.6	0.1	19.8	4.9	11.1	36.5	69.6	30.4	3360
Uganda	10.7	2.6	8.7	14.0	36.0	1.1	0.1	16.5	5.1	15.3	38.1	74.1	25.9	4730
Zimbabwe	10.9	3.2	7.1	14.6	35.8	0.4	0.0	19.0	3.4	8.0	30.8	66.6	33.4	4201
NORTH AFRICA														
Egypt	0.8	5.6	9.7	14.7	30.8	0.3	0.2	33.7	4.4	11.0	49.6	80.4	19.6	8911
Morocco	1.0	5.1	8.4	15.2	29.7	0.2	0.3	29.2	5.5	12.3	47.5	77.2	22.8	5982
Tunisia	0.1	5.2	10.3	13.2	28.8	0.1	0.2	25.6	5.1	10.9	41.9	70.7	29.3	4184
ASIA														
Indonesia	0.8	8.0	7.6	15.6	32.0	0.2	0.1	29.0	2.2	6.1	37.6	69.6	30.4	11884
Sri Lanka	0.3	11.9	9.1	6.4	27.7	0.0	0.7	19.4	1.5	4.0	25.6	53.3	46.7	5865
Thailand	0.6	9.2	7.5	5.8	23.1	0.2	0.2	20.6	1.1	2.0	24.1	47.2	52.8	6775
LATIN AMERICA/CARIBBEAN														
Bolivia	9.7	6.3	7.2	10.6	33.8	0.3	0.2	20.5	3.5	8.0	32.5	66.4	33.7	7923
Brazil	10.0	6.9	6.5	5.1	28.5	0.4	0.2	8.3	1.2	3.9	14.0	42.5	57.5	5892
Colombia	10.1	6.6	6.0	6.4	29.1	0.4	0.1	13.0	1.1	4.0	18.6	47.7	52.3	5331
Dominican Rep.	11.5	3.9	7.4	5.4	28.2	0.6	0.1	9.2	0.8	3.8	14.5	42.7	57.4	7645
Ecuador	9.9	5.4	7.6	9.3	32.2	0.6	0.3	13.7	2.2	6.1	22.9	55.1	44.9	4713
El Salvador	10.3	3.9	7.9	5.8	27.9	0.6	0.1	12.1	1.8	5.5	20.1	48.0	52.0	5207
Guatemala	10.7	3.5	7.8	11.7	33.7	0.6	0.1	13.2	3.9	11.9	29.7	63.4	36.6	5160
Mexico	11.0	5.8	6.9	8.4	32.1	0.4	0.3	13.5	1.9	5.2	21.3	53.4	46.6	9310
Peru	10.1	5.0	6.4	9.7	31.2	0.2	0.2	20.5	2.5	5.7	29.1	60.3	39.7	4999
Trinidad & Tob.	8.2	9.6	6.6	8.7	33.1	0.1	0.3	15.3	0.8	3.8	20.3	53.4	46.6	3806

[a]There were no women in the multiple risk categories of "too young and too many" and "too young, too soon and too many."

Table 3.2 Demographic risk factors for all births in the preceding ten years

Percent distribution of births in the ten years preceding the survey by demographic risk factors, Demographic and Health Surveys, 1985-1990

Country	Single risk factor					Multiple risk factor[a]						All births		
	Too young	Too old	Too soon	Too many	Total	Too young and too soon	Too old and too soon	Too old and too many	Too old, too soon, and too many	Too soon and too many	Total	At risk	Not at risk	Total
SUB-SAHARAN AFRICA														
Botswana	8.4	1.1	5.7	20.9	36.1	0.4	0.1	9.5	1.6	5.8	17.4	53.5	46.5	100.0
Burundi	2.0	0.9	9.4	20.9	33.2	0.2	0.1	12.7	3.4	9.0	25.4	58.6	41.4	100.0
Ghana	6.0	0.6	6.3	22.4	35.3	0.5	0.2	12.9	3.0	7.2	23.8	59.1	40.9	100.0
Kenya	7.2	0.4	8.5	25.5	41.6	0.8	0.1	10.4	3.7	14.0	29.0	70.6	29.4	100.0
Liberia	10.7	1.2	10.1	18.6	40.6	1.3	0.2	8.2	3.5	11.7	24.9	65.4	34.5	100.0
Mali	8.0	0.8	8.6	22.7	40.1	1.9	0.2	11.0	4.4	14.2	31.8	71.9	28.1	100.0
Ondo State	2.8	1.2	3.6	30.9	38.5	0.1	0.1	23.1	1.9	4.2	29.4	67.9	32.1	100.0
Senegal	9.5	0.4	7.6	25.6	43.1	0.9	0.0	11.1	2.3	9.4	23.7	66.8	33.2	100.0
Sudan	6.7	0.6	9.6	25.0	41.9	1.6	0.1	9.2	3.5	16.0	30.5	72.4	27.6	100.0
Togo	7.9	0.5	5.7	24.3	38.4	0.4	0.0	13.6	2.7	8.0	24.7	63.1	36.9	100.0
Uganda	10.1	0.2	8.6	25.0	43.9	1.4	0.1	9.5	2.9	13.3	27.2	71.1	28.9	100.0
Zimbabwe	6.8	0.8	7.1	24.8	39.5	0.5	0.1	11.2	2.3	7.6	21.7	61.2	38.8	100.0
NORTH AFRICA														
Egypt	4.5	1.0	13.1	21.7	40.4	1.2	0.1	9.1	2.5	12.5	25.5	65.8	34.2	100.0
Morocco	3.4	0.8	11.5	22.3	38.0	0.7	0.2	13.3	4.0	12.2	30.4	68.4	31.6	100.0
Tunisia	0.9	1.3	16.0	18.1	36.3	0.1	0.3	10.5	3.9	11.0	25.8	62.1	37.9	100.0
ASIA														
Indonesia	6.8	0.9	10.1	18.7	36.5	0.8	0.1	9.4	2.4	8.5	21.2	57.7	42.3	100.0
Sri Lanka	2.3	3.7	13.6	12.6	32.2	0.3	0.5	7.5	1.3	5.3	14.9	47.1	52.9	100.0
Thailand	4.4	2.3	12.3	11.0	30.0	0.4	0.4	7.9	1.6	4.5	14.8	44.8	55.2	100.0
LATIN AMERICA/CARIBBEAN														
Bolivia	4.9	2.0	12.0	18.7	37.6	0.7	0.3	10.4	4.0	10.1	25.5	63.1	36.9	100.0
Brazil	4.7	1.9	14.5	13.0	34.1	0.9	0.3	4.6	2.4	13.3	21.6	55.7	44.3	100.0
Colombia	6.1	1.5	13.7	12.8	34.1	1.1	0.4	7.2	3.3	9.9	21.9	56.0	44.0	100.0
Dominican Rep	7.4	1.0	13.6	15.2	37.2	1.6	0.2	7.3	3.1	13.3	25.6	62.8	37.2	100.0
Ecuador	5.7	1.4	13.7	16.1	36.9	0.9	0.3	8.0	3.3	11.9	24.3	61.3	38.7	100.0
El Salvador	8.3	1.5	7.4	21.2	38.4	0.6	0.1	10.9	1.7	5.9	19.3	57.7	42.3	100.0
Guatemala	7.1	0.6	11.8	23.2	42.7	1.2	0.2	6.4	2.1	12.3	22.2	64.9	35.1	100.0
Mexico	6.7	1.3	13.6	17.6	39.2	1.2	0.2	8.1	3.1	11.7	24.3	63.5	36.5	100.0
Peru	4.6	1.5	13.1	17.4	36.6	0.7	0.4	11.1	4.2	12.2	28.6	65.2	34.8	100.0
Trinidad & Tobago	5.4	2.4	16.1	10.8	34.7	1.2	0.2	5.2	1.5	9.4	17.5	52.2	47.8	100.0

[a]There were only 0.1 percent births (in El Salvador) to women in the multiple risk category "too young and too many," and 0.1 percent births each in Brazil, the Dominican Republic, Mali, Egypt, and Sudan, in the multiple risk category "too young, too soon and too many."

Table 3.3 Relative risk associated with under-five mortality

Relative risk associated with under-five mortality in the five years preceding the survey by demographic risk factors (not at risk = 100), Demographic and Health Surveys, 1985-1990

Country	Single risk factor				Multiple risk factor[a]				
	Too young	Too old	Too soon	Too many	Too young and too soon	Too old and too soon	Too old and too many	Too old too soon, too many	Too soon and too many
SUB-SAHARAN AFRICA									
Botswana	126	(410)	172	97	(257)	-	96	180	160
Burundi	137	75	145	86	-	-	85	149	145
Ghana	180	(137)	170	111	(185)	-	125	140	159
Kenya	147	(378)	115	83	151	-	96	181	152
Liberia	134	46	145	94	144	(107)	86	173	148
Mali	150	(81)	175	81	197	-	93	212	173
Ondo State	120	82	83	107	-	-	93	186	108
Senegal	145	(112)	108	101	(222)	-	93	166	132
Sudan	124	106	148	89	153	-	91	150	151
Togo	93	(98)	153	92	(142)	-	105	126	121
Uganda	145	(14)	131	81	160	-	75	157	124
Zimbabwe	145	(144)	89	76	(366)	-	105	212	194
NORTH AFRICA									
Egypt	228	82	196	95	346	(278)	116	362	346
Morocco	168	66	141	87	231	133	97	173	177
Tunisia	188	81	146	90	-	-	112	339	254
ASIA									
Indonesia	134	67	137	103	226	(89)	99	223	187
Sri Lanka	170	122	125	122	(304)	101	122	197	208
Thailand	160	71	171	96	(393)	-	233	413	227
LATIN AMERICA/CARIBBEAN									
Bolivia	154	76	203	117	268	(89)	123	274	256
Brazil	272	64	212	127	(193)	179	231	425	374
Colombia	187	63	183	183	(446)	-	134	292	207
Dominican Republic	162	134	119	84	221	-	145	195	174
Ecuador	148	39	169	124	(205)	-	139	324	248
El Salvador	213	113	158	159	(376)	-	177	303	250
Guatemala	154	125	166	85	227	-	109	240	221
Mexico	140	94	150	150	434	(22)	200	292	280
Peru	240	134	188	145	(439)	135	193	388	356
Trinidad & Tobago	233	193	102	121	(489)	-	154	(309)	292
Mean	164	108	150	107	230	137	126	240	208

[a]There were no women in the multiple risk categories "too young and too many" and "too young, too soon and too many." Rates based on 50-199 births are shown in parentheses; rates are not shown for fewer than 50 births. These are excluded when calculating the mean.

4 Unmet Need for Family Planning

DHS-I data clearly show that high-risk births have a deleterious effect on maternal, infant, and child survival, although the mechanisms that link the two are not completely understood. There are two interventions that could reduce both maternal and infant and child morbidity and mortality associated with high-risk births. One is to target family planning services to women who, because of their age, their parity, or close birth spacing, are currently in a high-risk category. The other possibility is to provide better maternity care to those women who are already pregnant and will be delivering a high-risk birth. This chapter analyzes the unmet need for family planning services for noncontracepting women and the need for better methods of contraception for contracepting women who are in a high-risk category.

4.1 CONCEPTUALIZING THE UNMET NEED FOR FAMILY PLANNING

While it is difficult to assess the exact effects of women's reproductive patterns on maternal and infant and child health, evidence suggests that mortality and morbidity due to reproductive causes can be reduced if women limit the number of pregnancies that they have in their lifetime and lower the incidence of high-risk pregnancies. This would be especially beneficial where reproductive rates are high, health care facilities are inadequate or absent, and fertility-related mortality and morbidity are high. Health care planners and policy makers should examine the potential of family planning as an important tool for improving maternal and infant and child survival.

To minimize maternal and infant and child mortality resulting from high-risk births, those women who have bio-demographic risk factors and are exposed to the risk of pregnancy must be targeted for family planning. Thus far, the unmet need for contraception has been conceptualized entirely in terms of the number of women who have expressed a desire to space or limit their births. However, the role of family planning should extend beyond providing women with contraception in order to achieve their personal desires regarding family size and child spacing. Family planning can also play an important role in reducing maternal and infant and child morbidity and mortality. Given this new goal, the concept of unmet need for contraception must be expanded to include the need posed by women who fall into a high-risk category.

For the purposes of this report, women who at the time of the survey are using an IUD, injection, female or male sterilization, or Norplant® are classified as using a method appropriate for limiting family size, while women using the pill, diaphragm/foam/jelly, condom, periodic abstinence, withdrawal, and all other methods not otherwise categorized are classified as using a method appropriate for spacing. The rationale for this classification is based on the use-effectiveness of each method and, in the case of the pill, the health risks associated with use after the age of 35. Thus, if a method is sufficiently use-effective and can be used by older women without health risks, it is classified as a limiting method. This definition of contraceptive use includes all methods, even though the effectiveness of some traditional methods like herbs and folk methods is not known. Therefore, this analysis may in fact underestimate the contraceptive need among women having high fertility risks.

The concept of an unmet need for contraception was first introduced as a result of KAP surveys conducted during the 1960s and 1970s to ascertain the contraceptive knowledge, attitudes, and practices of couples of reproductive age. These surveys found a discrepancy between a woman's reproductive preferences and her contraceptive behavior, which later came to be known as the KAP-gap. It was assumed that this gap indicated an unmet need for contraception. An estimate of this measure of unmet need was easily obtained from surveys which questioned women about their desire for more children and current family planning practices. However, this conventional measure of the unmet need for contraception suffered from two basic flaws. First, it did not take into account women's birth spacing intentions, and, second, it did not attempt to establish whether women were actually exposed to the risk of conception. These flaws were due in part to the lack of such information in existing KAP survey data.

After World Fertility Survey (WFS) data became available in the 1970s and early 1980s, the measure of unmet need was refined. The new measure included not only women who did not wish to have any more children, but also women who wanted to postpone their next pregnancy and were not using any contraception. Moreover, women who were not exposed to the risk of conception were excluded (Westoff and Pebley, 1981). This revised measure has been referred to as the instantaneous KAP-gap (Bongaarts, 1991). Measures of the instantaneous KAP-gap excluded women who were currently pregnant or amenorrheic and thus did not allow for the fact that some proportion of currently nonexposed women could become exposed to the risk of pregnancy some time in the future.

In an attempt to improve the measurement of the instantaneous KAP-gap, Nortman (1982) calculated the total demand for contraception by constructing a model that took into account the number of women who have an unmet need over a period of one year, rather than at one point in time. Using data from the Contraceptive Prevalence Surveys, her model specifically allows both women whose pregnancy was unintentional and breastfeeding women to rejoin the group of exposed women who require contraceptive protection, for at least part of the time under review. However, be-

cause of its complexity, this model has not been a popular method of estimation.

Westoff (1988) has recently revised the instantaneous KAP-gap measure of the unmet need for family planning, using the more sophisticated data collected by DHS. He has improved the operational concept of unmet need by excluding married, noncontracepting women who are infecund, have not been sexually active in the past month, or are unsure of their pregnancy intentions, do not intend to practice contraception and wanted no more children. In addition, he has included those women who are unintentionally pregnant or postpartum amenorrheic following an unintentional pregnancy. (For a more detailed description of this analysis using DHS-1 data, see Westoff and Ochoa, 1991.)

Westoff's conceptualization of the KAP-gap and his subsequent conclusions have been criticized by Bongaarts (1991) who argues that Westoff's estimate of total unmet need considerably overestimates the actual unmet need. According to Bongaarts, women who are unintentionally pregnant or amenorrheic from an unintended pregnancy would practice contraception for a specific period of time and then resume their childbearing. Therefore one cannot assume that at any one point in time all those women who have mistimed their pregnancies would be current contraceptive users if all demand has been fully satisfied. Moreover, if demand for spacing preferences were fully met, this would shorten women's remaining reproductive years and hence reduce the need for contraception for limiting purposes. Bongaarts therefore has proposed a new methodology to compute the instantaneous unmet need, based on Westoff's measure of total unmet need and using the same DHS data. His model revises Westoff's estimates downward with an adjustment factor that addresses the two shortfalls just described. His key assumption is that this adjustment factor is equal to the reduction in the need for limiting that results from the satisfaction of spacing demands. (For further insight into the ensuing debate between Westoff and Bongaarts, see Westoff, 1992 and Bongaarts, 1992.)

Many researchers have attempted to conceptualize and measure the unmet need for contraception based on a couple's desire for children. None, however, have tried to incorporate a need for spacing and limiting births arising out of the bio-demographic risk factors that are associated with excess maternal and infant and child mortality. To our knowledge, this study will be the first to examine this new concept of total unmet need for family planning, which has two components. The first, or *preference-need*, arises from a woman's desire to space and/or limit her childbearing. The second, which we refer to as the *high-risk birth* or *HRB-need*, refers to the need to space and/or limit childbearing in order to reduce the risk of maternal and infant and child mortality. In other words, we assume that even though a woman may not express a preference to space or limit her births, it may be desirable for her to do so if she is in a bio-demographic risk category in order to avoid the negative health consequences associated with such a pregnancy.

4.2 MEASURING THE HRB-NEED FOR CONTRACEPTION

Most sample populations for DHS-I consist of women in the reproductive ages of 15-49 (the exceptions being Brazil and Guatemala where women were aged 15-44), irrespective of their marital status. In our measurement of the HRB-need for contraception we are interested only in those women who are at risk of conception, that is, women who are currently married, or who are currently in a consensual union, or who are currently not married but are sexually active (see Table 4.1). For short, we will refer to all these women as *sexually active*. Information about the sexual practices of unmarried women are not available for all countries, however; where populations are predominantly Muslim or Catholic, such questions were not asked.

Sexually active women in the sample population are divided into two groups—current users and nonusers of contraception. Women who do not practice any form of contraception are most at risk of conceiving a high-risk birth. Women who use some form of contraception may be protected from having a high-risk birth, but they may not always be using the most effective method of contraception given the nature of their risk characteristics. For example, older, high-parity women may be using a spacing method rather than a limiting method. These women are regarded as being in need of a better method of contraception. Another group of women also considered to be in need of a better method are those who are unintentionally pregnant because of a method failure.

Contraceptive prevalence among all women interviewed, regardless of whether they are sexually active, varies markedly from country to country as shown in Table 4.1; the proportion of users ranges from 5 percent in Mali to 62 percent in Thailand. Contraceptive prevalence is much higher in the three Asian countries surveyed and much lower in the sub-Saharan African countries surveyed. Less than 10 percent of all women interviewed are using any method of contraception in Burundi, Liberia, Mali, Ondo State (Nigeria), Sudan, and Uganda.

Nonusers of contraception can be subdivided into those who are pregnant at the time of interview and those who are not pregnant (see Figure 4.1.1). Women who are pregnant include those whose pregnancy was not intentional, that is, women who became pregnant because of a method failure. These women are then classified according to their bio-demographic risk characteristics. Women at risk are assumed to have a spacing need if they are less than 18 years old at the time of interview or face the risk of having a birth within 24 months of a previous one; they are assumed to have a limiting need if they are more than 34 years old or have had 3 or more births at the time of the survey. All other pregnant women are considered not at risk.

Table 4.1 Contraceptive use by marital status

Percentage of women currently using/not using contraception by marital status, Demographic and Health Surveys, 1985-1990

Country	Currently married women			Women in consensual union			Women currently not married or in consensual union: Sexually active[a]			Women currently not married or in consensual union: Not sexually active[a]			Total			No. of women
	Users	Non-users	Total	Users	Non-users	Total	Users	Non-users	Total	Users	Non-users	Total	Users	Non-users	Total	
SUB-SAHARAN AFRICA																
Botswana	9.5	18.8	28.3	3.4	7.4	10.8	11.9	13.2	25.1	4.9	30.9	35.8	29.7	70.3	100.0	4368
Burundi	5.7	60.8	66.5	0.1	0.6	0.7	0.1	0.3	0.4	0.5	31.9	32.4	6.4	93.6	100.0	3970
Ghana	8.4	56.4	64.8	0.6	4.9	5.5	1.6	3.9	5.5	1.7	22.5	24.2	12.3	87.7	100.0	4488
Kenya	17.3	45.8	63.1	0.7	2.9	3.6	1.7	3.0	4.7	3.5	25.1	28.6	23.2	76.8	100.0	7150
Liberia	1.8	27.4	29.2	2.5	35.8	38.3	2.8	12.2	15.0	1.3	16.2	17.5	8.4	91.6	100.0	5239
Mali	4.3	87.8	92.1	0.1	1.7	1.8	0.1	0.3	0.4	0.1	5.6	5.7	4.6	95.4	100.0	3200
Ondo State	4.0	62.8	66.8	0.1	0.4	0.5	3.2	3.0	6.2	1.8	24.7	26.5	9.1	90.9	100.0	4213
Senegal	8.6	67.4	76.0	0.0	0.3	0.3	NA	NA	NA	1.5	22.2	23.7	10.1	89.9	100.0	4415
Sudan	8.0	84.2	92.2	NA	NA	NA	NA	NA	NA	0.0	7.8	7.8	8.0	92.0	100.0	5862
Togo	24.7	48.3	73.0	NA	NA	NA	3.1	2.1	5.2	5.2	16.6	21.8	33.0	67.0	100.0	3360
Uganda	2.6	51.2	53.8	0.7	12.7	13.4	0.9	5.1	6.0	1.3	25.5	26.8	5.5	94.5	100.0	4730
Zimbabwe	27.1	35.8	62.9	NA	NA	NA	2.8	3.6	6.4	2.3	28.4	30.7	32.2	67.8	100.0	4201
NORTH AFRICA																
Egypt	34.9	57.4	92.3	NA	NA	NA	NA	NA	NA	0.0	7.7	7.7	34.9	65.1	100.0	8911
Morocco	32.7	58.3	91.0	NA	NA	NA	NA	NA	NA	0.1	8.9	9.0	32.8	67.2	100.0	5982
Tunisia	47.7	48.2	95.9	NA	NA	NA	NA	NA	NA	0.0	4.1	4.1	47.7	52.3	100.0	4184
ASIA																
Indonesia	43.8	48.0	91.8	NA	NA	NA	NA	NA	NA	0.0	8.2	8.2	43.8	56.2	100.0	11884
Sri Lanka	57.3	35.5	92.8	NA	NA	NA	NA	NA	NA	1.2	6.0	7.2	58.4	41.6	100.0	5865
Thailand	60.3	31.8	92.1	NA	NA	NA	NA	NA	NA	1.5	6.3	7.8	61.8	38.2	100.0	6775
LATIN AMERICA/CARIBBEAN																
Bolivia	16.6	34.9	51.5	2.3	8.6	10.9	0.4	0.8	1.2	0.6	35.8	36.4	19.9	80.1	100.0	7923
Brazil	34.4	15.5	49.9	4.6	4.4	9.0	2.6	1.3	3.9	2.1	35.1	37.2	43.7	56.3	100.0	5892
Colombia	23.6	10.8	34.4	11.0	8.0	19.0	2.4	1.3	3.7	1.9	41.0	42.9	38.9	61.1	100.0	5331
Dominican Republic	12.2	8.0	20.2	14.7	19.1	33.8	NA	NA	NA	4.1	41.9	46.0	31.0	69.0	100.0	7645
Ecuador	19.4	22.8	42.2	8.4	12.2	20.6	NA	NA	NA	1.2	36.0	37.2	29.0	71.0	100.0	4713
El Salvador	13.1	12.7	25.8	15.6	19.4	35.0	NA	NA	NA	3.6	35.6	39.2	32.3	67.7	100.0	5207
Guatemala	10.3	28.9	39.2	4.8	21.4	26.2	0.4	0.5	0.9	0.7	33.0	33.7	16.2	83.8	100.0	5160
Mexico	28.2	23.2	51.4	3.8	5.6	9.4	NA	NA	NA	1.9	37.3	39.2	33.9	66.1	100.0	9310
Peru	19.9	20.2	40.1	6.7	11.2	17.9	NA	NA	NA	1.4	40.6	42.0	28.0	72.0	100.0	4999
Trinidad & Tobago	23.5	17.4	40.9	12.6[b]	15.2[b]	27.8[b]	0.4	0.5	0.9	0.9	29.5	30.4	37.4	62.6	100.0	3806

NA = Not available

[a]Sexually active/not active in the four weeks preceding the interview.

[b]Includes the less stable *visiting relationship*.

Figure 4.1.1—Components of unmet need for contraception

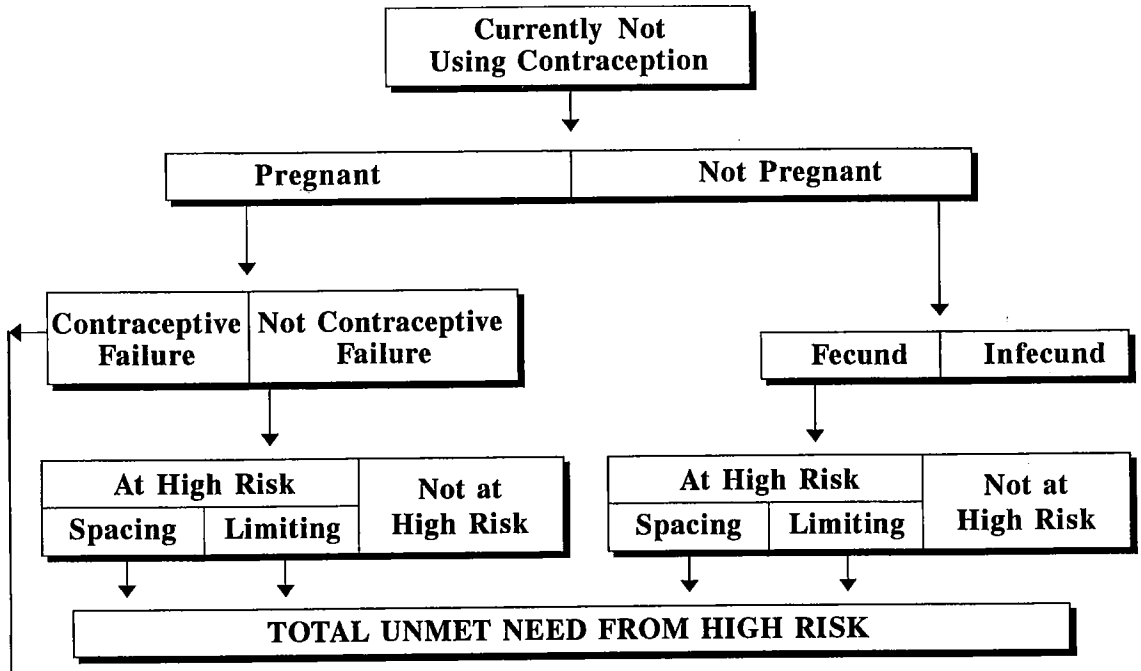
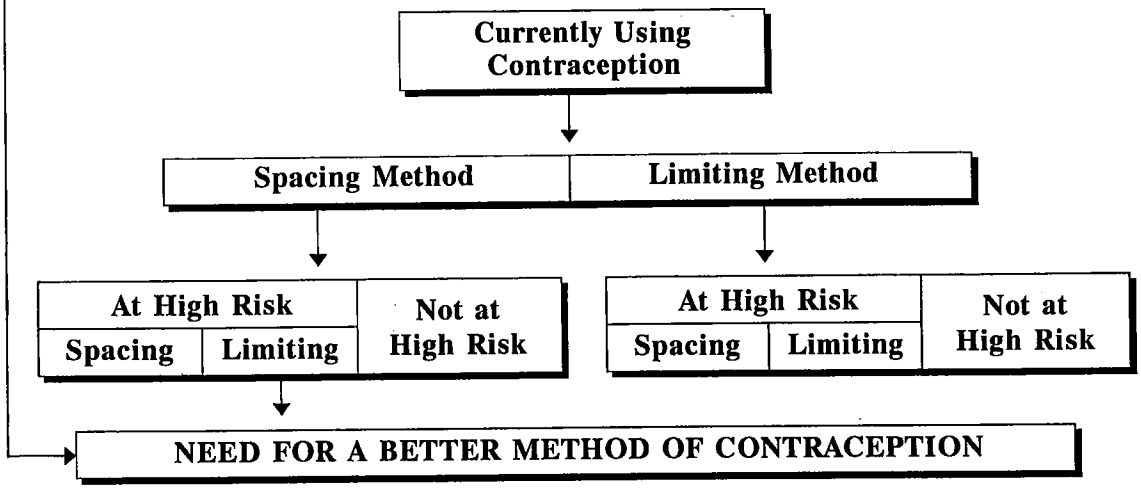


Figure 4.1.2—Components of need for a better method of contraception



Nonpregnant, nonamenorrheic women who have been in a union status for more than four years, have not used contraception, and have had no births; women who have not menstruated for more than 12 weeks prior to the survey date; and women who have never menstruated are defined as being infecund. Infecund women are excluded from those who are currently not pregnant. Infecundity ranges from 4 percent in Bolivia to 33 percent in Senegal among all sexually active women (see Table 4.2).

Nonpregnant, fecund women are then classified into those having a spacing or limiting need according to their bio-demographic risk characteristics. The total unmet need for noncontracepting women in a high-risk group is then obtained by adding pregnant and nonpregnant women who should be spacing or limiting their childbearing to avoid a high-risk birth.

UNMET NEED FOR CONTRACEPTION

Table 4.2 shows the percentage of sexually active women who are currently not using contraception according to their exposure to a high-risk birth. The proportion of sexually active women who are not using contraception and who have one or more bio-demographic risk factors ranges from 14 percent in Thailand to 65 percent in Burundi. In every country studied here, the majority of sexually active nonusers have some bio-demographic risk factor. More women are vulnerable to a high-risk birth in sub-Saharan Africa

Table 4.2 Demographic risk factors for sexually active women exposed to high-risk births

Percentage of sexually active women exposed to high-risk births (currently not using contraception), by type of risk factor, Demographic and Health Surveys, 1985-1990

	Single risk factor					Multiple risk factor						Total				Total		
Country	Too young	Too old	Too soon	Too many	Total	Too young and too soon	Too old and too soon	Too old and too many	Too old, too soon, and too many	Too soon and too many	Total	At risk	Not at risk	Method failure	Infecund	Using contraception	Not using contraception	No. of women
SUB-SAHARAN AFRICA																		
Botswana[a]	1.5	1.9	3.2	7.7	14.3	0.0	0.0	9.7	3.1	6.6	19.4	33.7	20.0	0.4	7.3	38.6	61.4	2805
Burundi[a]	0.1	0.7	10.6	14.0	25.4	0.0	0.0	14.8	8.5	16.1	39.3	64.7	15.4	NA	11.1	8.8	91.2	2686
Ghana[a]	1.2	0.8	8.2	12.5	22.7	0.3	0.0	13.6	5.8	11.4	31.1	53.8	20.4	NA	11.8	14.0	86.0	3403
Kenya[a]	1.1	0.5	6.6	11.2	19.4	0.2	0.0	9.7	5.1	13.2	28.2	47.6	11.3	NA	13.6	27.5	72.5	5100
Liberia[a]	4.3	1.1	8.9	11.5	25.8	0.6	0.4	8.5	5.2	14.0	28.7	54.5	18.8	NA	18.0	8.7	91.3	4327
Mali[a]	2.4	0.4	8.8	13.6	25.2	0.6	0.2	11.1	7.8	16.2	35.9	61.1	14.2	NA	19.9	4.8	95.2	2962
Ondo State[a]	1.5	0.5	7.6	11.4	21.0	0.3	0.1	18.4	8.3	10.0	37.1	58.1	15.1	NA	16.8	10.0	90.0	3092
Senegal[b]	1.5	0.4	6.1	12.0	20.0	0.7	0.0	7.6	4.6	12.1	25.0	45.0	10.3	NA	33.4	11.3	88.7	3365
Sudan[e]	1.0	0.8	9.7	13.7	25.2	0.3	0.2	14.0	5.9	13.8	34.2	59.4	15.4	NA	16.5	8.7	91.3	5400
Togo[d]	2.1	0.7	5.8	10.2	18.8	0.3	0.2	11.5	3.2	7.7	22.9	41.7	15.8	NA	7.0	35.5	64.5	2628
Uganda[a]	3.2	0.4	9.8	14.6	28.0	0.9	0.1	9.1	6.3	18.1	34.5	62.5	17.6	NA	14.1	5.7	94.2	3464
Zimbabwe[d]	1.3	1.5	3.6	8.7	15.1	0.1	0.0	12.1	2.6	5.4	20.2	35.3	14.2	NA	7.3	43.2	56.8	2911
NORTH AFRICA																		
Egypt[e]	0.8	1.2	6.9	6.8	15.7	0.3	0.2	9.4	3.2	8.5	21.6	37.3	11.4	1.1	12.4	37.8	62.2	8221
Morocco[e]	0.8	0.6	6.2	7.1	14.7	0.1	0.3	9.0	4.6	10.1	24.1	38.9	10.6	1.5	13.1	35.9	64.1	5447
Tunisia[e]	0.1	1.2	6.0	4.9	12.2	0.1	0.2	6.9	4.0	7.9	19.1	31.3	9.4	1.1	8.4	49.8	50.2	4012
ASIA																		
Indonesia[e]	0.7	1.0	4.8	4.4	10.9	0.2	0.1	5.7	1.6	4.5	12.1	23.0	11.1	0.3	17.8	47.8	52.2	10907
Sri Lanka[e]	0.3	2.6	5.8	1.5	10.2	0.1	0.4	3.4	0.9	2.6	7.4	17.6	10.7	1.2	8.8	61.7	38.3	5442
Thailand[e]	0.4	1.7	3.9	1.2	7.2	0.1	0.1	4.9	0.9	1.2	7.2	14.4	11.1	0.3	8.7	65.5	34.5	6236
LATIN AMERICA/CARIBBEAN																		
Bolivia[a]	0.4	1.4	7.7	7.3	16.8	0.3	0.2	9.1	4.4	10.3	24.3	41.1	9.8	1.7	17.1	30.3	69.7	5033
Brazil[a]	0.7	1.9	3.5	2.2	8.3	0.2	0.3	3.9	1.3	3.6	9.3	17.6	10.3	1.6	4.3	66.2	33.8	3699
Colombia[a]	0.6	1.2	3.7	2.4	7.9	0.4	0.1	4.3	1.1	3.5	9.4	17.3	9.7	1.9	6.4	64.7	35.3	3046
Dominican Rep.[b]	0.8	1.0	6.5	4.8	13.1	0.5	0.1	5.2	0.9	4.7	11.4	24.5	13.0	1.6	11.1	49.8	50.2	4133
Ecuador[b]	0.8	1.2	7.8	6.5	16.3	0.6	0.3	6.3	2.9	7.2	17.3	33.6	10.2	1.3	10.6	44.3	55.7	2957
El Salvador[b]	1.7	0.6	5.0	4.6	11.9	0.2	0.1	5.1	1.9	4.9	12.2	24.1	9.9	0.5	18.2	47.3	52.7	3164
Guatemala[a]	1.5	0.7	8.6	11.7	22.5	0.7	0.1	9.2	5.5	16.0	31.5	54.0	12.4	0.6	9.6	23.4	76.6	3422
Mexico[b]	1.1	1.0	5.3	6.0	13.4	0.4	0.3	5.7	2.3	5.9	14.6	28.0	8.4	1.6	9.3	52.7	47.3	5662
Peru[b]	0.4	1.3	5.7	5.4	12.8	0.3	0.1	8.4	3.4	7.5	19.7	32.5	6.8	2.6	12.4	45.7	54.3	2900
Trinidad & Tob.[c]	0.5	3.6	3.3	3.9	11.3	0.2	0.1	7.6	0.7	2.2	10.8	22.1	14.2	1.7	9.4	52.6	47.4	2649

NA = Not available

[a]Includes those who are currently married, or living in a consensual union, or were sexually active in the last four weeks prior to interview.

[b]Includes those who are currently married, or living in a consensual union.

[c]Includes those who are currently married, or living in a consensual union, or were sexually active in the last four weeks prior to interview, or a visiting relationship.

[d]Includes those who are currently married, or sexually active in the last four weeks prior to interview.

[e]Limited to those within a marital relationship, since questions on sexual activity outside of marriage, were not asked.

than in any other region. More than half of all sexually active women in Burundi, Ghana, Guatemala, Liberia, Mali, Sudan, and Uganda are in a high-risk category and are not using contraception.

Among women who have just a single risk factor, high parity and short birth intervals are most common. The proportion of sexually active women who are not using contraception and are at risk of a high parity birth ranges from around 1 percent in Thailand to 15 percent in Uganda; it averages 8 percent for all the countries. The figure for closely spaced births ranges from 3 percent in Botswana to 11 percent in Burundi and averages 6 percent for all countries. The proportion of sexually active women who are not contracepting and have a single risk factor is highest in the sub-Saharan African countries: more than 25 percent of sexually active women in Burundi, Liberia, Mali, Sudan, and Uganda fall in this category. In all the countries studied, on average, more than 16 percent of sexually active women are not contracepting and have a single risk factor.

The most common combinations of risk factors involve high parity, together with either short birth intervals or older maternal age. Once again, women in sub-Saharan Africa are more likely to be at risk. In 9 of the 12 countries in this region, more than 10 percent of sexually active women are at risk for high-order, closely spaced births and are not contracepting. In Uganda this figure is 18 percent. Outside of this region, Bolivia, Guatemala, and Morocco also have more than 10 percent of women in this category. The total percentage of sexually active women who are not contracepting and have multiple risk factors ranges from 7 percent in Thailand to 39 percent in Burundi. On average, more than 21 percent of all sexually active women are unprotected and have multiple risk factors.

Table 4.2 also shows the contraceptive prevalence among all sexually active women. This ranges from a low of 5 percent in Mali to a high of 66 percent in Brazil. It is lowest in sub-Saharan Africa, averaging 18 percent as compared with 41 percent for North Africa, 48 percent for Latin America and the Caribbean, and 58 percent for Asia. Contraceptive prevalence is below 10 percent in Burundi, Liberia, Mali, Sudan, and Uganda and over 60 percent in Brazil, Colombia, Sri Lanka, and Thailand.

Table 4.3 summarizes the unmet need for contraception to prevent the occurrence of high-risk births (*HRB-need*); it includes only sexually active women who are not currently using contraception. Total unmet HRB-need ranges from a low of 14 percent in Thailand to a high of 65 percent in Burundi (see Figure 4.2). This need is greatest in sub-Saharan Africa, exceeding 50 percent in seven of the twelve countries in that region. Guatemala is the only country outside of this region whose unmet HRB-need for contraception is over 50 percent. For all DHS-I countries the need for limiting births is much greater than for spacing births. The limiting need ranges from 10 to 54 percent while the spacing need ranges from 4 to 14 percent. The need to limit births is greatest among non-pregnant, fecund women, averaging 25 percent; this compares with an average of 5 percent for pregnant women.

A breakdown of the socioeconomic characteristics of sexually active women in the high-risk groups who are currently not using contraception is given in Table 4.4. Noncontracepting women who face the possibility of a high-risk birth are predominantly rural, have little or no education, and are not likely to be working at the time of the survey. This is especially evident in sub-Saharan Africa. On average, 51 percent of all women in sub-Saharan Africa face the possibility of a high-risk birth. Around three-quarters of these women are rural and unemployed. Nearly two-thirds have no education, while another third have only primary schooling. Thus the unmet need for family planning to avoid high-risk births is most acutely felt among poorly educated, rural women in sub-Saharan Africa who are currently unemployed.

NEED FOR A BETTER METHOD OF CONTRACEPTION

Users of contraception are also categorized according to their bio-demographic risk characteristics into whether they should be spacing, limiting, or neither (if they are not at risk) (see Figure 4.1.2). Women in need of a better method of contraception are then identified as those who are currently using a spacing method but who should be using a limiting method because of their bio-demographic risk factors.

Table 4.5 summarizes the percentage of sexually active, contracepting women who need a better method of contraception. This percentage is obtained by cross-tabulating the current contraceptive practices of women with their bio-demographic risk characteristics. Women who are currently using a spacing method but are more than 34 years old and/or have had more than 3 live births are considered to need a limiting method; their numbers range from a low of 2 percent in Mali to a high of 26 percent in Zimbabwe. The limiting need for spacers is most acutely felt in Morocco, Peru, Togo, and Zimbabwe, where it exceeds 20 percent (see Figure 4.3).

In contrast to earlier analyses, the limiting need for spacers is least felt in sub-Saharan Africa where it averages 9 percent, as opposed to the other three regions where it averages 18 percent in North Africa, 13 percent in Latin America and the Caribbean, and 12 percent in Asia. This is because the percentage of contraceptive users is lowest in sub-Saharan Africa, so the need is for contraception itself rather than a better method.

Women who are currently pregnant due to a failure in their contraceptive method are also in need of a better method, because their pregnancy is either mistimed or unwanted. However this need is comparatively less important, ranging from less than half a percent to just 3 percent. Moreover this information is available only for some countries.

Table 4.3 Unmet need for contraception to prevent high-risk births

Percentage of sexually active women currently not using contraception who have a spacing or limiting unmet need for contraception to prevent the occurrence of high-risk births, Demographic and Health Surveys, 1985-1990

	Pregnant				Not pregnant					Unmet need for contraception to prevent high-risk births		
					Fecund							
Country	Spacing	Limiting	Not at risk	Total	Spacing	Limiting	Not at risk	Infecund	Total	Spacing	Limiting	Total
SUB-SAHARAN AFRICA												
Botswana	0.2	3.1	4.1	7.4	4.4	26.0	16.2	7.3	53.9	4.6	29.1	33.7
Burundi	1.1	8.2	6.1	15.4	9.6	45.8	9.3	11.0	75.7	10.7	54.0	64.7
Ghana	0.4	7.0	5.3	12.7	9.3	37.1	15.1	11.8	73.3	9.7	44.1	53.8
Kenya	1.3	6.2	3.7	11.2	6.6	33.5	7.7	13.6	61.3	7.9	39.7	47.6
Liberia	1.9	7.6	5.7	15.2	11.9	33.1	13.1	18.0	76.1	13.8	40.7	54.5
Mali	1.4	7.9	4.7	14.0	10.4	41.4	9.5	19.9	81.2	11.8	49.3	61.1
Ondo State	1.1	6.4	5.6	13.1	8.3	42.3	9.5	16.8	76.9	9.4	48.7	58.1
Senegal	1.5	8.9	4.8	15.2	6.8	27.8	5.5	33.4	73.5	8.3	36.7	45.0
Sudan	1.5	9.0	5.5	16.0	9.6	39.3	10.0	16.5	75.4	11.1	48.3	59.4
Togo	1.0	6.7	5.7	13.4	7.2	26.8	10.1	7.0	51.1	8.2	33.5	41.7
Uganda	2.4	8.7	5.5	16.6	11.5	39.9	12.2	14.1	77.7	13.9	48.6	62.5
Zimbabwe	0.9	6.4	4.9	12.2	4.1	23.9	9.2	7.3	44.5	5.0	30.3	35.3
NORTH AFRICA												
Egypt	1.8	5.1	5.1	12.0	6.3	24.1	7.3	12.4	50.1	8.1	29.2	37.3
Morocco	1.3	5.7	5.7	12.7	5.8	26.1	6.4	13.1	51.4	7.1	31.8	38.9
Tunisia	1.4	4.1	5.2	10.7	4.8	21.0	5.2	8.4	39.4	6.2	25.1	31.3
ASIA												
Indonesia	0.8	2.1	3.9	6.8	4.9	15.2	7.5	17.8	45.4	5.7	17.3	23.0
Sri Lanka	0.6	1.1	5.2	6.9	5.5	10.4	6.7	8.8	31.4	6.1	11.5	17.6
Thailand	1.0	1.0	4.1	6.1	3.4	9.0	7.3	8.7	28.5	4.4	10.0	14.4
LATIN AMERICA/CARIBBEAN												
Bolivia	1.1	5.4	5.4	11.9	7.3	27.3	6.1	17.1	57.8	8.4	32.7	41.1
Brazil	1.5	2.6	5.9	10.0	2.9	10.6	6.0	4.3	23.8	4.4	13.2	17.6
Colombia	1.3	2.1	6.1	9.5	3.4	10.5	5.5	6.4	25.8	4.7	12.6	17.3
Dominican Rep.	1.9	2.9	6.9	11.7	5.9	13.8	7.8	11.1	38.6	7.8	16.7	24.5
Ecuador	1.8	3.9	4.7	10.4	7.4	20.5	6.9	10.6	45.4	9.2	24.4	33.6
El Salvador	2.1	3.4	4.6	10.1	4.8	13.8	5.7	18.2	42.5	6.9	17.2	24.1
Guatemala	2.1	7.3	5.3	14.7	8.6	36.0	7.6	9.6	61.8	10.7	43.3	54.0
Mexico	2.3	3.9	4.8	11.0	4.6	17.2	5.3	9.3	36.4	6.9	21.1	28.0
Peru	1.1	3.6	5.6	10.3	5.2	22.6	3.7	12.4	43.9	6.3	26.2	32.5
Trinidad & Tob.	0.7	1.4	5.0	7.1	3.2	16.8	10.9	9.4	40.3	3.9	18.2	22.1

Note: Pregnant women include those whose pregnancy was due to a method failure. Pregnant and nonpregnant fecund women who are not currently using contraception are classified according to their bio-demographic risk characteristics. Women at risk are assumed to have a spacing need if they are less than 18 years old at the time of interview or face the risk of having a birth within 24 months of a previous one, and a limiting need if they are more than 34 years old or have had 3 or more births at the time of the survey.

Figure 4.2—Unmet high-risk birth need among noncontracepting, sexually active women, Demographic and Health Surveys, 1985-1990

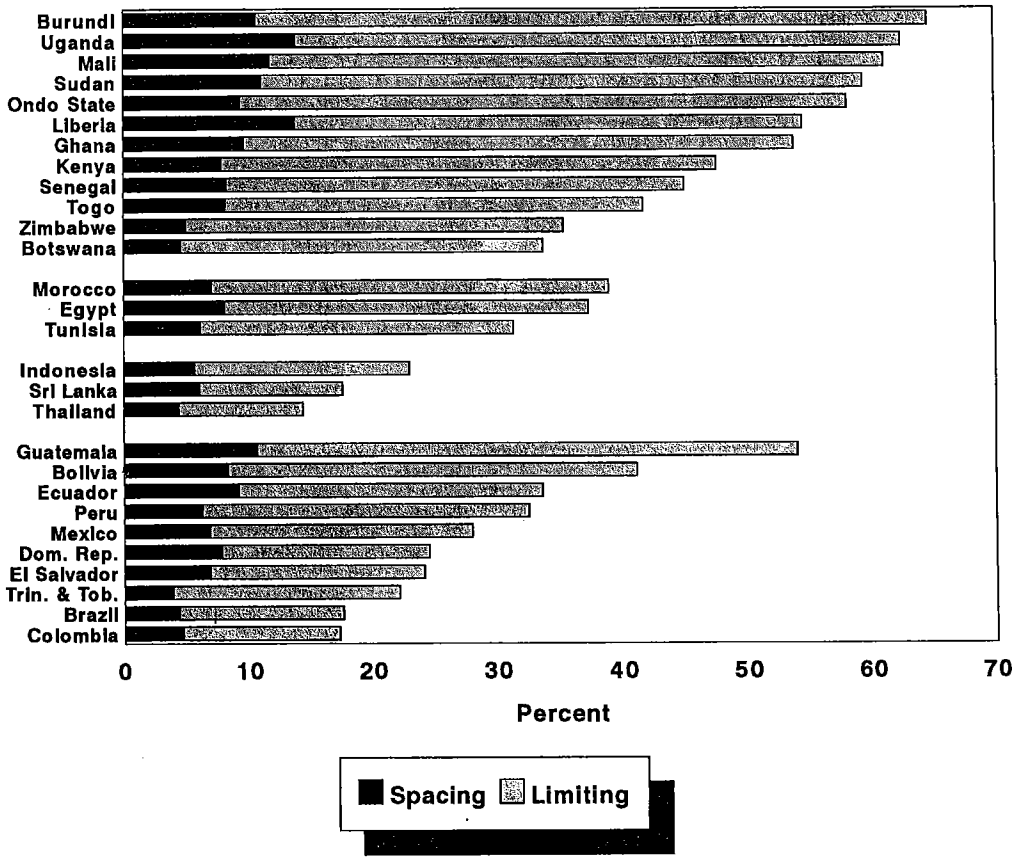


Table 4.4 Differentials in exposure to high-risk births

Percentage of sexually active women currently not using contraception who are exposed to high-risk births, by selected socioeconomic characteristics, Demographic and Health Surveys, 1985-1990

Country	Residence		Level of education				Current work status		Total percent at risk
	Urban	Rural	No education	Primary	Secondary	Higher	Working	Not working	
SUB-SAHARAN AFRICA									
Botswana	8.3	25.5	13.6	16.8	3.2	0.3	6.4	27.3	33.7
Burundi	1.5	63.3	53.9	9.8	0.9	0.1	2.2	62.5	64.7
Ghana	14.3	39.5	26.8	25.2	1.7	0.2	28.4	25.4	53.8
Kenya	6.6	41.0	16.2	24.9	6.4	0.1	3.3	44.1	47.6
Liberia	20.8	33.7	39.4	9.0	5.7	0.4	NA	NA	54.5
Mali	14.3	46.9	53.6	7.3	0.2	0.1	14.5	46.6	61.1
Ondo State	22.1	36.0	28.7	19.5	7.8	2.0	37.8	20.3	58.1
Senegal	13.6	31.4	39.5	4.1	1.3	0.1	12.2	32.8	45.0
Sudan	19.4	40.0	36.7	16.6	5.8	0.3	3.4	56.0	59.4
Togo	11.2	30.5	29.2	10.0	2.5	0.0	29.1	12.6	41.7
Uganda	4.9	57.6	27.9	30.6	4.1	0.1	4.6	57.9	62.5
Zimbabwe	8.7	26.6	8.4	22.4	4.3	0.2	12.0	23.3	35.3
NORTH AFRICA									
Egypt	13.2	24.2	22.3	10.8	3.2	1.0	2.9	34.4	37.3
Morocco	10.5	28.3	35.4	2.3	0.9	0.1	1.3	37.5	38.9
Tunisia	12.6	18.7	21.0	8.1	1.9	0.3	2.4	28.9	31.3
ASIA									
Indonesia	4.9	18.0	5.3	14.9	2.5	0.3	8.5	14.5	23.0
Sri Lanka	2.5	15.1	2.2	5.0	6.3	4.1	2.5	15.1	17.6
Thailand	1.9	12.5	1.9	11.4	0.6	0.5	7.4	7.0	14.4
LATIN AMERICA/CARIBBEAN									
Bolivia	18.5	22.6	11.0	21.3	7.4	1.4	6.5	34.7	41.1
Brazil	10.2	7.4	3.4	12.3	1.3	0.6	5.7	11.9	17.6
Colombia	9.0	8.3	1.8	11.4	4.0	0.1	1.9	15.4	17.3
Dominican Rep.	12.8	11.7	2.3	18.2	3.2	0.8	3.0	21.5	24.5
Ecuador	14.5	19.1	5.0	20.9	6.4	1.3	6.2	27.4	33.6
El Salvador	8.4	15.7	8.0	15.0	1.1	0.1	NA	NA	24.1
Guatemala	11.6	42.4	30.8	21.6	1.5	0.2	5.6	48.4	54.0
Mexico	13.8	14.2[a]	6.4	17.7	3.4	0.4	7.5	20.5	28.0
Peru	12.9	19.6	8.1	17.5	6.0	0.9	13.3	19.2	32.5
Trinidad & Tob.	10.0	12.1	0.2	14.1	7.6	0.2	5.2	16.8	22.1

NA = Not available

[a]Places having a population of less than 2500 are classified as rural. Totals may not add up due to rounding.

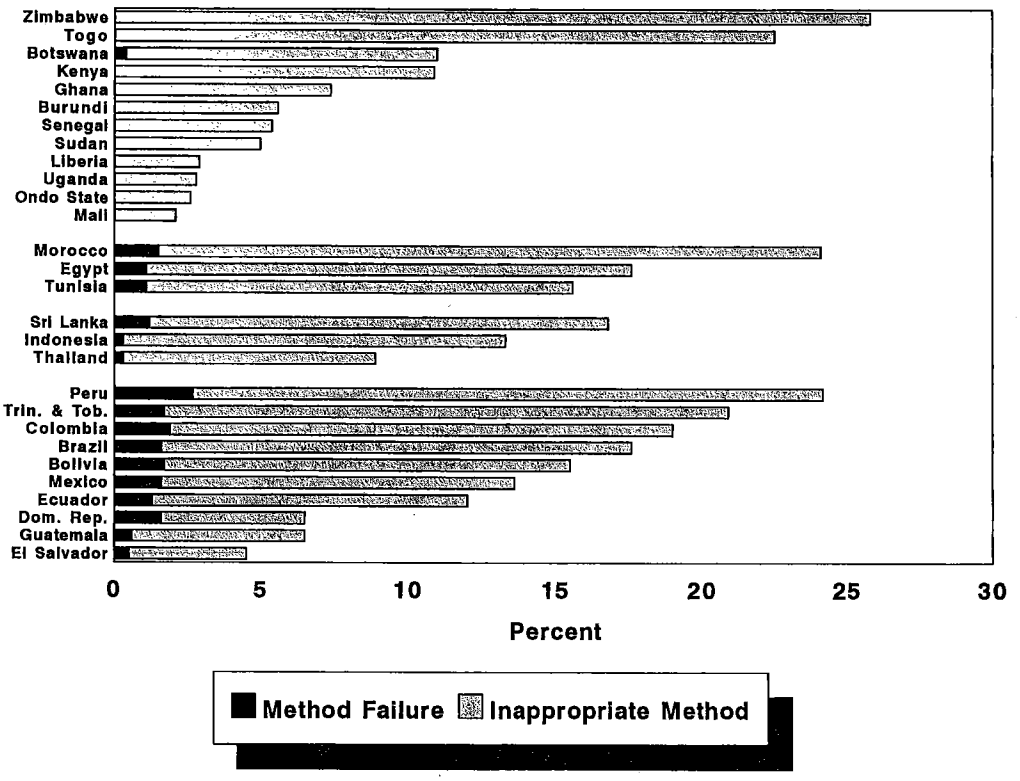
Table 4.5 Contraceptive users who are exposed to high-risk births and need a better method

Percentage of sexually active women currently using contraception who are exposed to high-risk births, by need for a better method, Demographic and Health Surveys, 1985-1990

Country	Using spacing method[a]				Using limiting method[a]				Need better method of contraception		
	Spacing	Limiting	Not at risk	Total	Spacing	Limiting	Not at risk	Total	Pregnant due to method failure	Spacers who should be limiters	Total
SUB-SAHARAN AFRICA											
Botswana	2.5	10.6	12.3	25.4	0.4	9.8	2.1	12.3	0.4	10.6	11.0
Burundi	1.1	5.6	1.1	7.8	0.2	0.6	0.1	0.9	NA	5.6	5.6
Ghana	1.4	7.4	3.4	12.2	0.0	1.4	0.0	1.4	NA	7.4	7.4
Kenya	1.2	10.9	3.2	15.3	0.2	9.7	0.7	10.6	NA	10.9	10.9
Liberia	0.0	2.9	0.1	0.2	0.0	0.1	0.0	0.0	NA	2.9	2.9
Mali	0.9	2.1	1.4	4.4	0.0	0.3	0.0	0.3	NA	2.1	2.1
Ondo State	1.3	2.6	4.3	8.2	0.0	1.7	0.1	1.8	NA	2.6	2.6
Senegal	1.5	5.4	0.7	7.6	0.1	0.4	0.1	0.6	NA	5.4	5.4
Sudan	1.0	5.0	1.1	7.1	0.1	1.2	0.1	1.4	NA	5.0	5.0
Togo	4.2	22.5	6.9	33.6	0.0	1.2	0.3	1.5	NA	22.5	22.5
Uganda	0.4	2.8	1.0	4.2	0.0	1.2	0.0	1.2	NA	2.8	2.8
Zimbabwe	5.3	25.8	7.9	39.0	0.1	2.8	0.4	3.3	NA	25.8	25.8
NORTH AFRICA											
Egypt	1.8	16.5	2.0	20.3	1.4	12.9	2.5	16.8	1.1	16.5	17.6
Morocco	2.5	22.6	4.7	29.8	0.3	4.2	0.6	5.1	1.5	22.6	24.1
Tunisia	2.3	14.5	3.5	20.3	2.1	22.0	3.5	27.6	1.1	14.5	15.6
ASIA											
Indonesia	1.5	13.0	6.6	21.1	2.0	16.3	5.7	24.0	0.3	13.0	13.3
Sri Lanka	2.9	15.6	7.5	26.0	0.8	28.2	4.0	33.0	1.2	15.6	16.8
Thailand	1.9	8.6	10.6	21.1	2.8	26.4	9.0	38.2	0.3	8.6	8.9
LATIN AMERICA/CARIBBEAN											
Bolivia	1.6	13.8	4.7	20.1	0.2	7.6	1.5	9.3	1.7	13.8	15.5
Brazil	5.6	16.0	16.0	37.6	1.0	23.2	3.9	28.1	1.6	16.0	17.6
Colombia	3.4	17.1	12.4	32.9	1.4	22.3	6.2	29.9	1.9	17.1	19.0
Dominican Rep.	3.9	4.9	4.7	13.5	1.1	30.2	2.7	34.0	1.6	4.9	6.5
Ecuador	1.7	10.7	6.1	18.5	1.4	19.0	3.7	24.1	1.3	10.7	12.0
El Salvador	1.8	4.0	4.7	10.5	1.1	26.3	4.7	32.1	0.5	4.0	4.5
Guatemala	1.1	5.9	2.6	9.6	0.2	11.3	1.2	12.7	0.6	5.9	6.5
Mexico	2.6	12.0	5.7	20.3	2.6	23.4	5.5	31.5	1.6	12.0	13.6
Peru	2.6	21.5	6.7	30.8	1.0	10.2	2.8	14.0	2.6	21.5	24.1
Trinidad & Tob.	4.8	19.2	14.7	38.7	0.3	10.9	1.7	12.9	1.7	19.2	20.9

NA = Not applicable
[a]Excludes women who are infecund

Figure 4.3—Need of a better method of contraception among sexually active women, Demographic and Health Surveys, 1986-1990



Note: Information on method failure is not available for Sub-Saharan Africa (except Botswana)

Adding together the spacers who should be using a limiting method and the pregnant women who suffered a method failure yields the total percentage of women in need of a better method of contraception, as shown in the last column of Table 4.5. The total contraceptive need for a better method ranges from 2 percent in Mali to 26 percent in Zimbabwe and averages 12 percent for all the countries under study.

4.3 PREFERENCE-NEED VERSUS HRB-NEED

To reiterate, conventional measures of the unmet need for contraception are based solely on preference-need, that is, a woman's preference to space and/or limit the number of children that she bears. In contrast, our measure of unmet need also incorporates the goal of avoiding high-risk births, that is, the HRB-need for family planning. Table 4.6 summarizes the difference between the two measures and presents the total demand for contraception, made up of the demand by current users and the demand posed by nonusers who have either a preference-need or a HRB-need.

The HRB-need for spacing and limiting is greater than the preference-need for all countries under consideration here. There are several possible reasons for this. Women may not be aware of the characteristics associated with high-risk births and hence lack the knowledge to avoid such pregnancies. Even if they are aware of the fact that some pregnancies are more risky than others, they may not have access to family planning facilities or the services may be of poor quality. Within the broader social context, women may not be in control of their own fertility behavior because of their low status. Also, in some societies a strong preference for sons or the power associated with a large family may override the health considerations associated with high-risk births. In many cases, both the total HRB-need and preference-need for spacing (see Table 4.6, column 7) are less than the preference-need for spacing alone (column 4). This is because many women who express a desire to space have a need to not have any more children because of high-risk factors.

Table 4.6 Demand for contraception according to unmet need that could prevent high-risk births and unmet need for spacing/limiting births

Comparison of the total demand for contraception arising from the unmet need that could prevent the occurrence of high-risk births (HRB) and unmet need for spacing/limiting births as expressed by women, Demographic and Health Surveys, 1985-1990

Country	Unmet need that could prevent high-risk births			Unmet need for spacing/limiting births			Total unmet need that could either prevent high-risk births or space/limit births as desired by women			Current use of contraception			Total demand for contraception	
	Spacing (1)	Limiting (2)	Total (3)	Spacing (4)	Limiting (5)	Total (6)	Spacing (7)	Limiting (8)	Total (9)	Spacing (10)	Limiting (11)	Total (12)	Conventional (13)	With HRB (14)
SUB-SAHARAN AFRICA														
Botswana	4.6	29.1	33.7	11.0	8.9	19.9	7.0	29.8	36.8	25.6	13.0	38.6	58.5	75.4
Burundi	10.6	54.1	64.7	35.4	17.0	37.1	14.8	54.4	69.2	7.9	0.9	8.8	45.9	78.0
Ghana	9.8	44.0	53.8	27.9	11.7	39.6	14.0	44.9	58.9	12.3	1.7	14.0	53.6	72.9
Kenya	7.9	39.7	47.6	13.7	19.1	32.8	9.1	40.6	49.7	15.8	11.7	27.5	60.3	77.2
Liberia	13.8	40.7	54.5	17.3	6.4	23.7	16.1	40.9	57.0	6.5	2.1	8.6	30.3	63.6
Mali	11.8	49.3	61.1	20.8	7.9	28.7	13.5	49.5	63.0	4.5	0.3	4.8	33.5	67.8
Ondo State	9.4	48.7	58.1	23.5	8.1	31.6	11.5	48.7	60.2	8.1	1.8	9.9	41.5	70.1
Senegal	8.3	36.7	45.0	14.1	6.4	20.5	9.0	36.8	45.8	10.3	1.0	11.3	31.5	57.1
Sudan	11.1	48.3	59.4	19.1	14.6	33.7	12.6	49.1	61.7	7.1	1.6	8.7	42.4	70.4
Togo	8.2	33.5	41.7	18.3	8.9	27.2	11.1	33.8	44.9	33.9	1.6	35.5	62.7	80.4
Uganda	13.8	48.7	62.5	18.1	10.2	28.3	15.2	49.1	64.3	4.2	1.5	5.7	34.0	70.0
Zimbabwe	5.0	30.3	35.3	9.0	9.8	18.8	5.9	30.8	36.7	39.5	3.7	43.2	62.0	79.9
NORTH AFRICA														
Egypt	8.0	29.3	37.3	6.3	22.1	28.4	8.0	31.2	39.2	20.5	17.3	37.8	66.2	77.0
Morocco	7.2	31.7	38.9	11.4	16.1	27.5	8.1	32.6	40.7	30.5	5.4	35.9	63.4	76.6
Tunisia	6.2	25.1	31.3	10.7	14.5	25.2	7.2	26.1	33.3	20.5	29.2	49.7	74.9	83.0
ASIA														
Indonesia	5.7	17.3	23.0	10.3	10.6	20.9	8.3	18.4	26.7	21.5	26.3	47.8	68.7	74.5
Sri Lanka	6.1	11.5	17.6	7.4	9.3	16.7	6.9	13.7	20.6	27.1	34.6	61.7	78.4	82.3
Thailand	4.4	10.0	14.4	4.8	8.9	13.7	5.1	12.4	17.5	21.5	43.9	65.5	79.2	83.0
LATIN AMERICA/CARIBBEAN														
Bolivia	8.4	32.7	41.1	6.1	33.6	39.7	6.4	39.2	45.6	20.4	9.9	30.3	70.0	75.9
Brazil	4.4	13.2	17.6	3.8	11.4	15.2	4.1	15.9	20.0	37.8	28.5	66.3	81.5	86.3
Colombia	4.8	12.5	17.3	2.0	10.5	12.5	4.5	14.7	19.2	33.1	31.6	64.7	77.2	83.9
Dominican Rep.	7.8	16.7	24.5	9.2	13.2	22.4	9.8	19.1	28.9	13.7	36.1	49.8	71.2	78.7
Ecuador	9.2	24.4	33.6	10.1	20.1	30.2	8.7	28.7	37.4	18.8	25.5	44.3	74.5	81.7
El Salvador	6.9	17.2	24.1	10.2	11.0	21.2	8.1	20.1	28.2	10.9	36.4	47.3	68.5	75.5
Guatemala	10.7	43.3	54.0	19.1	20.3	39.4	12.1	46.0	58.1	9.8	13.6	23.4	62.5	81.5
Mexico	6.8	21.2	28.0	4.4	14.3	18.7	6.5	23.7	30.2	20.3	32.4	52.7	71.4	82.9
Peru	6.4	26.1	32.5	5.4	24.5	29.9	4.8	30.1	34.9	30.9	14.8	45.8	75.7	80.7
Trinidad & Tob	3.9	18.2	22.1	7.3	14.3	21.6	6.5	20.6	27.1	39.0	13.6	52.6	74.2	79.7

Note: Column (13) = Columns (6) + (12); Column (14) = Columns (9) + (12).

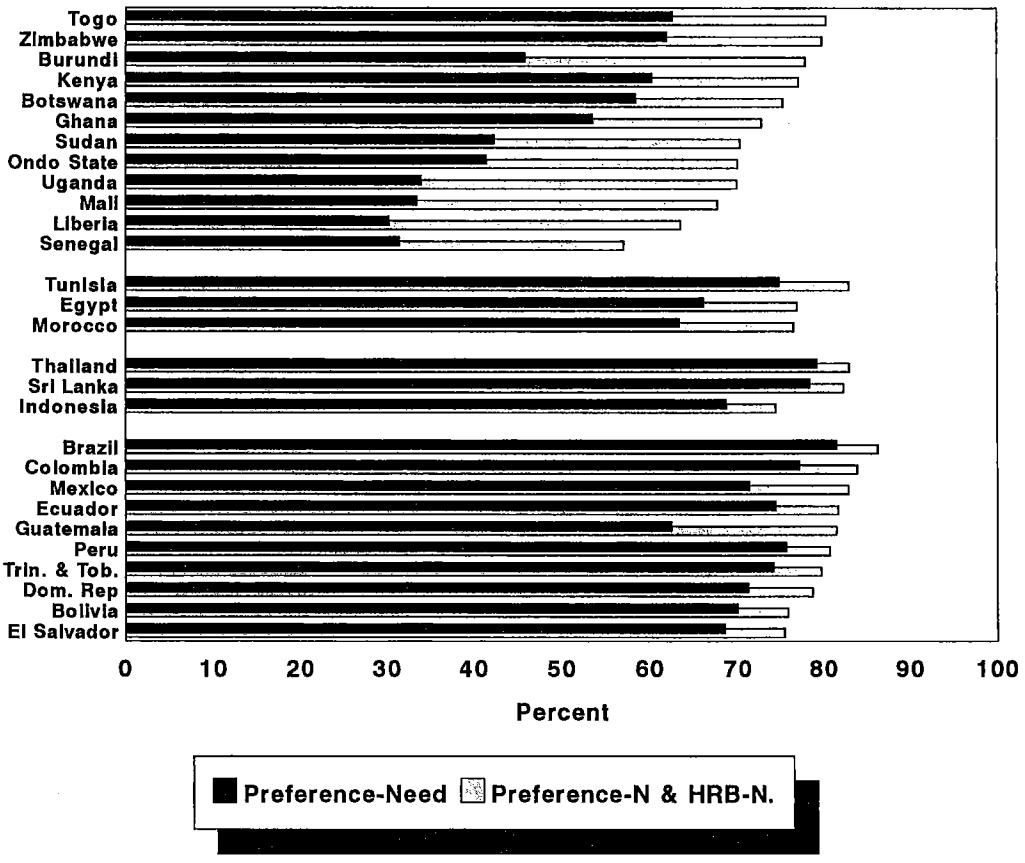
Unmet need for contraception among women who could avoid high-risk births ranges from 14 to 65 percent (column 3), whereas the unmet need as expressed by women's preferences ranges from 13 to 40 percent (column 6). The gap between the HRB-need and the preference-need is especially great for countries in sub-Saharan Africa.

When only the need to avoid high-risk births is considered, women's need to limit is much more important than their need to space in all these countries. Their spacing need ranges from 4 to 14 percent (column 1), while their limiting need ranges from 10 to 54 percent (column 2). However, when women's preferences are considered, the importance of limiting as opposed to spacing varies regionally. Women in North Africa, Asia, and Latin America and the Caribbean express a greater desire to limit than to space childbearing (columns (4) and (5)). In contrast, women in sub-Saharan Africa (with the exception of Zimbabwe) express a greater desire for spacing than limiting.

The total unmet need for contraception, that is, the preference-need and HRB-need combined, is presented in column 9 of Table 4.6. In every country, this figure is much higher than if only women's preferences to space and limit childbearing are considered. The total unmet need for contraception ranges from 18 percent in Thailand to 69 percent in Burundi.

The total demand for contraception, that is, the unmet need for contraception plus the demand by current contraceptors, is shown in the last two columns of Table 4.6. When the HRB-need for contraception is included, there is an overall increase in the total demand for contraception (see Figure 4.4). Total demand is, on average, 15 percentage points higher when the HRB-need is incorporated. This is a relative increase of 25 percent in the total demand for contraception. The difference is even more pronounced in sub-Saharan Africa, where total demand is, on average, over 29 percentage points higher when the HRB-need is included, or a relative increase of 66 percent.

Figure 4.4—Total demand for contraception among sexually active women, Demographic and Health Surveys, 1986-1990



4.4 TARGETED FAMILY PLANNING SERVICES

Table 4.7 summarizes the percentage of women who have an overall need for targeted family planning services either because:

- they have fertility-related characteristics that would put their births at high risk,
- they would prefer to space or limit their childbearing,
- they need a better method of contraception since their current pregnancy was due to a method failure, or
- they are currently using a spacing method, but should be using a limiting method because of their high-risk characteristics.

The need for targeted family planning services averages 53 percent for all the DHS-I countries and ranges from a low of 26 percent in Thailand to a high of 75 percent in Burundi (see Figure 4.5).

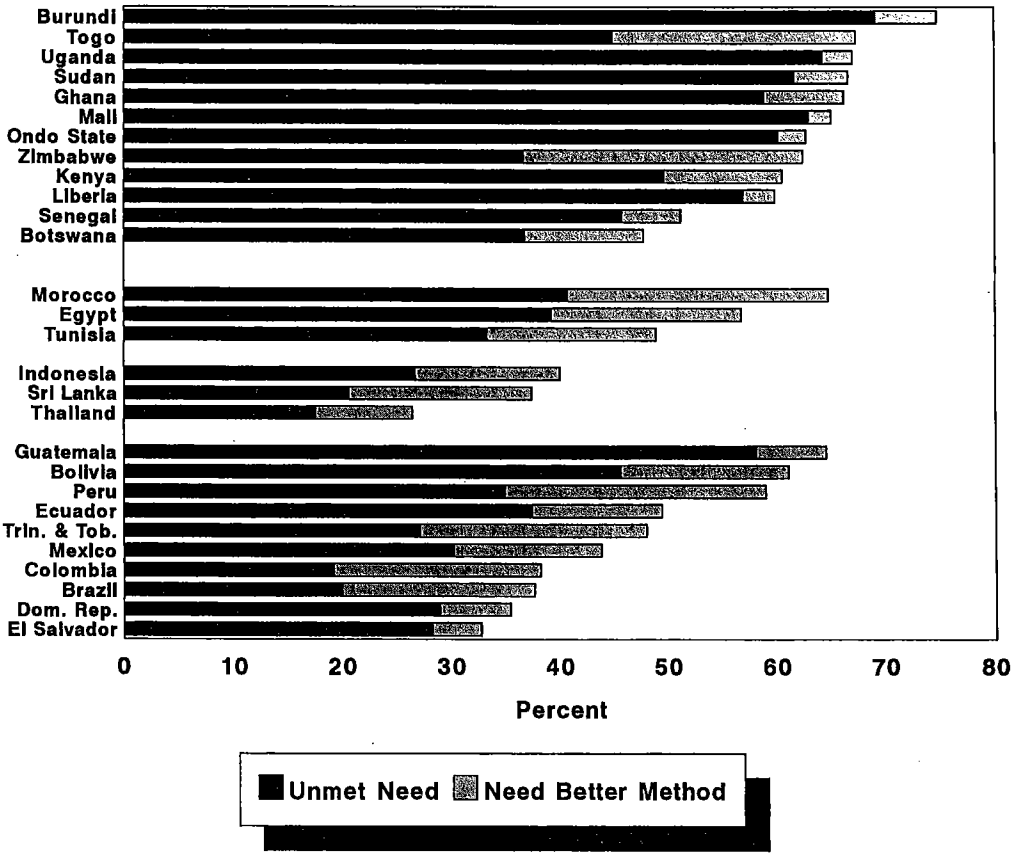
Table 4.7 Women in need of targeted family planning services

Percentage of women having an HRB-need or a preference-need for contraception, the percentage having a need for a better method of contraception, and the percentage in need of targeted family planning services, Demographic and Health Surveys, 1985-1990

Country	Unmet need that could either prevent HRB or spacing/limiting births as desired by women			Need for a better method of contraception			Percentage of women in need of targeted family planning services
	Spacing (1)	Limiting (2)	Total (3)	Pregnant due to method failure (4)	Spacers who should be limiters (5)	Total (6)	(7)
SUB-SAHARAN AFRICA							
Botswana	7.0	29.8	36.8	0.4	10.6	11.0	47.8
Burundi	14.8	54.4	69.2	NA	5.6	5.6	74.8
Ghana	14.0	44.9	58.9	NA	7.4	7.4	66.3
Kenya	9.1	40.6	49.7	NA	10.9	10.9	60.6
Liberia	16.1	40.9	57.0	NA	2.9	2.9	59.9
Mali	13.5	49.5	63.0	NA	2.1	2.1	65.1
Ondo State	11.5	48.7	60.2	NA	2.6	2.6	62.8
Senegal	9.0	36.8	45.8	NA	5.4	5.4	51.2
Sudan	12.6	49.1	61.7	NA	5.0	5.0	66.7
Togo	11.1	33.8	44.9	NA	22.5	22.5	67.4
Uganda	15.2	49.1	64.3	NA	2.8	2.8	67.1
Zimbabwe	5.9	30.8	36.7	NA	25.8	25.8	62.5
NORTH AFRICA							
Egypt	8.0	31.2	39.2	1.1	16.5	17.6	56.8
Morocco	8.1	32.6	40.7	1.5	22.6	24.1	64.8
Tunisia	7.2	26.1	33.3	1.1	14.5	15.6	48.9
ASIA							
Indonesia	8.3	18.4	26.7	0.3	13.0	13.3	40.0
Sri Lanka	6.9	13.7	20.6	1.2	15.6	16.8	37.4
Thailand	5.1	12.4	17.5	0.3	8.6	8.9	26.4
LATIN AMERICA/CARIBBEAN							
Bolivia	6.4	39.2	45.6	1.7	13.8	15.5	61.1
Brazil	4.1	15.9	20.0	1.6	16.0	17.6	37.6
Colombia	4.5	14.7	19.2	1.9	17.1	19.0	38.2
Dominican Rep.	9.8	19.1	28.9	1.6	4.9	6.5	35.4
Ecuador	8.7	28.7	37.4	1.3	10.7	12.0	49.4
El Salvador	8.1	20.1	28.2	0.5	4.0	4.5	32.7
Guatemala	12.1	46.0	58.1	0.6	5.9	6.5	64.6
Mexico	6.5	23.7	30.2	1.6	12.0	13.6	43.8
Peru	4.8	30.1	34.9	2.6	21.5	24.1	59.0
Trinidad & Tob.	6.5	20.6	27.1	1.7	19.2	20.9	48.0

Note: The percentage of women in need of targeted family planning services (Column (7)) consists of those with an unmet need that could either prevent the occurrence of HRB or meet the desire of women to space/limit their births (Column 3)) and those in need of a better method of contraception (Column (6). Information on pregnancy due to method failure is not available (NA) for sub-Saharan Africa (with the exception of Botswana).

Figure 4.5—Overall need for targeted family planning services among all women, Demographic and Health Surveys, 1985-1990



5 Conclusions

The prevention of maternal mortality must target at least one of these three possible points of intervention:

- the prevention of pregnancy,
- the prevention of complications among pregnant women, and
- the management of complications, once they occur (Freedman and Maine, 1992).

Successful implementation of any of these strategies would also result in improved child survival.

This report has focused on the first strategy, by proposing a broadened definition of unmet need for family planning that considers known mortality risks associated with maternal age, parity, and birth spacing. While this approach refines the population targeted for family planning services, it is more encompassing than previous definitions of unmet need. This more inclusive approach increases the unmet need for family planning by an average of 15 percentage points over conventional estimates based solely on women's desire to space and/or limit their births (a relative increase of 25 percent).

However, increasing contraceptive use among women at known risk requires changes in both attitudes and behaviors that can be difficult to attain. In addition, many women experiencing complications of pregnancy and childbirth fall outside of the easily identifiable, fertility-related risk categories. This report also presents DHS-I data on the antenatal and delivery care received by women surveyed and highlights the need for broader access to and utilization of such maternity services. The need for better maternal health services presents another important challenge.

These challenges call for a wide range of efforts giving considered thought to the process through which final goals are to be met. Expanding the range of contraceptive methods available and the quality of follow-up provided can increase the acceptability of family planning use. Operations research and studies of women's perspectives on their need for family planning play a major role in improving the quality and utilization of family planning information and contraceptive services. Ideally, one type of information family planning programs should emphasize is the negative health consequences of high-risk births. Health care planners and policymakers need to play a more active role in identifying women who are at risk and increasing their awareness of the health benefits of using contraception. For those women who do become pregnant, access to delivery care is of utmost importance given the often unpredictable nature of fatal complications. A combined approach involving both pregnancy prevention and problem management is necessary to reduce the level of maternal mortality in developing countries.

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Appendix

Summary of DHS Surveys, 1985-1990

Region and Country	Date of Fieldwork	Implementing Organization	Respondents	Sample Size	Supplemental Studies, Modules, and Additional Questions
SUB-SAHARAN AFRICA					
Botswana	Aug-Dec 1988	Central Statistics Office	All women 15-49	4,368	AIDS, PC, adolescent fertility
Burundi (Husband Survey)	Apr-Jul 1987	Département de la Population Ministère de l'Intérieur	All women 15-49	3,970	AM, SAI, adult mortality
Burundi	Apr-Jul 1987	Département de la Population Ministère de l'Intérieur	Husbands	542	KAP study
Ghana[1]	Feb-May 1988	Ghana Statistical Service	All women 15-49	4,488	AM, SM, WE
Kenya[2]	Dec-May 1988/89	National Council for Population and Development	All women 15-49	7,150	
Liberia	Feb-Jul 1986	Bureau of Statistics Ministry of Planning and Economic Affairs	All women 15-49	5,239	TBH, employment status
Mali	Mar-Aug 1987	Institut du Sahel USED/CERPOD	All women 15-49	3,200	AM, VC, childhood physical handicaps
Mali (Male Survey)	Mar-Aug 1987	Institut du Sahel USED/CERPOD	Men 20-55	970	KAP study
Ondo State, Nigeria	Sep-Jan 1986/87	Ministry of Health, Ondo State	All women 15-49	4,213	AM, TBH
Senegal	Apr-Jul 1986	Direction de la Statistique Ministère de l'Economie et des Finances	All women 15-49	4,415	AM, CD
Sudan	Nov-May 1989/90	Department of Statistics Ministry of Economic and National Planning	EMW 15-49	5,860	M, MM, female circumcision family planning services
Togo	Jun-Nov 1988	Unité de Recherche Démographique Université du Benin	All women 15-49	3,360	AM, SAI, marriage history
Uganda	Sep-Feb 1988/89	Ministry of Health	All women 15-49	4,730	AM, SAI
Zimbabwe	Sep-Jan 1988/89	Central Statistical Office	All women 15-49	4,201	AIDS, AM, PC, SAI, WE
NORTH AFRICA					
Egypt	Oct-Jan 1988/89	National Population Council	EMW 15-49	8,911	AM, CD, MM, PC, SAI, WE, women's status
Morocco	May-Jul 1987	Ministère de la Santé Publique	EMW 15-49	5,982	AM, CD, S
Tunisia	Jun-Oct 1988	Office National de la Famille et de la Population	EMW 15-49	4,184	AM, CD, S, SAI

[1]Data available for 943 husbands interviewed with a husband's questionnaire
[2]Data available for 1,133 husbands interviewed with a husband's questionnaire

CMW = currently married women
EMW = ever-married women

Region and Country	Date of Fieldwork	Implementing Organization	Respondents	Sample Size	Supplemental Studies, Modules, and Additional Questions
ASIA					
Indonesia	Sep-Dec 1987	Central Bureau of Statistics, National Family Planning Coordinating Board	EMW 15-49	11,844	PC, SM
Nepal (In-depth)	Feb-Apr 1987	New Era	CMW 15-49	1,623	KAP-gap survey
Sri Lanka	Jan-Mar 1987	Department of Census and Statistics, Ministry of Plan Implementation	EMW 15-49	5,865	AM, NFP
Thailand	Mar-Jun 1987	Institute of Population Studies Chulalongkorn University	EMW 15-49	6,775	AM, S, SAI
LATIN AMERICA & CARIBBEAN					
Bolivia	Mar-Jun 1989	Instituto Nacional de Estadística	All women 15-49	7,923	AM, CD, MM, PC, S, WE
Bolivia (In-depth)	Mar-Jun 1989	Instituto Nacional de Estadística	All women 15-49	7,923	Health
Brazil	May-Aug 1986	Sociedade Civil Bem-Estar Familiar no Brasil	All women 15-44	5,892	AM, PC, SM, abortion, young adult use of contraception
Colombia	Oct-Dec 1986	Corporación Centro Regional de Población, Ministerio de Salud	All women 15-49	5,329	AM, PC, SAI, SM
Dominican Republic	Sep-Dec 1986	Consejo Nacional de Población y Familia	All women 15-49	7,649	NFP, S, SAI, SM, family planning communication
Dominican Republic (Experimental)	Sep-Dec 1986	Consejo Nacional de Población y Familia	All women 15-49	3,885	
Ecuador	Jan-Mar 1987	Centro de Estudios de Población y Paternidad Responsable	All women 15-49	4,713	SAI, CD, employment
El Salvador	May-Jun 1985	Asociación Demográfica Salvadoreña	All women 15-49	5,207	S, TBH
Guatemala	Oct-Dec 1987	Instituto de Nutrición de Centro América y Panamá	All women 15-44	5,160	S, SAI
Mexico	Feb-May 1987	Dirección General de Planificación Familiar, Secretaría de Salud	All women 15-49	9,310	NFP, S, employment
Peru	Sep-Dec 1986	Instituto Nacional de Estadística	All women 15-49	4,999	NFP, employment, cost of family planning
Peru (Experimental)	Sep-Dec 1986	Instituto Nacional de Estadística	All women 15-49	2,534	
Trinidad and Tobago	May-Aug 1987	Family Planning Association Trinidad and Tobago	All women 15-49	3,806	AM, NFP, breastfeeding

AIDS acquired immune deficiency syndrome
AM anthropometric measurements
CD causes of death (verbal report of symptoms)
S sterilization
M migration
MM maternal mortality
NFP natural family planning
PC pill compliance
WE women's employment
SAI service availability information
SM social marketing
TBH truncated birth history
VC value of children